The Global Point Prevalence survey of Antimicrobial Consumption and Resistance (Global-PPS): evidence of poor laboratory use as a barrier to antimicrobial stewardship in Nigerian hospitals

Prof. Oyin Oduyebo
College of Medicine, Unilag/LUTH
NIGERIA

ICAN CONGRESS, July 2018
Introduction

• The principle of rational antimicrobial use includes
  – targeted prescribing at the pathogen
  – accurate (definitive) diagnosis

• This involves
  – microbiology investigation to detect specific pathogen
  – and/or a check of biomarkers when the organism is not likely to be present in the samples any longer

• Routine culture and sensitivity provides antibiogram for institutional guidelines on empiric therapy
  – Also surveillance of clinically important resistance

• A uniform and standardized method for surveillance of antimicrobial use in hospitals was used
  – To assess the variation in antimicrobial prescribing in Nigerian hospitals as part of the Global-PPS project
Methods

• Global-PPS was carried out in 8 tertiary hospitals in Nigeria between November and December 2017
• All inpatients receiving an antimicrobial on the day of the point prevalence survey were included
• Validated data tool was used to collect information on
  – patients’ demographics
  – antimicrobial agents
  – indications for treatment
  – microbiological data
  – a set of quality indicators including
    • targeted prescribing
    • use of biomarkers
    • MDROs
Methods

• A web-based application used for data-entry, validation and reporting was designed by the University of Antwerp, Belgium (www.global-pps.com).
• Data analysis was done with Excel and Epi Info version 7.2
• Frequencies and Proportions were calculated
Result

• 8 hospitals
• 7 teaching hospitals and one secondary care centre
• One of the teaching hospitals is privately owned
• 1,764 eligible patients admitted to 157 wards
• 1,170 received 2180 antimicrobials
  – Prescribing rate 66.32% (overall)
  – Some on multiple antibiotics
Antibiotic prescribing rates in Nigerian Hospitals

<table>
<thead>
<tr>
<th>Hospital</th>
<th>No of eligible patients</th>
<th>Antibiotic Prescribing rates (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LUTH</td>
<td>258</td>
<td>65.5</td>
</tr>
<tr>
<td>NHA</td>
<td>144</td>
<td>63.2</td>
</tr>
<tr>
<td>ABUTH</td>
<td>346</td>
<td>71.7</td>
</tr>
<tr>
<td>FETHA</td>
<td>220</td>
<td>78.2</td>
</tr>
<tr>
<td>BUTH</td>
<td>53</td>
<td>52.8</td>
</tr>
<tr>
<td>SSH</td>
<td>79</td>
<td>79.7</td>
</tr>
<tr>
<td>UITH</td>
<td>213</td>
<td>61.0</td>
</tr>
<tr>
<td>UCH</td>
<td>451</td>
<td>59.6</td>
</tr>
</tbody>
</table>
Prevalence of Antibiotic Use by Ward in Nigeria

Prevalence

Hospital ward

<table>
<thead>
<tr>
<th>Ward</th>
<th>Prevalence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult ICU</td>
<td>73.3</td>
</tr>
<tr>
<td>Neo. ICU</td>
<td>44.2</td>
</tr>
<tr>
<td>Adult Med</td>
<td>65.4</td>
</tr>
<tr>
<td>Paed. Med</td>
<td>82.7</td>
</tr>
<tr>
<td>Neo. Med</td>
<td>55.8</td>
</tr>
<tr>
<td>Pneumology Med</td>
<td>50.0</td>
</tr>
<tr>
<td>Haemat-Onco Med</td>
<td>30.8</td>
</tr>
<tr>
<td>Adult Surg</td>
<td>64.0</td>
</tr>
<tr>
<td>Paed. Surg</td>
<td>77.1</td>
</tr>
</tbody>
</table>
Quality indicators and the antibiotic prescribing pattern in Nigerian Hospitals

<table>
<thead>
<tr>
<th>Quality Indicators</th>
<th>Frequency (n=2180)</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stop/Review Date</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>740</td>
<td>33.9</td>
</tr>
<tr>
<td>Reason in note</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1599</td>
<td>73.4</td>
</tr>
<tr>
<td>Guideline compliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>131</td>
<td>6.0</td>
</tr>
<tr>
<td>Treatment based on Biomarker data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>10</td>
<td>0.4</td>
</tr>
<tr>
<td>Treatment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Targeted</td>
<td>69</td>
<td>3.2</td>
</tr>
<tr>
<td>Route of administration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parenteral</td>
<td>1396</td>
<td>64.0</td>
</tr>
</tbody>
</table>
### Pattern of Microbiology Laboratory use versus Antibiotic prescribing in Nigerian Hospitals

