Evaluating alternative models to optimise trachoma trichiasis case finding and surgical outreach in areas with low prevalence

Caleb Mpyet, Joy Shuaibu

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<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of TT cases among people attending the camp</td>
<td>17</td>
</tr>
<tr>
<td>Patients with cataract and other ocular morbidities</td>
<td>21</td>
</tr>
<tr>
<td>Financial and human resources utilised by different methods</td>
<td>23</td>
</tr>
<tr>
<td>Discussion</td>
<td>28</td>
</tr>
<tr>
<td>Key lessons learned</td>
<td>30</td>
</tr>
<tr>
<td>Limitations/interpretation of the study findings</td>
<td>31</td>
</tr>
<tr>
<td>References</td>
<td>32</td>
</tr>
<tr>
<td>Appendices</td>
<td>34</td>
</tr>
<tr>
<td>Appendix 1: Maps of study site</td>
<td>34</td>
</tr>
<tr>
<td>Appendix 2: Study clusters and implementation plan</td>
<td>36</td>
</tr>
<tr>
<td>Appendix 3: Ethical clearance letter</td>
<td>36</td>
</tr>
<tr>
<td>Appendix 4: Key messages used for case finding</td>
<td>37</td>
</tr>
<tr>
<td>Appendix 5: Data capturing tools</td>
<td>39</td>
</tr>
<tr>
<td>Appendix 6: Activity timing sheet</td>
<td>39</td>
</tr>
<tr>
<td>Appendix 7: Complete study data</td>
<td>39</td>
</tr>
<tr>
<td>Appendix 8: Summary of study data</td>
<td>39</td>
</tr>
<tr>
<td>Appendix 9: Picture gallery</td>
<td>39</td>
</tr>
</tbody>
</table>
### Abbreviations and acronyms

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP</td>
<td>Blood pressure</td>
</tr>
<tr>
<td>CATCH</td>
<td>Coordinated Approach to Community Health</td>
</tr>
<tr>
<td>CTAs</td>
<td>Community trained assistants</td>
</tr>
<tr>
<td>GET 2020</td>
<td>Global Elimination of Trachoma 2020</td>
</tr>
<tr>
<td>HANDS</td>
<td>Health and Development Support Programme</td>
</tr>
<tr>
<td>H2H</td>
<td>House to house</td>
</tr>
<tr>
<td>LGA</td>
<td>Local government area</td>
</tr>
<tr>
<td>MOH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-governmental organisation</td>
</tr>
<tr>
<td>OCO</td>
<td>Ophthalmic clinical officer</td>
</tr>
<tr>
<td>ON</td>
<td>Ophthalmic nurse</td>
</tr>
<tr>
<td>PI</td>
<td>Principal investigator</td>
</tr>
<tr>
<td>RBS</td>
<td>Random blood sugar</td>
</tr>
<tr>
<td>SAFE</td>
<td>Surgery, antibiotics, facial cleanliness, environmental sanitation</td>
</tr>
<tr>
<td>TT</td>
<td>Trachomatous trichiasis</td>
</tr>
<tr>
<td>VA</td>
<td>Visual acuity</td>
</tr>
<tr>
<td>VI</td>
<td>Visual impairment</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>
List of tables

Table 1: Fieldwork schedule in study clusters ................................................................. 14
Table 2: Trachomatous trichiasis related outputs across four case-finding methods .......... 18
Table 3: Outputs related to cataract surgeries, presbyopic glasses, and referrals for other ocular morbidities across four case-finding methods .................................................................................................................. 19
Table 4: Percentage yield of confirmed TT and cataract cases for each case-finding method tested .................................................................................................................................................................................. 21
Table 5: Proportion of confirmed TT cases from suspected TT cases on the case finders’ register 23
Table 6: TT outreach camp productivity across all methods tested ........................................ 25

List of figures

Figure 1: Percentage of people examined at the household level who showed up at the camp .... 20
Figure 2: Proportion of confirmed TT cases among self-referred patients to camp ............... 20
Figure 3: Comparison of proportion of TT cases among the self-referred patients and those referred by TT case finders .................................................................................................................. 21
Figure 4: Comparison of proportion of TT cases among the self-referred patients and those referred by TT case finders .................................................................................................................. 21
Figure 5: Comparison of proportion of TT cases among the self-referred patients and those referred by TT case finders .................................................................................................................. 22
Figure 6: Expenditure on finding one TT case for each method ............................................ 23
Figure 7: Number of case finders and TT surgeons in camp ................................................. 24
Figure 8: Number and type of personnel involved with camps .............................................. 25
Figure 9: Cataract cases identified in the camps .................................................................... 26
Figure 10: Other ocular morbidities excluding TT and cataract cases identified in camp ....... 26
Figure 11: Expenditure on cataract surgeries in US dollars compared to number of cataract surgeries for each method .................................................................................................................. 27
Figure 12: Expenditure on managing non-TT and cataract eye conditions in US dollars compared to the number of non-TT/cataract eye conditions managed ................................................................. 27
List of appendices

1: Maps of study site
2: Study clusters and implementation plan
3: Ethical clearance letter
4: Key messages used for case finding
5: Data capturing tools
6: Activity timing sheet
7: Complete study data
8: Summary of study data
9: Picture gallery
Acknowledgements

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Abstract

Research background

Coordinated Approach to Community Health (CATCH) is a project funded by the UK Department for International Development (UKAID) and implemented by Sightsavers. It delivers treatment for a range of eye care conditions alongside a trachoma elimination programme which focuses on surgery for trachomatous trichiasis (TT) in Kano State, Nigeria, where an estimated 36,000 people have the condition.

