Original Article

Risk factors for sexually transmitted diseases among women attending family planning clinics in Dar-es-Salaam, Tanzania

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Background: Identification of risk factors for sexually transmitted diseases (STDs) assists in development of treatment algorithms, which are potentially important components of STD control when microbiologic facilities are limited.
Methods: A cross-sectional study was performed to assess STD and HIV risk factors of 2285 women attending three family planning clinics in Dar-es-Salaam, Tanzania during 1991–92. Women were interviewed and examined for signs of STDs. Specimens were taken for laboratory diagnosis of HIV, other sexually transmitted organisms, and *Candida albicans*.
Results: The prevalence of gonorrhoea was found to be 4·2%, prevalence of trichomoniasis was 14·3%, and positive syphilis serology was found in 2·5% of women. Unmarried women were at increased risk of trichomoniasis (age-adjusted OR = 1·48 95% CI [1·12, 1·95]), gonorrhoea (age-adjusted OR = 1·81 95% CI [1·14, 2·86]) and syphilis (age-adjusted OR 1·5 [0·84, 2·68]). An increasing number of sexual partners in the past five years was associated with an increased risk of all STDs. Current use of the oral contraceptive pill was positively associated with gonorrhoea, multivariate OR = 1·75 95% CI [1·05, 2·93]. The prevalence of candidiasis was 11·5% and was not associated with any of the demographic or behavioural risk factors examined. Clinical diagnostic algorithms for STDs in this study population had relatively low sensitivity and low positive predictive value.
Conclusion: Being unmarried and having a higher number of sexual partners were consistently associated with each STD, while the associations for other risk factors varied between STDs, emphasising the complexity of STD distribution. Further development of diagnostic algorithms and other methods for screening women for STDs are needed to reduce the impact of STDs and HIV in developing countries.
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Keywords: Sexually transmitted diseases; algorithms; risk factors

Introduction

Sexually transmitted diseases (STDs) are an important public health problem in Africa. Studies have shown a high prevalence of STDs in many African countries, even among women thought to be at low risk of acquiring STDs.[1–4] The highest prevalence of STDs is usually reported from studies of female prostitutes; however, pregnant women, women attending family planning clinics and women in the general population have also been shown to bear a significant burden of STDs.[1 5]

In addition to the substantial complications which may result from STD infection when untreated, including infertility, pelvic inflammatory disease, and neonatal pathology, STDs have been shown to influence HIV transmission.[6–8] The presence of STD may enhance HIV transmission, and the immunodeficiency associated with HIV infection may alter the natural history, diagnosis or response to therapy of STD.[9 10]

Despite the extent of the STD problem, and its contribution to the rapid spread of the HIV epidemic, relatively few studies have been performed of STD risk factors among women in Africa thought to be at low risk. Identification of risk factors for STDs may enable more appropriate targeting of the limited resources available for diagnosis and treatment of STDs, and may aid in the development of improved algorithms for STD treatment. To examine the behavioural and biological risk factors for STDs and candidiasis among low risk women, we analysed data from a large cross sectional study which was conducted primarily to examine HIV risk factors, in particular contraceptive use, among women in family planning clinics in Dar-es-Salaam, Tanzania. In addition, we evaluated the performance of key STD risk factors in diagnostic algorithms.

Methods

i. Study design

This study utilised a cross-sectional case control design, and details of data collection and methods have been described elsewhere.[11] In brief, women attending three family planning clinics in urban areas of Dar-es-Salaam, between February 1991 and June 1992, were invited to participate in the study. Women who were new and continuing contraceptive users were enrolled after informed consent was obtained. Women were interviewed by trained female interviewers regarding sociodemographic characteristics, type of contraceptive use, sexual history and other potential risk factors for HIV/STD. A small validation study of contraceptive use was performed and good correlation was found ($r > 0·8$) between self-reported use and medical records.[11] Physical

