[RESEARCH ARTICLE]

Development of content for an early intervention mother-infant programme for vulnerable infants

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ABSTRACT

Introduction: Early intervention in the first months of life focuses on the high-risk infant, often born premature or with significant risk factors present. Early developmental surveillance of infants is carried out briefly at vaccination appointments at 14 weeks, six months and nine months in South Africa. It is however not sensitive enough to pick up subtle challenges in the infants' functioning in autonomic stability, state regulation, motor control or social interaction.
Methods: A Nominal Group was held in a workshop session at a national occupational therapy congress, where delegates chose to attend and participate. Nineteen participants attended the workshop, where a plenary session was followed by item generation and reaching a consensus on the inclusion of these items in an early intervention mother-infant group intervention programme.
Results: A master list of 45 activities was generated, which was reduced to nine activity groups, covering all domains of newborn functioning. Guiding principles were shared and agreed on. Consensus was reached during the workshop process, with subsequent emailed rounds only yielding comments on clarity in the item description.
Discussion: Massage, maternal education and empowerment, play and communication were essential for inclusion.
Conclusion: Consensus was reached on the inclusion of 45 activities, with 9 of these considered essential in mother-infant dyad group-based intervention for vulnerable infants.

Implications for practice

- Applicable across multiple settings in South Africa, this research informs occupational therapy service providers on the development of early itnervetion mother-infant dyad-based group intervention programs.
- Activities that are a priority for inclusion in a group-based mother-infant dyad early intervention programme are: vision, play, skin-to-skin/ KMC, communication, massage, midline/ containment, maternal education/ empowerment, auditory and movement based on an analysis of their qualities.

INTRODUCTION

Early intervention in the first months of life largely focuses on programmes for high-risk infants, which include all infants born pre-term or post-term, term infants born with risk factors (such as neonatal hypoxic-ischaemic encephalopathy, metabolic problems, neonatal abstinence syndrome, congenital conditions or who have undergone complex surgical procedures), low (<1,5kg) or high (>4kg) birth weight and infants receiving palliative care[1].These infants are treated in Neonatal Intensive Care Units (NICU) or Neonatal High Care Units (NNHCU), where developmentally supportive care, parent support, and engagement are provided[2,3]. These infants are followed up in early intervention services to monitor for cognitive, physical, and social-emotional difficulties and provide appropriate developmental intervention[3].

For infants not admitted to NICU or NNHCU, and who are considered physiologically stable (respiratory rate 40 to 60/min, heart rate average

140 beats/min, maintaining body temperature in appropriate clothing, passing urine and stool and feeding well)[1] and discharged home with their parent/s, medical follow-up at a Primary Health Care (PHC) centre in the public service or to a private paediatrician is recommended at three to six days and at six weeks of age. Follow-ups then occur as per the recommended vaccination schedule. At these visits, these infants should be screened for developmental delays or concerns in gross-motor, fine-motor-adaptive, communication, and personal-social domains and referred for further assessment and intervention if there are concerns[4].

There has been a recent re-emphasis on early identification and intervention for developmental delay in children from low- and middle-income countries[5] , with a call to healthcare workers to prevent adverse outcomes of developmental delays by providing access to appropriate services, skill development for new life roles, prevention through screening and health promotion through parental workshops[6,7] Early intervention for the infant begins in pregnancy, at the start of the first 1000 days. Along with specific interventions geared at pregnant mothers in this time, education and facilitation of responsive parent-child interactions as well as screening for any difficulties the parents or child is experiencing in navigating through the early weeks and participating in the appropriate domains of functioning, are needed, for mothers and infants[6,7].

In many guidelines, developmental surveillance occurs at the nine and 18-month vaccination dates and is recommended at the ages of two and three years, and again before commencing formal schooling[8]. The South African Road to Health booklets for boys and girls, available only in English, include specific developmental screening for milestone attainment from 14 weeks[9,10] Many infants not meeting "high risk" criteria do present with challenges in one or more of the domains of newborn functioning, namely: autonomic stability (AS: Regulation of breathing, temperature and other aspects the of the autonomic system needed before infants can concentrate on other developmental areas), motor control (MC: Inhibiting random movements and controlling activity), State regulation (SR: A key developmental concept that describes levels of consciousness, which range from quiet sleep to full cry) and social interaction (SI: he ultimate developmental task, where infants show engagement in their world)[11,12]. These infants are medically stable and discharged into home care with their mothers soon after birth. Their challenges may lead to them being described as "unsettled" or more colloquially "high need" when they are identified at later developmental screenings[12-16].