This was an operational research study integrated within the CATCH project conducted between February and September 2017.

Research aim

The research aimed to explore the most appropriate method of finding TT cases for the areas with rapidly decreasing TT prevalence, and to consider the positive and negative impacts of adding additional eye care services to the TT outreach.

Study design

This was a prospective descriptive study which utilised both routine programme data and additional primary data collected from the field. The study was conducted in Ajingi, Kura, and Tudun Wada local government areas of the Kano State.

The study compared the following four methods:

- **Method 1**: House-to-house case finding by community volunteers for TT only, and management of TT only at the outreach camps.
- **Method 2**: House-to-house case finding by community volunteers for TT only, followed by management of TT, cataract and other ocular morbidities through treatments at the outreach camps and referrals to nearby hospitals.
- **Method 3**: House-to-house case finding by trained health workers for TT and visual impairment, and management of different eye conditions through treatment at the camps and referrals to nearby hospitals.
- **Method 4**: Use of mass media to mobilise communities for eye care outreach camps and management of different eye conditions through treatment at the camps and referrals to nearby hospitals.

Each of the study sites was divided into four clusters to accommodate the four different methods. Clusters were matched across sites based on population and known eye morbidity to ensure comparability.
Results

The number of camp attendees across methods 1-4 was 403; 1,072; 1,419 and 1,901. The yield of TT cases among people presenting at the camp was 32.5%, 16%, 11.9% and 10.25% respectively.

The proportion of females among patients attending the camps varied from 53.4% in method 3 to 70% in method 1.

The proportion of self-referrals varied from 40.1% in method 3 to 55.7% in method 2. There was little difference in the proportion of confirmed TT cases among those referred by the case finders (79%-82%), and little difference in the proportion of TT cases managed at the camp (90.8%-98.8%).

The proportion of patients diagnosed with cataract among those attending the camps varied from 14% in method 2 to 38.9% in method 4. The proportion of females among those with diagnosed cataract varied from 50.3% in method 2 to 71% in method 1. The proportion of other (non-TT and non-cataract) ocular morbidities identified at the camps varied from 13.4% in method 4 to 39.2% in method 1.

The average project expenditure for finding one TT case were similar in methods 1-3 ($5.4-$6.3 US dollars). The expenditure per one TT case found using method 4 was 3.5 times higher ($21.5 per TT case found). The average project expenditure per cataract case managed varied from $32.6 in method 4, to $48.8 in method 2. The expenditure for managing other ocular morbidities varied from $4 per case in method 4, to $6.7 in method 3.

Conclusion

This study found that the house-to-house search for TT cases only and the focus of outreach camps on patients with TT had the highest yield of TT cases among patients attending the camp. However, even in this TT-focused approach, two thirds of the camp attendees were non-TT cases; about a quarter of patients had cataract and nearly 40% required treatment for other ocular morbidities.

This study showed that mobilising patients with other eye conditions alongside TT outreach campaign is feasible. However, such camps can increase the number of camp attendees four to five fold; the camps require additional human resources and effective camp management. It will be useful to further evaluate the effect of providing additional eye care services on the TT surgical outcomes and camp staff motivation.
Introduction

Research background

Trachoma is the leading infectious cause of blindness, affecting an estimated 84 million people globally (WHO, 2010). The disease has been long eliminated as a public health problem in Europe and the United States but is still prevalent in many parts of the developing world, affecting the poorest and the most vulnerable population groups (Frick et al, 2003).

The National Survey of Blindness and Low Vision conducted in Nigeria in 2005-2007 found trachoma to be responsible for 4.2% of all blindness and 0.8% of all visual impairment in the country (Dineen et al, 2008). Kano is one of the Nigerian states where trachoma is endemic, with an estimated backlog of 36,000 people living with trachomatous trichiasis (TT) today (Mpyet et al, 2012).

The World Health Organization (WHO) recommends a strategy called SAFE as the approach to eliminate and mitigate the impact of trachoma (WHO, 1997). With over £10 million of annual investments, the global trachoma elimination programme is currently underway.

Although surgical management of trichiasis has been shown to be cost-effective, finding TT cases continues to be challenging (Greene et al, 2015) and the success of any trachoma programme is dependent on the effectiveness of finding TT cases and the efficiency of the TT surgical outreach.

Evidence from earlier TT outreach programmes suggests that many TT camps yield a significant number of patients with other ocular morbidities. It is important that these people are appropriately managed by the health system – firstly because it is unethical to turn down the patients in need of care, and secondly because untreated patients with eye diseases can negatively influence community attitudes and undermine the effectiveness of the TT elimination campaigns.

In response to the growing number of patients with different eye conditions attending TT outreach camps, Sightsavers – with funding from the UK Department for International Development (UKAID) – started implementing a CATCH programme (Coordinated Approach to Community Health). The aim of the programme is to complement the TT outreach activities and to identify and treat patients presenting with various ocular morbidities at the TT outreach camps.

