“Consensus on an infant massage programme for high risk infants from resource constrained contexts: A Delphi Study with Physiotherapists and Occupational Therapists.”

Lauren Perks

Student number: 208503734

Submitted in fulfilment of the degree of Masters in Occupational Therapy (via manuscript) the School of Health Sciences, University of KwaZulu-Natal

Submission date: 15 November 2017

PREFACE

The attachment of the mother to her infant is one which aims to provide the foundation for the infant's well-being and adaptation (Bowlby, 1958; Carter, et al., 2005 in Atzil, Hendler, & Feldman, 2011 p.1). However, it is evident that primary caregivers present with difficulty with bonding and attachment with infants who were born in the high risk category as a result of delayed responses from the infant to the caregiver's cues as well as from a variety of emotional reactions in the caregiver (McClure, 2000, p. 167). This alongside limited access to financial resources, limited transport and underresourced hospitals (Salojee, Rosenbaum, & Stewart, 2011, p. 37) contributes to making the attachment and bonding process difficult. This study aims to explore this dynamic and to develop an infant massage programme, through consensus from Occupational Therapists and Physiotherapists. As shown in literature this will assist this dyad in the attachment and bonding process amidst all the challenges and constraints which they are faced with.

DECLARATION

I, **Mrs Lauren Perks (student number: 208503734)**, declare as follows:

1. That the work described in this thesis has not been submitted to UKZN or other tertiary institution for purposes of obtaining an academic qualification, whether by myself or any other party.

2. That my contribution to the project was as follows:
   I was responsible for the reviewing of literature and composition of a proposal for this research project. Further roles included the design and implementation of the delphi online surveys as well as the data collection and data analysis. I was also responsible for the composition of this final mansucript.

3. That the contributions of others to the project were as follows:

   Gina Rencken: This individual was responsible for the supervision of this project by assisting the candidate in the process.

   Pragashnie Govender: This individual was responsible for the co-supervision of this project by assisting the candidate in the process.

Signed:  **Date: 10/11/2017**

DEDICATION

This project is dedicated to those special caregivers in the rural community who are posed with so many challenges in their life journey but yet conquer and continue despite them.

You are an inspiration and I hope this work will help in benefitting your special young ones' lives.

ACKNOWLEDGMENTS

The University of KwaZulu Natal is acknowledged for their assistance in making this project possible via a college scholarship and fee remission.

Much appreciation is to be given to the Discipline of Occupational Therapy for their support, and more specifically to Gina Rencken and Pragashnie Govender for their patience and enduring assistance throughout this process.

Further acknowledgements are given to the therapists who took part in this research by completing the online surveys. The results of this research are accredited to your efforts and interest in this study.

Recognition must also be given to my husband, my son and my parents who provided me with much emotional support and strength throughout the process. Your encouragement and belief in the benefits of this research were very supporting.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

OPERATIONAL DEFINITIONS

OCCUPATIONAL THERAPY: Occupational Therapy is a client-centred health profession which is interested using occupation to promote health and well being. The primary goal of this therapy is to enable people to participate in their activities of daily living to their full potential (WFOT, 2012).

PHYSIOTHERAPY: Physiotherapy focusses on using movement and exercise, education and advice to assist individuals who have been affected by an injury, illness or disability. This profession assists in encouraging development and facilitating recovery (WCPT, 2013)

HIGH RISK INFANT: The birth of a high risk infant is frequently the result of birth trauma (Hynan, 1997 in Pizur-Barnekow, 2010, p. 642). A "high risk infant" is an infant who requires a greater degree of monitoring and care compared to a healthy infant who was born full term (Elzouki, et al., 2012, pp. 177-178).

INFANT MASSAGE: Infant massage consists of gentle, slow stroking of each part of the body through tactile stimulation by human hands (Vickers, 2004 in Guzzetta, 2011, p. 1).

BONDING: Bonding refers to the emotional connection that a mother has to her infant (Kennell & Klaus, 1998 in Else-Quest, Hyde, & Clark, 2003, p. 496).

ATTACHMENT: 'Attachment' is based on the attachment theory formulated by John Bowlby (Bowlby, 1958, p. 1) which he defined as having its 'goal in increasing proximity to the attachment figure' which is developed through the function of bonding behaviors from the mother (Mastripieri, 2001 in Else-Quest, Hyde, & Clark, 2003, p. 496).

ABSTRACT

Background and aim: There are various infant massage programmes which have been designed for infants born without complications but there are limited options available for caregivers with high risk infants from a resource constrained context. The aim of this study was to develop a caregiver-initiated infant massage programme specific for high risk infants from this context and to create a medium for the bonding and attachment process between this dyad despite the many social and medical obstacles they face.

Method: A three round Delphi technique was conducted with twenty-five (25) participants who are Occupational Therapists and Physiotherapists. A total of fourteen (14) participants completed survey one (56%), eleven (11) participants completed survey two (44%) and eight (8) participants completed survey three (32%). The first survey was designed based on literature and the subsequent two surveys were designed based on the data and comments generated from previous surveys. Iteration of results was provided prior to the round three survey. Content and concurrent validity were maintained by the participants being required to meet certain selection criteria (Goodman, 1987 in Keeney, Hasson, & McKenna, 2001, p. 198) as well as the the inclusion of three successive rounds (Hasson, Keeney, & McKenna, 2000, p. 1013). The pilotting of the initial survey and appraisal of successive surveys by two expert professionals who were not participants in this study also contributed to validity (Skulmoski, Hartman, & Krahn, 2007, p. 4). The researcher was unable to test reliability of the surveys by testing and retesting the with a different sample due to time constraints.

Descriptive statistics were used in the Delphi technique in round two and round three to summarise the quantitative data (Evans, Rogers, Mcgraw, Battle, & Furniss, 2004; Cohen, Harle, Woll, Despa, & Munsell, 2004; Greatorex & Dexter, 2000 in du Plessis & Human, 2007, p. 21) to determine the level of consensus (Hasson, Keeney, & McKenna, 2000, p.1012). Central tendencies (mean, median, mode) of the data from the Likert scales as well as standard deviation were used to determine the level of importance of each item as determined by the participants (Hasson, Keeney, & McKenna, 2000, p.1012). The responses in the 'comments' section were analysed using content analysis by grouping similar items together which had several different terms but which appeared to be the same issue in order to provide one universal description (Hasson, Keeney, & McKenna, 2000, p. 1012).

Results: Consensus was achieved on nineteen (19) massage strokes for inclusion in the programme as well as the considerations for implementation with this population. There was a further non-consensus obtained regarding “Swedish milking” of the lower limbs which was included in the programme based on the literature which states its benefits for circulation (McClure, 2000, p. 74). “Hug and glide” of the upper and lower limbs also obtained non-consensus but these were excluded from the programme based on the literary evidence which highlights the possible aversive response it may have due to its activation of the anterolateral system which may result in dysregulating effects with this sensitive infant (Bundy, Lane, & Murray, 2002, p. 49). The “butterfly” massage stroke also obtained non-consensus but it was included in the programme as it stimulates and deepens breathing (Simpson, 2001, p. 28) which is beneficial for these high risk infants who often have a history of breathing difficulties.

Conclusion: Through this study an infant massage programme for this population was developed with the inclusion of considerations for this dyad’s social and medical context.

CHAPTER ONE

1.1. INTRODUCTION

1.1.1. Background of the study

The birth of a high risk infant is frequently the result of birth trauma (Hynan, 1997 in Pizur-Barnekow, 2010, p. 642) and these infants subsequently spend a significant amount of time in the hospital (Minde, 1993 in Pizur-Barnekow, 2010, p. 642). Infants who are born prematurely or with a low birth weight present with greater deficits in their first year in mental function as well as in neuromusculoskeletal and movement-related dysfunctions compared with children born at a normal birthweight or full term (Beck, 2010 in Park, 2014, p. 268). Approximately 50-70% of children born prematurely present with dysfunctions such as cognitive deficits, learning disabilities, attention problems, behavioral problems, and neuropsychological deficits when they reach school age (Sullivan, 2007 in Park, 2014, p. 269).

As a result of these special needs that the infant may be presenting with as well as the possibility of losing the medically fragile infant may lead to maternal perceptions of failure (Minde, 1993 in Pizur-Barnekow, 2010, p. 642).

Caregivers in rural settings in South Africa experience difficulties with various extraneous factors such as a shortage of financial resources, limited transport and under-resourced hospitals (Salojee, Rosenbaum, & Stewart, 2011, p. 37). Unfortunately these caregivers also feel that they are further faced with long queues at hospitals, inefficient administration procedures where they feel they have to wait lengthy periods for their files, and have a perception of disrespectful and “uncaring” attitudes from the staff at these hospitals (Salojee, Rosenbaum, & Stewart, 2011, p. 37).

Therapists in rural district hospitals also perceive that they are posed with limitations in their rehabilitation care due to a lack of resources and policies. Some of these facilities have developed their own policies for how to manage high risk infants in their institutions. St Apollinaris Hospital is a rural district hospital with 155 beds located in Creighton and which services the Ingwe and Mzimkhulu Municipality with a total population of 150 000 (KZN Health, 2017). According to the High Risk Baby Policy from this hospital Boyd (2015, pp. 1-2), high risk infants are referrred for rehabilitation when they are requiring rehabilitation intervention and therapists additionally screen the nursery in order to ensure early idenitification of high risk infants. This initial screening by the Occupational Therapist will include observation of the infant, assessment of muscle tone and the

presence of primitive reflexes and the Speech Language Therapist assesses feeding difficulties (Boyd, 2015, pp. 1-2). This initial screening is followed by individual and group sessions whereby information is shared with the caregivers on correct positioning of the infant, feeding, calming strategies, swaddling, as well as developmental activities for 0 to 3 months (Boyd, 2015, pp. 1-2).

These services are available during the nursery stay and during the transition home. These infants return to the hospital three months post discharge for a follow up with the medical team and possibly with a referral to the rehabilitation department (Boyd, 2015, pp. 1-2) but often have to be put on long waiting lists for therapy appointments and have poor access to equipment and assistive devices due to a lack of district funding (Salojee, Rosenbaum, & Stewart, 2011, p. 37).

A further contextual concern is that only 12% of infants less than four months of age are exclusively breastfed (UNICEF, 2007, p. 16) which impacts on their dietary intake as well as on the bonding process between the mother and child (Liu, Leung, & Yang, 2013, p. 77).

1.1.2. Problem statement

Bonding is a matter of reciprocal interaction and is dependent on the caregiver stimulating the infant in response to appropriate cues and signals from the infant (McClure, 2000, p. 167). However, the infant who presents with developmental impairments or delays can often not respond in this appropriate manner to the cues which can often lead to the primary caregiver feeling out of touch with their baby as well as the infant feeling overwhelmed (McClure, 2000, p. 168). An infant with a special need may be presenting with visual difficulties, auditory difficulties, neurological conditions such as cerebral palsy and seizures, sensory processing difficulties or tactile defensiveness, the presence of a bypass or shunt, diabetes, rheumatoid arthritis and cancer (McClure, 2000, pp. 167-175). Alongside these difficulties the caregiver may also be presenting with a variety of emotional reactions to the discovery of their high risk infant possibly developing a special need which may include confusion, denial, guilt, anger, wishful thinking, depression, intellectualisation and acceptance (McClure, 2000, p. 168).

In addition to the underlying causes of infants being born high risk there are also a variety of cultural and environmental factors which inhibit this bonding process such as the death of the infant's parent/s and resource constrained living conditions (Statistics South Africa, 1995-2005) (UNICEF, 2007, pp. 8-17). A family and primary social support system provide the young child with the environment in which to flourish and grow. These interactions are important for the child's development in terms of their culture and formation of their value system. Therefore, the type of

household a child lives in, and the ability of the caregiver to provide a safe and stimulating environment, will provide a foundation for the child for his/her development (UNICEF, 2007). In the South African context this foundation is poorly established due to the situation of many children who have deceased caregivers and parents with only 42.8 percent of children living in the same household as their parents and four in every ten young children living in extended families with at least six other people (Statistics South Africa, 1995-2005). Two percent of young children are maternal orphans and 7.4 percent are paternal orphans with a further 0.9 percent being maternal and paternal orphans (Statistics South Africa, 1995-2005). This results in over 81 percent of young children in South Africa being cared for in a household headed by a grandparent or great-grandparent resulting in the burden of care falling on the elderly (Statistics South Africa, 1995-2005).

Another contextual strain for these young children is that many children are living in poverty with only 58.4 percent of children living in formal dwellings, 22.4 percent in traditional homesteads and 14.3 living in informal housing (Statistics South Africa, 1995-2005). Only 51.2 percent have access to safe water at home, 41.8 percent had access to a flush or chemical toilet in 2001 and 63.5 percent had access to electricty for lighting in their dwelling in 2001 (Statistics South Africa, 1995-2005).

HIV-related illnesses are a great cause of death in young children under five in South Africa and account for 40 percent of deaths (Statistics South Africa, 1995-2005). However, this vertical infection rate of mother to child tranmission has decreased from 8% in 2008, to 3.5% in 2010 and an estimated 1.4% in 2015 (Jackson, Dinh, & Goga, 2016). This is a dramatic shift from the 20%-40% infection rate evident prior to the implementation of the prevention of mother-to child transmission of HIV (PMTCT) (Jackson, Dinh, & Goga, 2016). Although this programme has saved 80 000-85 000 newborn babies per year from early HIV infection (Jackson, Dinh, & Goga, 2016), the reality is that 300 000 babies are being born to HIV-positive mothers annually who are facing a significant burden of disease (Statistics South Africa, 1995-2005).

These are considered social risk factors and impact on the infants' cognitive and behavioral development (Lee, Brooks-Gunn, & Schnur, 1990, p. 496). These contextual factors often make it difficult for sustainability of therapy programmes and medical intervention due to poor access to services, lack of finances and transport (van Stormbroek & Buchanan, 2016, p. 69). Therapists working in community-based hospitals as community service therpaists feel challenged and frustrated due to a lack of resources, high workload and a lack of knowledge (van Stormbroek &

Buchanan, 2016, p. 69). They also report that the focus of treatment with infants who are born high risk is primarily on basic survival as opposed to the progress of the infant developmentally (Lecuona, van Jaarsveld, van Heerden, & Raubenheimer, 2016, p. 15). This makes it challenging for the therapist to implement a rehabilitation programme with the infant and the caregiver with a focus on bonding and development during the hospital stay. According to the St Apollinaris High Risk Baby Policy (Boyd, 2015, pp. 1-2), each high risk infant is also only followed up on a three monthly basis with the rehabilitation team, indicating irregular and infrequent intervention with these infants.

1.1.3. Literature review

Bonding and attachment

The psychological preparation for the birth of an infant does not start at the birth but rather during the parents own infancy and childhood as they develop their own personal experience of being taken care of (Brazelton & Nugent, 2011, p. 96). This process intensifies for the mother during pregnancy and is followed by the period after the birth of an infant which is met with a time of psychological and emotional transformation (Stern, 1998, p.1). This can be referred to as bonding which is the emotional connection that a mother has to her infant (Kennell & Klaus, 1998 in Else-Quest, Hyde, & Clark, 2003, p. 496). This process of bonding can be described by the 'motherhood constellation' where the mother experiences four major transitions (Stern, 1995 in Brazelton & Nugent, 2011, p. 95). The first transition is that she has a new responsibility which she needs to care for and in order to fulfill this role she needs to be able to understand the infant's behavioural signals as to what the infant is wanting or needing (Brazelton & Nugent, 2011, p. 95). The second adjustment is that the mother must develop an attachment with her infant which is also developed through understanding the infant's behaviour and being able to interpret their signals (Brazelton & Nugent, 2011, p. 95). Thirdly, the mother needs to establish a support network of women who have experience in motherhood and who can provide support and validate her new feelings and emotions (Brazelton & Nugent, 2011, p. 95). The fourth transition for the mother is a reorganisation of her identity and her priorities as a woman (Brazelton & Nugent, 2011, p. 95). It is important for the mother that she is able to work through these transitions as soon as possible so that she can fulfil her responsibility with ease (Brazelton & Nugent, 2011, p. 95). In normal development, the mother's behaviours to her infant are shaped by a combination of her past positive and negative experiences, the infant's behaviour as well as the attitudes of the people surrounding her (Brazelton & Nugent, 2011, p. 94).

‘Attachment’ is based on the attachment theory formulated by John Bowlby (Bowlby, 1958, p. 1) which he defined as having its ‘goal in increasing proximity to the attachment figure’ which is developed through the function of bonding behaviors from the mother (Mastripieri, 2001 in Else-Quest, Hyde, & Clark, 2003, p. 496). The development of attachment and the attainment of the sense of security is dependant on the meeting of the infant’s psychological needs through nurturing far more than the meeting of their biological and physical needs (Rutter, 1995, p. 6). This bond is said to be present with a mother to her child which is not based on the attainment of her sense of secuity in the relationship but rather with the infant attaining a sense of security with the mother (Ainsworth, 1989, p. 710).

The growth and survival of the infant is dependent on certain maternal behaviours that appear immediately after birth and function to organize the infant’s physiology and behavior (Leckman & Herman, 2002; Meaney, 2001 in Atzil, Hendler, & Feldman, 2011, p. 2603). This development of these behaviours and the subsequent attachment process starts at birth and the early post-partum period (Bowlby, 1969; Feldman, et al., 2009; Tronick, 1989 in Atzil, Hendler, & Feldman, 2011, p. 2604) and can be seen in four stages (Brazelton & Nugent, 2011, p. 97). The first two stages meet the first theme of the motherhood constellation and occur when the infant is born (Brazelton & Nugent, 2011, p. 97). They generally unfold very naturally where the mother is aware that the infant is alive and when she knows that the infant is healthy and anatomically intact (Brazelton & Nugent, 2011, p. 97). This reassurance is followed by the mother discovering how the infant relates to the family physically and emotionally and is a stage which is particularly sensitive to comments from others (Brazelton & Nugent, 2011, p. 98). The final stage is the development of a mutual field of communication and emotional contact between the dyad where the infant looks at the mother with great attention in a “neonatal moment of meeting” (Brazelton & Nugent, 2011, p. 98). This moment will highlight the need of the infant to communicate and seek contact with its mother (Brazelton & Nugent, 2011, p. 98). The mother’s main preoccupation is to understand the baby’s behaviour and the accurate or inaccurate reading of these signals will determine the future relationship and bonding and attachment process (Brazelton & Nugent, 2011, p. 94,97)**.**

If a healthy new born infant is placed skin-to-skin on the mother’s chest it has an innate behavioural pattern after birth to find the mother’s breast and begin sucking (Widstrom, et al., 1987; Nissen, et al., 1995 in Widstrom, et al., 2010 p.1). This is combined with massage-like movements from the infant to the mother’s breast which increases maternal oxytocin levels which is significant for mother-infant bonding and attachment (Matthiesen, Ransjo-Arvidson, Nissen, & Uvnas-Moberg, 2001 in Widstrom, et al., 2010, p. 1). Alongside the many benefits of

breastfeeding (American Academy of Pediatrics, 2012, p. 828) it is clear that it is a source of bonding between the dyad (Else-Quest, Hyde, & Clark, 2003, p. 496) as the skin to skin to contact results in the infant becoming calm and relaxed (Bystrova, et al., 2003 in Widstrom, et al., 2010, p. 6). This process of breastfeeding and the presentation of the innate behavioural patterns of the infant are often delayed with high risk infants due to several risk factors such as the medical condition of the infant, the length of hospitalisation, the distance of the infant from the maternal residence and the type of delivery (Dall'Oglio, Salvatori, Bonci, & Nantini, 2007, pp. 1628-1629).

Touch

Touch is involved in the mother-infant attachment process where contact behaviours are integral features of emotional communication and secure positive attachment (Ainsworth, Blehar, Waters , & Wall, 1978; Bowlby, 1969 in Field, 2004, p. 64). This attainment of this sense of security is critical for the attachment process between the dyad (Ainsworth, 1989, p. 709).

Therapeutic or nurturing touch is beneficial in that it contributes to the infant's optimal development psychologically and physically through stimulation, relaxation, relief and interaction (Simpson, 2001, p. 32) through enhancing the parent-child relationship and strengthening the emotional attachment (Shipwright & Dryden, 2012, p. 108). Further benefits include improvements in social interaction, emotional functioning and soothing temperaments and sleep organisation in full term infants (Field, 1998, p. 1272).

Infant massage, a form of nurturing touch, consists of gentle, slow stroking of each part of the body through tactile stimulation by human hands (Vickers, 2004, p. 1). Contingent tactile stimulation, which is massage conducted alone or in conjunction with visual and/or auditory stimulation, assists in increasing vocalisations, smiles, eye contact and approach behaviours (Pelaez-Nogueras, Field, & Gewrits , 1997, p. 170) and they highlight the infant's need to interact with the mother (Brazelton & Nugent, 2011, p. 98). This may occur when massage is combined with other forms of stimulation such as talking, eye contact or kinaesthetic stimulation e.g. passive extension/flexion or movements of the arms and legs (Vickers, 2004, p. 1). The high risk infant who presents with developmental impairments or delays can often not respond in this appropriate manner to the cues which can often lead to the primary caregiver feeling out of touch with their baby as well as the infant feeling overwhelmed (McClure, 2000, p. 168). Through stimulation of these cues through infant massage it will provide the infant with a means to communicate and seek contact with its mother (Brazelton & Nugent, 2011, p. 98) and for the mother to understand the infant's behaviour (Brazelton & Nugent, 2011, p. 97).