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Treatment</th>
<th>No of MDROs</th>
<th>Bio-marker Use</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Targeted</td>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>LUTH</td>
<td>2 (0.7%)</td>
<td>2</td>
<td>0 (0)</td>
</tr>
<tr>
<td>NHA</td>
<td>3 (1.8%)</td>
<td>2</td>
<td>0 (0)</td>
</tr>
<tr>
<td>ABUTH</td>
<td>7 (1.6%)</td>
<td>2</td>
<td>0 (0)</td>
</tr>
<tr>
<td>FETHA</td>
<td>21 (5.5%)</td>
<td>3</td>
<td>0 (0)</td>
</tr>
<tr>
<td>BUTH</td>
<td>14 (25.0%)</td>
<td>9</td>
<td>0 (0)</td>
</tr>
<tr>
<td>SSH</td>
<td>0 (0%)</td>
<td>0</td>
<td>0 (0)</td>
</tr>
<tr>
<td>UITH</td>
<td>5 (2.0%)</td>
<td>4</td>
<td>0 (0)</td>
</tr>
<tr>
<td>UCH</td>
<td>17 (3.8%)</td>
<td>11</td>
<td>10 (2.2)</td>
</tr>
</tbody>
</table>
MDROs Detected

• MRSA =2
• MRCNS =0
• VRE =2
• ESBL-producing Enterobacteriaceae =6
• 3rd generation cephalosporin resistant =13
• ESBL-producing non fermenter Gram-negative bacilli =7
• Carbapenem-resistant non fermenter Gram-negative bacilli = 3
• Targeted treatment against other MDR organisms = 7
Results

• Antimicrobials were prescribed for
  – community acquired infections (57%)
  – surgical prophylaxis (30.6%),
  – hospital acquired infections (11.4%)
  – medical prophylaxis (9.7%)
Results

• Most commonly prescribed antibiotic and (the most commonly used in the class) were

  – Cephalosporins (ceftriaxone 57%)
  – Nitro-imidazoles (metronidazole 99.4%)
  – Quinolones (ciprofloxacin 67%)
  – Penicillin+combination (amoxicillin +combination 73%)
Discussion

• Lack of definitive diagnosis would be a barrier to antimicrobial stewardship:
  – Precludes definitive antibiotic therapy
  – Inadequate antibiogram from routine Microbiology procedures (which forms the basis of empiric therapy)
  – Undermines recognition of clinically important resistance and appropriate treatment
  – Need to pay attention to the magnitude of MDROs in the country
Reasons must be sought and issues addressed

• Possibly
  – lack of confidence in the laboratories
    • Financial challenges
      – Non-availability of tests due to stock-outs
    • Inadequate infrastructures in some hospital Labs
    • Long TAT due to manual techniques
    • Very few centres have automated blood culture equipment
  – lack of awareness of the importance of Microbiology diagnosis
  – sheer nonchalance or poor attitude of prescribers towards appropriate use of antimicrobials.
Low rate of use of biomarkers

- Targeted prescribing may not always be possible in clinically diagnosed severe infections.
- Biomarkers may point diagnosis in the direction of bacterial infection and thus justify antimicrobial prescription.
- Low rate of use of biomarkers probably points to:
  - a low level of awareness of this procedure
  - Non-availability
  - poor attitude to proper diagnosis of infection as basis for antimicrobial use.
Non-availability of antibiotic guidelines

- further shows the amount of effort required for promoting rational use of antimicrobials in the country
- Every core evidence based strategy for antimicrobial stewardship requires formulation and use of antimicrobial guidelines
- Probably the reason the antibiotics used most commonly are the broad spectrum antibiotics
  - ceftriaxone, ciprofloxacin and amoxicillin, which highly predispose to rapid emergence of antimicrobial resistance
Conclusions

• Need to raise awareness and encourage adequate laboratory diagnosis in the country
  – Discuss importance of targeted prescribing with prescribers
  – This will enable antimicrobial stewardship
• These findings call for increased national awareness for targeted antimicrobial prescribing and use of evidence based antibiotic guidelines
THANK YOU
Authors

• Iregbu KC
• Olayinka A
• Ola-Bello OI
• Chukwuma Umeokonkwo
• Ann Versporten
• Fadeyi A
• Elikwu CJ
• Kehinde A
• Herman Goossens
• Fowotade A
• Nwajiobi Princewill I
• Ogunsola FT
• Oduyebo OO