Improving TB case detection in children at community level

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Stop TB Symposium
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Acknowledgements

• Dr. Abdul Hamid Salim, Dr. Aung and Priojit Nandi of Damien Foundation Bangladesh
• NTP Bangladesh
• Erwin Cooreman, WHO Bangladesh
• Iftia Jerin and Farhana Sharmin, CWCH
Trends of national case detection and treatment success rate, NTP Bangladesh
Notification of new smear positive pulmonary TB by age and sex at NTP 2006
Damien Foundation smear +ve TB case notification by age and sex in 2009
5 month old baby boy with cough, fever and breathlessness
Exclusively breastfed but severely malnourished
died of previously missed miliary TB
So how much childhood TB is there in Bangladesh?
Bangladesh tuberculin survey 2007-09
5-14 year olds (n=17,585)
Prevalence of infection among children 1-9 years of age by zone and stratum

Annual Risk of Tuberculous infection (ARTI) by zone and stratum
Incidence of childhood TB (0-14 years) per 100,000 children per year

<table>
<thead>
<tr>
<th></th>
<th>NTP 2007 (n=48,608,812)</th>
<th>Damien 2008 (n=9,400,000)</th>
<th>Madhupur 2008-09 (n=153,427)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All types</td>
<td>9</td>
<td>6</td>
<td>52*</td>
</tr>
<tr>
<td>SS +ve</td>
<td>2</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>SS -ve</td>
<td></td>
<td></td>
<td>39</td>
</tr>
<tr>
<td>Extrapulmonary</td>
<td></td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

*Damien Foundation Annual Report 2009
Potentially in Bangladesh.....

\[
\frac{52 \times 48,608,812}{100,000} = 25,277
\]

0-14 year olds can be diagnosed with TB annually

Whereas currently the NTP is diagnosing a mere

\[
\frac{9 \times 48,608,812}{100,000} = 4,375 \text{ children a year}
\]
Barriers to child TB detection

• Lack of family centered contact tracing (*contact tracing with chemoprophylaxis only in 23% of DOTS centres*)

• Lack of guidelines in the field about systematic screening and referral of children suspected to have TB

• Lack of trained personnel (doctors and paramedics) who can diagnose and treat children with TB according to WHO guidelines
A community based intervention to increase referral of children with suspected TB and case detection at microscopy centres at the upazila level
General objective

To increase **case referral** and **detection rates** of children with TB (suspected or actual) in Microscopy Centres by training **paramedics** and **doctors** in screening/referral and diagnosis.
Methods

Study Design

Cluster randomised control trial

Study sites

18 intervention and 18 controlled Damien Foundation (DF) supported Microscopy Centres and their respective upazila health centres
## Distribution of study microscopy centres

<table>
<thead>
<tr>
<th>DISTRICT</th>
<th>Intervention</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tangail</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Jamalpur</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Mymemsingh</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Kishoreganj</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Netrakona</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Rajshahi</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Naogaon</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>C. Nawabganj</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Faridpur</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Gopalganj</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Rajbari</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Madaripur</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Shariatpur</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
Study population

All children aged <15 years attending study Microscopy Centres
  • either referred as suspected TB
  • or brought from contact tracing

Hypothesis

12 months of intervention would result in case detection among referred children increasing from 4% to 8%
Methodological framework

18 Intervention microscopy centres

- Baseline rate of childhood TB referral and detection
- Training of staff of MCs and UHCs and community orientation about early referral and detection of childhood TB
- End term rate of childhood TB referral and detection

18 Control microscopy centres

- Baseline rate of childhood TB referral and detection
- No intervention
- End term rate of childhood TB referral and detection
Pre-intervention activities

• Field visits to DF microscopy centres, adjacent upazila health complexes and their catchment areas to assess how child TB was referred and diagnosed
  – No guidelines available to field staff or doctors
  – No training of field staff or doctors
  – Very few detections from hundreds of children tested with sputum microscopy

• Discussions with Damien management and field staff on what intervention would improve child TB detection
Microscopy centre field staff trained

• Using the 1996 WHO child TB score chart (Keith Edwards)
• Administering the Mantoux Test
• Weighing of child and interpreting how malnourished
• Referring the child to the doctor when needed
• Conducting health education sessions at UHCs, FWCs and RDs with messages on childhood TB, using child TB Flip Chart.
• Filling out our research questionnaires
Doctors trained and oriented on child TB

- Epidemiology
- Diagnosis
- Case scenarios
- Treatment as per NTP guidelines
Childhood TB activities in the community

