Prevalence and risk assessment for sexually transmitted infections in pregnant women and female sex workers in Mali: is syndromic approach suitable for screening?

Introduction
The analysis of local factors and the determination of most appropriate risk assessment are essential for the development of clinical algorithms for the management of STIs. In Mali little is known about the prevalence and risk assessment for reproductive tract infections in women. This study aimed to document the prevalence and risk factors for cervical and vaginal infections among a high and a low risk group and to assess the diagnostic value of factors associated with these infections.

Materials and methods
In June 1997, cross sectional surveys were conducted among pregnant women (n=549) in Bamako and in sex workers in Bamako (n=191) and Sikasso (n=93). Data on socio-demographic characteristics, sexual behaviour, and clinical signs were recorded. After clinical examinations, blood and genital specimens were collected. Women taking any antibiotics and who did not consent were excluded. The presence of Trichomonas vaginalis, yeast, clue cells, polymuclear cells, and leucocytes was determined by direct microscopic examination of a wet mount and after Gram coloration. 

Nesseria gonorrhoeae was identified by culture on modified Thayer-Martin medium. Chlamydia trachomatis antigen was detected in endocervical specimen using the Microtrak II EIA (Syva, France). Syphilis was diagnosed by RPR test (Becton Dickinson) and TPHA (Fujirebio, Japan). HIV testing was performed using a rapid test for screening (Capillus HIV-1/2, Cambridge Diagnostics, Ireland) and a Line immunosassay for confirmation (Innolisa HIV-1/2, Innogenetics, Belgium). We defined cervical infections as the presence of N gonorrhoeae and/or C trachomatis antigen; vaginal infections by the presence of T vaginalis and/or C albicans and/or clue cells. In pregnant women, lower abdominal pain was the only sign associated with cervical infections (OR 2.45, 95% CI 1.08–5.82). In this group, vaginal itching was associated with vaginal infections (OR 1.59, 95% CI 1.09–2.30).

Among sex workers, no condom use (OR 2.99, 95% CI 1.29–7.10) and the length (>3 years) of prostitution (OR 2.16, 95% CI 1.09–4.30) were associated with cervical infections. Abnormal clinical signs were rare, more than 50% of infected women were asymptomatic. The sensitivities of variables associated with cervical or vaginal infections were above 50% of infected women.

Results
The mean age of pregnant women was 24 years, 538 (98%) were Mali and 260 (47%) had a history of STIs. Sex workers in Bamako had a mean age of 27 years and a mean duration of prostitution of 4.2 years; 151 (79%) always or sometimes used condoms, and 124 (65%) had a history of STIs. Sex workers in Sikasso had a mean age of 29 years, and a mean duration of prostitution of 4.6 years; 42 (45%) always or sometimes used condoms and 72 (77%) had a history of STIs. Table 1 shows the STI prevalence in the study population.

Cervical infections were associated with younger age in both groups; pregnant women aged <25 years (OR 2.67, 95% CI 1.02–7.38) and sex workers aged <21 years (OR 3.50, 95% CI 1.41–7.88) were infected compared with older women. In addition, sex workers who had more than 10 clients per week had cervical infections (OR 3.04, 95% CI 1.23–7.61).

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Owing to the low prevalence of STI in this population, the PPV were not greater than 10% in detecting cervical infections.

Discussion
Vaginal and cervical infections were common in asymptomatic pregnant women and sex workers in Mali. The overall prevalence of cervical infections (9%) in sex workers was relatively lower compared with what has been reported in the same population groups in other west African countries, such as in Côte d’Ivoire 35% and Senegal 25%.

Factors, which elsewhere have been associated with cervical or vaginal infections, were not found to be so in our study, especially among pregnant women. Our data indicate that low prevalence of STIs and lack of symptoms among infected women, even in the high risk group, are real constraints in the development of a suitable tool for STI screening. These findings suggest that syndromic approaches may not be suitable for screening vaginal or cervical infections in this setting. Further studies are needed to develop feasible screening strategies for asymptomatic patients in developing countries.

We are grateful to the Ministry of Health, the National AIDS/STD Committee, the Regional director of Health in Sikasso, the staff of the six district health centres in Bamako, and the staff of the INRSP laboratory in Bamako, the staff of DANA YASO, who assisted with logistical support in the field work and for their kind cooperation.

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Contributors: ED, principal investigator for the regional project, was responsible for the study design, supervision, and the preparation of the manuscript; CMK was responsible for study design, data analysis, fieldwork, and the preparation of the manuscript; YIM and ZD were responsible for the supervision of the study sites; IN was the principal investigator of the regional project and the study design; HD was responsible of the statistical analysis and the manuscript preparation; EM and FD were responsible of the laboratory testing; EB was laboratory scientist, in addition to the laboratory testing on the study sites, was responsible of the subject recruitment; SG was a senior clinician at the DANYASO centre and responsible of FSW contact.