Within this paper, these infants are referred to as "medium risk", as these neurobehavioral challenges are evident from the first weeks of life, and standard developmental screenings at vaccination appointments or reliance on maternal identification are not sensitive enough to identify and remediate this[9,10]. If these challenges are not addressed, they can influence infant mental health (understood to incorporate the well-being and social-emotional development of infants within their early relationship, family and broader context) and holistic development[1,13,17, 18].

LITERATURE REVIEW

The newborn infant is a complex and competent being, born into a relationship with their parent/s. The infant and parent/s are active contributors, with the parent (usually the mother) experiencing heightened sensitivity to meet the infant's needs and understand their subtle communication tools [11]. This mother-infant attachment process and resulting bond lay the foundation for the infant's future mental health, stress adaptation, and relationships [19]. Infants communicate through behaviour in their four domains of functioning, with observable changes in their autonomic nervous system, motor control, state regulation, and attention-interaction subsystems. This indicates underlying brain function, neurologic status, and their need to return to homeostasis and security in the dyad with their parent [11,19,20].

The autonomic nervous system regulates breathing, heart rate, and temperature. Adequate functioning is needed here before the infant can concentrate on other developmental areas. Infants who experience difficulty with autonomic regulation may be overtaxed by sight and sounds, responding with changes in respiration, startles, tremors, or colour changes. Motor control is needed for the infant to inhibit random movements, control activity, and focus energy from nutrition into developmental tasks vital to their growth. State regulation is a critical developmental concept describing levels of consciousness ranging from deep sleep to a full cry. State regulation is vital to enable the infant to respond to information from their environment and transition appropriately between states to sleep, feed and interact effectively. The final domain of functioning, social interaction, is the ultimate developmental task. This enables infants to engage with their world, respond to parents and objects, and thus ensure their survival by attachment, gaining nutrition and security[11].

The mother's mental health influences the expression of these behaviours from the infant and her sensitivity to be able to observe and respond to these behavioural signals. Postnatal depression poses threats to the infant, with infants born to depressed mothers having less optimal performance in all four domains of function. As a result, these infants are less manageable and satisfying to care for[7,20-27]. During pregnancy, mothers undergo physical and psychological preparation for parenthood, with a necessary change in occupational identity in relationships, work, social domains and self-identity These changes may result in the mother feeling vulnerable, experiencing a loss of her former self, and needing support[11,27].

Early Intervention (EI) is implemented effectively in the high-risk population, with developmentally supportive care implemented in the NICU or NNHCU, and close monitoring for emerging challenges as the infant ages. Developmentally supportive care in the hospital environment aims to support positive growth and development whilst stabilising physiologic and behavioural functioning to improve developmental outcomes in the family context [28].

EI programmes post NICU discharge show mixed results. A systematic review indicated little effect on motor performance at school-going age for infants born preterm, and only short-term gains in cognitive outcome, however, these may be attributed partly to the paucity of adequate motor assessment tools used compared to the availability of cognitive assessment tools[29]. The same study indicated significant variability in EI programmes, difficulty in determining which is most effective, and the need for outcome measures that can detect subtle changes. It also noted that early intervention should be targeted at infants and families who would benefit by them, and that societal participation be included[29]. In a randomised control trial of clinic-based intervention, home-based intervention and usual care for preterm infants; infants who received the intervention showed enhanced cognition, motor, emotional regulation and behaviour (including sleep). Early improved mother-infant interaction in the dyad showed positive effects in cognition specifically[30]. A parent-delivered intervention programme after discharge from NICU was trailed in Australia and compared to a usual care group[31]. In this programme, parents were guided by occupational therapists and/or physiotherapists in establishing a routine for developmentally appropriate play by identifying their infant's cues of readiness for social interaction, monitoring their response to interaction, and incorporating this into their daily routine, at least five times a week for 20 minutes. Parents were also guided and encouraged to provide opportunities to support their infant's attempts at postural control, motor coordination, and object interaction. This parent-delivered intervention was considered feasible for premature infants, bridging the gap between NICU interventions and later follow-up. Positive outcomes included parents reporting that they had a better understanding of the value of play and the importance of providing daily opportunities for this. Parents also expressed a need for more parent-therapist interaction and direction in learning to interact with their infant [31]. Whilst these studies showed positive results, the intervention is only available to a niche population – those infants who were born premature and those who were discharged from NICU and had the opportunity to benefit from a bridging programme between

