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Division of Communication Sciences and Disorders

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**THE COMMUNICATION BETWEEN LOW-RISK
LOW BIRTH WEIGHT PREMATURE INFANTS
AND THEIR MOTHERS IN THE FIRST YEAR OF
LIFE: A DESCRIPTION OF FOUR CASES**

by

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Submitted to the University of Cape Town

In fulfilment of the requirements for the degree

MSc in Speech-Language Pathology

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Co-supervisor: Ass. Prof Pat Mayers

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Declaration

I,, hereby declare that the work on which this dissertation/thesis is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

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“From small beginnings come great things”

-American proverb-

Glossary

Bronchopulmonary dysplasia (BPD): A chronic, potentially reversible lung disease of prematurely born children who have required mechanical ventilation and increased inspired oxygen concentrations in the first weeks of life (Rossetti, 2001).

Extremely low birth weight (ELBW) infant: A child weighing less than 1000 grams at birth (Zegers-Hochschild et al., 2009).

Full-term/term infant: A child born at more than 36 weeks of gestation (Rossetti, 2001).

High-risk: Presence of neurological, physical, congenital or sensory difficulties (Rossetti, 2001).

Low birth weight (LBW) infant: A child weighing less than 2500 grams at birth (Rossetti, 2001).

Low-risk: No major neurological, physical, congenital or sensory difficulties (Rossetti, 2001).

Premature or preterm infant: A child born at less than 37 weeks of gestation (Rossetti, 2001).

Very low birth weight (VLBW) infant: A child weighing between 1000 and 1500 grams at birth (Zegers-Hochschild et al., 2009).

In this study the format 2,6 refers to the children's chronological ages: 2 years, 6 months.

Abstract

There has been a global increase in survival rates of premature infants due to advances in medical technology. Premature infants are known to be at risk for developmental problems including communication delays and disorders. Speech-Language Pathologists have an important role to play in the assessment and management of premature infants, especially due to the high prevalence of premature births in South Africa. The bonding and attachment experiences of premature infants and their mothers are often challenged, further placing these infants at risk for communication difficulties. This study aimed to explore the communication between low-risk low birth weight premature infants and their mothers at three points in the first year of life. A longitudinal study was conducted where four mother-infant dyads were investigated. Subjective maternal reports were obtained through semi-structured interviews while objective data were gathered using the Rossetti Infant-Toddler Language Scale (RITLS) and an adapted version of the Observation of Communicative Interaction Scoring Sheet (OCI). The data was descriptively analysed and presented as four case studies. The RITLS showed two infants with typical communication skills and two infants who experienced slight delays with aspects of their communication from the second to the third visit. During the interviews, the mothers reported that they helped their infants communicate through physical contact such as holding, breastfeeding and positioning and through verbal exchanges such as talking and singing. All mothers were observed interacting effectively with their infants when using the adapted OCI. Risk and protective factors for early communication development are discussed in relation to these findings. Using the transactional model, the bidirectional interplay of the infants' developmental skills and their mothers' interactive styles are also discussed. The information obtained in this study may contribute to the way in which Speech-Language Pathologists make specific recommendations during their contact with premature infants and their families, specifically in the South African context.

Keywords: Prematurity; Low-risk low birth weight premature infants; Communication development; Attachment; Mother-infant dyads; Transactional framework; Speech-Language Pathologists

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INTRODUCTION AND LITERATURE REVIEW

1.1 Introduction

Twenty years ago infants born with a gestational age of less than 28 weeks were not expected to survive at all, while infants born later and with higher birth weights had less than 50% chance of survival (Chesney & Champion, 2008). Today, the expected survival rate of premature infants has increased considerably to 85-90% (Chesney & Champion, 2008) due to medical and technological improvements. Premature births tend to be higher in developing countries with approximately 85% of preterm births occurring in Africa and Asia (Beck et al., 2010). The higher rates of premature births in Africa may be due to intrauterine infections and a lack of availability of drugs and other resources (Beck et al., 2010).

It is widely acknowledged that premature infants are at an increased risk of experiencing developmental difficulties (Briscoe & Gathercole, 2001; Limperopoulos et al., 2008), and more specifically communication delays and disorders. Premature birth often acts as a stressor in the lives of the baby's family and can potentially impair the early interactions between the child and his or her parents (Forcada-Guex, Pierrehumbert, Borghini, Moessinger & Muller-Nix, 2006). Speech-Language Pathologists (SLPs) have an important role to play in the assessment and management of premature infants and their families from the time of birth (ASHA, 2004). SLPs are particularly important in South Africa due to the high prevalence rates of premature birth (McInroy & Kritzinger, 2005).

Limited research has focused on the impact of premature birth on early communication development and mother-infant interactions in South Africa. This study therefore aimed to describe the communication between low-risk low birth weight premature infants and their mothers in the first year of life. A longitudinal study was conducted where the data collection was performed over three home visits namely T1 (one week post infants' discharge from Neonatal Intensive Care Unit (NICU)), T2 (three months corrected age) and T3 (six months corrected age). Corrected age is the age from the expected date of birth (Rose, Feldman &

Jankowski, 2002) and is normally used during assessment instead of chronological age.

The four objectives of this study are:

1. To describe the mothers' perceptions of their premature infant's communication at T1, T2 and T3
2. To describe the communication skills of low-risk LBW premature infants at T2 and T3.
3. To describe the mothers' perceptions of their role in the communication of their premature infants at T1, T2 and T3.
4. To describe the communication of mothers with their premature infants at T1, T2 and T3.

Four mother-infant dyads were investigated. The researcher used individual semi-structured interviews to address the first and third objectives; the Rossetti Infant-Toddler Language Scale (Rossetti, 2005) was administered for the second objective and an adapted version of the Observation of Communicative Interaction Scoring Sheet (Klein & Briggs, 1987) was used to meet the last objective.

This study consists of six interdependent chapters. Chapter 1 introduces prematurity and gives an overview of the literature regarding the developmental difficulties faced by premature infants and children. The second chapter outlines the related processes of communication development and mother-infant interaction and introduces three theoretical frameworks (attachment theory, the transactional and ecological models) which can be used to understand these processes. Chapter 3 follows with a description of the methodology used in this study. This chapter also includes the research process and the ethical procedures that were considered. A detailed description of the findings is presented in chapter four, in the form of four case studies. Chapter 5 discusses the participants' similarities and differences and relates these to the reviewed literature and key theoretical frameworks. Finally, Chapter 6 outlines limitations and clinical implications of this study as well as recommendations for future research.

1.2 Literature review

Advances in medical technology and neonatal intensive care have resulted in an increased survival of preterm infants (Hall & Brinchmann, 2009). Consequently, preterm infants are surviving at younger gestational ages and with lower birth weights. The number of preterm infants has increased by 20% in the past twenty years in the United States of America (Ment & Vohr, 2008). The global prevalence of preterm birth is 9.6% of live births (March of Dimes, 2009). According to the World Health Organisation (WHO), the highest rate of preterm birth is in Africa (March of Dimes, 2009). There is a high prevalence of preterm birth and low birth weight infants in South Africa (Pattinson, 2003) possibly due to the significantly greater number of deliveries and fertility levels as compared to other parts of the world (March of Dimes, 2009). The low birth weight rate in South Africa is approximately 16% (Greenfield, Rhoda & Pattinson, 2011). The specific breakdown for rates of prematurity in South Africa is not available in the literature.

Around the world, improved survival rates have led to an increase in subsequent neurodevelopmental difficulties and communication delays and disorders, as infants with younger gestational ages are at higher risk of having medical and neurological complications (Limperopoulos et al., 2008; Rossetti, 2001). Studies have shown that even infants without neurological disabilities show signs of communication difficulties (Crosbie, Holm, Wandschneider & Hemsley, 2011; DeHaan, Bauer, Georgieff & Nelson, 2000). The association between prematurity and communication difficulties is not viewed as a simple cause and effect linear model, but as a complex interplay of mutual influences that exist between the child and his or her environment such as socio-economic status, race, maternal education and age, and neurological and medical complications (Lewis et al., 2002).

The current recommendation from the American Academy of Pediatrics (AAP) is adjusting for prematurity until two years of age (Bernbaum, Campbell & Imaizumi, 2009). D'Agostino (2010) conducted a review of articles where the use of chronological age is compared to use of adjusted age for assessment of premature infants. The results support the recommendations from the AAP, whereby premature infants should be assessed using their adjusted/corrected age for a minimum of 12

months. Corrected age is the age from the expected date of birth (Rose et al., 2002) and is normally used during assessment instead of chronological age.

Premature infants are at risk for a range of developmental delays and difficulties. A summary of studies investigating the effects of prematurity on development is presented in Tables 1 and 2.

Table 1

Developmental difficulties experienced by premature infants and children

Area of development	Authors	Comments
<u>Attachment</u>	Borghini, Pierrehumbert, Miljkovitch, Muller-Nix, Forcada-Guex & Ansermet, 2006	Secure attachment representations were negatively affected in mothers of both low-risk and high-risk premature infants as compared to the control group at 6 months and 18 months.
	Brisch et al., 2005	VLBW infants with neurological difficulties are at higher risk of developing an insecure quality of attachment.
	Fuertes, Lopes-dos-Santos, Beeghly & Tronick, 2009	At 12 months, 35% of healthy low-risk premature infants were classified as insecure-avoidant and 31% as insecure-resistant, therefore showing a high prevalence of insecure attachment.
	Keilty & Freund, 2005	Caregiver-child interaction was significantly lower in the extremely premature dyads as compared to full-term dyads and was also related to later child interaction.
	Montirosso, Borgatti, Trojan, Zanini & Tronick, 2010	Healthy premature infants exhibit a higher level of stress and have different regulatory and interactive patterns as compared to infants born at term.
<u>Behavioural and social</u>	Forcada-Guex et al., 2006	At 6 months, mother-infant interactional behaviour was recorded and two patterns emerged (cooperative mothers made up of sensitive mothers and controlling mothers). At 18 months, infants whose mothers were cooperative at 6 months showed better social and communication outcomes.
<u>Attention</u>	Bhutta, Cleves & Casey, 2002	A meta-analysis of 16 studies showed that preterm infants present with an increased incidence of attention deficit hyperactivity disorder (ADHD) compared to the control group.
	Rose, Feldman & Jankowski, 2001	Preterm infants showed less efficient patterns of attention than full-term infants in the first year of life.
<u>Cognitive</u>	Bhutta et al., 2002	A meta-analysis of 15 studies showed that preterm infants present with lower cognitive scores compared with term-born controls.
	Emancipator et al., 2006	Preterm infants present with a high prevalence of sleep-disordered breathing leading to poorer cognitive functions.

	Sansavini, Guarini, Alessandroni, Faldella, Giovanelli & Salvioli, 2007	Preterm infants present with persisting cognitive difficulties at 3,6 years.
<u>Memory</u>	Briscoe & Gathercole, 2001	Premature children are at an increased risk of everyday memory deficits.
	Isaacs et al., 2000	VLBW preterm infants have a smaller hippocampal volume leading to memory deficits.
<u>Information processing</u>	Rose, Feldman & Jankowski, 2002	Preterm infants present with slower processing speeds than full-term infants in the first year of life.
<u>Autistic Spectrum Disorders</u>	Limperopoulos et al., 2008	26% of VLBW premature infants showed early autistic features between 18-24 months of age.
<u>Motor skills</u>	Lewis et al., 2002	Premature infants with BPD present with poorer gross and fine motor skills when compared to VLBW premature and term infants.
<u>Academic</u>	Isaacs et al., 2000	VLBW preterm infants have significantly more numerical deficits compared to full-term infants.
	Lindeke, Stanley, Else & Mills, 2002	Less than half of the participants (n=22) received special school services (maths, speech therapy, reading assistance). Length of NICU stay correlated with academic performance.
	Roberts, Bellinger & McCormick, 2007	Premature infants are at higher risk for mathematical and reading difficulties during school years.

Table 1 shows that premature infants are at risk for cognitive, behavioural, social, emotional, motor and academic problems. Of particular interest to the present study, premature birth has been shown to potentially impair bonding and attachment between the mother and her infant, thus challenging healthy mother-infant interactions. Premature infants have been reported to be at risk of developing insecure patterns of attachment with their mothers (Borghini et al., 2006). Attachment behaviours are closely linked to the development of communication, which can also be affected in premature infants. Table 2 focuses specifically on communication difficulties faced by premature infants and children.

Table 2

Communication difficulties experienced by premature infants and children

<u>Speech and Language Disorders</u>	Briscoe & Gathercole, 2001	Preterm children presented with vocabulary delays when compared to children born at term.
	Cattani, Bonifacio, Fertz, Iverson, Zocconi & Caselli, 2010	Premature infants showed a delay in terms of action/gesture production, word comprehension and word production at 1-2 years of age.
	Caravale, Tozzi, Albino & Vicari, 2005	Low-risk premature children showed vocabulary delays at 3-4 years of age.
	Crosbie et al., 2011	Children born preterm showed more difficulties in formulating an oral narrative than full-term infants during the upper primary school years.
	Cusson, 2003	Premature infants experience delays of 3-5 months in terms of receptive and expressive language at 26 months corrected age.
	Emancipator et al., 2006	Preterm infants present with higher rates of language comprehension difficulties as compared to full-term infants.
	Holditch-Davis, Bartlett & Belyea, 2000	23 out of 39 premature infants were reported to have a language concern.
	Lewis et al., 2002	Premature infants with BPD presented with reduced articulation and receptive language skills when compared to VLBW and term infants. The BPD and VLBW group both showed poorer receptive and expressive language skills than the term infants.
	Rvachew, Creighton, Feldman & Sauve., 2005	VLBW premature infants with BPD produced significantly less canonical babbling than full-term infants; VLBW premature infants without BPD also produced less canonical babbling than full-term infants but caught up with them by 18 months of age.
	Sansavini et al., 2007	Premature infants present with poorer grammatical abilities as compared to full-term infants and these difficulties persist till 3,6 years of age.
	Stolt, Haataja, Lapinleimu & Lehtonen, 2009	VLBW premature infants present with slower growth of receptive lexicon and have poorer language skills at 2 years corrected age.
<u>Hearing Disorders</u>	Cunningham & Cox, 2003	Birth weight of less than 1500g is a high-risk indicator for hearing loss.
	Gray, Sarkar, Young & Rogers, 2001	All preterm infants are at risk of hearing loss, but those with BPD have a higher incidence of persistent conductive hearing loss in the second half of their first year.
	Hille, Van Straaten & Verkerk, 2007	The prevalence of hearing loss was 3.2% in premature infants (born at less than 30 weeks gestation and/or a birthweight of less than 1000g) compared to a prevalence of 0.1% in the normal population.

	Lamonica, Carlino & Alvarenga, 2010	Premature infants presented with significantly lower scores in terms of expressive hearing and receptive hearing when compared to full-term infants.
	Valkama, Laitakari, Tolonen, Vayrynen, Vainionpaa & Koivisto, 2000	High-risk premature infants showed significantly higher failure rates during hearing screenings (ABR, TEOAE and FF) than full-term infants.

These studies show that premature birth can contribute to a broad range of communication difficulties. These difficulties start to be present from the first year of life (for example, during babbling phases) (Rvachew et al., 2005) and sometimes persist till school years (Crosbie et al., 2011). Preterm infants showed poorer skills in terms of both language comprehension and expression involving vocabulary (Briscoe & Gathercole, 2001), lexicon (Stolt et al., 2009), and narrative (Crosbie et al., 2011). Additionally, the prevalence of hearing loss is higher in this population, and could negatively affect other areas of communication development such as articulation skills (Lewis et al., 2002). SLPs have an important role to play in assisting families of premature infants to reduce the impact of communication problems on these infants, and need to understand about the developmental trajectory and its implications for premature babies.

The effects of prematurity have been investigated at different ages, using different methodologies and with various ‘degrees’ of prematurity. The following sections focus on each of these three areas.

Ages of children studied

Significant research has focused on long term effects of prematurity through follow up studies during school years (Arnaud, et al., 2007; Bhutta et al., 2002; Crosbie et al., 2011; Lewis et al., 2002; Magill-Evans, Harrison, Van der Zalm & Holdgrafer, 2002; Marlow, Wolke, Bracewell & Samara, 2005; Mikkola et al., 2005; Roberts et al., 2007). Sansavini et al. (2007) investigated the cognitive skills of VLBW preterm infants born with a gestational age of less than 33 weeks and compared them to full-term infants. The authors documented persisting cognitive difficulties in these preterm children when assessed at 3,6 years of age. Briscoe and Gathercole (2001) investigated the memory and cognitive ability of prematurely born infants, ranging from 4,11 to 5,11 years of age. The children studied were born at or before 32 weeks

gestation and were compared to children born at term. This study showed that the preterm infants exhibited a decreased story recall and are at an increased risk of presenting with everyday memory difficulties. Marlow et al. (2005) conducted research on extremely prematurely born infants (less than 26 weeks gestation) and indicated the presence of cognitive difficulties at six years of age when compared to full-term controls. Bhutta et al. (2002) conducted a meta-analysis involving 15 studies on cognitive skills and 16 studies on behavioural skills and found that preterm children had lower cognitive skills as well as an increased incidence of ADHD when compared to controls at school age. Recent research into toddlers suggests that even premature infants who are at low-risk cannot be assumed to have caught up with their peers in terms of cognitive development (DeHaan et al., 2000). These studies show the effects of cognitive, memory and attention difficulties in premature infants in pre-school and primary school years.

Caravale et al. (2005) conducted a study on low-risk premature infants born between 30 to 34 weeks of age and compared them to a control group. The children presented with vocabulary delays when assessed at three to four years of age. Crosbie et al. (2011) investigated the narrative skills of 15 preterm children born at less than 33 weeks gestational age and with no physical or sensorineural difficulties, and compared them to full-term peers during primary school years. The authors found that children born preterm demonstrated difficulties in formulating a narrative even though they produced a similar amount and used similar structural aspects to the children born full-term. The findings from the above studies suggest that low-risk premature infants show subtle and specific linguistic deficits that may frequently be overlooked.

There are fewer studies that have been conducted during the first two years of life compared to follow-up studies during pre-school and primary school years (Fosten-Cohen, Edgin, Champion & Woodward, 2007; Fuertes et al., 2009; Hall & Brinchmann, 2009; Peña, Pittaluga & Mehler, 2010; Rose et al., 2002; Rvachew et al., 2005). Cattani et al. (2010) showed that premature infants of various gestational ages and birth weights exhibited a delay in terms of action/gesture production, word comprehension and word production when they were 12 to 24 months of age.

Limperopoulos et al. (2008) studied 91 high-risk VLBW premature infants between the ages of 18 and 24 months and indicated that 26% of these infants showed early autistic features. The authors also documented a strong correlation between prematurity and behavioural, socialisation and communication difficulties. It should be noted that the researchers in this study used a screening instrument designed to identify children at risk for autism, but they could not diagnose any of the participants in the study with autism. Additionally since only high-risk VLBW premature infants were included in this study, the results cannot be generalised to all populations of premature infants.

Together the group of studies described show that communication deficits frequently occur during the first two years of life in the population of prematurely born infants and could persist or emerge later in childhood (Magill-Evans et al., 2002).

Methodology used in other studies

It is common for researchers to use a quantitative approach where a premature group is compared to a group of children born at term (Anderson & Doyle, 2003; Briscoe & Gathercole, 2001; Caravale et al., 2005; Cattani et al., 2010; Crosbie et al., 2011; Lewis et al., 2002; Limperopoulos et al., 2008; McCormick et al., 2006; Mikkola et al., 2005; Rose et al., 2001; Rose et al., 2002). In a longitudinal study, Rose et al. (2001) investigated the patterns of attention of preterm infants who weighed less than 1750 grams at birth, and compared them to full-term infants over the first year of life. The authors found that preterm infants showed less efficient patterns of attention as they presented with longer look durations, slower shift rates, more off-task behaviour and lower novelty scores. The authors in another longitudinal study (Rose et al., 2002) also showed that in the first year of life, preterm infants exhibit significantly slower processing speeds than full-term infants. In a prospective follow-up study, Lewis et al. (2002) investigated the speech, language and motor skills of premature infants with BPD, VLBW premature infants and infants born at term. These authors found that when they were eight years of age, the infants with BPD showed poorer articulation and gross and fine motor skills as compared to VLBW premature infants and term infants. Both the BPD and VLBW groups presented with reduced receptive and expressive skills when compared to the infants born full-term.

Fewer studies have looked at the development of a small number of participants using a qualitative method. McInroy and Kritzinger (2005) conducted a case study of a premature infant from birth to discharge from the NICU where the communication developmental steps were described. A phenomenological study explored the lived experiences of parents providing Kangaroo Mother Care (KMC) to their preterm infants (Leonard & Mayers, 2008). These two studies were both conducted in South Africa. No published studies in South Africa looking at the development of premature infants over an extended period of time could be sourced.

'Degree of prematurity'

Different definitions of prematurity with varying criteria for gestational ages and birth weights have been used in research studies, making the comparison of results difficult. The developmental outcomes of VLBW (between 1000g and 1500g) and ELBW (less than 1000g) premature infants, have been the subject of much research (Anderson & Doyle, 2003; Briscoe & Gathercole, 2001; Forcada-Guex et al., 2006; Keilty & Freund, 2005; Lewis et al., 2002; Limperopoulous et al., 2008; McInroy & Kritzinger, 2005; Mikkola et al., 2005; Rose et al., 2001; Rose et al., 2002; Saigal, 2000).

Keilty and Freund (2005) conducted a longitudinal study on ELBW premature infants, and established that their interaction patterns were consistently lower over three years compared to a cross-sectional sample of children born at term. Saigal (2000) showed that VLBW and ELBW premature infants continue to lag behind their peers born at term in terms of cognitive, learning, emotional, behavioural and neurological abilities even during adolescent years. Foster-Cohen et al. (2007) conducted a longitudinal study of high-risk preterm children born at gestational ages of less than 33 weeks and birth weights of less than 1500g, and compared them to a sample of children born at term. The study investigated the early language development of the preterm children throughout the perinatal period, at term and within two weeks of their first and second birthday. The results of this study show that the VLBW and ELBW preterm children presented with shorter utterances, limited vocabulary, and less use of morphological and syntactic complexity when compared to the children born at term.

Limited literature is available on the developmental outcomes of healthy LBW premature infants, typically referred to as low-risk LBW premature infants. Fuertes et al. (2009) conducted a longitudinal study of healthy LBW and VLBW preterm infants, exploring their attachment status in the first year of life. They reported a high prevalence of insecure attachment in this group of healthy preterm infants. Magill-Evans et al. (2002) investigated the cognitive development of healthy prematurely born LBW infants and compared them to full-term infants at 10 years of age. The children born prematurely displayed significantly poorer cognitive skills and lower receptive and expressive language skills compared to the children born at term at 10 years of age. It can therefore be noted that the early language delays of low-risk LBW premature infants may persist till school years. The above studies indicate the presence of speech and language deficits in both low and high-risk premature infants.

There is a substantial body of literature on the typical communication development of infants born at term. Few studies have investigated the communication development of premature infants in South Africa. Most studies use a quantitative approach and include high-risk infants and few studies in South Africa have investigated low-risk premature infants using a qualitative approach. Some studies focus on the interaction patterns between mothers and their premature babies, while others focus on the speech and language outcomes of premature infants. Much of the research focuses on longitudinal development in follow-up studies and does not focus on the early months of life. The early bonding and attachment experiences between mothers and infants can have an impact on the infant's communication development. Little is known about the communication development of low-risk premature infants in the South African context including a focus on the interaction patterns in the early months of life between the mother and her infant.

1.3 Conclusion

This chapter has introduced prematurity and outlined the developmental difficulties that may be faced by premature infants. Reviewed literature relating to prematurity has been presented in terms of three main areas: (1) the ages of children studied, (2) the methodology used in other studies and (3) the degree of prematurity. The next

chapter will introduce key theoretical frameworks used to understand mother-infant interactions. The relationship between communication development and mother-infant interaction will be discussed by integrating the attachment theory, transactional and ecological models.

THEORETICAL FRAMEWORK

This chapter introduces the bidirectional relationship between communication development and mother-infant interaction. Theoretical frameworks such as the attachment theory, the transactional model and the ecological model are introduced and applied specifically to this study.

2.1 Communication development and mother-infant interaction

Communication is a two-way process involving “the sharing of ideas between a sender who encodes a message and a receiver who decodes the message” (McLaughlin, 2006, p.4) (Figure 1).

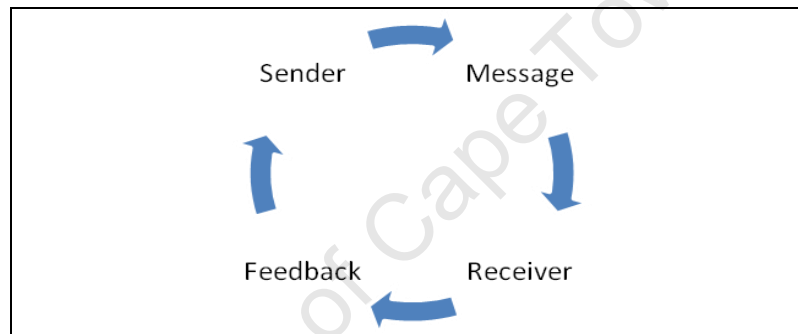


Figure 1: Process of communication
(McLaughlin, 2006)

Communication occurs through means such as facial expressions, eye contact, body language, gestures, speech and written language. Rossetti (2005) classifies communication development of children from birth to 36 months into six pre-verbal and verbal areas namely: interaction-attachment, pragmatics, gesture, play, language comprehension and language expression.

Communication development and mother-infant interaction are linked (Rossetti, 2005). For example, a child with a motor impairment might have difficulty organising the fine movements required for smiling and making eye contact. The parents’ attempts to interact with their child might be unrewarding and they may unintentionally decrease the number of social exchanges with the child, thus providing fewer opportunities for interaction. It is documented that orphaned infants

who are institutionalised could be exposed to minimal interactions with communication partners which places them at risk for communication delays and disorders (Levin & Haines, 2007). These two examples show the intrinsic link between communication development and mother-infant interaction. Furthermore, there are many factors (such as socio-economic status (SES), maternal level of education, maternal age, race, medical complications) that have been reported to impact on both communication development and interaction (Shonkoff & Meisels, 2000). Figure 2 depicts this relationship which is discussed further in the paragraphs that follow.

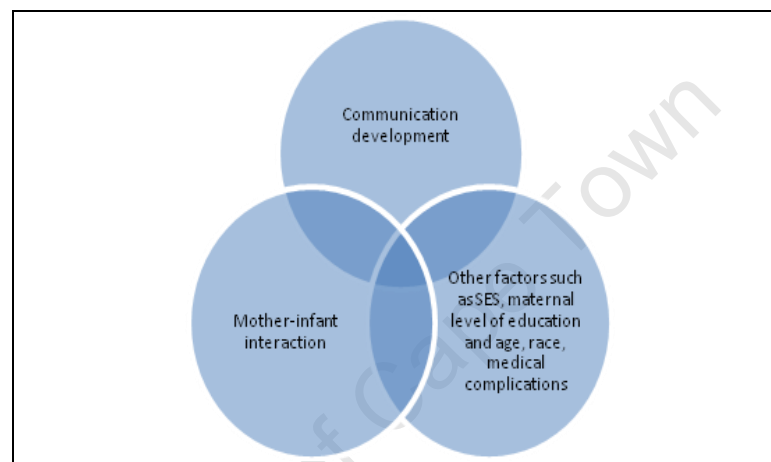


Figure 2: Link between communication development and mother-infant interaction

Rossetti (2005) classifies communication development into six main areas. These areas will be briefly discussed and exemplified below.

Interaction-Attachment refers to the reciprocal relationship between the mother and her infant (Rossetti, 2005). An example is a mother making eye contact in response to her child crying, which results in soothing the child. Pragmatics is the way the child uses language within a social context (Rossetti, 2001). For example, an infant produces different cries (such as hunger cry) to serve different purposes in the first few months of life. Gesture is the use of body movement to express thought before verbal language emerges (Rossetti, 2005). Gesture is not expected to be present in the first six months of life. Play refers to “the changes in a child’s play that reflect the development of representational thought” (Rossetti, 2005, p.9). Examples of play in young babies are reaching and banging of objects. Language comprehension refers

to the understanding of language, while language expression refers to the use of preverbal and verbal language (Rossetti, 2001). A child can show understanding of language by attending to his/her mother's voice, and show language expression by vocalising in response to hearing his/her mother's voice.

Rossetti (2001, p.215) defines prelinguistic communication as "intentional communication behaviours that do not involve words". Prelinguistic communication is important as it lays the foundation for later linguistic communication development. It also allows for communication to become more complex with increasing infant-caregiver interactions. Presymbolic communication which is another term used to describe the prelinguistic stage allows the child to learn language, so that early behaviours used by infants become intentional and contribute to their overall language communication development (Owens, 2005).

Several prelinguistic skills such as turn taking, eye contact and joint reference are developed between the infant and the communication partner during the first six months of life (McLaughlin, 2006). Turn taking involves the sharing of turns between mother and infant while vocalising (Fletcher & MacWhinney, 1995). Eye contact refers to the establishment of direct eye gaze between the mother and the infant (Fletcher & MacWhinney, 1995). Joint reference is defined as the "achievement of shared attention on an object or event" between the child and the conversational partner (Owens, 2005, p.57). These skills become more complex over time as the child develops and are all expected to be present by six months of life (Fletcher & MacWhinney, 1995). These are important for the formulation of words and sentences that commonly occurs between 12 and 24 months (Fletcher & MacWhinney, 1995).

Infants start babbling at around six months of age. It has been reported that babbling directly or indirectly influences the development of spoken language. Fletcher and MacWhinney (1995) provide three reasons as to why babbling is an important precursor of language development. Firstly, several studies have shown that the initial lexicons of young infants correlate with their phonological development at three years of age. A connection might also exist between the onset of babbling and

lexical development. Lastly, infants who were not given an opportunity to babble audibly seem to show less complex vocalisation at a later stage (Fletcher & MacWhinney, 1995). Owens (2005) has also indicated that babbling promotes social interchange between mothers and their infants. Delays in babbling can have an effect on the development of language, and such is the case with infants with limited interaction. These reasons show that the first six months of life are crucial for the language and lexical development of infants at later stages.

There is an orderly sequence in which communication development occurs. For example, a child learns to babble before he/she learns to use single words. Children also develop specific skills at predictable ages (Owens, 2005). The culmination of communication development is typically first words at the end of the first year. However, there is much happening in the first year which precedes that milestone. The communication development of a typically developing child in the first year of life is outlined in Table 3.

Table 3

Typical communication development in the first year of life

Age in months	Social-emotional	Pragmatics, Gesture, Play, Language	Interaction-attachment
New-born	Cries for assistance.	Aware and reacts to environmental sounds. Makes vegetative sounds.	Fixes gaze on mother's mouth or eyes.
1	Smiles reflexively.	Responds to mother's voice. Makes pleasure sounds.	Establishes eye contact with mother.
2	Unselective social smile.	Distinguishes between different speech sounds. Makes guttural sounds. Starts cooing.	Associates people with behaviours (for e.g. mother and feeding).
3	Selective social smile.	Listens to new sounds and looks for sources of sounds.	Vocal turn-taking appears.
4	Laughs when played with.	Responds to changes in tone, pitch and loudness. Vocal play and marginal babbling start.	Conversational turn-taking between mother and child.
5	Starts to display anger. Frolics when played with.	Recognises and responds to own name. Imitates some sounds Explores the environment by mouthing and touching.	
6	More sociable.	Prefers people games. Uses a variety of volume, pitch and tone of voice. Reduplicated and non-reduplicated babbling emerge.	
7-12	Expresses different emotions.	Starts responding to requests. Imitates play. Uses social gestures. Babbling becomes more complex (more consonant and vowel combinations). First meaningful word appears around 1 year.	Shows clear attachment to mother.