Therapeutic intervention

Infants who are born preterm present with a complex condition which is as a result of genetic, biological and environmental risk factors which in turn may also contribute to further neonatal complications and neurodeveleopmental abnormalities (Allen, 2008 in Guzzetta A., 2011, p.1) The initial primary goal of intervention with these infants is to prevent further exposure to dangerous environmental stimulation (Anand, 2000 in Guzzetta A., 2011, p. 1). Further goals of intervention are to encourage and create a supportive environment which provide appropriate stimulation for the infant and which mirrors that provided in utero (Westrup, 2000 in Guzzetta A., 2011, p. 1). Infant massage therapy, alongside other early intervention programmes based on this goal, are used to optimise the infant's sensory experience and thus improve developmental and functional outcomes (Symington, 2006 in Guzzetta, 2011, p. 1).

In a study done in the United Kingdom (Underdown & Barlow, 2011) it was identified that the focus of intervention for infants with neurological impairment needs to be on infant communication through infant massage rather than on prioritising infant physical development and flexibility as it will maximise support for crucial early relationships. Therefore, this highlights the importance of including infant massage as part of the rehabilitation programme.

A recent study conducted in Pakistan with infants with Cerebral Palsy highlighted that the addition of deep cross-friction massage conducted by the therapist to the rehabilitation programme was efficacious for the management of spasticity (Rassol, Memon, Kiyani, & Sajjad, 2017, p. 91). This focus of this research was therapist-led with an intensive frequency of sessions over the six week period. However, this therapy design is not always realistic for caregivers in the rural setting in South Africa due to various extraneous factors such as a shortage of financial resources, limited transport and underresourced hospitals (Salojee, Rosenbaum, & Stewart, 2011, p. 37).

Two British studies investigated the outcomes of a parent-delivered home massage programme in children with high or low tone and reported an improvement in mobility (Powell, Barlow, & Cheshire, 2006; Barlow, Powell, Gilchrist, & Fotiadou, 2008, in Silva, Schalock, Garberg, & Cynthia, 2012, p. 348). A more recent research study also took this concern into consideration when investigating the benefits of qiqong massage on children with Cerebral Palsy and Down Syndrome by training the caregiver on the method of massaging (Silva, Schalock, Garberg, & Cynthia, 2012, p. 3543). Qiqong massage is originally a chinese massage technique which is implemented with the aim of restoring normal capillary circulation and awareness to the skin by activating the sympathetic and parasympathetic nervous system function (Silva, Schalock,

Garberg, & Cynthia, 2012, p. 349). Therefore, this method has a focus on improving health by improving circulation and excludes the sensory integrative approach or focus on bonding and attachment (Silva, Schalock, Garberg, & Cynthia, 2012, p. 349). This study concluded that a parent-delivered home programme of daily qiqong massage showed improvement in young children with motor delays (Silva, Schalock, Garberg, & Cynthia, 2012, p. 354).

The research done into deep cross-friction massage (Rassol, Memon, Kiyani, & Sajjad, 2017, pp. 87-91) and qiqong massage (Silva, Schalock, Garberg, & Cynthia, 2012, pp. 348-355) showed positive outcomes, with the Rassol et al (2017) study being therapist-led and the Silva et al (2012) study being caregiver-led. However, the initial technique is one which is conducted by trained physiotherapists (Rassol, Memon, Kiyani, & Sajjad, 2017, p. 88) and not the primary caregiver making it unrealistic for this target population. It is crucial that in order to increase caregiver competence that caregivers are taught the strategies with their children (Colyvas, Brook Sawyer, & Campbell, 2010, p. 777). This will empower the caregiver to be an active participant in their child's recovery programme towards improving their child's development and functioning in their activities of daily living (Colyvas, Brook Sawyer, & Campbell, 2010, p. 776).

Benefits of infant massage with high risk infants

High risk births occur as a result of a variety of factors including delay in seeking medical attention during labour, non-initiation of antenatal care, booking late in pregnancy, inappropriate response to ruptured membranes, inadequate facilities and lack of transport and ventilator and resuscitation equipment (Lloyd & de Witt, 2013, p. 1). A "high risk infant" is an infant who requires a greater degree of monitoring and care compared to a healthy infant who was born full term (Elzouki, et al., 2012, pp. 177-178). These high risk infants have a lower threshold for sensory input than other infants and in turn experience difficulty with tolerating handling and interaction (Miller & Quinn-Hurst, 1994, p. 506).

The St Apollinaris high risk baby policy has been included as a reference below (Boyd, 2015, pp. 1-2). This policy was developed based on the experience that rural district therapists experience limitations in their rehabilitation care due to a lack of resources and policies (van Stormbroek & Buchanan, 2016, p. 70) and so this rehabilitation team at this facility designed a guideline for management of these clients.

Table I: Conditions that determine a "high risk infant"

Time	**Condition/diagnosis and comments** (Elzouki, et al., 2012, pp. 177-178)	**Conditions/diagnosis according to the St. Apollinaris High risk categories** (Boyd, 2015, pp. 1-2)
Immediately following delivery (10-20min after birth): either in the delivery room, or in the stabilisation room	Born pre or post term	Preterm birth (ie. <37 weeks)
	Requires rescucitation in delivery room	Infants requiring mechanical ventilation for more than 24 hours
	Congenital infections e.g. syphilis, CMV, toxoplasmosis, herpes simplex	Infants presenting with infections (e.g. meningitis)
	Cardiopulmonary distress	Neonatal encephalopathy resulting in low APGAR scores of 7/10
	Drug withdrawal syndrome requiring monitoring	-
	Suspected or proven congenital malformation requiring immediate evaluation and/or treatment E.g. Congenital heart disease, hydrocephalus, ambiguous genitalia, chromosomal abnormalities	Major malformations
Early neonatal period (the first 24 hours)	Small or large for gestational age	Born with a low birth weight (ie. <1800g)
	Cardiorespiratory distress	-
	Drug withdrawal syndrome requiring monitoring	-
	Suspected/proven neonatal sepsis	-
	Seizures	Infants presenting with seizures post-delivery
	Metabolic abnormalities e.g. anemia, hypoglycemia, hypocalcemia	-
First week and beyond	Jaundice requiring exchange transfusions	Hyperbilirubinemia where the infant requires a blood transfusion
	Sepsis	-
	Necrotizing enterocolitis	-
	Other surgical conditions	Infants presenting with major mobidities (ie. Chronic lung disease, intra-ventricular hemorrhage, peri-ventricular leucomalacia)
	Bleeding diathesis and other hematological conditions	-
	-	Abnormal neurological examination at discharge

There is limited research about the possible mechanisms of the effect of massage on early brain development with preterm infants (Guzzetta, 2011, p. 1). A recent study measured brain maturation with different EEG parameters which reported an acceleration in maturation in healthy preterm infants receiving skin-to-skin contact, a related intervention to infant massage (Scher, 2009 in Guzzetta, 2011, p. 2). These evident neurological benefits of this intervention are reflected in the infant's functioning and medical condition.

Authors of studies have highlighted that infant massage is beneficial for preterm infants as it facilitates weight gain and vagal activity (Diego, Fiel, & Hernandes-Reif, 2014, p. 139) as well as the maturation of visual function (Guzzetta, 2009 in Guzzetta A., 2011, pg.1). It is also beneficial in increasing the preterm infant's body temperature during the massage therapy which contributes to stabilization of thermoregulation (Diego, Field, & Hernandez-Reif, 2008, p. 151) as well as assisting in providing a faster recovery rate (Diego, Field, & Hernandez-Reif, 2009, p. 140). This increase in weight gain alongside the other benefits have been associated with shorter hospital stays and thereby, significant hospital cost savings (Field, 2010, p. 54). These findings are consistent with similar research which suggest the positive effect of massage on extra-uterine life on brain maturation (Guzzetta, 2011, p. 2).

The infant who has been in the neonatal unit and has been separated from their mother may be feeling insecure and will require extra sensitive handling and if this infant has a special need then this will need to be coupled with emotional support (Pick, 1999 in Simpson, 2001, pp. 25-26). There has been extensive research into the physical benefits of infant massage on the infant but limited research into the effects of massage on regulating the infant's emotions (Hertenstein & Campos, 2001, p. 549). However, a study explored these emotional benefits and noted that this experience of contact through touch can assist to soothe the infant (Korner & Thoman, 1972, p. 451).

The experience of infant massage can help the dyad in this bonding and attachment process to provide that sensitive handling and emotional support when they return home. Parents in a previous study have felt that it provided them with the opportunity to be close to their infant and to learn more about their infant in greater detail which in turn made them more responsive and sensitive to them (Clarke, Gibb, Hart, & Davidson, 2002, p. 125). It also provides them with a means to constructively and confidently respond to the physical well-being of their infants which helps to improve their ability to communicate and interact (Clarke, Gibb, Hart, & Davidson, 2002, p. 125). A further benefit in the attachment process is that infant massage creates a purposeful and satisfying interaction between the dyad through a constructive and positive activity (Clarke, Gibb, Hart, & Davidson, 2002, p. 125). This dedicated infant massage time is also a protected time between the mother and the infant (Clarke, Gibb, Hart, & Davidson, 2002, p. 125) which is relaxing for both amongst the many other demands which she is required to do during the infant's waking times such as nappy changing, bottle or breast feeding, trying to decipher the different cries, alongside a lack of sleep and side effects from the birthing procedure (Simpson, 2001, pp. 26-27).

1.1.4. Research aims and objectives

The aim of this study was to develop an infant massage programme for high risk infants from resource constrained contexts through a consensus process with an expert panel of Occupational Therapists and Physiotherapists currently working in the field.

The aim of this study was realised through the following objectives:

1. To generate ideas of what could constitute an infant massage programme for the high risk infant population living in a resource constrained context
2. To gain consensus on stroke items and considerations for inclusion in the infant massage programme
3. To consolidate the consensus findings and to develop the infant massage programme

1.2. Methodology

1.2.1. Study design

The study was conducted using a Delphi technique with the aim of programme development (Hsu, 2007, p. 1). A Delphi technique was selected for this study as it employs anonymity (Rowe & Wright, 1999, p. 354), which allowed participants to freely and honestly express their opinions without these opinions being inhibited by peer pressure and group bias (du Plessis & Human, 2007, p. 15). Therefore, the focus of this study was on the stability of the group consensus rather than on the individuals' opinions (Adler & Ziglio, 1996, p. 206).

This Delphi technique is comprised of repeated rounds of data collection in order to obtain an expert opinion anonymously (De Villiers, Kent, & De Villiers p.1). This study aimed to seek a consensus on the infant massage techniques that could be included in a programme for high risk infants from resource constrained contexts, through a process of item generation and subsequent item reduction as part of the Delphi technique (Skulmoski, Hartman, & Krahn, 2007, p. 4).

Three rounds were conducted (du Plessis & Human, 2007, p. 17), which was based on the time available to the researcher, the available funding as well as the consideration of participation fatigue (Powell, 2003, p. 378; Hasson, Keeney, & McKenna, 2000 p.1011). Each of the three rounds formed the basis for the next round (McKenna, 1994 in du Plessis & Human, 2007, p. 17) which resulted in group consensus at the end of round three (Deshpande, Shiffman, & Nadkarni, 2005; Evans, Rogers, Mcgraw, Battle, & Furniss, 2004 in du Plessis & Human, 2007, p. 17).

As outlined by (Hasson, Keeney, & McKenna, 2000, p. 1009-1010) this study adopted a group facilitation process whereby the 'comments' section in the survey yielded qualitative information which was given back to the participants in a quantitative form in the subsequent survey. This was done by participants being required to respond using a survey design of rating of Likert scales (Skulmoski, Hartman, & Krahn, 2007, p. 9) which was included for the purposes of item generation for the subsequent round. This element also aimed to ensure that the research findings provided a holistic understanding of the research question (Mason, 1996 in Skulmoski, Hartman, & Krahn, 2007, p.9).

This quantitative analysis and interpretation of the data allowed for aggregation of the group's response (Rowe & Wright, 1999, p. 354). The choice of this study design was for two reasons. Firstly, the aim of the study was to develop a programme comprised of specific infant massage techniques to be used with the target population which was based on the evidence from the responses from the expert participants. The second reason for the choice of this design was to ensure that the online surveys were comprised of well-written and concise questions which were quick and easy to respond to. The latter reason described was to ensure that these expert participants were committed to the study and would not become fatigued from the process and lose commitment. This is because it is often found that these experts have great insight but are often very busy and may experience difficulty to participate fully (Skulmoski, Hartman, & Krahn, 2007, p. 10). Previous studies have noted that as the number of rounds increase and the effort required by the participants, that a drop in the response rate us often observed (Alexander, 2004; Rosenbaum, 1985; Thomson, 1985 in Skulmoski, Hartman, & Krahn, 2007, p.11).

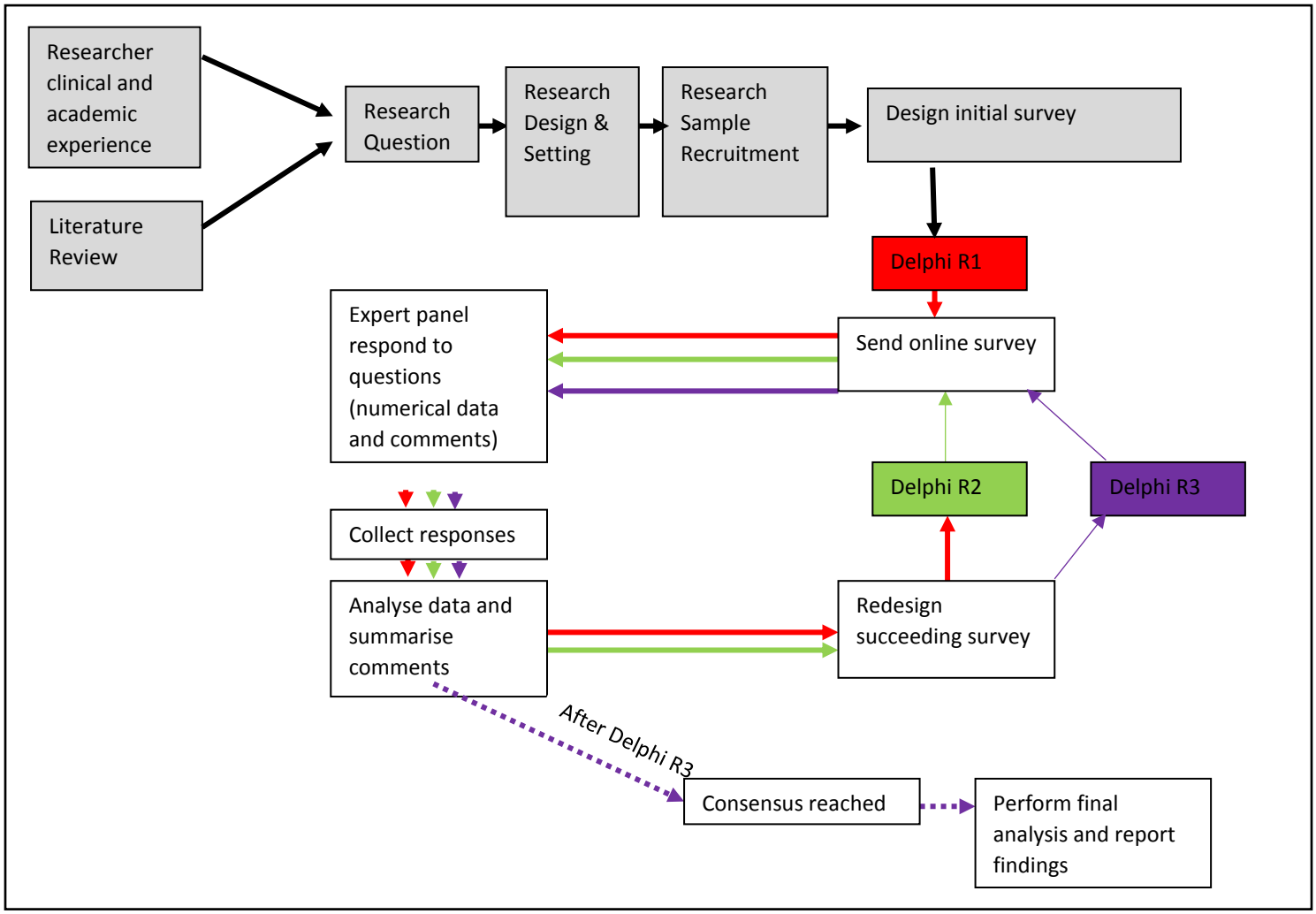

Figure 1: The methodological process based on (du Plessis & Human, 2007) & (Skulmoski, Hartman, & Krahn, 2007)

The study included the following phases:

Phase One: Literature review

The initial phase of the study focused on a comprehensive literature review by the researcher on the high risk infant, the contextual considerations for this dyad from the resource constrained context as well as on infant massage in order to form a basis upon which the initial online survey could be created in Phase two (Hasson, Keeney, & McKenna, p.1011).

Phase Two: Delphi Process Round One: Item Generation

A purposive sampling approach was used for this study (Bruce, Langley, & Tjale, 2008, p. 59) whereby specific expert participants were selected depending on the set inclusion and exclusion criteria (du Plessis & Human, 2007, p. 18) (Akins, Tolson, & Cole, 2005, p. 4). These participants were recruited by the researcher contacting relevant therapists who met the criteria via email as well as through sending a bulk email to the Occupational Therapy Association of South Africa (OTASA), the South African Association of Sensory Integration (SAISI) and the KwaZulu Natal Department of Health mailing lists for Occupational Therapists and Physiotherapists.

Following recruitment of the sample the initial online survey was uploaded online onto www.surveymonkey.com. The format and content of this initial online survey was based upon the researcher's experience and a comprehensive literature review (Hasson, Keeney, & McKenna, 2000, p.1011). The main aim of phase two in this Delphi technique was item generation through guidance from literature and comments provided by the participants to explore the participants' broad range of views (du Plessis & Human, 2007, p. 20). Participants were only able to start the survey at question one and if they did not complete a compulsory question then they were not able to continue with the survey. Certain questions requiring comments were not compulsory (refer to Table II below). Therefore, survey one was a structured survey due to the fact that there is much basic information concerning this topic that is accessible and applicable (Kerlinger, 1973 in Hsu C., 2007, p. 2).

Much care and attention was given to the development of the initial broad question so that the expert participants gained a clear understanding and insight into the question to avoid participants from giving inappropriate answers and becoming frustrated (Delbeq, Van de Ven, & Gustafson, 1975 in Skulmoski, Hartman, & Krahn, 2007, p.10). The initial online survey was appraised for its content by two expert professionals who were not participants in the study. This contributed towards validity as well as piloting prior to implementation of the survey (Powell C. , 2003; Hasson, Keeney, & McKenna, 2000 in du Plessis & Human, 2007, p. 17). This process included testing and adjusting the survey to ascertain any procedural problems or comprehension difficulties (Skulmoski, Hartman, & Krahn, 2007, p. 4).

Following completion of the piloting process the expert participants were required to judge how well each of the concepts fitted into this programme and the rating of these items (Gomm, Needham, & Bullman, 2000 in Bruce, Langley, & Tjale, 2008, p. 58).

Following completion of the online survey by the expert participants the researcher analysed the data using statistical summarizing into medians as well as upper and lower quartiles (Skulmoski, Hartman, & Krahn, 2007, p. 4).

Question number	Details of question	Number of participants ending survey on each question	Number of participants answering the question
One	Consent	-	40
Two	Demographic analysis	11	29
Three	Inclusion criteria	3	26
Four	Massage duration	1	25
Five	Lower limbs	8	17
Six*	Lower limbs	-	6
Seven	Stomach	2	15
Eight*	Stomach	-	7
Nine	Chest	0	15
Ten*	Chest	-	2
Eleven	Upper limbs	0	15
Twelve*	Upper limbs	-	7
Thirteen	Face	1	14
Fourteen*	Face	-	6
Fifteen	Back	0	14
Sixteen*	Back	-	3
Seventeen	Massage conclusion	0	14
Eighteen	Massage repetitions	0	14
Nineteen	Massage oil	0	14
Twenty	Sensory input	0	14
Twenty-One	Training	0	14
Twenty-Two	Positioning	0	14
Twenty-Three*	Positioning	-	1
Twenty-Four	Time of day for massage	0	14
Twenty-Five	Follow up contacting	0	14

*These questions were not compulsory to complete

Table II: Pattern of survey one initiation and completion by the participants

Phase Three: Round Two Delphi Process: Consensus on item generation

The list of infant massage techniques formulated from the initial structured survey and from the additions from the expert participants in Phase One was pared down in Round Two in the second online survey (Schmidt, 1997, p. 769). The inclusion of information based on the comments from the participants in round one was done in, as far as possible, the wording used by these particpants (Hasson, Keeney, & McKenna, 2000, p. 1012). Items which were infrequently rated by particpiants in round one were still included in this survey (Hasson, Keeney, & McKenna, 2000, p. 1012).

Iteration was not provided at this stage as round one and round two aimed to establish consensus on similar items.

Following completion of this online survey the responses were analysed using statistical summarizing into medians as well as upper and lower quartiles (Skulmoski, Hartman, & Krahn, 2007, p. 5). The final online survey was then designed based on these findings from round two (Skulmoski, Hartman, & Krahn, 2007, p. 4).

Question number	Details of question	Number of participants ending survey on each question	Number of participants answering the question
One	Consent	-	22
Two	Pre-requisite	8	14
Three	Implementation considerations	1	13
Four	Massage duration	0	13
Five	Medical contraindications	0	13
Six	Lower limbs	1	12
Seven	Lower limbs	0	12
Eight	Stomach	1	11
Nine	Chest	0	11
Ten	Upper limbs	0	11
Eleven	Upper limbs	0	11
Twelve	Face	0	11
Thirteen	Back	0	11
Fourteen	Massage conclusion	0	11
Fifteen	Stroke repetition	0	11
Sixteen	Massage oils	0	11
Seventeen	Sensory input	0	11
Eighteen	Training	0	11
Nineteen	Positioning	0	11
Twenty	Time of day for massage	0	11
Twenty-One	Follow up contacting	0	11

Table III: Pattern of survey two initiation and completion by the participants

Phase Four: Round Three Delphi Process: Consensus

The third round was initially comprised of iteration whereby an organized summary of the previous round one and round two results were distributed to the participants so that they were aware of the range of opinions and positioning of the programme based on these opinions (Hsu & Sandford, 2007, p. 2). This feedback was controlled in order to reduce the effect of noise which allowed the participants to generate additional insights into the programme and to clarify any uncertain points (Hsu & Sandford, 2007, p. 2).

