

# Guidelines for the implementation of developmental care for preterm and sick neonates

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## ABSTRACT

Developmental care is a relatively new concept in neonatal intensive care within the South African context. The term 'developmental care' describes a group of interventions focused at reducing stress levels of the preterm and sick neonate in order to reduce negative short and long term outcomes. These negative outcomes directly affect infant morbidity and neurodevelopment. Although it has been widely implemented internationally, implementation in South Africa seemed problematic. A formal research study using an intervention research design was conducted to determine how developmental care could be implemented in the South African context and this article discusses the guidelines for implementation drawn from the conclusion of the study.

## Introduction

The preterm and sick neonatal population nowadays has the benefits of advanced technology as this gives them the life sustaining care needed to survive a variety of conditions. As a direct result, preterm infants and sick term infants can benefit from therapies like oscillation, nasal CPAP and nitric oxide. Unfortunately, technology advancement also has negative consequences. The patients' mortality rate decreases, but a range of morbidity related to the immaturity of their organ systems and concurrent disease states increases.<sup>1</sup> Thus, more infants survive, but they often survive with complications or illness. Stress experienced during their hospitalisation and the management thereof has a direct impact on the severity of morbidity.

## Neonatal stress

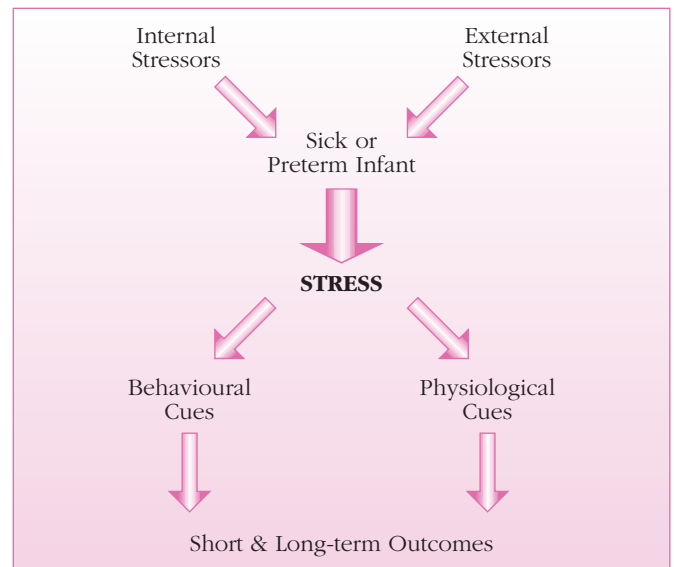
Preterm and sick infants are commonly exposed to internal stressors like haemodynamic instability and impaired oxygenation; and external stressors such as inappropriate handling and positioning techniques, and excessive light and noise. The preterm infant's brain is developing rapidly and is particularly vulnerable to a stressful environment, and the sensory overload of the neonatal intensive care unit (NICU) causes neurological overstimulation. Neonates demonstrate stress to the caregiver by showing behavioural and physiological cues. Behavioural cues involve motor activity like splaying fingers and toes or frowning and crying, whereas physiological cues involve changes on either side of the normal values of vital observations, for example tachycardia or bradycardia. The detrimental effect of environmental stress has both short and long term implications for the already compromised neurodevelopment of the preterm infant, as well as the compromised sick term infant.<sup>1</sup>

Short-term outcomes can be seen when monitoring the patient's vital observations. Changes in heart rate, respiration rate, skin colour, blood pressure and oxygen saturation are specifically related to physiological instability and/or increased stress levels. Long term outcomes for preterm and sick infants include developmental delays, speech and comprehension delays, cerebral palsy, lung disease, visual and hearing impairment, impaired growth, and musculoskeletal problems.

## Developmental care

The concept of developmental care (DC) allows caregivers simple and effective methods of reducing the negative short and long term outcomes of the infant by adapting the handling of and the NICU environment to which the preterm and sick infant are exposed. Symington and Pinelli describe DC as a broad category

**Figure 1:** Diagrammatic representation of neonatal stress



of interventions designed to minimise the impact of the NICU by decreasing a variety of stressors for the infant and creating an optimal environment for neurodevelopment.<sup>1</sup>

## Developmental care outcomes

A study done by Becker and colleagues attempted to determine the outcomes of DC for very low birth weight infants. The results demonstrated that the developmental approach has a positive