Research rationale

The current preferred approach to finding TT cases is to train volunteer TT case finders and to conduct house-to-house searches for people with suspected TT (one or more lashes touching the globe) over a period of two to three weeks. At the end of the case-finding campaign a list of suspected cases from all case finders is summarised by the District Health Team (DHT) or a local implementing partner and the dates and length of the outreach camp are set up. The case finders are then asked to bring the identified cases to the camp.

However, in many contexts where the backlog of trichiasis is high, trachoma programmes utilise campaign strategies which mobilise communities through radio and other means of public
communication. In this approach, patients from surrounding settlements are asked to come to eye camps where they are examined, and people with TT receive surgery. This approach has been described as an easier option to organise, but it has the unintended effect of bringing significant numbers of patients with other eye morbidities – especially when the public awareness campaigns are not tailored to trichiasis. A high volume of patients turning up at the camp can overwhelm the trachoma programme and slow down the elimination efforts.

As trichiasis services are being scaled up, and the backlog of trichiasis cases is decreasing, it is important to understand which case-finding approach is most effective and efficient and how different approaches to community mobilisation work in different settings.

**Research aim and objectives**

This research aimed to compare different approaches to community mobilisation and TT case finding and assess positive and negative impacts of adding additional eye health services to the TT campaign.

The research objectives were:

- To determine the yield of TT cases identified and managed using different case-finding methodologies.
- To determine the yield of non-TT cases identified and managed using different case-finding methodologies.
- To examine resource implications and compare costs and cost-effectiveness of different case-finding methodologies.
Methods

Study areas

The study was conducted in Kano State, located in the Sudan and Sahel zones of northern Nigeria. The state has 44 local government areas (LGAs) and a population of about 9 million people (Federal Republic of Nigeria, 2006).

The vast majority of the population are settled agriculturists and herdsmen. There are also pastoral Fulani, some of whom are nomadic and move according to the season. Nine districts of Kano State are endemic for trachoma and are supported by Sightsavers through a grant from the UKAID.

The study was carried out in three districts of the State: Kura, Ajingi and Tudun Wada (Appendix 1), selected based on the inclusion and exclusion criteria outlined below.

Inclusion criteria:

- TT endemic districts supported by Sightsavers, where no TT activities had been implemented prior to the study

Exclusion criteria:

- TT endemic districts which are not supported by Sightsavers.
- TT endemic districts which had TT activities prior to the study.

Study design and sampling

This was a prospective descriptive study which utilised routinely collected programme data and data collected from the field during outreach camps and case-finding campaigns.

The non-probability sampling was used to select study sites (Ajingi, Kura and Tudun Wada LGAs). Each site was divided into four clusters corresponding to the four case-finding methodologies compared in this study (Appendix 2).

Measurements

The primary outcome measure was the number of TT cases identified and managed with each of the methods tested.

The secondary outcome measures were the number of cataract cases identified and managed, the number of other ocular morbidities identified and managed, the patient to staff ratio at the outreach camps, and the cost per TT, cataract and other ocular morbidity case managed.
Ethical considerations

The study used routine and non-routine data collected by the TT/CATCH programme. All data collected was anonymised and confidentiality of patient information was ensured throughout the study. All data was stored in secure password-protected computers accessed by the research team only. All participants attending the camp gave their consent to use their data for the purpose of the study.

All TT cases identified by the TT case finders were referred to the TT outreach camps and received appropriate treatment free of charge. All individuals with active trachoma or bacterial conjunctivitis were treated with tetracycline eye ointment. All people who could not be treated at the camp were referred to the nearby eye clinic for further examination and treatment.

The study received ethical approval from the Institutional Review Board (IRB) of the Jos University Teaching Hospital and the Kano State Ministry of Health (Appendix 3).

Data entry and analysis

The data collected from each study site was entered into a Microsoft Excel spreadsheet; after the cleaning, the data was consolidated across the sites and analysed using the Statistical Package for Social Sciences (SPSS) software version 21.

Study process

Research team

The research team consisted of six people including a principal investigator (PI), a research coordinator, a research supervisor and three research assistants. The principal investigator led the team and was responsible for ensuring the quality of the study. The research coordinator worked closely with the PI, liaised with the Kano State Ministry of Health, and provided support to the research supervisor and research assistants. The research supervisor was responsible for the implementation of the study, and the research assistants had the primary responsibility for collecting the data.

The first planning meeting took place on 14 February 2017, where the study objectives and the roles and responsibilities were agreed.

Two-day training was held with the representatives of the Kano State Ministry of Health, the implementing partner (HANDS), Sightsavers, ophthalmic nurses, TT surgeons and LGA focal persons.

Data collection tools

The study used routine programme data on the number of people screened and the cases identified and treated. It also collected additional data on timing of different activities, services
provided, infrastructure, logistics and personnel. The tools for collecting the additional data were developed by the research team (Appendices 4, 5 and 6).

The tools were piloted at a TT project site (Gabasawa) which was not included in the main study. Each camp had a research assistant responsible for data collection and ensuring the data entered by the surgeons and their assistants was complete and accurate. The research supervisor moved between the three study locations to ensure consistency and quality of the fieldwork.