hospital care and later developmental follow-up. There are no routine, accessible early intervention programmes taking a more habilitative, promotive, and thus preventative stance in early development, including transitioning to motherhood and domains of newborn functioning.

Another study examining priorities for maternal education highlighted, among the 24 needs listed, the need for mothers to gain knowledge about the characteristics of a newborn, how to look after a newborn, a space to have their fears and concerns dealt with, breastfeeding support, and guidance or facilitation in social and community support. Group-based interventions were suggested to be useful in addressing some of these needed educational topics [32]. These are topics regularly covered in private, paid-for antenatal group classes, where an added benefit is the bonding and development of support structures between mothers and at private, paid-for well-baby consultations in the early weeks after birth. In South Africa, this is not offered in this format as a routine in State-funded facilities, where antenatal and postnatal care is essentially medically based [33].

Group intervention is commonly used in Occupational Therapy treatment, and is considered highly effective, and a benefit of it is the presence and application of intrinsic therapeutic factors in the process. These therapeutic factors beneficially affect client growth, and consist of the instillation of hope, universality, imparting information, altruism, the corrective recapitulation of the primary family group, development of socialising techniques, imitative behaviour, interpersonal learning, group cohesiveness, catharsis, and existential factors[34].

Many maternal and infant factors can make functioning in newborns challenging, even in infants who are not high risk and thus do not receive close routine follow-up and monitoring. These factors include environmental and social risk factors, maternal mental health, and exposure to HIV and antiretrovirals[11, 22, 35]. These mother-infant dyads are vulnerable to later adverse developmental outcomes in occupations of motherhood and childhood. Identifying problems in the postpartum period and providing coping tools, including maternal education and responsive caregiving, is needed to mediate this[32]. There is a gap in intervention services for this population, from a promotive and preventative viewpoint, as well as allowing very early identification of difficulties prior to the nine-month vaccination and developmental screening where most mother-infant pairs would have their first opportunity[8-10]

This paper aims to describe the iterative development and programme for a group-based mother-infant intervention for vulnerable mother-infant pairs in the 0-6-week period after birth, aimed at postnatal care in any hospital, community clinic or other setting in South Africa where mother and baby services are provided.

METHODOLOGY

The larger study from which this paper emanates (ethics approval BFC354/15) explored the neurobehavioral functioning of HIV-exposed infants in KwaZulu Natal, South Africa, and the maternal mental health in this population. The results, including specifics of the assessments used in evaluating the infants (Neonatal Behavioural Assessment Sale (NBAS) and mothers (Edinburgh Postnatal Depression Scale (EPDS) and Mother and Baby Scales (MABS), are discussed elsewhere[7,12]. As part of developing an early intervention supportive care package for these mother-infant pairs, a modified Nominal Group Technique (NGT) was followed in an iterative content development process.

The NGT is a structured, facilitated, and multi-step group technique that is well established in medical education, programme development, and clinical guideline development, as well as successfully used in developing clinical practice[36 – 42]. NGT, whilst primarily used with "expert groups", can include stakeholders and lay persons as participants whose interest in a field, experience, or perceptions relate to the area being explored[36, 37, 38, 42].

Participants and procedures

A workshop abstract and invitation were sent as part of the programme advertisement and participant information for a national Occupational Therapy congress. The workshop was presented in a parallel session of workshops and was limited to 25 participants. These participants chose to sign up during the pre-congress registration process, or on the day of the workshop based on their interest or experience in the topic. The workshop aimed to have participants leave the session with greater insight into neonatal care and early intervention, treatment ideas, and guidelines for clinical practice, as well as having contributed to developing an early intervention programme for infants exposed to HIV as part of a PhD project. Delegates who had an interest in early intervention and who wanted to contribute to and learn from the discussion voluntarily registered. All participants provided consent via an informed consent form, which included consent to contact via email after the conclusion of the workshop. A short demographic questionnaire was completed, detailing the total years of experience, years of paediatric-specific experience, qualifications, and contact email address.

