Management of Pain and Developmental Supportive Care in Neonatal Intensive Care Unit

Developmental care refers to set of actions like reduction in noise and light, minimal handling, effective pain prevention and treatment aimed at reducing the stresses in the NICU and optimizing neurobehavioral outcome. Developmental care interventions are potentially beneficial to sick neonates especially those born prematurely to cope with the adverse external environment in NICU. Structured developmental supportive programs like Newborn Individualized Development Care and Assessment Program (NIDCAP) combines various measures to provide individualized care based on the each babies need.

**Developmentally supportive care: what is evidence?**

A Cochrane meta-analysis (2006) included 36 RCTs and examined the effects of developmental care interventions like positioning, clustering of nursery care activities, modification of external stimuli and individualized developmental care interventions (e.g. NIDCAP). There were:

- Modest beneficial effects in the form of decreased moderate-severe chronic lung disease, decreased incidence of necrotizing enterocolitis and improved family outcomes
- Limited long-term positive effect on behavior and motor outcome at 5 years corrected age

For operationalizing of evidence based developmental care program, the following core measures are proposed:

1. Protected Sleep
2. Pain and stress assessment and management
3. Developmentally supportive activities of daily living
4. Family centered care
5. Creating a healing environment

These patients centered five point core measures needs to be integrated into the routine clinical practice and its performance needs systematic audit, so as to reap best results (Table 1).

**TABLE 1** Evidence based core developmental care strategies in NICU

<table>
<thead>
<tr>
<th>Core Measure</th>
<th>Practice parameters</th>
</tr>
</thead>
</table>
| Protect sleep      | • All non-emergent care giving is provided while infant is awake (No disturbance while baby is sleeping)  
|                    | • Promote sleep by facilitative tuck, swaddling and skin-to-skin care  
|                    | • Light and sound levels are minimized. Day-night pattern is simulated by reducing lights in night to facilitate nocturnal sleep  
|                    | • Family education on care giving activities that promote safe sleep  |
| Prevent and treat pain | • Assess if baby suffers from pain once during each nursing shift and during all procedures using a validated score (refer to pain section)  
|                     | • Provide non-pharmacologic and/or pharmacologic measures to reduce pain for all stressful and/or painful procedures |
| **Provide developmentally supportive care** | • Use boundaries around the infants to maintain them in flexed posture (similar to intra-uterine posture) (Figure 1)  
• Provide non-nutritive sucking while the infant is being fed by gavage or paladai by allowing the baby on suck on mother’s finger or breast  
• Provide lactation counseling and support to initiate and maintain lactation in the mother  
• Protect the integrity of skin during application, and removal of adhesive products (minimize use eg do not strap to achieve hemostasis after sampling instead just put a cotton swab and hold it for some time. Adhesive should be removed only after 72 hr of application once it has loosened from skin surface. Wet the plaster before removal) |

| **Provide family centered care** (Do not consider infant as a solo entity) | • Disease has serious impact on social fabric of the family. Consider individuals beyond infant, and issues beyond disease such as those related to financial condition and relationship within family. Consider cost-benefit ratio of treatment/investigation modality that you plan to employ.  
• Allow the parents to visit the infant in NICU and to have conversation with the treating team. Involve parents in decision making regarding treatment of the infant. Family observations and input regarding their infant are sought by the clinical care providers  
• Family is supported in parenting activities such as skin-to-skin care, holding the baby, feeding, dressing, diapering, singing and all infant care interactions  
• Babies in NICU should be divided to available nurses on the shift so that all care giving activities of a baby should be carried out by the allotted nurse of that baby. The practice of ‘task-specific’ allotment of nurses (such as one nurse responsible for feeding, another for injections to all babies) must be avoided.  
• Practice ‘primary nursing’. That means one nurse becomes ‘primary nurse’ of a baby and that baby always get allotted to the primary nurse in whatever shift duty she comes. Her name should be recorded on bedside identification tag and is communicated to the family. ‘Primary nurse’ of the baby is responsible for keeping a close liaison with family and physicians for holistic care of the baby. |

| **Healing environment** | • Minimize sound and lights. Do not place anything on incubators. Close the incubator doors gently. Cover incubators with a cloth sheet to minimize light. Do not use procedure light unnecessarily  
• Make sure health professionals follow caring behaviors such as adherence to hand hygiene protocols, cultural sensitivity, open listening skills and a empathic relationship with families  
• Do not perform investigation for a routine. Consider utility of an investigation before you do it. If it is unlikely to change your management, it is unnecessary and potentially harmful by causing pain and increasing the infection risk.  
• Promote free and healthy communication between physicians, nurses and other professionals working in NICU. A cohesive team is more likely to avoid errors and provide healing touch. |