Compiled from Cunningham & Cox (2003); McLaughlin (2006); Owens (2005); Rossetti (2001)

Mother-infant interactions vary amongst different cultural and social groups (Owens, 2005). For example, in hunter-gatherer cultures, the mother and child have little face-to-face interaction as the baby is carried on the carer's back in a sling. It has been reported that these babies show minimal crying as the mother normally attends to the child's needs before he/she starts crying (Rossetti, 2001). Keller, Borke, Lamm, Lohaus and Yovsi (2011) analysed the verbal and nonverbal strategies used by two distinct cultural communities during the first three months of life. The researchers compared face-to-face contact and body contact over the first 12 weeks of life in

German urban and Cameroonian Nso farming mother-infant interactions. The authors also assessed maternal discourse during mother-infant interactions when the infants were 4, 8 and 12 weeks of age. The study showed that German mothers showed significantly more face-to-face contact during free-play interactions as compared to the Cameroonian mothers. Face-to-face contact is normally increased in Western populations such as German mothers due to their infants' growing ability to maintain facial exchange which in turn reinforces the mothers' interest in eye contact. In Cameroon, face-to-face contact is not considered as a priority by the parents. The Cameroonian mothers were however noted to use more body contact with their infants in the first three months of life as body contact is regarded as an indicator of good parenting in their community. German mothers showed a decrease in body contact as their infants grew so as to allow them to become more physically independent over time. Studies by Wang, Leichtman and Davies (2000) and Keller, Demuth and Yovsi (2008) found that mothers from Euro-American backgrounds focus more on their infant's mental states and preferences while mothers from interdependent cultures such as in China or Cameroon focus more on the social context, moral obligations and respect.

Vigil (2002) studied the variations in attention regulation during interactions of five British mother-infant dyads and five Chinese-immigrant mother-infant dyads. Two styles of attention regulation emerged when the infants were 9 and 12 months of age; British mothers responded to their infants' behaviours by following their lead while Chinese mothers directed their infants' attention. At 9 months, the British mothers also maintained their attention longer to what their infants' initiated while the Chinese mothers often disengaged themselves from the activity. In terms of object manipulation, Chinese mothers attempted to show their infant how to play with a toy by manipulating the object and the infant's hands. British mothers were found to allow their infants to be more exploratory with their toys. These studies demonstrate how mother-infant interactions are culture-specific and how mothers in different cultures begin to use particular styles of interaction with their infants from a very young age.

Despite cultural differences, there are also many similarities in interactional patterns between mothers and infants of different cultural groups. For example, parents use intonation patterns consisting of higher pitch, wide variability in pitch, shorter utterances and longer pauses in English, French, Italian, German and isiXhosa (Rossetti, 2001).

There have been contradictory findings on infants' preferences for motherese, also known as baby talk (BT), or for adult-directed speech (ADS). Baby talk is defined as modifications in prosody, syntax, semantics and pragmatics used by adults when talking to infants (Singh, Morgan & Best, 2002). Prosodic modifications within BT are often characterized by increased pitch, variations in intonations, reduced speech rate, elongated vowels, long pauses, and prosodic repetitions. Other characteristics include imitations of the infants' vocalisations, repetitions, and reduced syntactic and semantic complexity. This type of speech is also sometimes accompanied by visual interactions, gestures and touch (Bendixen & Pelaez, 2010).

Falk (2004) reported that infants prefer BT over ADS. Bendixen and Pelaez (2010) found that the use of BT resulted in higher canonical babbling in a 12-month old infant. These findings indicate that specific maternal vocal styles play an important role in shaping early development of infant speech. Chang and Thompson (2011) suggested that BT has a particular effect on the listener: to bring the attachment partner nearer. These authors concluded that humans could be predisposed to react more to such attachment vocalisations. A recent study (Dunst, Gormon & Hamby, 2012) involving a meta-analysis of 34 studies involving 840 preverbal infants revealed that BT lasting for more than 8 to 10 seconds in length was linked with higher infant attention and more social responsiveness as compared to ADS.

Singh et al. (2002) found that infants' listening preferences for BT may not be due to its speech register or acoustic qualities, but rather due to the positive affect within this type of speech. In this study, infants showed a perceptual bias towards BT with positive affect as compared to BT with neutral affect. Additionally, the infants had equal preferences for BT with positive affect and ADS with positive affect, and preferred ADS with positive affect over BT with neutral affect. Singh et al. (2002)

propose that infants can perceive affective cues from birth whereas language is a learning process requiring the involvement of memory and cognitive skills. Parents generally use more positive affect during the use of BT, explaining the finding that infants prefer BT over ADS.

Children do not only learn from direct stimulation from the caregiver, but also through indirect means, such as listening to conversational exchanges between other people (Owens, 2005). Some mothers also spend much of their time interacting with their child through singing or reciting rhymes (Rossetti, 2001). Maternal singing, also known as infant-directed singing, has been documented as a universal caregiving behaviour that has existed throughout time and within different cultures (Huron, 2003). It has been shown that while playful maternal singing promotes arousal levels that are optimal for sustained infant attention, soothing forms of singing reduces arousal levels and thus induces sleep (Shenfield, Trehub & Nakata, 2003).

De L'etoile (2006) conducted a study to identify infant behaviours in response to live presentations of maternal singing. The participants included 60 mother-infant dyads consisting of infants ranging from six to nine months of age. It was found that maternal singing resulted in high infant cognitive scores. The author suggested that maternal singing is as effective as book reading or toy play in maintaining infants' attention. A study by Nakata and Trehub (2004) showed that six-month old infants demonstrate more sustained attention in response to maternal singing as opposed to maternal speech. This finding could be due to the predictable and ritualised nature of maternal singing, which aids in increasing the infants' level of arousal and promoting attention. These findings suggest that maternal singing has an effect on the states of arousal of prelinguistic infants.

SES and maternal education have been reported to affect mother-infant interactions and child language development. Hoff and Tian (2005) investigated the relationship between SES and child vocabulary growth in a sample of 63 two-year olds in the United States. The authors found that children from higher SES backgrounds used larger vocabularies as compared to children from mid-SES. Hoff and Tian (2005)

also studied the interaction of maternal education, language practices and language development in a sample of 662 Chinese children ranging from 24 to 47 months of age. Mothers with a higher level of education reported a higher frequency of conversation and storytelling with their children compared to mothers with a lower level of education. Moreover, children of mothers with a high level of education had larger vocabularies compared to children of mothers with a lower level of education. A study in Brazil (Piccinini, Tudge, Marin, Frizzo & Lopes, 2010) examined the impact of SES on parent-infant interaction when the infants were three months of age. Mothers from higher SES were reported to talk more and interpret their infants' behaviour more than mothers from a lower SES. A South African study (Price, 2008) investigated how SES affected the nature of mother-infant interaction in the Cape Malay Muslim cultural group. 10 mother-infant dyads were included in the study with infants ranging between 0-3 months of age. Mother-infant interaction was uniform across all SES groups, showing that SES is not the most important factor in establishing mother-infant interactions. The study was however limited in sample size and thus the results cannot be generalised.

Family structure is an additional factor that needs to be considered when analysing mother-infant interactions. Gibson-Davis and Gassman-Pines (2010) observed interactions between married, cohabiting, never-married, and divorced mothers and their children. Results from this study indicated that married mothers were associated with higher quality interactions with their children compared to the other three groups of mothers. Giardino, Gonzalez, Steiner and Fleming (2008) compared mother-infant interactions between 56 teenage mothers, 58 teenage non-mothers and 49 adult mothers. Teenage mothers were found to show more sympathy and be more alert in response to their infants' cries as compared to non-mother teenagers. Physiological and interactional measures of responsiveness showed that only the adult mothers presented with an alerted pattern of heart rate and cortisol response to their infant cries. Additionally, teenage mothers were found to be more easily distracted from focusing attention on their infant as compared to adult mothers. Even if teenage mothers express equally positive feelings of sympathy and alertness about their infants, their physiological behaviours indicate that they are less attentive and less attuned to infant cues when compared to adult mothers. This study highlights the

differences in mother-infant interaction based on maternal age, showing that adult mothers are more responsive to their infant cues as compared to teenage mothers possibly due to the teenagers' neural immaturity (Giardino et al., 2008).

Gender has been reported to affect mothers' interactions with their infants. Giardino et al. (2008) investigated the impact of child sex on parent-infant interactions when the infants were three months of age. Mothers were reported to talk more with their infant girls while fathers talked more with infant boys. An American study by Cho, Holditch-Davis and Belyea (2004) showed that mothers expressed more positive affect, talked more and spent more time interacting with their premature girls compared to premature boys. The premature girls were noted to look at their mothers more in return. The authors propose that boys make less satisfying social partners resulting in the mothers expressing less positive affect and fewer interactions than with girls. Lutchmaya, Baron-Cohen and Raggatt (2002) conducted a study analysing the amount of eye contact made by infant boys and girls with their carers. At 12 months of age, girls were noted to make significantly more eye contact than boys. The authors also analysed the infants' foetal testosterone level and found that foetal testosterone was a significant predictor of eye contact. The testosterone level was inversely related to eye contact, explaining why girls made more eye contact when compared to boys. This study shows that social behaviours could be determined by hormone levels and biological make-up.

2.2 Theoretical perspectives

2.2.1 Attachment theory

Attachment theory was proposed by John Bowlby in the 1960s (Bowlby, 1969). Bowlby was a psychoanalyst who believed that the early relationship between a child and his or her caregiver is the most important predictor of the child's personality development in future. McLaughlin (2006, p. 82) defines attachment as "the close, nurturing, long-term relationship that develops between the caregiver and the infant". According to this theory, the attachment bond is the means through which the infant has his or her biological and emotional needs met (Bowlby, 1969). Bowlby

suggested that infants' attachment behaviours consist of a number of instinctual responses (such as sucking, smiling and crying) that serve the function of binding the infant and the mother to each other. The author also proposed that the first six months after birth are crucial in establishing an affective tie between mother and infant (Bowlby, 1969). As the infant ages, attachment to new individuals become increasingly difficult and continues at a slower pace until adulthood (Bowlby, 1969).

It is believed that the first hour after birth is crucial for the development of attachment. In optimal situations, the well infant is alert, makes eye contact with the mother and searches for the breast to feed. The mother is equally anxious to meet her new infant. Rossetti (2001) stated that there are two important factors influencing post-natal attachment; the alertness of the newborn infant in the first 60-90 minutes after birth and the mother's response. If one or both of these factors are affected, the attachment process could potentially be disrupted. However, this does not necessarily mean that the infant and mother would develop insecure attachment later in life. Early caregiving experiences are essential in establishing secure attachment as it gives the mother and infant opportunities to recognise and identify each other's patterns of behaviour (Rossetti, 2001).

Ainsworth and Marvin (1995) elaborated on Bowlby's concept of attachment and suggested that the quality of the infant's attachment to his or her mother reflects the quality of the early interactions, which are in turn affected by the mother's responsiveness and sensitivity towards the infant (Ainsworth, 1979). Ainsworth identified four types of attachment styles namely secure, avoidant, resistant-ambivalent and disorganized-disoriented (Hardy, 2007). Securely-attached infants typically protest when they are separated from their caregiver and try to regain contact once the caregiver returns (Scroufe, 2005). Infants with avoidant patterns of attachment ignore the caregiver's departure and return and avoid closeness when the caregiver is back (Hardy, 2007). The resistant-ambivalent style of attachment is noted by a fixation on the caregiver where the infant alternates between seeking comfort and rejecting the caregiver (Hardy, 2007). The disorganized-disoriented pattern is characterized by the infant simultaneously reaching for and turning away

from the caregiver (Hardy, 2007). It was believed that secure children have more sensitive and cooperative interactions with their mother (Sroufe, 2005).

2.2.2 Transactional model

Attachment theory has been criticised for emphasizing only certain aspects of development involving a simple cause and effect linear model (Davis, Mohay & Edwards, 2003). A more integrative approach, the transactional model, was developed by Sameroff and Chandler in 1975. This model focused on the ongoing and dynamic aspects of development and has been used to describe the impact of interactions on the development of a child (Davis et al., 2003). The transactional model describes how the way in which the caregiver interacts with the child influences the nature of the child's response, and the way in which the child interacts with the caregiver influences the nature of the caregiver's response (Keilty & Freund, 2005). For example, if a child cries to get attention, but is ignored by the caregiver, this will affect the child's way of seeking attention in future. On the other hand, if the child's cry is recognised and an appropriate response is obtained from the caregiver, there is an increased likelihood that he or she will cry to get attention in future situations. In this way, the child learns that crying will give him or her some control over his or her environment, and such interactions will encourage the use of social communication.

The transactional model emphasizes the relationship of context and developmental processes where the social environment and the experiences provided to a child are central to his or her development (Sameroff & Fiese, 2000). According to this model, this process is dynamic and bidirectional where maternal and infant behaviours and their environment affect each other in a mutual manner that impacts on the child's developmental outcomes. Figure 3 shows the bidirectional link between communication development and mother-child interactions and how these interactions shape and are in turn shaped by the mother's and child's response.

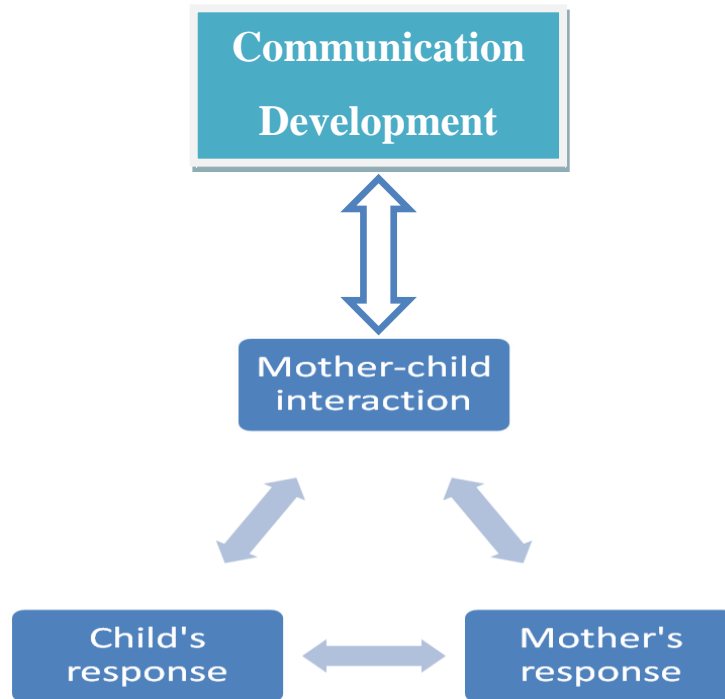


Figure 3: Transactional model within mother and child interactions
(Sameroff & Fiese, 2000)

In the 1920s, Arnold Gesell, a paediatrician and psychologist proposed a ‘maturationist’ view of development (Shonkoff & Meisels, 2000). Gesell believed that children are biologically programmed and that long term developmental outcomes are based on the rate of acquisition of developmental milestones. In the 1950s, believers in the maturationist view suggested a correlation between adverse perinatal events and later neurodevelopmental disorders. This view suggested that a child’s development is solely affected by his or her biological determination (Shonkoff & Meisels, 2000). Later, behaviourists challenged this view by arguing that developmental outcomes are influenced by environmental factors in the absence of significant brain damage. Finally, in the 1960s it was believed that development is influenced by both biological and environmental factors, which mutually influence each other. The transactional model places equal emphasis on the child as well as his or her environment and suggests that developmental outcomes depend on the mutual effects of nature and nurture (Shonkoff & Meisels, 2000).

2.2.3 Ecological model

The ecological model proposes an even broader approach to understanding environmental influences on a child. This model was developed by Bronfenbrenner and consists of four complex layers of the environment, each one having an effect on the child's development (Bronfenbrenner, 1979). This model has recently been renamed 'bioecological systems theory' to emphasize that the child's biology acts as a primary environment in his or her development (Berk, 2000).

The first layer is called the microsystem and is the layer closest to the child. This layer consists of relationships and interactions that the child has with his or her immediate surroundings (Berk, 2000). An example of a microsystem is the child's relationship with his or her parents or with school. The second layer, the mesosystem, is the relationship between the different microsystems (Shonkoff & Meisels, 2000). For example, the connection between the child's parents and his or her school would be a mesosystem. The exosystem is the third layer and is described as the larger social system where the child does not play a direct role, such as the parent's workplace (Shonkoff & Meisels, 2000). Lastly, the fourth layer, the macrosystem is the outermost layer and consists of the general organisation of the world (Berk, 2000). Examples are religion, cultural beliefs, customs and laws. According to the ecological model, each layer has a cascading effect on the interactions of the other layers. This model is illustrated in Figure 4.

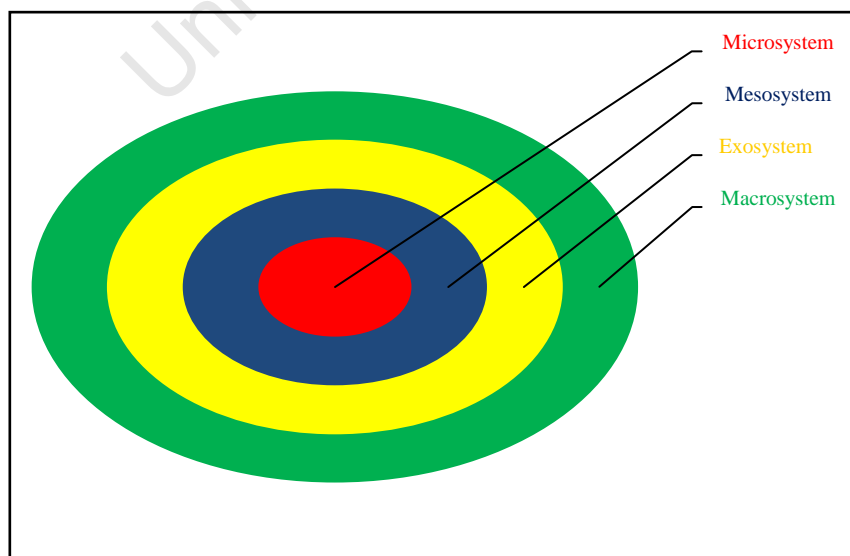


Figure 4: The four layers of the ecological model (Bronfenbrenner, 1979)

The transactional and ecological models both take into account various external factors such as risk factors and protective factors within the child’s environment. These risk factors and protective factors act together in determining the child’s developmental outcomes. Some examples of risk factors and protective factors are tabulated in Table 4.

Table 4

Examples of risk factors and protective factors

Risk factors	Protective factors
Poverty	Supportive social networks
Low SES	High level of maternal education
Teenage mother	High SES
Low level of maternal education	Mother has experience with other children
Single-parented family	
Depressed mothers	
Child born with congenital, chromosomal, neurological or sensory disorders	

Compiled from Rossetti (2001); Shonkoff & Meisels (2000)

It is possible for protective factors to outweigh risk factors and result in positive outcomes (Shonkoff & Meisels, 2000). For example, teenage mothers are considered as being a risk factor in their child’s development. However in certain cases, other family members play important roles in providing emotional and financial support, thus acting as stress buffers. Shonkoff and Meisels (2000) have stated that the number rather than the nature of risk factors is the best determinant of outcome. Therefore a child from a poor background, living with a teenage mother with no father figure is more likely to present with developmental problems as compared to a child from a poor background living with adult parents.

Some clusters of risk seem to have a more negative impact on the developmental outcomes of the child (Fuertes, Faria, Soares & Crittenden, 2009). Fuertes et al. (2009) investigated the impact of premature birth and low income on mother-infant interaction. This study showed that dyads presenting with two risk factors (low SES and premature birth) presented with the same negative effects in terms of mother-

infant interaction as compared to dyads with one risk factor only (low SES). The findings from this study show that certain social risks could have a greater impact on interaction as compared to a medical risk. It has also been reported that protective factors may have a more generalized effect on the child than risk factors (Shonkoff & Meisels, 2000). The transactional and ecological models suggest that each family comprises of its own risk factors and protective factors which result in unique developmental outcomes for the child. Figure 5 depicts the effects of biological, familial, social and environmental factors on human development bringing together elements of the transactional and ecological models.

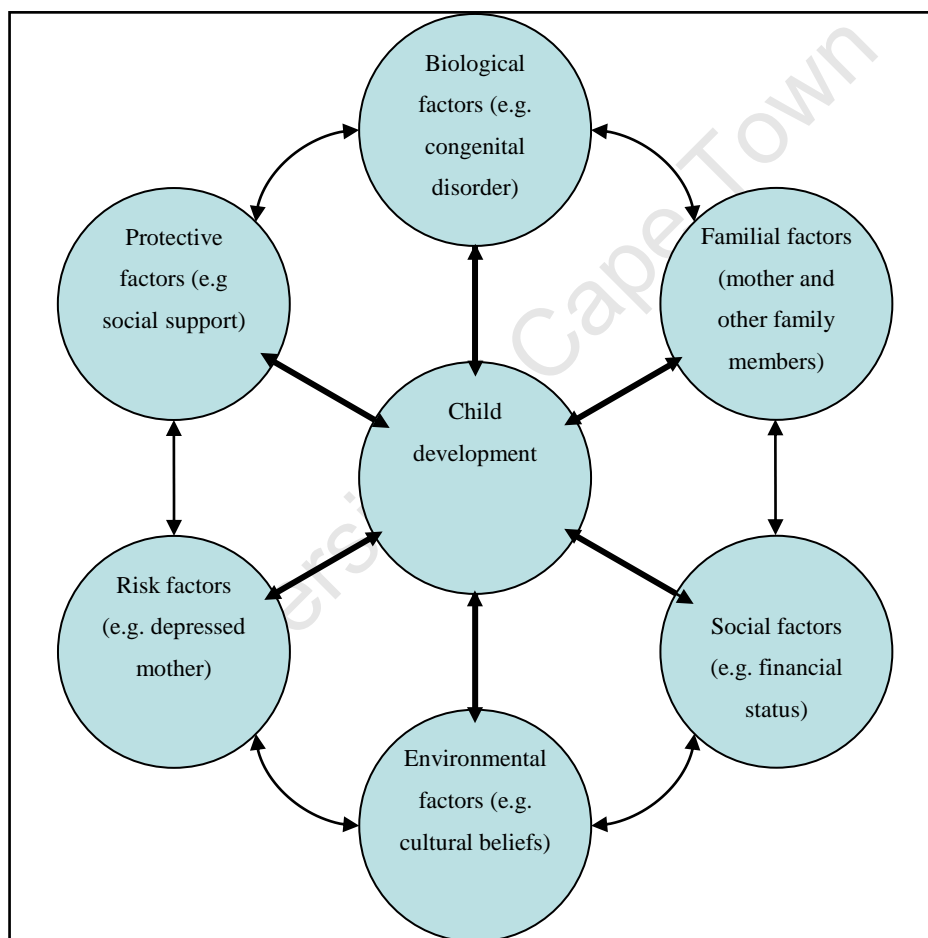


Figure 5: The effects of biological, familial, social and environmental factors on human development.

2.2.4 Attachment theory applied to prematurity

Attachment theory is a useful framework for understanding the effects of premature birth (Borghini et al., 2006). Typically, pregnant women have certain expectations

regarding the birth of their baby. Immediately after birth, mothers usually establish visual contact with their babies, pick the infant up, stroke his or her face, touch his or her head and body and breastfeed their baby (Rossetti, 2001). The initial interaction between mother and baby that occurs from the moment the mother begins to feel connected to her baby is known as bonding. Owens (2005) states that bonding between a mother and her child is determined by the quality of their interactions. By immersing herself in daily routines of caring for her baby, the mother naturally develops the attachment described by Bowlby (Rossetti, 2001). The initial bonding and attachment is believed to have a significant impact on the infant's emergence of social interactions and development (McLaughlin, 2006). Caregivers shape their infant's speech and language through physical, vocal, emotional and visual stimulation during daily interactions (McLaughlin, 2006).

Forcada-Guex et al. (2006) and Montirosso et al. (2010) found that the quality of the early child-parent relationship can worsen or improve the potentially adverse impact of preterm birth. Having a premature infant can have a major impact on the quality of the child-parent relationship for a number of reasons. Firstly, infants cannot respond to parental expectations in the same way as full-term babies do (Montirosso et al., 2010; Tallandini & Scalembra, 2006). Premature infants tend to be less alert, less attentive, less active and less responsive compared to full-term infants (Fuertes et al., 2009; Nicolaou, Rosewell, Marlow & Glazebrook, 2009). Preterm infants are also reported to have different regulatory and interactive capacities as compared to term infants (Fiamenghi, 2007; Forcada-Guex et al., 2006). In instances of premature births, the mother may typically feel unprepared due to the unexpected birth (Rabelo, Chaves, Cardoso & Sherlock, 2007). She may not be psychologically ready for the birth of her baby and this challenges the attachment process with both low and high risk premature infants (Borghini et al., 2006; Leonard & Mayers, 2008). In such a situation, mothers are often faced with the stress of their baby being placed in NICU immediately following birth (Lupton & Fenwick, 2001). In cases of hospitalisation in the NICU, the mother may be separated from her baby and the opportunity to interact with the infant is limited (Nicolaou et al., 2009). NICUs now aim to be more family-oriented, however the intimacy of the home is still difficult to achieve in the busy medical atmosphere (Keilty & Freund, 2005). Due to the highly medical nature of the

NICU, mothers are often more focused on the physical and medical needs of the child, neglecting the importance of social interactions (Lupton & Fenwick, 2001).

Parents often describe NICU as being overwhelming and frightening and the separation encountered during hospitalisation in NICU further reinforces the feelings of insecurity felt by the parents (Leonard & Mayers, 2008). It has been reported that mothers feel emotionally strained by the separation during the first week of life even if the infant is not seriously ill (Nystrom & Axelsson, 2002). A study found that parents of preterm infants have a tendency to make less body contact, spend less time smiling, playing, touching their infant and appear to be more emotionally withdrawn (Muller-Nix, Forcada-Guex, Pierrehumbert, Jaunin, Borghini & Ansermet, 2004). Mothers also feel detached from their infants due to the inability of being actively involved in daily caring activities for their infants (Nicolaou et al., 2009).

Mothers themselves are at higher risk of exhibiting depressive symptoms in response to the stress of having a premature infant (Veddovi, Kenny, Gibson & Starte, 2001). Singer, Fulton, Davillier, Koshy, Salvator and Baley (2003) documented that these mothers show less positive parenting and have more difficulties in interpreting their premature infant's behaviours. A systematic review of 14 articles reported the following feelings by mothers of preterm infants: distress, anxiety, depression, shock, being scared and worried, unhappiness, suffering, feelings of powerlessness, hopelessness, being out of control due to emotional instability, guilt, and insecurity (Obeidat, Bond & Callister, 2009). Kritzinger and Louw (2003) indicated that mothers of premature babies believed that their infants were not able to see and hear at birth. They were thus not responsive to their baby's signals and did not encourage interaction to take place. In some cases, mothers were scared to bond with their babies in case they did not survive (Leonard & Mayers, 2008; Nystrom & Axelsson, 2002). A study in South Africa reported that depressed mothers were less sensitive during early face-to-face interactions with their infants and those infants were also less positively engaged with their mothers (Cooper et al., 1999). A prospective longitudinal South African study documented how postpartum depression at two months was associated with insecure infant attachment (Tomlinson, Cooper &

Murray, 2005). These studies suggest that the maternal emotional state is important in determining the quality of attachment between the mother and her child.

Premature infants are at risk of presenting with feeding difficulties due to their inability to coordinate sucking, swallowing and breathing (Swift & Scholten, 2009). Feeding interactions are therefore interrupted or absent during the first few days or weeks after birth. Successful and safe feeding is an essential criterion for hospital discharge (Silberstein et al., 2009). It has been reported that mothers of premature infants with such difficulties often perceive interactions during feeding to be negative and frustrating as the attention is shifted to the infant's weight gain rather than on the mother-infant relationship (Swift & Scholten, 2009). These feeding difficulties have also been noted to affect the bonding process and attachment between the mother and her infant.

The overall impact of the difficulties described can result in the parents feeling disconnected to their infant, and it has been reported that parents can feel like they are taking a stranger home after the child is discharged (Rossetti, 2001). These difficulties could lead to the formation of insecure attachment between the mother and her child (Ainsworth, 1979) and in turn result in unsuccessful interactions and poor communication development. Rossetti (2005) has emphasized that mother-infant interactions play a key role in the formation of the child's communication development.

2.2.5 Transactional and ecological models applied to prematurity

The transactional model suggests that developmental processes are transactional and the outcomes are mediated by mutual effects of nature and nurture, while the ecological model highlights the reciprocity between individuals and their environment (Shonkoff & Meisels, 2000). These models both emphasize that each child's development is influenced by unique risk and protective internal and environmental factors. These models are useful in the field of early childhood intervention. In the following paragraphs, these two models will be applied to show how the effects of biological insult (prematurity in this case) could be modified by familial, social and environmental factors.

Perception of child vulnerability has been shown to have an impact on developmental outcomes at one year of age (Allen et al., 2009). These authors suggested that parents often perceive their premature infants to be more vulnerable when compared to full-term peers. As a result, they tend to shelter their infants more, and often provide fewer opportunities for them to become independent in everyday situations (Allen et al., 2004). Mothers of premature infants also provide less support, less patience, use a lower quality of vocalisations and chose less age-appropriate toys for their infants (Porter et al., 2009). It therefore appears that the perception that their infants are vulnerable makes parents provide less positive interactions and fewer learning opportunities, which could in turn negatively impact on the child's development. In this case, perception of child vulnerability could act as a risk factor in terms of the child's development.

In a similar fashion, mothers who are securely attached after birth tend to have infants who present with secure representations of attachment as well (Brisch et al., 2005). Brisch et al. (2005) also noted that infants with neurological deficits have a higher risk of presenting with insecure attachment and parents of infants with neurological deficits in turn revealed an insecure pattern of attachment themselves. In their study investigating the relationship between feeding and mother-infant interaction in low-risk premature infants, Silberstein et al. (2009) found that mothers presenting with less adaptive and more intrusive behaviours were more likely to have infants with less optimal feeding outcomes. Secure attachment could therefore act as a buffer in protecting the infant from his or her biological determination.

Holditch-Davis et al. (2000) investigated how the language abilities of a premature child can affect the mother-child interaction. These authors found that when premature children presented with a low IQ, they spent considerably less time playing and were less responsive to their mothers as compared to children with average IQs. This study also showed that mothers of the children with lower IQs provided less play materials, talked and interacted less and were more negative towards their infants. These findings support other studies showing that infant language delays prevail more within mother-infant dyads consisting of lower

interactive patterns (Cho, Holditch-Davis & Belyea, 2007). In these studies, low IQ acted as a risk factor in determining successful mother-infant interactions.

It has been documented that mother's communicative style changes over time (Suttora & Salerni, 2011). Maternal speech was analysed in terms of lexical and syntactical complexity and verbal productivity when preterm infants were 6, 12, 18 and 24 months corrected age, as well as the infants' communicative, motor and cognitive abilities. Maternal verbal input did not differ compared to term infants at those ages, showing that mothers of preterm infants provide the same type of verbal input. It was however noted that changes in verbal input were more influenced by the child's verbal and motor development. The authors suggested that the preterm infants' motor skills and verbal output represented a cue for the mothers to adjust their communicative style. These findings show the mutually dynamic interplay between the infants' developmental skills and the mothers' interactive styles (Suttora & Salerni, 2011).

The transactional model can be used to describe the positive contribution of KMC on maternal and infant behaviours. KMC involves placing the baby wearing only a diaper, and sometimes a cap, between the mother's breasts (Feldman, 2004). A growing body of research evidence points to the beneficial effects of the practice of KMC in establishing positive mother-infant interactions (Feldman, Eidelman, Sirota & Weller, 2002; Johnson, 2005; Tessier et al., 2003). It has been hypothesized that the direct skin-to-skin contact between the mother and her child promotes the development of bonding and attachment, which in turn influences the development of early social interactions (Tessier et al., 2003). Skin-to-skin contact also helps the infant in coping with environmental stimuli which can be overwhelming in the NICU, and lowers infant stress (Feldman, 2004). Another explanation is that the release of oxytocin, a hormone released during nursing and during physical contact has been shown to have a positive impact on the mother's mood (Tessier et al., 2003). KMC encourages the release of oxytocin, which impacts on the mother's psychological state, and indirectly on her interaction with her infant (Feldman, Gordon, Schneiderman, Weisman & Zagoory-Sharon, 2010).

