Safer Care Victoria

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Developmental and family-centred care of infants

Clinical guidance

OFFICIAL

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Key messages

- Environmental factors within the neonatal nursery environment can be stressful for the developing infant.
- Preterm infants are born prior to or during critical periods of brain development and are at risk of developmental delay.
- Term and near-term infants are also at risk of adverse developmental outcomes.
- Infant and family centred developmental care seeks to promote healthy brain development by providing individualised, neurodevelopmentally supportive care.

Acknowledgement

This guidance uses the terms ‘woman’ and ‘mother,’ which are intended to be inclusive of anyone who may use other self-identifying terms and aims to encompass all for whom this guidance is relevant.

Consumer Engagement Statement

All interactions between health care staff with consumers (women, mothers, patients, carers and families) should be undertaken with respect, dignity, empathy, honesty and compassion.

Health care staff should actively seek and support consumer participation and collaboration to empower them as equal partners in their care.

Background

While advances in perinatal care have resulted in increased survival rates in term and preterm infants, long-term effects of neonatal care persist.[1]

In addition to cerebral palsy, hearing loss, visual impairments and developmental delay, long-term follow-up studies have identified other important neurosensory impairments that may not become evident until preschool or school age such as cognitive, motor and behavioural problems.

Preterm infants are born prior to or during critical periods of brain development. The third trimester of fetal development is a period of rapid brain growth and environmental influences such as noise, light or handling may impact the developing brain.[2,3]

Infant and family-centred developmental care (IFCDC) is a framework of care founded on the theories and concepts of neurodevelopment, neuro-behaviour, parent-infant interaction, parental involvement, breastfeeding promotion (if the mother is willing and able), and environmental adaptation. It has three core principles: sensitive care is good for the brain; parent engagement is good for development; individualised care gives the infant a voice and a better outcome.[4,5]

Scope

All caregivers including family, nursing/midwifery, medical and allied health staff.

Goals of developmental care

The goals of developmental care are to:

- reduce infant stress responses
- conserve energy to optimise recovery and growth
- promote growth and well-being
- protect sleep
- support emerging behaviours at each stage of neurodevelopmental maturation
- support caregivers to recognise behavioural cues
- encourage and support parents in the primary caregiver role
- support the family's emotional and social wellbeing.[6]

Definition of commonly used terms

Developmental care

The process of developmental care involves creating an environment for the infant that minimises stress while providing a developmentally appropriate experience for the infant and their family.

Developmental care refers to interventions that:

- support the behavioural organisation of the individual infant
- enhance physiological stability
- protect sleep
- promote growth and development
- are individualised to each infant.[5]

Developmental care interventions include:

- optimal handling and positioning measures

- reduction of noxious environmental stimuli
- cue-based care and feeding.

The education and involvement of parents or carers is crucial to the infant's social, emotional and physical wellbeing. The healthcare team should work with the infant's family to educate them and encourage their involvement in the care of the infant.***Error! Reference source not found.***

Behavioural organisation

This refers to the ability of the infant to maintain a balance between the five subsystems:

- autonomic/physiological
- motor
- organisational state (e.g. sleep/wake cycles)
- attention/interaction
- self-regulation.

Examples would include the infant's physiological status (breathing rate, heart rate, etc.), muscle tone, posture, facial expressions, colour, visceral responses and visual attention.

How these behaviours are affected by external stimuli, either positive or negative, gives caregivers information about the infant's ability to cope and organise their responses.[8]

Cue-based care

The provision of individualised caregiving in response to the infant's behavioural cues, including the modification of sensory stimulation.[5]

Implementation of developmental care

Caregiving includes:

- Observing and responding to the infant's behavioural and physiological cues
- Regular review and modification of caregiving based on:
  - the infant's condition (i.e. clinical stability)
  - the infant's level of maturity and gestational age
- modifying the nursery environment - including the acoustic environment, light levels, general layout and furnishings.[9]

Nursery practices

Parental involvement

There are many benefits for early parent-infant closeness during hospitalisation. Physical and emotional closeness between the infant and their parent/s in the nursery environment are considered crucial to the physical, emotional and social wellbeing of both the infant and the parent/s. Minimising infant and parent separation has been demonstrated to have positive effects on infant brain development, parent psychological wellbeing and on the parent-infant relationship.

By encouraging parents to be actively involved in their infant's care, parents learn their infant's behaviour and can practice cue-based, infant-led care, which is responsive to the individual needs of their child.

This parental involvement also promotes parental confidence in decision making and inclusion in care planning, promoting the parental role within the neonatal nursery.[5]

Positioning

Positioning in the neonatal nursery environment is a key component of neonatal care. Infants should be provided with developmentally appropriate and supportive positioning to optimise musculoskeletal development and behavioural organisation. Whilst the following are the primary goals, modifications may need to be made due to the presence of medical devices i.e. IV cannula; or medical interventions required.

