HIV/AIDS and rape: Modelling predictions of the increase in individual risk of contracting HIV from forced sex

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Background:
- A high proportion of girls, women, and some boys and men, will experience forced sex in their lifetimes.
- In conflict & post-conflict - rape, coerced sex and transactional sex common.
- Debate about contribution to HIV epidemic.

Aim:
- To use mathematical modelling to estimate how much forced sex may increase an individual’s risk of HIV acquisition for different scenarios.

Methods:
- Literature review of HIV transmission factors.
- Develop conflict and comparable non-conflict risk scenarios.
- Adapt existing HIV-risk model to incorporate effect of genital injury.
- Develop and use analytical equation to estimate relative probability of acquiring HIV in conflict versus non-conflict.

Evidence:
- Genital injury disrupts the multi-layered stratified epithelium that protects a woman’s reproductive tract.
- Literature distinguishes between assaults with single versus multiple sites of trauma.
- No estimates of how this may affect ‘per-sex-act’ probability of HIV transmission.

Key assumptions:
- Genital trauma increases ‘per-sex-act’ risk by multiplicative factor of 1.5 for single sites of trauma, 3 for multiple sites of trauma and 6 for anal rape.
- HIV and STI prevalence twice as high among higher risk / violent males versus other males.
- No differences between conflict and non-conflict scenarios in probability of high HIV viral load or condom use.

Preliminary results:

<table>
<thead>
<tr>
<th>Conflict scenario</th>
<th>Comparison</th>
<th>Risk ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult female trades sex with several male members of peacekeeping force (trauma once in every 8 sex acts)</td>
<td>Same number of consensual sex acts with one man from own community</td>
<td>1.5</td>
</tr>
<tr>
<td>Adult woman, quarter of sex acts are forced by her highly exposed male partner</td>
<td>Same number of consensual sex acts with male partner who has not been to higher risk situation</td>
<td>1.6</td>
</tr>
<tr>
<td>Adult female, forced to have sex by unknown combatant assailants</td>
<td>Same number of consensual sex acts with one partner from own community</td>
<td>4.3</td>
</tr>
<tr>
<td>Adult female raped by 3 men at refugee camp and also has low risk male partner that she has 3 consensual sex acts with</td>
<td>Only has 3 consensual sex acts with low risk male partner</td>
<td>5.3</td>
</tr>
<tr>
<td>Anal rape of adult fe/male by 3 men at refugee camp, and also has low risk partner of opposite sex that s/he has 3 consensual penile-vaginal sex acts with</td>
<td>Only has 3 consensual penile-vaginal sex acts with the low risk partner</td>
<td>86</td>
</tr>
<tr>
<td>Influx of higher exposed population to an area of lower exposure</td>
<td>No population movement, otherwise same behavioural patterns</td>
<td>1.4</td>
</tr>
<tr>
<td>Influx of lower exposed population to an area of higher exposure</td>
<td>No population movement, otherwise same behavioural patterns</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Conclusions and implications:
- Even where differences in population HIV prevalence cannot be attributed to mass rape, conflict may result in large increases in an individual’s risk of acquiring HIV.
- Rape and coercion should be considered in HIV programming.

Acknowledgements: Support for this research was provided by the AIDS, Security & Conflict Initiative, convened by the Netherlands Institute of International Relations ‘Clingendael’ and the Social Science Research Council. Partial funding for this analysis also came from the Sigrid Rausing Trust. Anna Foss and Charlotte Watts are also members of the DFID-funded Research Programme Consortium for Research and Capacity Building in Sexual and Reproductive Health and HIV in Developing Countries of the LSHTM. Thanks also to the Centre for the Mathematical Modelling of Infectious Diseases at LSHTM for funding the lead author’s conference registration fees.