**The principles of DC include individualised infant care, family-centred care, appropriate handling and touch, initiation of cluster care for multidisciplinary interventions, flexed positioning and swaddling, kangaroo mother care, environmental manipulation to reduce excessive noise and light, non-nutritive sucking, and infant pain management.<sup>2</sup>**

impact on the progress of infants during hospitalisation. When the experimental group was compared to the control group results indicated improved respiratory status, earlier transition from nasogastric tube to oral feeds, increased self-regulatory abilities, physiological stability, reduced morbidity, diminished length of hospitalisation and improved behavioural organisation.<sup>3</sup>

A systematic review of previous research conducted by Symington and Pinelli for the Cochrane Collaboration included 31 randomised controlled trials. The findings indicate that DC has advantages for preterm infants, which include improved growth and weight gain, reduction in cost of hospitalisation, reduced need for respiratory support, reduction in critical care costs, and a decreased period of hospitalisation, as well as improved neurodevelopment at two years corrected age. No detrimental effects regarding DC have been reported. Further clinical research is recommended to determine more short and long term outcomes of DC interventions, as well as studies to determine the economic impact of implementation and the maintenance of such practices.<sup>4</sup>

Research studies which did not make use of randomised clinical trials have indicated additional advantages of DC related to the reduction of stress levels resulting in more physiologically stable infants. These advantages include a reduction in developmental delays, a reduced need for oxygen and decreased use of sedation. These improvements relate to more positive short and long term outcomes of the preterm infant.<sup>5-9</sup>

Rossetti quotes a statement from research done by Van den Berg: "Developmental care is no longer optional. It is mandatory if we are to provide optimal care for low-birth-weight infants and those surviving the NICU".<sup>10</sup> McGrath and colleagues reiterate this conviction by concluding that DC facilitates the provision of holistic care and calls attention to the need for human caring where technology may not be sufficient to maintain meaningful life. They further comment that there are barriers to DC due to reluctant support from the medical role players.<sup>11</sup>

**Developmental care implementation**

DC, including kangaroo mother care (KMC), was introduced as a new care approach into neonatal terminology in the 1980's. Extensive research between 1972 and 1987 concluded that the NICU was over-stimulating the preterm and sick infant resulting in stress. The need to implement DC was clear although the initial acceptance of this new approach took time. DC was implemented internationally into neonatal intensive care units in the United States of America and Sweden with varied levels of success.<sup>12-14</sup> DC implementation necessitates that a new concept or plan be brought into effect in a NICU. When changing the care approach in a NICU from the standard medical model of care to a more 'preemie-friendly' model of care, where the care paradigm shifts

to a family-centred and infant-focused approach, all facets of caregiving need to be re-evaluated and re-organised. Changes need to be made to routine care practices by all multidisciplinary members of the team, including ways of thinking about the patient and the work environment, development of policies and procedures, acquiring of medical equipment and interpersonal interactions between staff and families. This change cannot be accomplished without problem analysis, planning, education, implementation, evaluation and team work. This process of change takes time and quick results should not be expected.<sup>15</sup>

Based on the researcher's personal observation during a previous study, many factors influence implementation of DC. Problems experienced include resistance to change, a non-caring attitude, unfavourable working conditions, financial restraints, negative attitudes of some multidisciplinary team members, low levels of knowledge about DC and a lack of training on the topic.<sup>10</sup> These barriers are confirmed by Carrier, who includes staff resistance, frequent rotation of staff, high staff turnover, raised patient acuity, staff shortages, anxiety associated with change and a lack of knowledge and inconsistency of caregivers.<sup>16</sup> For such barriers to be successfully overcome good communication, wide-ranging managerial support, staff empowerment through increased autonomy and flexibility, and a "bottom-up approach" positively influence ownership among staff.<sup>17</sup>

**Research methodology**

The research methodology was based on the Intervention Design and Development research model where a five-phase implementation process guided the study course.<sup>18</sup> *Problem analysis and project planning* (phase one) involved analysing and describing the level of DC practised at the research site before implementation, and planning for implementation at the site. Phase two included *gathering and synthesis of information* and resulted in the identification of factors involved in DC implementation from national and international examples, which provided a contextual framework for the intervention plan. Phase three *designed* an intervention plan for developmental care implementation, involving guidelines for this implementation. Phase four involved *implementation* of the intervention in a South African NICU, with participation of the multidisciplinary team. The plan was refined and developed further in Phase five, through *evaluation* of DC principles in the NICU. The guidelines were validated by a focus group interview consisting of neonatal experts and the implementation plan was re-evaluated.

**Implementation guidelines**

Implementation guidelines were established as part of the intervention plan. The intervention plan, based on implementation guidelines for DC, was used to implement DC at the chosen site. These guidelines, derived from the literature and natural examples, are summarised in Table I and discussed below.