The primary goals of positioning include:

- Ensuring the infant is comfortable and positioning is responsive to the infant's needs
- Using a variety of symmetrical postures (supine/prone/side lying)
- Encouraging a flexed or tucked body with arms and legs also gently flexed towards the body
- The ability to let the hands reach the face and/or mouth to self-soothe
- Neutral alignment of head and neck whenever possible
- Regular position changes aligned with handling and sleep/wake cycles
- The use of swaddling or nesting to provide boundaries whilst ensuring a safe sleeping environment
- The use of head water/gel pillows for infants less than 34 weeks[Error! Reference source not found.] (with respiratory monitoring).

As infants approach term, they may be no longer require cardio-respiratory monitoring and are preparing for discharge to home; the Red Nose safe sleeping guidelines must be implemented and parental education provided re: safe sleeping guidelines.[10]

Infant-led, individualised, and sensitive caregiving is considered an essential component of IFCDC. Care should be delivered in collaboration with the family and be responsive to the individual needs of the infant. Both staff and the family should respond to infant behaviour using states of alertness and infant cues to guide care practices. Infants have 6 states of alertness from deep sleep through to crying. Their behaviour is structured and intentional.

The following table describes infant cues and behaviours in an organised 'Traffic Light System', in which green cues and behaviour reflect an infant which is calm and regulated through to an infant whose behaviour could be described as stressed or dysregulated, i.e. red cues.[6,11]

The Newborn Traffic Light Tool is a 2-sided poster serving as a clinical advocacy tool for caregivers - both parents and clinical staff - to use as prioritised mindful guidance during painful and stressful interventions. **An education module** for health professionals via the Royal Children's Hospital Education hub is available that will introduce you to the *Newborn Traffic Light Tool* so that it may be used consistently and effectively across organisations.[11]

Infant communication – traffic light cues

	'RED' STRESSED/ DYSREGUALTED	'YELLOW' EARLY STRESS SIGNS	'GREEN' REGULATED
Autonomic	• Pale, red, mottled • Dusky or cyanotic • Apnoea • Tachypnoea + tachycardia • Sighs + yawns • Grunting • Straining • Gagging +/- possets or vomit • Bowel action • A/b/ds	• Pauses in breathing pre/post stimulus • Tachypnoea • Tachycardia • Twitching or startle • Hiccups • Passing flatus • Sneezing	• Natural colour for baby • Regular respiratory rate + pattern • Normal heart rate • Minimal digestive disturbances
Motor	• Jerky • Flailing • Hypotonic • Hypertonic • Back arching • Unable to grasp	• Full body squirm • Increased sucking response • Extension of limbs • Finger splay • Decreased grasp • Head lag • Unable to keep head midline • Increasing/decreasing tone + movement	• Smooth movements • Normal, flexed tone • Can bring/ maintain hand to face or mouth • Hand +/or foot clasping • Soft cheeks • Strong rooting + sucking • Strong grasp
Organisation	• Rapid state changes • States may be difficult to identify • Ongoing gaze aversion • Closed eyes • Difficult to soothe	• Cries intensify despite supportive intervention • Averts gaze to 'take a break' • Unable to focus eyes • Fussing • Unable to maintain self-settling techniques (hand to mouth, grasp)	• Alert • Active • Easily soothed • Bright eyes • Smooth transition from state to state

	‘RED’ STRESSED/ DYSREGUALTED	‘YELLOW’ EARLY STRESS SIGNS	‘GREEN’ REGULATED
RESPONSIVITY	• Low level alertness • Hyperalert • Staring • Withdrawn, appears asleep	• Able to maintain short interactive periods • Cries decrease briefly in response to caregiver settling attempts	• Remains engaged • Cries in response to pain/stress but calms with support

Providing Cluster Cares

Clustering or grouping cares encourages minimum handling and protects deep sleep by minimising the number of times an infant is woken or disturbed.

As always caregiving should be infant-led and the caregiver should be guided by what each individual infant is able to cope with each time.

Care practices may include:

- Protect infant sleep by performing cares based on the infant’s sleep/wake cycle
- Perform cares 6–8-hourly if able
- Group non-urgent tasks together but provide breaks/or defer procedures if the infant shows signs of stress
- Gather all equipment for the procedure/interaction before disturbing the infant
- Continuously monitor for behavioural signs of stress[12] (i.e. Is the infant crying or agitated, desaturating, bradycardic or apnoeic).

Sleep protection

As sleep is the main organisational state of the preterm baby, sleep protection is very important for optimal brain development. Sleep deprivation can have long term effects on growth and development. Understanding the infant's unique sleep/wake cycle and by providing cued-based and clustered cares, this will enable longer periods of uninterrupted sleep.

