Conflict of interest-None

Smartphone Apps in Newborn Health

Department of Pediatrics
All India Institute of Medical Sciences
WHO-CC for Training & Research in Newborn Care
Smart phone Apps

- Idea about Apps
- Development
- Principle of proof – enhance learning; can be used as training tool
- Dissemination
Idea-why smartphones?

- One day an Intern posted at Community Hospital, 100 kms away walks in room and suggests need for point of care Tool
- Webcast on Google 45 minutes!
- So simple –Can Do it!!
Neonatal Division, AIIMS

The Neonatal Division at the Department of Pediatrics, All India Institute of Medical Sciences, New Delhi, was designated as the WHO Collaborating Centre for Training and Research in 1997. During the sixteen years since its inception, the Centre has made significant contribution towards promotion of newborn care at the national and the International level.

For More
Android & iOS platform
Standard Treatment Protocols

Evidence based- 2012-13 WHO Guidelines

- Target group
- Contents – Wall charts; Job Aids; Rx Algorithm
- Essential drugs, equipment, procedures
- Uses existing resource materials of WHO-CC

*Based on WHO HQ’s Pink & Blue book, guidelines 2012
Rapid Assessment and immediate management of emergencies

**Look for EMERGENCY Signs**

- Not breathing at all (even when stimulated) OR
gasping respiration
OR respiratory rate less than 20/minute

**APNEA OR GASPING RESPIRATION**

- Start PPV
- Continue Oxygen

**Evaluate all neonates for emergency signs afterwards refer to Sheet B**

**Weak and fast pulse (HR>180/mt) AND Extremities cold to touch AND Capillary Refill Time > 3 sec. with or without pallor, or lethargy or unconscious**

**SHOCK**

- If bleeding is the likely cause of shock:
  - Infuse normal saline 10ml/ kg body weight over 10 minutes
  - Stop external bleeding
  - Give Vit K IV
- If bleeding is not the likely cause of shock:
  - Give 10 ml/kg normal saline over 30 min
  (Follow STP)

**Bleeding**

**SEIZURES**

- Manage Airways, Check and manage Low Blood Glucose, check Calcium, give Anticonvulsants

**Blood glucose less than 45 mg/dl**

**HYPOGLYCEMIA**

- Treat Hypoglycemia
(Follow STP)

**Temperature <36° C**

**MODERATE TO SEVERE HYPOTHERMIA**

- Keep under warmer
  - Rapid re-warm if temp. <32° upto 34° C and then gradual rewarming
  (Follow STP)

**Standard Treatment Protocol for management of common newborn conditions in small hospitals**

For additional / next level management please refer to WHO Guidelines (Managing Newborn Problems and Pocket Book of Hospital Care of Children), http://www.ontop-in.org/sick-newborn/, http://www.newbornwho.cc.org/
Assessment for specific conditions

**NEONATAL HISTORY**
- Age of the neonate and the birth weight if available.
- Was the baby born term? If not, then at what gestation?
- Delayed Cry/ not breathing at birth/ requirement of BMV at birth
- Is the baby having any other problem in feeding/ choking/ vomiting?
- When did the problem start?
- Has the baby worsened?

**MATERNAL HISTORY**
- Medical, obstetric, social history.
- Pregnancy: Duration, chronic diseases, HIV, any complications, history of maternal fever
- Labour: Any complications, duration of rupture of membranes, any complication-fetal distress, prolonged labor, caesarean section, color and smell of amniotic fluid, instrumental delivery, vaginal delivery, malposition, malpresentation, any other complications

**EXAMINATION**
- Recheck Temperature*
- Recheck Heart rate*
- Recheck Respiratory rate*
- Severe chest indrawing, grunting, central cyanosis.
- Abdominal distention and/or vomiting
- Seizure
- Lethargy
- Jaundice
- Any other obvious abnormality/malpresentation, any other complications

*If taken more than 30 minutes before

Newborn with Hypothermia
- Follow STP
- Preterm

Follow STP for Feeding low birth weight/ sick newborn

Newborn with Sepsis
- Suspect if any of following signs are present
  - Breathing difficulty, abnormal movements, unconscious or lethargic, not feeding or poor feeding, abdominal distension, or vomiting
  - Maternal risk factors for sepsis present
- Follow STP