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examination was performed, which included taking genital swabs; however 254 women were not examined because they had their menstrual period at the time of examination and did not return for a subsequent appointment. Blood was collected for syphilis and HIV-1 serology. The study protocol was approved by ethics committees of the Muhimbili Medical Centre and the National AIDS Control Programme.

ii. Laboratory methods

Active syphilis was diagnosed if subjects were positive on both the VDRL test (Murex Diagnostic, Dartford, England) and *Treponema Pallidum* Hemagglutination (TPHA: Fujirebio, Tokyo, Japan). Specimens from the endocervix and posterior fornix were placed in transport media, transported to the laboratory on the same day, then inoculated onto Thayer Martin media and incubated at 34–36°C for 48 h. Isolation of gram-negative diplococci and positive oxidase and sugar fermentation reactions were used to detect the presence of *Neisseria gonorrhoeae*. *Trichomonas vaginalis* was diagnosed by visualisation of the organism on wet preparation. Blood specimens were tested for HIV-1 ELISA (Wellcome Recombinant HIV-1, Wellcome Diagnostics, Research Triangle Park, NC, USA) and were considered positive only when confirmed by Western Blot (Dupont de Nemours, Wilmington, DE, USA). *Candida albicans* was detected by isolation of gram negative yeast-like cells on Saboraud's dextrose agar.

iii. Statistical methods

Stratified analyses were performed for all STDs and candidiasis, to assess potential confounding and effect modification. SPSS software was used for all analyses.[12] Multivariate logistic regression, with separate models for each STD and candidiasis, was performed to control for potentially confounding factors. Confidence intervals were calculated based on coefficients and standard errors from the logistic model[13] and approximate confidence intervals were calculated for binomial proportions.[14] Variables were entered into the model based on level of significance in univariate analyses ($p < 0.25$) and further variables of interest were entered into the model based upon prior knowledge of STD risk factors and to ensure comparability of risk factors for all STDs. Single women (n = 15) were combined with cohabiting women (n = 637) for the analysis. Sensitivity, specificity and positive predictive value (PPV) of various predictor variables and clinical signs were calculated for each STD. We also evaluated the performance of the diagnostic algorithm proposed by Vuylsteke *et al*[15] in our study population. Each woman was assigned a score based on variables from the Vuylsteke algorithm that were available in our study: single/cohabiting = 5, $\geqslant$ 2 sexual partners in the past 5 years = 10, < 25 years = 14, 25–29 years = 11, history of

Table 1 Risk factors for gonorrhoea, trichomoniasis and syphilis among women in family planning clinics, Dar-es-Salaam, Tanzania, 1991–1992