**Table I:** Guidelines for the implementation of developmental care

Guidelines	
1.	Planning and preparation should take place before the intervention phase
2.	A programme co-ordinator should drive the implementation process
3.	Management support and involvement are essential
4.	Resources needed to facilitate the intervention plan should be available
5.	A developmental care committee should be established
6.	Practice guidelines for the principles of developmental care should be available
7.	Education and empowerment of staff are critical for success
8.	Good communication pathways are vital for positive implementation
9.	Policies and procedures should be altered to include DC
10.	Monitoring and evaluation of the intervention plan are essential
11.	Re-enforcing tactics are important for sustainable practice

**Guideline one: Planning and preparation should take place before the intervention phase**

Planning and preparation is one of the most important steps for implementation success. By creating awareness regarding the implementation of DC, the team develops a sense of involvement and is more inclined to take ownership of the process. Awareness can be created by scheduling information sessions about DC and identifying the needs and concerns of the staff regarding implementation.<sup>19</sup> Enthusiastic key informants are essential to identify as these role players will inspire and encourage other members of staff to participate in the implementation. Awareness of the implementation should not be isolated to the NICU, but spread throughout the hospital. A formal launch can be organised to commence the project and tasks for the event can be delegated to key informants and staff members. An

information pamphlet on DC or an information board can help to create awareness about the approach.

**Guideline two: A programme co-ordinator should drive the implementation process**

The need for a developmental specialist and/or programme coordinator was highlighted in the literature. Als and Gilkerson recommend a developmental specialist and/or DC nurse educator in the unit to provide the knowledge and training needed for DC.<sup>20</sup> Ballweg and Lee describe the developmental specialist's responsibilities in clinical practice as including advanced assessment, interpretation and implementation of individualised developmental patient plans which integrate the infant's physiological needs and the family's psychosocial needs. He or she also coordinates staff in performing the actual hands-on activities of DC. The DC nurse educator is responsible for the clinical implementation of DC practices.<sup>21</sup>

The responsibilities of a programme coordinator include demonstration of good interpersonal skills, in-service training, mentoring, practical support and clinical accompaniment, leading the DC committee, observing and evaluating progress, consulting in difficult patient care problems, interdisciplinary communication and conflict management, and family support. Ideally, these developmental roles are dedicated positions and the developmental specialist and DC nurse educator are not part of the NICU workforce.

**Guideline three: Management support and involvement are essential**

Implementation of DC in different countries has been successful to various extents, but problems are still experienced. Without effective participation and leadership from management, the quality of DC provided relies on individual caregivers' philosophy and emotional status when allocated to infants. This results in inconsistent care and high levels of frustration for health care professionals and families. Management support must consist of active involvement and participation.

Robison discusses the need for broad-based leadership to improve implementation success, reduce conflict and enhance optimal outcomes. Leadership should therefore include multidisciplinary team members who have the necessary influence, authority and power. Authoritative support is needed to ensure that participants are held accountable for their actions. DC should be incorporated into the participants' performance appraisals, and staff allocations organised to ensure consistency of caregivers to particular patients over consecutive shifts.<sup>22</sup>

**Guideline four: Resources needed to facilitate the intervention plan should be available**

Resources for the project such as 'baby nests' and 'prem nappies' can either be accumulated through fundraising efforts and donations or by using available linen, hospital resources, and parent's resources. A storage area and control system could be necessary to ensure that resources don't go missing.

**Guideline five: A developmental care committee should be established**

Role players from the multidisciplinary team with attributes of influence, authority and power should be identified as members of the DC committee.<sup>22</sup> This committee should be chaired by the programme co-ordinator and meetings should be held on a regular basis (weekly or bimonthly) to identify and address

implementation problems. *Influential leaders* are registered nurses with an additional qualification in neonatal nursing and have knowledge and insight into DC. *Authoritative leaders* like the unit manager can ensure that professional competencies are maintained according to the standards of practice, and ensure that staff members are accountable for their actions. *Leaders with power*, for example the neonatologist, are able to make medical decisions about infants' care.

**Guideline six: Practice guidelines for the principles of developmental care should be available**

The following four standards of care are recommended as a solid foundation for success<sup>22</sup>:

- Care-giving should be flexible and infant-driven where the participant responds to communication from the infant by altering care practices as to prevent compromise of the preterm or sick infant.
- The multidisciplinary team should co-ordinate its care to provide the infant with synchronised care practices.
- An environment that is developmentally appropriate should be provided to the preterm and sick infants within the NICU.
- Parents should be involved with their infants from delivery to promote parent-infant attachment and bonding.

Based on the above four standards and relevant literature, practical guidelines should be available for each DC principle. The DC committee should obtain or compile these guidelines for practice with input from members of the multidisciplinary team. Once approved, the guidelines should be signed by a member of the DC committee, the nursing services manager, the unit manager and the neonatologist.

