Evaluating the Effectiveness of a Training Intervention in Neonatal Resuscitation:

Establishing Grounds for Further Rollout

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Aim

To share findings from a training project evaluation

OBJECTIVES

- Background
- Methods
- Findings
- Implications for practice

What this presentation will not do...
Background
Zambia

Neonatal mortality rate:
24:1000 (Central Statistics Office (CSO) 2015)
Scoping: Benefactors, Sponsors & Partners

Mr & Mrs Chowen – Project Benefactors

Prof. Newport – Chair BLHL

Prof. Hatzidimitriadou - CCCU

Ms Jean Musonda - UTH

Mr Wisdom Chelu – Zambia MoH
Scoping

Key suggestions:

- Staff knowledge/skills in neonatal care including assessment, initial management at birth and resuscitation
- Standardisation of approach to neonatal resuscitation
- Leadership
- Clarify communication systems
- Equipment including fetal & neonatal monitoring
- Transportation between wards
- Thermoregulation
- Discharge examination of the newborn
- Health care support role
Intervention...

- Multidisciplinary Team
  - Senior Neonatal Nurse
  - Neonatologist
  - Senior Resuscitation Officer
  - Midwife/Lecturer

- Teaching material
Intervention: Preparation and set up
Teaching: theory, skills, simulation, TTT
Immediate evaluation

Scores

Candidates
## Defining effectiveness...

<table>
<thead>
<tr>
<th>Author</th>
<th>Measure of effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opiyo et al (2008)</td>
<td></td>
</tr>
<tr>
<td>Dempsey et al (2015)</td>
<td>Change in team work and resuscitation behaviour</td>
</tr>
<tr>
<td>Opiyo et al (2008)</td>
<td></td>
</tr>
<tr>
<td>Hoban et al (2013)</td>
<td>Knowledge (immediate and long-term)</td>
</tr>
<tr>
<td>Fuchs et al (2015)</td>
<td></td>
</tr>
<tr>
<td>Bookman et al (2010)</td>
<td></td>
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<tr>
<td>Carlo et al (2009)</td>
<td></td>
</tr>
</tbody>
</table>
Defining effectiveness for the Zambia project:

- Further training
- More staff
- Quality and integrity of training
- Positive impact on trainee knowledge
- Goals
- Clinical practice
Methods
Methodology

- Single Case study approach (*Yin 2009; Taylor & Thomas-Gregory 2015*)

- Selection/recruitment of participants
  - Process/arrangements
  - different levels
  - informed consent
Methods - Triangulation

**Interviews**
- 1-1/focus groups/telephone;
- Range of settings: Health/shopping centres

**Questionnaire**
- Review of goals

**Documents**
- Training records;
- Pre/post-test results;
- Training programme

**Observation**
- Lectures;
- Team interaction/Meetings;
- Feedback;
- Skills and Simulation Stations
Findings
Clinical impact
Individual accounts from practice (I)

• "... from August up to February this year, we have not recorded any mortality ... the referrals can even be counted ... it has greatly improved our skills..." (Midwife)

• "Since I received that neonatal resuscitation...we refer them at the point the babies are stable now ... we know how to manage..."(Nurse)
Individual accounts from practice (II)

- ‘...we managed to resuscitate the baby until the baby was out of danger. And then we referred ...for further management...’ (Midwife from lower level hospital)

- ‘... the training we have got has really impacted on our services in a positive way, in that our babies and mothers are being saved. We no longer lose lives...’ (Midwife)
Clinical guidelines

Interviewee by a resucitaire in a local neonatal unit - notice algorithm on the wall
Internalising Clinical knowledge (I)

‘...you don’t even go through those complicated stages, where you need to intubate and the rest...”’ (Paediatrician)

‘... I’ve seen it as a good thing, this course. It has really changed the way we used to look at some of the things, as in where we resuscitate now, where the priority is not centred in oxygen...” (Midwife)

‘...I really did apply, you know, stage by stage - the ... inflation, yes. ... inflation breaths was not something that was emphasised, yes, we would go into the ventilation breath immediately ...' (Paediatrician)
'...apart from the resuscitation itself there are other things ... We are now delivering the babies onto the mother’s abdomen because we have learnt about the skin to skin contact. We are delaying cord clamping. All those majors are helpful in making the baby alive. Yes, so there is change like that...' (Midwife)
Important insights from Clinical log of experience

Delivered as an emergency caesarean section due to cord presentation and fetal distress.

Resuscitaire warmed...baby...wiped, stimulated and wrapped in dry clean clothing...assessed...not breathing...floppy...blue...low heart rate

Five(5) inflation breath given chest expansion observed...

Baby reassessed breathing normal, heart rate fast, tone good and colour pink...cried...wrapped in warm clothing and given to mother...

I did not start the clock...
Challenges to clinical application

- Equipment
- Poor Staffing levels
- Clinical and professional guidelines - limitations
- Competing guidelines
- Lack of Leadership/mentorship
Further training
Successes

- Support

Candidate receiving certificate of attendance from Medical superintendent LGH
## Formal activity

### Summary of training

<table>
<thead>
<tr>
<th>Date</th>
<th>Venue</th>
<th>Numbers</th>
<th>Staff groups trained</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-8.4.17</td>
<td>Livingstone</td>
<td>50</td>
<td>Doctors, nurses, midwives, anaesthetists (From one hospital)</td>
</tr>
<tr>
<td>9-10.3.17</td>
<td>LUSON</td>
<td>40</td>
<td>Paediatric nurses (Qualified nurses)</td>
</tr>
<tr>
<td>20-21.2.17</td>
<td>Lusaka</td>
<td>50</td>
<td>Midwives, nurses, doctors, anaesthetists</td>
</tr>
<tr>
<td>2016</td>
<td>LUSON</td>
<td>39</td>
<td>Paediatric nurses (Qualified nurses)</td>
</tr>
</tbody>
</table>
Informal activity

"...Our unit, we always get new doctors, new nurses, ... as part of, probably you could call it an orientation, when they come to the unit we do take them through resuscitation of the babies ..."