	Gonorrhoea				*Trichomoniasis*			*Syphilis*			
Predictor	*N**	*% +ve*	*Age adjusted OR [95% CI]*	*OR† [95% CI]*	*% +ve*	*Age adjusted OR [95% CI]*	*OR† [95% CI]*	*N*	*% +ve*	*Age adjusted OR [95% CI]*	*OR† [95% CI]*
Marital status:											
Married (monogamous)	1336	(3·4)	1·0‡	1·0	(12·0)	1·0‡	1·0‡	1485	(2·1)	1·0	1·0
Married (polygamous)	126	(4·0)	1·23 [0·48, 3·17]	1·36 [0·51, 3·64]	(26·2)	2·65 [1·72, 4·08]	2·27 [1·43, 3·61]	148	(3·4)	1·69 [0·64, 4·43]	1·93 [0·68, 5·46]
Unmarried	569	(6·2)	1·81 [1·14, 2·86]	1·55 [0·92, 2·61]	(17·0)	1·48 [1·12, 1·95]	1·44 [1·05, 2·00]	652	(3·1)	1·50 [0·84, 2·68]	1·10 [0·57, 2·09]
Education:											
None/adult	233	(2·1)	1·0	1·0	(15·0)	1·0‡	1·0	264	(3·8)	1·0	1·0
Primary (1–4 yrs)	212	(6·6)	2·94 [1·03, 8·37]	3·46 [1·17, 10·28]	(17·5)	1·17 [0·70, 1·95]	1·37 [0·80, 2·35]	232	(2·6)	0·63 [0·22, 1·77]	0·66 [0·22, 1·95]
Primary 5–7 yrs)	1479	(4·3)	1·61 [0·62, 4·20]	1·83 [0·67, 5·00]	(14·3)	0·86 [0·57, 1·31]	1·04 [0·66, 1·63]	1661	(2·3)	0·54 [0·25, 1·17]	0·64 [0·28, 1·47]
Secondary	107	(3·7)	1·42 [0·37, 5·54]	1·53 [0·34, 6·88]	(6·5)	0·36 [0·15, 0·85]	0·35 [0·13, 0·91]	128	(0·8)	0·18 [0·02, 1·44]	0·25 [0·03, 2·31]
Occupation:											
Housewife	1090	(4·2)	1·0	1·0	(13·9)	1·0	1·0	1226	(2·0)	1·0	1·0
Agricultural/ manual	106	(4·7)	1·15 [0·45, 3·00]	0·97 [0·37, 2·57]	(11·3)	0·80 [0·43, 1·49]	0·73 [0·38, 1·41]	123	(3·3)	1·67 [0·57, 4·90]	1·68 [0·54, 5·26]
Small scale trader	698	(4·0)	1·00 [0·61, 1·62]	0·89 [0·54, 1·48]	(15·3)	1·15 [0·88, 1·52]	1·03 [0·77, 1·37]	778	(2·8)	1·43 [0·79, 2·57]	1·32 [0·71, 2·44]
Hotel worker	19	(5·3)	1·22 [0·16, 9·38]	1·15 [0·13, 9·54]	(5·3)	0·35 [0·05, 2·66]	0·24 [0·03, 1·89]	21	—	—	— —
Secretar'l/ profess'nl	55	(3·6)	0·91 [0·21, 3·87]	0·93 [0·19, 4·70]	(14·5)	1·13 [0·52, 2·46]	1·48 [0·61, 3·61]	69	(1·4)	0·69 [0·09, 5·21]	1·30 [0·15, 11·41]
Other	63	(6·3)	1·57 [0·54, 4·51]	1·32 [0·43, 4·03]	(17·5)	1·30 [0·66, 2·55]	1·03 [0·50, 2·13]	68	(5·9)	3·19 [1·07, 9·49]	3·37 [1·04, 10·91]
Sex partners last 5 yrs:											
1	1094	(3·1)	1·0	1·0	(11·8)	1·0‡	1·0	1213	(1·8)	1·0‡	1·0
2	524	(5·3)	1·74 [0·91, 2·56]	1·53 [0·89, 2·64]	(17·7)	1·58 [1·18, 2·11]	1·36 [1·00, 1·86]	603	(2·7)	1·54 [0·80, 2·97]	1·35 [0·68, 2·69]
3	228	(6·6)	2·13 [1·14, 4·01]	1·79 [0·90, 3·55]	(19·3)	1·76 [1·21, 2·57]	1·50 [1·00, 2·26]	259	(4·2)	2·46 [1·18, 5·16]	2·26 [1·02, 4·97]
4+	185	(4·9)	1·55 [0·73, 3·30]	1·25 [0·55, 2·85]	(13·0)	1·10 [0·69, 1·76]	1·01 [0·61, 1·69]	210	(3·3)	1·87 [0·79, 4·46]	1·74 [0·67, 4·53]
Age first intercourse:											
9–15 yrs	560	(4·1)	1·0	1·0	(16·6)	1·0‡	1·0	633	(3·2)	1·0	1·0
16–17 yrs	830	(3·6)	0·87 [0·50, 1·51]	0·94 [0·52, 1·67]	(14·5)	0·83 [0·62, 1·12]	0·89 [0·65, 1·21]	935	(2·6)	0·83 [0·45, 1·51]	0·80 [0·42, 1·50]
18–19 yrs	447	(6·3)	1·51 [0·84, 2·68]	1·92 [1·04, 3·55]	(12·5)	0·71 [0·49, 1·02]	0·87 [0·59, 1·27]	494	(1·8)	0·56 [0·25, 1·26]	0·59 [0·25, 1·36]
> 20 yrs	194	(2·6)	0·61 [0·23, 1·65]	0·79 [0·28, 2·25]	(10·8)	0·63 [0·38, 1·05]	0·79 [0·46, 1·37]	223	(1·3)	0·40 [0·11, 1·36]	0·43 [0·12, 1·56]
Current OC use:											
No	864	(2·8)	1·0	1·0	(17·4)	1·0	1·0	978	(2·6)	1·0	1·0
Yes	1167	(5·3)	1·94 [1·20, 3·14]	1·75 [1·05, 2·93]	(12·0)	0·65 [0·51, 0·84]	0·71 [0·54, 0·94]	1307	(2·4)	0·92 [0·54, 1·58]	0·96 [0·53, 1·73]
Condom use:											
Never	1525	(4·3)	1·0	1·0	(15·4)	1·0‡	1·0	1726	(2·7)	1·0	1·0
Sometimes	408	(4·4)	0·97 [0·57, 1·66]	1·02 [0·57, 1·79]	(10·3)	0·61 [0·43, 0·86)	0·71 [0·49, 1·03]	453	(2·0)	0·74 [0·36, 1·53]	0·75 [0·35, 1·62]
Always	98	(2·0)	0·43 [0·10, 1·79]	0·46 [0·11, 1·94]	(13·3)	0·83 [0·45, 1·50]	0·94 [0·50, 1·75]	106	(0·9)	0·35 [0·05, 2·53]	0·31 [0·04, 2·35]