In the short term

• UHC monthly meetings: Health assistants and other field staff given handbills on childhood TB
• Posters and handbills distributed to FDPs
• Childhood TB discussed at TB club and village doctor meetings
Childhood TB activities in the community

In the longer term

• Quarterly monitoring meetings at CS office oriented to childhood TB.
• Child TB messages given at meetings in schools, madrassas, girl guide and boy scout meetings as well as meetings with Ansars and VDPs.
• Micro credit and NNP NGO workers motivated through orientation sessions
• Direct sessions with mothers from NGO groups
• All doctors (including private practitioners) orientated with childhood TB.
• New messages on childhood TB given at Jumua prayers.
• Folk songs, popular theatre and miking used to transmit messages
CHILD TB CONTACTS AND SUSPECTS FLOW CHART AT MICROSCOPY CENTRE

Register in the CHILD TB CONTACTS AND SUSPECTS REGISTRATION KHATA:
1. All <5yr old child TB contacts (whether symptomatic or asymptomatic)
2. All 5-14 yr old child TB contacts who are symptomatic
3. Child suspects directly attending microscopy centre

Request TB patients to bring:
1. All <5yr old child TB contacts (symptomatic or asymptomatic)
2. All 5-14 yr old child TB contacts who are symptomatic

Registered child TB contacts brought to centre
1. Fill up research questionnaire
2. Mantoux Test
3. WHO child TB score
   - THEN
4. Refer child to UHC MO(DC) for assessment with
   a. Referral slip
   b. Mantoux Test result
   c. WHO child TB score sheet (whether +ve or not)

Assessed by MO (DC)
- Asymptomatic infant (<1 year old) with no TB
  - Give chemoprophylaxis and register
- 1-14 year old not diagnosed with TB
  - Healthy child
    - Send home with assurance
  - Other disease
    - Other treatment
- 1-14 year old diagnosed with TB
  - Give TB treatment

1 “Symptomatic” means fever, persistent cough for more than 3 weeks, weight loss and loss of playfulness
2 “Asymptomatic” means no fever, no persistent cough for more than 3 weeks, no weight loss and no loss of playfulness
Training at Jalchatra, Tangail

Training session for DF TLCAs, TLCOs and FC

Practical session for Mantoux Test

Practical session for questionnaire fill up
Training session for DF medical officers and government MODC
Mantoux Test
### WHO child TB score chart

**Score chart for the diagnosis of TB in children**

<table>
<thead>
<tr>
<th>Feature</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>General</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>duration of illness (weeks)</td>
<td>&lt;2</td>
<td>2 - 4</td>
<td>&gt;4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>nutrition (%weight for age)</td>
<td>&gt;80</td>
<td>60 - 80</td>
<td>&lt;60</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>family history of TB</td>
<td>none</td>
<td>reported by family</td>
<td>proved sputum positive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>tuberculin test</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>positive</td>
</tr>
<tr>
<td>malnutrition</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>not improving after 4 weeks</td>
</tr>
<tr>
<td>unexplained fever and night sweats</td>
<td></td>
<td></td>
<td></td>
<td>no response to malaria treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Local</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lymph nodes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>joint or bone swelling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>abdominal mass or ascites</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C.N.S. signs, and usually abdominal C.S.F. findings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>angle deformity of spine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL SCORE**
আপনার শিশু কি যক্ষ্মা রোগে ভুগছে?

তিন সপ্তাহের বেশি সময় ধরে কাশি ও জুর থাকা

ওজন দিনে দিনে কমে যাওয়া

গলায় গুটির মতো ফুলে যাওয়া

পিঠের হাড় বেঁকে যাওয়া

শিশুর যক্ষ্মা হলে উপরের মে কোন লক্ষণ দেখা দিতে পারে

বিনামূল্য যক্ষ্মা পরীক্ষা ও চিকিৎসার জন্য আজই

নিকটস্থ উপজেলা যাত্রা কমপ্লেক্সে যোগাযোগ করুন।
যাক্সা শুধু বড়দের অসুখ না

প্রতিবছর বাংলাদেশে:
কমপক্ষে ৩৭ হাজার শিশু যাক্সা রোগে আক্রান্ত হয় এবং
১২ হাজার শিশু যাক্সা রোগে মৃত্যু যায়।

বড় যাক্সা রোগীর সংস্পর্শে আসলে ছোট শিশুদের শতকরা ৫০ ভাগই এ রোগে আক্রান্ত হয়।

শিশুদের যাক্সার লক্ষণ:
● তিন সালের বেশি বয়সের শিশুর মৃত্যু বড় হয় এরকম কারণ
● ৩ মাস থেকে শিশুর ওজন বাড়ুকে না
● শিশু আগের মতো খাদ্য খাওয়া করে না এবং
● বীরে যীরে নিজেকে ঘুরে যাইতে সামে
● সাধারণত বড় যাক্সা রোগীর সাথে থিয়ো সংস্পর্শে এসেছে।