**Guideline seven: Education and empowerment of staff are critical for success**

Training on DC principles should take place for all staff members across all shifts. Training can either be formal or informal depending on the resources available. Emphasis should be placed on the practical implementation of developmental care during training and time should be allocated to practice sessions and questions. On-the-spot training can be done and an orientation programme could be helpful for all newcomers to the unit. Training should be delivered on the appropriate level according to the level of patient interaction; for example, non-medical support staff (porter services/cleaning services) can be trained about environmental manipulation only, whereas the nursing staff needs to be trained on all principles. Parental empowerment should be emphasised during the training sessions, and parents can be included in training and routine patient care. The registered nurse in charge of each particular shift should be responsible for supervising DC practices.

**Guideline eight: Good communication pathways are vital for positive implementation**

Good communication between professional disciplines and in the unit is vital for a positive implementation experience. Various methods of communication could be used, including the following: DC information wall, notice board, newsletters, short message service (SMS) via cellular telephone, in-service posters, and clear signage. Positive interpersonal relationships between the persons responsible for supervision of DC practices and the persons responsible for the implementation thereof are crucial.

**Guideline nine: Policies and procedures should be altered to include DC**

Policies and procedures need to be changed to adopt the new care approach. It may be necessary to change the existing mission, vision and philosophy for the unit as well. It further requires revision of all common procedures regarding basic and advanced care in the unit.

**Guideline ten: Monitoring and evaluation of the intervention plan are essential**

The DC committee should monitor progress continuously and give feedback to staff members. All meeting minutes with questions and problems addressed should be

**Table II:** Examples of resources

Linen and blankets for positioning	Poster and signage material
Individual lighting	Towels for swaddled bathing
Microwave sterilising unit	Premature-sized diapers
Pacifiers	Individual containers for pacifiers
Washing machine	Tumble drier

**Table III:** Example of positioning checklist

Positioning checklist		YES	NO	Not applicable
1	Head in a neutral position to facilitate an open airway			
2	Shoulders rounded with a curved back			
3	Elbows flexed			
4	Hands positioned near mouth			
5	Hips and knees flexed			
6	Knees kept together			
7	Ankles kept together			
8	Feet flexed and supported by a boundary			
9	Boundaries in a circle around the whole infant including the head			
10	Boundaries touch the baby to provide support but are not restrictive or limit movement			
11	Gel pillow or substitute used to relieve pressure of the infant's head (if applicable)			
12	Positioning aids, linen, prone rolls and other substitutes used for positioning			
13	Infant observed before, during and after positioning changes for stress cues with evidence of documentation			
14	All interventions and observations recorded			
15	Guidelines adjusted to patient's individual needs regarding their current medical condition			

documented. All meeting agendas and minutes should be made available in the unit to all involved with the implementation. Different methods can be used to evaluate progress to determine the level of implementation achieved for example: staff questionnaire to assess their opinion of the progress of the intervention, and checklists based on the guidelines for practice. The checklists on the principles of DC can be used to observe the progress of implementation, either by direct observation of care, for example assessing appropriate handling and touch, or indirect observation of care, for example, infant positioning.

**Guideline eleven: Re-enforcing tactics are important for sustainable practice**

Incentives in the form of small gifts can be awarded to members of staff identified as having done a job well. This gives them the feeling of being rewarded for their efforts. Competitions can also be arranged for example, the infant with the best position is identified and his nurse is awarded a prize. Certificates for commitment and participation could be awarded and verbal encouragement should be given to participants in recognition of good work done. Recognition from external visitors and management boosts staff members to go the extra mile for DC implementation. DC should become part of the daily conversations and culture.

**Conclusion**

This intervention study targeted the multidisciplinary team where medical, nursing, allied health profession and non-medical support personnel implemented DC. Evidence of change was seen with the achievement of set goals that included improving the quality of care at the research setting, improvement in the multidisciplinary team's working environment, increased staff members' knowledge and skills, improvement in their morale and attitudes, and the level of job satisfaction increased.

By applying these implementation guidelines, DC can be implemented to improve the management and outcomes of the preterm and sick infant population in order to minimise the negative short and long term outcomes by improving the quality of medical care rendered to the infants as well as reducing stress levels, thereby protecting the delicate neurological system of the preterm and sick infants. Developmental care is crucial for surviving preterm and sick neonates and can be effectively implemented

in neonatal care within the South African context. The effects of this project are of ongoing benefit to the staff and patients at the research site, and should contribute greatly to the effectiveness of neonatal intensive care throughout South Africa.

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