Newborn with Seizure
- Follow STP

Neonate with Breathing Difficulty
- Follow STP

Newborn with Birth Asphyxia
- Requiring bag and mask ventilation/ intubation/ drug at birth

Neonate with Jaundice
- Follow STP

Baby may have more than one condition to treat; so look for all conditions

Standard Treatment Protocol for management of common newborn conditions in small hospitals
For additional / next level management please refer to WHO Guidelines (Managing Newborn Problems and Pocket Book of Hospital Care of Children), http://www.ontop-in.org/sick-newborn/, http://www.newbornwhocc.org/
Shock in Newborn

- Weak & fast pulse (HR > 180/min) AND
- Extremities cold to touch AND
- Capillary Refill Time > 3 sec
- With or without the following signs:
  - Colour - very pale
  - Lethargy, not arousable on stimulation

Provide warmth
Secure airway
Support breathing, circulation and temperature
Start oxygen, if saturation (<90%) is low
Measure blood glucose; correct hypoglycemia (Follow STP)

If bleeding is NOT the likely cause

- Establish IV access
- Give IV normal saline or Ringer Lactate 20 ml/kg body weight over the first hour
- Give IV 10% Dextrose at maintenance rate
- Treat for Sepsis (Follow STP)
- Continue O2 as required

Monitor hourly (Panel 2)
- Heart rate, oxygen saturation
- Capillary refill time
- Urine output
- Sensorium

If signs of shock improve

- Continue maintenance IV fluid as per weight and day of life (Follow STP)
- Reassess above parameters hourly
- Give specific treatment based on diagnosis (Follow specific STP)

Determine Diagnosis (Panel 1)

If bleeding is the likely cause

- Establish IV access
- Give IV normal saline or Ringer Lactate 10 ml/kg body weight over 10 min
- If no improvement, repeat fluid of 10 ml/kg once after 20 minutes as above
- Immediately give a blood transfusion using type O, Rh negative blood
- Give Vitamin K 1 mg IV

If signs of shock persist

- Continue IV Fluid and O2
- REFER

Standard Treatment Protocol for management of common newborn conditions in small hospitals
For additional / next level management please refer to WHO Guidelines (Managing Newborn Problems and Pocket Book of Hospital Care of Children), http://www.ontop-in.org/sick-newborn/, http://www.newbornwhocc.org/
Type on Android Smartphone to download small 274 kb app
AIIMS WHOCC  STPs
# RAPID ASSESSMENT AND IMMEDIATE MANAGEMENT OF EMERGENCIES

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**LOOK FOR ALL EMERGENCY SIGNS**
RAPID ASSESSMENT AND IMMEDIATE MANAGEMENT OF EMERGENCIES

APNEA or GASping REPIRATION

BLOCK

- Seizures

Seizures MANAGEMENT
- Manage airways,
- Check and manage low blood glucose,
- check calcium,
- Give anticonvulsants (Follow STP)

NO EMERGENCY SIGNS

LOOK FOR ALL EMERGENCY SIGNS
ASK AND LOOK

NEONATAL HISTORY

MATERNAL HISTORY

EXAMINATION
DEFINITIVE MANAGEMENT

HYPERThERMIA

HYPOTHERMIA

HYPOGLYCEMIA

SEIZURES

JAUNDICE

RESPIRATORY DISTRESS

SHOCK

SEPSIS

TRANSPORT
Newborn with abnormal movements
Differentiate from jitteriness/other abnormal movements
(CLICK for details)

IF SEIZURES

Secure airway;
Optimize breathing, circulation, and temperature;
Start oxygen in the presence of cyanosis and/or low

Measure Serum Calcium, if possible
If low, give IV Calcium*
• Seizure continues REFER
• If no seizure Start Oral Calcium
(CLICK for more details)

Measure glucose

< 45 mg/dl

• Do Lumbar Puncture if clinical examination shows bulging anterior fontanel, opisthotonus, lethargy or unconsciousness
• After immediate treatment, also assess signs check if for other illnesses
Newborn with abnormal movements
Differentiate from jitteriness/other abnormal movements
(CLICK for details)

**Convulsions vs. Jitteriness**

**Convulsions**
- Have both fast and slow components
  - Slow movements (1-3 jerks per second)
  - Not provoked by stimulation
  - Does not stop with restraint
  - Neurological examination - often abnormal
  - Neurological examination – usually normal
  - Often associated with eye movements (tonic deviation or fixed stare) and/or autonomic changes (changes in heart rate)