(Senior Neonatal Nurse)
## Quality of training: evolving content

<table>
<thead>
<tr>
<th>Initial launch content</th>
<th>Post launch content</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>One day</strong></td>
<td><strong>Two days</strong></td>
</tr>
<tr>
<td>- Immediate care at birth</td>
<td>- Immediate care at birth</td>
</tr>
<tr>
<td>- Newborn physiology</td>
<td>- Newborn physiology</td>
</tr>
<tr>
<td>- Resuscitation at birth</td>
<td>- Resuscitation at birth</td>
</tr>
<tr>
<td>- Prematurity /Meconium</td>
<td>- Prematurity /Meconium</td>
</tr>
<tr>
<td>- Teamwork/communication/documentation</td>
<td>- Teamwork/communication/documentation</td>
</tr>
<tr>
<td>- Post resuscitation care</td>
<td>- Post resuscitation care</td>
</tr>
<tr>
<td></td>
<td>- Neonatal Intubation</td>
</tr>
<tr>
<td></td>
<td>- Umbilical Vein Cannulation</td>
</tr>
<tr>
<td></td>
<td>- Day 2 - KMC/Nutrition &amp; growth monitoring/infection</td>
</tr>
<tr>
<td></td>
<td>- prevention/hand hygiene</td>
</tr>
</tbody>
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*Canterbury Christ Church University*
Teamwork and constitution

Team member consulting with team leader during a session – note manual in use for reference

Team members discussing approach prior to a session

Trainers working in pairs to support each other facilitating a skills station
## Observation of training...

### Lectures

<table>
<thead>
<tr>
<th>Set (includes environment)</th>
<th>Needs further development</th>
<th>Effective and competent</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Checks and adjusts layout and equipment</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>Could be emphasised further</td>
</tr>
<tr>
<td>Introductions</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td></td>
</tr>
<tr>
<td>Establishes usefulness and clearly states learning outcomes</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td></td>
</tr>
<tr>
<td>Uses visual aids appropriately</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td></td>
</tr>
<tr>
<td>Uses voice appropriately</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td></td>
</tr>
<tr>
<td>Uses eye contact appropriately</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td></td>
</tr>
<tr>
<td>Demonstrated enthusiasm</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td>✓ ✓ ✓ ✓ ✓ ✓</td>
<td></td>
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</tbody>
</table>

*resus.org.uk*
Candidate being taught how to administer ventilation breaths using a BVM

Team leader offering support to refine the rate of ventilation breaths a little more accurately

Learning to perform cardiac compressions

Teaching UVC insertion
**PRE TEST AND POST TEST - FIRST GROUP**

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Lowest Score</th>
<th>Highest Score</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre test</td>
<td>33%</td>
<td>80%</td>
<td>61.9%</td>
</tr>
<tr>
<td>For Post test</td>
<td>57%</td>
<td>97%</td>
<td>84.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test Type</th>
<th>Lowest Score</th>
<th>Highest Score</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre test</td>
<td>53%</td>
<td>90%</td>
<td>84.7%</td>
</tr>
<tr>
<td>For Post test</td>
<td>67%</td>
<td>100%</td>
<td>88.12%</td>
</tr>
</tbody>
</table>
Challenges to further training

- Funding for rollout
- Recognition
- Equipment
- Previous learning/approaches
Review of goals
<table>
<thead>
<tr>
<th>Goal</th>
<th>Achieved</th>
<th>Not achieved</th>
<th>No response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Lusaka Province health centres/staff</td>
<td>8</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Create list of potential participants</td>
<td>6</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Quarterly training</td>
<td>5</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Identify and approach funders</td>
<td>3</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Formulate action plan</td>
<td>7</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Trainers split into two groups</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support from MoH</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Create minimum requirements for Health Centres – equipment...</td>
<td>8</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Database for trained personnel</td>
<td>5</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>First training Sept./Oct. 2016</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Train in-service nursing students</td>
<td></td>
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</tbody>
</table>
Suggestions moving forward
Moving forward...

- Recognition
- Train more trainers
- Evaluation in the clinical area
- Mentorship

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Further forward...

- CPD strategies
- Neonatal mortality outcomes

Government and professional body recognition, funding and support are vital to ensure successful rollout of neonatal resuscitation training.
Moving Forward…

- Standardisation of neonatal resuscitation guidelines to facilitate application of knowledge and skills to practice
Implications for future practice

- ‘...we have come up with a profile ... all the members having input ... I think actually it will give us a good direction because we will be guided with what we have documented ourselves...’

Diagram:
- Inform further training activity - quantity & quality
- Adjust post evaluation / audit of relevant issues
- Focused Pilot site / Clinical area
- Measure impact
- Neonatal morbidity & mortality / clinical practice outcome measures
Sufficient grounds for further rollout?
the evidence...

✓ Further training activity undertaken
✓ More staff
✓ Knowledge improvement
✓ Goals achieved
✓ Clinical impact
✓ Lives are being saved
Questions?
Reference list

- Taylor R & Thomas-Gregory A (2015) Case study research Nursing standard Vol.29(41), pp.36-40
- Trevisanuto, D ; Bertuola, F ; Lanzoni, P ; Cavallin, F ; Mediana, E; Manzungu, Ow ; Gomez, E ; Da Dalt, L; Putoto, G (2015) Effect of a Neonatal Resuscitation Course on Healthcare Providers' Performances Assessed by Video Recording in a Low-Resource Setting Plos One, Dec 11, Vol.10(12)