Research clusters

The research was carried out in three LGAs: Ajingi, Kura and Tudun Wada. The sites were geographically distant from each other (Appendix 1). Each LGA was divided into four clusters corresponding to the four methods of case finding tested in the study; the methods were applied in each cluster across the three LGAs concurrently (Table 1).

<table>
<thead>
<tr>
<th>Method</th>
<th>Month</th>
<th>Kura</th>
<th>Ajingi</th>
<th>Tudun wada</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>March</td>
<td>Dalili, Rigar Duka</td>
<td>Toranke, Gafasa</td>
<td>T/ Wada A, T/Wada B</td>
</tr>
<tr>
<td>2</td>
<td>April</td>
<td>Tanawa, Sarkin Kura, Kurunsumau</td>
<td>Ajingi, Dundun, Kunkurawa</td>
<td>Burum-Burum, Dalawa, Baburi</td>
</tr>
<tr>
<td>3</td>
<td>May</td>
<td>Kosawa, Dan Hassan, Dukawa</td>
<td>Balare, Chula, Dabi</td>
<td>Nata’all, Karefa, Jita</td>
</tr>
<tr>
<td>4</td>
<td>July</td>
<td>Gudutse, Karfi</td>
<td>Gurduba, Unguwar Bai</td>
<td>Jandutse, Yaryasa, Shuwaki</td>
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</tbody>
</table>

Methods of case finding

The study tested and compared four models of case finding and outreach camp management. Based on the experiences of other TT and eye care programmes, the camps were planned to last two days in each location, but this was open to modification based on the number of people attending each camp.

The camps were guided by standardised protocols agreed by the surgical teams prior to the study. The surgeons also had a standardised document for pre- and post-operation counselling.
Case finding: Method 1 (current preferred practice approach)

This method used house-to-house searching for TT patients only, with the TT camp organised two weeks after the case-finding campaign.

Outreach camp for method 1

The outreach camp for method 1 was held on 30 and 31 March 2017. The camp followed a standard protocol used to coordinate activities; patients brought/sourced by the case finders were first called out and registered, then a triage was carried out to distinguish between TT and non-TT patients.

The TT screening was done by the TT surgeons. No other eye care services except minor treatments were provided at the camp but patients with other ocular morbidities were referred to the eye health clinics.

Case finding: Method 2

Case finders were trained to conduct house-to-house searches for TT cases only. The outreach camp was held two weeks after the case-finding campaign.

Outreach Camp for method 2

The outreach camp for method 2 was held on 20 and 21 April 2017. The camp provided services to TT and cataract patients. The cataract surgery teams were mobilised alongside the TT surgery teams and both surgical services were provided at the same venue in most cases. In a few instances, cataract surgeries were provided at a different venue.

Documents to track the number of patients in different disease categories were handed out. Screened TT patients were given diagnosis sheets in which their BP, RBS and VA data was recorded. Patients with operable cataracts were given coupons with their BP, RBS and VA recorded on the coupons and were referred for cataract surgery at the designated section of the camp. Patients with minor eye conditions were given non-TT patient slips showing their prescribed medicines. These patients were given medicines at the camp immediately after the prescription.

Patients with refractive errors and presbyopia were examined but no glasses were provided for them at the camp. These patients were referred to nearby hospitals to obtain spectacles. Minor eye morbidities were treated with eye drops and other medicines; those with bacterial conjunctivitis and other eye infections were offered tetracycline eye ointment.

Case finding: Method 3

This method used house-to-house searching of TT cases and people with visual impairment (visual acuity (VA) less than 6/18). Case finders were health workers trained on both TT and VA testing using the Snellen’s Chart; people with visual acuity less than 6/18 were referred to the camp.

The camp was held two weeks after the case-finding campaign.

Outreach camp for method 3
The outreach camp for this method was scheduled for 19 and 20 April, however one of the centres extended it to 21 April in order to manage all cases presented at the camp. All cases of ocular morbidity that attended the camp were addressed, and complicated cases were referred to nearby hospitals.

Surgery was provided for people with TT and cataracts. Patients with refractive errors were referred to hospitals to obtain spectacles, while those with presbyopia were provided with presbyopic spectacles at the camp. Minor ocular morbidity cases received eye drops and other medicines and those with bacterial conjunctivitis and other minor infections were offered tetracycline ointment.

Case finding: Method 4 (mass media community mobilisation)

In this method patients were mobilised by town announcers, hand bills and posters. The announcements were made in each community for a period of eight days. Information and communication materials such as handbills and posters, depicting cataract and trichiasis, were displayed. Radio jingles were excluded to prevent people from other locations coming to the camps.

Outreach camp for method 4

These camps were held on 6 and 7 July; the camp in Ajingi was extended to 8 July to be able to address all cases attending. All ocular morbidity cases presented at the camp were managed, and complicated cases were referred to nearby hospitals.
Results

Number of patients attending the camps

The number of patients attending the outreach camps varied from 403 in method 1 to 1,901 in method 4. The proportion of females among all patients attending the camps varied from 53.4% in method 3 to 70% in method 1 (Table 2).

Among the three methods which used both referrals by the case finders and self-referrals (methods 1, 2, 3), the proportion of self-referred (walk in) patients varied from 40.1% in method 3 to 55.7% in method 2. The proportion of patients who attended the camps out of those screened by the case finders varied from 31.3% in method 1 to 63.7% in method 2.