*modified as per feasibility in developing country settings*
Figure 1 Boundaries to promote in-utero posture of the infant

Note that boundary is tall enough to contain the baby and the cloth sheet should be tied at ends so as to maintain the round shape of it. Warmer bassinet has been covered using a thin plastic sheet to minimize insensible water losses.
Pain Assessment and Management

Preterm infants have well developed pain perception mechanisms, but do not have those required for pain modulation as in term infants or an adult. Repeated stimuli in later result in progressive attenuation of pain while it result in increasing severity of pain in the former. Therefore preterm infants not only perceive pain but do it at much more intensity as well as for much longer time.

Pain has lasting bad effects on infant’s brain development which manifests later as abnormal pain perception, behavioral abnormalities, cognitive defects and learning disabilities. Hence routine assessment and management of pain, forms an important part of the developmental supportive care.

Pain Assessment

Assessment of pain, an integral part of any pain prevention program is challenging in neonates. Use Premature Infant Pain Profile (PIPP; Table 2) for assessment of acute pain.

<table>
<thead>
<tr>
<th>TABLE 2 Premature Infant Pain Profile (PIPP)</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>SN</td>
<td>Parameters</td>
</tr>
<tr>
<td>1.</td>
<td>What is gestation of infant?</td>
</tr>
<tr>
<td>2.</td>
<td>Score behavioral state before the procedure (15 sec)</td>
</tr>
<tr>
<td>3.</td>
<td>Record baseline HR and find out maximum HR during the procedure</td>
</tr>
<tr>
<td>4.</td>
<td>Record baseline SO(_2)% and find out minimum SO(_2)% during the procedure</td>
</tr>
<tr>
<td>5.</td>
<td>Observe the infant for 30 sec immediately after the procedure (for brow bulge, eye squeeze and nasolabial furrow)</td>
</tr>
</tbody>
</table>

Health professionals should record PIPP score of all babies once/nursing shift and before the procedures. The issue as pain should be discussed on the rounds. The minimum score is 0 and maximum score is 21. Higher is the score greater the pain. Score < 5: no pain; 6-10: moderate pain; and >10: severe pain

Preventing or reducing pain

General measures

Pain is managed most effectively by preventing, limiting or avoiding noxious stimuli. The following measures in combination are followed to minimize pain:

- Avoid bright light, loud noise
- Limit the number of painful procedures and handling
- Bundling of investigations and nursing interventions
- Swaddling, facilitated tucking, distraction measures like talking, music etc
- Tactile stimulation like stroking, caressing, massaging

**Non-pharmacological measures**

The environmental and behavioral interventions that do not use pharmacological agents are collectively called non-pharmacological measures. These include:

1. Sucrose/glucose solution induced analgesia
2. Breast feeding/breast milk supplementation
3. Skin to skin care
4. Non-nutritive sucking using pacifiers

The non-pharmacological measures are thought to alleviate pain by activating gate control mechanism, secretion of endogenous endorphins, diversion of attention and by pre-empting hypersensitivity.⁴

**Sucrose analgesia**

Sucrose administration is particularly useful for short procedures like venipuncture, heel prick etc. Oral administration of concentrated sucrose solution (24% to 50%) acts by release of endogenous opioids like beta-endorphin. Analgesic effect lasts for 5-8 min and should be combined with other non-pharmacological measures for maximum benefit. Alternative to sucrose is dextrose, which is less widely used.