In South African public hospitals, it is common practice for the mother to start KMC when the infant is medically stable and to continue doing so 24 hours a day, both in hospital and after discharge until the child has achieved a desirable weight. The practice of KMC is also perceived as beneficial in private hospitals but mothers are typically only encouraged to do so for a few hours daily.

Tessier et al. (2003) investigated the developmental outcomes of preterm infants who had received KMC as opposed to those who were given more traditional care. The KMC infants showed more positive outcomes in terms of speech and hearing, personal-social and mental development. Johnson (2005) showed that KMC infants demonstrated less crying, less negative emotions, improved attention modulation and interacted more at six months compared to infants in the control group. Feldman et al. (2002) also found that mothers practicing KMC showed more positive interactions as compared to control mothers. The authors reported that mothers in the KMC group looked at their infants more, touched them more, showed more positive affect and were more adaptive and responsive to their infants' signals at 37 weeks. At three months corrected age, the mothers showed higher levels of emotional and verbal responsiveness and provided more learning opportunities. Furthermore, it was noted that high-risk infants in the KMC group showed more positive outcomes in terms of motor and cognitive development at six months corrected age. These results all suggest that KMC has a positive effect on mother-infant interaction leading to successful attachment and better developmental outcomes in premature infants.

The findings from the above-mentioned studies can be examined using the transactional and ecological models, showing that the process and outcomes of the child's development can be influenced by the parent-child interactions, and the child's development in turn influences the parents' pattern of behaviours. The unique set of behaviours used by the child and the caregiver affects their interactions (McLaughlin, 2006). Therefore, the lack of or inadequacy of interaction between the parents and the child can impair the establishment of bonding and attachment, which in turn can impact on the child's social, emotional, cognitive and language development outcomes (McLaughlin, 2006; Muller-Nix et al., 2004). Additionally environmental factors can have a major impact on the child and his or her

interactions with others. These factors can either serve a protective or risk-perpetuating mechanism in the child's development. For these reasons, premature infants are at risk of facing difficulties with the earlier aspects of communication development. Figure 6 shows how the transactional model and ecological model can be applied to the developmental outcomes of premature infants.

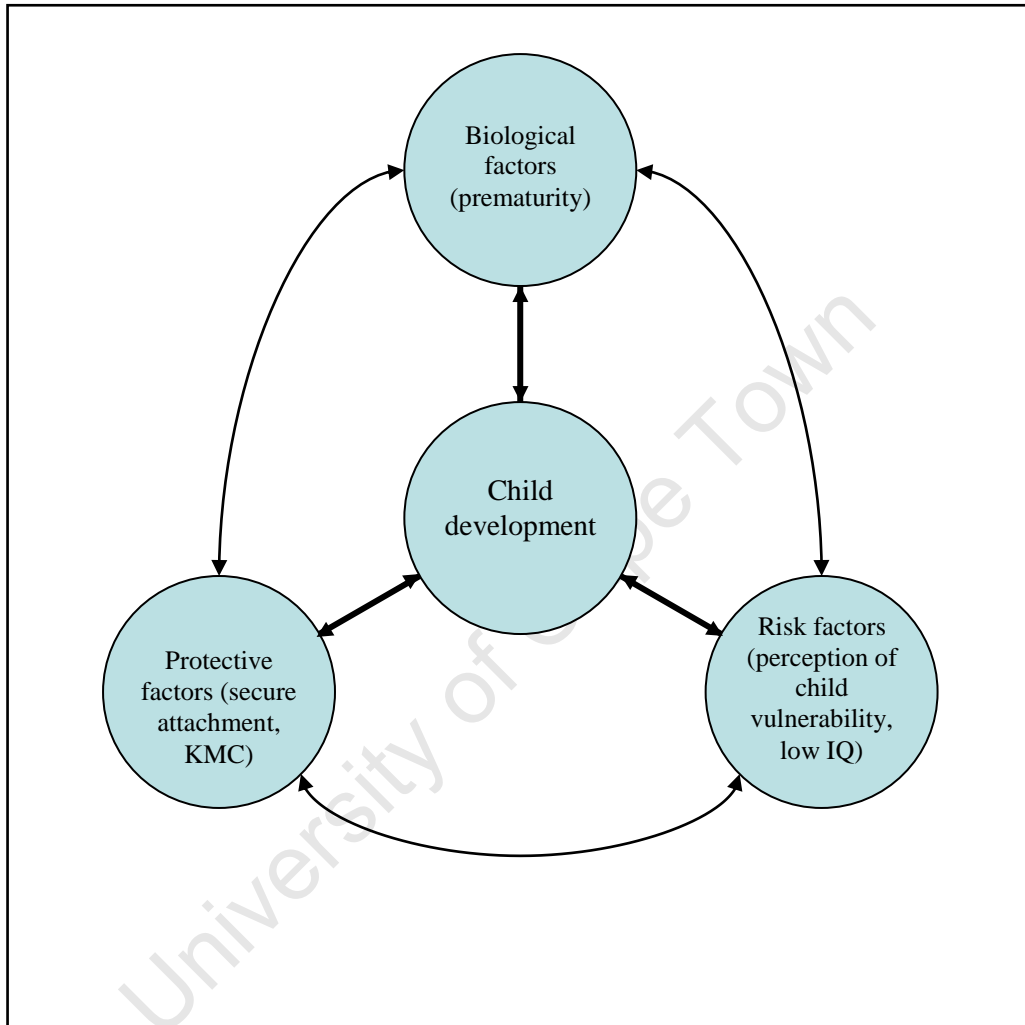


Figure 6: Transactional and ecological models applied to prematurity

2.3 Conclusion

This chapter has described the relationship between communication development and mother-infant interaction. The impact of prematurity on mother-infant interaction and child developmental outcomes has been exemplified using reviewed literature. Three frameworks, the attachment theory, the transactional model and the ecological model have been used to describe the influence of biological and environmental factors on mother-infant interaction and child development, and the literature

pertaining to these frameworks as they relate to premature infants has been reviewed. The transactional and ecological models are clinically useful in determining the impact of risk and protective factors with regards to premature birth and will thus be used as the main frameworks underlying the four cases in this study.

METHODOLOGY

This chapter describes the methods used in the study. An overview of the project is given, together with motivation for the methodological choices made. The aims of the study, research design, participant selection, research personnel, materials, procedures and data analysis will be detailed. The researcher also provides an account of the scientific rigor used for this project and ethical considerations that were necessary for the research process.

3.1 Aim:

To describe the communication between low-risk low birth weight (LBW) premature infants and their mothers in the first year of life.

The data collection was carried out over three visits namely:

T1: one week post discharge from hospital

T2: three months corrected age

T3: six months corrected age

3.1.1 Objectives:

In order to realise the aim of the project, the following objectives were specified:

1. To describe the mothers' perceptions of their premature infant's communication at T1, T2 and T3.
2. To describe the communication skills of low-risk LBW premature infants at T2 and T3.
3. To describe the mothers' perceptions of their role in the communication of their premature infants at T1, T2 and T3.
4. To describe the communication of mothers with their premature infants at T1, T2 and T3.

3.2 Research Design

A longitudinal design was used. Longitudinal designs involve data collection over an extended period of time (McLaughlin, 2006). This type of design can be carried out over weeks, months or years based on the time span available for data collection (Maxwell & Satake, 2006). In this study, data collection was carried out over three different visits (T1, T2 and T3) with the last visit occurring when the infants were six months corrected age. Corrected age refers to the age from the expected date of birth (Rose et al., 2002).

The advantage of carrying out a longitudinal study is that it allows the researcher to obtain a better insight into the continuity of the infant's overall development, thus increasing accuracy (Kumar, 2005; McLaughlin, 2006). Longitudinal designs are also well suited for developmental studies (Maxwell & Satake, 2006) such as communication development. A disadvantage of a longitudinal approach is that the study can be subject to conditioning effect. This occurs when the same participants are contacted frequently and start knowing what is expected of them and therefore give answers which they think right, or lose interest in the study (Kumar, 2005). In this study, this disadvantage was addressed by having different interview schedules over the three visits. The infants were also not conditioned as all the tools used were administered by the researcher herself through observation and by interviewing the mother.

A case study method was used where four mother-infant dyads were selected based on inclusion criteria. Case studies allow for "systematic investigation into a single individual, event or situation because of its uniqueness" (Walsh, 2001, p.52). Case studies are ideal for in-depth research as they do not require the control of any behavioural events (Maxwell & Satake, 2006; Yin, 2009). They also allow for an intensive analysis of the data collected which is often not possible with other methods (Kumar, 2005).

Case studies have been widely used in Speech-Language Pathology, for example, in studies focusing on aphasia and dyslexia (Armstrong & Macdonald, 2000; Ramus et al., 2003). It has been suggested that case study is the method of choice for clinical

sciences that involve interaction and communication between people. Using the case study method does not allow for generalisation of the findings to the population (Walsh, 2001) but can provide valuable, in-depth information about the cases being studied.

3.3 Participants

This study investigated four mother-infant dyads.

3.3.1 Selection criteria

Inclusion criteria (infants):

- Gestational age of less than 37 weeks
A premature infant is defined as a child being born less than 37 weeks of gestation (Rossetti, 2001).
- Birth weight between 1500g to 2500g
Low birth weight (LBW) infants are defined as having a birth weight between 1500-2500g. Infants born very prematurely (VLBW: 1000-1500g) and extremely prematurely (ELBW: less than 1000g) are at higher risk of medical complications (Rennie & Robertson, 2002). Infants with LBW have a minimised risk of severe medical complications which involve extended hospital and medical treatment as compared to very premature and extremely premature infants.
- Low-risk
No major neurological, physical, congenital or sensory difficulties as infants presenting with any of these would be expected to have a different developmental pattern based on their condition (Rossetti, 2001).

Exclusion criteria (infants):

- Medically diagnosed disorders of the peripheral nervous system or central nervous system damage.

- Infants requiring ongoing medical treatment related to chronic illnesses or congenital abnormalities.
- Known sensori-perceptual deficits such as blindness or hearing loss.

The above exclusion criteria were specified as infants born with any of the above are at higher risk for developmental delays (Rossetti, 2001).

Inclusion criteria (mothers):

- Living with her infant and is the primary caregiver
In this study, the interaction between mother and infant was studied, and birth history information was of significant importance. The requirement that the mother lived with her infant meant that she would be the richest possible informant.
- English-speaking
The data collection was in English as the researcher does not have a functional level of other languages spoken in South Africa. English is the third most spoken language in the Western Cape (Census, 2001). The mothers were included in the study if they were able to communicate fluently in English.

These selection criteria were met by using a screener (Appendix D) and obtaining information from the infant's hospital folder or by asking the infant's paediatrician. The researcher also administered a hearing test before the data collection began to rule out hearing impairment. If an infant failed the hearing screening test (screener), he/she would have been referred to an Audiologist or Ear Nose and Throat (ENT) specialist for further testing. In this study, none of the infants failed the hearing screener.

3.3.2 Sample size

There is debate about what constitutes a minimum number of participants in qualitative studies. In qualitative research, the aim of the research is not to make generalisations, but rather to provide information-rich data (Higginbottom, 2004).

Sample size should thus be determined based on the quantity of data that the researcher seeks to obtain from the research. According to Holloway (2008), case study research involves a small number of participants, with a minimum of one case. In this study, four infant-mother dyads were investigated as this sample size fitted with the case study method that was used. Small sample sizes provide rich data for deep analysis, using a qualitative analysis method (Erlandsson & Fagerberg, 2005). The small sample size did not allow for generalisation of results to the broader population, however provided detailed descriptions and generated themes for further investigation in future studies.

3.3.3 Sampling method

In this study, purposive sampling was used to recruit participants. Purposive sampling refers to the deliberate selection of participants based on the knowledge of their characteristics (Maxwell & Satake, 2006). The type of sampling used is based on the methodology of the study and the topic being investigated (Higginbottom, 2004). Purposive sampling allows the researcher to focus on a small group of participants. It allows the researcher to study each participant intensively and generate a large amount of information (Curtis, Gesler, Smith & Washburn, 2000). A disadvantage is that this type of sampling is based on the researcher's personal prejudices and perceptions of the individuals leading to biases (Maxwell & Satake, 2006). The researcher ensured that the participants were not subject to researcher bias by adhering strictly to the inclusion criteria and by consulting the research supervisor throughout the selection process. A total of seven potential participants were screened and the first four who met the inclusion criteria were selected.

3.3.4 Recruitment

The participants were recruited through public and private hospitals, personal contacts and neonatology practices in Cape Town. After obtaining approval from the University of Cape Town Faculty of Health Sciences Human Research Ethics Committee (FHS HREC REF: 306/2010) (Appendix A), the Western Cape Department of Health (Appendix B) and the facilities concerned (Appendix C), the recruitment process began.

The researcher adopted a mediated access approach. A health professional in charge of each facility was assigned to obtain the details of potential participants. Firstly, posters were put up in the breastfeeding/expressing rooms and Kangaroo Mother Care rooms stating the aim and purpose of the study and providing details about the selection criteria. Mothers were invited to participate in the study if they fitted the inclusion criteria. They were asked to give their contact details to the person in charge of that facility. Secondly, the researcher provided written information about the study and briefed the health professional in charge who could then verbally inform potential participants about the study. This was done to ensure that mothers who were illiterate could also take part in the study.

The mothers were asked to give their names and telephone numbers to the person in charge who passed on the information to the researcher (Appendix D). If the mothers did not have access to a telephone, they provided a relative or friend's phone number. The mothers were also asked to give an appropriate time during which the researcher could contact them.

The researcher then telephoned the potential participants in order to obtain verbal consent. The screener (Appendix E) was administered over the telephone. If the infant and mother met the inclusion criteria, permission was obtained verbally to view the infant's medical folder or to contact the child's paediatrician. If the infant did not present with any exclusion criteria, the mother was contacted and a suitable date and place to meet was organised.

The researcher started by obtaining informed consent for participation in the research. An information sheet (Appendix F) was given or read out to the mother and a consent form (Appendix G) was completed. The hearing screening test was administered to rule out presence of hearing impairment. In the event that the infant failed the hearing screening test, he/she would have been referred for further testing by an Audiologist or ENT, and would not have been included in the study. If the infant passed the hearing screening, the data collection was carried out on the same day.

In cases where the potential infant participants were still patients in the health facility and were due for discharge in the next 48 hours, the researcher visited the mothers to discuss the study and arrange an appointment. Permission was obtained verbally to view the medical records of the infant or to obtain the relevant information from the paediatrician. The infants were excluded if they presented with any of the exclusion criteria. On the day of discharge, the screener was administered. If all inclusion criteria were met, informed consent was obtained, followed by the administration of the hearing screening assessment. If the infant and mother passed all the criteria for participation, another meeting was scheduled to start the data collection. This process was carried out at the participant's home.

The recruitment process has been summarised using a flowchart (Figure 7).

University of Cape Town

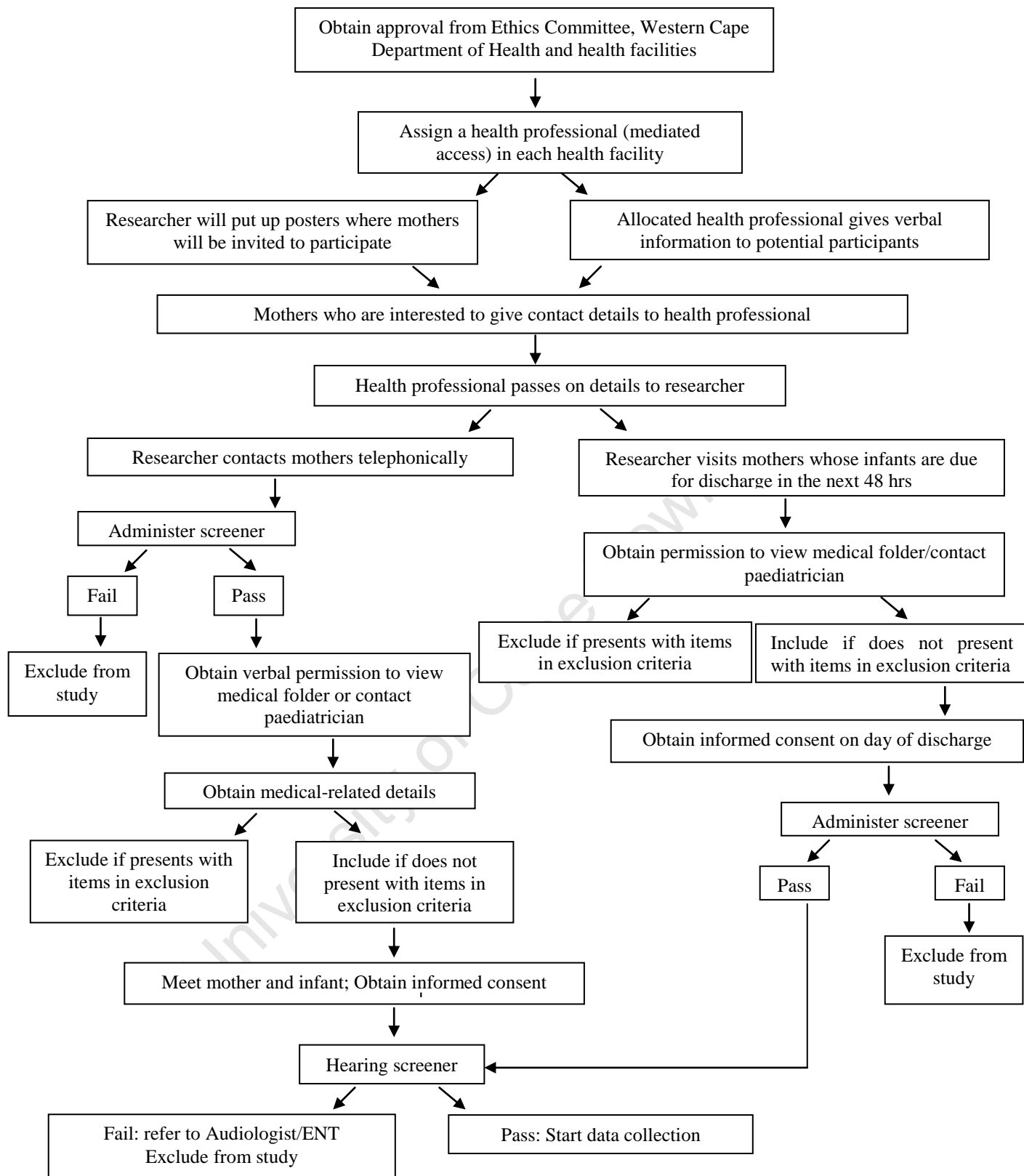


Figure 7: Recruitment flowchart

3.4 Research personnel

Researcher

The researcher is a Masters student in Speech-Language Pathology and a qualified Speech-Language Pathologist. Her first language is Mauritian Creole. She is a fluent second language English speaker and was therefore competent to carry out the data collection process.

Assistant researcher

An assistant researcher blind to the purpose and design of the study was employed. In this study, the assistant researcher viewed the audiotapes, videotapes and transcriptions and analysed approximately 25% of the findings to ensure trustworthiness. Any disagreements with the researcher were discussed and resolved until 100% agreement was reached.

3.5 Materials

3.5.1 Data collection tools

Screener

A screener (Appendix E) was used to determine participant eligibility. The screener obtained biographical information as well as checking inclusion and exclusion criteria for the participants in the study. The biographical information and inclusion criteria for the infant and mother were obtained from the mother herself. The information about the exclusion criteria was obtained from the mother and the infant's hospital folder or from his/her paediatrician.

Lastly, a hearing screening assessment was administered by the researcher to rule of presence of a hearing impairment. An otoscopic examination was conducted to identify the presence of malformations, obstructions, trauma or infections of the external ear, external auditory canal and tympanic membrane (Katz, Burkard & Medwetsky, 2002). If any problem was noted, the infant would have been referred to an ENT and would have been excluded from the study.

An Oto Acoustic Emission (OAE) screening assessment was administered as it is a quick, easy to use and non-invasive way of detecting hearing losses (Ohl, Dornier, Czajka, Chobaut & Tavernier, 2009). OAEs are used to evaluate cochlear outer hair cell function (Cole & Flexer, 2007). A small probe was inserted into the infant's ear, sounds were presented and response tracing was then recorded. In the event that an infant failed the OAE, he/she would have been referred for diagnostic testing by an Audiologist. If the infant had a hearing loss, he/she would have been excluded from the study.

Objectives 1 and 3: Interview Schedules

Three interview schedules (Appendices H, I and J) were used to address Objectives 1 and 3 which focus on the mother's perceptions. There are different types of approaches used in interviews, namely structured, unstructured and semi-structured interviews (Irwin, Pannbacker & Lass, 2008). In this study, the researcher adopted a semi-structured approach. Semi-structured interviews allow the researcher to obtain the participant's beliefs on the subject (Walsh, 2001). The researcher thus provided the mother with a list of topics during the interview and probed for more specific information in order to obtain in-depth information (Pring, 2005; Terre-Blanche & Durrheim, 1999). Another advantage of using semi-structured interviews is that participants are able to ask for clarification if needed and do not need to be literate as the researcher is responsible for asking the questions.

The interview schedules were administered in a face-to-face manner. Two response formats are commonly used in interviews, namely open-ended and closed-ended questions. For the purposes of this study, the main questions were open-ended. These questions allow participants to provide responses in their own words without any restriction (Terre-Blanche & Durrheim, 1999). The interviews comprised of a list of the open-ended questions followed by suggestions for supplementary questions or probes (Pring, 2005). Probes were used to obtain more direct answers that would yield further information (Patton, 2002). As the mother answered the questions, the researcher ticked off that specific question to ensure that all areas were covered (Pring, 2005).

A different interview schedule was used at each visit to minimise conditioning effects. Each interview schedule was constructed based on the developmental milestones that are expected to occur over time (Kumar, 2005). The questions chosen encompassed the six areas of communication and interaction within the RITLS to allow for comparison between the data observed by the researcher and the data obtained from the mother.

Objective 2: Rossetti Infant-Toddler Language Scale

The RITLS was used to obtain the communication profile of each infant at two points in time (Rossetti, 2005). The RITLS is a criterion-referenced scale that is used to assess preverbal and verbal areas of communication and interaction in children from birth to 36 months. The scale details the strengths and weaknesses that the child demonstrates within each of the six areas. These areas are Interaction-Attachment, Pragmatics, Gesture, Play, Language Comprehension and Language Expression. The RITLS is not quantitatively scored, but rather provides a description of the skills attained in each area. This scale can be administered several times without the risk of the participants remembering the items (Rossetti, 2005).

To collect the data, the researcher used three techniques, namely observation, elicitation and report, as indicated in the RITLS manual (Rossetti, 2005). The researcher directly observed and recorded spontaneously occurring behaviour. The researcher or the mother also tried to elicit specific behaviours from the infant. If the two above-mentioned techniques did not yield the desired behaviour, the researcher asked the mother if the infant had mastered the behaviour and how often the behaviour is present.

During the administration of this scale, the corrected age of the infants was used instead of their chronological age. The following calculation was done to calculate the corrected age of the infants:

Chronological age – (40 – gestational age at birth) = Corrected age

For example: For a 5 month old infant born at 32 weeks gestation,

5 months chronological age – (40 – 32 weeks) = 3 months corrected age.

(Metropole Pediatric Interest Group, 2009)

Objective 4: Adapted Observation of Communicative Interaction Scoring Sheet

An adapted version of the OCI was used to address Objective 4 (Klein & Briggs, 1987). The original OCI was developed by Klein and Briggs (1987) to informally observe interactions between caregivers and their infants. This scale has been developed to measure interaction strategies that are used during communication interaction such as caregiver positioning, use of encouragement, caregiver's responses to child distress and behaviours (Klein & Briggs, 1987). For the purposes of this study, the researcher adapted the original OCI. The adapted OCI (Appendix K) was administered through systematic observation. Observation is a "purposeful, systematic and selective way of watching and listening to an interaction or phenomenon as it takes place" (Kumar, 2005, p. 119). In this situation, non-participant observation was used where the researcher did not get involved in the activities but remained a passive observer.

Scaled questions consist of statements or questions where participants are required to respond by indicating the degree to which they agree or disagree with the item (Terre-Blanche & Durrheim, 1999). In this study, the researcher observed the different items and used the Likert Scale format to score each item. The Likert Scale "assumes that each item on the scale has equal 'weight' in terms of reflecting an attitude towards the issue in question" (Kumar, 2005, p.145).

The adapted OCI Items were scored at T1, T2 and T3 to describe changes over time. The researcher scored the item whenever a specific technique demonstrated by the mother participant was being used. This technique was used for any routine activity at home or during the administration of the RITLS or the interview schedules. There were no risks of conditioning effects since the researcher scored the test herself based on her observations. The advantage of using this scale is that it allowed for qualitative interpretation by describing the strengths and weaknesses of the interaction between the mother and her infant (Rossetti, 2001).

The researcher as a tool

In qualitative research, the researcher acts as an instrument during the data collection process (Neuman, 2006). It is the researcher's role to be sensitive to the participants

and to be able to adapt to changes in situation (Morse, Barrett, Mayan, Olson & Spiers, 2002). The researcher's presence has an impact on the process, and on the actual data (Neuman, 2006). In this study, the researcher kept a reflexive journal to document her subjective experiences so as to eliminate potential biases. This journal was used during the data analysis process.

3.5.2 Apparatus

Before the data collection process, the researcher screened each infant participant for hearing impairments using an otoscope (Welch Allyn: 25020A) and an Oto Acoustic Emission machine (AABR and OAE combination machine: AO 040256). A video recorder (Panasonic digital video camera recorder: I6SA11870 R) and a Dictaphone (Cenix Digital Voice Recorder: VR-W240 2GB) were used to record information throughout the data collection process (at T1, T2 and T3) for later review by the researcher and the assistant researcher. At the beginning of each visit, the researcher mounted the video recorder on a tripod at the back of the room in which the data collection took place to make the setting as minimally intrusive as possible for the participants. The dictaphone was placed between the participant and the researcher to prevent external noises from being recorded.

A summary of the procedures and tools used for each objective at the three visits is presented in Table 5.

Table 5

Summary of method

<u>Time of visit</u>	<u>Objectives</u>	<u>Procedure</u>	<u>Tool</u>
T1	1, 3 4 All	Hearing screening assessment Interview Adapted OCI (observation)	Otoscope, OAE screener Interview schedule 1 Adapted OCI scoring sheet Video recorder and dictaphone
T2	1, 3 2 4 All	Interview RITLS (observation) Adapted OCI (observation)	Interview schedule 2 RITLS scoring sheet Adapted OCI scoring sheet Video recorder and dictaphone
T3	1, 3 2 4 All	Interview RITLS (observation) Adapted OCI (observation)	Interview schedule 3 RITLS scoring sheet Adapted OCI scoring sheet Video recorder and dictaphone

3.6 Procedures

Ethics submission and approval

The proposal was submitted to the Faculty of Health Sciences Human Research Ethics Committee at the University of Cape Town for review (HREC REF: 306/2010) (Appendix A). After ethics approval, the researcher obtained permission from the Western Cape Department of Health to carry out the study and from the facilities concerned to display posters and provide information to an allocated health professional in order to recruit participants.

Pilot study

A pilot study is a smaller, preliminary version of the study carried out with a few participants from the study population (Maxwell & Satake, 2006). The pilot study was conducted before the data collection of the four participants started. One mother-infant dyad was used as the pilot study and was not included in the full study. The participant was a 34-year-old White female living in Wynberg, Cape Town. She was recruited through a private hospital in Cape Town. Her son was born at 25 weeks gestational age, with a birth weight of 580 grams. This mother-infant dyad did not fit into the inclusion criteria of the study due to the low gestational age and weight of

the infant, but was used to provide clarification of the design and to make adjustments to the procedures employed and tools used. Changes to the interview schedules and OCI were made after the pilot study was completed.

The questions in the interview schedules were modified by including more direct probe questions. An example is given below:

Interview schedule for pilot study:

Main question: Tell me about your baby's birth?

Probe: Feelings about having a premature baby

Probe: Bonding and attachment (holding the baby)

Final interview schedule:

Main question: Tell me what happened from the time you were admitted to hospital till you were discharged?

Probes:

Baby's birth

Medical status of baby

Feelings about having a premature baby

Bonding and attachment (holding and interacting with the baby)

Kangaroo Mother Care

Support from others (family and health professionals)

Information obtained from health professionals (medical, feeding, development, including communication)

The original OCI (Klein & Briggs, 1987) was adapted for this study. Some items were deleted and additional space was provided below each item to allow for specific descriptions or examples of each strategy used. The word caregiver was replaced with mother since she had to be the primary caregiver to participate in this study. The researcher also separated the scale allowing for four (never, rarely, sometimes, often) instead of three responses (never/rarely, sometimes, often).

The pilot study also aided in training and familiarising the researcher with methods and procedures within the research process.

Data collection

The adapted OCI and the interview schedule were administered at each of the three visits (T1, T2 and T3) while the RITLS was administered at two visits (T2 and T3).

In this study, corrected age was used to adjust for prematurity. The RITLS was therefore not used during the first visit as the scale begins at zero month chronological age.

Each visit lasted for approximately two hours with one hour spent interviewing the mother and one hour spent observing interactions with the infant within daily routines. The researcher aimed to obtain all her data during the same time of the day for T1, T2 and T3 to ensure that the infants' behaviours and states were not affected by the time of the day. However, the time of the day remained flexible to fit with the needs of the participants. Data collection could have been carried out on more than one day if necessary for each time frame (T1, T2 and T3) but one day was sufficient. Data collection took place at the participants' homes to ensure as naturalistic context as possible and also because this was likely to be the most practical and safe environment for the families (Maxwell & Satake, 2006). If the participants had requested for the data collection to be carried out in another place, the researcher would have made the necessary arrangements. This arrangement was however not required as all the participants opted for the data collection to be carried out at home. For mothers who were at work during the day, the data collection was conducted during afternoons or on weekends, based on the participants' preferences.

Data collected was entered into a checklist during the administration of the adapted OCI and the RITLS. These two tools were administered through observation, and subsequently ticking off the item being observed. During the interviews, the researcher took field notes. Neuman (2006, p.400) describes jotted notes as 'short, temporary memory triggers such as words, phrases or drawings'. After the interview, the researcher wrote more detailed notes about the interview and the context in which it occurred. The audio-recorded and video-recorded data were reviewed and transcribed.

Data management

During the research process, all written, video and audio recordings containing participant information were kept in a locked cabinet and electronic data was locked

using a password. This information was only accessed by the researcher, the assistant researcher and the supervisors of the study.

3.7 Data Analysis

Biographical Information

Biographical information about the participants was obtained during the administration of the screener (Appendix E). This information was used to describe the participants.