Following this feedback the participants were provided with the round three survey based on the findings of round two (du Plessis & Human, 2007, p. 20). In this final Delphi round the aim was for consensus to be obtained from the participants regarding the final infant massage programme which had emerged from the previous two rounds (Skulmoski, Hartman, & Krahn, 2007, p. 20). The inclusion of information based on the comments from the participants in round one and round two was done in, as far as possible, the wording used by these particpants and no additional items were added that were not produced in the first round (Hasson, Keeney, & McKenna, 2000, p.1012). Items which were infrequently rated by particpiants in round one and round two were still included in this survey (Hasson, Keeney, & McKenna, 2000, p. 1012). The list of items in survey three were reduced by including only those items that achieved a a priori consensus threshold of 70% or more (Cremers, 2008, p. 293). This threshold is concurrent with previous studies which noted this as an acceptable threshold (Graham, 2003) (Naidoo, 2013, p. 2).

This was the final survey round as the opinions of the participants converged to reach group consensus (Deshpande, Shiffman, & Nadkarni, 2005; Evans, Rogers, Mcgraw, Battle, & Furniss, 2004 in du Plessis & Human, 2007, p. 17).

Question number	Details of question	Number of participants ending survey on each question	Number of participants answering the question
One	Consent	-	11
Two	Pre-requisite	0	11
Three	Implementation considerations	1	10
Four	Implementation considerations	0	10
Five	Lower limbs	1	9
Six	Lower limbs	0	9
Seven	Stomach	0	9
Eight	Chest	0	9
Nine	Chest	0	9
Ten	Upper limbs	0	9
Eleven	Upper limbs	0	9
Twelve	Face	1	8
Thirteen	Back	0	8
Fourteen	Massage conclusion	0	8
Fifteen	Massage conclusion	0	8
Sixteen	Duration of massage routine	0	8
Seventeen	Massage repetition	0	8
Eighteen	Massage oil	0	8
Nineteen	Coconut oil	0	8
Twenty	Sensory input	0	8
Twenty-One	Positioning	0	8
Twenty-Two	Positioning	0	8
Twenty-Three	Time of day to massage	0	8
Twenty-Four	Massage repetitions in the day	0	8
Twenty-Five	Follow-up contacting	0	8

Table IV: The pattern of survey three initiation and completion by the participants

Phase Five: Development of the Programme

This phase was comprised of the final collation and development of the infant massage programme and was based on the consensus obtained in Round Three.

1.2.2. Data analysis

Quantitative data analysis

Descriptive statistics were used in the Delphi technique to summarise the quantitative data (Evans, Rogers, Mcgraw, Battle, & Furniss, 2004; Cohen, Harle, Woll, Despa, & Munsell, 2004; Greatorex & Dexter, 2000 in du Plessis & Human, 2007, p. 21). This Delphi study used central tendencies (mean, median, mode) of the data from the Likert scales as well as standard deviation to determine the level of importance of each item as determined by the participants (Hasson, Keeney, & McKenna, 2000, p.1012). In order to determine the consensus on items the statsitical testing of the central tendency, the mean, assisted in determining the group opinion and the standard deviation assisted in determining the level of disagreement on each item (Greatorex & Dexter, 2000 in du Plessis & Human, 2007, p. 21)

Nominal data, such as the profession and the gender of the participants were analysed by counting the number of cases falling into each category and then calculating a percentage grouped in each. The measure of central tendency was the mode which was obtained by inspecting the grouped data and identifying the largest group.

Ordinal data, such as the rating scales used for certain questions “not important” “nice to have” “important”, were analysed by tallying the results and presenting them as a frequency distribution. The frequency of each category was then plotted on a bar graph where the height of the bar represented the frequency of each given category. The mode was then analysed by observing the most frequently occuring score in each category in the distribution.

Continuous data, such as the participants’ ages, were analysed by grouping the frequency distributions where the intervals were equally sized and then finding the mode out of the groupings. Other continuous data, such as the number of repetions of each massage stroke, were analysed by calculating the sum of the scores and dividing it by the number of scores to find the mean.

The purpose of these statistical summaries was to determine the level of consensus (Hasson, Keeney, & McKenna, 2000, p.1012).

Qualitative data analysis:

The qualitative responses in the 'comments' section were analysed using content analysis by grouping similar items together which had several different terms but which appeared to be the same issue in order to provide one universal description (Hasson, Keeney, & McKenna, 2000, p. 1012). The content analysis and the statistical summaries formed the quantitative basis for developing the online survey for subsequent rounds (McKenna, 1994 in du Plessis & Human, 2007, p. 17).

1.2.3. Sampling techniques

A purposive sampling approach was used for this Delphi study (Bruce, Langley, & Tjale, 2008, p. 59) whereby specific expert participants were selected depending on the set inclusion and exclusion criteria (du Plessis & Human, 2007, p. 18) (Akins, Tolson, & Cole, 2005, p. 4). These criteria were selected to ensure the participants were experts in this field who have both knowledge and clinical experience with working with high risk infants and in resource constrained contexts (Bruce, Langley, & Tjale, 2008, p. 58). The use of experts in this study is concurrent with literature which states that they are consistently used to collect data in the design and development processes (Bruce, Langley, & Tjale, 2008, p. 58). The knowledge required can be based on work done by Benner (1984) who hypothesised that knowledge and expertise develop when an individual tests and refines principles and theories in their field of practice and in turn uses their own judgement and decision making when practicing. Experience of an expert can be defined as how active the individual is in their field and the scope of their experience in that field (Benner, 1984 in Bruce, Langley, & Tjale, 2008, p. 58).

These participants were recruited by the researcher contacting relevant therapists who met the criteria via Email. Reminders were sent to participants via email when they were required to complete online surveys. The researcher also recruited these therapists through sending a bulk email to the Occupational Therapy Association of South Africa (OTASA), the South African Association of Sensory Integration (SAISI) and the KwaZulu Natal Department of Health mailing lists for Occupational Therapists and Physiotherapists. This included a detailed email regarding

the research process as well as a link to the survey. Participants were required to meet the relevant inclusion criteria for the study through completing a question on the survey before they could continue with the survey. Those who did not meet these criteria were unable to continue with the survey. Purposive sampling was used to ensure a homogenous sample was maintained for this study which would yield sufficient results even though the sample size was smaller (Skulmoski, Hartman, & Krahn, 2007, p. 10).

The following selection criteria were used in this sampling approach which were based on the qualities of the expert panel rather than on the sample size, as characterized by the Delphi technique (Powell, 2003, p.380):

Selection Criteria:

- Bachelor degree in Occupational Therapy or Physiotherapy
- Knowledge and practical engagement in with intervention with high risk infants for a minimum of one year (Akins, Tolson, & Cole, 2005, p. 10) (Bruce, Langley, & Tjale, 2008, p. 58)
- Knowledge of and practical engagement in community based clinics or rural district hospitals for a minimum of one year (Akins, Tolson, & Cole, 2005, p. 10) (Bruce, Langley, & Tjale, 2008, p. 58)
- Capacity and willingness to participate in and contribute to the development of an infant massage programme for high risk infants from resource constrained contexts (Akins, Tolson, & Cole, 2005, p. 10)
- Good written communication skills in English (Akins, Tolson, & Cole, 2005, p. 10)
- Adequate computer literacy and computer skills (Hasson, Keeney, & McKenna, 2000, p. 1011)

The literature on the Delphi technique on the number of participants to be included is variable with little agreement with numbers in previous studies ranging from five (Malone, et al., 2005), to twenty three (Armstrong, et al., 2005) and over one thousand in another study (Barnette, Danielson, & Algozzine, 1978). There are marginal benefits of a larger sample size above a certain threshold as a large sample size may increase the reduction in group error but the management of the data analysis and Delphi process may become cumbersome (Skulmoski, Hartman, & Krahn, 2007, p. 10).

In order to maintain the rigor of the results from the Delphi technique, this study aimed for a response rate of 70% throughout the study (Hasson, Keeney, & McKenna, 2000, p. 1011). Therefore, in order for this study to obtain, what is considered to be a small sample size of 15 respondents, the study should have begun with 23 Delphi participants (Akins, Tolson, & Cole, 2005, p. 4). Therefore, a rigorous Delphi technique with a homogenous smaller sample size was selected. However, although this study started with a sample of twenty five participants only fourteen participants completed survey one (refer to Table II), thirteen completed survey two (refer to Table III) and eight participants completed survey three (refer to Table IV). There are a few possible reasons for this dramatic decrease in numbers from the large initial sample to the final smaller sample size. Therapists may have not presented with an interest in this topic once they started the survey (du Plessis & Human, 2007, p. 19), they may also have not had sufficient current knowledge of the topic (du Plessis & Human, 2007, p. 18), and may not have had sufficient time available to them to be part of the research process (Avery, 2005 in du Plessis & Human, 2007, p. 18). The decrease observed in the response rate over the three rounds may have been due to the participants being very busy and experiencing difficulty to participate fully (Skulmoski, Hartman, & Krahn, 2007, p. 10). Previous studies have noted that as the number of rounds increase and the effort required by the participants, that a drop in the response rate is often observed (Alexander, 2004; Rosenbaum, 1985; Thomson, 1985 in Skulmoski, Hartman, & Krahn, 2007, p. 11).

1.2.4. Data management

All electronic data was stored on a hard drive which required a secure password to access the data. The researcher and supervisor have access to this. The data will be stored for a minimum of five years and will be disposed of effectively on completion of this term. The raw data was and will be stored in a locked cupboard where the researcher and supervisors have primary access to it.

1.2.5. Ethical considerations

The researcher complied to all ethical considerations by ensuring the following:

(i) Ethical clearance was obtained from the Humanities and Social Sciences Research Ethics Committee at the University of KwaZulu Natal. Ethical clearance number: HSS/0533/017M

(ii) Completion of the 'National Institutes of Health (NIH) Office of Extramural Research that Web-based training course on "Protecting Human Research Participants"'. Certificate number: 2254111

This research study included the following ethical considerations in the design of this study:

(i) Informed Consent

All participants were provided with the information about the study in an e-mail prior to them starting the online survey. This information included the details and purpose of the study including; the approximate duration of completing each survey, the methodological process of the study, the inclusion criteria, what would be required from the participants as well as the details for what and how the results would be used. They were also required to agree to informed consent at the start of each online survey.

Participants were also informed of their right to withdraw from the study at any point with no repercussions as well as the voluntary nature of this study.

(ii) Confidentiality

A key feature of the Delphi method is anonymity (Rowe & Wright, 1999, p. 354) where true anonymity is ensured when no link can be made between the response to a respondent (du Plessis & Human, 2007, p. 16). However, participants were given the option to be contacted via Email or via bulk mailing systems and so true anonymity was not maintained if they provided their Email address. The participants were not required to provide any other personal information and were allocated a number when answering the surveys. If the participant chose to provide their Email address then they chose to give up complete anonymity. Therefore, "quasi-anonymity" was maintained as the researcher had access to some of these provided participants Email addresses but the judgements and opinions that were provided during the

surveys were strictly anonymous (McKenna, 1994 in Hasson, Keeney, & McKenna, 2000, p. 1012). This was reinforced by the responses from the participants being pooled into a table and graph format for each question in the survey whereby each participant was allocated a number without inclusion of their indentifying information from their Email addresses.

(iii) Trustworthiness, reliability and validity

The following considerations were taken into account to ensure credibility and trustworthiness namely; reliability, objectivity and validity (i.e. internal and external) (Anney, 2014, p. 272). Objectivity in this study was mantained by the researcher not including any aspects which had not been raised by the participants and by using, as far as possible, the wording used by these particpants (Hasson, Keeney, & McKenna, 2000, p.1012).

According to Hasson, Keeney, & McKenna (2000, p. 1012) reliability refers to the 'the extent to which a procedure produces similar results under constant conditions on all occassions'. However, there is limited evidence of reliability when using the Delphi method (Hasson, Keeney, & McKenna, 2000, p. 1012) and the researcher was unable to test and retest the outcomes with a different sample due to time constraints. However, the consensus obtained in the surveys contributed towards reliability through inter rater reliability.

The content validity of this study was maintained by the participants being required to meet certain selection criteria which meant they were representative of the field of expertise (Goodman, 1987 in Keeney, Hasson, & McKenna, 2001, p. 198) as well the inclusion of three successive rounds to increase the concurrent validity (Hasson, Keeney, & McKenna, 2000, p. 1013). The pilotting of the initial survey and appraisal of successive surveys by two expert professionals who were not participants in this study also contibuted towards validity (Skulmoski, Hartman, & Krahn, 2007, p. 4).

Overall, the credibility and trustworthiness of this study was ensured through use of purposive sampling to ensure a homogenous sample was maintained for this study which would yield sufficient results even though the sample size was smaller (Skulmoski, Hartman, & Krahn, 2007, p. 11).

CHAPTER TWO

MANUSCRIPT

"CONSENSUS ON AN INFANT MASSAGE PROGRAMME FOR HIGH RISK INFANTS FROM RESOURCE CONSTRAINED CONTEXTS: A DELPHI STUDY WITH PHYSIOTHERAPISTS AND OCCUPATIONAL THERAPISTS"

Summary:

Bonding and attachment is an integral part of infant development whether they were born without complications or as a high risk infant. The development of a caregiver-initiated infant massage programme specific for high risk infants from resource constrained contexts through this three round Delphi study has created a set of guidelines for use in this context by Physiotherapists and Occupational Therapists. These guidelines will assist in the bonding and attachment process between the primary caregiver and the infant to take place despite the many social and medical factors which this dyad may face.

Journal Details

The South African Journal of Occupational Therapy (SAJOT) is the leading publication in Africa for research in Occupational Therapy and is the official publication for occupational therapy research in South Africa. The journal publishes research that contributes to the profession in Africa with particular reference to service delivery and creates a platform for discussion and debate about relevant topics pertaining to the profession. A further goal of SAJOT is to contribute to the profession worldwide through the research and findings disseminated in Africa.

Manuscript

This formatting of this manuscript was presented according to the author guidelines outlined in the SAJOT. The names of the authors have been removed from the manuscript as specified by SAJOT and figures and tables have been included for ease of reading.

"CONSENSUS ON AN INFANT MASSAGE PROGRAMME FOR HIGH RISK INFANTS FROM RESOURCE CONSTRAINED CONTEXTS: A DELPHI STUDY WITH PHYSIOTHERAPISTS AND OCCUPATIONAL THERAPISTS"

2.1. ABSTRACT

Background and aim: There are various infant massage programmes which have been designed for infants born without complications but there are limited options available for caregivers with high risk infants from a resource constrained context. The aim of this study was to develop a caregiver-initiated infant massage programme specific for high risk infants from this context and to create a medium for the bonding and attachment process between this dyad despite the many social and medical factors they face.

Method: A Delphi study was conducted over a three round process with a concluding number of eight Physiotherapists and Occupational Therapists with experience in the field of high risk babies in a resource constrained context. The first survey was designed based on literature and the subsequent two surveys were designed based on the data and comments generated from previous surveys. Iteration of results was provided prior to the round three survey.

Results: Following completion of the Delphi process there was a consensus on 19 massage strokes to be included in this programme as well as the considerations for implementation with this population.

Conclusion: Through this study an infant massage programme for this population was developed with the inclusion of considerations for this dyad's social and medical context.

2.2. INTRODUCTION:

The birth of a high risk infant is frequently the result of birth trauma[1] and may result from a variety of factors such as delay in seeking medical attention during labour, non-initiation of antenatal care, booking late in pregnancy, as well as facility and management factors including inappropriate response to ruptured membranes, inadequate facilities and lack of transport and ventilator and resuscitation equipment[2]. These infants then subsequently spend a significant amount of time in the hospital[3].

This high risk infant can often not respond in the appropriate manner to the caregiver's cues which can often lead to the primary caregiver feeling out of touch with their infant as well as the infant feeling overwhelmed[4]. As a result of the future anticipated special needs that the infant may present with, as well as the possibility of losing the medically fragile infant, the caregiver may start to develop perceptions of failure[3]. In addition to the underlying causes of the infant being born high risk there are also a variety of cultural and environmental factors which inhibit this bonding process such as such as the death of the infant's parent/s and resource constrained living conditions[5 6.]. Alongside these social factors is that breastfeeding, which is a source of bonding between the dyad[7], is often a challenge with infants who are born high risk. This is due to several risk factors such as the medical condition of the infant, the length of hospitalisation, the distance of the infant from the maternal residence and the type of delivery[8]. These medical and social factors impact on the bonding and attachment process between the dyad.

The aim of this study was to develop an infant massage programme for high risk infants that can be initiated by these primary caregivers in their context towards assisting this dyad in the bonding and attachment process.

2.3. LITERATURE REVIEW:

A "high risk infant" is an infant who requires a greater degree of monitoring and care compared to a healthy infant who was born full term[9]. The St Apollinaris high risk baby policy has been included as a reference of high risk infants[10]. This policy was developed due to rural district therapists experiencing limitations in their rehabilitation care due to a lack of resources and policies[11] and so this rehabilitation team at this facility designed a guideline for management of these clients. High risk infants present as having one or more of the following[9 10]; born with a low birth weight (ie. <1800g), preterm birth (ie. <37 weeks), neonatal encephalopathy resulting in low APGAR scores of 7/10, infants requiring mechanical ventilation for more than 24 hours, infants presenting with seizures post-delivery, infants presenting with infections (e.g. meningitis, syphilis, CMV, toxoplasmosis, herpes simplex), infants presenting with major mobidities (ie. Chronic lung disease, intra-ventricular hemorrhage, peri-ventricular leucomalacia) hyperbilirubinemia where the infant requires a blood transfusion, major malformations and abnormal neurological examination at discharge, cardiopulmonary distress, drug withdrawal syndrome requiring monitoring, suspected or proven neonatal sepsis and metabolic abnormalities ie. anemia, hypoglycemia, hypocalcemia.

Many infants who are born prematurely or with a low birth weight present with greater deficits in their first year in mental function as well as in neuromusculoskeletal and movement-related dysfunctions compared with children born at a normal birthweight or full term[12]. Approximately 50-70% of children born prematurely present with dysfunctions such as cognitive deficits, learning disabilities, attention problems, behavioral problems, and neuropsychological deficits when they reach school age[13]. These high risk infants have a lower threshold for sensory input than other infants and in turn experience difficulty with tolerating handling and interaction[14]. This infant who has been in the neonatal unit has also been separated from their mother and so may be feeling insecure which will require extra sensitive handling and if this infant has a special need then this will need to be coupled with emotional support[15].

Primary caregivers are also faced with various extraneous factors such as a shortage of financial resources, limited transport and under-resourced hospitals[16]. These social risk factors impact on the infants' cognitive and behavioural development[17] and also make it difficult for sustainability of therapy programmes and medical intervention[11]. Unfortunately these caregivers are further faced with long queues at hospitals, inefficient administration procedures where patients have to wait lengthy periods for their files, and have a perception of disrespectful and "uncaring" attitudes from the staff at these hospitals[16]. Clients often have to be put on long waiting lists for therapy appointments and have poor access to equipment and assistive devices due to a lack of district funding[16].

These social factors alongside the medical concerns of the infant, difficulty with breastfeeding and the emotional experience of the primary caregiver hinder the bonding and attachment process. Infant massage therapy, alongside other early intervention programmes, provide this supportive environment needed for attachment and bonding and appropriate stimulation for the infant, and is used to optimise the infant's sensory experience and thus improve development and functional outcomes[18]. The initial primary goal of intervention with preterm infants, after ensuring survival, is to prevent further exposure to dangerous environmental stimulation[19]. Further goals of intervention are to encourage and create a supportive environment which provides appropriate stimulation for the infant and which mirrors that provided in utero[20]. Other goals include providing support and strategies to the families of the infant so that they can become competent and confident in optimising their child's development and to empower them to be an active participant in their child's recovery programme[21]. It is therefore crucial that in order to increase caregiver competence and sustainability of the programme that they are taught the stimulation techniques with their children[21].

Infant massage consists of gentle, slow stroking of each part of the body through tactile stimulation by human hands[22]. This nurturing touch is beneficial in that it contributes to the infant's optimal development psychologically and physically through stimulation, relaxation, relief and interaction[23] through enhancing the parent-child relationship and strengthening the emotional attachment[24]. Further benefits include improvements in social interaction, emotional functioning and soothing temperaments and sleep organisation in full term infants[25].

A further benefit in the attachment process is that infant massage creates a purposeful and satisfying interaction between the dyad through a constructive and positive activity[26]. This dedicated infant massage time is also a protected time between the mother and the infant[26] which is relaxing for both amongst the many other demands which she is required to do during the infant's waking times such as nappy changing, bottle or breast feeding, trying to decipher the different cries, alongside a lack of sleep as well as recovering from the physical birthing process if she is the mother[23].

Early identification and intervention is recommended for all infants and toddlers who are presenting with difficulties as there is much evidence that this intervention has a positive effect on the development of the child throughout their life[27]. This is evident in neuroplasticity where young animals and humans' exposure to sensory information and experiences from their environment results in growth and development as a result of specialisation and maturation[27].