The workshop venue was structured to accommodate four small group discussions after a short plenary. Participants entered the room and chose where to position themselves. Stationery (A4 Art Jotters, and coloured pens/markers) were available on each table. The facilitator (an occupational therapist and the primary researcher for this study) started the workshop by having participants introduce themselves and briefly share their experience in paediatrics and working with infants. A short plenary session followed, with a presentation on high-risk babies, covering aspects of neurodevelopmental supportive care [43,44], the "fourth trimester" [45], commercially available paid participation stimulation programmes for typically developing infants [46-50], and results from early intervention studies[51-56]. Information regarding the four domains of newborn functioning, namely, autonomic stability, motor control, state regulation, and social- interaction, were introduced as concepts with definitions[11]. The concept of a "medium risk" baby was introduced, being a baby/ infant or a mother-infant dyad who is medically stable, not in a hospital or needing specialised medical care, but having some vulnerabilities in transitioning through the "fourth trimester" [13-16]. Participants were informed of the task: to develop content for a four-week, mother-infant group-based early intervention programme across the four domains of newborn functioning. A tea break followed, during which the participants had time to reflect and silently generate ideas.

Participants returned from the tea break to their small groups and shared their ideas. Each table volunteered a scribe, who used the coloured pens and jotters to record these ideas as they arose and were shared. Each person was afforded the opportunity to contribute to this process, which was noted unobtrusively by the facilitator. A round robin with the whole group followed, led by the facilitator, who documented all contributions, removing direct duplicates. These were then discussed and reduced to "activities" and "guiding principles" for clarification. A list of activities was presented to the participants. Participants returned inward to their small groups, and the group was asked to choose their top five activities for inclusion in the programme in a collective vote. They rated importance on a scale from 1 (most important) to 5 (less important).

The workshop ended at this point, with follow-up contact via blind carbon copy email, sharing the collated ideas of content after a summary and analysis by the facilitator. In the process of analysing generated content, the primary author/ facilitator merged items that were similar (e.g. "creaming baby (and massage)", "massage" and "deep pressure creaming and massage") were all considered as an activity of "infant massage", through a process of reasoning based thematic analysis as well as on the qualities of activities [57,58]. These were further collated into the four domains of newborn functioning, according to the definitions of the domain and the characteristics of the activity[11]. This was checked against the notations in the jotters made by the scribe in each group for reliability.