Proportion of TT cases among people attending the camp

The proportion of TT cases among those attending the camps varied from 10.3% in method 4 to 32.5% in method 1. The proportion of females among patients with confirmed TT was 65% in method 1 and slightly higher (73-75%) in the other three methods.

There was little difference in the proportion of confirmed TT cases among those referred by the case finders: 81% in method 1, 82% in method 2, and 79% in method 3 (Figure 1). The proportion of confirmed TT cases among self-referred/walk in patients was 14.5% for method 1, 5.2% for method 2, and 6.2% for method 3 (Figure 2).

The majority of TT cases identified were managed at the camp, with little variation between the four methods (range from 90.8% in method 1 to 98.8% in method 3) (Figures 3-5).
Table 2: Trachomatous trichiasis related outputs across four case-finding methods

<table>
<thead>
<tr>
<th>Method</th>
<th>Total no. screened</th>
<th>Male</th>
<th>Female</th>
<th>All confirmed TT cases</th>
<th>Percentage yield of TT cases</th>
<th>Total TT surgeries</th>
<th>Male</th>
<th>Female</th>
<th>Total epilation</th>
<th>Male</th>
<th>Female</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>403</td>
<td>121</td>
<td>282</td>
<td>131</td>
<td>32.5%</td>
<td>107</td>
<td>22</td>
<td>85</td>
<td>12</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>1072</td>
<td>429</td>
<td>643</td>
<td>172</td>
<td>16.0%</td>
<td>149</td>
<td>22</td>
<td>127</td>
<td>10</td>
<td>5</td>
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<tr>
<td>3</td>
<td>1419</td>
<td>661</td>
<td>758</td>
<td>169</td>
<td>11.9%</td>
<td>154</td>
<td>27</td>
<td>127</td>
<td>8</td>
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<td>4</td>
</tr>
<tr>
<td>4</td>
<td>1901</td>
<td>744</td>
<td>1157</td>
<td>195</td>
<td>10.3%</td>
<td>176</td>
<td>28</td>
<td>148</td>
<td>9</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4795</strong></td>
<td><strong>1955</strong></td>
<td><strong>2840</strong></td>
<td><strong>667</strong></td>
<td></td>
<td><strong>586</strong></td>
<td><strong>99</strong></td>
<td><strong>487</strong></td>
<td><strong>39</strong></td>
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<table>
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<th>Method</th>
<th>Total no. screened</th>
<th>Male</th>
<th>Female</th>
<th>Cataract surgeries</th>
<th>Male</th>
<th>Female</th>
<th>Received presbyopic glasses</th>
<th>Male</th>
<th>Female</th>
<th>Referred to hospital for other ocular morbidities</th>
<th>Male</th>
<th>Female</th>
</tr>
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<tbody>
<tr>
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<td>403</td>
<td>121</td>
<td>282</td>
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<td>80</td>
<td>67</td>
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Figure 1: Percentage of people examined at the household level who showed up at the camp

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<tr>
<th>Method</th>
<th>Patients who came to TT camp</th>
<th>Patients who did not come to TT camp</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method 3</td>
<td>46.6</td>
<td>53.4</td>
</tr>
<tr>
<td>Method 2</td>
<td>63.7</td>
<td>36.3</td>
</tr>
<tr>
<td>Method 1</td>
<td>31.25</td>
<td>68.75</td>
</tr>
</tbody>
</table>

Figure 2: Proportion of confirmed TT cases among self-referred patients to camp

<table>
<thead>
<tr>
<th>Method</th>
<th>Total Number of TT cases confirmed amongst the self referrals</th>
<th>Number of people who walked into the camp (self-referrals)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method 1</td>
<td>25</td>
<td>173</td>
</tr>
<tr>
<td>Method 2</td>
<td>31</td>
<td>597</td>
</tr>
<tr>
<td>Method 3</td>
<td>35</td>
<td>569</td>
</tr>
</tbody>
</table>
Patients with cataract and other ocular morbidities

The proportion of patients diagnosed with cataract among those attending the camps varied from 14% in method 2 to 38.9% in method 4. Interestingly, even in method 1 – which did not target patients with conditions other than TT – over a quarter of patients attending the camp were patients with cataract (Tables 3 and 4). The proportion of females among those with diagnosed cataract varied from 50.3% in method 2 to 71% in method 1 (Figure 9).

The proportion of other (non-TT and non-cataract) ocular morbidities identified at the camps varied from 13.4% in method 4 to 39.2% in method 1 (Table 3, Figure 10).

