Newborn intervention and child development

The Burkina Faso-Uganda Saving Brains project focusing on exclusive breastfeeding

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What I am going to say

• Introduction
• EBF
• Saving Brains
• Milestones
• Preliminary Observations
• Conclusions
Heartfelt thanks

• Organizers of IFPE
• All colleagues at GCC for enormous support and encouragement.
• All members of the Saving Brains Community (Nicolas Meda, Hama Diallo, Anselme Simeon Sanou, Grace Ndeezi, Victoria Nankabirwa, Paul Bangirana, Angelina Kakooza, JB Lwanga, Mary Kwagala, Michael Boivin, Bruno Giordani, Penny Holding, Ingunn Marie Engebretsen, Eesperance Kashala, Torkild Tylleskar et. al for your support
• PROMISE_EBF/SB community
• All who in one way contributed to this work directly or indirectly
Greetings from Makerere University – Uganda’s ivory tower!
Greetings also from Bergen: CIH@UiB!
Makerere-Bergen collaboration going strong

James Tumwine

Thorkild Tylleskar
PROMISE - EBF

• A cluster randomised study 2006-2008 (PROMISE-EBF)

• Aim: To establish the effect of home-based peer counselling for exclusive breastfeeding (EBF)

• Sites: Uganda, Burkina-Faso and South Africa
Key Results of PROMISE-EBF

• Increase in EBF in Uganda and Burkina-Faso from 40% to 80%

Tylleskar et al, Lancet July 2011;378;420-27
PROMISE-Saving Brains

AIM

To establish the effect of peer counseling for EBF in the first 6 months of life on human capital formation in an African setting

Specific objectives:

1. To measure the effect of peer counseling for EBF on human capital formation in Uganda and Burkina-Faso

2. To identify solutions to barriers that limit scale up of peer counseling for EBF in Uganda and Burkina-Faso
Core matrices

1. Height for age (WHO standard) with measure of self-reported puberty for 10-18 years
2. Estimate of general intelligence based on
   a. Kaufman Assessment Battery for Children
3. Years of school, with indication of school access and, as is feasible, a measure of school quality
4. Indication of literacy
5. Measures of executive function, specifically:
   a. Working memory,
   b. Cognitive flexibility,
   c. Inhibitory control,
   d. Sustained attention
6. Presence of behavioral and emotional problems and, as is feasible, criminality or its risk factors
Saving the Brain through Breastfeeding
Methods

Participants
• Children from PROMISE-EBF cohort
• Uganda & Burkina Faso sites: At least 70% of original cohort

Data (agreed core matrices)
• Key aspects of human capital formation:
  – Mental health
  – Somatic health
  – Productivity
Three key areas

• Psychometric testing
  – KABC II
  – TOVA
  – CCT

• Clinical assessment
  – Current and past health status, laboratory tests

• Household and school visits
  – Changes in HH economic status, school readiness and attainment
Quality control

• Careful participant tracing and identification to avoid mis-enrolment
• PROMISE-EBF recruiters, evaluators, and data collectors blinded to intervention
• Reliability/validity: Ingunn, Victoria, Hama
MILESTONE S  (A)

• Training I : (October 2012)
  Metropole hotel, Kampala.
  Investigators, study coordinators
  Participants from Uganda, USA, Burkina Faso, Bergen
  – Revision of core matrices
  – Practical session on neuro-cognitive tests - KABC II, TOVA, CCT
  – Set time line for the project and way forward
  – Draft communication strategy
  – Defined staffing structure
Participants at the October 2012 workshop, Metropole Hotel, Kampala
<table>
<thead>
<tr>
<th>Content</th>
<th>Materials</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>KABC II</strong></td>
<td>Kaufman Assessment Battery for children II (KABC II) testing kit</td>
</tr>
<tr>
<td>Sequential testing/ short term memory</td>
<td></td>
</tr>
<tr>
<td>Simultaneous/ Visual processing</td>
<td></td>
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<tr>
<td>Learning ability</td>
<td></td>
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<tr>
<td>Planning ability</td>
<td></td>
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<tr>
<td>Knowledge ability</td>
<td></td>
</tr>
<tr>
<td>TOVA</td>
<td>Computerised TOVA material</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>----------------------------</td>
</tr>
<tr>
<td>Testing omissions/inattention</td>
<td>(Laptop)</td>
</tr>
<tr>
<td>Measuring impulsivity</td>
<td></td>
</tr>
<tr>
<td>Processing ability</td>
<td></td>
</tr>
<tr>
<td>CCT</td>
<td>Children’s Category Test for children Level I (5-8yrs) testing kit</td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------------------------------------------------------</td>
</tr>
<tr>
<td>Non verbal learning</td>
<td></td>
</tr>
<tr>
<td>Cognitive ability/ Concept formation</td>
<td></td>
</tr>
<tr>
<td>Problem solving</td>
<td></td>
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</tbody>
</table>
MILESTONES (B)

• IRB approval (SOMREC & UNCST) December 2012 and April 2013
• Staff recruitment (psychometric, clinical, community teams)

• Training II in Mbale, Uganda – March 2013
  (Bruno Giordani et al)

  – Participants from Uganda, Burkina Faso, Bergen, USA
  – Key areas:
    • Core matrices
    • Psychometric testing
    • Anthropometry
    • Revision of study tools
    • Translations
MILESTONES (C)