**Jitteriness**
- Fast movements (4-6 per second); tremors are of equal amplitude
- Provoked by stimulation
- Stops with restraint
- Neurological examination – usually normal
- Not associated with eye movements or autonomic changes

Do Lumbar Puncture if clinical examination shows bulging anterior fontanel, opisthotonus, lethargy or unconsciousness
After immediate treatment, also assess signs check if for other illnesses
IF SEIZURES

Secure airway;
Optimize breathing, circulation, and temperature;
Start oxygen in the presence of cyanosis and/or low

Measure Serum Calcium, if possible
If low, give IV Calcium*
• Seizure continues REFER
• If no seizure Start Oral Calcium (CLICK for more details)

Measure glucose
< 45 mg/dl

> 45 mg/dl

• Do Lumbar Puncture if clinical examination shows bulging anterior fontanel, opisthotonus, lethargy or unconsciousness
• After immediate treatment, also assess signs check if for other illnesses
SEIZURE - Initial Management

IF SEIZURES

Secure airway;
Optimize breathing, circulation, and temperature;
Start oxygen in the presence of cyanosis.

Measure Serum Calcium, if possible.
If low, give IV Calcium.
- Seizure continues REFER
- If no seizure Start Oral Calcium
  (CLICK for more details)

Measure glucose

< 45 mg/dl

- Do Lumbar Puncture if clinical examination shows bulging anterior fontanel, opisthotonus, lethargy, or unconsciousness.
- After immediate treatment, also assess signs/symptoms for other illnesses.

Newborn with abnormal movements
Differentiate from jitteriness/other abnormal movements
(CLICK for details)

CALCIUM GLUCONATE I.V.

NOTE
For giving IV calcium, cardiac monitoring is preferred.
Therefore, baby should be referred to higher center for treating hypocalcemia, if present.

PRESENTATION
9 mg/ml ampoules

DOSAGE
1-2 ml/kg/dose every 6-8 hourly

Direction for use
- Dilute in equal amount of distilled water
- Inject very slowly while monitoring heart rate.
- If there is bradycardia, discontinue the injection

CAUTION
Take care to avoid extravasation, if being given as infusion, as it may cause sloughing of skin.
SEIZURE-Initial Management

Newborn with abnormal movements
Differentiate from jitteriness/other abnormal movements
(CLICK for details)

IF SEIZURES

Secure airway;
Optimize breathing, circulation, and temperature;
Start oxygen in the presence of cyanosis and/or low

Measure Serum Calcium, if possible
If low, give IV Calcium*
• Seizure continues REFER
• If no seizure Start Oral Calcium
(CLICK for more details)

Measure glucose
< 45 mg/dl

• Do Lumbar Puncture if clinical examination shows bulging anterior fontanel, opisthotonus, lethargy or unconsciousness
• After immediate treatment, also assess signs check if for other illnesses
Newborn with abnormal movements
Differentiate from jitteriness/other abnormal movements
(CLICK for details)

IF SEIZURES

Secure airway;
Optimize breathing, circulation, and temperature;
Start oxygen in the presence of cyanosis and/or low

Measure Serum Calcium, if possible
If low, give IV Calcium*
• Seizure continues REFER
• If no seizure Start Oral Calcium
(CLICK for more details)

Measure glucose

Give phenobarbital 20 mg/kg IV slowly over 20 minutes
(CLICK for more)

Seizure cont.

• Do Lumbar Puncture if clinical examination shows bulging anterior fontanel, opisthotonus, lethargy or unconsciousness
• After immediate treatment, also assess signs check if for other illnesses

No seizure
SEIZURES - Initial Management

Newborn with abnormal movements
Differentiate from jitteriness/other abnormal movements
(CLICK for details)

IF SEIZURES

Secure airway;
Optimize breathing, circulation, and temp;
Start oxygen in the presence of cyanosis.

Measure Serum Calcium, if possible.
Flow, give IV Calcium.
Seizure continues REFER
If no seizure Start Oral Calcium
(CLICK for more details)

Measure glucose

Give phenobarbitone 20 mg/kg IV slowly
(CLICK for more)

Seizure cont.