Interview schedules

Conventional content analysis was used to interpret the interview schedules (Hsieh & Shannon, 2005). Content analysis is used to refer to “any qualitative data reduction and sense-making effort that takes a volume of qualitative material and attempts to identify core consistencies and meanings” (Patton, 2002, p.453). Terre-Blanche, Durrheim and Painter (2006) have proposed five steps to be used in qualitative data analysis which were followed.

i. Familiarisation and immersion

The unit of analysis used was the transcribed interviews (Graneheim & Lundman, 2004). The researcher transcribed all the audio-recorded and video-recorded data herself as this process provided an opportunity to be fully immersed in the data, which could potentially generate insights into the analysis (Patton, 2002). This initial approach of being immersed in the data is known as inductive category development (Hsieh & Shannon, 2005). The researcher repeatedly read the transcribed data as a whole from beginning to end to achieve immersion (Hsieh & Shannon, 2005).

ii. Inducing themes

The second step involved the labelling of categories by highlighting words or phrases from the text that appeared to capture key thoughts or concepts (Hsieh & Shannon, 2005). The categories were then organised into

chronological themes. The themes were rearranged into main themes with underlying subthemes (Terre-Blanche et al., 2006).

iii. Coding

During the development of themes, the researcher started to code the meaning units. Coding refers to the “marking of different sections of the data as being relevant to one or more themes” (Terre-Blanche et al., 2006). This step was undertaken by using different coloured marker pens to highlight the different codes. The same data sometimes fitted into more than one theme, thus were labelled with more than one code.

iv. Elaboration

During this step, the researcher used a back and forth movement between the whole texts, the themes and the codes developed (Graneheim & Lundman, 2004). This process was continued until no new insights emerged (Terre-Blanche et al., 2006).

v. Interpretation and checking

The last step of analysis involved providing a written account of the phenomenon studied based on the first four steps. The researcher reviewed the data, removed sections that seemed to be irrelevant and reflected on and documented the impact that her presence might have had on the data collection and analysis process (Terre-Blanche, et al., 2006). During this step, the assistant researcher also reviewed more than 10% of the transcribed data and disagreements were discussed and reviewed until consensus was reached.

Rossetti Infant Toddler Language Scale

The results obtained were analysed descriptively. Each infant’s strengths and weaknesses within each area were described for T2 and T3. A communication profile of each infant was described at each point in time, as well as overall. The communication profile was also described in relation to the parental perceptions of their infants’ communication which were obtained from the interview schedules.

The Observation of Communicative Interaction Scoring Sheet

The mothers' interactions were analysed descriptively at each time point (T1, T2 and T3). The strengths and weaknesses were described within each time frame.

3.8 Scientific rigor and trustworthiness

Trustworthiness

In quantitative research the terms reliability and validity are used to evaluate the research design and tools (Terre-Blanche et al., 2006). The evaluation criteria used in qualitative research are known as trustworthiness and includes four aspects namely credibility, confirmability, transferability and dependability (Morse et al., 2002).

Credibility

Credibility refers to the “truthfulness, believability, and value of the researcher’s findings in representing the real world as perceived by the participants” (Maxwell & Satake, 2006, p. 270). This principle was ensured by using peer debriefing and by seeking agreement between the researcher and her supervisors (Flick, 2006). The supervisors were responsible for assisting the researcher throughout the research process (Shenton, 2004). The researcher also enhanced credibility by asking an assistant researcher to view more than 10% of the data to ensure that the observations made by the researcher had been accurately captured. Any disagreements with the researcher were discussed and resolved. The researcher also ensured greater credibility by collecting data at the participants’ homes thus keeping the context as naturalistic as possible. By observing the participants at three different occasions, over a period of several months, the researcher engaged in prolonged engagement, further increasing credibility (Flick, 2006).

Member checks were carried out through clarification of misunderstandings with the mother (Holloway, 2008). At the end of each visit, summarised observations were given to the mothers and they were asked to confirm that what the researcher understood was correct and changes to the information collected were made if necessary (Maxwell & Satake, 2006).

Triangulation was further used to enhance credibility. Triangulation is the use of different approaches combined together to provide more comprehensive data (Pring, 2005). In this study, methodological triangulation was used where the researcher used different sources of information, namely the OCI, interview schedules and the RITLS. Triangulation allows the researcher to look at the different realities of one case from different perspectives (Denzin & Lincoln, 2008). In this case, the researcher used objective measures to assess the infant's communication abilities but also looked at the mother's experience of the communication development of her child.

Confirmability

Reflexivity refers to the "need of awareness of bias" (Pring, 2005, p.197) and the process of self-examination. The researcher can be subject to bias especially during the interviewing process and analysis as she can influence the responses given by the participants as well as the coding of the material when being reviewed (Pring, 2005). In order to overcome this bias, the researcher kept an audit trail by documenting the research process in detail (Holloway, 2008). The researcher also kept a reflexive journal so as to acknowledge any assumptions that she had and ensure that she did not let them reflect on the data collection and analysis process (Terre-Blanche et al., 2006). Debriefing sessions were also organised with the researcher and her supervisor and co-supervisor throughout the data collection and analysis process to discuss potential biases.

Another way to ensure confirmability is the use of feedback sessions (Maxwell & Satake, 2006). In this study, observations made during the administration of the RITLS and OCI and themes that emerged from the interviews were read out to the participants at the beginning of the next visit and they were asked to confirm if these were an accurate representation of the information shared with the researcher. This procedure aided in confirming the view of the participants (Irwin et al., 2008).

Transferability

Transferability refers to "the extent to which the finding can be transferred to similar settings without causing changes to the interpretations of the researcher" (Maxwell &

Satake, 2006, p. 270). In qualitative research, meanings are thought to be variable across different contexts and thus do not seek to be generalised (Terre-Blanche & Durrheim, 1999). In this study, a small number of cases were studied to obtain detailed and rich descriptions of their situations (Shenton, 2004). The findings were also reported by providing quotations from the data obtained. The findings from this research are not transferable to the broader population, but provide a framework that can be used within similar contexts.

Dependability

Dependability refers to the degree to which the reader can be convinced that the findings reported by the researcher have actually occurred (Terre-Blanche & Durrheim, 1999). This principle was achieved by providing rich and detailed descriptions of each case studied in this research. The researcher thus immersed herself fully in the data during data analysis to obtain rich descriptions of the cases. To further ensure dependability, the researcher kept an audit trail by having a reflexive journal, field notes and audio and video recordings. The researcher kept a journal where she accounted for the concerns that rose during the entire research process, and how these concerns have been dealt with (Terre-Blanche et al., 2006). The field notes and recordings were used during the analysis process.

3.9 Ethical considerations

This study was conducted in accordance with the principles of the Declaration of Helsinki (Williams, 2008). The four basic ethical principles were followed, namely autonomy, beneficence, non-maleficence and justice (Terre-Blanche et al., 2006).

Autonomy

Autonomy refers to the “obligation to respect the decision-making capacities of autonomous persons” (Seedhouse, 2009, p.96). An information sheet was read out to each participant before the start of the data collection process. A written copy of the consent form was given to the participants. The participants were informed of the nature, purpose and duration of the study, the research procedures as well as the implications of their involvement. Participation in the study was voluntary and the

mothers had the right to decline participation or withdraw from the study at any stage of the research should they wish to. No penalties would have occurred if the participants chose not to participate or to withdraw from the study. Since child participants were involved in this research, the mothers provided informed consent for the children. Permission was sought to video-record and audio-record the participants during the data collection.

The participants' personal details were kept confidential by the researcher throughout the research process. They were each allocated a code during the data recording so as to ensure anonymity. The written data were concealed in a locked cabinet while electronic data was locked by using passwords. The recorded video and audio material was viewed only by the researcher, the assistant researcher and the supervisors.

Beneficence

No immediate benefits were offered to the participants. The infant participants were screened by the researcher for hearing difficulties/impairment. If any problem was identified, the infant would have been referred for diagnostic tests by an Audiologist or ENT. Referrals to other professionals would have also been made if necessary. Mothers also had the opportunity to reflect on their infant's communication. An information pack about early language stimulation techniques was handed out to the participants after the data collection process was complete. The participants are able to access the completed research report should they wish to.

Non-maleficence

Non-maleficence or harm includes "hazardous medical experiments and procedures that might cause discomfort, anxiety, harassment and invasion of privacy" (Kumar, 2005, p.214). There were no anticipated risks involved in participating in this study and no harm was caused to the participants. If at any point during the data collection process, the mother experienced emotional or psychological difficulties, the researcher would have given her the option of continuing the data collection at another time. If required, the participant would have been referred to a social worker or psychologist. No referrals were necessary in this study.

Justice

Justice ensures that all participants are treated “with fairness and equity during all stages of research” (Terre-Blanche et al., 2006, p.68). Distributive justice refers to, “the perceived fairness of the amounts of compensation” (McFarlin & Sweeney, 1992, p.626) participants’ receive. This principle was adhered to by including the first four mother-infant dyads who met the inclusion criteria. The participants were also recruited from private and public health facilities so as to maximise diversity. The recruitment process involved the provision of written and verbal information so that literate and illiterate participants could be included.

Risks and benefits

There were no risks incurred by the mothers and infants for taking part in the study. No direct benefits were offered to the participants. Referrals of infants to Audiologists, ENTs and other health professionals would have been made if necessary.

3.10 Summary

This chapter provided the framework used for the planning and execution of the study. An overview of the project was provided and was followed by systemic description of the research process. The findings derived from the above method will be presented in the next chapter by presenting four case studies.

FINDINGS

4.1 Introduction

This study was conducted to investigate the communication between low-risk low birth weight premature infants and their mothers. The data collection was performed over three home visits namely T1 (one week post discharge), T2 (three months corrected age) and T3 (six months corrected age). The study aimed to explore the mothers' perceptions of their infant's communication (T1, T2 and T3), observe the infants' communication (T2 and T3), mothers' perceptions of their role in communication (T1, T2 and T3) and observe the communication of mothers with their infants (T1, T2 and T3). In this chapter, the data is presented in the form of four case studies consisting of the mother-infant dyads. The names of all participants (and any other individuals they mentioned) have been changed to fictional names for the purpose of anonymity. The dyads are presented as Abigail-Anathi, Beverly-Blair, Carmen-Calvin and Debra-Dominique with the mothers' name preceding the infants. Each case study will be presented in the format of background information, followed by information pertaining to the four objectives of the study.

In the following chapter, the current study findings will be summarised and discussed in terms of the participants' similarities and differences. Thereafter, these findings will be put into perspective in relation to the reviewed literature and to the transactional and ecological frameworks. Information pertaining to each mother and infant participants has been summarised in Tables 6 and 7.

Table 6

Background information of mothers

Mothers	Age	Area	Education level	Occupation	Status	Other children
1 (Abigail)	18	Delft	First year of technical college	Student	Single	None
2 (Beverly)	33	Wynberg	Tertiary education	Teacher	Married	2
3 (Carmen)	18	Lavender Hill	Did not complete high school	Housewife	Single	None
4 (Debra)	29	Mitchells Plain	Did not complete high school	Housewife	Married	2

Table 7

Background information of infants

Infants	Sex	Gestational age	Birth weight
1 (Anathi)	Male	33 weeks	2050 grams
2 (Blair)	Female	33 weeks	1900 grams
3 (Calvin)	Male	36 weeks	1660 grams
4 (Dominique)	Female	34 weeks	1530 grams

4.2 Case study one: Abigail and Anathi**4.2.1 Background information**

Abigail is an 18-year-old black* female living in low-cost housing in Delft, Cape Town. After going for a routine check-up at the community health clinic, she was diagnosed with HELLP syndrome (Hemolytic anemia, Elevated Liver enzymes and Low Platelet count) leading to mild renal dysfunction. She was then admitted to a tertiary hospital where she had a Caesarean section delivery. Her first baby, Anathi, a boy, was born at 33 weeks of gestation with a birth weight of 2050 grams. Abigail's first language is isiXhosa, but she also speaks English fluently. Abigail lives with her aunt, nephews and nieces in a two-roomed house. At the third visit, Abigail had started attending college. Her aunt looked after Anathi during the day.

*In South Africa, there are four main cultural groups namely Black (African), White, Coloured (mixed race) and Indian/Asian. The terms used for the different races are consistent with those in common use and employed by the national census, and do not imply acceptance of racial attributes of any kind.

After birth, Anathi was placed in an open cot and was fed infant formula orally through feeding tubes. Abigail was not able to have any physical contact with Anathi for one week post-delivery while he underwent phototherapy. She started to practice KMC after one week and started to cup feed and breastfeed Anathi at this time. She stayed in the hospital with her son until he was discharged, about ten days after birth.

Abigail felt unprepared due to the early birth and was scared about Anathi's medical and developmental status. She also felt that she lacked information about the medical condition of her baby, and would have liked more information about the presence of the feeding tubes and the reason why she could not breastfeed till she started KMC. Abigail explained that she would have liked to receive more support from the staff at the hospital but instead had to turn to her family to help her with breastfeeding.

4.2.2 Mother's perceptions of her infant's communication

Conventional content analysis was used to interpret the interview schedules. This section has information grouped under the five areas of the RITLS which have been used as the headings for this aim. Key information relating to each subsection is described and illustrated with direct quotes from Abigail. The time of the visits have been indicated in brackets after each quote (T1: one week post discharge from hospital; T2: three months corrected age; T3: six months corrected age).

Interaction-Attachment

Shortly after being discharged from hospital, Abigail felt that she developed a sense of reciprocity with Anathi where they would understand each other's actions.

“He knows I am changing him, he moves around” (T1).

As from T1, Anathi recognised his mother's face and could differentiate between her and other people. At T2, Anathi started recognising their voices as well, and reacted differently to each family member.

“He knows my voice, he stops crying when I talk. He looks at me too when I talk. And he looks at my family” (T2).

Anathi became more active and responsive as he became older. Initially Abigail noted:

“He sleeps a lot, I don’t like that. I want him to be awake, when I breast feed him he is also sleeping, when I cup feed, he also sleeps” (T1).

At the second observation, Abigail reported:

“He is responding now, he is not sleeping a lot now” (T2).

Pragmatics

At T1, Abigail always positioned Anathi in a way to encourage eye contact but commented that he rarely looked at her. Anathi started establishing eye contact around T2, and would maintain eye contact for longer periods of time at T3.

“When I talk to him, he just looks at me and smiles” (T3).

Anathi started engaging in turn taking from T1. He engaged in vocal turn taking with his mother at around T3.

“Maybe when I cough when he is in kangaroo, then he kicks (T1).”

“He makes noises too when I sing. I talk to him when he makes noises. I repeat what he says” (T3).

Play

Abigail felt that her infant was too young to play with toys and objects initially. At T2, she engaged in verbal play with Anathi. At T3, she introduced a rattle and Anathi banged the rattle.

“I don’t give him toys to play. He is not playing with toys yet, he is too young. I will give him when he is 6 months. My aunty told me this” (T2).

Language Comprehension

Anathi started to become aware of sounds in his environment and startled at loud noises at T1. From T2, he became more aware of sounds, and started discriminating between different tones of voice.

“Sometimes I shout at him. He knows I am angry. He is then crying (T3)”.

Language Expression

Anathi expressed himself through crying and made bodily sounds such as burping at T1. He started cooing at T2, and continued to do so at T3, but had not started babbling yet.

“He is crying when he needs a nappy change. He does not make any sounds. He burps after feeding (T1)”.

“He is making sounds like ya ya ya ya (T3).

4.2.3 Infant’s communication

The RITLS was used to assess the preverbal and verbal areas of communication and interaction of Anathi at two points in time. The results were analysed descriptively and each infant’s strengths and weaknesses at each visit was documented. The communication profile of Anathi at T2 and T3 is presented in Table 8.

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Table 8

Communication profile of Anathi at T2 (in black) and T3 (in red)

	Strengths	Weaknesses	Comments
Interaction-Attachment	<ul style="list-style-type: none"> Mother is relaxed and comfortable and smiles frequently during interaction Smiles to family members and when alone Stops crying with adult eye contact and voice Shows differing responses to family members 		Interaction-Attachment skills lie between a 3-6 months level at 3 months corrected age and 6 months corrected age.
Pragmatics	<ul style="list-style-type: none"> Shows interest, responds and maintains eye contact with people Laughs at amusing activities and cries for attention Vocalises in response to vocalisation 	<ul style="list-style-type: none"> Does not produce different cries Does not imitate facial expressions 	Pragmatics skills emerging at 3-6 months at 3 months corrected age and 6 months corrected age.
Play	<ul style="list-style-type: none"> Looks and reaches for object Attempts to imitate facial expression Enjoys frolic play Plays with a rattle and bangs objects Smiles and reaches for self in mirror 	<ul style="list-style-type: none"> Does not play with rattle or bang objects Does not smile at self in a mirror 	Play skills scattered between 0-6 months at 3 months corrected age; emerging 6-9 months level at 6 months corrected age
Language Comprehension	<ul style="list-style-type: none"> Quiets and moves in response to voice Sound awareness and discrimination Attends to a speaker's mouth and searches for speaker Sound location Responds to voices, other sounds and to own name 	<ul style="list-style-type: none"> Does not always attend to speaker's mouth 	Comprehension skills scattered between 0-6 months at 3 months corrected age; between 3-6 months at 6 months corrected age.
Language Expression	<ul style="list-style-type: none"> Crying (hunger cry and to get attention) Vocalisations (to caregiver, and two different sounds) Laughs and whines Cooing and guttural sounds Repeats a syllable while crying Vocalises to express pleasure and displeasure Vocalises in response to singing 	<ul style="list-style-type: none"> Does not repeat a syllable while crying Does not vocalise to express pleasure Does not coo or make guttural sounds Does not babble 	Expression skills scattered between 0-6 months at 3 months corrected age; emerging at 3-6 months at 6 months corrected age.

Anathi presented with abilities ranging in the 3-6 months group for Interaction-Attachment and Pragmatics, and 0-6 months group for Play, Language Comprehension and Expression at T2.

At T3, no major change in skills was noted for Interaction-Attachment and Pragmatics. In terms of play skills, Anathi fitted into the 6-9 months group and into the 3-6 months group for Language Comprehension and Expression. Anathi might show a slight delay as no significant changes in age-group was noted for Interaction-Attachment and Pragmatics. Additionally, he had not started babbling, a skill expected to occur by 6 months of age.

4.2.4 Mother's perception of her own role in communication

Conventional content analysis was used to interpret the interview schedules. The analysis of the interviews with Abigail generated two main themes: 'physical contact' and 'verbal expression'. Each theme with its underlying subthemes will be discussed below.

Theme 1: Physical contact

- *Holding*

Abigail wanted to hold Anathi from the time he was born but was only able to do so when she started Kangaroo Mother Care, a week after birth.

“He was in the cot for a week. I could not hold him. I could not play with him, just see him, no holding for one week” (T1).

At T1, Abigail engaged in touching and holding Anathi throughout the day. As Anathi became older, she started holding him less.

“When he was a baby I held him all the time, now he is bigger I do not hold him as much. I sit down on the couch and he is on the floor when he is playing in his baby walker, I stand and let him play in there” (T3).

- *Positioning*

At T1, Abigail used the KMC position and also placed Anathi in her arms. Abigail encouraged face-to-face positioning as she practiced KMC mostly.

“I do KMC mostly when I sleep. I do not do KMC all the time when I am awake” (T1).

At T2, she had stopped practicing KMC but often positioned Anathi on her chest: she felt that he liked that position because of his familiarity with KMC. She also placed him on her lap during feeding and on the couch when she was busy. At T3, Abigail continued using the lap position and the couch but also started placing him upright against her shoulders and in a walking ring. At T2 and T3, she used a combination of face-to-face and side-by-side positioning. At T3, Abigail also reported facing Anathi away from her during certain positions.

“I hold him on my lap (facing outwards) or on shoulders. I hold him this way (lap) because he is going to fall” (T3).

- *Breastfeeding*

Breastfeeding was an issue with which Abigail struggled. She would have liked more support from the hospital staff.

“I wanted them to show me how to breastfeed, something like that, and they didn’t. I had to do it by myself. When I got discharged, my family helped me with feeding and they told me how to breastfeed him” (T1).

Theme 2: Verbal expression

- *Helping talking*

Abigail believed that Anathi learns through listening to her speech. She started to repeat Anathi’s vocalisations at T2. She reported using baby talk at all three visits by speaking slower and using baby words.

“He learns by listening to me, that is why I talk to him” (T1).

“If he makes noise, I also play with him and talk to him. I repeat what he says” (T2).

“I talk to him, not like I am talking to you, in a baby way. I speak slower, use baby words” (T3).

Abigail started engaging in everyday situational talk with Anathi at T2, and continued doing so at T3.

“I talk to him when I come back from school. I talk to him about how school was, and ask him how his day was” (T3).

- *Singing*

At T3, Abigail reported rarely engaging in talking to Anathi as she preferred singing to him. She reported singing lullaby songs in isiXhosa.

“I sing to him in sleeping time, baby Xhosa songs” (T3).

- *Increase in communication*

Abigail felt that she started communicating more with Anathi at T3, as he was more active and responsive as compared to T1 and T2.

“I talk more now, he is more mature now. Before I spoke but not much because he doesn’t respond and he was sleeping (T3)”.

4.2.5 Mother’s communication with infant

An adapted version of the OCI was used to observe the interactions between Abigail and Anathi. The mothers’ interactions were analysed descriptively. The items being observed were divided into three main categories namely, Interaction and Behaviour, Emotions and Speech.

Interaction and Behaviour

Abigail often provided tactile and kinaesthetic stimulation during her interaction with Anathi at T1, T2 and T3. For example, At T2, she was observed playing with Anathi’s feet and placing her finger in his hand when he was awake.

Abigail used several positions throughout the day. At T1, she always positioned Anathi in a face-to-face manner by holding him on her chest and in her arms to be able to look at him. By T2, Abigail had stopped practicing KMC, but would still place Anathi on her chest, in her lap or on the couch, thus still enabling frequent eye contact. At T3, she started positioning Anathi upright against her shoulders as well. She showed a decrease in enabling eye contact at T3, as she often placed Anathi on the floor or in the walking ring while she stood and was therefore at a much higher level.

Abigail typically responded to Anathi’s behaviour by modifying her interaction with him. For example, at T1 she stopped talking when he started crying, and instead

started rocking him. At T2, she was noted to change positions during feeding when Anathi looked uncomfortable. Abigail was also responsive to Anathi's needs at all three visits. For example, she responded to Anathi's crying by changing, feeding, patting or picking him up.

Emotions

Abigail often demonstrated pleasure by looking and smiling at Anathi from T1 to T3. At T1, she reported waiting for Anathi to be awake to be able to 'love him'. At T3, she was observed bouncing Anathi on her lap while they were both laughing together.

Speech

- *Prosodic features*

Abigail was occasionally observed using baby talk during her interaction with Anathi at T2 and T3.

- *Conversation and communication*

Abigail was rarely noted to communicate with Anathi. No conversational exchanges were observed at the first visit. At T2, Abigail was observed holding Anathi face-to-face and vocalising to him (for example 'nanana', 'hai hai hai' (English translation: No! No! No!)). At T3, Abigail spoke to Anathi twice, once using single isiXhosa words and the second time making vowel sounds ('ah ah ah'). During that time, she was sitting on a couch, while Anathi was on the floor.

4.2.6 Summary

After giving birth to Anathi, Abigail had a challenging start due to her breastfeeding difficulties. She is a young mother which could have contributed to her initial anxiety regarding the birth of her first child. Abigail's report of Anathi's communication skills were in line with the scoring of the RITLS. According to the RITLS, Anathi's communication skills appear age-appropriate when using corrected age except for Interaction-Attachment and Pragmatics where his skills remained in the 3-6 months range from T2 to T3. It was also noted that Anathi had not started babbling by T3. Abigail felt that her role in helping Anathi communicate was through physical

contact and by expressing herself verbally. She showed constant behaviours in most areas of the OCI except for the ‘speech’ subsection, as she rarely communicated and encouraged conversational exchanges with Anathi. This observation may have been noted due to the researcher’s presence.

4.3 Case study two: Beverly and Blair

4.3.1 Background information

Beverly is a 33-year-old white* female living in Wynberg, Cape Town, with her husband and three daughters. Her third daughter, Blair, was born at 33 weeks gestational age with a birth weight of 1900 grams. Beverly had been hospitalised at 33 weeks due to a placental abruption. She was admitted to a private hospital in Cape Town where an emergency Caesarean section delivery was performed. Beverly is a teacher by profession and speaks English at home with her family. She also speaks Afrikaans and Danish. Her other two daughters are three and six years old respectively.

Beverly was able to hold Blair shortly after birth, before the baby was admitted to the NICU. Beverly stayed in the hospital for three days, while Blair stayed in the NICU until she was discharged, about three weeks after birth. During her stay in hospital, Blair underwent phototherapy for jaundice and was connected to a C-pap machine to assist with breathing for the first four days after birth. Afterwards, she was placed in an incubator for one day, before moving into an open bassinet. Blair was fed through feeding tubes orally while she was on the C-pap machine, and nasally afterwards. A week before being discharged, she started being bottle fed. Beverly and her husband were able to hold Blair once she was off the C-pap machine. After being discharged, Beverly would visit Blair at the hospital once or twice daily. Beverly tried to practice KMC for about an hour everyday from there onwards. After Blair was discharged from hospital, Beverly would still place her on her chest, but not necessarily practice skin-to-skin contact.

*The terms used for the different races are consistent with those in common use and employed by the national census, and do not imply acceptance of racial attributes of any kind.

Having a premature birth led to Beverly being very emotional. She was shocked and panicked when she found out that she needed an emergency delivery. She was also worried that Blair might have medical problems. Beverly also reported feeling guilty for not being able to spend much time with Blair while she was in the NICU, and that she could not spend as much time as she would have liked to as she needed to take care of her other two daughters.

Blair exhibited some aversion to touch for the first few days after birth. Beverly felt that Blair's aversion to touch together with the complexities of holding a premature baby in an NICU made the bonding process for her and her husband difficult. She noted that she was not able to bond with her baby while she was in hospital as the premature infant spent considerable time sleeping. Beverly did however report that Blair was more relaxed during KMC and this helped them slowly start bonding.

4.3.2 Mother's perceptions of her infant's communication

The three interview schedules were analysed using conventional content analysis. The areas of the RITLS have been used as the headings and the findings are presented below using direct quotes from Beverly.

Interaction-Attachment

After being discharged from the hospital, Blair spent most of her time sleeping. She started becoming more active around the time that the first visit (T1) took place. Beverly noted that Blair's activity levels increased at each visit.

“Luckily she sleeps a hell of a lot, she is a typical prem baby. Yesterday she started waking up a bit more and being more alert” (T1).

“She is a lot more wakeful, she was still sleeping quite a lot then, although not as much as when she was a newborn but quite a lot” (T3).

From T1, Beverly encouraged Blair into a routine which she believed aided Blair in being able to predict events across her day.

“Like she already seems to know, the first few times that we bathed her, she did actually cry and I think largely because she was hungry and she wanted her bottle. Whereas now she knows after the bottle always comes the bath, so

that is the routine. So now she is kind of relaxing more and laughing. In terms of communication, the routine lets her know what is happening next without words, she knows” (T1).

At T1, Blair was able to recognise her mother’s voice and face. At T2 and T3, she was reported to show more interest in other people and objects.

“She just shows it with her eyes, she just watches, she watches my face generally to show me she is interested. When she hears my voice she does stop crying” (T1).

“She needs to be entertained a little more. She wants more of something. She is very interested in people, like now, she will sit and watch you. Especially whoever is talking, she loves looking at whoever is talking” (T3).

At T3, Beverly felt that Blair interacted differently and was more responsive to her sisters.

“She definitely interacts differently with her sisters, I think babies do, they notice other children, and she loves, they get the most reactions from her, laughing, I don’t know what they are doing, one of them will just come stand here, and start pulling faces or whatever and she will just start laughing. She loves them. I think she is a different baby than with adults” (T3).

Pragmatics

Blair made minimal eye contact with Beverly at T1, and did so mostly during feeding.

“Sometimes in the dark at night when I am feeding her, you can see her big eyes looking at me” (T1).

Blair started making eye contact for longer at T2 and started to look at objects as well. At T3, Beverly reported that Blair was more engaged when positioned in a face-to-face manner.

“She is just starting to look at objects, briefly” (T2).

“I think I try to position her in a way to get more eye contact. She seems to find it quite entertaining, she is more engaged in this position. But if you look

at her I think she finds it quite entertaining, and kind of watching my face or whoever is holding her” (T3).

Beverly felt that using baby talk resulted in Blair making more eye contact.

“She looks for longer when I baby talk, it is almost as if she is partaking in the conversation for a bit, but she can’t” (T3).

Blair started to engage in vocal turn taking with her family at T2 and continued doing so at T3.

“Quite often she makes noises and then we copy her, then she might do it again” (T3).

Play

While at T1, Blair had just started playing with mobile toys for a short period of time, she started holding soft toys and mouthing them at T2. At T3, Blair was reported to engage in shaking and banging her toys and was more explorative about her environment. She enjoyed playing with soft toys, toys that make noises, and a mirror.

“She probably is ready to start being entertained by a mobile but only for 10-15 minutes then she goes back to bed” (T1).

“She loves trees, if I need her to be occupied, I just put her in her picnic blanket or in her pram under the tree. And the lights coming under the trees for a baby is like the best mobile ever” (T3).

“There are a couple of toys she prefers, this kind of thing (soft toy), the teething thing, soft toys that make a noise, and there is a book upstairs on her bed, I often give her while giving her the bottle. It makes a noise, it got that paper inside that when you squash it makes a noise” (T3).

Beverly and Blair engaged in verbal play from T2.

“Like if I make noises, then she makes it, then I make it again” (T2).

Language Comprehension

At T1, Beverly felt that Blair was used to loud noise exposure from being hospitalised and thus did not react much to continuous loud noises. She would however startle to an unexpected brief loud noise. Blair also started paying attention to people's voices at T1 and was doing this for longer periods at T2. She started to localise sounds by turning her head in the direction of the noise and was able to discriminate between familiar people's voices and tones of voice at T2 and T3.

"She sleeps through a lot of noises. I think that is from being in ICU. She got used to noises quite quickly. She probably reacts more to silence and darkness, that something she wasn't really used to" (T1).

"She looks in the direction of the sound. She looks when we talk to her. She can hear I think the noise and she will try to follow it" (T2).

"I think she knows the angry voice from them (her sisters), if they've done something and get shouted at, she doesn't like it. She cried when they did something and got shouted at" (T2).

"She recognises our voices. Like upstairs in the morning, when I am changing her and Nandipha (the nanny) arrives and we can hear her downstairs. Lying on the chair I can see her, looking around for Nandipha. But definitely people who she sees everyday, not like strangers" (T3).

At T3, Beverly believed that Blair was interested and soothed by music and singing.

"Often I will put music on and then still leave her to play if I am busy and that kind of pacifies her for a while, the music. I sing to her to calm her down sometimes at night. But Sharon (her sister) sings quite a lot, she makes up half her songs but she sings, and this one definitely watches, very interested" (T3).

Language Expression

At T1, Blair mostly expressed herself through crying and made bodily sounds. She was reported to engage in cooing, shouting and laughing at T2. At the second visit, Beverly felt that Blair sometimes interrupts her vocalisations. At T3, Blair was reported to have started babbling at around three months.

“She is making a lot of noises. She has been making noises for quite a while, just like baby gurgling ooooo, lots of that. Recently she has started kind of shouting, making a lot of noise” (T2).

“If I am talking, she interrupts me, and sometimes starts talking quite loud, then sometimes you have to stop talking” (T2).

“She started making babababa at around 3 months but I would say she is changing, it is not as random, there are a lot more repetitions in the sounds, she will stick with a sound and keep saying it again. Dadadada that is her favourite one. She says that quite a lot” (T3).

4.3.3 Infant’s communication

The RITLS was used to obtain a communication profile of Blair at T2 and T3. The results are presented in Table 9.