Protect quiet (deep) sleep – delay handling where possible if infant is asleep.[5]

Stressful or painful procedures

Infants experience many painful procedures during their hospital admission. It is imperative that pain and stress are avoided or managed appropriately.

Strategies to reduce pain and stress:

- Include parents in the care of their infant
- Minimise painful procedures where possible
- Regular pain assessment using an appropriate pain assessment scale

- Use of non-pharmacological pain management strategies: breast feeding, breast milk, as well as positioning, swaddling, non-nutritive sucking and scent
- Use of pharmacological pain management as appropriate. Most commonly this would involve the use of buccal sucrose.[Error! Reference source not found.]

Feeding support

Nutritional support is key to neurodevelopment. Provide support for breastfeeding or alternatives as required with the emphasis on individualised family-centred care.

Follow the infant's cues and pace feeds according to the infant's capacity to co-ordinate sucking, swallowing and breathing.

Non-nutritive sucking on a dummy should be encouraged as infants transition to suck feeds. Offer the infant an opportunity to suck on their dummy, or on an empty breast as they tube feed, if they are showing signs of oral readiness.[6]

Staffing practices

Provide continuity of caregivers whenever possible. Develop caregiver groups for longer stay infants.

Touch

- Infants use their own touch and the touch of others to soothe and comfort themselves.
- The deliberate use of appropriate touch, that is responsive to the infant's cues, level of maturity and gestational age, can provide infants with a positive touch experience which can help promote self-regulation and neurological stability.

Handling techniques include the following:

- Handle infants in ways that minimise stress and uncontrolled responses, such as:
  - Involve the parents in the care of their infant
  - Use voice in preparation for touch, this preparatory touch method lets the infant know they are soon to be handled
  - Contain the infant using hands or a light swaddle to keep them in a flexed and contained position.
  - Move infants slowly and keep them in contact with a supporting surface whenever possible.
  - Introduce touch slowly and allow time for the infant to respond and adjust to a change in position.
  - Care should be individualised and at the infant's pace.[12]

Skin-to-skin care

Skin-to-skin (kangaroo) care is one of the most well-researched and frequently applied components of developmental care. Skin-to-skin care is a method of holding an infant that involves skin to skin contact with a parent.

The benefits of skin-to-skin care for the infant include:

- Promotes physiological stability

- Improves thermal regulation
- Decreases pain and stress
- Promotes attachment and connection
- Improves digestion and reduces feed intolerance
- Increased weight gain
- Encourages initiation and continuation of breast feeding
- Improves sleep
- Decreases infection rates
- Shortens hospital stay.
- The benefits of skin-to-skin care for parents:
- Promotes connection and bonding
- Decreases stress
- Helps to establish the parental role
- Establishes breast feeding
- Enhances breast milk supply.[1]

The Nursery Sensory Environment

Sound levels

Always maintain a quiet environment in the nursery. Sound levels for the nursery environment (Australian and New Zealand guidelines) should not exceed 45–50 decibels (dBs).[14]

Noise reduction strategies

- Avoid tapping or writing on incubators. Close incubator doors and portholes carefully.
- Use incubator covers where appropriate.
- Encourage staff and visitors to talk quietly (using a ‘library voice’) and avoid talking over the infant’s cot.
- Move medical and nursing ward rounds away from the bedside or be mindful of speaking quietly.
- Avoid banging bin lids.
- Set monitor alarm limits and tones at appropriate levels and try to silence alarms as soon as possible.
- Purchase equipment with a low noise criterion.
- Monitor noise levels periodically to identify areas for strategic improvement. [7]

Light levels

Current literature supports the use of low intensity cycled lighting as it closely mimics the intrauterine environment. Light should be adjusted accordingly to the needs of the infant in addition to the needs of the staff to safely and adequately care for the infant. Excessive light significantly contributes to sleep deprivation and altered sleep patterns.

It is suggested that ambient lighting levels in NICUs be adjustable through a range of intensities and that infants be exposed to diurnal variation in ambient lighting and daylight.

This helps to establish their day/night sleep schedule and supports diurnal variations in hormones and temperature levels. Lighting should be adjustable – the adjustment level range of 100–600 lux is recommended.[Error! Reference source not found.5]

Light reduction tips

- Utilise appropriate individualised lighting when required.
- Use adjustable light levels within each nursery area and use procedure lights for observation and procedures.
- Monitor ambient light levels.
- Shield infants from bright light with cot covers, eye covers and dimmed lights.
- Reduce light levels generally in the nursery, maintaining a safe level for accurate clinical observation as necessary.
- Make use of available natural lighting.[16]

More information

Further resources

Newborn Behavioural Observations Training (NBO) https://www.thewomens.org.au/health-professionals/clinical-education-training/nbo-australia

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