*Specimens were unavailable for 254 women.
†From a model including: number of sex partners in past five years, marital status, education, age, occupation, husband's occupation, husband's education, clinic, age at first intercourse, contraceptive use, history of treatment for STD in past year, HIV status.
‡Test for trend, $p < 0.05$.

discharge = 1, pelvic pain = 3, vaginal discharge = 4, cervical discharge = 17. The scores were then compared with laboratory results to determine performance of the algorithm. Cut-offs were varied to maximise sensitivity and specificity.

Results

The prevalence of sexually transmitted diseases among the 2285 women examined was: 4·2% (86/2031) 95% CI [3·3, 5·7] for gonorrhoea, 14·3% (290/2031) 95% CI [12·8, 15·8] for trichomoniasis and 2·5% (56/2285) 95% CI [1·8, 3·2] for syphilis. The prevalence of candidiasis was 11·5% (234/2031) 95% CI [10·1, 12·9]. HIV prevalence in this population has previously been reported as 11·5%.[11]

The women ranged in age between 15–48 years (median 25·5); age was not consistently a significant risk factor for any of the STDs (data not shown). Most women (65%) were in a monogamous marriage; and when compared with these, married polygamous women were at increased risk of syphilis, age-adjusted OR = 1·69 95% CI [0·64, 4·43] and trichomoniasis, age-adjusted OR = 2·65 95% CI [1·72, 4·08]. Unmarried women were at approximately 50% increased risk for gonorrhoea and trichomoniasis, age-adjusted OR = 1·81 95% CI [1·14, 2·86], age-adjusted OR = 1·48 95% CI [1·12, 1·95] respectively, but there was no significant association with syphilis, table 1.

Secondary education was inversely associated with trichomoniasis (~ 65% decreased risk) and syphilis (~ 75% decreased risk) with borderline significant decreasing trends in the age-adjusted analyses (table 1). Nearly 50% of women in the study were housewives and no clear associations emerged with the woman's occupation and STDs. In addition, there was no consistent association with husband's occupation or education (data not shown).