**TABLE 3 Dose of sucrose/dextrose for analgesia**

<table>
<thead>
<tr>
<th>Concentration</th>
<th>For babies who are NPO</th>
<th>Preterm (&lt;32 weeks)</th>
<th>Late PT/ Term</th>
</tr>
</thead>
<tbody>
<tr>
<td>24% Sucrose / 25% Dextrose</td>
<td>0·1-0·2 mL</td>
<td>0·1-0·5 mL</td>
<td>0·2-1 mL</td>
</tr>
</tbody>
</table>

*The sucrose solution is given orally by a syringe 2-3 min before procedure and may be repeated 1-2 min after the procedure. Intragastric administration has no analgesic effect.*

**Breast feeding and breast milk supplementation**

Almost as effective as sucrose analgesia in reducing pain in newborns undergoing single painful procedure.
TABLE 4 Evidence supporting non-pharmacological analgesic measures in neonates

<table>
<thead>
<tr>
<th>Agent</th>
<th>Evidence</th>
<th>Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sucrose (24%)</td>
<td>Cochrane meta-analysis 5</td>
<td>• Reduction in pain scores (PIPP)</td>
</tr>
<tr>
<td></td>
<td>44 studies, 3496 infants</td>
<td>• Decreases physiological indicators of pain (heart rate increase)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Less behavioral indicators of pain (duration of cry, facial action)</td>
</tr>
<tr>
<td>Breast milk and breastfeeding</td>
<td>Cochrane meta-analysis 6</td>
<td>• Less duration of cry, lesser increase in heart rate</td>
</tr>
<tr>
<td></td>
<td>11 studies</td>
<td>• Lesser PIPP score</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Lesser increase in neonatal facial coding score</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Breast feeding was better than breast milk supplementation</td>
</tr>
<tr>
<td>Non-nutritive sucking</td>
<td>Systematic review 4</td>
<td>• Favorable effect on heart rate, respiration and oxygen saturation, on the reduction of motor activity, and on the excitation states after invasive measures</td>
</tr>
<tr>
<td>Skin to skin care</td>
<td>13 RCT</td>
<td>• Non-nutritive sucking”, “swaddling” and “facilitated tucking’ are particularly useful</td>
</tr>
<tr>
<td>Swaddling</td>
<td>2 Meta-analysis</td>
<td>• Combination of measures always provide better analgesia</td>
</tr>
<tr>
<td>Facilitated tucking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Music</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Pharmacological measures

The pharmacological measures can be broadly divided into
- Local anesthetic agents
- Systemic agents: opioids, acetaminophen

*Non steroidal anti-inflammatory agents (NSAID) are generally not used in newborns as analgesics.*

Local anesthetics

Local anesthesia is particularly useful for management of acute procedure related pain with the exception of heel lances. It can be either topically applied on intact skin or injected subcutaneously.

The common topical preparations marketed are:

1. Eutectic mixture of local anesthetics (EMLA): is a mixture of two local anesthetics namely lidocaine and prilocane that comes as 5% cream.
2. Tetracaine (4%)
3. Liposomal lidocaine 4% cream.

The dose of EMLA is 1-2 g with contact period of 30 min to 1 hour. Apply the cream over 2-3 cm² area with 1-2 mm thickness and cover with transparent (tegaderm) dressing. For maximal analgesic effect, the topical anesthetics should be combined with other non-pharmacological measures like sucrose analgesia or breast milk supplementation.

The major drawback is the delayed onset of action and a contact period of at least 1 hour prior to the procedure, which makes it unsuitable for emergent procedures. The risk of methemoglobinemia associated with repeated use of EMLA cream, is not seen with newer preparations like tetracaine gel.
For emergent procedures, subcutaneous local anesthetic injection (lidocaine hydrochloride 2%) is the preferred over the topical creams.

**Opioids**
The opioid drugs are the mainstay in the management of severe pain related to mechanical ventilation, endotracheal intubation and post surgical pain in neonates.

The two most commonly used agents are morphine and fentanyl.

**Morphine**
Morphine has slower onset of action with mean onset at 5 min with peak effect at 15 min. It is metabolized in the liver to morphine-3-glucuronide, an opioid antagonist and morphine-6-glucuronide a potent analgesic. Newborn babies especially preterm infants mainly produce morphine-3-glucuronide leading to emergence of tolerance after 2-3 days of therapy.