2.4. METHODOLOGY:

2.4.1. Study design:

The study was conducted using a Delphi technique with the aim of programme development[28]. Three rounds were conducted[29], which was based on the time available to the researcher, the available funding as well as the consideration of participation fatigue[30 31]. The focus of this study was on the stability of the group consensus rather than on individuals' opinions[32]. Participants were required to respond using a survey design of rating of Likert scales[33]. As outlined by[31] this study adopted a group facilitation process whereby the open-ended 'comments' section in the survey yielded qualitative information which was given back to the participants in a quantitative form in the subsequent survey. This element also aimed to ensure that the research findings provided a holistic understanding of the research question[34].

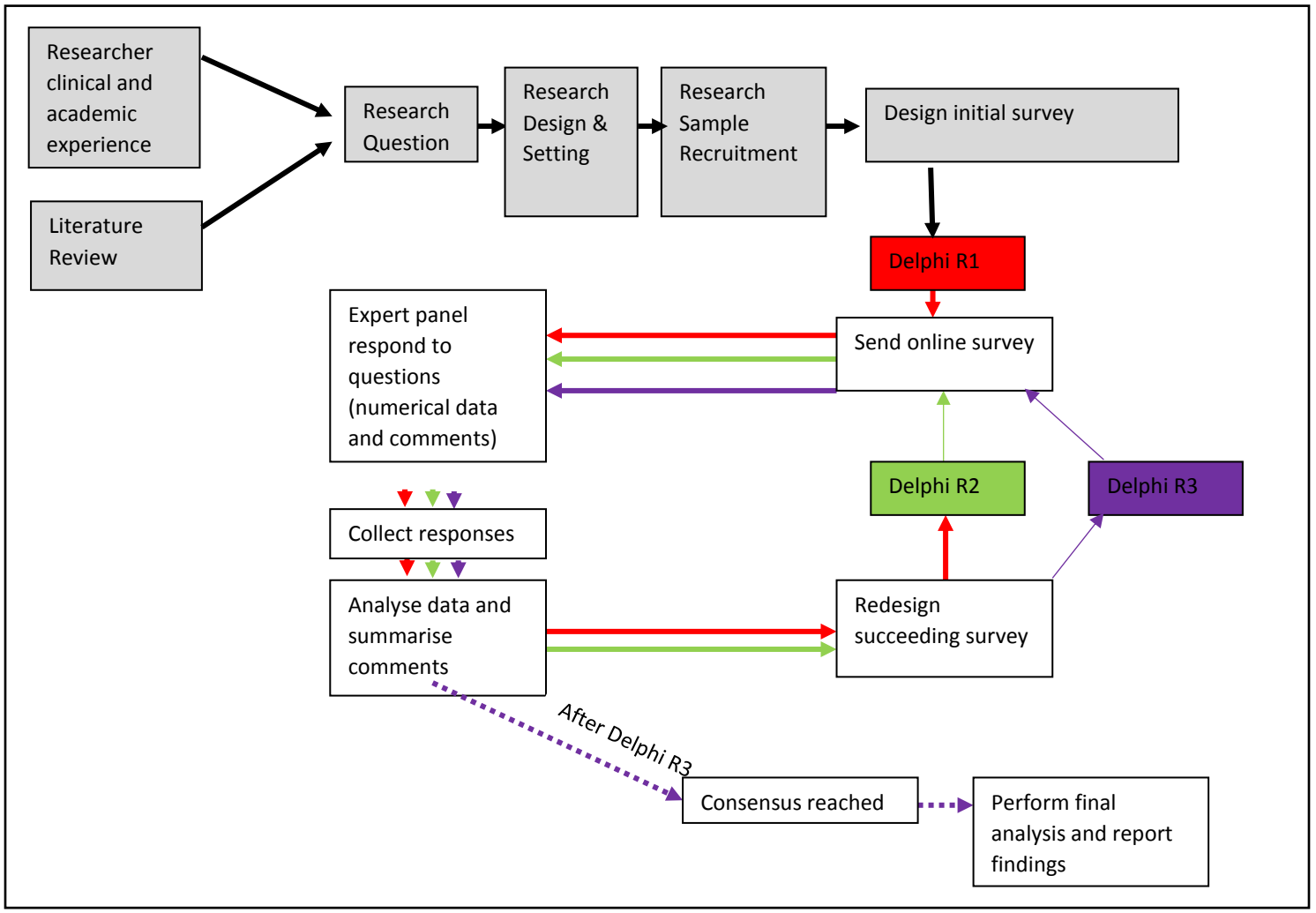

Figure 1: The methodological process based on du Plessis & Human, 2007[29] & Skulmoski, Hartman, & Krahn, 2007[33]

The study included the following phases:

Phase One: Literature review

The initial phase of the study focused on a comprehensive literature review by the researcher on the high risk infant, the contextual considerations for this dyad from the resource constrained context as well as on infant massage in order to form a basis upon which the initial online survey could be created[31].

Phase Two: Delphi Process Round One: Item Generation

A purposive sampling approach was used for this Delphi study[35] whereby specific expert participants were included depending on certain selection criteria[29 36]. Following recruitment of the

sample the initial online survey was uploaded online onto www.surveymonkey.com. The format and content of this initial online survey was based upon the researcher's experience and a comprehensive literature review[31] and so was a structured survey[37]. The main aim of phase two in this Delphi process was item generation through guidance from literature and comments provided by the participants to explore the participants' broad range of views[29]. Participants were only able to start the survey at question one and if they did not complete a compulsory question then they were not able to continue with the survey. Certain questions requiring comments were not compulsory.

Phase Three: Round Two Delphi Process: Consensus on item generation

The list of infant massage techniques formulated from the initial structured survey and from the additions from the expert participants in Phase One was pared down in Round Two in the second online survey[38]. The three point Likert scale from survey one was collapsed into a two point scale where "Important" and "Nice to have" were reduced to "Important" and "Not important" was kept as "Not important". Items which were infrequently rated by particpiants in round one were still included in this survey[31]. Iteration was not provided at this stage as round one and round two aimed to establish consensus on similar items.

Phase Four: Round Three Delphi Process: Consensus

The third round included iteration, whereby an organized summary of the previous round one and round two results were distributed to the participants so that they were aware of the range of opinions and positioning of the programme based on these opinions[28]. This feedback was controlled in order to reduce the effect of noise which allowed the participants to generate additional insights into the programme and to clarify any uncertain points[28]. Following this feedback the participants were provided with the round three survey based on the findings of round two[29]. The two point Likert scale from round two was maintained with a change in terminology from "Important" to "Agree" and "Not important" to "Disagree". The list of items in survey three were reduced by including only those items that achieved a a priori consensus threshold of 70% or more[39]. This threshold is concurrent with previous studies which noted this as an acceptable threshold[40 41].

Phase Five: Development of the Programme

This phase was comprised of the final collation and development of the infant massage programme and was based on the consensus obtained in Round Three.

2.4.2. Sampling techniques:

Purposive sampling was employed in the selection of experts for this study based on set selection criteria[29 36]. This approach was used to ensure a homogenous sample was maintained for this study which would still yield sufficient results even though the sample size is smaller[33].

The following selection criteria were used in this sampling approach to ensure representativeness of the sample to the study population which was based on the qualities of the expert panel rather than on the sample size[30]. The selection criteria based on Akins, Tolson, & Cole (2005)[36] and Bruce, Langley, & Tjale (2008)[35] included having a bachelor degree in Occupational Therapy or Physiotherapy, knowledge and practical engagement in with intervention with high risk infants for a minimum of one year, knowledge of and practical engagement in community based clinics or rural district hospitals for a minimum of one year, capacity and willingness to participate in and contribute to the development of an infant massage programme for high risk infants from resource constrained contexts, good written communication skills in English and adequate computer literacy and computer skills[31]. Participants who did not meet the selection criteria were excluded from the study.

In order to maintain the rigor of the results from the Delphi technique, this study aimed for a response rate of 70% throughout the study[31]. Therefore, in order for this study to obtain, what was considered to be a small sample size of fifteen (15) respondents, the study should have begun with twenty three (23) participants[36]. This selection of a homogenous small sample size was based on the theory that there are marginal benefits of a larger sample size above a certain threshold as a large sample size may increase the reduction in group error but the management of the data analysis and Delphi technique may become cumbersome[33]. However, although this study started with a sample of twenty five (25) participants who met the selection criteria only fourteen (14) of these participants completed survey one (1), thirteen (13) completed survey two (2), and eight (8) participants completed survey three (3).

The researcher was aware of the concepts of validity and reliability during the data collection and data analysis processes. Validity was maintained through the appraisal and piloting of the online surveys prior to implementation of the surveys by two expert professionals who were not participants in the study[30 31] as well as the inclusion of selection criteria which meant the participants were representative of the field of expertise[42] and their consensys contirbuted towards inter-rater reliability. Concurrent validity was increased through the inclusion of three successive rounds[31]. Reliability was maintained as the data from the comments in each survey

guided the subsequent surveys and so the tool was based on the responses of the participants and not on that of the researcher.

2.5. RESULTS:

Quantitative data analysis

Descriptive statistics were used in the Delphi technique to summarise the data from the questions with Likert scales[29]. This Delphi study used central tendencies (mean, median, mode) of the data from the Likert scales as well as standard deviation to determine the level of importance of each item as determined by the participants[31]. In order to determine the consensus on items the statsitical testing of the central tendency, the mean, assisted in determining the group opinion and the standard deviation assisted in determining the level of disagreement on each item[43]. The purpose of these statistical summaries was to determine the level of consensus[31].

Qualitative data analysis:

The qualitative responses in the open-ended 'comments' section were analysed using content analysis by grouping similar items together which had several different terms but which appeared to be the same issue in order to provide one universal description[31]. The content analysis and the statistical summaries formed the quantitative basis for developing the online survey for subsequent rounds[44].

Table I: Demographics of survey participants in survey one (n=29)*

* Twenty nine (29) participants started survey one (1) and completed their demographics. Therefore, this table is based on that number. However, only twenty five (25) of these participants met the selection criteria.

GENDER		AGE				
Male	Female	20-25	26-30	31-35	36-40	40+
0%	100%	17.24%	41.38%	13.79%	3.45%	24.13%
LEVEL OF EDUCATION			PROFESSION			
Bachelor Degree	Masters Degree	Postdoctoral Degree	Occupational Therapy		Physiotherapy	
72.41%	24.14%	3.44%	82.76%		17.24%	
EXPERIENCE (in years) WORKING WITH HIGH RISK INFANTS						
<1	1-5	6-10	11-15	16-20	21+	
3.45%	48.28%	17.24%	13.79%	6.90%	6.90%	
LOCATION						
KZN	GAUTENG	CAPE TOWN	FREE STATE	MPUMALANGA		
58.62%	13.79%	13.79%	10.34%	3.45%		

Table II: Infant massage strokes included in the consensus programme

SURVEY ONE		SURVEY TWO		SURVEY THREE		THERAPIST'S INSTRUCTIONS FOR STROKES
Agreed %	**Disagreed %**	**Agreed %**	**Disagreed %**	**Agreed %**	**Disagreed %**	
LOWER LIMBS						
*		75.00	25.00	100.00	0	Complete all strokes on one limb before progressing to the next limb
*		75.00	25.00	100.00	0	Apply deep pressure around the infant's ankle by circulating the ankle with your thumb
100.00	0	100.00	0	100.00	0	Cup the infant's leg in your hand for 5 seconds and tell the infant to relax, use resting hands and additional deep pressure
94.12	5.88	91.67	8.33	100.00	0	Cup the infant's foot in your hand for 5 seconds and tell the infant to relax, using deep pressure and avoiding light touch
94.12	5.88	100.00	0	100.00	0	Using adapted Indian milking, place one of your hands on the infant's hip joint. Using your other hand cup the leg and using pressure move your hand from the hip to the knee and then the knee to the ankle
*		66.67	33.33	44.44	55.56	Using hug and glide, start at the upper thigh with your hand turning opposite to each other whilst grasping the thigh. Twist each hand as you move from the thigh to the ankle whilst applying deep pressure.
*		66.67	33.33	62.50	37.50	Using adapted Swedish milking, place one of your hands on the baby's ankle joint. Using your other hand cup the leg and using pressure move your hand from the ankle to the knee and then the knee to the hip
*		83.33	16.67	100.00	0	Touch each toe separately using deep pressure
STOMACH						
93.33	6.67	72.73	27.27	100.00	0	Use one of your hands and apply deep pressure on the stomach
*		90.91	9.09	100.00	0	Place your right hand below the infant's naval. Use a sweeping motion with deep pressure in a clockwise direction below this position.
86.67	13.33	72.73	27.27	100.00	0	Use a circular sweeping motion of one hand to sweep from the left hip to the right hip below the infant's naval
*		81.82	18.18	100.00	0	Using deep pressure move up from the right hip, across from right to left and then down
CHEST						
86.67	13.33	72.73	27.27	88.89	11.11	Using both of your hands, do resting hands on the infant's chest
93.33	6.67	81.82	18.18	88.89	11.11	Using both hands, draw the shape of a book on the infant's chest. This will involve both hands going up the sternum, outwards to the left/right, down the lateral aspect of the chest and then back to the medial position.
*		63.64	36.36	55.56	44.44	Using butterfly, place both hands at the side of the infant's ribs, slide your hand diagonally across the infant's chest to the opposite shoulder and then back to the starting position. Repeat with the other hand.

UPPER LIMBS						
*		72.73	27.27	100.00	0	Complete all strokes on one limb before progressing to the next limb
100.00	0	100.00	0	100.00	0	Cup the infant's arm in your hand for 5 seconds and tell the infant to relax, using resting hands
93.33	6.67	100.00	0	100.00	0	Using adapted indian milking, place one of your hands on the infant's shoulder joint. Using your other hand cup the arm and using pressure move your hand from your shoulder to the wrist. Avoid pulling the arm.
*		63.64	36.36	66.67	33.33	Using hug and glide, start at the shoulder with your hands turning opposite to each other whilst grasping the arm. Twist each hand as you move from the shoulder to the wrist whilst applying deep pressure.
86.66	13.33	90.91	9.09	100.00	0	Try and open the infant's hand gently with your thumb and press your thumb into the palm.
*		90.91	9.09	100.00	0	Using your fingers roll each of the infant's fingers separately
FACE						
71.43	28.57	72.73	27.27	87.50	12.50	Apply deep pressure around the perimeter of the infant's face following the facial contours using your thumbs, your left thumb on the left side while your right thumb concurrently moves on the right side
*		81.82	18.18	87.50	12.50	Using your fingertip, apply small circles around the infant's jaw
BACK						
100.00	0	100.00	0	100.00	0	Using one hand, apply resting hands on the infant's back for 5 seconds
100.00	0	100.00	0	100.00	0	Using both of your hands apply deep pressure as your comb down the lateral sides of the spine, from the top to the bottom of the spine, the left hand on the left side and the right hand on the right side

***** Asterisk marked strokes were not questioned in survey one.

Table III: Considerations for implementation of the infant massage programme with high risk infants from resource constrained contexts included

SURVEY ONE		SURVEY TWO		SURVEY THREE		THERAPIST'S INSTRUCTIONS FOR STROKES
Agreed %	**Disagreed %**	**Agreed %**	**Disagreed %**	**Agreed %**	**Disagreed %**	
Duration						
Average calculated: 10 minutes		92.31	7.69	Consensus reached		Duration of massage routine: average of 10 minutes
*				87.50	12.50	Ability of this massage programme to be completed in the limit of 10 minutes
Conclusion considerations						
100	0	81.82	18.18	100.00	0	Integration: use resting hands on each part of the body that has been massaged and name the areas for the infant.
100	0	81.82	18.18	100.00	0	Say thank you to the infant for accepting the massage
92.85	7.14	90.91	9.09	100.00	0	Dressing the infant
*		90.91	9.09	100.00	0	Sharing a cuddle with the infant
Stroke repetition						
Average calculated: 3		90.91	9.09	100.00	0	Include one repetition of each stroke. However, after one week of massage this can be increased to two repetitions with a subsequent increase to three repetitions in the following week.
Recommended oils/creams						
28.57	71.43	Excluded				Cold pressed sunflower oil
21.43	78.57	Excluded				Sunflower oil
28.57	71.43	Excluded				Olive oil
78.57	21.43	81.81	18.18	87.50	12.50	Non-perfumed baby cream
*		54.55	45.45	50.00	50.00	Coconut oil
*		27.27	72.73	Excluded		Vaseline
*		*		87.50	12.50	Aqueous cream
Sensory input						
85.72	14.29	90.91	9.09	100.00	0	Primary caregiver singing softly and quietly
100	0	100.00	0	100.00	0	Primary caregiver talking to the infant
50	50	18.18	81.82	Excluded		Music in the background
100	0	81.82	18.18	100.00	0	Eye contact

*		100.00	0	100.00	0	Skin to skin contact
*		81.82	18.18	100.00	0	Facial expressions
Training of the programme						
71.43	28.58	72.73	27.27	Consensus reached		Ability of the massage programme, alongside a handout, to be trained to a primary caregiver from this context in one 30 minute session by an Occupational Therapist or Physiotherapist
Positioning of the primary caregiver						
78.57	21.43	90.91	9.09	100.00	0	Caregiver seated on the floor on a blanket in long sitting with infant positioned with it's head by the caregivers knees and legs up against the caregivers stomach
71.43	28.58	81.82	18.18	100.00	0	Caregiver seated on a bed in long sitting with infant positioned with it's head by the caregiver's knees and legs up against the caregiver's stomach
85.71	14.29	72.73	27.27	100.00	0	Towel/blanket rolled around perimeter of infant for cradling support
92.85	7.14	100.00	0	100.00	0	Lower limbs of primary caregiver supporting edge of infant for cradling support
78.57	21.43	63.64	36.36	62.50	37.50	Caregiver seated on the floor in long sitting with infant lying on caregiver's legs in supine
Advantageous time of day for implementation of this massage programme at home by the primary caregiver						
64.29	35.71	27.27	72.73	Excluded		Following the first nappy change in the morning
92.86	7.14	72.73	27.27	100.00	0	Before the infant's bed time
57.14	42.86	36.36	63.64	62.50	37.50	Three times a day if possible
*		81.82	18.18	100.00	0	After bath time
*		100.00	0	100.00	0	When the baby is in a quiet alert state
Medical considerations						
*		100.00	0	100	0	Deemed medically stable as determined by the medical team
*		15.38	84.62	100	0	Full term gestational age
*				90.00	10.00	The infant's vital signs (blood pressure, pulse, temperature, respiration) must be stable, as deemed by the medical doctor
*		61.54	38.46	Explained under "medically stable and vital signs"		Is on ventilator support
*		46.15	53.85	Explained under "medically stable and vital signs"		Is not requiring oxygen

***** Asterisk marked strokes were not questioned in this relevant survey

Delphi Rounds (Refer to Table II and Table III)

Delphi round one survey: Consensus was obtained on all massage strokes which were included in the initial survey and obtained from the literature review conducted by the researcher in Phase One of the study[31].

Participants who commented noted that certain strokes should be included into the programme. One participant said when commenting on the lower limbs *"hug and glide- provides much more proprioceptive input"* and which was confirmed by another participant who also noted *"hug and glide (squeeze and twist)"*. This observation was also noted by a third participant who recommended the inclusion of *"deep compression along long bones- from hip to knee and knee to heel. Calming, well tolerated in supine and good prep for therapeutic activities"* which has similar characteristics to the hug and glide massage stroke. Another participant also suggested the inclusion of *"swedish milking".* A further suggestion also recommended *"touching each toe separately"*. When commenting on the stomach participants recommended *"circular sweeping motion across the stomach in a clocking motion to mimic bowel movements"* and *"clockwise circular sweep"* as well *as "along large colon- up from right hip, across from right to left and then down to aid digestion and soothe cramps".*

It was recommended by one particpant that *"butterfly"* is included as a massage stroke for the chest which is a technique which stimulates and deepens breating in the infant (Simpson, 2001, p. 28). When questioned about the upper limbs two participants stated that *"hug and glide"* should be included, one participant recommended the inclusion of *"swedish milking"* and two participants recommended *"finger rolling"/"rolling each finger separately"*. One participant recommended *"small circles around the jaw with fingertips"* as well as a further *"maybe 'Relax the Jaw' or jaw clenching"*.

It was noted in this survey that the average recommended duration for an infant massage routine is 10 minutes as well as the repetition of each stroke three times. There was consensus obtained on excluding certain oils/creams as recommendations for this population and these included *"cold pressed sunflower oil*", *"sunflower oil"* and *"olive oil".*

Delphi round two survey: In this round two survey all strokes which had obtained consensus in round one were confirmed with a subsequent consensus in round two. There was also a further consensus on six additional strokes added in round two which were based on the comments gathered in round one. However, there was a non-consensus noted for the added sub-items *"hug*

and glide" and *"swedish milking"* for the lower limbs as well as *"butterfly"* for the chest and *"hug and glide"* for the upper limbs.

One of the participants recommended *"a cuddle"* as a conclusion consideration in survey one and this was confirmed in survey two by obtaining consensus. Participants noted in survey one that further beneficial sensory input could include *"encourage skin to skin"* . The recommendation was also to include *"facial expressions"* which were confirmed with a result of consensus in survey two. Further additions included that participants recommended the inclusion of *"vaseline"* and *"coconut oil"* for use during the massage routine. The use of "coconut oil" did not obtain consensus and "vaseline" obtained consensus of not being important.

It was also recommended by participants in survey one that this routine is implemented *"after bath time when cream should be applied"* and *"I would suggest after bath time", "when baby is happy and calm" and "so long as baby is calm-alert state"* as well as *"when the baby is in the quiet alert state"*. These were confirmed by consensus in survey two.