Table 1 Prevalence of infections among pregnant women and sex workers in Mali

<table>
<thead>
<tr>
<th>Infections</th>
<th>Pregnant women</th>
<th>Sex workers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bamako (n=549)</td>
<td>No (%)</td>
<td>Bamako (n=191)</td>
</tr>
<tr>
<td>Gonorrhoea</td>
<td>6 (1)</td>
<td>8 (4)</td>
</tr>
<tr>
<td>Chlamydia</td>
<td>28 (5)</td>
<td>8 (4)</td>
</tr>
<tr>
<td>Trichomiasis</td>
<td>119 (22)</td>
<td>62 (33)</td>
</tr>
<tr>
<td>Candida</td>
<td>216 (39)</td>
<td>33 (17)</td>
</tr>
<tr>
<td>Clue cells</td>
<td>104 (19)</td>
<td>46 (24)</td>
</tr>
<tr>
<td>Syphilis (RPR+TPHA)</td>
<td>11 (2)</td>
<td>14 (7)</td>
</tr>
<tr>
<td>Cervical infections (N gonorrhoeae and/or C trachomatis)</td>
<td>34 (6)</td>
<td>16 (8)</td>
</tr>
<tr>
<td>Vaginal infections (Trichomiasis vaginalis and/or C albicans and/or clue cells)</td>
<td>339 (62)</td>
<td>109 (57)</td>
</tr>
</tbody>
</table>
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Prevalence of reproductive tract infections in family planning clients in Trabzon, Turkey

Introduction
The study took place at two family planning (FP) clinics in Trabzon, Turkey where 410 female patients aged 16–57 (mean 31.8 (SD 7.1)) attending the two FP clinics in October and December 1997 were tested for reproductive tract infections (RTIs).

Methods
After the administration of a baseline survey, pelvic examination was conducted for each woman and appropriate samples were taken for microscopic examination, culture, and serological analyses. Bacterial vaginosis was diagnosed according to Nugent's scoring system.1 Cervical antigen detection (Cellabs Chlamydia Cellisa, Australia) and cell culture was used for the diagnosis of Chlamydia trachomatis. Wet mount preparations were evaluated within 15 minutes for the detection of motile trichomonads and culture and examination results were used for the diagnosis of vulvovaginal candidiasis (VVC) together with patient symptoms. Serological test, cervical antigen detection (Cellabs Chlamydia Cellisa, Australia), and antigonorrhoea antibodies (IgG and IgM) (Alfa Biotech Gonorrhea Agglutinotest Tetrakit, Italy). Neisseria gonorrhoeae was also assessed by Gram staining of cervical smears. The χ² test was used for the analyses of associations between different variables.

Results
Of all 410 women, 99.5% were married and monogamous, 58.3% had five or fewer years of schooling, 88.3% were housewives, and 62.2% had three or more pregnancies. The most prevalent infection was found to be BV (28.2%), followed by C trachomatis (12.0%), VVC (11.3%), N gonorrhoeae (4.5%), hepatitis B (2.0%), and syphilis (0.25%) respectively. No HIV seropositivity was detected. Overall, 46.1% of all women had at least one RTI and 14.2% had multiple infections. Reproductive tract infections were found to be significantly more prevalent in women aged 25 or over (p=0.03) (table 1). Although educational level, place of living (rural or urban) or working status of women were not found to be associated with RTIs (p=0.05), having complaints of dysuria and history of sexually transmitted disease (STD) symptoms in the husband were also significantly associated with the diagnosis of RTIs (p<0.01).

Comment
RTIs are prevalent among married monogamous women of middle age who are classically defined as the “low risk group.” These results are similar to other local studies conducted in Turkey. Although the nonsexually transmitted RTIs (that is, BV and VVC) account for the majority of the infections, results suggest that chlamydia infections, which are usually ignored for diagnosis and treatment can also be important among other RTIs. The traditional risk factors for STDs such as young age and low socioeconomic status (as indicated by low level of education, semi/rural residence, and not having paid work) were not replicated in this study. It can be inferred that RTIs in developing countries can have different patterns and risk markers/factors.

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Table 1 Results of analyses for associations between different variables and diagnosis of reproductive tract infections (RTIs) *

<table>
<thead>
<tr>
<th>Variables</th>
<th>% of women diagnosed with RTIs</th>
<th>Odds ratio</th>
<th>Confidence interval (95%)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age 16-24</td>
<td>33.8</td>
<td>0.54</td>
<td>0.30-0.97</td>
<td>0.03</td>
</tr>
<tr>
<td>25 and over</td>
<td>48.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educational level†</td>
<td>5 years or less</td>
<td>45.5</td>
<td>0.92</td>
<td>0.57-1.46</td>
</tr>
<tr>
<td></td>
<td>6 years or more</td>
<td>47.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Place of living†</td>
<td>Urban (city centre)</td>
<td>46.5</td>
<td>1.06</td>
<td>0.67-1.70</td>
</tr>
<tr>
<td></td>
<td>Semirural or rural</td>
<td>45.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working status†</td>
<td>Housewife</td>
<td>45.9</td>
<td>0.92</td>
<td>0.48-1.76</td>
</tr>
<tr>
<td></td>
<td>Paid work outside home</td>
<td>47.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal discharge†</td>
<td>Yes</td>
<td>46.9</td>
<td>1.12</td>
<td>0.72-1.75</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>44.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dysuria</td>
<td>Yes</td>
<td>58.7</td>
<td>1.87</td>
<td>1.09-3.23</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>43.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower abdominal pain†</td>
<td>Yes</td>
<td>48.8</td>
<td>1.20</td>
<td>0.79-1.83</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>44.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Itching in the genital area</td>
<td>Yes</td>
<td>53.3</td>
<td>1.49</td>
<td>0.93-2.38</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>53.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of STD symptoms in the husband (past 1 year)</td>
<td>Yes</td>
<td>69.0</td>
<td>2.80</td>
<td>1.17-6.90</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>60.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous treatment for genital infections†</td>
<td>Yes</td>
<td>50.3</td>
<td>1.36</td>
<td>0.89-2.06</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>42.7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Reproductive tract infection is defined as having at least one of the following: T vaginalis, N gonorrhoeae, C trachomatis, syphilis, hepatitis B, HIV, bacterial vaginosis, or vulvovaginal candidiasis.
†No association with RTIs.
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