The observed side effects include hypotension, need for prolonged ventilations, delay in reaching full feeds, and rarely bronchospasm secondary to histamine release.

**Fentanyl**
Fentanyl is a synthetic opioid analgesic. It is 50 to 100 times more potent and more rapid in onset of action compared to morphine. Fentanyl is preferred over morphine in infants with hypotension as cardiovascular side effects are lesser. The unique side effect of fentanyl is chest wall rigidity especially if given as rapid intravenous bolus.

The other opioids used are methadone, sufentanil, remifentanil etc, which are used for short procedures like endotracheal intubation and short neonatal surgeries.

**Analgesia for specific procedures**

**Elective and semi-elective intubation**
Intubation of neonates in awake state is associated with increase in heart rate, greater fall in oxygen saturations / heart rate, increased intracranial pressure, increased risk of IVH, airway trauma and failure of procedure especially, in in-experienced hand.

The AAP committee on fetus and newborn recommends avoiding awake intubation of newborn babies except in emergent situations like delivery room intubation and in cases where intravenous access is unavailable.

The AAP recommends:
- Analgesic agents or anesthetic dose of a hypnotic drug should be given
- Vagolytic agents and rapid-onset muscle relaxants should be considered
- Use of sedatives alone such as benzodiazepines without analgesic agents should be avoided
- A muscle relaxant without an analgesic agent should not be used.
TABLE 5: Sedation for elective intubation

The preferred regimen includes:

1. Inj. Fentanyl 1-4 mcg/kg, given slow IV over 3-5 min
2. Inj. Atropine 0.02 mg/kg (minimum dose should of 0.1 mg)
3. Inj. Vecuronium 0.1 mg/kg administered IV, 2-3 minutes prior to the procedure

*Avoid using paralytic agents in case experienced person is unavailable for intubations.*

Mechanical ventilation

Mechanical ventilation is a painful and uncomfortable experience which might, adversely affect the course of acute illness as well as long term neurodevelopment\(^1\). However there is insufficient evidence for routine use of pharmacological measures in all ventilated infants.

**Indications for continuous infusion of opioids in ventilated neonates are:**

- Post operative patients especially in the first 48-72 hours
- Illnesses like meconium aspiration syndrome or congenital diaphragmatic hernia with PPHN
- Asynchrony or fighting with ventilator. Rule out causes like ventilator malfunction, tube block or inappropriate settings before infant is sedation for this indication.

*Avoid use of midazolam especially in preterm babies. Do not use paralytic agents routinely in ventilated babies.*

**Analgesia/sedation in ventilated neonates: what is evidence?**

A Cochrane meta-analysis (2005) including 13 studies and 1505 infants concluded that there is insufficient evidence to recommend routine use of opioids. However, when used, morphine is safer than midazolam showing reduction in pain severity as noted by lower PIPP scores and there was no long term/ short term reduction in morbidity/mortality.
Table 6 and 7 provides details on how to provide analgesia in different procedures.

### TABLE 6 Analgesia measures for routine bedside procedures

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Analgesia measure recommended</th>
<th>Procedure</th>
<th>Analgesia measure recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>General measures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Venipuncture Sampling*</td>
<td>+</td>
<td>Heel prick*</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Sucrose analgesia*</td>
<td>Subcutaneous/ IM injection</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Breast milk*</td>
<td>Adhesive tape removal</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Facilitated tucking / caressing</td>
<td>IV Cannulation</td>
<td>+</td>
</tr>
</tbody>
</table>

*Either sucrose analgesia or breast feeding can be adopted depending on the availability and feasibility; for slightly longer procedure sucrose analgesia is preferred over breast milk/breast feeding.