Delphi round three survey: This survey confirmed the consensus strokes from the round one and round two surveys. However, there was a further non-consensus on the four sub-items discussed above in round two on *"hug and glide"* and *"swedish milking"* for the lower limbs as well as *"butterfly"* for the chest and *"hug and glide"* for the upper limbs. It was confirmed in this survey that this programme would be able to be completed in the recommended limit of 10 minutes. Participants recommended that should the primary caregiver be unable to complete the massage routines on the whole body in 10 minutes then they should, *"complete one area.. and end in the above mentioned routine (conclusion considerations). The next session start at a missed area or only do resting hands on a previously completed area"*, *"can complete routine later", "at the next massage, the carer could start where they left off"* and confirmed with *"start the next time with the body parts she didn't do".*

The recommendation of completing the routine three times a day if possible did not obtain a final consensus in survey three with participants stating; *"build up to 3x per day"* and *"this will give mothers a number to aim for, which may get in the way, rather than promoting bonding in this dyad where separation post-birth has been necessary due to medical reasons".* A further non-consensus on the recommendation of use of "coconut oil" was noted in survey three, as in survey two. This is confirmed with comments from the participants of *"new research showing coconut oil is not as good as previously thought", "I don't think this is easily accessible in this context", "may not be easily accessible"* and *"may be costly for population group".* "Vaseline", a commercially

produced mineral oil, was excluded in survey three based on its consensus of not being important in survey two. However, one participant did note in survey two that *although Vaseline may not be the best choice- it is most commonly used by caregivers in resource constrained settings".* The inclusion of "aqueous cream" as a recommendation obtained consensus. Non-consensus was also noted in the final positioning sub-item.

2.6. DISCUSSION AND IMPLICATIONS:

Massage strokes for high risk infants

High risk infants have a lower threshold for sensory input, and may experience difficulty tolerating tactile input from handling and interaction[14] which is an imbalance between discriminative interpretation and the need for a defense response[45]. The use of deep touch pressue and the resultant activation of the dorsal column medial lemniscal system (DCML) blocks the protective response to touch and so in turn results in decreased levels of distractibility[45] and pain relief[46]. Therefore, the massage stroke must have pressure to be able to gain these benefits of DCML activation as light touch, activation of the anterolateral system, can be aversive for the infant and result in protective responses and strong emotional reactions[45].

Restings hands is a simple holding technique which activates the DCML system and is especially beneficial with a medically fragile, premature or colicky baby[4]. This is done by warming of the hands, placing them on the infant and then letting the hands go heavy and warm[4]. Due to the nature of this technique it helps the dyad to become more conscious of the experience of touch[4] and improve the infant's body awareness of these areas through the activation of the DCML system[46]. This technique will be implemented in a massage stroke with the lower limbs, upper limbs, chest and the back. Deep pressure will further be added to the ankles by circulating the ankle with the caregiver's thumb as this will further stimulate growth and development and joint flexibility[23]. This deep pressure will also be added to the infant's toes by touching each toe separately. However, caution must be given when massaging the feet as commented by a participant that *"These babies often have quite tender feet from all the prodding and poking in NICU"*. The infant's fingers may also not have been mobilized very much in the unit and so the individual will be required to try and open the infant's hand gently with their thumb and press into the palm as well as roll each of the fingers. These strokes are beneficial as they are*"very useful to prevent contractures and increase input into palm".*

These high risk infants who have been in the neonatal unit or in kangaroo mother care have also not been mobilized very often or picked up unless it was medically necessary. Indian milking of the upper and lower limbs is included in the programme as it relaxes the limb and encourages blood flow to the infant's feet or hands[23] and so encourages normal movement patterns.

The high risk infant may also have experienced gastro-intestinal concerns due to the nature of their medical condition and so may be presenting with constipation. Through massage of the abdomen area of the infant the gas and intestinal matter is moved toward the bowel as these strokes assist in mimicking the movement of the bowel and this will assist with alleviating gas and discomfort[4]. Three strokes will be done on the stomach area which include a sweeping motion with deep pressure in a clockwise direction, a circular sweeping motion from hip to hip and deep pressure movement across the bowels.

High risk infants may have been overstimulated on their face during their stay in the unit in the anterolateral system, as commented; *"babies who have had NGTs hate their faces being touched or heads held firmly- beware of fear response"* and *"babies in the NICU faces are usually overstimulated due to be ossilated, ventilated, tube feeding through the nose. Also the regular suction and wiping of the face"*. This may also be as a result of the high receptor density on the face which is very sensitive to touch and so can result in overstimulation[46]. However, it is still recommended that these two strokes are conducted on the face where deep pressure is applied around the perimeter of the infant's face as well as applying small circles around the infant's jaw. These strokes are beneficial in that they alleviate tension in the jaw, support chewing and speech[23].

Touch of the infant's back activates a larger receptor field where the receptor density is low and so is less sensitive to touch[46] and so has a calming effect for the infant. The massage stroke to be done on the back with require deep pressure combing down the lateral sides of the spine from superior to posterior. The added benefit of this stroke is that it will also stimulate body awareness in the infant as their back is not an area which is frequently touched during their daily routine[23].

The study highlighted a non-consensus on inclusion of "hug and glide" for the upper and lower limbs where the stroke involves. This massage stroke motion involves a twisting motion of the limb which would activate the anterolateral system and so result in the dysregulating effects of activating this system with this sensitive infant[46]. Therefore, these strokes will be excluded from the programme to avoid this aversive response.

"Swedish milking" of the lower limbs was also a stroke that did not obtain consensus in this study. The purpose of this stroke is to aid circulation from the feet and back towards the heart[4] and it is for this purpose that it will be included in the programme.

The final non-consensus was regarding the "butterfly" technique on the chest. This technique is beneficial for the infant in that it stimulates and deepens breathing[23] which is beneficial for this high risk infant who often has a history of breathing difficulties due to preterm birth or low birth weight and so it will be included in the programme.

Inclusion of other sensory stimulation during massage routine

This consensus from this study highlighted the inclusion of contingent tactile stimulation, which is massage conducted alone or in conjunction with visual and/or auditory stimulation[47.] The participants agreed on the inclusion of eye contact between the dyad, skin to skin contact as well as the primary caregiver singing softly and quietly and talking to the infant whilst showing facial expressions[22]. The benefits of this are that they assist in increasing vocalisations, smiles, eye contact and approach behaviours in the infant who is possibly experiencing difficulty with responding appropriately to the mother due to the nature of their medical condition[47]. A further benefit is that by the primary caregiver responding to different facial expressions and vocalisations from the infant it will further assist the infant to become familiar with the caregiver's personality as well as to help the infant to integrate experience[23]. The infant also uses the caregiver's emotional expressesions to help make sense of their environment[23]. The inclusion of skin to skin contact is beneficial in helping the infant to remain calm and relaxed which is in addition to the calming effect of the massage routine[48].

Duration of massage routine

A consensus was not obtained in this study about the recommendation of repeating the massage routine three times a day. However, with the support from Field's protocol (1986)[49] as well from a participant's comment of *"build up to 3x per day"* it is recommended that this routine be conducted up to three times a day if the dyad are comfortable with this. This study also obtained consensus on the inclusion of infant massage before the infant's bed time or after bath time as this will help with obtaining the benefits of massage on sleep[50].

However, whilst keeping these recommendations as priority it is further considered that primary caregivers initiate that infant massage routine when both them and the infant are in a state which

is accepting and ready for the process as it is remembered that this dyad is also faced with many other responsibilties and contextual factors in these early days .

The massage routine should be concluded by integrating the infant's body by using resting hands on each part of the body that has been massaged and naming the areas. This should be in addition to saying thank you to the infant for accepting the massage and dressing the infant. Finally, the dyad should share a cuddle as this is a technique which will also aid in the bonding and attachment process through nurturing touch[51] and is a means of expressing emotions without words[52].

Use of oils/creams

It is recommended that the massage routine is initiated with the use of oils/creams; such as non-perfurmed baby cream or aqueous cream. However, it is important to note that the substance used is non-occlusive and does not block the skin pores but allows the skin to breathe[53]. The substance should also be safe and suit the baby's delicate skin and the ingredients of the formula should have been tested for their potential to cause contact sensitivity[53]. The use of coconut oil with this population did not obtain consensus on its inclusion or exclusion. However, research has shown the positive effects of preterm weightgain with the use of coconut oil over mineral oils[54] due to the transcutaenous absorption of the vegetable oil through the thinner and more vascular skin of the infant[55]. Although there are clear benefits of using this oil it *"may not be easily accessible"* and *"may be costly"* for this population in their resource constrained context. It must also be noted that certain cosmetic products and baby creams such as Vaseline and Johnsons baby products are also sensitizing agents as they contain formaldehyde and may contibute to allergic contact dermatitis (ACD) and so should be avoided when conducting infant massage[56].

2.7. LIMITATIONS:

The study did not obtain the 70% response rate throughout the study[31] which may have affected the rigor of the results. There are a few possible reasons for the dramatic decrease in numbers from the initial sample of 25 participants who met the inclusion criteria to the final smaller sample size of eight participants. Therapists may have not presented with an interest in this topic once they started the survey[29], they may also have not had sufficient current knowledge of the topic[29], and may not have had sufficient time available to them to be part of the research process[57]. The decrease observed in the response rate over the three rounds may have been due to the participants being very busy and experiencing difficulty to participate fully[33]. Previous studies have

noted that as the number of rounds increase and the effort required by the participants, that a drop in the response rate is often observed[58 59 60].

There is limited evidence of reliability when using the Delphi technique[31] and the researcher was unable to test and retest the outcomes of the surveys with a different sample due to time constraints.

2.8. CONCLUSION:

A three round Delphi technique completed by expert Physiotherapists and Occupational Therapists guided the development of an infant massage programme for high risk infants from resource constrained contexts. A total of 14 participants completed survey one, 13 completed survey two and 8 completed survey three. The information provided from the participants answering of the Likert scales as well as their additional comments guided the development of subsequent surveys. This process led to the consensus on the infant massage programme as well as considerations for its implementation.

It is recommended that a user friendly format is designed which can be provided to caregivers from Physiotherapists and Occupational Therapists during their training session which they can take home to use to practice the techniques. This programme and its relevant considerations are available and accessible for all Occupational Therapists and Physiotherapists to use to train these primary caregivers from this context to implement these massage techniques with their high risk infants.

A collaborative goal of intervention of Physiotherapists and Occupational Therapists working with high risk infants is to encourage and create a supportive environment which provides appropriate stimulation for the infant and which mirrors that provided in utero[20]. As therapists the focus needs to be on including strategies in the early intervention rehabilitation programme that optimises the infant's sensory experience and thus improve developmental and functional outcomes[18] but that is still appropriate and accessible for this population. The aim of this research study was achieved to provide an infant massage guideline that can be utilised and accessed in this setting to achieve that collaborative goal.

2.9. REFERENCES

1. Hynan. The Perinatal Posttraumatic Stress Disorder (PTSD) Questionnaire. (M. Lanham, Ed.) *Evaluating stress: A book of resources, 2*, 199-200; 1997.
2. Lloyd, L. G., & de Witt, T. W. Neonatal mortality in South Africa: How are we doing and can we do better? *South African Medical Journal.* 2013*; 103*(8).
3. Minde, K. Prematurity and serious medical illness in infancy: Implications for development and intervention. In J. C. H. Zeanah, *Handbook of infant mental health.* (pp. 87-105). New York: Guilford Press; 1995.
4. McClure, V. *Infant Massage: A Handbook for loving parents.* Croydon, United Kingdom: CPI Group Ltd; 2000.
5. Statistics South Africa (1995-2005). Trends in the percentage of children who are orphaned in South Africa. *Census 2001.*
6. UNICEF (2007). Statistical data on the status of children aged 0-4 in South Africa.
7. Else-Quest, N., Hyde, J., & Clark, R. Breastfeeding, bonding and the Mother-Infant Relationship. *Merrill-Palmer Quarterly*. 2003; 495-517.
8. Dall'Oglio, I., Salvatori, G., Bonci, E., & Nantini, B. Breastfeeding promotion in neonatal intensive care unit: impact of a new programe toward a BFHI for high-risk infants. *Acta Paediatrica*. 2007; 1626-1631.
9. Elzouki, A. Y., Harfi, A. A., Nazer, H. M., Stapleton, B. F., Oh, W., & Whitley, R. J. *Textbook of Clinical Paediatrics: 6th edition.* Springer; 2012.
10. Boyd, J. Department of Health. *High risk baby programme: Rehab 01*; 2015.
11. van Stormbroek, K., & Buchanan, H. Community Service Occupational Therapists: thriving or just surviving? *SAJOT*. 2016; 63-72.
12. Beck, S. W. The world- wide incidence of preterm birth: a systematic review of maternal mortality and morbidity. *Bulletin of the World Health Organization*. 2010; p. 88.
13. Sullivan, M. C., & Hawes, K. A decade comparison of preterm motor performance at age 4. *Research in Nursing and Health. 2007; 30*, 641-654. Retrieved from http://dx.doi.org/10.1002/nur.20220
14. Miller, M. Q., & Quinn-Hurst, M. Neurobehavioural Assessment of High-Risk Infants in the Neonatal Intensive Care Unit. *AJOT.* 1994; *48*(6), 506-513.
15. Pick, R. Understanding Childhood. In *The Child Psychotherapy Trust.* London: Child Psychotherapy Trust; 1999.
16. Salojee, G. M., Rosenbaum, P. L., & Stewart, A. V. Using caregivers' perceptions of rehabilitation services for children with Cerebral Palsy at public sectors hospitals to identify the components of an appropriate service. *SA Journal of Physiotherapy*. 2011; 35-40.

17. Lee, V., Brooks-Gunn, J., & Schnur, E. Are Head Start effects sustained? A longitudinal follow-up comparison of disadvantaged children attending Head Start, no preschool, and other preschool programs. *Child Development*. 1990; 495-507.

18. Symington, A., & Pinelli, J. Developmental care for promoting development and preventing morbidity in preterm infants. *Cochrane Database Syst Rev.* 2006; (19).

19. Anand, K. J., & Scalzo, F. M. Can adverse neonatal experiences alter brain development and subsequent behavior? *Biol Neonate.* 2000; (77), 69-82.

20. Westrup, B., Kleberg, A., von Eichwald, K., Stjernqvist, K., & Lagercrantz, H. A randomized, controlled trial to evaluate the effects of the newborn individualized developmental care and assessment program in a Swedish setting. *Pediatrics.* 2000; (105), 66-72.

21. Colyvas, J. L., Brook Sawyer, L., & Campbell, P. Identifying strategies early intervention Occupational Therapists use to teach caregivers. *American Journal of Occupational Therapist*. 2010; 776-785.

22. Vickers, A., Ohlsson, A., Lacy, J. B., & Horsley, A. Massage for promoting growth and development of preterm and/or low birth-weight infants. *Cochrane Database Syst Rev*. 2004.

23. Simpson, R. Baby massage classes and the work of the Internationla Association of Infant Massage. *Complementary Therapies in Nursing and Midwifery.* 2001; *7*, 25-33.

24. Shipwright, S., & Dryden, T. Paediatric massage: an overview of the evidence. *Focus on Alternative and Complementary Therapies.* 2012; *17*(2), 103-110.

25. Field, T. Massage therapy effects. *American Psychologist*. 1998; 1270-1281.

26. Clarke C.L., Gibb C., Hart J., & Davidson A. Infant massage: developing an evidence base for health visiting practice. *Clinical effectiveness in nursing.* 2002; 121-128.

27. Smith Roley, S. Ayres Sensory Integration for Infants and Toddlers. *The South African Institute for Sensory Integration*. 2016; 1-14.

28. Hsu, C., & Sandford, B. A. The Delphi Technique: Making sense of Consensus. *Practical Assessment, Research & Evaluation.* 2007; *12*(10). Retrieved from http://pareonline.net/getvn.asp?v=12&n=10.

29. du Plessis, E., & Human, S. P. The Art of the Delphi technique: highlighting its scientific merit. *Health SA Gesondheid*. 2007; 13-24.

30. Powell, C. The Delphi technique: Myths and realities. *Journal of Advanced Nursing*. 2003; 376-382.

31. Hasson, F., Keeney, S., & McKenna, H. Research guidelines for the Delphi survey technique. *J Adv Nurs*. 2000; 1008-1015.

32. Adler, M., & Ziglio, E. *Gazing into the Oracle: the Delphi method and its application to social policy and public health.* Bristol: PA: Jessica Kingsley Publications. 1996.

33. Skulmoski, G. J., Hartman, F. T., & Krahn, J. The Delphi Method for Graduate Research. *Journal of Information Technology Education*. 2007.

34. Mason, J. *Qualitative researching.* Thousand Oaks, USA: Sage Publications. 1996.

35. Bruce, J. C., Langley, G. C., & Tjale, A. A. The use of experts and their judgements in nursing research: an overview. *Curationis.* 2008; *31*(4), 57-61.

36. Akins, R. B., Tolson, H., & Cole, B. R. Stability of response characteritics of a Delphi panel: application of bootstrap data expansion. *BMS Medical Research Methodology*. 2005.

37. Kerlinger F. Foundations of behavioral research. New York: Holt, Rinehart, and Winston. Inc. 1973.

38. Schmidt, R. Managing Delphi surveys using nonparametric statistical techniques. *Decision Sciences*. 1997; 763-774.

39. Cremers, D., Rosenhahn, B., Yuille, A., & Schmidt, F. *Statistical and Geometrical Approaches to Visual Motion Analysis.* Germany: Springer. 2008.

40. Graham, B., Regehr, G., & Wright, J. G. Delphi as a method to establish consensus for diagnostic criteria. *J Clin Epidemiol.* 2003; (56), 1150-1156.

41. Naidoo, P., & Joubert, R. W. Consensus on hypotonia via Delphi Process. *Indian J Pediatr*. 2013.

42. Goodman C.M. The Delphi technique: a critique. *Journal of Advanced Nursing.* 1987; 12, 729-734.

43. Greatorex, J., & Dexter, T. An accessible analytical approach for investigating what happens between the rounds of a Delphi study. *Journal of Advanced Nursing*. 2000; 1016-1024.

44. McKenna, H. The Delphi technique: A worthwhile research approach for nursing? *Journal of Advanced Nursing.* 1994; *19*(6), 1221-1225.

45. Ayres, A. J. *Sensory integration and learning disorders.* Los Angeles: Western Psychological Services. 1972.

46. Bundy, A. C., Lane, S. J., & Murray, E. A. *Sensory Integration Theory and Practice: Second Edition.* Philadelphia: F.A. Davis Company. 2002.

47. Pelaez-Nogueras, M., Field, T., & Gewrits , J. L. The effects of systematic stroking versus tickling and poking on infant behaviour. *Journal of applied developmental psychology*. 1997; 169-178.

48. Bystrova, K., Widstrom, A. M., Matthiesen, A. S., Ransjo-Arvidson, A. B., Welles-Nystrom, B., & Wassberg, C. Skin to skin contact may reduce negative consequences of "the stress of being born": a study on temperature in newborn infants, subjected to different ward routines in St. Petersburg. *Acta Paediatr.* 2003; *92*, 320-326.

49. Field, T., Schanberg, S. M., Scafidi, F., Bauer, C. R., Vega Lahr , N., Garcia R, R., . . . Kuhn, C. M. Tactile/kinesthetic stimulation effects on preterm neonates. *Pediatrics.* 1986; *77*, 654-658.

50. Agarwal, K. N., Gupta, A., Pushkarna, R., Bhargava, S. K., Faridi, M. M., & Prabhu, M. K. Effects of massage & use of oil on growth, blood flow & sleep pattern in infants. *Indian Journal of Medical Research.* 2000; *112*, 212-217.

51. Schneider, E. F. The power of touch: massage for infants. *Infants and young children*. 1996; 40-55.

52. Binning, S. The Loving Touch. *Nursery World*, 22-33. 1992.

53. Dhar S. Newborn skin care revisited. *Indian J Dermatol. 2007; 52*, 1-4.

54. Sankaranarayanan K., Mondkar, J A; Chauhan, M M; Mascarehas, B M; Mainkar, A R; Salvi, R Y. Oil massage in neonates: An open randomised controlled study of conconut vesus mineral. *Indian Pediatrics. 2005; 42*, 877-884.

55. Nachman, R. L., & Esterly, N. B. Increased skin permeabilitu in preterm infants. *J. Pediatr.* 1979;, *79*, 628-632.

56. Moennich, J. N., Hanna, D. M., & Jacob, S. E. Formaldehyde-Releasing Preservative in Baby and Cosmetic Products. *Dermatology Nurses' Association. 2009; 7*(3), 211-214.

57. Avery, A J; Savelyich, B S; Sheikh, A; Cantril, J; Morris, C J; Fernando, B; Bainbridge, M; Horsfield, P; Teasdale, S. Identifying and establishing consensus on the most important safety features of GP computer systems. *E-Delphi study. Informatics*. 2005.

58. Alexander, D. C. A Delphi Study of the trends or events that will influence the future of California charter schools. *Digital Abstracts International*. 2004; 3629.

59. Rosenbaum, J. A College and University Curriculum Designed to Prepare Students For Careers in Non-Broadcast Private Telecommunications: A Delphi Method Survey of Professional Video Communicators. *Digital Abstracts International*. 1985; 25483.

60. Thomson, B. R. Appropriate and inapproriate uses of humour in psychotherapy as perceived by certified reality therapists: A Delphi Study. *Digital Abstracts International*. 1985; 90.

61. World Confederation for Physical Therapy (WCPT). (2016). What is Physical Therapy? www.wcpt.org.

62. World Federation of Occupational Therapy (WFOT). (2012). Definition of Occupational Therapy. www.WFOT.org.

CHAPTER THREE
SYNTHESIS

3.1. Synthesis

The aim of this study was to develop an infant massage programme for high risk infants from resource constrained contexts through a consensus process with an expert panel of Occupational Therapists and Physiotherapists currently working in the field.