Presentation:
Injection 200 mg/ml: 1 ml ampoules

Dosage
Loading dose: 20 mg/kg IV or IM
Maintenance: 5 mg/kg/day PO (once daily)

Route: Intravenous and per oral

Direction for use
- Take 9.1 mL of solution and dilute with 0.9 mL of water for injection to make 1 mL
- Resultant concentration is 20 mg/mL
- Give required amount slowly over 15-20 minutes

Caution:
May cause respiratory arrest

Protocol for phenobarbitone
IF SEIZURES

Secure airway;
Optimize breathing, circulation, and temperature;
Start oxygen in the presence of cyanosis and/or low

Measure Serum Calcium, if possible
If low, give IV Calcium*
• Seizure continues REFER
• If no seizure Start Oral Calcium
(CLICK for more details)

Measure glucose

Give phenobarbitone 20 mg/kg IV slowly over 20 minutes
(CLICK for more)

Seizure cont.

• Do Lumbar Puncture if clinical examination shows bulging anterior fontanel, opisthotonus, lethargy or unconsciousness
• After immediate treatment, also assess signs check if for other illnesses
IF SEIZURES

Secure airway;
Optimize breathing, circulation, and temperature;
Start oxygen in the presence of cyanosis and/or low

Measure Serum Calcium, if possible
If low, give IV Calcium*
• Seizure continues REFER
• If no seizure Start Oral Calcium
  (CLICK for more details)

Measure glucose

Give phenobarbitone 20 mg/kg IV slowly over 20 minutes
  (CLICK for more)

Repeat phenobarbitone 10 mg/kg every 30 min until a total of 40 mg/kg is reached
  • Do Lumbar Puncture if clinical examination shows bulging anterior fontanel, opisthotonus, lethargy or unconsciousness
  • After immediate treatment, also assess signs check if for other illnesses
IF SEIZURES

Secure airway;
Optimize breathing, circulation, and temperature.
Start oxygen in the presence of cyanosis.

Measure Serum Calcium, if possible.
If low, give IV Calcium.
• Seizure continues REFER.
• If no seizure Start Oral Calcium (CLICK for more details).

Measure glucose.

Give Phenobarbitone 20 mg/kg IV slowly (CLICK for more).

Repeat Phenobarbitone 10 mg/kg every 30 min until a total of 40 mg/kg is reached.

Seizure cont.
• Do Lumbar Puncture if clinical examination shows bulging anterior fontanel, opisthotonus, lethargy or unconsciousness.
• After immediate treatment, also assess signs check if for other illnesses.

IF Seizures controlled with initial management

- Start maintenance Phenobarbitone 5 mg/kg PO once daily.
- 12 hours after the last seizures

Monitor for recurrence of seizures.

1. Recurrence of seizures
   Treat as described under ‘Initial management of neonatal seizures’ to control the seizure and REFER.

2. No clinical seizures in the next 72 hours
   If controlled by Phenobarbitone alone, stop without tapering of the doses.

   If controlled by more than one drug, stop the drugs one by one. Phenobarbitone stopped the last.
APPENDIX

BASIC NRP

I.V. FLUIDS

FEEDING LOW BIRTH WEIGHT

DISCHARGE

VIDEO TUTORIAL: INSTRUMENTS

VIDEO TUTORIAL: PROCEDURES

MCQ’s Test
Management

Hypothermia

Hypoglycemia

Jaundice

Sepsis

Shock

Seizures

Breathing difficulty

Hyperthermia

Clinically not stable

Start IV fluids

- Start Minimal Enteric Nutrition / trophic feeds 10-15 ml/kg/day by oro/naso-gastric tube, & Monitor for feed intolerance/
- if the baby tolerates the feed Gradually increase the feed by 10-15 ml/kg/day. Taper and Stop IV fluids once feed reach 2/3rd of total daily requirement.

Then put the baby on oro/naso-gastric feeding; if the baby tolerates feed well:

- Try to spoon-feed once or twice a day. Also, put onto mothers’ breast.
- If the baby accepts this well: gradually increase the frequency and amount of spoon/paladai feed. Reduce tube feeds accordingly.

Then put the baby on spoon/paladai feed:

Instrument videos

In these online videos, our team demonstrates how to operate various neonatology instruments.