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Table 9

Communication profile of Blair at T2 (in black) and T3 (in red)

	Strengths	Weaknesses	Comments
Interaction-Attachment	<ul style="list-style-type: none"> • Mother is relaxed and comfortable and smiles frequently during interaction • Smiles spontaneously to family members • Stops crying with adult eye contact • Shows differing responses to vocalisations and to family members • Smiles when alone • Stops crying with adult voice • Shows a desire to be with people and becomes more lively with familiar people • Shows separation fear 		Interaction-Attachment skills lie between a 3-6 months level at 3 months corrected age; between 6-9 months at 6 months corrected age
Pragmatics	<ul style="list-style-type: none"> • Shows interest, responds and makes eye contact with people • Laughs at amusing activities and cries for attention • Produces different cries • Engages in vocal turn taking • Shouts for attention • Maintains eye contact • Imitates facial expressions 		Pragmatics skills emerging at 3-6 months at 3 months corrected age; scattered between 3-9 months at 6 months corrected age
Play	<ul style="list-style-type: none"> • Momentarily looks at objects and plays with rattle • Reaches for and bangs object • Attempts to imitate facial expression • Smiles and reaches for self in mirror • Enjoys frolic play • Participates in games • Searches for hidden objects • Smiles and laughs during games 	<ul style="list-style-type: none"> • Does not attempt to imitate facial expressions 	Play skills emerging at 0-3 months at 3 months corrected age; emerging at 6-9 months at 6 months corrected age
Language Comprehension	<ul style="list-style-type: none"> • Quiets and moves in response to voice • Sound awareness, location and discrimination • Attends to speaker's mouth and voices • Responds to environmental sounds • Anticipates feeding • Recognises own name at times and responds to no • Startles at an angry tone • Attends to music, singing and pictures • Maintains attention to speaker 		Comprehension skills emerging at 3-6 months at 3 months corrected age; emerging at 6-9 months at 6 months corrected age
Language Expression	<ul style="list-style-type: none"> • Vocalisations (to caregiver and two different sounds) • Produces crying, cooing, guttural and other sounds • Vocalises to express pleasure and displeasure • Takes turns vocalising • Interrupts other people's vocalisations • Crying (hunger cry and to get attention) • Repeats a syllable while crying • Laughs and whines 		Expression skills emerging at 3-6 months at 3 months corrected age; emerging 6-9 months at 6 months corrected age.

	<ul style="list-style-type: none"> • Vocalises feelings through intonation and in response to singing • Babbles and stops with other people's vocalisations • Vocalises 4 different syllables • Shouts to get attention 		
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At T2, Blair presented with emerging abilities in the 3-6 months group for Interaction-Attachment, Pragmatics, Language Comprehension and Expression and with skills scattered in the 0-6 months group for Play. Blair had not started playing with a rattle and imitating facial expressions at T2. At T3, all communication skills fitted into the 6-9 months group. Blair therefore showed typical communication development within all areas of the RITLS at T2 and T3 when corrected age is used.

4.3.4 Mother's perception of her own role in communication

The analysis of the three interviews with Beverly generated the main themes 'physical contact' and 'verbal expression'. Each theme with its underlying subthemes is presented below.

Theme 1: Physical contact

- *Holding*

Beverly held Blair on the day she was born but was only able to do so for a limited period of time. While Blair was still in the NICU, Beverly and her husband would try to spend some time everyday holding her.

“And then they didn't like her to kind of be passed around, rather sit with one person for about an hour, then my husband would hold her for an hour”.

At T1, Beverly spent much of her time holding Blair. By T2, Beverly had started working again, and would spend less time holding Blair. She however reported trying to spend one-on-one time with her in the morning when her other children were still asleep. At T3, Beverly spent one-on-one time with Blair mostly at night.

“I touch her a lot. We hug her a lot. I find this morning time is good” (T1).

“Now we interact at different times, it is not the same coz she wakes up last. The time that she is alone with me is really at night when I give her a bottle,

and after that for a short while, then she goes to bed. So probably 15 minutes” (T3).

- *Positioning*

Beverly practiced KMC while Blair was in the hospital and felt that KMC helped in relaxing the baby. At T1, Beverly reported still placing Blair on her chest, but with her clothes on. By T2, she had stopped practicing KMC.

“But I think they certainly get very peaceful when they are on the mother's chest. I think she just kind of she gets so relaxed, I can feel her breathing slowing down and her whole body, her muscles just give in” (T1).

At T1, Beverly preferred placing Blair in her arms during feeding to make sure that she could watch her reactions. At other times, she would place her on her legs, on the couch or next to her on the bed. She mostly positioned Blair in a face-to-face manner at T1.

“Or I hold her in my arm, in my elbow. I find it easier to hold her like this coz I can see what she is doing and you can hold her a little bit more upright. As she gets bigger I'll probably put her in my arm” (T1).

At T2, Blair would sit up in her pram and her baby seat and lie down on her play mat. Beverly reported also placing Blair on her stomach everyday for ‘tummy time’. She continued feeding Blair in her arms. At T2, Beverly used a combination of face-to-face and the facing-away position.

“Like in the pram she used to lie down the whole time, now she sits up some of the time. And then she spent a lot of time in her baby carrying thing, lying flat on her back. And in that chair there, the pink chair there. She spends quite of bit of time there” (T2).

“Often if I am talking to her, then she is always like this (face to face) and she likes to stand. She feels really comfortable doing this, I think it is quite hard work. A lot of like this if I am talking to her or playing with her, and then when she gets tired or whatever then I sit her down like this, more on my lap (facing away)” (T2).

At T3, Beverly reported positioning Blair in various positions. Blair enjoyed standing on or sitting in Beverly's lap in a face-to-face manner. At times, Blair also sat facing away on her mother's lap during feeding and to be able to look around her. Beverly positioned Blair on the play mat, on the corner of the couch and in her high chair. She also reported using side-to-side positioning by holding Blair on her side while standing sometimes. The most commonly used position used during standing was in Beverly's arms. Beverly therefore continued using face-to-face and facing-away positions and also started using side-by-side positioning at T3.

"So she does quite a bit of this (standing or sitting on mom's lap facing mom). So we prefer up standing with eye contact, unless she is entertained by something else, then she sits like that (in arms on side, facing away). Probably on my hip a little bit or like this side to side. She now wants to check out what is going on around her so often finds lying down in my arms a bit limiting. So then, I hate it but she likes it. I hold her like this (facing away) and feed her with her bottle there. I don't like it coz I can't see her. But she obviously likes it coz she is so peaceful. Holding her up on my lap and arms while I am standing, that's the most common way" (T3).

Theme 2: Verbal expression

- *Helping talking*

At T1, Beverly felt that premature babies need to be spoken to more as their visual abilities are not as well developed. By T2 however, she reported no difference in her interaction with Blair as compared to her other children at similar ages.

"I think it's quite important to talk to them because certainly initially they can't see much, certainly not so clearly. So they get used to voices before faces I think" (T1).

"Like now. I don't think I react differently to her now, not anymore. I think I have almost forgotten that she was born prematurely" (T2).

At all visits, Beverly felt that Blair was more responsive and alert to the high-pitched voice used during baby talk. She reported sometimes using adult speech especially when other family members were around.

“If I am on my own then I feel that I do more baby talk with her, and I'd say that kind of more high-pitched voice, she is probably more alert to, she reacts more to it than just the normal adult voice. If I baby talk, she watches more, more and more” (T1).

“I use a bit of both, I would say mostly baby talk if it is directed at her. Particularly if I am on my own with her, if there are other people around probably more adult style conversation or older. I think she responds more with the high-pitched voice, it is kind of the noises entertain her more” (T3).

Beverly and her family involved Blair in everyday conversational activities by engaging her in made-up scenarios.

“We just talk to her all the time. We talk to her mostly about a whole lot of nonsense. I kind of ask her how she is, we've kind of made up scenarios to talk to her about. Like if I am leaving her with Nandipha, Nandipha will say now we will go and watch tv, play with play dough or whatever. You know you make up kind of silly scenarios that don't make sense for her but make sense for the older ones” (T1).

Beverly used various techniques in order to help Blair develop her communication skills.

“I think just really from listening to others, to us, to her sisters. Then eventually by her getting the words out. And repetition, a lot of repetition, I remember with the elder two, you know a lot of mama mama mama, and then they finally say that word” (T1).

“I make noises she makes, and add my own words. I exaggerate my words, use repetition, high pitched and slower. I just started showing her things and naming them. She is not so awake yet I think but just started. I show her pictures in a book, the simpler the better. If there is too much she loses interest. If there is just one thing or two, then she looks” (T2).

“If she is making happy noises, quite often I will make it with her, I will copy her. Or make other ones, make it almost like a conversation. I also copy her and add a bit of my own sounds. Generally she will carry on, she will make more noises” (T3).

- *Singing*

Beverly reported that her and her other daughters would sing to Blair at T2 and T3.

“I do sing to her, if she is crying, doesn’t look good, I sing and the kids sing. In the car, around bath time, coz she doesn’t like bath time generally” (T2).

“I sing to her to calm her down sometimes at night” (T3).

- *Increase in communication*

At T3, Beverly felt that she engaged more with Blair over time as she became more active and responsive.

“I think my role has changed because the more engaging she becomes, the more we do. So I think initially when she was so sleepy we didn’t do much then. But now it is quite easy to interact and engage with her, so we do more. But in a similar way. Baby noises, mimicking noises, that kind of thing. But just more of it. Not really more complex forms of speech” (T3).

4.3.5 Mother’s communication with infant

The adapted OCI was used to observe the interactions between Beverly and Blair. The observations are presented in terms of three main categories below.

Interaction and Behaviour

At T1, T2 and T3, Beverly often provided tactile and kinaesthetic stimulation by rocking Blair during feeding and stroking her after feeding. She typically positioned Blair in a manner to facilitate eye contact. At all visits, Beverly often responded contingently to Blair’s behaviours and modified her interaction in response to negative cues. For example, at T1, she stopped feeding Blair to burp her as she noticed that her baby’s facial expressions changed.

Emotions

Throughout the different visits, Beverly often displayed pleasure and smiled during her interaction with Blair. For example, at T1, Beverly was noted to smile when Blair burped after completing her feed.

Speech

- *Prosodic features*

Beverly was observed using baby talk with Blair at all three visits. She used slow speech with a higher pitch. Beverly also used simpler language and shorter sentences.

- *Conversation and Communication*

At all visits, Beverly often encouraged conversation and engaged in ‘teaching’ various concepts during her daily routine. For example, she was observed talking to Blair about her bottle and her nappy at T1. They were also noted to engage in vocal turn taking activities at T2 and T3. Some examples are given below.

“I know it’s coming, it’s coming (milk bottle). Did you say hello to everybody? Oh dear we are hungry, oh dear. It’s coming see, it’s just a bit hot” (T1).

“Can we chat? Lulu? Please? What’s that? There you are” (T2).

“What is that? Wow, blowing bubbles. Oops. Sorry sorry (while wiping baby’s face). What’s that? What’s that? Oh no, oh no. Do you want to lie there a bit?” (baby vocalising in between) (T3).

“Hey, do you want to come up now? You have had enough? Are you singing now?” (baby vocalising) (T3)

4.3.6 Summary

Beverly’s report of Blair’s communication skills was in line with the scoring of the RITLS. Blair showed typical communication development in all five areas of the RITLS when using corrected age. Beverly felt that she can help Blair communicate through physical contact with her and by verbally expressing herself. According to the OCI, Beverly was typically observed to show positive interactive behaviours in all three areas at all visits. An experienced mother, Beverly was able to make comparisons between her premature baby and her other two children. She noted that after the early weeks she could almost forget that Blair had been born early.

4.4 Case study three: Carmen and Calvin

4.4.1 Background information

Carmen is an 18-year-old coloured* female living with her father in a brick-house in Lavender Hill, Cape Town. Her brother and sister live close to their house and visit frequently. At the first and second visits, Carmen's boyfriend was involved in the caring of their son, but had stopped by the third visit. Carmen was unemployed before her pregnancy and was planning to look for a job. After her pregnancy, her father decided to financially provide for both her and her son. Carmen's father is the owner of a taxi business. Carmen's first language is Afrikaans but she also speaks English fluently. Carmen's first baby, Calvin was born at 36 weeks of gestation and weighed 1660 grams. Carmen presented with preterm rupture of membranes and was admitted for an emergency delivery at a tertiary hospital. After birth, Calvin underwent phototherapy for a day. Carmen was not able to hold Calvin until she started KMC, one day after giving birth. She stayed at the hospital with Calvin, and continued practicing KMC until they were discharged, about two weeks after birth. Calvin was fed expressed breast milk through a cup for the first three days, before being breastfed. Carmen reported feeling shocked at the early birth and being scared for her baby's health.

4.4.2 Mother's perceptions of her infant's communication

Using conventional content analysis, the findings of the interview schedules were grouped under the five areas of the RITLS. Direct quotes from Carmen have been included. The time of the visits have been indicated in brackets after each quote (T1: one week post discharge from hospital; T2: three months corrected age; T3: six months corrected age).

Interaction-Attachment

Carmen observed that Calvin spent considerable time sleeping at T1. He was awake mostly during feeding and slept after being fed. At T2 and T3, Calvin's activity levels were higher, and he was more aware of his environment and reacted more.

*The terms used for the different races are consistent with those in common use and employed by the national census, and do not imply acceptance of racial attributes of any kind.

Carmen and Calvin seemed to have developed reciprocity by T3.

“He sleeps a lot but sometimes at night he might be awake” (T1).

“Sometimes when I talk to him he would just look at me, but now he is more lively and he is responding...I have also changed, before I was not bothered too much, but now I’m on the ball” (T3).

At T1, Calvin recognised his mother’s face amongst other family members and by T2 he had started responding to her voice. Calvin also started differentiating between other people’s faces and voices at T3.

“He does not look at people but he recognises me. He cries with my sister, then I just take him, he looks at me in the eyes, in the face, then he is still, he just stops” (T1).

“If he sees my dad, he will laugh and scream, jump up and down. He recognises other people. He knows my voice, my daddy’s voice. If it’s my daddy, he will scream for him, he’ll know it’s my daddy. He also knows my brother, he will look at him” (T3).

Carmen felt that she and Calvin started to understand each other better at T2.

“I can understand him more now, and he knows what I want” (T2).

Pragmatics

Calvin started making eye contact with his mother as early as T1, and started maintaining eye contact for longer periods of time at T2.

“He looks at me in the eyes when he needs something” (T1).

“He is looking, he just looks, it’s like he is telling me with his eyes pick me up. If I am outside sometimes for too long, he looks at me, like he is saying I miss you, come” (T2).

At T2, Carmen and Calvin started to engage in vocal turn taking activities where the latter would vocalise in response to his mother’s speech.

“I make noises, then he makes” (T2).

“I talk, then he laughs then he talks as well” (T3).

Play

Carmen had not introduced toys at T2, but reported making ‘funny faces’ during play. She had introduced toys at T3, and Calvin started to reach out and mouth toys and was more explorative in nature.

“He is now going and grabbing stuff, and playing, he can sit also, he can sit alone and everything. He also puts toys in his mouth” (T3).

“Sometimes I must walk with him outside, then he wants to be outside. He likes to be outside” (T3).

Carmen and Calvin engaged in verbal play from T2.

“I talk, then he laughs then he talks as well” (T3).

Language Comprehension

Calvin showed awareness to sounds in his environment and startled in response to loud noises at T1. At T2, he was able to discriminate between different tones of voices, locate the sound by turning his head and also attend to the speaker’s mouth. Carmen felt that Calvin was able to understand certain gestures such as ‘come up’ and had started to pay attention to her speech for longer at T3.

“When there is a loud noise, he goes like this (startles).” (T1).

“He does know my voice, and he knows when I get angry” (T2).

“If there is a voice, he will look. Sometimes he looks at my dad. He looks at my mouth” (T2).

“If I talk to him, it feels like he can understand now” (T3).

Language Expression

In terms of language expression, Calvin expressed his needs mainly through crying at T1. He also made bodily sounds such as burping after feeding.

“He cries when he needs something, he only cries one way. He burps when he is done eating” (T1).

At T2, Calvin produced different types of cries and laughed frequently. He started vocalising and cooing. He would repeat a syllable while crying (for example,

‘yayayaya’) and interrupted his mother’s speech at times. At T3, Calvin started screaming often, especially when he was excited and continued cooing.

“He makes noises, he screams, he makes his own noises. Some stuff like that yayaya. He repeats the same thing when he is crying” (T2).

“Sometimes when I talk he starts talking in between” (T2).

“He screams, he starts talking alone and stuff” (T3).

4.4.3 Infant’s communication skills

The RITLS was used to obtain a communication profile of Calvin at T2 and T3. The findings are presented in Table 10.

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Table 10

Communication profile of Calvin at T2 (in black) and T3 (in red)

	Strengths	Weaknesses	Comments
Interaction-Attachment	<ul style="list-style-type: none"> Mother is relaxed and comfortable and smiles frequently during interaction Smiles to family members and when alone Stops crying with adult eye contact and voice Shows differing responses to family members Becomes more lively and shows a desire to be with familiar people 		Interaction-Attachment skills lie between a 3-6 months level at 3 months corrected age; emerging at 6-9 months at 6 months corrected age.
Pragmatics	<ul style="list-style-type: none"> Shows interest, responds and maintains eye contact with people Laughs at amusing activities and cries for attention Vocalises in response to vocalisations Shouts to gain attention 	<ul style="list-style-type: none"> Does not imitate facial expressions 	Pragmatics skills emerging at 3-6 months at 3 months corrected age; scattered between 3-9 months at 6 months corrected age
Play	<ul style="list-style-type: none"> Looks for object Enjoys frolic play Smiles at self in mirror Plays with rattle, reaches and bangs objects Reaches for self in mirror 	<ul style="list-style-type: none"> Does not play with rattle, reach for and bang objects Does not imitate facial expression 	Play skills scattered between 0-6 months at 3 months corrected age; scattered between 3-9 months at 6 months corrected age
Language Comprehension	<ul style="list-style-type: none"> Quiets and moves in response to voice Sound awareness, discrimination and location Attends to speaker's mouth Sometimes recognises own name and responds to no Responds to gestures 'come up' Attends to music Responds to sound when source not visible 	<ul style="list-style-type: none"> Does not recognise own name Does not respond to 'no' 	Comprehension skills emerging at 3-6 months level at 3 months corrected age; emerging at 6-9 months at 6 months corrected age
Language Expression	<ul style="list-style-type: none"> Crying (hunger cry and to get attention) and laughing Vocalisations (to caregiver, and two different sounds) Vocalises to express pleasure and displeasure Cooing Repeats a syllable while crying Vocal turn taking and interrupts other people's vocalisations Demonstrates sound play when alone Whines with a manipulative purpose 	<ul style="list-style-type: none"> Does not make guttural sounds Does not babble Does not vocalise in response to singing 	Expression skills scattered between 0-6 months at 3 and 6 months corrected age

Calvin generally presented with abilities ranging in the 3-6 months age group at T2 with the exception of play and language expression (0-6 months age group). At T3, he presented with skills in different age groups; 6-9 months (interaction-attachment, language comprehension), 3-9 months (pragmatics, play) and 0-6 months (language expression).

Calvin showed a delay in terms of language expression as no changes were noted from T2 to T3. He had not started babbling when the third visit took place. Calvin showed typical communication development within the other areas of the RITLS (Interaction-Attachment, Pragmatics, Play and Language Comprehension).

4.4.4 Mother's perception of her own role in communication

The three interview schedules were analysed using conventional content analysis. Again, the same two main themes ('physical contact' and 'verbal expression') emerged, but the subthemes were different compared to the other mothers.

Theme 1: Physical contact

- *Holding*

After giving birth, Carmen was able to hold her baby the next day. At T1 and T2, she spent considerable amounts of time holding and touching Calvin during their interactions. At T2, she reported being worried for the safety of her son when left alone, and would thus hold him most of the time. At T3, Carmen started holding Calvin less compared to T1 and T2, but reported that Calvin preferred being held by her rather than other people. At the time of the study, Calvin slept next to his mother on the same bed.

“He is always close to me, except when I bath or eat or something, then I give him to my sister or my brother or my daddy” (T1).

“The whole day and night I have to hold him. I like holding him the whole day, I don't trust to leave him on his own. I am scared that something will happen” (T2).

“Sometimes I must keep him, he doesn't want anyone but me, then I hold him” (T3).

- *Positioning*

Carmen started practicing KMC the day after giving birth, and continued after she and Calvin were discharged from hospital. At T1, Carmen mostly used the KMC position throughout the day, and would occasionally place Calvin in her arms. She encouraged face-to-face positioning at T1.

“I started KMC the next day. I enjoyed KMC, it wasn’t too much” (T1).

By T2, she had stopped practicing KMC. At the second visit, she reported placing Calvin in her arms while sitting, and upright against her shoulders while standing and walking. At T3, Calvin was able to sit up with support and therefore was sometimes placed in the car seat, on the ground or in his walking ring. At other times, Carmen would position Calvin on her lap, looking away from her, or standing on her and also placed him against her shoulders when he wanted to sleep. At T2 and T3, she used a combination of face-to-face and side-by-side positioning. She also used the facing away position at T3.

“I rock him a lot and look at him the whole time. Sometimes I put him against my shoulders, but when I sit in my arms, when I walk then my shoulders” (T2).

“I put him in the walking ring. Sometimes I put him on the car seat, or on the ground on a blanket. Also on me, sometimes standing on me, sometimes sitting (baby looking away). I turn him around at times, when he wants to sleep or something I put him on my shoulders” (T3).

Theme 2: Verbal expression

- *Helping talking*

Carmen reported using adult language during her interaction with Calvin at all visits. She felt that the use of adult speech was more effective in helping the baby’s communication skills develop.

“Me and my family talk to him, like anyone talks to a baby. I speak to him normally, like I’m talking to you” (T1).

“I prefer talking the way I talk to you. If you talk in baby language, they take a long time to listen and understand. He will learn faster if I talk like I talk to you (T2).

Carmen felt that her son would learn by listening to her. She reported repeating names of objects and naming them.

“I think he will learn by listening to me. He listens to me because I will learn him. Yes I will teach him. I repeat the same thing” (T2).

“Sometimes I show him colours and name them” (T2).

Carmen reported talking about everyday topics during her exchange with her son as from T1. At T2, she reported engaging Calvin more when he was more alert.

“I talk to him about his daddy, and about my father, my sister. He is just laughing” (T1).

“I talk to him, like if I go to the game shop, I will tell him this is the pool, look at the people shooting” (T3).

“I spend more time talking to him when he is awake. When he is sitting on my lap, he will jump up and down, then I know it is a good time to talk to him” (T2).

- *Singing*

Carmen started singing to Calvin from T2 and continued doing so at T3.

“Sometimes I sing to him, any song, at any time” (T3).

- *Increase in communication*

Carmen showed an increase from T1 to T2 in terms of encouraging conversation with Calvin. She reported engaging and talking to Calvin more as from T2 as he was more active and responsive during interactions. As a result of Calvin being more responsive, Carmen reported being more involved at T3.

“Sometimes when I talk to him he would just look at me, but now he is more lively and he is responding. He is also very friendly, he likes to laugh at people. I have also changed, before I was not bothered too much, but now I’m on the ball (T3).

4.4.5 Mother's communication with infant

An adapted version of the OCI was used to observe the interactions between Carmen and Calvin. The observations were categorised into three main areas namely, Interaction and Behaviour, Emotions and Speech.

Interaction and Behaviour

Carmen often provided tactile and kinaesthetic stimulation and responded regularly to Calvin's behaviour during their interaction at T1, T2 and T3. She was observed to frequently rock him while holding him at all three visits. During the hearing screening at T1, she placed her finger in Calvin's mouth to soothe him as he was restless. At all three visits, Carmen often modified her interaction with Calvin when he showed negative cues. For example, as soon as Calvin started crying at T1, she placed him on her breast and started rocking him. At T1, Carmen used mostly the KMC position during their interaction therefore enabling frequent eye contact. She reported practicing KMC when she sleeps, lying with Calvin on her chest. By T2, Carmen had stopped practicing KMC and enabled less eye contact as she started placing Calvin in positions where he would be facing away from her looking outwards.

Emotions

Carmen often displayed pleasure and smiled frequently during her interaction with Calvin. At T1, she was observed laughing while changing Calvin's nappy, and was noted to laugh together with Calvin at T3. She was also observed looking and smiling at him at various points during the different visits.

Speech

- *Prosodic features*

Carmen never varied her prosodic features at any of the three visits.

- *Conversation and Communication*

Carmen was rarely observed communicating with Calvin. At T3, she was observed vocalising to Calvin once ('ki ki ki') while holding him on her lap facing her. She was also seen talking to him at another instance ('Yo you are making me tired man').

4.4.6 Summary

Carmen's report of Calvin's communication skills were in line with the scoring of the RITLS. Based on the RITLS, Calvin's communication skills appear age-appropriate when using corrected age for all categories except for Language Expression. Calvin had not started babbling at T3. Carmen had a very strong physical relationship with Calvin and believed that she could help him communicate through lots of holding. She also reported talking and singing to him. According to the OCI, Carmen showed positive interactions with Calvin except for the 'speech' subsection. Carmen was rarely observed communicating with Calvin and no conversational exchanges were noted, perhaps due to the researcher's presence.

4.5 Case study four: Debra and Dominique

4.5.1 Background information

Debra is a 29-year-old coloured* female living in low-cost housing in Mitchells Plain, Cape Town. Debra is a housewife and lives with her three children, husband and father. Her first child was also born prematurely. Debra's first language is Afrikaans, and English is her second language, spoken fluently. Debra went for a routine check-up at the local community health centre at 28 weeks gestation and was diagnosed with high blood pressure. She was referred to a maternity hospital where she was admitted for three days, before being transferred to a tertiary hospital. Debra was hospitalised for about a month, till 34 weeks gestation, when an emergency Caesarean section was performed for foetal distress. A baby girl, Dominique was born weighing 1530 grams. After birth, Dominique was placed in an incubator for six days. While she was in the incubator, Debra was able to take her daughter out to hold her. Four days after delivering, Debra was discharged for a day, before being re-admitted to start practicing KMC. She continued practicing KMC till they were both discharged, about a week later when Dominique was 12 days old. When Dominique was in the incubator, she was cup-fed her mother's expressed milk. Debra started breastfeeding when she started KMC.

*The terms used for the different races are consistent with those in common use and employed by the national census, and do not imply acceptance of racial attributes of any kind.

As Debra had previously had a premature baby, she had a sense of hope that her newly born would develop well physically and would be able to communicate well.

4.5.2 Mother's perceptions of her infant's communication

Conventional content analysis was used in the interpretation of the three interview schedules conducted at each visit (T1: one week post discharge from hospital; T2: three months corrected age; T3: six months corrected age). The findings are presented according to the five areas of the RITLS along with direct quotes from Debra.

Interaction-Attachment

At T1, Debra reported that Dominique spent most of the day sleeping but was very active when awake. Her activity levels increased considerably after T1. At T2 and T3, Debra felt that Dominique was more awake and engaged more with people and her environment. Debra also noted that Dominique seemed to be more active and have developed faster compared to her siblings.

“She is not awake a lot, but during the times when she is awake, like early in the mornings, and then after 12 she is very active” (T1).

“The development is different, she is doing more stuff. The stuff that she does, they didn't do. They were sleepy all the time, not like this one. She is wild and has a lot of energy for her age” (T2).

She reacts differently. She is much more active. They were mostly quiet. She makes a lot of noise. She also plays more, because she sleeps less (T3).

Dominique started recognising her mother's face amongst others at T1. At T2, she started to respond to her mother's voice and discriminating between different voices and faces.

“I think she recognises me. Sometimes when I pick her up, she's quiet. When she looks at me then she is quiet the whole time. But when somebody else picks her up, she will look at them, she stays quiet for a few moments then she starts crying” (T1).

“She is laughing when I talk to her. Sometimes she talks back, sometimes she cries if she needs something” (T2).

“Our relationship has grown very nice, it has changed a lot. She knows exactly who I am. She knows who everybody is” (T3).

Pragmatics

At T1, Dominique was reported to make eye contact with her mother during feeding and other times. She also enjoyed looking at her surroundings and showed interest in people. She started to maintain eye contact for longer periods of time at T3.

“Yes she watches me sometimes when I am feeding, and sometimes she watches the surroundings” (T1).

“When she is looking at us, I know she is interested, she’s lying still and so, we can see her attention is with us and she is interested. She looks at me, just like now” (T1).

“She looks at me a lot especially when I feed her. She stares for longer now. She looks longer at me. Like the first time it was only a few seconds. But now it’s more like when she is done, then she looks away” (T3).

Debra and Dominique engaged in vocal turn taking activities during everyday activities at T2 and T3.

“She tries to talk to me in her own way. I say something, then she tries to say something” (T2).

Play

At T1, Dominique did not play with toys. She made facial grimaces during her interaction with people at T1 and T2. Debra introduced some toys such as keys and a teddy bear at T2 and a rattle and stuffed toys at T3. Dominique started reaching out and holding toys at T2, and banging and mouthing toys at T3. She started engaging in verbal play at T2.

“She is sort of looking at them and pulling faces or whatever it is she does” (T1).

“Everything goes to the mouth now, she will look at it and then puts it in her mouth. Yes she also bangs things, but mostly she will just bang her hand up and down” (T3).

“We make noises together also. But she doesn’t want us to make a louder noise than her, she wants to make the loudest noise. If I make a loud noise, then she will cry. I think it’s because she just wants it her way” (T3).

“On the bed she is laying there, and then I just play with her, do funny stuff. Sometimes we put our faces by her, then she grabs the hair or here (cheeks) then she makes a whole lot of noises” (T3).

Debra also felt that Dominique was more explorative about her environment at T3.

“She explores around her a lot more now. She reaches out if its far, look how she broke my plants already. She breaks it off, she grabs it then when she sees the pieces are too tiny, she drops it on the floor. She will go from here, then she sees she can’t reach from here, like now everything has been pulled off, it’s all broken, now she can’t reach so she goes to the door, she plays with the knobs and after that she just goes to the window, plays with the curtains” (T3).

Language Comprehension

Debra reported that Dominique showed awareness of sounds around her and located the sound by turning her head towards it at T1. At T2, Dominique responded to environmental sounds, startled in response to loud noises and was able to discriminate between different tones of voices. By T3, she was even more responsive and could pay attention as to where distant sounds were coming from and was also able to recognise her own name.

“She reacts, I would say she reacts, she moves her head to look at the sound” (T1).

“She listens to music even if it is loud. When it is a bang sound, then she jumps (T2)”.

“She knows when I am angry by listening to my voice” (T2).

“And when she hears daddy’s car then she looks. She can hear the sounds, she looks at the door. She is responding a lot more” (T3).

“If I ask her where is Oupa? Then she will look into his room. If I say when is Titi coming, she looks there through the door when she is coming back from school” (T3).

Language Expression

At T1, Dominique had different ways of expressing her needs mainly through crying and gesturing. At T2, she started taking turns vocalising and often laughed during playtime. She also produced cooing sounds and sometimes interrupted her mother's vocalisations by screaming or vocalising back. By T3, Dominique had started babbling, and also attempted to sing along to nursery songs.

“When I know that she is hungry, she puts her hands in her mouth or takes her clothes and puts it in her mouth, that's when I know she is hungry. And when she is wet, she will kick and move and stuff like that” (T1).

“She talks back now, the sounds and everything. When my other daughter talks, then the baby talks back. She makes ya ya ya ya” (T2).

“Aouuu, then giiii, then bangs her hands. Then ta ta ta ta” (T3).

“She knows ‘I love you Barney’. She sings it in her own way” (T3).

“Like a cat sound, soft voice sometimes. She makes a lot of sounds that I can't make, sometimes a mixture, like bada” (T3).

4.5.3 Infant's communication skills

The RITLS was used to obtain a communication profile of Dominique at T2 and T3. The results are presented in Table 11.