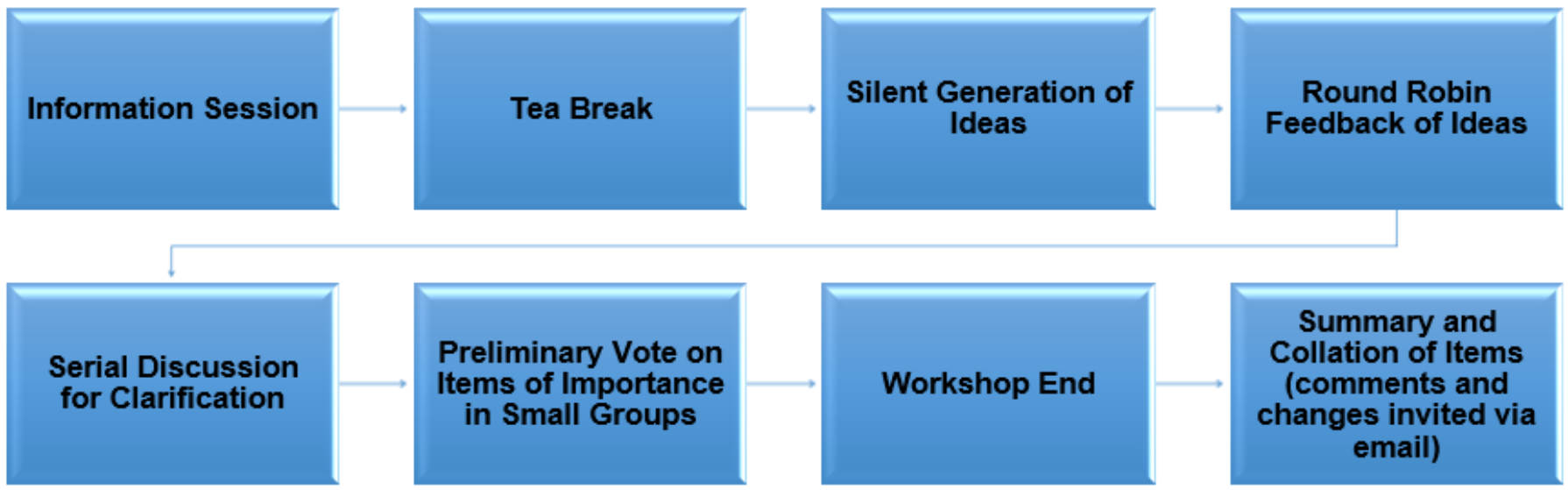

Figure 1: NGT Process followed

Data analysis

Descriptive analysis was used for demographic data. A master list of activities and guiding principles were generated during the round-robin after removing direct duplicates (with the same wording). The activities generated were thematically analysed [57] and categorised according to their inherent characteristics [58], resulting in activity categories. The principles generated by the group followed the same process of thematic and activity analysis in their reduction and categorisation [57-58]. The master list of activities, where group voting was required for the top five activities for inclusion was analysed to reveal frequencies and percentages after thematic analysis and categorisation into activity groups. Consensus was considered as reached in the workshop process, as the subsequent email round 1 returned comments only on points of clarity. No additions or changes were received.

RESULTS

A total of n=19 participants engaged in the workshop. All were occupational therapists or occupational therapy students, with 52.6% (n=10) holding a bachelor's degree, 10.5%(n=10) holding an advanced diploma, 21.1% (n=4) having a master's degree, and 15.8% (n=3) being undergraduate students, at the time of participation. The clinical experience in independent practice ranged from 0 to 37 years (mean 12.21 years), with paediatric-specific clinical experience being 0 to 35 years (mean 8.11 years). The greatest number of participants in independent practice worked in private practice (26.8%, n=7), followed by the Department of Health (26.3%, n=5) and academia (25.8%, n=3). One participant worked for an international organisation.

A master list of 45 activities and was generated during the round-robin after direct duplicates (with the same wording) were removed. The activities generated were thematically analysed after the workshop completion [57], and categorised according to their inherent characteristics [58], resulting in nine activity categories (Table I, below).

Table I: Activity groups after reduction of activity ideas generated by participants during the workshop

Numbers 1 – 45 indicate the unique activity generated by participants

Activity group	Original activity generated by NGT (45)
Vision	[1]visual tracking, [6]mobiles (black & white), [20]rattles, [24]graded visual input, [38]visual tracking with contrast
Play	[1]visual tracking, [6]mobiles (black & white), [20]rattles, [30] playing in water, [33]developmental dates* during alert stages or tummy time, [35]play with baby's body in social interaction, [37]peek-a-boo with main caregiver, [38]visual tracking with contrast, [39]movements* with verbalisation of body parts
Skin-to-skin and/or KMC	[2]kangaroo care & wrapping the baby in the front, [12]skin-to-skin bath, [27]skin-to-skin, [34]tummy time in skin to skin,
Communication	[3] hum, [4]talk, [5]sing, [14]transition baby through "stages",[16]teach mom how to read cues (poster),[26]normal movement* incorporated into songs,[32]listen to music,[37]peek-a-boo with a main caregiver, [39]movements with verbalisation of body parts, [41]focus on the needs of the baby
Massage	[7]massage, [28]creaming baby (and massage), [29]deep pressure creaming and massage
Midline/ containment	[8]swaddling & lifting, [9]creating a circle with your arms (mom), [10]nesting (in bed & when holding), [13]co-sleeping, [18]self soothing and positioning (safe space), [19]midline swaddling, [44] midline control - hand to mouth and hand to face
Maternal education/ empowerment	[11]deep bath*, [14]transition baby through "stages", [15]assist baby to return to a calm mood, [16]teach mom how to read cues (poster). [17]teach mom tips and techniques (poster), [31]"sensory diet", [40]correct the myths: bed sharing, crying, [41]focus on the needs of the baby, [42]routine, [43]daily programme where mom tracks baby's behaviour, [45]distress signs (poster)
Auditory	[3] hum, [4]talk, [5]sing, [20]rattles, [32] listen to music
Movement	[21]stimulate neck control, [22]rolling baby passively, [23]rolling & head control, [25]adequate sensory stimulation in normal movement patterns, [33]developmental dates during alert