শিশুদের যাক্সা নির্দিষ্ট ধরনের হতে পারে:
● কফি
● পাড়ায় বজর ঘুরলে বিদর্শন
● প্লার তাজা বাতাস বা তৃতীয় তরল
● পেট পানি অস্থায়ী
● তাড়াতাড়ি ঘরে যাওয়া
● বিশাল লক্ষণ জুন এবং রাতে ঘুমাও নাযার তামাক খেয়ে নিয়ে যাওয়া।

শিশু যাক্সার পরিকৃতি:
যদি যাক্সা দেহে ধরা পড়ে, তাহলে হয়তো শিশু মারা বেরে পারে।
যদি যাক্সা বড় তাড়াতাড়ি ধরা পড়ে, তাহলে শিশুকে চিকিৎসা দিয়ে সুস্থ করা সম্ভব।

শিশু যাক্সার প্রতিসংস্পর্শ:
বড় যাক্সা রোগীর সংস্পর্শে আসা ১ বছরের শিশুর স্তরে কিন্তু শিশুর কাছে নিয়ে যাওয়া।

উপরের লক্ষণগুলো দেখা দেওয়া মাত্র শিশুকে নিয়ে যাওয়া করে নিম্নে যাওয়া।

নামী ও শিশু যাক্সা কেন্দ্র
বেশ, ইমামবাজার, সাধারণ, তেলা, ১৮৩।
ফোন নং: ০৭১৬-৬৩৬৫৫, ০১৭১৫৬৪১২১৭

CWCH

damien

Bangladesh

CWCH
Child TB Flip chart

শিশুদের যক্ষার লক্ষণ সমূহ
Results
Annual child TB contacts and suspects seen in 18 + 18 study microscopy centres

<table>
<thead>
<tr>
<th></th>
<th>Pre-intervention 2007-08</th>
<th>Post-intervention 2008-09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention centres</td>
<td>1,943</td>
<td>1,577</td>
</tr>
<tr>
<td>Control centres</td>
<td>2,399</td>
<td>1,883</td>
</tr>
</tbody>
</table>
Percent diagnosed with child TB in intervention and control areas before and after intervention

<table>
<thead>
<tr>
<th></th>
<th>Pre-intervention 2007-08</th>
<th>Post-intervention 2008-09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>3.8</td>
<td>12</td>
</tr>
<tr>
<td>Control</td>
<td>4.3</td>
<td>7</td>
</tr>
</tbody>
</table>

Intervention centres | Control centres
Number diagnosed with child TB in intervention and control areas before and after intervention
Type of TB (%) diagnosed in children

![Bar chart showing the percentage of different types of TB diagnosed in children from Intervention and Control centres over different years].

- **Intervention centres 2007-2008**
  - SS+ PTB: 1.1%
  - SS- PTB: 0.8%
  - EPTB: 2.0%

- **Control centres 2007-2008**
  - SS+ PTB: 1.3%
  - SS- PTB: 0.8%
  - EPTB: 2.2%

- **Intervention centres 2008-2009**
  - SS+ PTB: 1.6%
  - SS- PTB: 3.2%
  - EPTB: 6.3%

- **Control centres 2008-09**
  - SS+ PTB: 1.5%
  - SS- PTB: 1.1%
  - EPTB: 4.2%
Type of TB diagnosed in children

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SS+ PTB</td>
<td>SS- PTB</td>
<td>EPTB</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>16</td>
<td>38</td>
<td>31</td>
</tr>
<tr>
<td>31</td>
<td>20</td>
<td>53</td>
<td>25</td>
</tr>
<tr>
<td>25</td>
<td>51</td>
<td>99</td>
<td>29</td>
</tr>
<tr>
<td>29</td>
<td>21</td>
<td>80</td>
<td></td>
</tr>
</tbody>
</table>
## Source of referral (%)

<table>
<thead>
<tr>
<th>Referred by</th>
<th>Intervention (n=395)</th>
<th>Control (n=376)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical personnel</td>
<td>44</td>
<td>56</td>
<td>0.002</td>
</tr>
<tr>
<td>Non-technical personnel</td>
<td>56</td>
<td>44</td>
<td></td>
</tr>
</tbody>
</table>
## Family characteristics