Table 11

Communication profile of Dominique at T2 (in black) and T3 (in red)

	Strengths	Weaknesses	Comments
Interaction-Attachment	<ul style="list-style-type: none"> Mother is relaxed and comfortable and smiles frequently during interaction Smiles to family members and when alone Stops crying with adult eye contact and voice Shows differing responses to family members Becomes more lively with familiar people Sometimes responds to 'come here' 		Interaction-Attachment skills lie between a 3-6 month level at 3 months corrected age; emerging at 6-9 months at 6 months corrected age
Pragmatics	<ul style="list-style-type: none"> Shows interest, responds and maintains eye contact with people Laughs at amusing activities and cries for attention Engages in vocal turn taking Produces different cries and shouts for attention Exchanges and uses gestures to protest 		Pragmatics skills emerging at 3-6 months at 3 months corrected age; emerging at 6-9 months at 6 months corrected age
Play	<ul style="list-style-type: none"> Looks and reaches for object Attempts to imitate facial expression and smiles at self in mirror Enjoys frolic play Bangs objects Participates and anticipates games Searches for hidden objects Reaches for self in mirror 	<ul style="list-style-type: none"> Does not bang objects 	Play skills emerging at 3-6 months at 3 months corrected age; emerging at 6-9 months at 6 months corrected age
Language Comprehension	<ul style="list-style-type: none"> Quiets and moves in response to voice Sound awareness, location and discrimination Attends to speaker's mouth and voices Responds to environmental sounds Recognises own and family names Responds to 'come up' gesture Cries at an angry tone Attends to music and pictures Maintains attention to speaker Waves in response to 'bye bye' 		Comprehension skills emerging at 3-6 months at 3 months corrected age; emerging at 6-9 months at 6 months corrected age
Language Expression	<ul style="list-style-type: none"> Vocalisations (to caregiver and two different sounds) Produces crying, cooing and other sounds Vocalises in response to singing and to express pleasure and displeasure Takes turns vocalising and imitates talking Interrupts other people's vocalisations Crying (hunger cry and to get attention) Repeats a syllable while crying Laughs and whines Makes guttural sounds, babbles 	<ul style="list-style-type: none"> Does not make guttural sounds 	Expression skills scattered between 0-6 months at 3 months corrected age; emerging 6-9 months at 6 months corrected age.

	<ul style="list-style-type: none"> • Vocalises 2 syllable combinations and imitates duplicated syllables • Vocalises during games and to get attention • Sings along to Barney 		
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Dominique presented with abilities ranging in the 3-6 months age group at T2, with the exception of language expression skills being scattered between the 0-6 months group. At T3, her skills fell into the 6-9 months age group. Dominique therefore showed typical communication development in all areas of the RITLS when corrected age is used.

4.5.4 Mother’s perception of her own role in communication

Conventional content analysis generated the same two main themes (‘physical contact’ and ‘verbal expression’) as with the other three mothers. Different subthemes were however noted amongst the different participants. The themes and subthemes from Debra’s interview are presented below.

Theme 1: Physical contact

- *Holding*

Debra was able to hold Dominique from the day she was born, even while she was in the incubator. After being discharged from the hospital, Debra reported always holding Dominique when she cried and also slept next to her at night at T1, T2, and T3.

“When she cries I pick her up, I always pick her up. She also sleeps next to me. She wakes up every 4 hours” (T2).

- *Positioning*

She started practicing KMC while in hospital, and continued to do so after being discharged. At T1, she practiced KMC mostly at night, as she was often busy with household chores and also had to take care of her other two daughters. She placed Dominique in her arms at other times. Debra stopped practicing KMC when Dominique weighed two kilograms. At T1, Debra positioned Dominique in a face-to-face manner.

“All over, like this (against shoulders), in front, when we go sleep I Kangaroo. I still do it most of the time when I go to bed and when I have the time to. It’s like sometimes I have to do something, cleaning, cooking, when I finish I have to do the toilet, so then I have to take her out and then put her in again” (T1).

At T2 and T3, Debra positioned Dominique in her arms during feeding, upright against her shoulders at times and also placed her in a baby car seat. Dominique was able to sit up with support at T3, and would therefore also be placed in her pram, baby walker, on the couch or on the bed.

“When she is awake, with her eyes open just looking at me, that’s a special moment. I keep her like this (face-to-face in arms) so she can see me, look at my face” (T1).

“I hold her up/sit up when she is not hungry, when I feed her then in my arms. Sometimes over the shoulders or in her car seat” (T2).

“We just bought her the pram now, but before that we got her a walking ring, she is running up and down in it” (T3).

“Now she sits up straight, she can sit up nicely, she can sit her alone, not alone but I must sit here by her. I put her next to me on the couch, also in the pram” (T3).

Debra used face-to-face, side-by-side and facing away positioning at T2 and T3.

“I prefer putting her in front of me, so she can look around, she is very busy this one” (T2).

“When she wants to sleep, then I put her there on my side, and I also turn on my side, then I make her sleep” (T3).

Debra reported spending more time making physical contact with Dominique when she was more alert and responsive. While at T2, Debra felt that she spent a lot of time holding Dominique as she often sought her mother’s attention, she started spending less time holding her at T3, as Dominique was able to sit up with support.

“I hold her when she is making sounds and wants to play, or the whole time when I feed her (T3).

“Most of the time I hold her because she is very naughty, she looks for my attention all the time” (T2).

“There are times when I need to carry her, like take her out of the walking ring, mostly when she is tired of walking” (T3).

- *Breastfeeding*

Debra struggled to breastfeed Dominique after birth, and felt that these difficulties affected her and her infant’s mood. She felt that the feeding difficulties had a major impact on the bonding between her and Dominique. By T2, Debra had stopped breastfeeding, and only fed Dominique infant formula.

“The milk is little and my nipples had been sore so she gets upset then I get upset” (T1).

At T2, Debra reported that KMC helped her bond with Dominique over time.

“KMC helped a lot actually, with the bonding and stuff. It was the first time that I Kangaroo, the nurses told me everything, how it works, and it is better than the incubator, to do that. I would recommend KMC to other mothers. KMC helped with the weight a lot and the bonding” (T2).

Theme 2: Verbal expression

- *Helping talking*

Debra believed that she had to provide additional stimulation due to Dominique being born prematurely.

“I think she will develop fine, but we will have to see about it. Like talking a lot to her can help” (T1).

“Because I was talking a lot to her when she was smaller that’s why she is smiling and talking so early. I think I spoke to her more compared to the other two, because I knew she is premature and I need to talk to her more, so she can learn” (T2).

Debra used adult language to Dominique at all three visits. At T2 and T3, she reported using some baby talk during play activities. Debra however preferred the

use of adult language as she felt this method would enable the baby's speech to develop faster.

"No I do not speak in a baby manner, like I talk everyday" (T1).

"I talk to her normally. Sometimes when I do that 'funny stuff in the baby manner' but not all the time. I talk to her in a baby way when I am playing with her only. I think the normal way of speaking is better. Then the child will talk quicker. When she starts talking, then her words will come out like an adult, she will learn the better words" (T2).

"I speak baby language, just a little bit but not too much. They say if you talk like a baby to a baby then they won't pronounce their words so well. That's why I don't. Family told me this" (T3).

Debra mostly used modelling at T1.

"I talk to her like I would talk to someone else, but it's just that she doesn't talk back. I know she can hear me" (T1).

At T2 and T3, she started copying and adding to Dominique's vocalisations.

"If I hear her making noises, I make it with her, I copy her, then she just gets excited. Sometimes I just copy what she says, and then sometimes I add my own words to her sounds" (T2).

At the last two visits, she also reported taking turns talking with her daughter and labelling items such as clothing and pictures.

"She tries to talk to me in her own way. I say something, then she tries to say something" (T2).

"Yes she copies us sometimes. Sometimes I make ouuu and then she makes ouuu. If I say dada, she says dada. She repeats what I say, just tata" (T3).

"My daughter likes to tell her 'madam what are you going to wear today?'. Will it be pink or yellow, and then she talks back (shows her the clothes at the same time)" (T2).

"My daughter gave her my pictures and the daddy. Then she asks where's mommy, then she looks at the pictures" (T3).

Debra reported that her and her family engaged in everyday situational talk with Dominique.

“I talk to her about things around her, different kind of stuff” (T2).

“When she makes noises, then I say what is baba saying. Like this morning we went out, we went to town centre to buy something, I asked her where are we going, then she laughs and says tatatata, I say yes we are going now” (T3).

- *Increase in communication*

Debra felt that she started communicating more with Dominique at T2 and T3 as she became more responsive to her mother’s speech. She also felt that she communicated more with Dominique as compared to her other two children.

“My role did change. In the beginning I didn’t talk much, only when she started to talk back. She did talk back in the beginning but now it’s more easier” (T3).

“My interaction with her is different. The other ones I didn’t have much experience, especially the first one. But I talk to this one a lot now. I didn’t talk much to the others. I used to think I am always talking to you but I don’t know what you are saying back. Like that time it was like that but not now. Now I realise that if I talk and she talks back, then I just make my own stuff, like what she is saying” (T3).

- *Singing*

Debra reported singing to Dominique at T2 and T3.

“I sing to her, she listens and she laughs” (T2).

4.5.5 Mother’s communication with infant

Interactions between Debra and Dominique were observed using the adapted OCI and were analysed descriptively. The items were presented in terms of three main categories.

Interaction and Behaviour

At T1, T2 and T3, Debra often provided appropriate tactile and kinesthetic stimulation. For example, at T2, she stroked Dominique during and burped her after feeding. At all three visits, she often responded contingently to Dominique's behaviours. For example, at T1, she picked Dominique up when she cried and fed her when she showed that she was hungry by putting her finger in her mouth. Debra also often modified her interaction in response to negative cues from Dominique at T1, T2 and T3. For example, at T1, Dominique started crying during the hearing test: Debra picked her up and patted her until she stopped crying.

At T1, Debra mostly positioned Dominique in a face-to-face manner in order to enable eye contact. At T2 and T3, she sometimes used face-to-face positioning, but also used side-by-side and facing away positions. Debra therefore enabled eye-to-eye contact often at all three visits.

Emotions

Debra showed a gradual increase in the expression of her emotions from T1 to T3. At T1, she rarely displayed pleasure during her interaction with Dominique. She smiled once during the interview, while she was changing Dominique. Over time, she showed more pleasure and smiled more frequently. Debra sometimes displayed pleasure at T2, and did so often at T3.

Speech

- *Prosodic features*

Debra did not use varying prosodic features during interactions at T1, and did so rarely at T2 and T3.

- *Conversation and communication*

At T1, Debra was not observed communicating with Dominique. At T2, she was noted to repeat Dominique's vocalisations once (for example, 'ou ou ou'). Dominique was observed vocalising back ('oo') to her older sister's vocalisations ('tatata') at T3.

4.5.6 Summary

Debra experienced a difficult start to her relationship with Dominique due to breastfeeding difficulties which lead to bonding problems. Their relationship however improved over time and Debra seemed to have developed healthy attachment with her daughter.

Debra's report of Dominique's communication skills were in line with the scoring of the RITLS. Dominique presented with age-appropriate communication skills for all areas of the RITLS at both T2 and T3. Debra reported using physical contact and verbal expressions to enable Dominique's communication skills to develop. She showed constant behaviours in terms of interacting with Dominique. In terms of emotions, Debra was noted to display more pleasure over time, possibly due to the initial breastfeeding and bonding difficulties. Debra started encouraging conversation and started communicating more with Dominique at T2. During the interview, Debra often compared Dominique's abilities to her older siblings. She felt that she has learnt from her older children, and was able to do things differently with Dominique.

4.6 Summary of mother-infant dyads findings

This chapter presented the four mother-infant dyads and the findings in relation to each objective. All four mothers shared their knowledge of their infant's communication development and were able to report on this accordingly. There was a match between what the mothers perceived and what the researcher observed.

Considerable individual differences were noted between the participants. Two infant participants, Anathi and Calvin showed delays in terms of their communication development based on the RITLS. While Anathi showed minimal changes in terms of the items observed for Interaction-Attachment and Pragmatics (3-6 months) from T2 to T3 Calvin showed no changes in Language Expression (0-6 months) from T2 to T3. Blair and Dominique both showed typical communication development within all areas of the RITLS.

The two recurring themes that emerged from the interviews with all four mothers were 'physical contact' and 'verbal expression' as a means to help their child communicate. The interviews with each mother however generated varying subthemes. The mothers showed different patterns of behaviours with their infants over time. All mothers showed constant positive behaviours in terms of interacting with their infants. Three mothers displayed pleasure throughout the three visits. One mother, Debra initially appeared withdrawn from her infant, but gradually displayed more pleasure over the next two visits. Only one mother, Beverly was frequently observed communicating and engaging in conversational exchanges with her infant at all three visits.

University of Cape Town

DISCUSSION

5.1 Introduction

This chapter presents a discussion of the study findings. The findings are summarised and discussed in terms of the participants’ similarities and differences and put into perspective, in relation to the reviewed literature.

The aim of this study was not to form generalisations from the findings, but rather to explore and develop a richer understanding of early communication skills of low-risk low birth weight premature infants. In addition, this research investigates the interactions of premature infants with their mothers. The findings show that the two research aspects are interrelated, as proposed by the transactional and ecological models.

5.2 Mother’s perceptions of her infant’s communication

5.2.1 Overview

Three different interview schedules were administered over the three home visits for each dyad. Conventional content analysis was used to interpret the data obtained from the schedules. The five areas of the RITLS accompanied by the underlying themes are presented below.

Table 12

Summary of themes

Interaction-Attachment	Pragmatics	Play	Language Comprehension	Language Expression
Activity levels	Eye contact	Types of play	Awareness	Crying
Reciprocity	Vocal turn taking	Mouthing	Location	Bodily sounds
Recognition		Banging	Discrimination	Shouting
Routine		Explorative	Responsive to music	Laughing
Siblings			Responsive to own name	Cooing
				Interruptions
				Babbling
				Singing along

Overall, this study found that the four mothers shared some common perceptions of their infants' communication skills. The mothers all provided an accurate report of their infants' communication. However, individual variation in their infants' reported skills was also noted, showing the uniqueness and diversity within each mother-infant dyad. Two mothers (Abigail and Debra) experienced breastfeeding difficulties which could have also affected the bonding process. Despite their initial difficulty in bonding with their infants, these mothers reported to have achieved synchrony with their infants by the third visit.

5.2.2 Similarities

Interaction-Attachment

All four of the mothers reported that their infants' activity levels increased considerably over the three visits. At the first visit, all mothers noted that their infants spent most of their time sleeping. These findings are consistent with research showing that premature infants have different regulatory and interactive capacities compared to term infants (Fiamenghi, 2007; Forcada-Guex et al., 2006). A previous research study has also described premature infants as less active, attentive, alert and responsive (Fuertes et al., 2009). Nicolaou et al. (2009) conducted a qualitative study to assess mothers' experiences of interacting with their premature infants. Mothers reported that their infants were sleepy and unresponsive during the first few weeks after birth and this in turn made them become less responsive during interactions. With the rising activity levels, the four infants in the present study became more responsive and engaged more with their environment which then promoted better opportunities for interacting.

Two mothers, Abigail and Carmen, reported that they developed a more reciprocal relationship with their infants over time. It is known that mothers face challenges developing reciprocity with their premature infants (Fegran, Helseth & Fagermoen, 2008). Firstly, the attachment process can be less developed due to the premature birth of the infant. Attachment theory postulates that the first few months of life are crucial in establishing the mother-infant bond (Bowlby, 1969). This bond is normally developed over time during daily interactions and routines (Rossetti, 2001). Physical proximity is an important aspect in the establishment of attachment (Fegran et al.,

2008). It has been reported that mothers who were deprived of physical contact after birth have different experiences of bonding with their infants. The lack of physical stimulation after birth could therefore delay the attachment process between the mother and her infant. Secondly, mothers of premature infants might struggle emotionally due to the unexpected and traumatic birth and become less confident in interactions with their infants (Fegran et al., 2008).

In the present study, both Abigail and Carmen reported only developing this reciprocal relationship after being discharged from hospital, when they were able to engage in daily interactions. Beverly also reported finding it difficult to bond with her daughter while she was still in the NICU. This study suggests that the early bonding experiences of these mothers may have been delayed due to the complexities linked to premature birth such as limited interaction during the infant's stay in the NICU and the emotional strain placed on the mother.

All mothers practiced KMC once their infants were medically stable. The beneficial effects of KMC on mother-infant interactions are well documented (Johnson, 2005; Nyqvist et al., 2010; Tessier et al., 2003). KMC has been reported to have a positive contribution during the hospital stay and over long-term (Feldman et al., 2002). Studies have shown that in spite of the expected positive effects of KMC during the hospital stay, mothers often feel that the hospital staff focus more on infant weight gain and early discharge, both essential components of the practice of KMC (Nyqvist et al., 2010; Swift & Scholten, 2009), instead of focusing on mother-infant interactions. In their research, Nicolaou et al. (2009) described that less than 50% of mothers reported positive experiences with the hospital staff in terms of the promotion of mother-infant interaction.

In the current study, the four mothers achieved positive attachment where they would understand their infant's signals and react appropriately. The mothers reported that over time the practice of KMC aided in the establishment of bonding with their infants. Feldman et al. (2002) also reported that KMC had a positive contribution on parental perceptions and behaviour. Other findings from this study were that mothers

who practiced KMC showed less signs of depression and were more sensitive during interactions with their infants.

KMC is normally practiced by placing the baby on the mother's chest (Feldman, 2004). This position is however not always practical and modified forms have been reported by the mothers in this study. At T1, Beverly reported placing Blair on her chest, but without the use of direct skin-to skin contact while Debra practiced KMC only at night. Two mothers, Abigail and Carmen reported practicing KMC regularly at T1 and spending considerable amounts of time touching and holding their babies at T1 and T2. This difference in KMC practice could be due to the fact that Beverly and Debra had two other children to take care and were thus less available. At each visit, Carmen also reported sleeping next to her son.

A study in North America (Green & Groves, 2008) identified parenting behaviours used by 275 mothers who identify themselves as 'attachment parents'. Most mothers reported exclusively breastfeeding their infants on cue and that the infants were held or nursed during their transition to sleep, and co slept with their mothers. These care giving practices are known as attachment parenting. In the present study, Abigail and Carmen appeared to be following some of the key practices of attachment parenting with their infants during their first three months of life.

The transactional model (Meisels & Shonkoff, 1990) has been used to describe the effects of premature birth on the mother and her infant, and the bonding process between them (Figure 8). In this study, premature birth acted as a risk-factor in terms of mother-infant interaction and bonding. The infants' early birth was associated with long hospital stays and limited physical interaction with their mothers. Additionally, premature infants are known to have lower activity levels as compared to term infants (Fiamenghi, 2007). These difficulties caused the mothers to become anxious and challenged the attachment process. The practice of KMC together with the increasing activity levels of the infants acted as protective factors and helped in establishing successful mother-infant attachment.

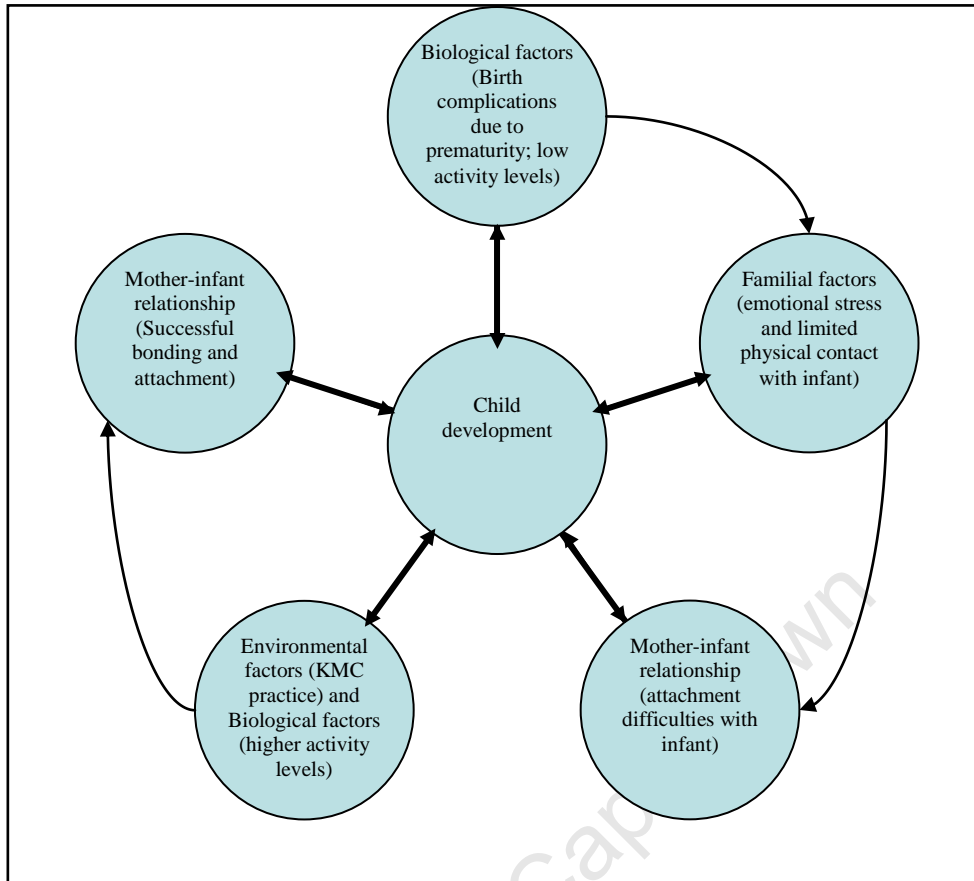


Figure 8: Effects of premature birth on bonding

All infants were able to recognise their mother's faces at T1, their voices by T2 and family members by T3. These milestones are all age-appropriate and in line with typical communication development (Owens, 2005).

Pragmatics

All four of the infants had only established minimal eye contact with their mother at T1. Owens (2005) stated that newborn full-term infants are attracted to visual stimuli within a few hours after birth. For example, during feeding, infants show their fascination of their mother's face by making eye contact. Eye contact is an important tool in the establishment of reciprocity as the mother in turn interprets her child's eye contact as a sign on interest. Parents of children who have problems initiating eye contact, such as those with blindness or Autism Spectrum Disorders, have been reported to have interaction and social communication problems (Clifford & Dissanayake, 2008; Dale & Salt, 2008; Owens, 2005).

In this study, the infants showed minimal eye contact after birth due to their relatively underdeveloped physical and mental maturity. However, all the infants were maintaining eye contact for prolonged periods of time at T3. These skills are age-appropriate as eye contact is normally established at around one month of age (Owens, 2005). Eye contact serves an important function during infant-caregiver interactions. Literature has shown that mothers whose infants are able to return their eye gaze feel more emotionally attached to their baby (McLaughlin, 2006). Referring to the transactional model, it can be suggested that with increasing activity levels and developmental skills, the infants engaged in making more eye contact, which could have been a factor in the establishment of successful attachment between the mothers and their infants over time.

Three infants started engaging in vocal turn taking at T2 and one infant (Anathi) slightly later than expected, at T3. According to Rossetti (2001), vocal turn taking normally appears around 3 months of age, corresponding with T2 in the current study. Vocal turn taking is essential for the development of more complex speech and conversational skills (Fletcher & MacWhinney, 1995). The transactional model possibly indicates that as the infants developed, they started vocalising more, encouraging their mothers to engage in vocal turn taking with them. Overall, the mothers and infants might have reinforced one another's vocalisations, establishing an early means of communication (Owens, 2005).

Play

Three of the mothers felt that their infants were too young to play with toys at T1. One mother (Debra) introduced toys at T2 while the other two mothers (Abigail and Carmen) did so at T3. The common reason for introducing toys later was due to the fact that their infants were still unresponsive and not alert enough. Research suggests that parents of premature infants often perceive their infants to be more vulnerable compared to term infants and in turn provide fewer learning opportunities (Allen et al., 2004). As a result, these parents spend less time playing with their infants (Muller-Nix et al., 2004) and often choose less age-appropriate toys for their infants (Porter et al., 2009). In the current study, Beverly reported that premature babies need to be exposed to more language due to their undeveloped visual abilities while

Debra reported having to provide additional stimulation due to her daughter being born prematurely. Unlike studies where mothers perceive their infants as vulnerable, Beverly and Debra provided more learning opportunities for their premature infants. Moore & Brooks-Gunn (2002) reported that younger mothers provide less play material for exploration. In the current study, the two mothers (Abigail and Carmen) who introduced toys at T3 were teenagers and perceived their infants as being too young to play with toys at T1 and T2. Their infants, Anathi and Calvin, in turn started holding and banging toys at T3 (6 months corrected age), skills normally expected to occur at 5 months of age. The other two infants, Blair and Dominique started holding and banging toys at T2 (introduced to toys at T1 and T2 respectively). This study suggests that the low activity levels of the infants as well as the mother's age influenced the introduction of toys, which in turn may have impacted on the infants' play skills.

Three mothers (Beverly, Carmen and Debra) reported that their infants were more explorative of their environment at T3. Developmental guidelines show that increased motor and visual abilities lead to improvement in social development, specifically play skills in the current study (Owens, 2005). Mothers of premature infants have been reported to adjust their verbal input based on changes in their infants' motor development (Suttora & Salerni, 2011). In this study, some mothers reported taking their infants outside and stimulating them more as they became more active, which could have led to them being perceived as more explorative. Had these infants been given an opportunity to be exposed to different environments earlier, the mothers could perhaps have perceived them as being more explorative then.

The transactional model is used to demonstrate how the child's activity levels affected the mother's perception of when it is appropriate to introduce toys, which in turn affected their interactions and subsequently the child's developmental skills (Figure 9).

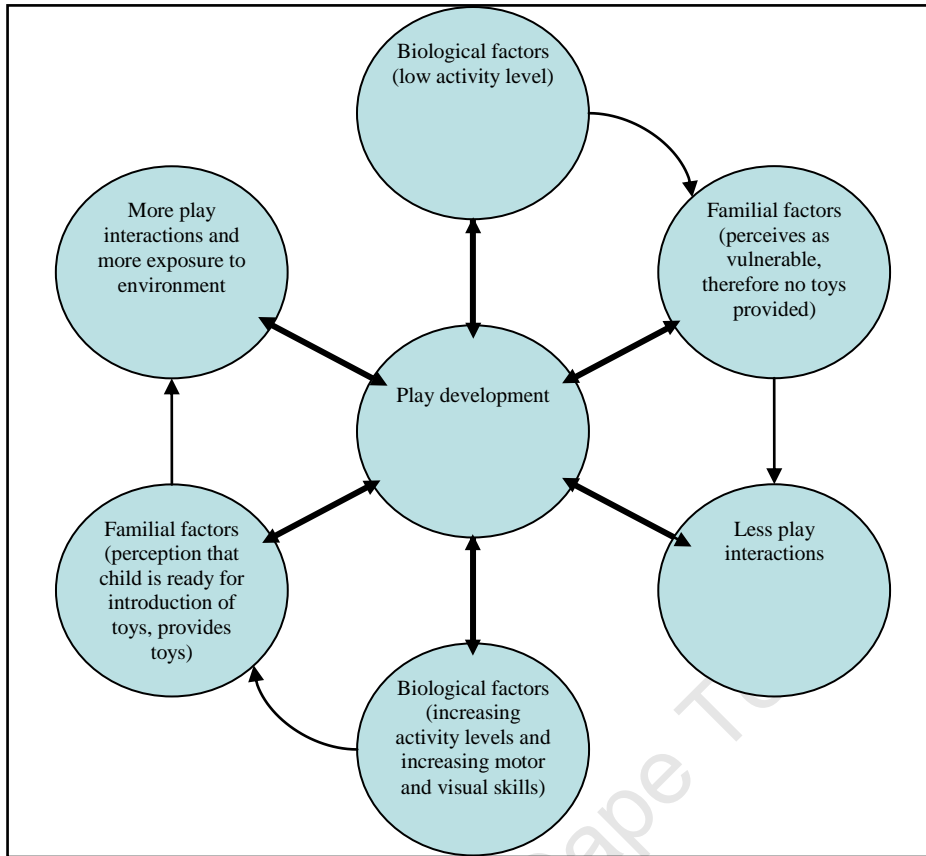


Figure 9: Activity levels and play interactions

All the mothers were reported to engage in verbal play with their infants by T2. It is interesting to note that most mothers in this study viewed play as being primarily considered in terms of toys. Mothers mentioned verbal play but during other parts of the interview focusing on different aspects such as turn taking (see ‘Pragmatics’ subsection). However, two mothers, Carmen and Debra reported that their infants made facial grimaces during interactions, which they considered as play. None of the mothers reported playing games such as ‘peekaboo’ which are often thought to be universal play interactions. According to Meisels and Shonkoff (1990), play skills represent an important method of assessing cognitive and language skills. In the current study, it seems that the infants who were more involved in playing started vocalising quicker, and showed more optimal language development as compared to infants who were less involved in play activities.

Language Comprehension

All four infants startled, paid attention and were aware of sounds at T1. At T2, three infants were able to locate the sound (Blair, Carmen and Dominique) and all four infants were reported to discriminate between different tones of voices. All infants paid attention to speech for longer periods of time at T3. These milestones are all age-appropriate (Rossetti, 2001; Owens, 2005).

Language Expression

At T1, all infants expressed themselves through crying and made bodily sounds. By T2, all infants engaged in shouting, laughing, and cooing. Three infants (Blair, Calvin and Dominique) also interrupted their mother's speech at times. Only two infants (Blair and Dominique) had started babbling by T3. According to Owens (2005), babbling normally emerges between four and six months of age. Babbling is reported to be an important precursor for language development (Fletcher & MacWhinney, 1995).

In this study, only the two girls (Blair and Dominique) had started babbling at T3. Cho et al. (2004) and Giardino et al. (2008) suggest that mothers of full-term and premature infants interact and talk more to girls as compared to boys. Foetal testosterone could be a predictor of eye contact, with boys (higher testosterone levels) making less eye contact (Lutchmaya et al., 2002). Cho et al. (2004) argued that mothers of boys could possibly find them less satisfying social partners and thus interact with them less. This lack of interactions could therefore result in language delays. The current study consisted of two girls and two boys. Generalisations cannot be made based on a small sample, however gender could possibly be a factor affecting mother-infant interactions and consequently language development.

5.2.3 Differences

Interaction-Attachment

One mother, Beverly established a routine as soon as her infant Blair was discharged from hospital. She felt that this routine enabled Blair to predict events across the day. Owens (2005) also describes how routines allow the infant to predict patterns of behaviour and speech. Infants engage in incidental learning through familiar daily

routines and events (Owens, 2005). At a later point, they are able to use the knowledge acquired through daily interactions and implement them into their early speech. Bochner and Jones (2003) reported that over time, infants learn the actions and sounds associated with their daily routine, thus encouraging social exchanges. A study conducted by Flacking, Ewald, Nyqvist and Starrin (2006) showed that mothers of premature infants find routines as being important, especially when they have older children to take care of. In this study, only Beverly established a routine as soon as her infant was discharged from hospital. The presence of older siblings has been reported to influence the language development of an infant (Flacking et al., 2006). In the current study, both Blair and Dominique's older siblings would often engage in conversations with them. Beverly felt that Blair seemed to be more interested and responsive to her older sisters. The other two infants, Anathi and Calvin were both the only child in their family.

Family structure and birth order have been reported to impact on early language development (Owens, 2005). First time mothers have more difficulty adapting to the birth of a premature infant as they are also adapting to their new role as a mother (Wilson, Rholes, Simpson & Tran, 2007). In addition, it has also been reported that mothers pay more attention to first born children compared to second born children in terms of interaction time, stimulation, play and talking (Keller & Zach, 2002). In a study comparing the language skills of first born and second born children, it was found that second born children were exposed to less direct verbal interactions from their mothers. However, the same study showed that second born children were more advanced in terms of pronoun production at 21 and 24 months of age (Oshima-Takane, Goodz & Derevensky, 1996). The authors indicated that overheard conversation between the infant's parents and siblings acts as an essential source of language input. Another study found that first born children were more advanced in lexical and grammatical development while later-born children were more advanced within conversational skills (Hoff-Ginsberg, 1998). These studies indicate that even though mothers seem to interact more with their first born children, second born children are exposed to additional input through conversational exchanges with their siblings, and between the parents and the siblings.

During the interview, Beverly reported spending more time with Blair as she was a third-born child. She believed that the first two children had each other to play with, enabling her to interact with Blair more.

“I think with the first child you have a lot of time for them. The second one you have less. Then with the third one you have more time again, cause these two have each other a lot of the time. Whereas when she was a baby, Sharon (sister) was the only other child, and she still needed me a lot more. In fact I have spent a lot more time with her (Blair) as a baby than I did with the second one” (T3).

These findings therefore suggest that the language learning experiences provided by mothers vary across different birth order and within different family environments (Hoff, 2006).