**Venipuncture should be the preferred mode of blood sampling as heel lance is more painful.

### TABLE 7 Analgesic measures for specific procedures

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Intubated</th>
<th>Non-intubated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arterial puncture/cannulation</td>
<td>EMLA cream locally</td>
<td>EMLA cream locally</td>
</tr>
<tr>
<td>Lumbar puncture</td>
<td>EMLA cream locally</td>
<td>EMLA cream locally</td>
</tr>
<tr>
<td>PICC line placement</td>
<td>Sucrose analgesia</td>
<td>Sucrose analgesia</td>
</tr>
<tr>
<td>Chest tube placement</td>
<td>Inj Morphine 0-1-0-2 mg/kg IV</td>
<td>Inj Morphine 0-1 mg/kg IV*</td>
</tr>
<tr>
<td></td>
<td>Local infiltration with Lignocaine 2%</td>
<td>Local infiltration with Lignocaine 2%</td>
</tr>
<tr>
<td></td>
<td>Sucrose analgesia</td>
<td>Sucrose analgesia</td>
</tr>
<tr>
<td>Chest drain removal</td>
<td>EMLA cream locally</td>
<td>EMLA cream locally</td>
</tr>
<tr>
<td></td>
<td>Sucrose analgesia</td>
<td>Sucrose analgesia</td>
</tr>
<tr>
<td></td>
<td>General measures</td>
<td>General measures</td>
</tr>
<tr>
<td>ROP screening</td>
<td>Local anesthetic eye drops</td>
<td>Local anesthetic eye drops</td>
</tr>
<tr>
<td></td>
<td>Sucrose analgesia</td>
<td>Sucrose analgesia</td>
</tr>
<tr>
<td></td>
<td>Post screen-paracetamol</td>
<td>Post screen-paracetamol</td>
</tr>
<tr>
<td>ROP Laser surgery</td>
<td>Inj Morphine 0-1-0-2 mg/kg IV</td>
<td>Inj Morphine 0-1-0-2 mg/kg IV*</td>
</tr>
<tr>
<td></td>
<td>Local anesthetic eye drops</td>
<td>Local anesthetic eye drops</td>
</tr>
<tr>
<td></td>
<td>Sucrose analgesia</td>
<td>Sucrose analgesia</td>
</tr>
<tr>
<td></td>
<td>Post OP-paracetamol 15 mg/kg q 6 hourly for 1-2 day</td>
<td>Post OP-paracetamol 15 mg/kg q 6 hourly for 1-2 day</td>
</tr>
<tr>
<td>CT/ MRI- for sedation</td>
<td>Oral Chlorthydrate 50-100 mg/kg</td>
<td>Oral Chlorthydrate 50-100 mg/kg</td>
</tr>
<tr>
<td></td>
<td>Oral Midazolam 0-1-0-3 mg/kg IV</td>
<td>Oral Midazolam 0-1-0-3 mg/kg IV</td>
</tr>
<tr>
<td></td>
<td>IV Midazolam 0-1-0-2 mg/kg IV single dose</td>
<td>IV Midazolam 0-1-0-2 mg/kg IV single dose</td>
</tr>
</tbody>
</table>

*In non ventilated babies while using opioids: Watch for apnea/respiratory depression; IV Naloxone should be kept ready and used in case of respiratory depression or apnea (0·1 mg/kg or 0·25 ml/kg IV); Inj Fentanyl may be substituted for Inj Morphine; Dose 1-4 mcg/kg slow iv over 3-5 min.

**Even ventilated patients on opioid infusion during procedures needs additional analgesic measures.
Table 8 provides details of different analgesic agents. Table 10 provides research priorities.