*" developmental dates" refer to moments of focused contact between a responsive caregiver and the infant movement refers to active(self-generated) or passive (facilitated by the caregiver) movements of one or more of the infant's body parts deep bath refers to a bath where the infant's limbs and torso are submerged in water

After the round-robin group discussion, small group interaction was re-invited where group consensus was sought on their "top five" activities. The frequency of votes was counted as the number of groups voting for the activity.

Table II: Top five ranked activities from small group voting aligned to domains of unctioning.

Activity	Frequency (%) of votes (n=4)	Activity group (after merging)	Domain of newborn functioning*
Massage	4 (100%)	Massage	MC, SR
Developmental dates during alert periods or tummy time	3 (75%)	Movement, play	MC, SI
Teach mom how to read cues (poster)	3 (75%)	Maternal education/ empowerment, communication	AS, SR, SI
Body play : Normal movement incorporated into songs or verbalisation of body parts	3 (75%)	Movement, communication, play	MC, SI
Visual tracking	1 (25%)	Visual, play	MC, SI
Adequate sensory stimulation in normal movement patterns	1 (25%)	Movement	MC, SR
Skin to skin	1 (25%)	Skin to skin	AS, SR
Transition baby through "stages"	1 (25%)	Communication	AS, SR
Daily programme where mom tracks baby's behaviour	1 (25%)	Maternal education/ empowerment	SR, SI
Midline control – hand to mouth and hand to face	1 (25%)	Movement	MC, SR
Distress signs (poster)	1(25%)	Maternal education/ empowerment, communication	AS, SR, SI

*AS: Autonomic stability, MC: motor control , SR: state regulation, SI: social interaction

The guiding principles, which participants unanimously agreed should be included, followed the same process of thematic and activity analysis in reduction and categorisation [57-59](Table III, below). A total of 26 were retained after this process. Some of the "principles" noted for inclusion by participants are not truly principles that could be applied to intervention but considerations for therapy.

Table III: Guiding principles generated by participants (n=19)
Numbers 1 –26 indicate the guiding principle generated by participants

Original "principle"/ consideration for intervention "generated by NGT (n=26)		
1)Treatment through the mother, 2) Fostering the bond between the infant and the mother, 3) Incorporate treatment into the normal routine of mom & baby interaction/ stimulation, 4) Build a good mother and baby relationship, 5) 100% attention to baby, 6) Time matters, 7) Include mom, dad, and siblings, 8) Support the mother (emotionally. Psychologically etc), 9) Facilitate normal development, 10) Everything ready for baby and close by, 11) No cell phone, 12) Safe sleep space (baby box)[60], 13) Correct the myths (crying & sleeping), 14) Effective use of mom & baby time, 15) Precautions for sensory overstimulation, 16) Look out for startle reflex, stop sign or withdrawal from interactions, 17) Temperature of room, 18) Lighting in room, 19) Stimulate baby's curiosity to engage in different positions, 20) Acknowledge prior knowledge of mom in distress signals, 21) Acknowledge prior knowledge of mom in play, 22) Know milestones, 23) Moms know stress/ distress signs and when it is too much for the baby, 24) Look at how mother and baby play together, 25) Look at how much baby cries, 26) Waking up for feeding times		
Therapeutic principles in month-infant dyad group based intervention		**NGT "principle" item**
Handling Principles	- Therapeutic use of self in interaction with mother-infant dyad. - Respectful style of interaction with the mom and baby at the centre. - Tone of voice appropriate to use with mother and baby (change between conversational tone, motherese, and singing as appropriate. - Engage mother-infant dyad. - Content of speech and information sharing on an appropriate level. - Management of mother and infant behaviour.	1, 2, 5, 7, 8, 11, 13, 20, 22, 23
Presentation Principles	- Group should be task-centred (with session activities and home activities as carry-over). - Social emotional group structure followed with facilitation of therapeutic factors (instillation of hope, universality, imparting information, altruism, the corrective recapitulation of the primary family group, development of socialising techniques, imitative behaviour, interpersonal learning, group cohesiveness, catharsis, and existential factors) - Create an accepting, secure and encouraging atmosphere. - Instructions in informative sessions are presented simply, clearly, without jargon, and without contradiction. - Include repetition to foster learning and retention. - Do activities with the mother-infant dyad. - Emphasise observed good points, successes, and evidence of the mother and infant learning. - Provide an opportunity for mothers' experience of activities, the experience of success and expression of emotion. - Use time adequately so that goals are met, clients are not pressured, and are not bored.	1, 2, 3, 4, 5, 6, 8, 13, 14, 19, 20, 21, 22, 23, 24, 25, 26,
Structuring Principles	- Set up the social environment with comfortable seating for mother and infant, facilitating social interaction with group members by sitting in a circle. - Set up physical environment by making sure all needed materials are within reach. - Set up physical environment by making sure room temperature and lighting is adequate. - Provide privacy and sense of containment in structuring. - Length of session 1 to 1.5 hours to allow for sleep cycle, feed, nappy change and facilitation of therapeutic factors for mother-infant pair.	2,3,4,6,7,8,9,10,11,14,15,17,28,29,26
Activity Requirements	- Appropriate types of activities used for mother-infant pair - activity presented at the right level – few steps, not complex to complete or engage in. - Mother-infant dyadic activity can be completed in appropriate time frame for mother and infant depending on the infant's state of arousal and the purpose of the activity	2,3,4,5,6,7,9,12,13,14,15,16,18,22,23,26

