KNOWLEDGE AND COMPETENCE BASED TRAINING OF NON-PHYSICIANS IN THE PROVISION OF EARLY INFANT MALE CIRCUMCISIION (EIMC) USING THE MOGEN CLAMP IN RAKAI, UGANDA
Background

• EIMC was included as a recommended component in combination HIV prevention in 14 Sub Saharan African countries with high HIV prevalence and low Male Circumcision (MC) prevalence, by WHO and UNICEF.

• Competence-based training of non-physicians using a structured curriculum can enhance scale-up in priority countries, where non physicians are better distributed than physicians.

• Following evidence, Clinical officers (COs) now perform most adult & adolescent circumcisions in Uganda (Buwembo DR et al, 2012).

• However, Registered Nurse Midwives (RNMs), who are mostly the first points of contact with neonates, are not licensed to perform neonatal circumcision.

Can these non-physicians (COs and RNMs) comparably be trained to provide EIMC, and how safe is such training?
Methods

Subjects

• 10 COs and 10 RNMWs with no prior training in EIMC.
• Healthy newborn boys of interested, consenting mothers, aged 1-28 days, weighing ≥ 2.5kg. Paternal awareness encouraged but their written consent not a requirement.

Figure 1 (L): A Clinical officer assisting, and Nurse-Midwives observing a trainer circumcise a neonate

Figure 2 (R): Healthy neonates aged 1-28 days, and weighing ≥2.5kg, with no medical or surgical contraindication were eligible

Figure 3 (L): The WHO/JHPIEGO Manual for EMIC under local anaesthesia was used for training

Figure 4 (R): The Mogen clamp (2.5mm slit) was the device used to circumcise the neonates
Methods (2)

Design
The training

- Qualified EIMC trainers, supervised by 2 experienced urologists, conducted the training using the WHO/JHPIEGO manual for EIMC.

Two phases; didactic and practicum

- Practicum included over-the-shoulder mentoring for skills in mobilization & health education, client screening, pre-operative care, surgical technique and post-operative care. Immediate feedback.

- For surgical technique, each trainee had to observe and assist in 5 EIMCs, then perform 10 EIMCs using the Mogen clamp.

Trainee assessment:
Didactic phase: A pre- and post- test to measure knowledge increment (80% pass mark for progressing to practicum)

Practicum phase: Step-by-step checklists used for each odd procedure (1,3,5,7,9). Extra cases if performance by last procedure not satisfactory. Overall pass mark 80%

Client follow up
Routine Phone call at 24 hours for each neonate
Hotline provided & clients encouraged to call for any queries or problems
Methods (3)

Statistical analysis
- Analyses used Stata13.1.

- Primary end-points:
  - Satisfactory performance with 80% Pass mark for post-didactic test and practicum
  - Time to complete procedure

- Secondary end-points:
  - Safety of training as per Reported adverse events and Pain levels

Performance
- Learning curves by cadre and by trainee plotted

- Multivariable analysis with a mixed effects model to generate random effects at provider level accounting for variation within and between the trainees

- Measured adjusted changes in scores with 95% confidence intervals

Safety of training
The Neonatal Infant Pain Scale (NIPS) scores were collapsed & categorized into two groups of no pain (score 0-2) and pain (score 3-6). Bivariate analyses of the pain scores stratified by cadre were assessed using chi-square tests.
Results

Knowledge gain

- Knowledge of COs and RNMWs on EIMC was similar at the start of training (p=0.50), but CO’s knowledge scores were significantly higher than the RNMWs following didactic training (p=0.043).

![Table 1: Assessment of knowledge increment with the didactic sessions, by cadre](image)

<table>
<thead>
<tr>
<th>Study arm</th>
<th>CO (N=10)</th>
<th>NMW (N=10)</th>
<th>Total (N=20)</th>
<th>X² p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Pre training</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>below 80%</td>
<td>8</td>
<td>80</td>
<td>9</td>
<td>90</td>
</tr>
<tr>
<td>80% and above</td>
<td>2</td>
<td>20</td>
<td>1</td>
<td>10</td>
</tr>
<tr>
<td>post training</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>below 80%</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>40</td>
</tr>
<tr>
<td>80% and above</td>
<td>10</td>
<td>100</td>
<td>6</td>
<td>60</td>
</tr>
</tbody>
</table>

Competency gain

Out of 202 neonatal circumcisions performed, 100 (5 odd cases per trainee) were used for assessment of competency gain.

![Figure 5: Client flow for the EIMC training](image)
Results (2)

Greatest improvement in competency was between 1st and 3rd procedures, with both cadres comparable (COs +5.87 points [CI: 3.14-8.60] and NMWs +7.9 points [CI: 5.89-9.86]).

All had achieved 80% competency and retention of skills by the 7th procedure, with significant reduction of inter– and intra– individual variations. (Figure 6)
Results (3)

Time to complete procedure
Overall median (IQR) time to complete a procedure was similar; 14.5 (10,47) minutes for the CO, 15 (10, 50) minutes for the RNMW, p=0.180.

Procedure duration reduced significantly by 2.2 minutes for every subsequent assessed procedure adjusting for cadre of circumciser, p=0.005, with no differences in rates of improvement by cadre, p=0.0966. (Figure 7)
Results (4)

Safety of training

• Pain control levels were similar to both cadres, with the cream based analgesia ameliorating but not abolishing infant pain.

• One screening error occurred; a neonate with a congenital buried penis who proceeded to circumcision. The congenital anomaly was later corrected by a urologist.

• Overall, the reported AE rate was 3.5%. Of these, 2 were moderate (1.0%). (Table 1, and Figure 8)

<table>
<thead>
<tr>
<th>Cadre</th>
<th>Description</th>
<th>Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO</td>
<td>Insufficient skin removal</td>
<td>Mild</td>
</tr>
<tr>
<td>NMW</td>
<td>Insufficient skin removal</td>
<td>Moderate</td>
</tr>
<tr>
<td>Not applicable*</td>
<td>Foreskin swelling</td>
<td>Mild</td>
</tr>
<tr>
<td>Not applicable*</td>
<td>Foreskin swelling</td>
<td>Mild</td>
</tr>
<tr>
<td>Not applicable*</td>
<td>Foreskin swelling</td>
<td>Mild</td>
</tr>
<tr>
<td>Not applicable*</td>
<td>Foreskin swelling</td>
<td>Mild</td>
</tr>
<tr>
<td>Not applicable*</td>
<td>Penile skin swelling</td>
<td>Moderate</td>
</tr>
</tbody>
</table>

Table 1: Reported AE rate for the training was 3.5%. Of these, 2 were moderate (1.0%). (Two neonates whose mothers reported ‘unsatisfactory skin removal’ were not verifiable because physical review, with repeated attempt, was futile for these infants. If these were included, AE rate would be 4.5%)
Conclusion

• COs and RNMWs can comparably gain knowledge and competency in provision of EIMC using a structured curriculum with over-the-shoulder mentoring and timely feedback.

• Gain in competency did not differ by cadre, but knowledge improvement was greater among COs.

• AE rate was within acceptable limits, both cadres were comparable, and all the AEs reported are preventable