Table 4: Percentage yield of confirmed TT and cataract cases for each case-finding method tested

<table>
<thead>
<tr>
<th>Method</th>
<th>Total no. screened</th>
<th>Male</th>
<th>Female</th>
<th>All confirmed TT cases</th>
<th>Percentage yield of TT cases</th>
<th>Cataract cases identified</th>
<th>Male</th>
<th>Female</th>
<th>Percentage yield of cataract cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>403</td>
<td>121</td>
<td>282</td>
<td>131</td>
<td>32.50%</td>
<td>107</td>
<td>38</td>
<td>76</td>
<td>26.50%</td>
</tr>
<tr>
<td>2</td>
<td>1072</td>
<td>429</td>
<td>643</td>
<td>172</td>
<td>16.00%</td>
<td>151</td>
<td>75</td>
<td>76</td>
<td>14%</td>
</tr>
<tr>
<td>3</td>
<td>1419</td>
<td>661</td>
<td>758</td>
<td>169</td>
<td>11.90%</td>
<td>462</td>
<td>206</td>
<td>256</td>
<td>23.80%</td>
</tr>
<tr>
<td>4</td>
<td>1901</td>
<td>744</td>
<td>1157</td>
<td>195</td>
<td>10.30%</td>
<td>391</td>
<td>138</td>
<td>253</td>
<td>38.90%</td>
</tr>
<tr>
<td>Total</td>
<td>4795</td>
<td>1955</td>
<td>2840</td>
<td>667</td>
<td></td>
<td>1118</td>
<td>457</td>
<td>661</td>
<td></td>
</tr>
</tbody>
</table>

Figure 3: Comparison of proportion of TT cases among the self-referred patients and those referred by TT case finders
Figure 4: Comparison of proportion of TT cases among the self-referred patients and those referred by TT case finders

Method 2

- Number of confirmed TT cases among self-referred patients: 18%
- Number of confirmed TT cases among the Case finder referred patients: 82%

Figure 5: Comparison of proportion of TT cases among the self-referred patients and those referred by TT case finders

Method 3

- Number of confirmed TT cases among self-referred patients: 21%
- Number of confirmed TT cases among the Case finder referred patients: 79%
Table 5: Proportion of confirmed TT cases from suspected TT cases on the case finders’ register

<table>
<thead>
<tr>
<th>Methods</th>
<th>Suspected TT cases on case finder register</th>
<th>Confirmed TT cases from case finder register</th>
<th>Percentage of TT cases from case finding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method 1</td>
<td>230</td>
<td>106</td>
<td>46.0%</td>
</tr>
<tr>
<td>Method 2</td>
<td>477</td>
<td>141</td>
<td>29.5%</td>
</tr>
<tr>
<td>Method 3</td>
<td>856</td>
<td>135</td>
<td>15.7%</td>
</tr>
</tbody>
</table>

Figure 6: Expenditure on finding one TT case for each method

Financial and human resources utilised by different methods

The variation in project expenditure on different case finding methods was largely determined by the human resources used (TT surgeons, other ophthalmic staff, case finders), the allowances paid to them, and the cost of publicity and community mobilisation.

The four methods used a similar number of case finders, ranging from 57 in methods 1 and 3, to 60 in method 4. The number of TT surgeons used at the camp was the lowest in method 1 (six) and the highest in method 4 (16), but the average number of TT cases managed by a surgeon was similar across the four methods (11-13 per surgeon) (Figure 7).

The number of other ophthalmic personnel and community volunteers helping at the camp was also the lowest in method 1 (three and six respectively) and the highest in method 4 (12 and 25 respectively) (Figure 8).
The ratio of camp attendees to health personnel (nurses and surgeons) ranged from 36.6 per health professional in method 1 to 78 per health professional in method 3. The ratio of camp attendees to camp volunteers also varied, from 67.2 per volunteer in method 1 to 134 per volunteer in method 2.

The average project expenditure for finding one TT case was similar in methods 1, 2 and 3 ($5.4-6.3 US dollars per case found). The expenditure per one TT case found using method 4 (mass media mobilisation) was 3.5 times higher ($21.5 per case found).

Project expenditures for managing cataract varied from $7,375 at the camps included in method 2 to $12,773 at the camps included in method 4, resulting in the average expenditure per cataract case ranging from $32.6 in method 4 to $48.8 in method 2 (Figure 11).

The project expenditure on managing other ocular morbidities (non-TT or cataract) varied from $4 per case in method 4 to $6.7 in method 3 (Figure 12).

Figure 7: Number of case finders and TT surgeons in camp
Table 6: TT outreach camp productivity across all methods tested

<table>
<thead>
<tr>
<th>Method</th>
<th>Number of surgeries</th>
<th>Number of TT surgeons</th>
<th>Number of health workers (including TT surgeons)</th>
<th>Number of days of outreach camps</th>
<th>Number of surgeries/surgeon/day</th>
<th>Number of surgeries/health workers/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>107</td>
<td>8</td>
<td>11</td>
<td>2</td>
<td>6.7</td>
<td>4.8</td>
</tr>
<tr>
<td>2</td>
<td>149</td>
<td>12</td>
<td>18</td>
<td>2</td>
<td>6.2</td>
<td>4.1</td>
</tr>
<tr>
<td>3</td>
<td>154</td>
<td>10</td>
<td>18</td>
<td>3</td>
<td>5.1</td>
<td>2.8</td>
</tr>
<tr>
<td>4</td>
<td>176</td>
<td>16</td>
<td>28</td>
<td>3</td>
<td>3.8</td>
<td>2.1</td>
</tr>
</tbody>
</table>
Figure 9: Cataract cases identified in the camps

Figure 10: Other ocular morbidities excluding TT and cataract cases identified in camp
Project expenditure on cataract surgeries in US dollars compared to number of cataract surgeries for each method