The proposed items for inclusion in the programme, generated through the NGT during the workshop, received consensus during the workshop process. Findings were circulated via email to all participants and had six responses in round 1(31.6%), where two participants (10%) suggested minor points of clarification, including deep pressure as opposed to light touch being used in massage, environmental considerations such as temperature, lighting and noise, and creating a schedule for non-interrupted play time (which is considered under the aspect of "developmental dates"). Maternal education in these aspects was also raised as a point to consider, with the importance of touch in these early weeks. These aspects were included or clarified in round 2, where no more suggestions of additions or changes were received.

DISCUSSION

The NGT was used to generate content for a four-week mother-infant dyad group-based intervention programme, applicable across multiple settings in South Africa, during the critical development period in the neonatal phase. In this period, mothers are transitioning into their new roles, and infants are gaining competence in domains of newborn functioning and living in the extra-uterine environment[11].

Nineteen participants, self-identified as interested parties whose experience, expertise or perceptions related to the topic being explored and the workshop's purpose attended and participated[36, 38, 42].

All the activities included require adequate functioning in more than one domain of newborn functioning. Massage was considered a priority to include in the intervention programme, with a guided, progressive approach based on a simplified infant massage model, with access to instructional pamphlets. Massage has many benefits to the mother and infant, as it decreases stress responses in the infant, stabilises the autonomic nervous system noted in heart rate and respiratory rate, and promotes bonding and attachment, especially when the experience is pleasurable for the mother-infant dyad[52,56,61,62]. Massage therapy, along with skin-to-skin contact, has positively influenced the psychomotor development of newborns and seemed to assist infants in gaining weight and improving in all areas of the Neonatal Behavioural Assessment Scale (NBAS).[56,62]

In this very early period, movement is characterised by "general movements", part of the spontaneous movement repertoire identified and described by Heinz Prechtl[63]. These are not voluntarily controlled, and in a competent newborn, involve the whole body in a variable sequence of arm, leg, neck, and trunk movements, waxing and waning in intensity, force and speed, with a gradual beginning and end[63.] During the neonatal period and early life, the infant learns to inhibit random movement and control its activity. The infant needs to develop these skills to conserve energy on developmental tasks vital for growth, primarily measured by appropriate weight gain. Participants agreed that massage, passive facilitation through normal developmental, sequential patterns of early movement, and encouragement of early movement skills through play are essential for inclusion. This could be done through passive movement by the mother, or gentle guided active movement with an external stimulus such as the mother's or caregiver's face, a toy, or a rattle. There is some controversy in the supporting literature around this, with a systematic review of early intervention programmes showing that they have little effect on motor outcomes in infancy or beyond[51]. Other studies show that a clinic-based intervention programme including massage and teaching of developmental skills have a mitigating effect on motor delay in an infant with fair to normal cognitive development[52-54]. This is supported by evidence that early movement experiences facilitated by parents, including prone play, sitting with upper trunk support, head control practice, midline hand-to-hand and hand-to-foot play, assisted kicking, and following or tracking toys have a positive effect on motor outcomes for at-risk infants[53-56].