• Tracing EBF children:
  – Commenced Jan/Feb 2013
• Testing children
• Commenced Early April 2013
MILESTONE (D)

• Data collection completed 30\textsuperscript{th} October 2014
• Data analysis workshop, Kampala February 2015
• To-date: Data cleaning, merging and analysis
EBF Cohort Uganda, N=765

Traced = 539

504 full results

Died = 85

680 (88.9% of original cohort)

539/765 = 70.5% of original cohort

539/680 = 79.3% of ‘survivors’
Preliminary observations

• About the cohort
  > 70% of original cohort traced (79% of ‘survivors’)
  504 or 74% of 680 survivors completed all study procedures
Preliminary observations

Psychometric testing

• Duration of completing tasks
  – KABC: 60 to 90 min
  – TOVA: 20 min (10 min for instructions and 10 min for the test)
  – CCT: 25 min
Preliminary observations

Data collectors experiences

- Tracing: went reasonably well
- Some participants came late so the tasks were completed late

Participants’ experiences

- KABC II: Children love the toys and want to walk off with them
- TOVA: Children love the switch but anxious about the unfamiliar computer
- CCT: Children anxious to solve more complex tasks
Table 1: Height for age and school attendance

<table>
<thead>
<tr>
<th></th>
<th>Control n (%)</th>
<th>Intervention n (%)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height for Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stunted</td>
<td>39 (15.9%)</td>
<td>53 (21.1%)</td>
<td>0.131</td>
</tr>
<tr>
<td>Not stunted</td>
<td>207 (84.1%)</td>
<td>198 (78.9%)</td>
<td></td>
</tr>
<tr>
<td>Kindergarten attendance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>30 (12.1%)</td>
<td>27 (10.6%)</td>
<td>0.778</td>
</tr>
<tr>
<td>Yes</td>
<td>213 (86.2%)</td>
<td>225 (88.2%)</td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td>4 (1.6%)</td>
<td>3 (1.2%)</td>
<td></td>
</tr>
<tr>
<td>Primary school attendance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>108 (43.9%)</td>
<td>110 (43.1%)</td>
<td>0.963</td>
</tr>
<tr>
<td>Yes</td>
<td>138 (56.1%)</td>
<td>145 (56.9%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control group Mean (std deviation)</td>
<td>Intervention group Mean (std deviation)</td>
<td>Mean difference (std error difference)</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------------------------------</td>
<td>---------------------------------------</td>
<td>----------------------------------------</td>
</tr>
<tr>
<td>Months spent in kindergarten</td>
<td>7.2 (5.6)</td>
<td>6.1 (3.0)</td>
<td>1.07 (0.97)</td>
</tr>
<tr>
<td>Months spent in primary school</td>
<td>18.9 (10.2)</td>
<td>15.6 (9.6)</td>
<td>3.34 (1.17)</td>
</tr>
<tr>
<td>Grade on age approximate school test (percentage)</td>
<td>80.0 (22.3)</td>
<td>79.5 (21.6)</td>
<td>0.53 (2.81)</td>
</tr>
</tbody>
</table>
Table 3: Differences in general intelligence and Executive function

<table>
<thead>
<tr>
<th></th>
<th>Mean difference (std error difference)</th>
<th>95% CI of mean difference</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Intelligence</td>
<td>0.07 (0.09)</td>
<td>(-0.12, 0.25)</td>
<td>0.471</td>
</tr>
<tr>
<td>Working memory</td>
<td>0.37 (0.09)</td>
<td>(-0.14, -0.22)</td>
<td>0.686</td>
</tr>
<tr>
<td>Cognitive flexibility</td>
<td>-0.07 (0.09)</td>
<td>(-0.12, 1.56)</td>
<td>0.789</td>
</tr>
<tr>
<td>Inhibitory control</td>
<td>-0.06 (0.09)</td>
<td>(-0.23, 0.10)</td>
<td>0.459</td>
</tr>
<tr>
<td>Sustained attention</td>
<td>0.11 (0.08)</td>
<td>(-0.05, 0.28)</td>
<td>0.184</td>
</tr>
</tbody>
</table>
Table 4: Differences in emotional and behavioral problems

<table>
<thead>
<tr>
<th></th>
<th>Mean difference</th>
<th>(95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total score</td>
<td>0.04</td>
<td>(-0.8, 0.83)</td>
</tr>
<tr>
<td><strong>Sub domains</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional</td>
<td>0.2</td>
<td>(-0.1, 0.5)</td>
</tr>
<tr>
<td>Conduct</td>
<td>0.0</td>
<td>(-0.3, 0.2)</td>
</tr>
<tr>
<td>Hyperactivity</td>
<td>0.0</td>
<td>(-0.3, 0.3)</td>
</tr>
<tr>
<td>Peer problems</td>
<td>-0.1</td>
<td>(-0.3, 0.2)</td>
</tr>
<tr>
<td>Pro social</td>
<td>-0.3</td>
<td>(-0.6, 0.0)</td>
</tr>
</tbody>
</table>
Conclusion

• We have successfully completed the project
• Data analysis (UGA/BF): work in progress
• Preliminary results gleaned from the Uganda data do not show major differences between intervention and control groups
• Too early to make any definitive conclusions
• South-South, North-South Collaboration can work despite challenges
What I told you

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• EBF
• Saving Brains
• Milestones
• Preliminary Observations
• Conclusions
Join me and all my colleagues to say:

Tusen takk!