The infant who has been in the neonatal unit and has been separated from their mother may also be feeling insecure and will require extra sensitive handling and if this infant has a special need then this will need to be coupled with emotional support (Pick, 1999 in Simpson, 2001, pp. 25-26). The high risk infant often is as a result of birth trauma which has meant that the mother has also experienced difficulty with obtaining the first two stages of the motherhood constellation as she is concerned if her infant is alive, healthy and anatomically intact (Brazelton & Nugent, 2011, p. 97). The third stage in the constellation of the mother discovering how the infant relates to the family physically and emotionally is also a strained stage for this mother as the infant is often in the neonatal unit for a long period and connected to various machinery. These difficulties make it a challenge for the mother/primary cargiver to obtain the final stage of the motherhood constellation of the development of a mutual field of communication and emotional contact between the dyad (Brazelton & Nugent, 2011, p. 98). The mother may then find it difficult to understand the infant's behaviour and the accurate or inaccurate reading of these signals will determine the future relationship and bonding and attachment process (Brazelton & Nugent, 2011, pp. 94, 97). This is coupled with the infant not being able to respond in this appropriate manner to the cues from the caregiver which can often lead to the primary caregiver feeling out of touch with their baby as well as the infant feeling overwhelmed (McClure, 2000, p. 168). The benefits of infant massage alongside contingent tactile stimulation have been proven to assist with communication between the dyad and in turn the bonding and attachment process (Underdown & Barlow, 2011).

The first objective of the study was to generate ideas of what could constitute an infant massage programme for the high risk infant population living in a resource constrained context through a literature review by the researcher on the high risk infant, the contextual considerations for this dyad from the resource constrained context as well as on infant massage (Hasson, Keeney, & McKenna, p.1011). From this initial search no accessible and available infant massage

programme available for this dyad from this context was identified. Rehabilitation in the resource constrained context with high risk infants is limited due to many factors, with a large factor being poor sustainability of therapy programmes and medical intervention due to poor access to services, lack of finances and transport (van Stormbroek & Buchanan, 2016, p. 69). This opinion is also held by the researcher and from anecdotal evidence from Physiotherapists and Occupational Therapists working in this field and context. It was therefore essential that the infant massage programme proposed in this study, be sustainable and caregiver initiated, to not only improve caregiver competence (Colyvas, Brook Sawyer, & Campbell, 2010, p. 777), but to ensure caregiver-initiated stimulation due to the time and resource constraints faced by therapists (van Stormbroek & Buchanan, 2016, p. 69).

The content obtained from literature was further extended by the online survey in round one where expert participants rated and added comments to the initial generation of ideas on infant massage. The participants' experience added to the richness of the information as their intuitive knowledge helped in guiding the programme from a deep understanding of the holistic situation that this programme was aiming to address (Benner, 1984 in Bruce, Langley, & Tjale, 2008, p. 58).

The second objective of this study was to gain consensus on stroke items and considerations for inclusion in the infant massage programme and the third objective was to consolidate the consensus findings on the massage strokes and the considerations and to develop the infant massage programme through reinforcement from literature. For the purposes of synthesis these two objectives will be discussed concurrently.

Evidence from the literature accessed over the last two decades assisted in the development of the initial strokes for consideration in this study which included thirteen (13) strokes in survey one. An additional twelve (12) strokes were included for consideration and reduction by the experts in survey two based on the participants' comments. Consensus was reached on nineteen (19) strokes demonstrating variation namely; (a) deep pressure around the ankle, (b) cupping the leg, (c) cupping the foot, (d) adapted indian milking on the lower limb, (e) touch each toe separately, (f) deep pressure on the stomach, (g) clockwise sweeping motion on the stomach, (h) horizontal sweeping motion on the stomach (i) deep pressure movement along stomach, (j) resting hands on the chest, (k) book stroke on the chest, (l) cupping the arm, (m) adapted indian milking on the upper limb, (n) opening the hand, (o) rolling the fingers, (p) deep pressure around facial perimeter, (q) small circles around the jaw, (r) resting hands on the back and (s) deep pressure combing down the spine.

Possible reasons that can be cited for consensus on these strokes include the following:

The resting hands technique will be implemented in a massage stroke with the lower limbs, upper limbs, chest and the back. Restings hands is a technique which is especially beneficial with a medically fragile, premature or colicky baby and is helpful in that it is a simple holding technique (McClure, 2000, p. 49). This is done by warming of the hands, placing them on the infant and then letting the hands go heavy and warm (McClure, 2000, p. 49). Due to the nature of this technique it will helps the dyad to slow down and become more conscious of the experinece of touch (McClure, 2000, p. 49). The benefit of this stroke is both relaxing and improving body awareness of these areas activation of the dorsal column medial lemniscal system DCML system which transmits information relative to the position of the body and limbs in space (Bundy, Lane, & Murray, 2002, p. 44). Deep pressure will further be added to the ankles by circulating the ankle with the caregiver's thumb as this will further stimulate growth and development and joint flexibility (Simpson, 2001, p. 8). This deep pressure will also be added to the infant's toes by touching each toe separately. However, caution must be given when massaging the feet as commented by a participant that *"These babies often have quite tender feet from all the prodding and poking in NICU"* which occurs as a result of repeated heel pricks for blood collection and testing. The infant's fingers may also not have been mobilized very much in the unit and so the individual will be required to (n) open the hand, (o) roll the fingers. These strokes are beneficial in mobilizing the fingers and as commented by a participant *"very useful to prevent contractures and increase input into palm".*

The indian milking for the lower limbs (d) and upper limbs (m) is important as these high risk infants who have been in the neonatal unit or in kangaroo mother care have not been mobilized very often or picked up unless it was medically necessary and so this massage stroke relaxes the limb and encourages blood flow to the infant's feet or hands (Simpson, 2001, p. 26) which will encourage positional changes and experiences in movement as a full term healthy infant.

The high risk infant may also have experienced gastro-intestinal concerns due to the nature of their medical condition and an immature gut and so may be presenting with constipation. This may also be due to the low digestibility found in formula milk which can result in stool hardness (Quinlan, Lockton, Irwin, & Lucas, 1995, p. 88) which frequently supplement these high risk infants' diet due to difficulties with breastfeeding.

Through massage of the abdomen area of the infant the gas and intestinal matter is moved toward the bowel and will assist with alleviating gas and discomfort (McClure, 2000, p. 84). These strokes

will require the individual to “Place your right hand below the infant’s naval. Use a sweeping motion with deep pressure in a clockwise direction below this position” as well as “Use a circular sweeping motion of one hand to sweep from the left hip to the right hip below the infant’s naval” and “Using deep pressure move up from the right hip, across from right to left and then down”. These strokes in their nature assist in mimicking the movement of the bowel.

High risk infants may have experienced aversive tactile stimulation to their face by insertion and securing of oxygen cannulas, suctioning of secretions, or nasogastric tubes (NGTs) for administration of feeds during their stay in the unit, as commented;*“babies who have had NGTs hate their faces being touched or heads held firmly- beware of fear response”* and *“babies in the NICU faces are usually overstimulated due to be ossilated, ventilated, tube feeding through the nose. Also the regular suction and wiping of the face”*. This may also be as a result of the high tactile receptor density on the face and so can result in overstimulation (Bundy, Lane, & Murray, 2002, p. 44). However, it is still recommended that these two strokes are conducted on the face where the individual is required to “Apply deep pressure around the perimeter of the infant’s face following the facial contours using your thumbs, your left thumb on the left side while your right thumb concurrently moves on the right side” and “Using your fingertip, apply small circles around the infant’s jaw”. These strokes are beneficial in that they alleviate tension in the jaw, support chewing and speech (Simpson, 2001, p. 29). A further benefit is the use of deep pressure having a positive effect on decreasing the activation of the anterolateral system which has been activated during the neonatal unit and in turn resulting in the fright-flight response of protective responses and strong emotional reactions (Ayres, 1972). The activation of the DCML system will result in decreased levels of distractibility (Ayres, 1972) and pain relief (Kandel & Schwartz, 1985 in Bundy, Lane, & Murray, 2002, pp. 120-121).

Touch of the infant’s back activates a larger receptor field where the receptor density is low and so is less sensitive to touch (Bundy, Lane, & Murray, 2002, p. 44). Therefore, massage of the back using deep pressure is relaxing and calming for the infant and so the individual will be required to “Using both of your hands apply deep pressure as your comb down the lateral sides of the spine, from the top to the bottom of the spine, the left hand on the left side and the right hand on the right side”. The added benefit of this stroke is that it will also stimulate body awareness in the infant as their back is not an area which is frequently touched during their daily routine (Simpson, 2001, p. 30).

The study highlighted a non-consensus on inclusion of (t) hug and glide” for the upper and (u) lower limbs where the stroke involves. This massage stroke motion involves a twisting motion of

the limb which would activate the anterolateral system and so result in the dysregulating effects of activating this system with this sensitive infant (Bundy, Lane, & Murray, 2002, p. 49). Therefore, these strokes will be excluded from the programme to avoid this aversive response.

(v) Swedish milking of the lower limbs was also a stroke that did not obtain consensus in this study where the individual is required to "place one of your hands on the infant's ankle joint. Using your other hand cup the leg and using pressure move your hand from the ankle to the knee and then the knee to the hip". The purposed of this stroke is to aid circulation from the feet and back towards the heart (McClure, 2000, p. 74) and it is for this purpose that it will be included in the programme.

The final non-consensus was regarding the (w) butterfly stroke where the individual is required to "place both hands at the side of the infant's ribs, slide your hand diagonally across the infant's chest to the opposite shoulder and then back to the starting position. Repeat with the other hand". This technique is beneficial for the infant in that it stimulates and deepens breathing (Simpson, 2001, p. 28) which is beneficial for this high risk infant who often has a history of breathing difficulties due to preterm birth or low birth weight and so it will be included in the programme.

It was recommended on repeated occasions by the participants that deep touch should be used and light touch should be avoided. The use of deep touch pressue and the resultant activation of the dorsal column medial lemniscal system (DCML) blocks the protective response to touch and so in turn results in decreased levels of distractibility (Ayres, 1972) and pain relief (Kandel & Schwartz, 1985 in Bundy, Lane, & Murray, 2002, pp. 120-121). This is because high risk infants have a lower threshold for sensory input than other infants and in turn experience difficulty with tolerating handling and interaction (Miller & Quinn-Hurst, 1994, p. 506) which is exacerbated by a long stay in the neonatal unit (Pick, 1999 in Simpson, 2001, pp. 25-26). The result is that these infants may be presenting with tactile defensiveness, as a result of this lower threshold as well as from the anxiety coupled with it (Ayres, 1964 in Bundy, Lane, & Murray, 2002, p. 116), which is an imbalance between discriminative interpretation and the need for a defense response (Ayres, 1972). Therefore, the massage stroke must have pressure to be able to gain these benefits of DCML activation as light touch, activation of the anterolateral system can be aversive for the infant and result in protective responses and strong emotional reactions (Ayres, 1972). Additionally, light touch may also not have the added physical benefits of touch with pressure as in a previous study where weight gain was evident with preterm infants when pressure was used and not with light touch (Scafidi, 1986 in Field, 2002, p. 1).

The participants obtained consensus on considerations for use of the programme where the programme has been developed with the following stipulations:

a) The programme is to be caregiver-initiated following training of the programme by a Physiotherapist or Occupational Therapist
b) The use of non-perfumed baby cream or aqueous cream during the massage routine means that these primary caregivers will most likely have access to them or be able to access them from their district hospital, which will help ease their anxieties of including a new activity in their demanding routine.
c) The massage routine should not last longer than 10 minutes, with two participants noting this could be "*increased to 15 minutes if the infant is tolerating"* the massage.
d) Should the time limit be complete and the massage routine isn't then the caregiver can do the following:
    i. Stop the routine at the body party started
    ii. Continue with massage routine at a later stage on next body part
    iii. Do resting hands on part previously managed
e) The inclusion of infant massage before the infant's bed time or after bath time as this will help with obtaining the benefits of massage on sleep (Agarwal, 2000, p. 1). However, whilst keeping this recommendation as priority it is further considered that primary caregivers initiate the infant massage routine when both them and the infant are in a state which is accepting and ready for the process as it is remembered that this dyad is also faced with many other responsibilties and contextual factors in these early days .
f) It is recommended that this routine be conducted up to three times a day if the dyad are comfortable with this. Although a consensus was not obtained in this study about this there is much literary support from this protocol as well from a participant's comment of *"build up to 3x per day"*.
g) Each massage stroke should initially be done once with an increase to two repetitions in the next week and three repetitions in the subsequent week. However, this is dependant on the dyad's comfort and progress with the massage programme.
h) The following are positioning options for the caregiver to use during the massage routine:
    i. Caregiver seated on floor on a blanket in long sitting with infant positioned with its head by the caregiver's knees and legs up against the caregivers stomach
    ii. Caregiver seated on a bed in long sitting with infant positioned with its head by the caregiver's knees and legs up against the caregiver's stomach

iii. Towel/blanket rolled around perimeter of infant for cradling support
iv. Lower limbs of primary caregiver supporting edge of infant for cradling support

i) Contingent tactile stimulation is also recommended such as:
    i. Primary caregiver singing softly and quietly
    ii. Primary caregiver talking to infant
    iii. Eye contact
    iv. Skin to skin contact
    v. Facial expressions from primary caregiver

j) The following conclusion techniques aim to help the infant integrate experience and to communicate with the primary caregiver. These will also aid in the bonding and attachment process through nurturing touch (Schneider, 1996) and are a means of expressing emotions without words (Binning, 1992 in Simpson, 2001, p. 25).
    i. Integration which involves using resting hands on each part of the body that has been massaged and to name the areas
    ii. Saying thank to the infant for accepting the massage
    iii. Dressing the infant and then
    iv. Sharing a cuddle with the infant.

3.2. Implications of the study

A collaborative goal of intervention of Physiotherapists and Occupational Therapists working with high risk infants is to encourage and create a supportive environment which provides appropriate stimulation for the infant and which mirrors that provided in utero (Westrup, 2000 in Guzzetta, 2011, p. 1). As therapists the focus needs to be on inclusion of appropriate and accesisble strategies in the early intervention rehabilitation programme that optimises the infant's sensory experience and thus improve developmental and functional outcomes (Symington, 2006 in Guzzetta, 2011, p. 1). The output of this study provides these therapists with a guideline that can be utilised and accessed in this setting to achieve that collaborative goal.

Based on the literature on the benefits of infant massage, and through implementation of this programme in this setting it will further validate and reinforce the roles and value of these rehabilitation team members with working with high risk infants.

3.3. Limitations of the study

A high level of attrition was noted in the study, in that a 70% response rate was not maintained throughout the study (Hasson, Keeney, & McKenna, 2000, p. 1012) which may have affected the rigour of the results. There are a few possible reasons for the dramatic decrease in numbers from the initial sample of 25 participants to the final smaller sample size of eight participants. Therapists may have not presented with an interest in this topic once they began the survey (du Plessis & Human, 2007, p. 19), they may also have not had sufficient current knowledge of the topic (du Plessis & Human, 2007, p. 18), and may not have had sufficient time available to them to participate in the research process (Avery, 2005 in du Plessis & Human, 2007, p. 18). The decline in response rate is documented in prior studies where as the number of rounds increase and the effort required by the participants, that a drop in the response rate is often observed (Alexander, 2004; Rosenbaum, 1985; Thomson, 1985 in Skulmoski, Hartman, & Krahn, 2007, p. 11).

There is limited evidence of reliability when using the Delphi method (Hasson, Keeney, & McKenna, 2000, p. 1012) and the researcher was unable to test and retest the outcomes of the surveys with a different sample due to time constraints.

A further limiting factor is that the final infant massage programme was not appraised after development but the development followed a rigorous process.

3.4. Recommendations

i. It is recommended that a take-home user friendly format of the infant massage programme is designed which can be provided to caregivers by the Physiotherapists and Occupational Therapists during their training sessions.

ii. The proposed programme and its relevant guideline should be made available and accessible for all Occupational Therapists and Physiotherapists to use to train these primary caregivers from this context to implement these massage techniques with their high risk infants. This will be prepared for presentation at the KZN Department of Health Occupational Therapy provincial meeting in 2018.

iii. It is recommended that a training workshop is conducted with Physiotherapists and Occupational Therapists in 2018 where this programme and its guidelines can be disseminated to those working in this setting.

iv. It is recommended that further research is done into assessing the benefits of this programme with this population.

3.5. Conclusion

A three round Delphi survey completed by expert Physiotherapists and Occupational Therapists guided the development of an infant massage programme for high risk infants from resource constrained contexts. A total of 14 participants completed survey one, 13 completed survey two and 8 completed survey three. The information provided from the participants answering of the Likert scales as well as their additional comments guided the development of subsequent surveys. This process led to the consensus on the infant massage programme as well as considerations for its implementation.

4. REFERENCES

Adler, M., & Ziglio, E. (1996). *Gazing into the Oracle: the Delphi method and its application to social policy and public health.* Bristol: PA: Jessica Kingsley Publications.

Agarwal, K. N., Gupta, A., Pushkarna, R., Bhargava, S. K., Faridi, M. M., & Prabhu, M. K. (2000). Effects of massage & use of oil on growth, blood flow & sleep pattern in infants. *Indian Journal of Medical Research, 112*, 212-217.

Ainsworth. (1989). Attachments beyond infancy. *American Psychologist*, 709-716.

Ainsworth, M. (1989). Attachments beyond infancy. *American Psychologist*, 709-716.

Ainsworth, M. D., Blehar, M. C., Waters , E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the strange situation.* Hillsdale: NJ: Lawrence Erlbaum Associates.

Akins, R. B., Tolson, H., & Cole, B. R. (2005). Stability of response characteritics of a Delphi panel: applkcation of bootstrap data expansion. *BMS Medical Research Methodology*.

Alexander, D. C. (2004). A Delphi Study of the trends or events that will influence the future of California charter schools. *Digital Abstracts International*, 3629.

Allen M.C. (2008). Neurodevelopmental outcomes of preterm infants. *Curr Opin Neurol*(21), 123-128.

American Academy of Pediatrics. (2012). Breastfeeding and the use of human milk. *Pediatrics, 129*(3), 827-841.

Anand, K. J., & Scalzo, F. M. (2000). Can adverse neonatal experiences alter brain development and subsequent behavior? *Biol Neonate*(77), 69-82.

Anney, V. N. (2014). Ensuring the quality of the findings of qualitative research: looking at trustworthiness criteria. *Journal of emerging trends in educational research and policy studies, 5*(2), 272-281.

Armstrong, D., Marshall, J. K., Chiba, N., Enns, R., Fallone, C. A., Fass, R., . . . van Zanten, S. J. (2005). Canadian consensus conference on the management of gastroesophageal reflux disease in adults- update 2004. *Can J Gastroenterol, 19*(1), 15-35.

Atzil, S., Hendler, T., & Feldman, R. (2011). Specifying the Neurobiological Basis of Human Attachment: Brain, Hormones, and Behavior in Synchronous and Intrusive Mothers. *Neuropsyhopharmacology*, 1-13.

Avery, A J; Savelyich, B S; Sheikh, A; Cantril, J; Morris, C J; Fernando, B; Bainbridge, M; Horsfield, P; Teasdale, S. (2005). Identifying and establishing consensus on the most important safety features of GP computer systems. *E-Delphi study. Informatics*.

Ayres, A. J. (1964). Tactile functions: Their relations to hyperactive and perceptual motor behaviour. *American Journal of Occupational Therapy, 18*, 6-11.

Ayres, A. J. (1972). *Sensory integration and learning disorders.* Los Angeles: Western Psychological Services.

Barlow, J. H., Powell, L. A., Gilchrist, M., & Fotiadou, M. (2008). The effectiveness of the Training and Support Program for parents of chidlren with disabilities: A randomised controlled trial. *Journal of Psychoomatic Research*, 55-62.

Barnette, J. J., Danielson, L. C., & Algozzine, R. F. (1978). Delphi methodology: an empirical investigation. *Educational Research Quarterly, 3*(1), 67-73.

Beck, S. W. (2010). The world- wide incidence of preterm birth: a systematic review of maternal mortality and morbidity. *Bulletin of the World Health Organization*, p. 88.

Benner, P. (1984). From novice to expert. In *Excellence and Power in Clinical Nursing Practice.* California: Addison-Wesley.

Binning, S. (1992). The Loving Touch. *Nursery World*, 22-33.

Bowlby, J. (1958). The nature of the child's tie to his mother. *Int. J. Psychoanal.*(39), 350-373.

Bowlby, J. (1969). *Attachment and Loss.* New York: NY: Basic Books.

Boyd, J. (2015). Department of Health. *High risk baby programme: Rehab 01*.

Brazelton, T. B., & Nugent, J. K. (2011). *The Neonatal Behavioral Assessment Scale: 4th edition.* Wiley.

Bruce, J. C., Langley, G. C., & Tjale, A. A. (2008). The use of experts and their judgements in nursing research: an overview. *Curationis, 31*(4), 57-61.

Bundy, A. C., Lane, S. J., & Murray, E. A. (2002). *Sensory Integration Theory and Practice: Second Edition.* Philadelphia: F.A. Davis Company .

Bystrova, K., Widstrom, A. M., Matthiesen, A. S., Ransjo-Arvidson, A. B., Welles-Nystrom, B., & Wassberg, C. (2003). Skin to skin contact may reduce negative consequences of "the stress of being born": a study on temperature in newborn infants, subjected to different ward routines in St. Petersburg. *Acta Paediatr, 92*, 320-326.

Carter, C. S., Ahnert, L., Hardy, S. B., Lamb, M. E., Porges, S. W., & et al. (2005). Attachment and bonding: a new synthesis. *The MIT Press*.

Clarke, C. L., Gibb, C., Hart, J., & Davidson, A. (2002). Infant massage: developing an evidence base for health visiting practice. *Clinical effectiveness in Nursing*, 121-128.