**TABLE 8 Drugs and dosages of analgesic/sedative medications commonly used in NICU**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Preparation/administration</th>
<th>Pharmacology</th>
<th>Adv effect</th>
</tr>
</thead>
</table>
| Morphine   | Bolus:100-200 mcg/kg slow IV over 5 min  
Infusion: 10-20 mcg/kg/hr IV | 1 mL=15 mg. Dilute in - NS/ 10D/5D to make a maximum concentration of 5 mg/mL  
Incompatible with phenytoin, phenobarbitone | Narcotic analgesic  
Onset: 5min  
Peak :15 min  
T1/2: 9 hrs | Respiratory depression  
Bradycardia  
Hypotension  
Ileus,  
Urinary retention  
Tolerance |
| Fentanyl   | Bolus 1-5 mcg/kg slow IV over 5-10 min  
Infusion: 1-5 mcg/kg/hour IV | 1 mL=50 mcg  
Dilute in NS/5D/10D  
Incompatible with phenytoin, phenobarbitone | 50-100 times more potent than morphine  
Rapid onset; less hypotension than morphine  
T1/2: 1-15 hrs | Respiratory depression  
Chest wall rigidity with rapid push  
Urinary retention  
Tolerance |
| Midazolam  | Bolus: 0.1-0.2 mg/kg slow IV  
Infusion: 0.01-0.06 mg/kg/hour  
Intranasal/sublingual route (dose 0.2-0.3 mg/kg) may also be used | 1 mL=1 mg  
Dilute in– NS/5D/10D  
Incompatible with NaHCO3, fat emulsion | Short acting benzodiazepine  
Sedation only, no analgesic effect  
T1/2: 4-6 hrs in term infants; preterm variable up to 22 hrs  
Not recommended in neonates esp. preterm | Respiratory depression  
Myoclonic Jerk  
Hypotension (esp with rapid push) |
| Vecuronium | 0.1 mg/kg Available as powder  
(1 vial=10 mg/20mg)  
Dilute in 5D/NS to make 1 mg/mL | Non depolarizing muscle relaxant  
Onset 1-2 min; duration of action 1-2 hours  
Consider using during non emergent intubation as premedication | Respiratory depression  
Hypotension  
Avoid routine use in ventilated neonates. |
| Paracetamol| 10-15 mg/kg/dose PO 6-8 hrly  
30 mg/kg/ dose per rectal | Syp 5 mL= 125 mg  
Drops 1 ml=100 mg  
Suppositories 80 mg | Rectal route erratic absorption | |
| Chloral hydrate | 25-75 mg/kg PO/rectally | 1ml=100mg | No analgesia, only sedation  
Administer with feeds ( high osmolality, may cause GI intolerance) | Bradycardia  
Gastric irritation  
Contraindicated in hepatic/renal dysfunction |
| EMLA cream | 1- 2 g for 1 hr  
Lidocaine-prilocaine 5% (Eg.Oint Prilox available in India)  
5g/30g with tegaderm dressing | Delayed onset – ½- 1 hr  
Not effective for heel lance | Methemoglobinemia |
<table>
<thead>
<tr>
<th>Research Question</th>
<th>Study Design</th>
<th>Intervention</th>
<th>Outcome measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the effects of developmental supportive care like NIDCAP and pain management protocols on long term neuro developmental outcomes in preterm and term neonates?</td>
<td>Prospective Cohort RCT</td>
<td>Structured Development supportive program and pain management program e.g. NIDCAP</td>
<td>Pschymotor and Mental developmental index as measured by Bayley scale of infant development or other suitable objective scales like DASI II at 18-24 months. Objective Neurological assessment at 18-24 months.</td>
</tr>
<tr>
<td>Efficacy and safety of Dextrose 25% versus Sucrose 24% in procedural analgesia in NICU</td>
<td>RCT</td>
<td>Dextrose 25% Vs Sucrose 24% For procedures like venipuncture, ROP examination, IV cannulation, arterial puncture, Lumbar puncture</td>
<td>Pain assessment by standardized pain scales like PIPP Comparison changes of physiological parameters like heart rate, saturations, respiratory rate etc during procedure</td>
</tr>
<tr>
<td>Knowledge attitude and practice of pain management in resource poor settings and feasibility of pain protocol</td>
<td>Survey</td>
<td>None</td>
<td>Structured questionnaire based survey and develop a scoring for assessment of participants</td>
</tr>
<tr>
<td>Compare the common pain assessment tools in NICU and adopt one as standard based on its validity as well as ease of use</td>
<td>Cohort study</td>
<td>Compare pain scales with PIPP scale as standard</td>
<td>Validity of different scale compared to PIPP Time required for assessment and accuracy by staff nurses and resident doctors</td>
</tr>
</tbody>
</table>

TABLE 9 Research priorities
REFERENCES AND SUGGESTED READINGS