Pragmatics

One mother, Beverly, reported that the use of baby talk encouraged Blair to make eye contact. This finding is consistent with literature showing that infants become more reactive in response to baby talk as opposed to adult directed speech (Falk, 2004). Chang and Thompson (2011) reported that baby talk has an important role in bringing the infant closer to his or her attachment partner. In this study, Blair demonstrated heightened interest in her mother’s speech by making more eye contact. Mothers who are securely attached with their infants tend to make more attempts at conversing with them, encouraging the establishment of eye contact and vocal turn taking. Figure 10 summarises the role of baby talk on attachment and communication.

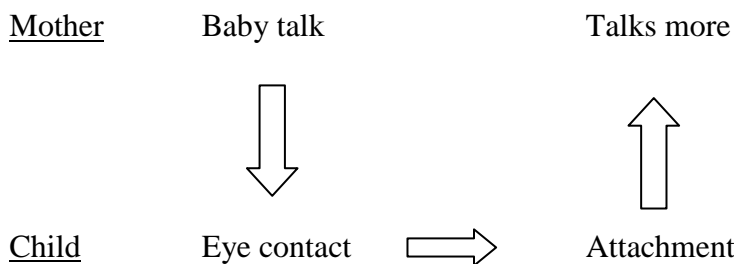


Figure 10: Role of baby talk on attachment and communication

One infant, Anathi, started engaging in vocal turn taking later than the other infants, at T3. The appearance of vocal turn taking at T3 could be due to differences in interaction style. Owens (2005) proposed that an infant is most responsive if his or her caregivers respond to him or her. In addition, turn taking has been documented to be less successful in premature infant-mother dyads as compared to term infant-mother dyads. Premature infants have been reported to initiate conversational turns more rarely as compared to term infants (Salerni, Suttora & D'Odorico, 2007). This finding could be attributed to these infants' lower activity levels and responsiveness. Abigail reported communicating with Anathi more at T3, as he was more active and responsive as compared to T1 and T2. Games have an important role in establishing turn taking skills (Owens, 2005). The child therefore learns turn taking skills through play which eventually aids in language development. In this study, Abigail introduced toys at T3, corresponding with the emergence of Anathi's vocal turn taking skills. The later emergence of vocal turn taking skills could be interpreted using the transactional model. As Anathi's activity levels increased, his mother introduced toys, thus encouraging the development of turn taking skills. She also started communicating and responding more to Anathi at T3 as she felt that he was more responsive. These two factors could perhaps have an impact on the later appearance of vocal turn taking skills (Figure 11).

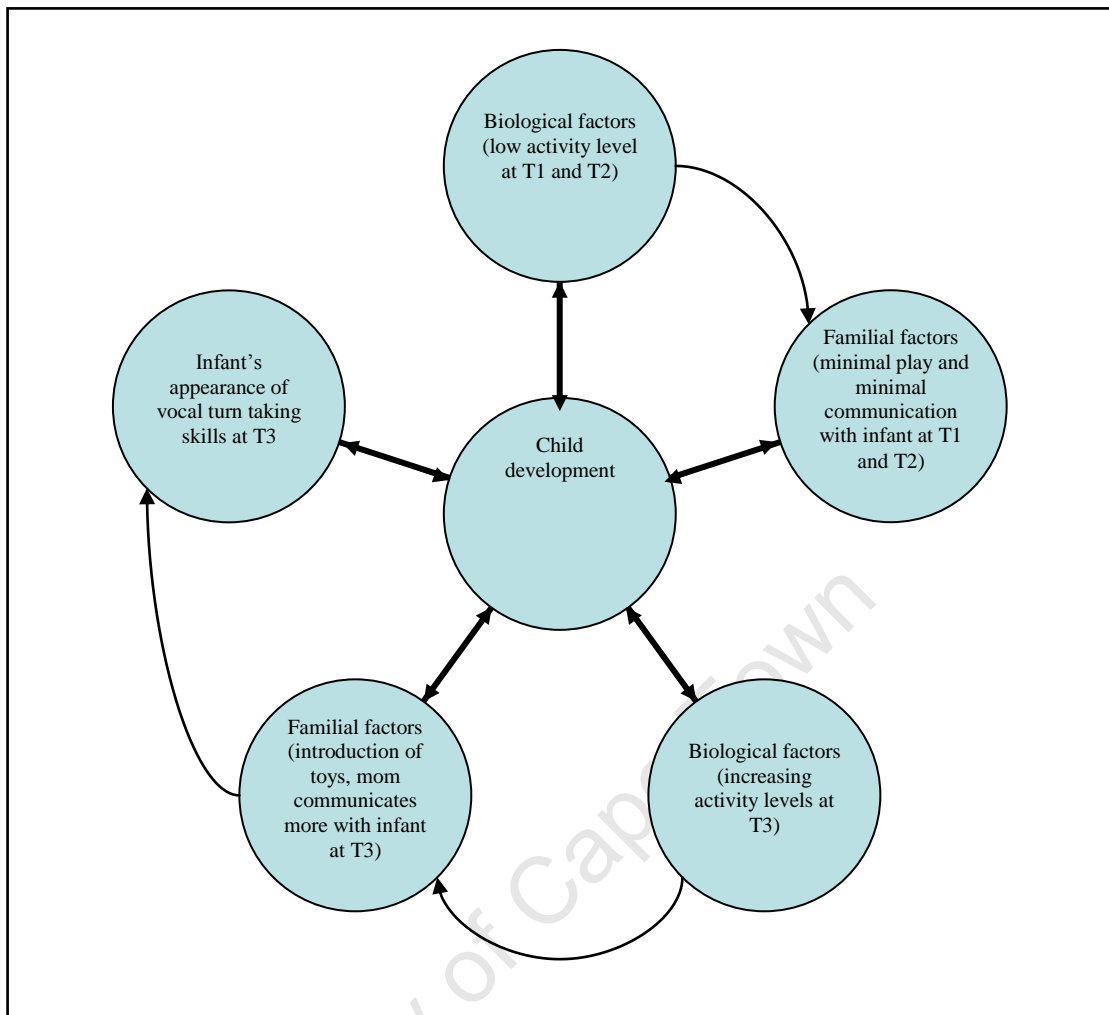


Figure 11: Link between activity levels, play and vocal turn-taking

Play

Only one mother, Beverly, introduced toys at T1. This relatively early introduction of toys could have occurred as a result of better financial access to toys and also due to better maternal education. SES and maternal education are both factors that have been reported to positively influence communication development (Lewis et al., 2002). In this study, Beverly was a mother from a relatively high SES and having a tertiary level of education. Beverly also had older children so she could have had ready access to toys at home.

It is also interesting to note that only Blair started mouthing toys at T2, compared to the other infants at T3. Blair was introduced to toys at T1, which could explain why she started mouthing toys earlier compared to the other three infants. This finding fits

with the transactional model, showing the impact of interaction on infant development (Figure 12).

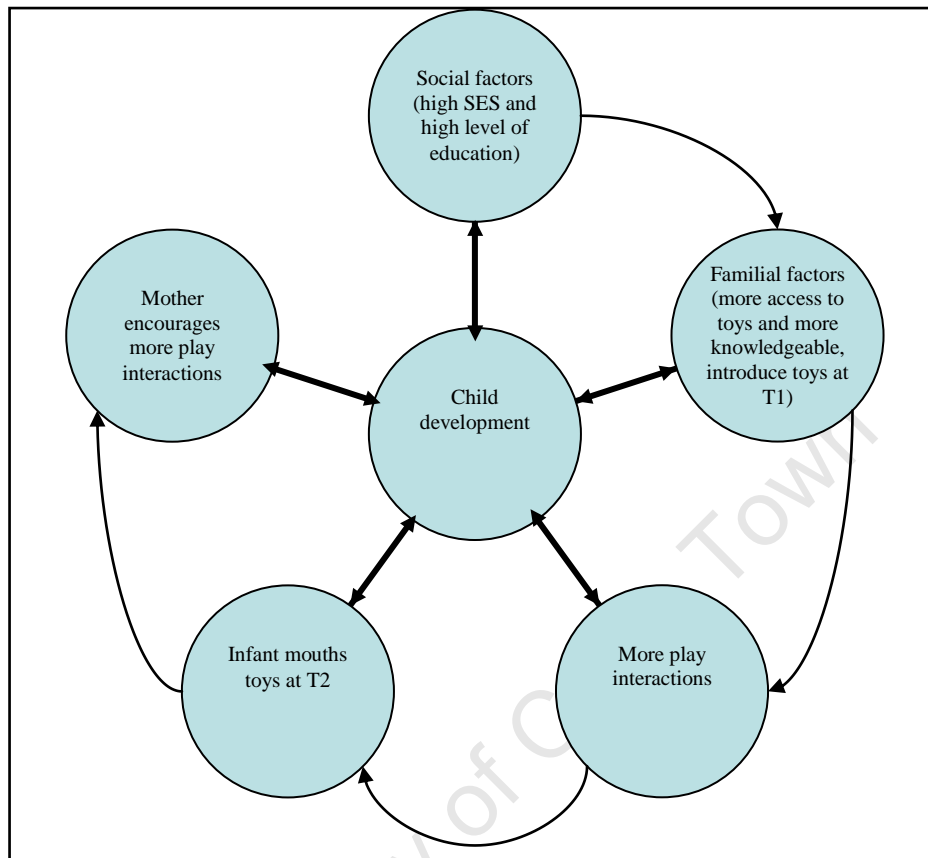


Figure 12: Effects of play interactions on child development

Language Expression

One infant, Dominique was reported to sing along to songs at T3. According to Rossetti (2001), infants start vocalising in response to singing between three to six months of age. In this study, Debra reported that Dominique vocalised back with the correct intonation. This finding could be due to individual differences. Dominique had two older siblings and lived with them and her parents and grandfather. It could therefore be that she was constantly exposed to language and frequent singing. Owens (2005) stated that opportunities are also important for learning, in addition to infant developmental maturation. Thus, Dominique could perhaps have been more precocious due to more exposure.

5.2.4 Summary

All mothers perceived that their infants were attempting to communicate even though they could not yet talk. They also had a sense of the ongoing nature of development. None of the mothers expressed any concerns regarding their infant's development. Beverly and Debra seemed to have more knowledge about child development as they had older children. Abigail and Carmen, both teenage mothers, viewed their infants as being more vulnerable, introduced toys at a later age and communicated less with their infants at the first two visits.

5.3 Infant's communication skills

5.3.1 Overview

The RITLS was used to obtain a communication profile of each infant at T2 and T3. The table below represents a summary of the infants' age-groups in terms of the different areas of the RITLS over the two visits.

Table 13

Summary of age-groups of communication skills for each infant at T2 and T3

<i>Corrected age</i>	Interaction-Attachment	Pragmatics	Play	Language Comprehension	Language Expression
<u>Anathi</u>					
<i>T2: 3 months</i>	3-6 m	3-6 m	0-6 m	0-6 m	0-6 m
<i>T3: 6 months</i>	3-6 m	3-6 m	6-9 m	3-6 m	3-6 m
<u>Blair</u>					
<i>T2: 3 months</i>	3-6 m	3-6 m	0-6 m	3-6 m	3-6 m
<i>T3: 6 months</i>	6-9 m	6-9 m	6-9 m	6-9 m	6-9 m
<u>Calvin</u>					
<i>T2: 3 months</i>	3-6 m	3-6 m	0-6 m	3-6 m	0-6 m
<i>T3: 6 months</i>	6-9 m	3-9 m	3-9 m	6-9 m	0-6 m
<u>Dominique</u>					
<i>T2: 3 months</i>	3-6 m	3-6 m	3-6 m	3-6 m	0-6 m
<i>T3: 6 months</i>	6-9 m	6-9 m	6-9 m	6-9 m	6-9 m

5.3.2 Similarities and differences

At T3, the skills of two infants (Blair and Dominique) lay in the 6-9 months age group thereby showing typical communication development given their corrected ages. This finding is in line with research showing that premature infants do not necessarily present with prelinguistic and early speech delays (Salerni et al., 2007). However, two infant participants (Anathi and Calvin) showed delays in terms of their communication development for their corrected ages as no changes over time were noted in certain categories of the RITLS. These infants were both boys and were children of teenage mothers and single parents.

Several studies have shown that girls tend to outperform boys in terms of early language development (Berglund, Eriksson & Westerlund, 2005; Bouchard, Trudeau, Sutton & Boudreault, 2009). Additionally, mothers interact differently with boys, which could contribute to the language differences across gender (Cho et al., 2004; Giardino et al., 2008; Karrass, Braungart-Rieker, Mullins & Burke Lefever, 2002). Parents often react differently to girls due to their beliefs that girls are more linguistically gifted (Bouchard et al., 2009). As a result, research suggests that premature boys may be more at risk for developmental delays as compared to girls (Cho, Holditch-Davis & Miles, 2010).

There are numerous studies examining the effects of teenage pregnancy on mother-infant interactions. In South Africa, adolescent pregnancies are very common (Kaufman, De Wet & Stadler, 2001). One in seven South African girls under the age of 18 years old has been reported to have given birth at least once (Department of Health, 2003). In the Western Cape, an estimated 13.6% of girls are already mothers or are reported to be pregnant with their first child (Department of Health, 2003). Adolescent pregnancy is a risk factor for prematurity and low birth weight infants (Ehlers, 2003). Teenage mothers are at higher risk for poverty, poorer health, educational and social outcomes (Jutte et al., 2010). Premature infants born to teen mothers have increased rates of rehospitalisations during their first year of life (Ray, Escobar & Lorch, 2010). Children of teen mothers have also been reported to present with poorer academic achievement during their school years (Jutte et al., 2010). Research by Causby, Nixon and Bright (1991) has shown that teenage mothers tend

to talk less and interact less effectively with their premature infants. Giardino et al. (2008) argued that teenage mothers are less attentive and less attuned to their full-term infants' cues based on physiological measures. Teenage mothers could be less knowledgeable about child development leading them to be more likely to misread their infants' signals and react inappropriately. These authors propose that intensive early intervention programs would facilitate the interaction between the adolescent mother and her premature infants, which would in turn encourage more positive developmental outcomes.

Two of the dyads participating in this project (Abigail-Anathi and Carmen-Calvin) faced both of the risk factors described here: teenage mothers; male babies.

5.4 Mother's perceptions of her own role in communication

5.4.1 Overview

Three different interview schedules were administered at each home visit. The data was analysed using conventional content analysis. Two recurring themes emerged for all participants namely physical contact, and verbal expression. Different subthemes were however noted amongst the different participants. Each theme with its underlying subthemes is presented in Table 14. Overall, all four mothers had the perception that they had an important role to play in their child's communication development.

Table 14

Themes and subthemes of Aim 3

Physical contact	Verbal expression
Holding	Helping talking
Breastfeeding	Singing
Positioning	Increase in communication

5.4.2 Similarities and differences

Physical contact

- *Holding*

For all the mothers, holding their babies formed an important part of the early interaction with their infants. Two mothers (Abigail and Carmen) who were admitted to public hospitals were not able to hold their infants after birth. They reported being able to do so once they started to practice KMC. On the other hand, Beverly, admitted to a private hospital, was allowed limited physical contact after birth. She was able to hold Blair every day, even while she was still in the NICU. Debra was also able to hold Dominique from the day she was born. These variations are most likely due to differences in the infants' medical status, but the effect on not being able to hold their infants after birth should not be underestimated. A study has shown that during hospitalisations in the NICU, mothers often do not have physical interactions with their infants (Nicolaou et al., 2009). In the current study, Abigail and Carmen were disappointed at not being able to hold their infants on the day they were born. Touching and seeing one's infant after delivery is critical during the initial phases of attachment (Rossetti, 2001). Touch has been reported as a mode of communication between mothers and their babies and also contributes in facilitating self-regulation for the infants (Moszhowski & Stack, 2007; O'Brien & Lynch, 2011). Erlandsson and Fagerberg (2005) described how mothers longed to be close and to hold their infants after birth. Mothers wanted to be able to hold their babies even while they were still in the NICU. The inability to hold their infants during the early days of their life was perceived to have affected the bonding process, even two months after they had been discharged. Fegran et al. (2008) also showed that the inability to have close physical contact with premature infants during the NICU stay led to delayed attachment. A recent study found that preterm infants who had physical contact with their mother within the first three hours after birth were more likely to develop secure attachment (Mehler et al., 2011). The authors suggested that the first few hours after birth act as a 'sensitive period' in developing the quality of attachment between the premature infant and his or her mother.

All mothers showed a decrease in holding their infants over the three visits. In terms of the transactional model, the infants' motor development influenced the physical

interactions between mothers and their infants: as the infants became older and gained better motor control, their mothers started placing them in baby seats and baby walkers, resulting in less holding. One mother, Beverly had also started working by T2, resulting in her holding her infant less due to time constraints. These results are in accordance with other studies that show how mothers engage in less holding as the baby develops and becomes more active (O'Brien & Lynch, 2011).

- *Breastfeeding*

Two mothers, Abigail and Debra, experienced difficulties with breastfeeding after birth. According to Swift and Scholten (2009), feeding difficulties can have a negative impact on the bonding process between the mother and her child. As suggested in a study by Flacking et al. (2006), breastfeeding is regarded as part of motherhood and an inability to breastfeed can have an impact on the mother's emotional state. According to the attachment theory, mothers achieve attachment by being sensitive and responsive to their infants' biological and emotional needs (Bowlby, 1969). O'Brien and Lynch (2011) also stated that breastfeeding is viewed by mothers as an opportunity to communicate and be sensitive to their infants needs. Again the transactional model can be used to explain how the infant's biological state (prematurity) led to feeding difficulties, which in turn affected the mother's emotional state and the bonding process as well (Figure 13).

Difficulties in breastfeeding can thus result in problematic attachment as the hospital staff often focuses more on the infant weight gain instead of mother-infant interactions (Swift & Scholten, 2009). Flacking et al. (2006) reported that mothers sometimes felt rejected by their infants and ashamed of their breastfeeding difficulties. The authors reported that one mother felt that 'breastfeeding was just a task, nothing pleasurable' (Flacking et al., 2006, p.77). Similarly, in the current study, Debra reported that her difficulties resulted in lowering her mood as well as her infant's mood. She felt that the feeding difficulties resulted in her not being able to bond with Dominique initially, but with time, KMC aided in helping her bond with her daughter.

KMC has been shown to be a valuable element in increasing maternal confidence and eventually leading to more successful patterns of attachment in premature babies (Johnson, 2005). In the present study, some mothers reported that the practice of KMC helped them bond better with their infants. The WHO guidelines are consistent with these findings documenting that KMC results in an improvement in mother-infant bonding and increased parental satisfaction (Ruiz-Pelaez, Charpak & Cuervo, 2004). In a study comparing traditional care with KMC, it was found that mothers who practiced KMC presented with less signs of depression and showed more positive affect with their infants (Feldman et al., 2002). Additionally, KMC had a positive impact on the infant's cognitive and motor development. The results of the current study are therefore consistent with previous research, showing the positive impact of KMC on maternal perceptions, infant development and also mother-infant interaction (Figure 13).

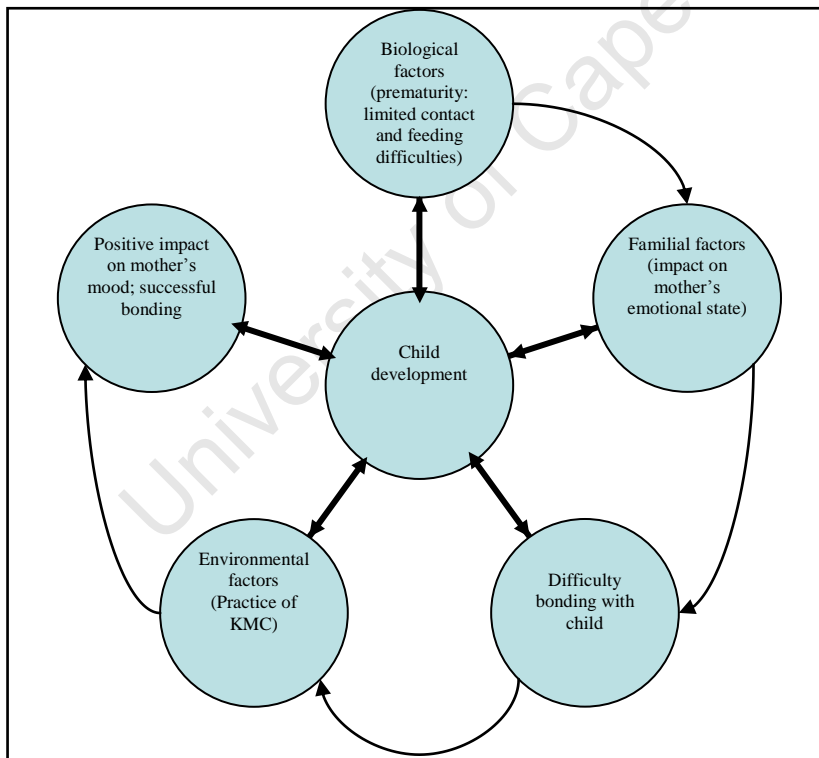


Figure 13: Interaction of feeding difficulties and practice of KMC on bonding

- *Positioning*

Various positions were used during mother-infant interactions. All of the mothers used the KMC position frequently at T1, and thus encouraged face-to-face interactions. Beverly felt that KMC aided in relaxing her baby. This is consistent with research showing that KMC has beneficial effects on the infant's physiological responses such as heart rate, breathing and temperature (Nyqvist et al., 2010).

At T2 and T3, the infants were positioned on their mothers lap, arms and upright against their shoulders. They also placed their infants on the couch, ground, walking ring, bed, pram, baby seat, and play mat. All mothers used mostly face-to-face positioning at T1 and a combination of face-to-face, side-by-side and facing away positioning at T2 and T3. Owens (2005) suggests that the type of positioning used by the mother can encourage visual contact and increase interaction. At T1, most mothers were still practicing KMC and would thus encourage eye contact while doing so.

It appears that as their infants' motor skills developed, the mothers accordingly changed the types of positioning used. According to Owens (2005), large-muscle control progresses so that infants can crouch on their hands and knees, roll over and creep and sit with support by the time they are six months. By six months, infants are able to sit, thus freeing their hands to reach and grasp objects. Additionally, visual skills become more coordinated allowing for reaching of objects (Owens, 2005). In this study, the changes in muscle control and visual abilities signalled the mothers to change the places and manner of positioning their infants.

Verbal expression

- *Helping talking*

All mothers in this study had a strong view on how best to talk to their infants. One mother (Abigail) reported using only baby talk with her infant, and another mother (Beverly) reported using a combination of baby talk and adult directed speech. Two mothers (Carmen and Debra) reported using only adult directed speech as they believed that baby talk could hinder their babies' speech development.

The literature regarding the use of baby talk is inconsistent and leads to contradictory findings. On one hand, studies (Chang & Thompson, 2011; Dunst et al., 2012; Falk, 2004) show that infants prefer baby talk (BT) over adult-directed speech (ADS). However, a study by Singh et al. (2002) suggests that infants prefer baby talk due to the positive affect within this type of speech. Singh et al. (2002) also concluded that using positive affect during the use of adult-directed speech leads to similar infant reactions. A study by Soderstrom (2007) pointed out that although BT has been shown to play a role in the child's language development, ADS also plays an important function. The effect of BT or ADS on communication development was not analysed in the present study. However, there seemed to be no link between the communication development of the infants and the type of speech used by the mothers.

The choice of using baby talk or adult directed speech is to some extent culture dependent (Owens, 2005). In the present study, both mothers who used only adult language were from the coloured community. This finding cannot be generalised to the coloured community, as the sample only consisted of two coloured participants. Further understanding of this aspect of mother-infant communication would be useful.

Based on the literature review and the current study, it seems that neither BT nor ADS emerges as more strongly beneficial to the infant's development. Perhaps the most important factor in infant development is not the type of speech, but the amount of speech used during mother-infant interactions. Of the two mothers in the study who frequently used baby talk, Abigail's son Anathi seems to have less positive communication outcomes as compared to Beverly's daughter Blair. However, there are several other factors (for example, SES and maternal level of education) that have an impact on communication development (Hoff & Tian, 2005) making it more complex than a linear cause-effect relationship.

As infants get older and pay more attention, mothers typically exaggerate their facial expressions as well as vocalisations to increase the level of stimulation (Owens, 2005). As the infant starts responding more, the mother in turn modifies her type of

stimulation to match the needs of her child. In this study, the participants reported using simpler speech techniques such as modelling at T1, and gradually used more complex techniques such as copying, labelling and expansions with time. Abigail only used modelling and copying, and Carmen only used modelling, repetition and labelling at T3. Both mothers did not engage in expanding their infants' vocalisations. Giardino et al. (2008) suggested that teenage mothers talk less and interact less efficiently with their infants. In this study, both teenage mothers used less complex forms of speech during interaction. Owens (2005) has also reported that mothers of premature infants sometimes use linguistic strategies that are appropriate for younger child (Owens, 2005).

All mothers engaged in everyday situational talk with their infants. All mothers except Abigail started to engage in conversations with their infants as from T1. The topics varied based on the occupation of the participants. By three months of age, conversations with infants are expected to occur frequently (Owens, 2005). Early conversations tend to be object-centred and are normally limited to what the infant can see and hear, as in the case of the participants in this study. Topics of conversation become more environment-centred around the age of six months, corresponding to T3 in this study. After birth, Abigail felt unprepared and scared. These feelings are commonly experienced by mothers of premature infants (Obeidat et al., 2009). These emotions could have affected the early communication between Abigail and Anathi as she did not feel confident enough to engage with her son. Additionally, Abigail is a teenager and is a single-parent, further placing her at risks in terms of interacting with her infant (Rossetti, 2001). Cho et al. (2004) found that mothers of premature infants tend to interact less with boys and Giardino et al. (2008) reported that mothers talk more with their girls. All these factors could have had an impact on Abigail's interaction, causing her to converse with Anathi later than the other mothers.

A study by Suttora and Salerni (2011) also postulated that maternal verbal input is influenced by the premature child's motor and speech development. In the current study, Abigail reported engaging in conversations only when her infant was more

alert, at T2. Anathi was the only infant to develop vocal turn taking skills at T3, as compared to the other children who started at T2.

The transactional model can be used to explain these changes in interactional patterns (Keilty & Freund, 2005). As Anathi grew, he started becoming more alert and thus reacted more to his mother's attempts to converse with him. Abigail in turn started to encourage conversation more often (at T2) as she became more confident. As Anathi's speech became more developed (at T3), Abigail started engaging in vocal turn taking activities.

- *Singing*

Beverly, Carmen and Debra reported singing to their infants at T2 while Abigail started at T3. Maternal singing is a universal behaviour and is present in different cultures (Huron, 2003). It has been shown that maternal singing has an effect on the arousal levels of prelinguistic infants, as in the case of the four infants in this study (Shenfield et al., 2003). Maternal singing has also been reported to be as effective as book reading and toy play in terms of maintaining the infant's attention (De L'etoile, 2006). In this study, some mothers reported that singing had a soothing effect on their infants.

- *Increase in communication*

All participants felt that they communicated more with their infants at T3 as they were more active and responded more compared to T1 and T2. Maternal behaviour is reported to change along with the motor and cognitive development of the infant (Owens, 2005). The transactional model shows that the mothers in this study changed their behaviour to match the performance and ability of their infants. As their infant's motor skills developed, the infants became more active and responsive. This change in activity level and responsiveness acted as a cue for the mothers to start communicating more with their infant.

Two mothers, Beverly and Debra, reported their belief that premature infants need to be stimulated more. Their interpretation is consistent with research showing that premature infants are at risk of communication delays (Caravale et al., 2005; Cattani

et al., 2010; Crosbie et al., 2011). Exposure to increased parental talk has been reported to encourage premature infants' vocalisations and conversational turns (Caskey, Stephens, Tucker & Vohr, 2011). Similarly, in the present study, the mothers who encouraged conversations more had infants with better language outcomes. These two mothers seemed to be more knowledgeable about premature infants' development as compared to Abigail and Carmen. These changes could be due to them having more experience with infants generally as they both have older children. Beverly and Debra are also older and married as compared to the other two mothers who are both teenagers and unmarried. As reported by Giardino et al. (2008), adult mothers are more responsive to their infants as compared to teenage mothers. Married mothers have also been reported to engage in higher quality interactions with their children when compared to cohabiting, never-married and divorced mothers (Gibson-Davis & Gassman-Pines, 2010). In the current study, Beverly and Debra's infants showed positive communication outcomes (based on the RITLS) when corrected age was used.

Carmen reported being aware of the factors that can affect the learning of a premature infant such as his activity level. In contrast to the beliefs of Beverly and Debra, Carmen believed that her baby needed to be treated differently and given more time to develop. This finding fits with a study by Allen et al. (2004) which shows that parents of premature infants often perceive their babies to be more vulnerable than full-term babies. These parents often provide fewer opportunities for their infants to become independent. In the current study, Carmen reported being worried about the safety of her son when left alone, and would thus hold him most of the time at T1 and T2. The other mothers held their infants less often than Carmen but tried to stimulate their infants more. This finding shows how maternal age plays an important role in determining the types of interaction between mothers and their premature infants.

5.4.3 Summary

All four mothers perceived their roles in the communication development of their infants to be important. The mothers however described specific roles: The two teenage mothers, Abigail and Carmen, engaged in more physical contact and holding

of their infants. Beverly and Debra believed in compensating for the language risks associated with prematurity by talking to their infants more and by using different techniques from an early age.

5.5 Mother's communication with infant

5.5.1 Overview

An adapted version of the OCI was used to observe the mothers' interactions with their infants at the three visits. The data was analysed descriptively and grouped into three main categories namely: Interaction and Behaviours, Emotions and Speech.

5.5.2 Similarities and Differences

Interaction and Behaviour

All four mothers used several positions during their interaction with their infants. Initially all mothers practiced KMC but had stopped by T2. They were therefore observed using face-to-face interactions at T1, and side-by-side, face-to-face and facing away positions at T2 and T3.

Two mothers, Abigail and Carmen, showed a decrease in enabling eye contact at T2 and T3. However, the other two mothers Beverly and Debra, ensured that they positioned Blair and Dominique in a face-to-face manner during playing and communicative activities at all three visits. This finding may be linked to the mothers' experience and age. Both Beverly and Debra had older children, and were thus more knowledgeable about child development. It has been reported that teenage mothers interaction patterns differ compared to non-teenage mothers (Giardino et al., 2008). Abigail and Carmen, both teenage mothers may possibly have enabled eye contact less due to their limited knowledge of child development.

All mothers provided appropriate tactile stimulation and responded appropriately to their infants' signals. The mothers all used positive patterns of interactions, and this could be due to the practice of KMC. It is well documented that the practice of KMC

helps in establishing positive mother-infant interactions (Johnson, 2005; Tessier et al., 2003).

Emotions

Three mothers expressed positive emotions towards their infants at all visits. By contrast, one mother, Debra, showed a gradual increase in the expression of her emotions from T1 to T3. She seemed to have bonded better with Dominique over time after a difficult start. This finding is consistent with research that shows that the disruption in early interaction due to hospitalisation can impair the bonding experience of the mother (Keilty & Freund, 2005). In these cases, delayed attachment may occur, which could have been experienced by Debra (Bialoskurski, Cox & Hayes, 1999). Tallandini and Scalembra (2006) and Feldman et al. (2002) also found that the practice of KMC resulted in an improvement in mother-child interaction and a decrease in maternal emotional distress. The practice of KMC could have thus been one of the protective factors that enabled Debra to bond with Dominique, as well as increasing mother-infant interaction over time.

Speech

- *Prosodic features*

Abigail was observed using baby talk with Anathi during the second and third visits while Beverly was noted to use baby talk throughout all three visits. Carmen used only adult directed speech, with no variations in terms of prosodic features. Debra used mostly adult directed speech, and some rare use of baby talk at the last two visits. As discussed earlier, the use of baby talk does not seem to affect communication development. Instead, the amount of stimulation provided by the mother seems to be much more crucial in influencing the infant's communication skills.