Cohen, M. Z., Harle, M., Woll, A. M., Despa, S., & Munsell, M. F. (2004). Delphi survey pf nursing research priorities. *Oncology nursing forum*, 1011-1018.

Colyvas, J. L., Brook Sawyer, L., & Campbell, P. (2010). Identifying strategies early intervention Occupational Therapists use to teach caregivers. *American Journal of Occupational Therapist*, 776-785.

Cremers, D., Rosenhahn, B., Yuille, A., & Schmidt, F. (2008). *Statistical and Geometrical Approaches to Visual Motion Analysis.* Germany: Springer.

Dall'Oglio, I., Salvatori, G., Bonci, E., & Nantini, B. (2007). Breastfeeding promotion in neonatal intensive care unit: impact of a new programe toward a BFHI for high-risk infants. *Acta Paediatrica*, 1626-1631.

De Villiers, M. R., Kent , A. P., & De Villiers, P. T. (2005). The Delphi technique in health sciences education research. *Medical Teacher*, 639-643.

Delbeq, A., Van de Ven, A., & Gustafson, D. H. (1975). *Group techniques for program planning: A guide to nominal group and Delphi process.* Glenview: USA: Scott, Foresman & Company.

Deshpande, A., Shiffman, R., & Nadkarni, P. (2005). Metadata- driven Delphi rating on the Internet. *Computer Methods and Programs in Biomedicine, 77*(1), 49-56.

Dhar S. (2007). Newborn skin care revisited. *Indian J Dermatol, 52*, 1-4.

Diego, M., Field, T., & Hernandez-Reif, M. (2008). Temperature Increases in preterm Infants During Massage Therapy. *Infant Behaviour & Development*, 149-152.

Diego, M., Field, T., & Hernandez-Reif, M. (2009). Procedural Pain Heart Rate Responses in Massaged Preterm Infants. *Infants Behaviour & Development*, 226-229.

du Plessis, E., & Human, S. P. (2007). The Art of the Delphi technique: highlighting its scientific merit. *Health SA Gesondheid*, 13-24.

Else-Quest, N., Hyde, J., & Clark, R. (2003). Breastfeeding, bonding and the Mother-Infant Relationship. *Merrill-Palmer Quarterly*, 495-517.

Elzouki, A. Y., Harfi, A. A., Nazer, H. M., Stapleton, B. F., Oh, W., & Whitley, R. J. (2012). *Textbook of Clinical Paediatrics: 6th edition.* Springer.

Evans, C., Rogers, S., Mcgraw, C., Battle, G., & Furniss, L. (2004). Using consensus methods to establish multidisciplinary perspectives on research priorities for primary care. *Primary Health care research and development*, 52-59.

Feldman, R., Grant, A., Pariente, C., Kanety, H., Kuint, J., & Gilboa-Schechtman, E. (2009). Maternal depression and anxiety across the postpartum year and infant social engagement, fear regulation, and stress reactivity. *J Am Acad Child Adolesc Psychiatry, 48*, 919-927.

Field T. (2002). Preterm infant massage therapy studies: an American approach. *Semin Neonatol, 7*, 487-494.

Field, T. (1998). Massage therapy effects. *American Psychologist*, 1270-1281.

Field, T. (2004). *Touch and massage in early childhood development.* University of Miami School of Medicine: Johnson & Johnson Pediatric Institute.

Field, T. (2010). Massage Therapy facilitates weight gain in preterm infants. *Current Directions in Psychological Science*, 51-54.

Gomm, R., Needham, G., & Bullman, A. (2000). *Evaluating Research in Health and Social Care.* London: SAGE Publications.

Goodman, C. M. (1987). The Delphi technqiue: a critique. *Journal of Advanced Nursing, 12*, 729-734.

Graham, B., Regehr, G., & Wright, J. G. (2003). Delphi as a method to establish consensus for diagnostic criteria. *J Clin Epidemiol*(56), 1150-1156.

Greatorex, J., & Dexter, T. (2000). An accessible analytical approach for investigating what happens between the rounds of a Delphi study. *Journal of Advanced Nursing*, 1016-1024.

Guzzetta, A; D'Acunto, M G; Carotenuto, M; Berardi, N; Bancale, A; Biagioni, E; Boldrini, A; Ghirri, P; Maffei, L; Cioni, G (2011). The effects of preterm infant massage on brain electrical activity. *Developmental Medicine and Child Neurology, 53*(4), 46-51. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/j.1469-8749.2011.04065.x/full

Guzzetta, A; Baldini, S; Bancale, A; Baroncelli, L; Ciucci, F; Ghirri, P; Putignano, E; Sale, A; Viegi, A; Berardi, N; Boldrini, A; Cioni, G; Maffei, L. (2009). Massage accelerates brain development and the maturation of visual function. *J Neurosci*(29), 6042-6051.

Hasson, F., Keeney, S., & McKenna, H. (2000). Research guidelines for the Delphi survey technique. *J Adv Nurs*, 1008-1015.

Hertenstein, M. J., & Campos, J. J. (2001). Emotional Regulation via Maternal Touch. *Infancy, 2*(4), 549-566.

Hsu, C., & Sandford, B. A. (2007). The Delphi Technique: Making sense of Consensus. *Practical Assessment, Research & Evaluation, 12*(10). Retrieved from http://pareonline.net/getvn.asp?v=12&n=10

Hynan. (1997). The Perinatal Posttraumatic Stress Disorder (PTSD) Questionnaire. (M. Lanham, Ed.) *Evaluating stress: A book of resources, 2*, 199-200.

Jackson, D., Dinh, T.-H., & Goga, A. (2016, July 19). *Early mother-to-child transmission of HIV stats plunge: Press release.* Retrieved from South African Medical Research Council: www.mrc.ac.za/Media/2016/13press2016.htm.

Kandel, E. R., & Schwartz, J. H. (1985). *Principles of neural science.* New York: Elsevier.

Keeney, S., Hasson, F., & McKenna, H. P. (2001). A critical review of the Delphi technique as a research methodology for nursing. *International journal of nursing studies, 38*, 195-200.

Kennell, J. H., & Klaus, M. H. (1998). BondingL Recent obersvations that alter perinatal care. *Pediatrics in Review, 19*, 4-12.

Kerlinger, F. (1973). *Foundations of behavioral research.* New York: Holt, Rinehart, and Winston, Inc.

Korner, A. F., & Thoman, E. B. (1972). The relative efficacy of contact and vestibular-proprioceptive stimulating in soothing neonates. *Child Development, 43*(2), 443-453.

KZN Health. (2017). *St Apollinaris Hospital*. Retrieved October 30, 2017, from KZN Department of Health: www.kznhealth.gov.za/stapollinarishospital.htm

Leckman, J. F., & Herman, A. E. (2002). Maternal behaviour and developmenta; psychopathology. *Biol Psychiatry, 51*, 27-43.

Lecuona, E., van Jaarsveld, A., van Heerden, R., & Raubenheimer, J. (2016). The developmental status and prevalence of sensory integration difficulties in premature infants in a tertiary hospital in Bloemfontein, South Africa. *SAJOT*, 15-19.

Lee, V., Brooks-Gunn, J., & Schnur, E. (1990). Are Head Start effects sustained? A longitudinal follow-up comparison of disadvantaged children attending Head Start, no preschool, and other preschool programs. *Child Development*, 495-507.

Liu, J., Leung, P., & Yang, A. (2013). Breastfeeding and Active Bonding Protects against Children's Internalizing Behaviour Problems. *Nutrients*, 76-89.

Lloyd, L. G., & de Witt, T. W. (2013). Neonatal mortality in South Africa: How are we doing and can we do better? *South African Medical Journal, 103*(8).

Malone, D. C., Abarca, J., Hansten, P. D., Grizzle, A. J., Armstrong, E. P., van Bergen, R. C., . . . Lipton, R. B. (2005). Identification of serious drug-drug interactions: results of the partnership to prevent drug-drug interactions. *Am J Geriatr Pharmacother, 3*(2), 65-76.

Mason, J. (1996). *Qualitative researching.* Thousand Oaks, USA: Sage Publications.

Mastripieri, D. (2001). Biological bases of maternal attachment. *Current directions in psychological science, 10*, 79-83.

Matthiesen, A. S., Ransjo-Arvidson, A. B., Nissen, E., & Uvnas-Moberg, K. (2001). Postpartum maternal oxytocin release by newborns: effect of infants' hand massage and sucking. *Birth, 28*, 13-19.

McClure, V. (2000). *Infant Massage: A Handbook for loving parents.* Croydon, United Kingdom: CPI Group Ltd.

McKenna, H. (1994). The Delphi technique: A worthwhile research approach for nursing? *Journal of Advanced Nursing, 19*(6), 1221-1225.

Meaney, M. J. (2001). Maternal care, gene expression, and the transmission of individual differences in stress reactivity across generations. *Annu Rev Neurosci, 24*, 1161-1192.

Miller, M. Q., & Quinn-Hurst, M. (1994). Neurobehavioural Assessment of High-Risk Infants in the Neonatal Intensive Care Unit. *AJOT, 48*(6), 506-513.

Minde, K. (1993). Prematurity and serious medical illness in infancy: Implications for development and intervention. In J. C. H. Zeanah, *Handbook of infant mental health (pp. 87–105).* (pp. 87-105). New York: Guilford Press.

Naidoo, P., & Joubert, R. W. (2013). Consensus on hypotonia via Delphi Process. *Indian J Pediatr*.

Nissen, E., Lilja, G., Matthiesen, A. S., Ransjo-Arvidsson, A. B., Uvnas-Moberg, K., & Widstrom, A. M. (1995). Effects of maternal pethidine on infants' developing breast feeding behaviour. *Acta Paediatr, 84*, 104-145.

Park, H. Y., Maitra, K., Achon, J., Loyola, E., & Rincon, M. (2014). Effects of Early Intervention on Mental or Neuromusculoskeletal and Movement-Related Functions in Children Born Low Birthweight or Preterm: A Meta-Analysis. *American Journal of Occupational Therapy, 68*(3), 268-276.

Pelaez-Nogueras, M., Field, T., & Gewrits , J. L. (1997). The effects of systematic stroking versus tickling and poking on infant behaviour. *Journal of applied developmental psychology*, 169-178.

Pick, R. (1999). Understanding Childhood. In *The Child Psychotherapy Trust.* London: Child Psychotherapy Trust.

Pizur-Barnekow, K. (2010). Maternal Health After the Birth of a Medically Complex Infant: Setting the Context for Evaluation of Co-Occupational Performance. *American Journal of Occupational Therapy, 64*(4), 642-649.

Powell, C. (2003). The Delphi technique: Myths and realities. *Journal of Advanced Nursing*, 376-382.

Powell, L., Barlow, J., & Cheshire, A. (2006). The Training and Support Programme for parents of children with cerebral palsy: A process evaluation. *Complementary Therapies in Clinical Practice*, 192-199.

Quinlan, P T; Lockton, S; Irwin, J; Lucas, A L. (1995). The relationship between stool hardness and stool composition in breast- and formula-fed infants. *Journal of Pediatric Gastroenterology and Nutrition*. 87-90

Rassol, F., Memon, A., Kiyani, M., & Sajjad, A. (2017). The effect of deep cross-friction massage on spasticity of children with cerebral palsy: A double-blind randomised controlled trial. *J Pak Medical Association*, 87-91.

Rosenbaum, J. (1985). A College and University Curriculum Designed to Prepare Students For Careers in Non-Broadcast Private Telecommunications: A Delphi Method Survey of Professional Video Communicators. *Digital Abstracts International*, 25483.

Rowe, G., & Wright, G. (1999). The Delphi technique as a forcasting tool: Issues and analysis. *International journal of forecasting*, 353-375.

Rutter, M. (1995). Clinical Implications of Attachment Concepts: Retrospect and Prospect. In *DHS Attachment and Bonding Guidelines* (Vol. 36, p. 10).

Salojee, G. M., Rosenbaum, P. L., & Stewart, A. V. (2011). Using caregivers' perceptions of rehabilitation services for children with Cerebral Palsy at public sectors hospitals to identify the components of an appropriate service. *SA Journal of Physiotherapy*, 35-40.

Scafidi, F., Field, T., Schanberg, S., Bauer, C., Vega Lahr, N., Garcia , R., . . . Kuhn, C. M. (1986). Effects of tactile/kinesthetic stimulation on the clinical course and sleep/wake behaviour of preterm neonates. *Infant Behaviour and Development, 9*, 91-105.

Schmidt, R. (1997). Managing Delphi surveys using nonparametric statistical techniques. *Decision Sciences*, 763-774.

Schneider, E. F. (1996). The power of touch: massage for infants. *Infants and young children*, 40-55.

Shipwright, S., & Dryden, T. (2012). Paediatric massage: an overview of the evidence. *Focus on Alternative and Complementary Therapies, 17*(2), 103-110.

Silva, L. M., Schalock, M., Garberg, J., & Cynthia, L. S. (2012). Qiqong massage for motor skills in young children with Cerebral Palsy and Down Syndrome. *American Journal of Occupational Therapy*, 348-355.

Simpson, R. (2001). Baby massage classes and the work of the Internationla Association of Infant Massage. *Complementary Therapies in Nursing and Midwifery, 7*, 25-33.

Skulmoski, G. J., Hartman, F. T., & Krahn, J. (2007). The Delphi Method for Graduate Research. *Journal of Information Technology Education*.

South African Journal of Occupational Therapy (SAJOT). (n.d.). (M. Concha, D. van der Reyden, D. Franzsen, H. M. van Biljon, & J. van der Linde, Editors) Retrieved 11 01, 2017, from South African Journal of Occupational Therapy (SAJOT): http://www.sajot.co.za/index.php/sajot/index

Statistics South Africa. (1995-2005). Trends in the percentage of children who are orphaned in South Africa. *Census 2001*.

Stern, D. N. (1995). *The Motherhood Constellation: A Unified View of Parent-Infant Psychotherapy.* New York: Basic Books.

Sullivan, M. C., & Hawes, K. (2007). A decade comparison of preterm motor performance at age 4. *Research in Nursing and Health, 30*, 641-654. Retrieved from http://dx.doi.org/10.1002/nur.20220

Symington, A., & Pinelli, J. (2006). Developmental care for promoting development and preventing morbidity in preterm infants. *Cochrane Database Syst Rev*(19).

Thomson, B. R. (1985). Appropriate and inapproriate uses of humour in psychotherapy as perceived by certified reality therapists: A Delphi Study. *Digital Abstracts International*, 90.

Tronick, E. Z. (1989). Emotions and emotional communication in infants. *Am Psychol, 44*, 112-119.

Underdown, A., & Barlow, J. (2011). Interventions to support early relationships: mechanisms identified within infant massage programmes. *Community Practitioner, 84*(4), 21-26.

UNICEF. (2007). Statistical data on the status of children aged 0-4 in South Africa.

van Stormbroek, K., & Buchanan, H. (2016). Community Service Occupational Therapists: thriving or just surviving? *SAJOT*, 63-72.

Vickers, A., Ohlsson, A., Lacy, J. B., & Horsley, A. (2004). Massage for promoting growth and development of preterm and/or low birth-weight infants. *Cochrane Database Syst Rev*.

Westrup, B., Kleberg, A., von Eichwald, K., Stjernqvist, K., & Lagercrantz, H. (2000). A randomized, controlled trial to evaluate the effects of the newborn individualized developmental care and assessment program in a Swedish setting. *Pediatrics*(105), 66-72.

Widstrom, A. M., Lilja, G., Aaltomaa-Michalias, P., Dahllof, A., Lintula, M., & Nissen, E. (2010). Newborn behaviour to locate the breast when skin-to-skin: a possible method for enabling early self-regulation. *Acta Paediatr*.

Widstrom, A. M., Ransjo-Arvidson, A. B., Christensson, K., Matthieson, A. S., Winberg, J., & Uvnas-Moberg, K. (1987). Gastric suction in healthy newborn infants. Effects on circulation and developing feeding behaviour. *Acta Paediatr Scand, 76*, 566-572.

5. ANNEXURES

Annexure One: Ethical Approval UKZN

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

19 June 2017

Mrs Lauren Michelle Perks (208503734)
School of Health Sciences – Occupational Therapy
Westville Campus

Dear Mrs Perks,

Protocol reference number: HSS/0533/017M
Project title: Consensus on an infant massage programme for high risk infants from resource constrained texts by Physiotherapists and Occupational Therapists

Approval Notification – Expedited Application

In response to your application received on 12 May 2017, the Humanities & Social Sciences Research Ethics Committee has considered the abovementioned application and the protocol has been granted **FULL APPROVAL.**

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number.

PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

The ethical clearance certificate is only valid for a period of 3 years from the date of issue. Thereafter Recertification must be applied for on an annual basis.

I take this opportunity of wishing you everything of the best with your study.

Yours faithfully

[redacted]

Dr Shenuka Singh (Chair)

/ms

Cc Supervisor: Ms Gina Rencken and Dr Pragashnie Naidoo
Cc Academic Leader Research: Professor J van Heerden
Cc School Administrator: Ms Phindile Nene

Humanities & Social Sciences Research Ethics Committee
Dr Shenuka Singh (Chair)
Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X54001, Durban 4000
Telephone: +27 (0) 31 260 3587/8350/4557 **Facsimile:** +27 (0) 31 260 4609 **Email:** ximbap@ukzn.ac.za / snymanm@ukzn.ac.za / mohunp@ukzn.ac.za
Website: www.ukzn.ac.za

Annexure Two: Ethics certificate of completion

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **Lauren Perks** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 12/12/2016.

Certification Number: 2254111.

Annexure Three: Cover letter circulated to database

My name is Lauren Perks and I am an Occupational Therapist with certification in Sensory Integration therapy. I am currently doing my masters on**:**

"Consensus on an infant massage programme for high risk infants from resource constrained contexts by Physiotherapists and Occupational Therapists."

This programme will be developed with the consensus and knowledge of Occupational Therapists and Physiotherapists who meet the inclusion criteria. This study will be conducted over three rounds using the Delphi process and online surveys to ensure a consensus on the content is reached. I would really appreciate it if you agreed to participate in this study. Please take note of the inclusion criteria below and complete the process if you meet these requirements. Please note that participation in this study is voluntary and withdrawal from the study without prejudice will be maintained.

Inclusion criteria:

- Bachelors Degree in Occupational Therapy or Physiotherapy
- Practical engagemen/therapy with high risk infants for a minimum of one year
- Practical engagement/therapy in community based clinics or rural district hospitals for a minimum of one year
- Capacity and willingness to participate in and contribute to the development of an infant massage programme for high risk infants from resource constrained contexts
- Good written communication skills in English
- Adequate computer literacy and computer skills

Thank you for your assistance in my research and I look forward to having your contribution in this study. You are welcome to contact me on 0792449601 or laurenperksot@gmail.com should you have any further questions or queries. Please find all supporting information and documents attached.

Lauren Perks

Researcher information:
Name: Mrs Lauren Perks
Institution: University of KwaZulu Natal
Student number: 208503734
Ethical clearance number: HSS/0533/017M
Cellphone number: 0792449601
E-mail address: laurenperksot@gmail.com
Supervisor: Gina Rencken
Co-supervisor: Pragashnie Naidoo

Project description:

Project title: "Consensus on an infant massage programme for high risk infants from resource constrained contexts by Physiotherapists and Occupational Therapists."

Overview of the study:
A therapist's role is to assist the individual to obtain their maximal level of functioning through facilitating and assisting them in their development. This role with high risk infants will be to facilitate the main developmental goals which are important at this developmental age, namely bonding and attachment between the mother-infant dyad as well as facilitating the development of the infant. A high risk infant can be defined as:

- Born with a low birth weight (ie. <1800g)
- Preterm birth (ie. <37 weeks)
- Neonatal encephalopathy resulting in low APGAR scores of 7/10
- Infants requiring mechanical ventilation for more than 24 hours
- Infants presenting with seizures post-delivery
- Infants presenting with infections (e.g. meningitis)
- Infants presenting with major mobidities (ie. Chronic lung disease, intra-ventricular hemorrhage, peri-ventricular leucomalacia)
- Hyperbilirubinemia resulting in exchange transfusion of the infant
- Major malformations/ dysmorphism
- Abnormal neurological examination at discharge

Therapists who are working in the rural context are faced with limited resources and limited time for therapy, due to a high patient turnover rate. Primary caregivers with high risk infants are also unable to attend therapy on a regular basis due to financial constraints. This results in these infants receiving irregular and very limited therapy despite the importance of therapy in the first 1000 days of life to facilitate development.

This research will contribute towards the knowledge base and to the practice in South Africa by providing therapists with a contextually appropriate and client-centred programme. This programme will be sustainable with this target population as caregivers will be able to continue with the programme at home on a regular basis which will assist them to facilitate the main developmental goals for their infant being bonding and attachment and sensory stimulation and development of the infant. This infant massage programme will be designed for this target population by taking these infant's risk factors, needs and contextual factors into consideration through rigorous Delphi process. These specific factors make this study unique in that it will ensure sustainability and benefit of this programme for this target population.

Annexure Four: Information sheet and consent form circulated to database

Information Sheet and Consent to Participate in Research

Date:

Dear Participant

My name is Lauren Perks and I am an Occupational Therapist. I am currently doing my Masters in Occupational Therapy at the University of KwaZulu Natal. You can contact me on (+27) 792449601 or laurenperksot@gmail.com.

You are being invited to consider participating in a study that involves research of the following topic:

"Consensus on an infant massage programme for high risk infants from resource constrained contexts by Physiotherapists and Occupational Therapists."

The study is expected to enroll a minimum of thirteen participants who are qualified Occupational Therapists/Physiotherapists. Therapists will be required to assist in the review and development of a caregiver-initiated infant massage programme which is appropriate and beneficial for the target population.