Maternal education and empowerment in reciprocal communication with their infant, reading and understanding their signals, and behavioural communication were considered important for inclusion in this study. Communication can be fostered through singing, humming, and talking to the infant in motherese. Maternal singing has been shown to reduce maternal anxiety and increase physiological stability in infants, and maternal-infant interaction is vital for stable attachment and bonding[64,65]. Transitioning the infant through states of arousal (referred to participants as "stages"), are included in empowering and educating mothers in infant communication. Soothing strategies for a fussy or crying infant are graded from minimal maternal to maximal maternal support. Minimal support includes gentle positioning into a position of flexion with midline orientation and a steady hand on the infant, which is gradually increased as needed. Increasing support includes facilitating self-soothing by bringing the infant's hands to his face and mouth. picking them up, and holding them against the mother's chest with her face close to their head. Maximal support requires a pacifier or bringing the infant to the breast to suckle[11,43,44].

The empowerment and education in understanding infant communication were recommended to take the form of didactic education, orientation to specific features on a picture and then guidance on interpreting their own infant's cues as these emerged. Identifying and understanding the differences between "approach" signals, "back off" signs, and distress signals were essential. These include a skin colour change, facial grimacing, arching their back or splaying fingers in the "stop" sign[43,44]. Further communication activities included using rhymes, songs and verbalisation during play.

With social interaction being the ultimate developmental task in the first weeks after birth, appropriate play was considered important. These play times, or developmental dates" include the mother being competent in communicating with their infant and participating in developmentally appropriate play on a motor and sensory level. Newborns have the ability to interact with their world, track animate and inanimate objects using their visual and auditory senses and interact with their caregivers. Participants considered face-to-face play, peek-a-boo games, and tracking highly contrasted visual items as essential inclusions. Play between a mother and her baby is vital, as social interaction in this primary relationship provides the infant with his first social experience and builds a template of what to expect from later interactions with others[66,67.] Parent-based play programmes are protective in enhancing early development in the critical period of early infancy and fostering secure attachment[63], and newborns have an innate ability to see form and prefer looking at highly contrasting or black-and-white patterns[68].

Limitations

The NGT group at the national congress was comprised solely of occupational therapists and occupational therapy students. Although the group was specific to this profession, early intervention approaches are similar across disciplines, focusing on participation in the domains of newborn functioning and mother-infant bonding being a priority. The small number of participants is another limitation.

CONCLUSION

A NGT process followed by a group of occupational therapists interested in early intervention resulted in a master list of 45 activities, of which 11 were considered a priority for inclusion in a group-based mother-infant dyad early intervention programme. The activities were grouped into vision, play, skin-to-skin/ KMC, communication, massage, midline/ containment, maternal education/ empowerment, auditory and movement based on an analysis of their qualities. These activities covered all the domains of newborn functioning, each being appropriate in at least two domains. Activities were also deemed appropriate by the participants in the NGT for transitioning the mother into her new role and empowering and supporting her in this phase.

This paper informs the development of an early intervention mother-infant dyad-based group intervention programme, which is to be delivered in the first few weeks of the infant's life, and the early transitional stages of the mother into her new role. This programme is unique in the age band it is intended for and its intention for the "medium risk" neonate, who is not part of careful developmental

surveillance after NICU discharge. It is applicable across multiple settings in South Africa. Feasibility testing and adaptations may be needed, and implementation studies are recommended.

Conflicts of interest declarations

The authors declare no conflict.

Author contributions

G Rencken is the primary researcher, and was responsible for conceptualising the study with the guidance and supervision of CJE Uys and P Govender. G Rencken completed the data collection and analysis and took the lead on writing the article. CJE Uys and P Govender provided valuable supervision, critical review and guidance throughout the process

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