- *Conversation and Communication*

Three mothers (Abigail, Carmen and Debra) were rarely observed communicating with their infants. However, this finding may have been noted due to the mothers being inhibited by the researcher's presence and due to them being video-recorded (Xu & Rajlich, 2005). This could have resulted in them engaging less with their

infants. Abigail and Carmen did not react to their babies' vocalisations on various occasions and thus missed opportunities for conversations to occur. Conversely, Beverly was frequently observed communicating and engaging with Blair in vocal turn taking at all visits.

As reported in previous studies, maternal age, education and SES could both have an impact on mother-infant interactions and child development (Hoff & Tian, 2005; Lewis et al., 2002). Rowe, Pan and Ayoub (2005) have stated that older mothers tend to be more responsive, provide richer and more abundant talk with their infants. It has also been reported that mothers with a higher level of education are more responsive during conversations with their infants as compared to mothers with a lower level of education (Hoff & Tian, 2005). Piccinini et al. (2010) reported that mothers from higher SES talk more and interpret their 3-month-old infants' behaviours more than mothers from a lower SES. In the current study, Beverly, being an experienced mother, with a tertiary level of education and from a higher SES could have been more aware of communication development and thus showed optimal patterns of communicating with her infant from the first visit. She may also have felt more comfortable being observed and been more familiar with the nature of research, hence was less inhibited by the researcher's presence. Abigail and Carmen, the teenage unmarried mothers may have been less sensitive to their infants' cues, and thus less responsive to their infant's vocalisations. Teenage mothers have different interactive behaviours with their infants, especially in terms of verbal behaviours (Giardino et al., 2008). They may be less responsive due to their emotional immaturity and inexperience with child rearing.

5.6 The transactional model and communication development

This study indicates that the quality of the early mother-child relationship could serve a protective or risk-precipitating role on the communication development of the infants. Figure 14 depicts the relationship between the risk factors and protective factors found in this study and their possible effects on mother-infant interaction as well as child development. Risk and protective factors may work in contrast with each other, affecting not only the child and his or her communication outcomes, but

the entire context in which the infant is embedded. Changes to that context affect the child, and in turn the child's changes affect the system.

Children participating in this study were all at risk by virtue of their biological status as premature (albeit low-risk) infants. Protective factors such as KMC and high level of maternal education may work to mitigate against that biological predisposition or alternatively additional risk factors such as teenage motherhood and emotional stress may compound the risk. The child's biological makeup, family and environment could themselves act as risk or protective factors in determining his or her communication development. Optimal communication development may occur when biological, familial and environmental factors act together to diminish the risks associated with prematurity. The model shown in Figure 14 could be a useful way for SLPs to conceptualise ways to achieve optimal communication development when working with families. This model is not static: bringing about small changes (e.g. introducing KMC, developing attachment, talking more to an infant) can have large effects on the entire system and ultimately the child's communication development.

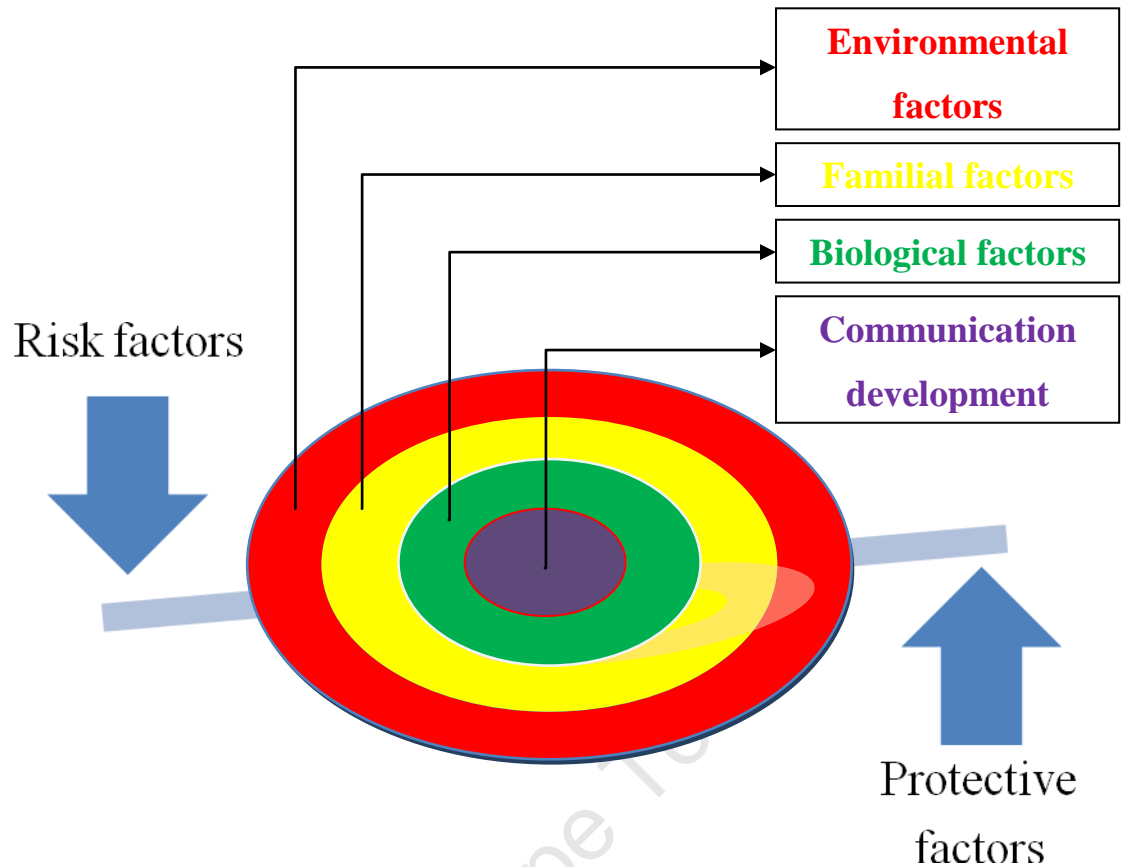


Figure 14: Transactional model and communication development based on the study findings

5.7 Summary

In this chapter, the mutual dynamic interplay between the four infants' developmental skills and their mothers' interactive styles has been discussed. According to the transactional view of language acquisition, early language problems could be due to environmental factors as well as biological factors within the child (Bochner & Jones, 2003). In the present study, the transactional model has been adapted and is presented based on the findings found. The results have revealed how various biological and environmental factors can act as risk or protective factors in influencing premature infants' communication development. The transactional model has proved to be a pivotal framework in understanding these concepts. Initially, the transactional model has been developed using an attachment perspective. However, this study shows how it can be adapted to suit other areas such as communication development.

CONCLUSION, LIMITATIONS AND IMPLICATIONS

6.1 Introduction

This final chapter summarises the conclusion of the research. Limitations of the study are discussed together with the recommendations for developing further research. Clinical implications for Speech-Language Pathologists and other health professionals are also highlighted.

6.2 Conclusion

This study aimed to investigate the communication between mothers and their premature infants over a period of time. This research has provided in-depth information about mother-premature infant communication from the mothers' perspective as well as using observational tools. Communication has been viewed as a two way process between mothers and their infants. The premise of this study is the importance of early communication for later communication development and the transactional nature of the mother-infant relationship.

The mothers in this study experienced difficulties with the initial phase of their relationship with their infants. These difficulties were due to the complications associated with premature birth such as lengthy hospital stays, low activity levels and feeding problems which sometimes led to a disruption in the mother-infant interaction and the bonding process. Over time, protective factors such as the practice of KMC aided the mothers in bonding and interacting successfully with their infants. By T3, all mothers seemed to have bonded well with their infants.

Maternal reports of their infants' communication skills were in line with the objective scores obtained on the RITLS. Two infants, Blair and Dominique showed typical communication development based on the RITLS. From T2 to T3, Anathi showed minimal changes in terms of his Interaction-Attachment and Pragmatics skills while Calvin showed no changes in Language Expression. These difficulties could possibly be due to certain risk factors such as having a teenage mother, low SES and male gender.

Two recurring themes emerged from the interviews with the mothers namely physical contact and verbal expression. The two younger mothers, Abigail and Carmen placed significant importance on holding and touching their infants at all visits. Beverly and Debra were more experienced mothers who believed that premature infants need to be stimulated further due to the risks associated with prematurity. They engaged more in communicative interactions with their infants. Based on the adapted OCI, all mothers were observed interacting positively with their infants. Only one mother, Beverly, was frequently observed communicating with her infant. The other three mothers could have been inhibited from doing so as they were aware of being video-recorded.

The data obtained from this project provides valuable information that could be incorporated into counselling, health promotion, early identification and management of premature infants and their families. The methodology employed and results obtained may be used as a basis for future research into the effects of prematurity on communication development and interaction with others.

6.3 Limitations

In this study, only four mother-infant dyads were investigated. The results of this study cannot be generalised due to the small sample size and further research could be carried out with larger samples in order to make generalisations to the wider population. This study however produced unique, rich and detailed data, which is generally obtained through this type of methodology.

This study was longitudinal in nature and involved investigating the participants three times, from the time of discharge from hospital, till the infant was six months corrected age. Ideally, the researcher would have conducted those visits over a longer period of time so as to track the infants' development till school-age, however this was not possible due to a limited budget and time frame.

All the participants in this study had a functional level of English and indicated that they preferred the data collection to be carried out in this language. It was however noted that mothers who spoke English as a first language (Beverly) provided richer

information as compared to the other mothers with English as their second language. Participants may have felt obliged to speak in English as the researcher was English-speaking. They may have spoken more freely with a researcher who shared their first language and was from the same community as them. It is recommended that future research be conducted in the participants' first language to ensure obtaining more detailed information. A trained interpreter could be used if necessary to eliminate possible language differences. The interpreter could be trained according to the following three processes: briefing, interaction and debriefing (Shipley & McAfee, 2004) to ensure that no information is lost through the translation process.

One of the aims of this study was to observe the communication between the mothers and their infants. It was noted that mothers did not or rarely communicated and engaged in conversational exchanges with their infants. This observation could be due to the Hawthorne effect where some of the mothers felt aware and conscious engaging with their infants in front of the researcher while being audio and video recorded (Fernald, Coombs, DeAlleaume, West & Parnes, 2012). A possible way of dealing with this challenge would be to place a video camera in the mother's house for a whole day and to recollect the video camera at the end of the day. This method would provide for a naturalistic way of obtaining data without the researcher's presence as the mothers would then not remain aware of the video camera the whole day.

6.4 Recommendations

A recommendation for further research is that a larger sample of participants be included so as to allow greater generalisations to this specific population.

In this study, only mothers of premature infants were investigated. It was however noted that other family members such as older siblings, the father or the grandparents often have an important role to play in terms of interacting and communicating with the infant. The ecological model shows that there are different layers in a child's environment and that these layers interact with each other in determining the child's developmental outcomes (Shonkoff & Meisels, 2000). Future research should attempt to involve other members of the child's microsystems (for example, other

family members) to obtain a more accurate representation of the infant's communicative environment.

Additionally, the possible impact of the other layers (mesosystem, exosystem and macrosystem) on the child's development should also be considered (Shonkoff & Meisels, 2000). In this study, the specific interactions of culture, a macrosystem, and the child's development were not investigated. However, culture has been found to affect mother-infant interaction and child development (Keller et al., 2011). Further research should thus view the child within all these layers so as to provide a unique intervention plan for each individual family.

The nature of this project was to generate hypotheses. Future studies could investigate these hypotheses in more depth and attempt to control for some of the many variables such as SES, birth order and maternal age.

6.5 Clinical implications

It is important for SLPs to learn more about the communication development of premature infants, especially due to the high prevalence of premature infants in South Africa (McInroy & Kritzinger, 2005). According to the ASHA (2004) Position Statement, SLPs play an important role in the assessment and intervention of preterm infants. SLPs are in charge of the assessment of psycholinguistics skills and socio-communication interactions, and are also responsible in providing support and culturally appropriate information to the parents of the premature infant (ASHA, 2004). In order to do so, SLPs need to become more knowledgeable in this field by carrying out research pertaining to the communication development of infants in the NICU and after discharge. The information obtained in this study may contribute to the way in which SLPs make specific recommendations during their contact with premature infants and their families, specifically in the South African context.

As noted in this study and others, mothers often experienced difficulties bonding with their infants after birth and during the first few weeks after discharge. In addition, some mothers reported that they did not receive much information regarding the importance of interactions with their infants. Furthermore, most

mothers did not receive any support in terms of communication development at discharge or later during general check-ups. There is thus a clear need for health professionals to support parents at and after discharge in order to help them interact with their infants and encourage successful attachment and bonding. SLPs could play a crucial role in promoting the development of positive interactional patterns between mothers and their premature infants from as early as birth.

The findings of this study indicate that the quality of the early mother-child relationship could serve a protective or risk-precipitating role on the developmental outcomes of the infants. The most important clinical implication of this study would be to support a healthy mother-infant relationship in the first few months of life. SLPs could use the transactional model as a framework during assessment and intervention. For example, parents could be provided with information on how premature birth could potentially have an impact on their interaction with their infant and on his or her communication development. The transactional model could be used to show parents how different risk and protective factors interact with each other in determining each infant's outcomes. This model could prove to be an important tool in assisting and intervening with premature infants and their families. Parents could then be counselled on strategies to assist them with diminishing the impact of the above difficulties and to facilitate social-communicative development. SLPs could also compile stories based on these real life cases (with the participants not identified) and use these to advise parents in similar situations and give them hope and expectations about typical outcomes.

In South Africa, people often live in large extended families consisting of grandparents, cousins, uncles and aunts. SLPs should be aware of this fact, and where possible information about premature infants' communication should be provided not only to the mother, but to other significant communicative partners and carers. It is therefore important to actively involve the whole family in the process. In addition, SLPs should be aware of other factors that impact on mother-infant interaction and child development such as gender, birth order, maternal education, SES and culture. SLPs should ideally design specific interventions for each infant based on these factors to obtain the best possible outcomes.

The link between culture and play interactions was not investigated in this study. It was however noted that some mothers only introduced toys at a later stage in their infant's development. The use of toys may have an impact on the speech development of the infants. This aspect should be explored further in research dealing with mother-infant interactions within different cultural groups in South Africa. Further information on this topic would help health professionals such as Occupational Therapists, Speech-Language Pathologists and Paediatricians in providing culturally appropriate information to parents and significant others in South Africa.

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Appendix A: Letter of approval from Ethics Committee

Appendix B: Permission letter from Western Cape Department of Health

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To whom it may concern,

Re: The communication between low-risk low birth weight premature infants and their mothers in the first year of life: a description of four cases

I am a first year Masters student in Speech-Language Pathology at the University of Cape Town. I am intending to conduct research to determine the communication between low-risk low birth weight premature infants and their mothers in the first year of life.

I have obtained approval from the University of Cape Town, Faculty of Health Sciences Human Research Ethics Committee to conduct the proposed study (REC REF number 306/2010).

My study will involve interviewing the mother about the development of her infant's communication skills as well her perceptions of her role in the development of her infant. I will also need to observe the mother and infant interacting and communicating.

As part of my study, I have to recruit three to five mother-infant dyads where the infant was born premature. In order to recruit the participants, I will need to put up posters in various public and private health facilities in Cape Town. I will also have to review the medical folder of the infant participants at the different institutions.

There are no anticipated risks in participating in this study. If any difficulties are found with the infant such as a hearing impairment; appropriate referrals will be made.

This study will not require the use of the institutions during the data collection process as the participants will be interviewed and observed at home or at another place chosen by them. This study also has no cost implications for the institutions.

I hereby request permission to carry out this study by recruiting potential participants from health facilities in Cape Town.

If you require further information or if you have any questions please feel free to contact me or my supervisor.

Thank you for your consideration.

Kind regards,

Miss Divya Bissessur
Speech-Language Therapist; Masters student
Tel: 074 833 6508
Email: divya.bissessur@uct.ac.za

Dr. Michelle Pascoe
Speech-Language Therapist; Research Supervisor
Tel: 021 406 6043
Email: michelle.pascoe@uct.ac.za

Prof. Marc Blockman
Chairperson of the Faculty of Health Sciences Human Research Ethics Committee
Tel: 021 406 6492
Email: marc.blockman@uct.ac.za

Appendix C: Permission letter from health facilities

UNIVERSITY OF CAPE TOWN



School of Health & Rehabilitation Sciences

Divisions of Communication Sciences & Disorders, Nursing
& Midwifery, Occupational Therapy, Physiotherapy

Old Main Building · Groote Schuur Hospital Observatory

·7925

Telephone: +27 21 406-6401

Fax: +27 21 406-6323

To the Medical Superintendent,
Health facility: _____

Re: The communication between low-risk low birth weight premature infants and their mothers in the first year of life: a description of four cases

I am a first year Masters student in Speech-Language Pathology at the University of Cape Town. I am intending to conduct research to determine the communication between low-risk low birth weight premature infants and their mothers in the first year of life.

I have obtained approval from the UCT Faculty of Health Sciences Human Research Ethics Committee to conduct the proposed study (REC REF number 306/2010).

My study will involve interviewing the mother about the development of her infant's communication skills as well her perceptions of her role in the development of her infant. I will also need to observe the mother and infant interacting and communicating.

As part of my study, I have to recruit three to five mother-infant dyads where the infant was born premature. I hereby request permission to put up posters in your health facility in order to recruit participants for my study and to review the medical folder of the infant participants at your institution. I also request permission to explain my study to a health professional in your facility who will be in charge to pass on the information to potential participants. A form has been attached to obtain the relevant information from the mothers who are interested.

There are no anticipated risks in participating in this study. If any difficulties are found with the infant such as a hearing impairment; appropriate referrals will be made. If the mother experiences emotional or psychological difficulties, she can be referred to a social worker or psychologist.

This study will not require the use of your institution during the data collection process as the participants will be interviewed and observed at home or at another place chosen by them. This study has no cost implications for your institution.

If you require further information or if you have any questions please feel free to contact me or my supervisor.

Thank you for your consideration.

Kind regards,

Miss Divya Bissessur
Speech-Language Therapist; Masters student
Tel: 074 833 6508
Email: divya.bissessur@uct.ac.za

Dr. Michelle Pascoe
Speech-Language Therapist; Research Supervisor
Tel: 021 406 6043
Email: michelle.pascoe@uct.ac.za

Prof. Marc Blockman
Chairperson of the Faculty of Health Sciences Human Research Ethics Committee
Tel: 021 406 6492

I, (Name _____), Medical Superintendent of (Name of Institution _____) hereby grant permission for the study 'The communication between low-risk low birth weight premature infant and their mothers in the first year of life; a description of three cases' to be conducted at this institution. The nature and purpose of the study has been explained to me and I have been given the opportunity to ask questions and gain further information.

Date: _____

Signature: _____

Appendix D: Contact details form

UNIVERSITY OF CAPE TOWN



School of Health & Rehabilitation Sciences

Divisions of Communication Sciences & Disorders, Nursing
& Midwifery, Occupational Therapy, Physiotherapy
Old Main Building · Groote Schuur Hospital Observatory
.7925

Telephone: +27 21 406-6401

Fax: +27 21 406-6323

Name of health facility: _____

Health professional in charge for obtaining details: _____

If you are interested in taking part in this study, please leave your contact details below.

1. Name of mother:
2. Surname of mother:
3. Home phone number:
4. Cellphone number:
5. If you do not have a phone number, can you please provide a friend's or relative's number where you can be contacted (State who):
6. Please state if you have a preferred time to be contacted (for e.g. after 08 00 pm):
7. Is your infant still in hospital?

If yes, When will he/she be discharged?

Thank you for your time. I will contact you soon to organise a time and place for a meeting. If your infant is still in hospital, I will visit you and your infant before he/she is discharged.

Appendix E: Screener (To be administered telephonically or in person)

UNIVERSITY OF CAPE TOWN



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Telephone: +27 21 406-6401

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Biographical Information (to be obtained from mother)

Name of mother:

Age:

Occupation:

Maternity leave (if yes, till when):

Cultural group:

Name of child:

Date of birth:

Name of hospital where baby was born:

Name of paediatrician:

Contact details of paediatrician:

Inclusion Criteria for infant (to be obtained from mother)

Duration of pregnancy (less than 37 weeks):

Weight at birth (1500-2500g):

Inclusion criteria for mother (to be obtained from mother):

First language:

Other languages:

Primary caregiver:

Exclusion Criteria for infant (to be obtained from mother):

1. Has your baby been referred to a paediatrician or to specialist clinics?
2. If yes, has he/she been diagnosed with a condition?
3. Do you have to return to hospital/the clinic often for special treatment? What type of treatment (breathing difficulty, cardiac problems etc)

Exclusion Criteria for infant (to be obtained by paediatrician/from medical folder):

1. Has _____ been medically diagnosed with a PNS or CNS damage?
2. Does _____ require ongoing medical treatment related to any chronic illness or congenital abnormalities?
3. Does _____ present with any sensori-perceptual deficits (such as blindness)?

Hearing screener (administered by researcher)

Otoscopy

Right Ear:

Left Ear:

OAE

Right Ear: Pass/ Fail

Left Ear: Pass/ Fail

Appendix F: Information sheet

UNIVERSITY OF CAPE TOWN



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Old Main Building · Groote Schuur Hospital Observatory
.7925
Telephone: +27 21 406-6401
Fax: +27 21 406-6323

To whom it may concern,

Re: The communication between low-risk low birth weight premature infants and their mothers in the first year of life: a description of four cases

I am a first year Masters student in Speech-Language Pathology at the University of Cape Town. I am currently doing a study to describe the communication between premature babies and their mothers in the first year of life.

I have obtained approval from the UCT Faculty of Health Sciences Human Research Ethics Committee to conduct the proposed study (REC REF number 306/2010).

What is the study about?

There is not much research on the communication development of premature infants in South Africa. Therefore, I want to know more about the development of premature infants' communication skills as well as the mother's perception of her infant's communication and her role in the development of her child.

Why have you been approached?

You and your baby are possible participants in this study as:

Your baby was born before 37 weeks

Your baby weighed between 1500-2500g at birth

You live with your baby

You are able to speak English fluently

This research will focus on three to five mothers and their babies.

What will be required of you?

Firstly, I will have to do a hearing test to find out if your baby has a hearing problem. If your child has a hearing problem, he/she will be referred to an Audiologist or Ear Nose and Throat specialist for further testing, and will not be included in the study.

If your child passes the hearing test and fits all the criteria to take part in the study, you will be included in the study. I will then need to visit you and your baby three times in the next year. The first visit will occur after your baby has been discharged

from hospital for a week. The next two visits will occur when your infant should have been 3 months and 6 months old respectively, had he/she been born at term. For example, if your child was born 2 months prematurely, I will need to visit you when he/she is 5 months and 8 months old.

At each visit, I will ask you some questions about your infant's development and will observe you interacting with him/her during your daily routine. I will need to take audio and video recordings of each visit. These recordings will only be viewed by the researchers and supervisors and will be destroyed after the study is completed. The visits will be done at your home or at a place that you feel is convenient for you. Each visit will last for about two hours. I can visit you on weekdays, weekends or public holidays based on your preference.

What will be the risks and benefits of participating in the study?

There are no expected risks in participating in this study. If any difficulties are found with your infant such as hearing difficulties; he/she will be referred for further tests and will be excluded from the study. If you feel any emotional or psychological difficulty, you can be referred to a social worker or psychologist. Apart from the possible referral if necessary there will be no immediate benefits to participating in this study. At the end of the study, you will be given an information pack describing the general communication development in children and ideas on how to further stimulate your baby.

Voluntary participation:

You are being invited to participate in this study. You have the right to withdraw from this study at any time with no consequences. All names will be kept confidential and only your reference code will be used if you wish to participate. During the research, only the researcher, the assistant researcher and the supervisors will have access to your record and all personal details will be kept in a locked filing cabinet. There will be no record kept of your details after the research is complete.

If you require further information or if you have any questions please feel free to contact me or my supervisor:

Divya Bissessur (Speech-Language Pathology student)

Tel: 074 833 6508

Email: divya.bissessur@uct.ac.za

Dr. Michelle Pascoe (Research Supervisor)

Tel: 021 406 6043

Email: michelle.pascoe@uct.ac.za

Prof Marc Blockman

Chairperson of the Faculty of Health Sciences Human Research Ethics Committee

Tel: 021 406 6492

Appendix G: Consent form

UNIVERSITY OF CAPE TOWN



School of Health & Rehabilitation Sciences

Divisions of Communication Sciences & Disorders, Nursing
& Midwifery, Occupational Therapy, Physiotherapy

Old Main Building · Groote Schuur Hospital Observatory
.7925

Telephone: +27 21 406-6401

Fax: +27 21 406-6323

“The communication between low-risk low birth weight premature infants and their mothers in the first year of life: a description of four cases”

I _____ have read (or had read to me by _____) the Information Sheet. I understand what is required of me and my child and I have had all my questions answered. I do not feel that I am forced to take part in this study and I am doing so of my own free will. I know that I can withdraw at any time without any negative consequences.

Signed: _____

Participant

Date and Place

Researcher

Date and Place

Full Name (mother): _____

Contact Number: _____

Physical Address: _____

Child's Name: _____

Child's Date of Birth: _____

Appendix H

Interview Schedule 1 (T1: one week post discharge)

1. Tell me what happened from the time you were admitted to hospital until 'name of infant- X' was discharged?
 - X's birth
 - Medical status of X
 - Feelings about having a premature baby
 - Bonding and attachment (holding and interacting with X)
 - Kangaroo Mother Care
 - Support from others (family and health professionals)
 - Information obtained from health professionals (medical, feeding, development, including communication)
2. How did you feel when X was discharged from hospital?
 - Happy/overwhelmed/not ready
3. What happened when X was discharged from hospital?
 - Support at home
 - Taking care of other child (if applicable)
4. How do you and X interact?
 - Positioning (baby in cot, face-to-face, on mom's lap, on floor, etc)
 - Cuddling, touch
 - Special moment with baby- feeding, changing nappy
 - How you spend most of your day
5. How does X interact with others (significant carers and siblings)?
6. How active is X?
 - Different states of alertness
 - Sleeps most of the time/ cries a lot
 - Watches mom during feeding, talking, etc
 - Mother and baby routines
7. How does X react to different sounds in the environment?
 - No reaction, turns towards sound
 - Looks surprised/gets a fright in response to loud noise
8. How does X express himself/herself for different needs? (for example when hungry v/s when needs nappy change)

- Cries for help
 - Different types of cries
 - Makes body sounds (such as burping)
9. How do you and other people (siblings, father) talk to X?
- Do not talk
 - Speak normally- like speaking to older child or adult
 - Speak in a baby manner (slow, simple words)
10. How does he/she show that he/she is interested and listening?
- Looks at you
 - Stops crying
11. What roles do you feel you play in helping X develop his/her communication skills (can give examples)?
- To act as a model
 - X learns by listening to other children
 - X is too young to learn
12. Is there anything else that you think is important for me to know about X's communication development?

Appendix I

Interview Schedule 2 (T2: three months corrected age)

1. Tell me what has changed since we last met?
 - Relationship with X
 - X's development (motor, feeding, communication)
 - Support at home
 - Any issues raised in interview 1
2. How do you and X interact?
 - Positioning (floor, chair, lap)
 - Face-to-face (some eye contact), side-to-side
 - Holds X when cries, sleep, etc
 - Make noises in turns (turn taking), he/she tries to copy mom
 - Make funny faces
 - Look at same object together (joint attention) when placed in front of X
 - When do you spend most of your time interacting (feeding, nappy change, etc)
 - Why do you prefer this type of interaction?
3. How does X interact with others (father, caregiver, siblings)
4. How does X play with toys?
 - Plays with a rattle
 - Smiles and laughs
 - Cries
 - Favourite toy
5. How does X react to loud noises?
 - Does not respond, Cries, Looks away, Looks where the sound is coming from
6. How does X respond when you talk to him/her?
 - No reaction/ignores you, Look at you (eye contact), Turn away, Smiles, laughs
Recognises your voice, Tries to make sounds in response (vocal turn taking), Quiets if was crying
7. How does X show you that he/she needs something?
 - Cries-different
 - Makes sounds (describe types)

8. What do you do in response to X making noises?
- Ignore it
 - Change the topic
 - Copy the sounds
 - Copy and add words (expand)
9. Thinking back to your older child, how does X compare to his/her older sister/brother? (if applicable)
- Interaction with mom (bonding, attachment, eye contact, joint attention, emotions, turn taking)
 - Reactions to sound and voice
 - Playing with toys
 - Noises that he/she makes
10. What roles do you feel you play in helping X communicate?
- Mother- talks the most, gives the example (model)
 - Need to provide further stimulation as child is premature
 - X learns from others
 - X not ready to communicate
11. Generally, how do you communicate with X?
- Do not talk to X, too young
 - Speak normally- like speaking to older child or adult
 - Speak in a baby manner (slow, simple words)
 - Songs and rhymes
12. Is there anything else that you think is important for me to know about X's communication development?

Appendix J

Interview Schedule 3 (T3: six months corrected age)

1. Tell me what has changed since we last met?
 - Relationship with X
 - X's development (motor, feeding, communication)
 - Any issues raised in interview 2
 - Started working

2. How do you and X interact now?
 - Positioning (floor, chair, lap)
 - Face-to-face (eye contact- how long?), side-to-side
 - Holds X (when cries, during feeding etc)
 - Make noises in turns (turn taking), he/she tries to copy mom
 - Make funny faces- baby tries to copy
 - Look at same object together (joint attention) – child looks for object
 - When do you spend most of your time interacting (feeding, nappy change, etc)
 - Why do you prefer this type of interaction?

3. How does X interact with others (father, caregiver, siblings)?

4. How does X play with toys?
 - Smiles and laughs when plays alone
 - Cries
 - Likes to explore environment, and play with different objects- reaches out
 - Bangs toy
 - Looks at self in mirror
 - Favourite toy

5. How does X respond when you talk to him/her?
 - No reaction/ignores you
 - Looks at you for long (eye contact)
 - Turns away
 - Smiles, stops crying
 - Tries to make sounds in response (vocal turn taking)
 - Knows own name
 - Has started responding to 'no'
 - Knows different voices

6. How does X show you that he/she needs something?
 - Cries-different
 - Makes sounds (babbling- bababa)- in turns
 - Vocalises when hears songs
 - Uses different volumes, pitch and rate
7. What do you do in response to X making noises?
 - Ignore it
 - Change the topic
 - Copy the sounds
 - Copy and add words (expand)
8. Thinking back to your older child, how does X compare to his/her older sister/brother? (if applicable)
 - Interaction with mom
 - Reactions to sound and voice
 - Playing with toys
 - Noises that he/she makes
9. How has your role in helping X communicate changed over time?
 - Mother- talks more now
 - Other people also talk
 - More complex patterns of speech
10. Generally, how do you communicate with X?
 - Speak normally- like speaking to older child or adult
 - Speak in a baby manner (slow, simple words)
 - Songs and rhymes
11. Is there anything else that you think is important for me to know about X's communication development?

Appendix K: Observation of Communicative Interaction Scoring Sheet
(adapted from Klein & Briggs, 1987)

Date: _____

Significance of ratings:

R- Rarely

N- Never

S- Sometimes

O- Often

	ITEM	R	N	S	O
1	Mother provides appropriate tactile and kinesthetic stimulation (strokes, caresses, pats, cuddles and rocks infant) _____ _____ _____				
2	Mother displays pleasure while interacting with infant _____ _____ _____				
3	Mother positions self and infant so eye-to-eye contact is possible _____ _____ _____				
4	Mother smiles contingently at infant _____ _____ _____				
5	Mother varies prosodic features (higher pitch, talks slower, exaggerated intonation) _____ _____ _____				
6	Mother responds contingently to infant's behaviour _____ _____ _____				
7	Mother encourages conversation _____ _____ _____				

8	Mother modifies interaction in response to negative cues from infant <hr/> <hr/> <hr/>				
9	Mother uses communication to teach language and concepts <hr/> <hr/> <hr/>				

Additional comments:

Mother participant: _____

Infant participant: _____

Observed by: _____

University of Cape Town