<table>
<thead>
<tr>
<th>Method</th>
<th>Expenditure on Cataract Surgeries</th>
<th>Number of cataract surgeries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method 1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Method 2</td>
<td>7375</td>
<td>151</td>
</tr>
<tr>
<td>Method 3</td>
<td>15115.1</td>
<td>462</td>
</tr>
<tr>
<td>Method 4</td>
<td>12772.6</td>
<td>391</td>
</tr>
</tbody>
</table>

Expenditure on managing non TT and cataract eye conditions in US dollars compared to the number of non TT/cataract eye conditions managed

<table>
<thead>
<tr>
<th>Method</th>
<th>Expenditure on managing non TT/Cataract eye conditions</th>
<th>Number of non TT/Cataract eye conditions managed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method 1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Method 2</td>
<td>3584.7</td>
<td>696</td>
</tr>
<tr>
<td>Method 3</td>
<td>5686.1</td>
<td>849</td>
</tr>
<tr>
<td>Method 4</td>
<td>5163.8</td>
<td>1307</td>
</tr>
</tbody>
</table>

Figure 11: Expenditure on cataract surgeries in US dollars compared to number of cataract surgeries for each method

Figure 12: Expenditure on managing non-TT and cataract eye conditions in US dollars compared to the number of non-TT/cataract eye conditions managed
Discussion

The prevalence of active trachoma is decreasing due to successful mass administration of antibiotics, environmental improvements and socio-economic developments in endemic regions (Mariotti et al, 2009). However, the large number of people living with trachomatous trichiasis continues to be a challenge (Mariotti et al, 2009) due to low uptake of surgery and difficulties in case finding in some settings (Courtright, 1994; West et al, 1994; Oliva et al, 1997; Rabiu and Abiose, 2001).

Effective case-finding methodologies are critical for successful elimination of trachoma. The case-finding process has also been described as an important step in increasing the uptake of surgery, as the case finders are often the first point of contact between the TT patient and the health system.

This study compared four different approaches to case finding and managing TT camps and generated some interesting findings relevant to both trachoma elimination efforts and broader eye health programmes.

The findings show that the house-to-house search for TT cases yields the highest proportion of TT patients among people attending the camp, which is not surprising as the case-finding campaigns focus on TT symptoms and proactive identification of TT patients known to the community. The camps that only focus on TT patients require lower numbers of staff and volunteers and are less overwhelming for the camp personnel, with lower numbers of patients and lower patient to staff ratios.

However, it is worth noting that even in these TT-focused camps about two thirds of camp attendees were non-TT patients and around a quarter were patients with cataract. The finding confirms earlier evidence that even TT-focused campaigns bring significant numbers of people with non-TT eye morbidities (largely cataract) to the camp, which need to be addressed for the reasons outlined earlier in this report.

The findings also show that the house-to-house search by community volunteers is an effective approach to identify TT cases, particularly in the areas with rapidly decreasing TT prevalence. In this study the trained health workers used for case finding in method 3 did not yield a significant proportion of TT cases and were less accurate in identifying TT patients than the community case finders in methods 1 and 2. This could be because trained health workers did not concentrate on TT cases but on visual impairment more broadly.

The proportion of cataract patients among all camp attendees recruited by method 3 was higher than in method 2, but similar to method 1 – the two methods that used community volunteers. This finding may suggest that using trained health workers for house-to-house search of any type of visual impairment may not be the best use of their time and skills, and community case finders may be a better and more efficient option.

The effectiveness of community volunteers in recruiting TT patients has been demonstrated in earlier research and can be explained by a number of factors (Greene et al, 2015; Mousa et al,
First, the community has ownership of the project, as community leaders are usually involved in the selection of case finders, which promotes a sense of community buy-in (O’Connor et al, 1999). Second, community members trust case finders as they are familiar with the environment and have respect for community residents. Third, community volunteers are more likely to know people suffering from TT, as they live in the community and interact with community members daily. Finally, the type of training undertaken by community volunteers is likely to play an important role in the accuracy of screening. For example, a randomised controlled trial in Tanzania showed that community treatment assistants undertaking a half-day training on finding trichiasis identified five times more TT patients than community treatment assistants trained in the usual MDA package with a 30-minute overview of trichiasis (Greene et al, 2015).

Public communication campaigns (used in this study as method 4) yielded a significant number of camp attendees but their costs per TT case found was 3.5 times higher than in other methods. This method did bring a significant proportion of cataract cases, confirming that it may be more appropriate for general eye health campaigns than for trachoma programmes.

The study also found that the proportion of patients who came to the camp via self-referrals was relatively low and did not differ across the methods, suggesting that TT elimination campaigns cannot rely on self-referrals and should prioritise proactive case finding.

The findings of this study show that managing other eye morbidities in TT camps is feasible and desirable, as many patients turn up at the camp irrespective of the focus of the campaign; such camps will require higher numbers of ophthalmic staff and volunteers. This study suggests that community mobilisation which focuses on broader eye health can result in a four to five times increase in the number of patients attending the camp – however, the health benefits of such camps are likely to outweigh the costs of the extra resources needed. Our findings suggest the three camps that managed conditions other than TT maximised their efficiencies through higher patient to staff ratios, leading to significant benefits arising from the economies of scale and scope.