Procedure videos

In these online videos, our team demonstrates how to carry out various neonatology procedures.
Evaluation of Apps as training tool

Knowledge, skills & Focus group discussions

- **Nursing**

- **Medical Officers (SNCUs) of Tamil Nadu** *
  Efficacy and acceptability of an "App on sick newborn care" in physicians from newborn units. BMC Medical Education 2015 under publication

*Reevaluation after 3 week & 6 month*
Improvement in knowledge scores and skill scores in SNCUs (N=27)
Helping Babies Survive

American Academy of Pediatrics, Chicago IL, USA

WHO CC for Education & Research in Newborn Care, AIIMS, New Delhi, India

Essential Newborn Care AAP on Google play 2015
Action chart or Classify
Essential care

Essential care for every baby

Prevent disease

Assess

Continue skin-to-skin care and monitor breathing

Initiate breastfeeding
Essential care

- Assess within 90 minutes
  - Exam
  - Temperature
  - Weight

- Prevent disease within 90 minutes
  - Eye Care
  - Cord Care
  - Give Vitamin K
Essential care

- Essential care for every baby
- Prevent disease
- Assess

- Background knowledge
- Review key knowledge
- Practice key skills
- To improve care in your facility
A baby begins to lose heat immediately after birth. Prevent heat loss and low body temperature with the following steps:
1) Dry the baby thoroughly at birth and remove wet towels or clothing.
2) Place the baby naked on mother’s skin near her breasts.
3) Cover the mother and baby with a clean, dry drape or cloth. Cover the baby’s head.

Skin-to-skin care should begin at birth and continue for at least one hour. Avoid interruptions and keep them as brief as possible. Uncover only the body areas needed for care. Check the baby’s temperature every 15 minutes during skin-to-skin care afterbirth. Feel the baby’s forehead.
Quality improvement

To improve care in your facility

Discuss the answers to these questions with other providers and leaders in your facility.

How can you make sure that all babies born in your facility are treated with vitamin K?

Suggested questions

Suggested questions

The following questions may help you understand what prevents you from performing this action as recommended.

Is vitamin K available for every baby?
Who can give vitamin K?
Is there more than one concentration of vitamin K?
Case exercises - four

- Care for normal newborn

- The mother is confident in taking care of the baby. Is there anything else which you need to reinforce? Tick all that is correct.

  - Advice mother about breast engorgement, sore or cracked nipples, mastitis, and low milk supply
  - Begin immunizations
  - Discuss any concerns with the family
  - Give parents guidance for home care

- Essential care for every baby

- Neonate with Problem

- Neonate with Danger Sign
Walk through

Care for normal newborn

You want to reassess the baby. What all will you note during the assessment? Tick all that is correct.

- Temperature
- Feeding with regards to position, attachment and adequacy
- Breathing
- Color
- Hydration
- Body movements and overall activity
- Appearance of the cord
- Jaundice

Next

Don't you think, you need to Body movements and overall activity is also to be done. Please refer to the reading material again.

OK

Next
Video links

- Early initiation of breast feeding
- Signs of attachment during breast feeding
- Breast feeding attachment
- Keeping baby warm
- Expression of milk
- Paladai feeding
- Care of the cord
- Intramuscular injection
- Weight recording
- Hand washing
- Danger signs in newborn

ONTOP- 9 Video on Paladai Feeding

Published Mar 19, 2013

1 like 0 dislikes

16 views
What works for 
*Saving Newborn Lives*

- Coverage with Quality
- Concept of contextual Quality Improvement
Log in for data
QI Data on local smart phone
Data to sync on server
- Workshop small group
- Participatory learning with basics of QI
- Uses modern educational methods of teaching learning simulators, tablets,
- Available as print, web, DVD, smartphone app
Acknowledgment

- Team at WHO-CC –AIIMS
- Ministry of Health FW /NHM
- WHO- SEARO Delhi /WHO HQs Geneva
- UNICEF India Country Office
- NIPI/ UNDP/ QEDJT- UK
- Network institutions-students & facilitators
Where to look for resources

AIIMS has the Best Tools in the Region

- www.newbornwhocc.org
- www.ontop-in.org
- Apps on Android AIIMS WHO CC STPs
- Apps for iphone/ iPad SickNewborn
## iOS downloads

**iTunes Connect Sales and Trends**

### Units per Week

- **Score**
- **Date Range**

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### Android downloads

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