Typhoid Over diagnosis in Nakaseke District, June 2016

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Typhoid verification in Nakaseke District

Typhoid Alert

Data Audit, 12 health facilities Nakaseke by FFETP (wk 15-21)

323 Typhoid cases reported

Notification
Reviewed HMIS data
84 cases/50,000

Typhoid Outbreak verification exercise

May 2016 | June 2016
---|---
1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14

May 2016

June 2016
Objectives

- Verify the existence of an outbreak
- Verify reported diagnosis using standard case definition
- Recommend public health action
District location

Typhoid verification in Nakaseke District
Facilities selected

- Private hospital - Kiwoko
- Government hospital - Nakaseke
- Health center IV - Semuto
- Health center III - Kapeeka
Data collection

- Extracted records from registers (1\textsuperscript{st}/12/2015 to 14\textsuperscript{th}/06/2016)
- Discussed with clinicians & lab personnel
- Took clinical history & examined typhoid suspects
Standard case definition

- **Suspected case**: Onset of fever ≥3 days, negative malaria test, resident of Nakaseke district
  
  Plus any of following: chills, malaise, headache, sore throat, cough, abdominal pain, constipation, diarrhea

- **Probable case**: Suspected case plus positive antigen test (Widal)

- **Confirmed case**: Suspected case plus salmonella typhi (+) blood or stool by culture
Data quality assessment

- Reviewed laboratory testing procedures
- Reviewed data capture & recording procedures
- Took samples for blood culture at CPHL
**80% of typhoid diagnoses were clinical**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency (n)</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient category</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Admitted</td>
<td>18</td>
<td>1.7</td>
</tr>
<tr>
<td>Outpatient</td>
<td>1007</td>
<td>98.2</td>
</tr>
<tr>
<td><strong>Basis of diagnosis &amp; treatment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood culture</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Clinical diagnosis</td>
<td>829</td>
<td>81.2</td>
</tr>
<tr>
<td>Clinical+ widal test</td>
<td>192</td>
<td>18.8</td>
</tr>
<tr>
<td><strong>Matching case definition</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>case definition</td>
<td>5</td>
<td>27.8</td>
</tr>
<tr>
<td>case definition did not match</td>
<td>13</td>
<td>72.2</td>
</tr>
</tbody>
</table>

** only admitted, N=1025**

Typhoid verification in Nakaseke District
Highest attack rates among females/per 1000 persons

<table>
<thead>
<tr>
<th>Gender</th>
<th>Rate/1000 persons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>3.1</td>
</tr>
<tr>
<td>Females</td>
<td>6.3</td>
</tr>
<tr>
<td>Total</td>
<td>4.6</td>
</tr>
</tbody>
</table>
Highest attack rate in Nakaseke subcounty

Rate/1000 persons

Subcounties

NAKASEKE: 11.2
KIKAMULO: 7.8
SEMUTO: 6.7
KASANGOMBE: 3.7
KAPEEKA: 3.3
WAKYATO: 3
KIWOKO TC: 0.6
NGOMA: 0.6
KINYOGOCA: 0.3
KINONI: 0.2
KITO: 0.1
Typhoid verification in Nakaseke District

No clear pattern over time

Rainy season

Dry season

Rainy season

Investigation
More cases reported in 2016 vs 2015

Typhoid verification in Nakaseke District
No capacity to confirm typhoid at district

- Typhoid screening done using antigen/antibody reagent.
- High 0 titers (1:160) supports diagnosis
- Lower level facilities have no screening reagents
- All 5 samples negative on blood culture
- None of the reviewed records recorded a perforation
Conclusions

- Available evidence not sufficient to support presence of outbreak in the district
- Over diagnosis of typhoid highly suspected
- Typhoid diagnosis based on typhoid titre and clinical symptoms
Public health implications

- Wastage of resources (personnel, supplies, time)
- Antibiotics over prescription posing threat to antibiotic resistance
- Typhoid over diagnosis likely to lead to delay of true diagnosis
Recommendations

- Strengthen capacity district laboratories to perform culture & sensitivity.
- Proactive measures to engage clinicians in typhoid surveillance
- Continuous Quality Improvement project to improve typhoid diagnosis and reporting
Acknowledgment

- Local Government, Nakaseke district
- In charges of health facilities
- PHFP secretariat
- CDC
- FFETP
Typhoid verification in Nakaseke District
Comparison of typhoid cases Kampala vs Nakaseke (between 2014 - 2016)

Typhoid verification in Nakaseke District
Reporting rates in Nakaseke

Reporting rate in Nakaseke 2014-2015

Typhoid verification in Nakaseke District
No clear pattern in Nakaseke sub county
Typhoid diagnosis

- The definitive diagnosis of typhoid fever depends on the isolation of *S. typhi* from blood, bone marrow or a specific anatomical lesion.
- Presence of clinical symptoms characteristic of typhoid fever or the detection of a specific antibody response is suggestive of typhoid fever but not definitive.
- Blood culture is the mainstay of the diagnosis of this disease.
Chronic carriers

- **Defn:** Excretion of *S. typhi* in stools for >1yr after the onset of acute typhoid fever (or repeated positive bile or duodenal string cultures).
- **Burden of carrier state:** 1-5%
- **Epidemiological role of chronic carriers** not as important as that of chronic
- **Some patients excreting *S. typhi*** have no history of typhoid fever.
Blood culture is definitive but bone marrow is standard

- Reasons for failure to isolate organism from blood
  - Limitations of laboratory media
  - Presence of antibiotics:
  - Volume of the specimen cultured;
  - Time of collection,
  - Duration of fever: fever* 7 to 10 days more likely than others to have a positive blood culture.
  - Without antibiotics blood cultures are positive in > 80% of the patients in 1st wk illness.
  - 20%-30% of untreated patients positive blood cultures late as the third week of illness

- Bone marrow aspirate is gold standard
Widal has limited sensitivity and specificity

- Dependent on O and H surface antigens
- O and H antigens shared with other salmonella species increasing likelihood of false positive
- False positive results may occur in other clinical conditions, e.g. malaria, typhus, bacteraemia caused by other organisms, and cirrhosis.
Two tests recommended (acute and convalescent phase) a four fold increase may be diagnostic of typhoid.

Need to establish threshold titre levels in the community.
## Upcoming new diagnostics

<table>
<thead>
<tr>
<th>New test</th>
<th>Basis of test</th>
<th>Comment</th>
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<tbody>
<tr>
<td>IDL Tubex</td>
<td>IgM 09</td>
<td>O9 only found in salmonella typhi</td>
</tr>
<tr>
<td>Typhidot</td>
<td>IgM and IgG</td>
<td>Detects acute and ongoing infection</td>
</tr>
<tr>
<td>Typhidot M</td>
<td>IgM</td>
<td>Detects acute infection . High sensitivity(&gt;93%)</td>
</tr>
<tr>
<td></td>
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<td>High negative predicative value</td>
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<td>IgM dipstick test</td>
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