It is however important to note that the method of case finding and type of outreach should be determined by the context and system the services are delivered in. In this study the eye care infrastructure and human resources were available to deliver a broad range of services, resulting in relatively low expenditure per case managed. In a context where such infrastructure is not available, and significant start-up investments are required, the overall programme expenditure and the expenditure per case managed may be significantly higher; managing other eye diseases alongside TT may be less efficient.

The findings suggest that house-to-house searches for TT cases with some elements of broader visual screening may be a viable way of combining a TT programme with other eye care programmes. This method yielded a significant number of cataract cases, patients with presbyopia, and other eye ailments – and it was less expensive in terms of costs per case managed compared to other methods. However, it is also possible that short, intense and highly focused TT campaigns are more appropriate for certain contexts, particularly as the number of TT cases continues to decline.
The additional costs of managing other eye conditions in this study were largely related to cataract surgeries, as surgeries were performed by ophthalmologists and required specialist medical equipment. In certain settings, it may be more beneficial to treat camp patients for other eye conditions and make referrals for cataract to stationary hospitals with better theatre facilities. Uptake of such referrals will need to be further explored.

Other community-based approaches to disease detection and control can also be used as opportunities for the integration of trachoma interventions. In South Sudan, community-level education programmes targeting eradication of Guinea worm have shown to be successful in integrating mass drug distribution for trachoma control (Rumunu et al, 2009). Collaboration and partnership between different programmes has been viewed as an effective way to pool resources, reduce implementation costs and improve health beyond TT and eye disease management (Thylefors et al, 1992; WHO, 2004). The findings of this study have shown that, to maximise the benefits of such partnerships, there is a need for adequate planning and effective management of roles, responsibilities and resources.

This study did not assess what impact the integration of TT campaigns with other services has on the quality of TT surgeries or staff motivation – questions that may be worth exploring in future studies.

In conclusion, this study suggests that it is possible to integrate TT camps with the management of cataract and other ocular morbidities if case finding is tailored to the needs of both programmes, the outreach teams are properly trained, and the camps are well planned and appropriately managed to maximise their efficiencies.

**Key lessons learned**

Triage of patients at the camps is effective when there are staff specifically trained to identify common eye conditions and help to coordinate and control the crowd.

Counselling patients in a group – especially pre-surgery counselling – is an efficient way to counsel patients which saves time and other resources.

The most time-consuming activities are TT screening and registration of all patients; there is a need to assign an adequate number of personnel to handle these tasks in order to avoid delays in beginning surgical interventions.

Health facility staff are very helpful in the organisation and control of the crowd and are important stakeholders in the planning and implementation of eye care programmes. This also helps to increase acceptance of the programme within the community.
Limitations/interpretation of the study findings

- The study areas were clustered in such a way that the sections of each LGA tested for the same method across the areas were similar in terms of population size, but the study areas were different in terms of the TT prevalence. As a result, this may have implications for the interpretation of the results.

- The study was unable to measure the time involved in case finding for each of the methods, or accurately separate the cost of finding TT cases from the cost of finding other ocular morbidities such as cataract. As a result, an objective assessment of the cost benefit ratio, as well as efficiency of the methods tested, could not be derived conclusively from the findings of the research.
References


Appendices

Appendix 1: Maps of study site
Appendix 2: Study clusters and implementation plan


Appendix 3: Ethical clearance letter

Appendix 4: Key messages used for case finding

KEY MESSAGES DEVELOPED AT THE RESEARCH TEAM TRAINING

A  KEY MESSAGE FOR CASE FINDERS (Method 1 and 2)

1. What is trachoma?
2. What causes trachoma?
3. What are the signs and symptoms?
4. What happens if not treated / Complications
5. Some people manage TT by epilation; They should also be brought
6. Surgery is painless and heals quickly
7. Surgery is simple patient can continue with their jobs the next day
8. All services are provided free
9. TT cases are found from house to house from within your geographic area only

Method 3 includes ALL the above including:

10. If you cannot read well either from FAR or NEAR (with Visual Acuity < 6/18) come, there could be treatment for you
11. Services are free

B  KEY MESSAGE FOR TOWN ANNOUNCERS

1. All people with eye problems should come for free treatment
2. Specify the dates of treatment
3. Specify location of treatment
4. Treatment is offered with support from Kano State Ministry of Health
5. Do not exceed the specified boundary

C  KEY MESSAGES FOR SURGEONS DURING PRE-OPERATION COUNSELING

1. Say what is causing the eye problem patient is experiencing
2. State reason for eye problem
3. State outcome if condition is not treated
4. Surgery is on the eyelid
5. Say what will be done to patient’s eyelid during surgery
6. Anesthesia will be given
7. Surgery is not bloody and it is painless
8. Say outcome of surgery
9. Surgery is free land brought close to your home
10. Patient can resume your job the next day

D  KEY MESSAGES FOR SURGEONS DURING POST-OPERATION COUNSELING

1. Counsel patients on how to use their drugs properly
2. (Take pain relievers and apply TEO for two weeks)
3. Say when the padding should be removed
4. When sutures will be removed
5. Stress the need for follow up (3 – 6 months) for assessment
6. Follow-up service is free
7. Emphasize on facial cleanliness
Appendix 5: Data capturing tools

A – CATCH data collection tool


B – Health facility assessment review


Appendix 6: Activity timing sheet


Appendix 7: Complete study data


Appendix 8: Summary of study data


Appendix 9: Picture gallery

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