Retention Patterns in an Adolescent Tuberculosis Cohort Study: Siaya District, Western Kenya in Preparation for Future Vaccine Trials

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Background

- Adolescents will be a prime target for new TB vaccines
- Tracking and retaining adolescents is an essential prerequisite to conducting future vaccine trials in this group
KEMRI/CDC Study Area, Western Kenya
Background

- Siaya District has a TB case notification rate of 440/100,000

- Karemo division has 57 primary and 10 secondary schools

- Karemo division had 13,000 adolescents aged 12-18 years (HDSS, 2008)

- Study area had high out migration rates (HDSS, 2008)
Age-specific migration rates (HDSS, 2008)

The graph illustrates the inmigration and outmigrations rates for different age groups, measured as migrations per 1000 person years.

Key highlights:
- The inmigration rate peaks in the age group 20-24 years.
- The outmigrations rate shows a steady decline across all age groups.

The data highlights the patterns of migration in the specified age groups.
Methods

• 167 villages, were mapped into 17 clusters
• We enrolled 5004 adolescents in 1 year from 9 randomly selected clusters (August 2008 to August 2009)
• Follow up visits were conducted every four months between one to two years depending on when they were enrolled
• A mobile field site was set up in schools where visits were conducted (using tents)
Follow up visits using mobile field site (MFS)
Tracing efforts

- Community interviewers (study staff) issued reminders in schools and at homes for upcoming visits.
- Village reporters (community volunteers that resided in the villages) were actively involved in updating on participants whereabouts.
- Participants who moved within HDSS were traced and brought to the mobile field site.
- A follow up card was issued to remind participants of the next visit.
Descriptive statistics were used to calculate the monthly retention percentages.
Retention rates were compared by gender and age groups.
Bivariate (Pooled t-test for equal variances) analysis was used to test for differences in mean retention rates at 95% confidence level.
Bivariate analysis was used to determine significant association between various factors and study completion.
Numbers enrolled per age group and gender

<table>
<thead>
<tr>
<th>Sex</th>
<th>Age group</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>12-14 yrs</td>
<td>55.7%</td>
</tr>
<tr>
<td>Male</td>
<td>15-17 yrs</td>
<td>37.8%</td>
</tr>
<tr>
<td>Male</td>
<td>18 yrs</td>
<td>6.5%</td>
</tr>
<tr>
<td>Female</td>
<td>12-14 yrs</td>
<td>48.5%</td>
</tr>
<tr>
<td>Female</td>
<td>15-17 yrs</td>
<td>51.5%</td>
</tr>
<tr>
<td>Female</td>
<td>18 yrs</td>
<td>0.0%</td>
</tr>
</tbody>
</table>
Numbers enrolled in school and level of education

- **In school:** 93.6%
- **Out of school:** 6.4%

- **Level of education:**
  - **Enrolled in school:**
    - Primary: 90.4%
    - Secondary: 8.6%
    - Post secondary: 0.1%
    - None: 0.9%
Retention in year 1

Age group

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Percentage Retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-14</td>
<td>87%</td>
</tr>
<tr>
<td>15-17</td>
<td>78%</td>
</tr>
<tr>
<td>18</td>
<td>72%</td>
</tr>
</tbody>
</table>

Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Percentage Retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>82%</td>
</tr>
<tr>
<td>Male</td>
<td>79%</td>
</tr>
</tbody>
</table>

Follow up Intervals

Average retention at 1 year of follow up was 81%
Retention in Year 2

Age group

Gender

Follow up Intervals

Follow up Intervals

Percentage Retention

Follow up Intervals

Percentage Retention

Month 16  Month 20  Month 24

Month 16  Month 20  Month 24

12-14 (n=1564)

15-17 (n=1031)

18 (n=189)

Average

Female (n=1337)

Male (n=1446)

Average
## Study Completion

<table>
<thead>
<tr>
<th>Predictor variable</th>
<th>Completed Study</th>
<th></th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Age category</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12-14 yrs</td>
<td>2443 (48.8 %)</td>
<td>346 (6.9%)</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>15-17 yrs</td>
<td>1463 (29.2 %)</td>
<td>428 (8.6%)</td>
<td></td>
</tr>
<tr>
<td>18 yrs</td>
<td>213 (4.3 %)</td>
<td>111 (2.2%)</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>2174 (43.5%)</td>
<td>405 (8.1%)</td>
<td>0.0001</td>
</tr>
<tr>
<td>Female</td>
<td>1945 (38.9%)</td>
<td>480 (9.6%)</td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>27 (0.5%)</td>
<td>18 (0.4%)</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Primary</td>
<td>3762 (75.3%)</td>
<td>756 (15.1%)</td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>325 (6.5%)</td>
<td>105 (2.1%)</td>
<td></td>
</tr>
<tr>
<td>Post secondary</td>
<td>5 (0.1%)</td>
<td>1 (0.02%)</td>
<td></td>
</tr>
<tr>
<td>School going</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>3954 (79.1%)</td>
<td>727 (14.5%)</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>No</td>
<td>165 (3.3%)</td>
<td>153 (3.1%)</td>
<td></td>
</tr>
</tbody>
</table>
Study Completion

• 4119 (82.3%) adolescents completed follow up as per protocol against 885 (17.7%) who were lost to follow up
Challenges

• Out-migration due to:
  - marriage
  - employment
  - visiting the relatives (especially during holidays)
  - schooling

• Difficulty in reaching students in boarding schools

• Adolescents are prone to peer pressure (influencing willingness to participate)

• Exam periods (disrupting study follow up)

• Setting up the mobile field site frequently required a lot of staff time resources
Discussion

• Younger adolescents showed a better retention compared to older adolescents

• The average retention rate was 80%

• We identified age category, gender, level of education and school going status as predictors of study completion

• Our data reveal that retaining an adolescent cohort for a TB vaccine trial is possible in Western Kenya
Acknowledgements

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• Community members-Karemo division
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Thank you

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.