<table>
<thead>
<tr>
<th></th>
<th>Intervention (n= 395)</th>
<th>Control (n= 376)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean family members</td>
<td>5.6</td>
<td>5.6</td>
<td>0.940</td>
</tr>
<tr>
<td>Mean monthly income of household</td>
<td>6346</td>
<td>6042</td>
<td>0.403</td>
</tr>
<tr>
<td>Tube well (%)</td>
<td>99</td>
<td>98</td>
<td>0.537</td>
</tr>
<tr>
<td>Sanitary toilet (%)</td>
<td>83</td>
<td>79</td>
<td>0.140</td>
</tr>
<tr>
<td>Electricity (%)</td>
<td>38</td>
<td>34</td>
<td>0.231</td>
</tr>
</tbody>
</table>
### Parental characteristics

<table>
<thead>
<tr>
<th></th>
<th>Intervention (n= 395)</th>
<th>Control (n= 376)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fathers educational qualification %</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School going</td>
<td>59</td>
<td>51</td>
<td>0.025</td>
</tr>
<tr>
<td>Not school going</td>
<td>41</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td><strong>Fathers occupation %</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blue collar worker</td>
<td>56</td>
<td>51</td>
<td>0.149</td>
</tr>
<tr>
<td>White collar worker</td>
<td>44</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td><strong>Mothers educational qualification %</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>School going</td>
<td>62</td>
<td>54</td>
<td>0.035</td>
</tr>
<tr>
<td>Not school going</td>
<td>39</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td><strong>Mothers occupation %</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>93</td>
<td>94</td>
<td>0.469</td>
</tr>
<tr>
<td>Garments worker/Others</td>
<td>7</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Biological parameters</td>
<td>Intervention (n= 395)</td>
<td>Control (n= 376)</td>
<td>p value</td>
</tr>
<tr>
<td>-----------------------</td>
<td>----------------------</td>
<td>------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Mean age (months)</td>
<td>62</td>
<td>82</td>
<td>0.000</td>
</tr>
<tr>
<td>Male (%)</td>
<td>53</td>
<td>51</td>
<td>0.517</td>
</tr>
<tr>
<td>Mean weight for age Z score (WAZ)</td>
<td>-1.95</td>
<td>-2.00</td>
<td>0.595</td>
</tr>
</tbody>
</table>
Parent

“When my child was ill at first I went to a community agent who asked me some questions and referred me to the UHC. At the UHC DOTS corner, the paramedic Mohonlal Babu asked me many questions such as how many days my child had cough. Is there any TB patient in your family and among your neighbours? After that he gave the child an injection, measured his weight, marked his arm and said to come back three days later. After three days he took my child to the doctor who examined my child’s arm and asked some questions and examined the child properly and told me that my child had TB.”
Community agent

“Previously we had no idea about child TB but now we know about it from paramedics and materials such as handbills and posters. We need separate training on childhood TB.”
Paramedic

“So some time ago I was conducting a health education session. At that time a woman told me that a child close by had the symptoms I had mentioned. I went to the child’s house and saw that his joints were swollen. I brought this child to the TB hospital and after doing the MT he was diagnosed with TB.”
“Mukti, a 9 y old girl, brought to me by a paramedic with a family history of contact with TB +ve patients (both father and mother) and a WHO chart score of 10 with fever and cough for 1 month along with weight loss. I examined the child and then started anti TB Drugs and now the child is improving.”
Damien Foundation doctor

“I have had training. This project is important and necessary. In study sub-districts, child TB referral and detection has increased. Children are a large part of our population and we didn’t know about the incidence of child TB. This project has opened our eyes. All our staff are working hard and they are getting the fruits of their work.”
“Obviously detection of child TB has increased. It was good initiative. Personally I have been benefited with this project’s training. Now TLCAs and TLCOs also know much about childhood TB from their training. In reality previously child TB was only diagnosed in medical colleges by specialists but now it’s diagnosed at the UHC. But there needs to be more focus on monitoring and on building up community awareness.”
Conclusions

• A comprehensive intervention involving existing front line TB workers can increase childhood TB detection at upazila level

• Referrals have not increased from the community but are more from lay people

• Overall performance of trained health personnel satisfactory

• Good response from the public to key messages on child TB
Recommendations for NTP

• Develop national child TB strategy and action plan
• SCALE UP training of microscopy centre and UHC personnel on childhood TB
• Provision of Mantoux Test and weighing scales at all microscopy centres
• Ensure chest x-rays at all government health centres
• Increase community based orientation of village doctors, community agents and health workers
• National incidence study for childhood TB
Thank you for your attention