High prevalence of bacterial vaginosis among adolescent girls attending secondary schools in Tanzania

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Introduction (1)

- Globally, there are approximately 380,000 new HIV infections among girls and young women aged 10-24 every year
- In young women in sub-Saharan Africa the high incidence of HIV cannot be fully explained by behavioural factors alone
- There is evidence of high rates of HIV positivity following the first few episodes of sexual intercourse after sexual debut
- Disturbances of the vaginal microbiota, including bacterial vaginosis (BV) increases the susceptibility to HIV

Introduction (2)

The aims of our study were

- To characterize the vaginal microbiota of adolescent girls in Tanzania around the time of their sexual debut
- To describe risk factors for BV in this study population

Methods (1)

- Cross-sectional study
  - Girls attending secondary schools in Mwanza City
  - Ages 17 and 18 years old
- Informed consent/assent
- Face to face structure interview
- Nurse-assisted, self-collected swabs were obtained for STI and BV testing
- BV was diagnosed by Nugent score

Methods (2)

- BV was considered as a binary outcome
  - Nugent scores 7-10 were considered BV positive
- Hierarchical approach to investigate the effects of socio-demographic, behavioural characteristics and biological risk factors for BV

Methods (3)

- Definition of sexual activity
  - No sexual activity
  - Noncoital sexual activity
  - Penile/vaginal sex
Results (1)

- 403 girls were enrolled
  - 386 had BV results and included in the analysis
  - Sexual activity
    - No sexual activity = 57% (220/386)
    - Noncoital sexual activity = 1% (3/386)
    - Penile/vaginal sex = 42% (163/386)
  - Overall noncoital sexual activity in all girls
    - Genital touching = 9% (35/386)
    - Receptive oral sex = 2% (9/386)

Results (2)

- BV prevalence was 25% (95/386)
- Other RTIs/STIs
  - Vaginal yeast: 5%
  - Chlamydia: 2%
  - Gonorrhoea: 2%
  - Trichomoniasis: 5%
  - HPV: 19%
  - HSV-2: 2%
  - HIV: 1%
- 48 participants tested positive for at least one STI
  - 14 (29%) reported having never had penile-vaginal sex

Results: Socio-demographic factors

<table>
<thead>
<tr>
<th>BV Positive n/N (%)</th>
<th>Unadjusted odds ratio (95% CI)</th>
<th>Adjusted odds ratio* (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, 18 years old</td>
<td>40/171 (23%)</td>
<td>0.88 (0.56 to 1.38)</td>
</tr>
<tr>
<td>Socio-economic status (SES indicator, owns a**</td>
<td>Car 2/24 (8%)</td>
<td>0.70 (0.49 to 1.01)</td>
</tr>
<tr>
<td>(4) TV, but no car</td>
<td>39/165 (24%)</td>
<td>0.94 (0.65 to 1.36)</td>
</tr>
<tr>
<td>(2) Mobile phone, but no car/TV</td>
<td>49/183 (27%)</td>
<td>0.94 (0.65 to 1.36)</td>
</tr>
<tr>
<td>(1) None of the above</td>
<td>5/14 (36%)</td>
<td>0.94 (0.65 to 1.36)</td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Christian</td>
<td>81/326 (25%)</td>
<td>1</td>
</tr>
<tr>
<td>Muslim</td>
<td>12/53 (23%)</td>
<td>0.89 (0.44 to 1.83)</td>
</tr>
<tr>
<td>Other</td>
<td>27/2 (29%)</td>
<td>1.21 (0.23 to 6.36)</td>
</tr>
</tbody>
</table>

* Adjusted for SES indicator
**SES indicator was fitted as a continuous covariate

Results: Behavioural factors

<table>
<thead>
<tr>
<th>BV Positive n/N (%)</th>
<th>Unadjusted odds ratio (95% CI)</th>
<th>Adjusted odds ratio* (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intravaginal cleansing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water only</td>
<td>8/34 (24%)</td>
<td>0.97 (0.42 to 2.23)</td>
</tr>
<tr>
<td>Other substances</td>
<td>8/24 (33%)</td>
<td>1.58 (0.65 to 3.82)</td>
</tr>
<tr>
<td>Genital touching</td>
<td>14/57 (40%)</td>
<td>2.22 (1.08 to 4.57)</td>
</tr>
<tr>
<td>Receptive oral sex</td>
<td>7/9 (78%)</td>
<td>11.5 (2.35 to 56.3)</td>
</tr>
<tr>
<td>Penile-vaginal sex</td>
<td>53/163 (33%)</td>
<td>2.08 (1.30 to 3.32)</td>
</tr>
<tr>
<td>Number of life-time partners</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One</td>
<td>33/123 (27%)</td>
<td>1.58 (0.94 to 2.66)</td>
</tr>
<tr>
<td>More than one</td>
<td>20/40 (50%)</td>
<td>4.31 (2.13 to 8.72)</td>
</tr>
<tr>
<td>Condoms at last sex</td>
<td>24/77 (31%)</td>
<td>0.76 (0.25 to 2.32)</td>
</tr>
</tbody>
</table>

*Adjusted for SES indicator, receptive oral sex and number of life-time sexual partners except for penile-vaginal sex which is not adjusted for number of life-time sexual partners

Results: Biological factors

<table>
<thead>
<tr>
<th>BV Positive n/N (%)</th>
<th>Unadjusted odds ratio (95% CI)</th>
<th>Adjusted odds ratio* (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaginal yeast</td>
<td>3/32 (14%)</td>
<td>0.50 (0.14 to 1.72)</td>
</tr>
<tr>
<td>Chlamydia / gonorrhoea</td>
<td>4/17 (14%)</td>
<td>0.94 (0.30 to 2.96)</td>
</tr>
<tr>
<td>Trichomoniasis</td>
<td>6/17 (35%)</td>
<td>1.72 (0.62 to 4.76)</td>
</tr>
<tr>
<td>HPV</td>
<td>4/42 (16%)</td>
<td>2.35 (1.46 to 3.79)</td>
</tr>
</tbody>
</table>

*Adjusted for SES indicator, receptive oral sex, number of life-time sexual partners and Human papillomavirus status.

Limitations

- Cross-sectional study
- Evidence of underreporting of sexual activity in this population
- Prevalence of many STIs were too low to investigate associations with BV
Conclusions

• High prevalence (25%) of BV found among adolescents girls attending secondary school in Tanzania
• High prevalence of HPV, but not HSV-2
• The strong associations between BV, number of lifetime sex partners, oral sex and HPV
• In conclusion, our data suggest that some young women in East Africa are entering sexual debut with altered vaginal microbiota, which increases their susceptibility to HIV infection

Acknowledgements

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