The study doesn't involve any risks and/or discomforts. We hope that the study will assist you in your professional field and help to increase your knowledge and insight into how to intervene with high risk infants.

This study has been ethically reviewed and approved by the UKZN Biomedical research Ethics Committee (approval number HSS/0533/017M).

In the event of any problems or concerns/questions you may contact the researcher at (provide contact details) or the UKZN Biomedical Research Ethics Committee, contact details as follows:

BIOMEDICAL RESEARCH ETHICS ADMINISTRATION
Research Office, Westville Campus
Govan Mbeki Building
Private Bag X 54001
Durban
4000
KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2604769 - Fax: 27 31 2604609

Email: BREC@ukzn.ac.za

Participation in this research project is voluntary and participation may be withdrawn at any point. In the event of refusal/withdrawal of participation you will not incur penalty or other benefit to which they are normally entitled. Should the participant wish to withdraw from the study then they are required to provide the researcher with a reason and one week's notice. No costs will be incurred by the participant.

The raw data will be stored in a locked cupboard where the researcher and supervisor have primary access to it. All electronic data will be stored on a hard drive which will require a password to access the data. The researcher and supervisor will have access to this. The data will be stored for a minimum of five years and will be disposed of effectively on completion of this term.

The confidentiality and privacy of the participants will be ensured by all confidential information being stored in a locked cupboard. No other individuals besides the researcher will have access to the participants' confidential information.

The participants' names will not be recorded but rather an identification number will be assigned to each participant.

BIOMEDICAL RESEARCH ETHICS ADMINISTRATION

Research Office, Westville Campus

Govan Mbeki Building

Private Bag X 54001
Durban
4000

KwaZulu-Natal, SOUTH AFRICA

Tel: 27 31 2604769 - Fax: 27 31 2604609

Email: BREC@ukzn.ac.za

If you do have any queries about this request please feel free to contact, Lauren Perks on 0792449601 or laurenperksot@gmail.com

Annexure Five: Survey One

Q1 I hereby note that by completing this survey that I consent to this information being used for the purposes of this study.
Yes No

Q2 Please complete your details for purposes of demographic analysis of the findings of this study.

- Gender
- Location
- Age
- Level of education
- Profession
- Amount of experience (years) working with high risk infants

Q3 Mark the relevant criteria which you have attained to highlight your adherence to the inclusion criteria for this research study:

- Bachelors degree in Occupational Therapy or Physiotherapy
- Knowledge and practical engagement with intervention with high risk infants or a minimum of one year
- Knowledge of and practical engagement in community based clinics or rural district hospitals for a minimum of one year
- Capacity and willingness to participate in and contribute to the development of an infant massage programme for high risk infants from resource constrained contexts
- Good written communication skills in English
- Adequate computer literacy and computer skills

Q4 Indicate on the scale your opinion of the beneficial duration of a massage routine for this dyad?
0 ----------20

Q5 Rate your opinion on the following infant massage strokes for use with high risk infants from resource constrained contexts. These strokes will be done with the infant's LOWER LIMBS one at a time.

	NOT IMPORTANT	NICE TO HAVE	IMPORTANT
Cup the baby's leg in your hand for 5 seconds and tell the baby to relax, using resting hands			
Cup the baby's foot in your hand for 5 seconds and tell the baby to relax, using resting hands			
Using adapted Indian milking, place one of your hands on the baby's hip joint. Using your other hand cup the leg and using pressure move your hand from the hip to the ankle.			

Q6 Please indicate if you recommend inclusion of another infant massage stroke for the lower limbs that has not been included.

Q7 Rate your opinion on the following infant massage strokes for use with high risk infants from resource constrained contexts. These strokes will be done on the surface of the infant's STOMACH.

	NOT IMPORTANT	NICE TO HAVE	IMPORTANT
Use one of your hands for resting hands on the stomach			
Use a sweeping motion of one hand to sweep from the left hip to right hip below the infant's naval.			

Q8 Please indicate if you recommend inclusion of another infant massage stroke for the stomach that has not been included.

Q9 Rate your opinion on the following infant massage strokes for use with high risk infants from resource constrained contexts. These strokes will be done on the surface of the infant's CHEST.

	NOT IMPORTANT	NICE TO HAVE	IMPORTANT
Using both of your hands, do resting hands on the infant's chest			
Using both hands, draw the shape of a book on the chest. This movement will involve both hands going up the sternum, outwards to the left/right, down the lateral aspect of the chest and then back the medial position.			

Q10 Please indicate if you recommend inclusion of another infant massage stroke for the chest that has not been included.

Q11 Rate your opinion on the following infant massage strokes for use with high risk infants from resource constrained contexts. These strokes will be done with the infant's UPPER LIMBS, one at a time.

	NOT IMPORTANT	NICE TO HAVE	IMPORTANT
Cup the arm in your hand for 5 seconds and tell baby to relax, using resting hands			
Using adapted Indian milking, place one of your hands on the baby's shoulder joint. Using your other hand cup the arm and using pressure move your hand from the shoulder to the wrist.			
Try and open the baby's hand gently with your thumb			

Q12 Please indicate if you recommend inclusion of another infant massage stroke for the upper limbs that has not been included.

Q13 Rate your opinion on the following infant massage strokes for use with high risk infants from resource constrained contexts. These strokes will be done on the infant's FACE.

	NOT IMPORTANT	NICE TO HAVE	IMPORTANT
Apply deep pressure around the perimeter of the baby's face following the facial contours using your thumbs, your left thumb on the left side while your right thumb concurrently moves on the right side.			

Q14 Please indicate if you recommend inclusion of another infant massage stroke for the face that has not been included.

Q15 Rate your opinion on the following infant massage strokes for use with high risk infants from resource constrained contexts. These strokes will be done with the infant's BACK.

	NOT IMPORTANT	NICE TO HAVE	IMPORTANT
Using one hand, apply resting hands on the back for 5 seconds			
Using both of your hands apply deep pressure as you comb down the lateral sides of the spine, from the top to the bottom of the spine, the left hand on the left side and the right hand on the right side.			

Q16 Please indicate if you recommend inclusion of another infant massage stroke for the upper limbs that has not been included.

Q17 Indicate what would be important to include in the conclusion of the massage routine.

	NOT IMPORTANT	NICE TO HAVE	IMPORTANT
Integration: use resting on each part of the body that has been massage and name the areas for the baby.			
Saying thank you to the baby for accepting the massage			
Dressing the baby			

Q18 How many repetitions of each massage stroke would you recommend?

0----------10

Q19 Would you recommend the use of the following oils to be used by primary caregivers from this context? Please comment on the reason for your choice.

	YES	NO
Cold pressed sunflower oil		
Sunflower oil		
Olive oil		
Baby cream		
Other		

Q20 State your opinion on the inclusion of other sensory input during the massage routine?

	NOT IMPORTANT	NICE TO HAVE	IMPORTANT
Primary caregiver singing			
Primary caregiver talking			
Music in the background			
Eye contact			
Other			

Q21 Rate your opinion on the ability of this massage programme, alongside a handout, to be trained to a primary caregiver from this context in one 30 minute session by an Occupational Therapist or Physiotherapist?

STRONGLY DISAGREE	DISGAGREE	AGREE	STRONGLY AGREE

Q22 Rate your view on the positioning of the primary caregiver and infant during the massage routine?

	STRONGLY DISAGREE	DISAGREE	AGREE	STRONGLY AGREE
Caregiver seated on the floor in long sitting				
Caregiver seated on a bed in long sitting				
Towel/blanket rolled around perimeter of infant for cradling support				
Lower limbs of primary caregiver supporting edge of infant for cradling support				
Caregiver seated on the floor in long sitting with infant lying on legs in supine				

Q23 Please indicate if there is another positioning consideration which has not been included above.

Q24 In your opinion, what is the most advantageous time of day for the implementation of this massage programme at home by the primary caregiver?

	DISAGREE	AGREE
Following the first nappy change in the morning		
Before the baby's bed time		
Three times a day if possible		

Q25 How would you like to be contacted for the second round of the Delphi process?

- Bulk mailer system
- My personal email address _____
- I do not want to continue with round two of the study

Annexure Six: Survey Two

Q1 I hereby note that by completing this survey that I consent to this information being used for the purposes of this study.
YES NO

Q2 I acknowledge that I have completed the round one survey, a prerequisite for this survey.
YES NO

Q3 This infant massage programme should only be implemented by the primary caregiver when the infant is:

	YES	NO
Deemed medically stable as determined by the medical team		
Full term age		
Is not on ventilator support		
Is not requiring oxygen		

Q4 The total duration of the massage routine should not exceed 10 minutes in total.
YES NO

Q5 Please indicate if you are aware of any medical contraindications for infant massage with this population and what they are.

Q6 Rate your opinion on the following infant massage strokes for use with high risk infants from resource constrained contexts. These strokes will be done with the infant's LOWER LIMBS.

	NOT IMPORTANT	IMPORTANT
Cup the baby's leg in your hand for 5 seconds and tell the baby to relax, using resting hands and additional deep pressure		
Cup the baby's foot in your hand for 5 seconds and tell the baby to relax, using deep pressure and avoiding light touch.		
Using adapted indian milking, place one of your hands on the baby's hip joint. Using your other hand cup the leg and using pressure move your hand from the hip to the knee and then the knee to the ankle.		
Using hug and glide, start at the upper thigh with your hands turning opposite to each other whilst grasping the thigh. Twist each hand as you move from the thigh to the ankle whilst applying deep pressure.		
Apply deep pressure around baby's ankle by circulating the ankle with your thumb.		
Touch each toe separately using deep pressure.		
Using adapted swedish milking, place one of your hands on the baby's ankle joint. Using your other hand cup the leg and using		

pressure move your hand from the ankle to the knee and then the knee to the hip.		

Q7 When massaging the lower limbs:

- Complete all strokes on one lower limb before progressing to the next limb.
- Complete each stroke on each lower limb before progressing to the next massage stroke**.**

Q8 Rate your opinion on the following infant massage strokes for use with high risk infants from resource constrained contexts. These strokes will be done on the surface of the infant's STOMACH.

	NOT IMPORTANT	IMPORTANT
Use one of your hands and apply deep pressure on the stomach.		
Place your right hand below the infant's naval. Use a sweeping motion with deep pressure in a clockwise direction below this position.		
Use a circular sweeping motion of one hand to sweep from the left hip to right hip below the infant's naval.		
Using deep pressure move up from the right hip, across from right to left and then down.		

Q9 Rate your opinion on the following infant massage strokes for use with high risk infants from resource constrained contexts. These strokes will be done on the surface of the infant's CHEST.

	NOT IMPORTANT	IMPORTANT
Using both of your hands, do resting hands on the infant's chest		
Using both hands, draw the shape of a book on the chest. This movement will involve both hands going up the sternum, outwards to the left/right, down the lateral aspect of the chest and then back the medial position.		
Using butterfly, place both hands at the side of baby's ribs, slide your hand diagonally across baby's chest to the opposite shoulder and then back to the starting position. Repeat with the other hand.		

Q10 Rate your opinion on the following infant massage strokes for use with high risk infants from resource constrained contexts. These strokes will be done with the infant's UPPER LIMBS.

	NOT IMPORTANT	IMPORTANT
Cup the infant's arm in your hand for 5 seconds and tell baby to relax, using resting hands		
Using adapted Indian milking, place one of your hands on the baby's shoulder joint. Using your other hand cup the arm and using pressure move your hand from the shoulder to the wrist. Avoid pulling the arm.		
Using hug and glide, start at the shoulder with your hands turning opposite to each other whilst grasping the arm. Twist each hand as you move from the shoulder to the wrist whilst applying deep pressure.		
Try and open the baby's hand gently with your thumb and press your thumb into the palm.		
Using your fingers roll each of the infant's fingers separately.		

Q11 When massaging the upper limbs:

- Complete all strokes on one upper limb before progressing to the next limb.
- Complete each stroke on each upper limb before progressing to the next massage stroke.

Q12 Rate your opinion on the following infant massage strokes for use with high risk infants from resource constrained contexts. These strokes will be done on the infant's FACE.

	NOT IMPORTANT	IMPORTANT
Apply deep pressure around the perimeter of the baby's face following the facial contours using your thumbs, your left thumb on the left side while your right thumb concurrently moves on the right side.		
Using your fingertips, apply small circles around the jaw.		

Q13 Rate your opinion on the following infant massage strokes for use with high risk infants from resource constrained contexts. Position the infant on their stomach. These strokes will be done with the infant's BACK.

	NOT IMPORTANT	IMPORTANT
Using one hand, apply resting hands on the back for 5 seconds		
Using both of your hands apply deep pressure as you comb down the lateral sides of the spine, from the top to the bottom of the spine, the left hand on the left side and the right hand on the right side.		

Q14 Indicate what would be important for the caregiver to include in the conclusion of the massage routine.

	NOT IMPORTANT	IMPORTANT
Integration: use resting hands on each part of the body that has been massage and name the areas for the baby.		
Saying thank you to the baby for accepting the massage		
Dressing the baby		
Sharing a cuddle with the baby.		

Q15 The infant massage routine should initially include one repetition of each stroke. However, after one week of massage this can be increased to two repetitions with a subsequent increase to three repetitions in the following week.
YES NO

Q16 Would you recommend the use of the following oils to be used by primary caregivers from this context?

	YES	NO
Non-perfumed baby cream		
Coconut oil		
Vaseline		

Q17 State your opinion on the inclusion of other sensory input during the massage routine, with the assumption that the baby is in the calm alert state?

	NOT IMPORTANT	IMPORTANT
Primary caregiver singing softly and quietly		
Primary caregiver talking to the infant		
Music in the background		
Eye contact		
Skin to skin contact		
Facial expressions		

Q18 Rate your opinion on the ability of this massage programme, alongside a handout, to be trained to a primary caregiver from this context in one 30 minute session by an Occupational Therapist or Physiotherapist?
DISAGREE AGREE

Q19 Rate your view on the different options for positioning of the primary caregiver and infant during the massage routine which the caregiver can chose from depending on their personal needs?

	DISAGREE	AGREE
Caregiver seated on the floor on a blanket in long sitting with baby positioned with it's head by the caregivers knees and legs up against the caregivers stomach.		
Caregiver seated on a bed in long sitting with baby positioned with it's head by the caregivers knees and legs up against the caregivers stomach.		
Towel/blanket rolled around perimeter of infant for cradling support		
Lower limbs of primary caregiver supporting edge of infant for cradling support		
Caregiver seated on the floor in long sitting with infant lying on legs in supine.		

Q20 In your opinion, what is the most advantageous time of day for the implementation of this massage programme at home by the primary caregiver? It is considered that this may also be impacted on by the dyad's home setting and normal daily routine.

	DISAGREE	AGREE
Following the first nappy change in the morning		
Before the baby's bed time		
Three times a day if possible		
After bath time		
When the baby is in a quiet alert state		

Q21 How would you like to be contacted for the second round of the Delphi process?

- Bulk mailer system
- My personal email address _____
- I do not want to continue with round two of the study

Annexure Seven: Survey Three

Q1 I hereby note that by completing this survey that I consent to this information being used for the purposes of this study.
YES NO

Q2 I acknowledge that I have completed the round one and round two surveys, a prerequisite for this survey.
YES NO

Q3 The following are considerations for implementing the caregiver- initiated infant massage:
1. The programme should only be initiated when the infant is deemed medically stable as determined by the medical team.
2. The infant does not have to have obtained its full term gestational age in order for the initiation of the programme.
AGREE DISAGREE

Q4 The infant's vital signs (blood pressure, pulse, temperature, respiration) must be stable, as deemed by the medical doctor, in order for caregiver initiated infant massage to be initiated in the hospital setting.
AGREE DISAGREE

Q5 This is the infant massage programme for the LOWER LIMBS. All strokes are to be completed on one limb before progressing to the next limb.
1. Cup the baby's leg in your hand for 5 seconds and tell the baby to relax, using resting hands and additional deep pressure
2. Cup the baby's foot in your hand for 5 seconds and tell the baby to relax, using deep pressure and avoiding light touch.
3. Using adapted indian milking, place one of your hands on the baby's hip joint. Using your other hand cup the leg and using pressure move your hand from the hip to the knee and then the knee to the ankle.
4. Apply deep pressure around baby's ankle by circulating the ankle with your thumb.
5. Touch each toe separately using deep pressure.
AGREE DISAGREE

Q6 Please rate your opinion on the inclusion of the following massage techniques with this populations lower limbs.

	AGREE	DISAGREE
Using hug and glide, start at the upper thigh with your hands turning opposite to each other whilst grasping the thigh. Twist each hand as you move from the thigh to the ankle whilst applying deep pressure.		
Using adapted Swedish milking, place one of your hands on the baby's ankle joint. Using your other hand cup the leg and using pressure move your hand from the ankle to the knee and then the knee to the hip.		

Q7 This is the infant massage routine to be done on the surface of the infant's STOMACH
1. Use one of your hands and apply deep pressure on the stomach.
2. Place your right hand below the infant's naval. Use a sweeping motion with deep pressure in a clockwise direction below this position.
3. Use a circular sweeping motion of one hand to sweep from the left hip to right hip below the infant's naval.
4. Using deep pressure move up from the right hip, across from right to left and then down.
AGREE DISAGREE

Q8 This is the infant massage routine to be done on the surface of the infant's CHEST.
1. Using both of your hands, do resting hands on the infant's chest
2. Using both hands, draw the shape of a book on the chest. This movement will involve both hands going up the sternum, outwards to the left/right, down the lateral aspect of the chest and then back the medial position.
AGREE DISAGREE

Q9 Rate your opinion on the inclusion of the following massage stroke on the chest.

	AGREE	DISAGREE
Using butterfly, place both hands at the side of the baby's ribs, slide your hand diagonally across baby's chest to the opposite shoulder and then back to the starting position. Repeat with the other hand.		

Q10 This is the infant massage routine to be done with the infant's UPPER LIMBS. Complete all strokes on one limb before progressing to the next limb.
1. Cup the infant's arm in your hand for 5 seconds and tell baby to relax, using resting hands
2. Using adapted Indian milking, place one of your hands on the baby's shoulder joint. Using your other hand cup the arm and using pressure move your hand from the shoulder to the wrist. Avoid pulling the arm.
3. Try and open the baby's hand gently with your thumb and press your thumb into the palm.
4. Using your fingers roll each of the infant's fingers separately.
AGREE DISAGREE

Q11 State your opinion on the inclusion of the following massage stroke with the upper limbs.

	AGREE	DISAGREE
Using hug and glide, start at the shoulder with your hands turning opposite to each other whilst grasping the arm. Twist each hand as you move from the shoulder to the wrist whilst applying deep pressure.		

Q12 This is the infant massage routine to be done on the infant's FACE.
1. Apply deep pressure around the perimeter of the baby's face following the facial contours using your thumbs, your left thumb on the left side while your right thumb concurrently moves on the right side.
2. Using your fingertips, apply small circles around the jaw.
AGREE DISAGREE

Q13 This is the infant massage routine to be done on the infant's BACK. Position the infant on their stomach.
1. Using one hand, apply resting hands on the back for 5 seconds
2. Using both of your hands apply deep pressure as you comb down the lateral sides of the spine, from the top to the bottom of the spine, the left hand on the left side and the right hand on the right side
AGREE DISAGREE

Q14 On conclusion of the infant massage routine, the caregiver should (where applicable):
1. Integrate: use resting hands on each part of the body that has been massage and name the areas for the baby.
2. Say thank you to the baby for accepting the massage
3. Dress the baby
4. Share a cuddle with the baby
AGREE DISAGREE

Q15 What would you recommend the primary caregiver to do if they have not completed the massage routine in the limit of 10 minutes?

Q16 State your opinion on the ability of this massage programme to be completed in the limit of 10 minutes with this population?
AGREE DISAGREE

Q17 The infant massage routine should initially include one repetition of each stroke. However, depending on how the infant is tolerating the massage, this can be increased to two repetitions after one week with a possible subsequent increase to three repetitions in the following week.
AGREE DISAGREE

Q18 The following oils/creams are recommended to be used by primary caregivers from this context:
1. Non-perfumed baby cream
2. Aqueous cream
AGREE DISAGREE

Q19 State your opinion on the recommendation of using coconut oil for infant massage with this population.
AGREE DISAGREE

Q20 The following stimulation is recommended during the massage routine, with the assumption that baby is in a calm alert state and accepting of the input:
1. Primary caregiver singing softly and quietly
2. Primary caregiver talking to the infant
3. Eye contact
4. Skin to skin contact
5. Facial expressions from the primary caregiver
AGREE DISAGREE

Q21 The following are different options for positioning of the primary caregiver and infant during the massage routine which the caregiver can chose from depending on their personal needs:

1. Caregiver seated on the floor on a blanket in long sitting with baby positioned with it's head by the caregivers knees and legs up against the caregivers stomach.
2. Caregiver seated on a bed in long sitting with baby positioned with it's head by the caregivers knees and legs up against the caregivers stomach.
3. Towel/blanket rolled around perimeter of infant for cradling support
4. Lower limbs of primary caregiver supporting edge of infant for cradling support.

AGREE DISAGREE

Q22 State your opinion on the following as an option for positioning for a primary caregiver during the massage routine?

	AGREE	DISAGREE
Caregiver seated on the floor on a blanket in long sitting with infant lying in supine on the caregivers legs.		

Q23 The following are recommended times for implementation of this massage programme at home by the primary caregiver, which is dependent on the dyad's home setting and normal daily routine.

1. Before the baby's bed time
2. After bath time
3. When the baby is in a quiet alert state

AGREE DISAGREE

Q24 State your opinion on the recommendation of including infant massage in this population's daily routine three times a day, if possible.

AGREE DISAGREE

Q25 How would you like to be informed of the final results and programme and further provision of the programme?

- Bulk mailer system
- My personal email address _____