Increasing number of sex partners in the past five years was associated with an increased risk for all STDs; however, the tests for trend were only significant in the age-adjusted analyses, table 1. Older age at first sexual intercourse (more than 20 years) was inversely associated with trichomoniasis, syphilis and gonorrhoea.

Current use of oral contraceptives (OC) was significantly positively associated with gonorrhoea, multivariate OR = 1·75 95% CI [1·05, 2·93], but inversely associated with trichomoniasis, multivariate OR = 0·71 95% CI [0·54, 0·94] (table 1). Use of the intrauterine device was non-significantly positively associated with both trichomoniasis, multivariate OR 1·69 [0·90, 3·19] and syphilis, multivariate OR 1·91 [0·52, 7·10]. Condom use was very low even in this population of women using family planning; only 4·6% of women reported regular condom use and 20% reported infrequent condom use. There were inverse associations between regular condom use and gonorrhoea and syphilis, after controlling for other risk factors, although none of the odds ratios reached statistical significance.

Candidiasis was not significantly associated with any of the risk factors examined in table 1. Unlike the STDs examined, candidiasis was not associated with being unmarried, age-adjusted OR 1·08 [0·80, 1·47] or with number of sex partners in the last 5 years (test for trend p = 0·69).

Almost a quarter of the women (23·9%) reported potentially STD related symptoms, including vaginal discharge, lower abdominal pain, painful intercourse and malodorous discharge. Cervical discharge was present in nearly 16% of women on examination, although only 7·2% reported symptoms of vaginal discharge. The prevalence of vulval or vaginal ulcers on examination was very low (0·3%). The presence of cervical discharge on examination was predictive of both gonorrhoea (age-adjusted OR = 1·78 95% CI [0·34, 0·94]) and trichomoniasis (age-adjusted OR = 2·25 95% CI [1·66, 3·04].

Several associations were observed between STDs. HIV was associated with an almost twofold increased risk of gonorrhoea and 30–50% increased risk of candida and syphilis.[11] Gonorrhoea and syphilis were positively associated, multivariate OR = 1·65 95% CI [0·54, 5·05] after controlling for other risk factors, and gonorrhoea was inversely associated with the presence of candidiasis, multivariate OR = 0·33 95% CI [0·12, 0·93].

Sensitivity, specificity and positive predictive values for selected risk factors, symptoms and signs, both individually and in combination, are presented in table 2. Sensitivity of the combined variables (being unmarried or having greater than two sexual partners in the past 5 years or the presence of vaginal/cervical discharge on examination) was acceptable for gonorrhoea and trichomoniasis, however, specificity was low (42%). The performance of the algorithm for gonorrhoea derived by Vuylsteke *et al*,[15] using only the variables that we had collected in our study and with no microbiological diagnosis of chlamydia, is shown in table 3. Using a cut-off of 28, as for

Table 2 Sensitivity, specificity and positive predictive value of selected predictors of STDs

Predictor variables	*N**	*Sensitivity (%)*	*Specificity (%)*	*PPV† (%)*
Gonorrhoea				
Unmarried	652	41	73	6
>2 sex partners in past 5 years	469	28	80	6
Vaginal/cervical discharge	758	51	63	6
Unmarried or >2 sex partners in past 5 years or vaginal/cervical discharge	1202	76	42	5
Unmarried and >2 sex partners in past 5 years and vaginal/cervical discharge	90	6	96	6
Trichomoniasis				
Unmarried	652	33	73	17
>2 sex partners in past 5 years	469	23	80	17
Vaginal/cervical discharge	758	46	64	18
Unmarried or >2 sex partners in past 5 years or vaginal/cervical discharge	1202	66	42	16
Unmarried and >2 sex partners in past 5 years and vaginal/cervical discharge	90	7	96	21
Syphilis serology				
Unmarried	652	36	72	3
>2 sex partners in past 5 years	469	32	80	4
Vulval ulcers	5	0	99	0
Unmarried or >2 sex partners in past 5 years or vulval ulcers	884	48	62	4
Unmarried and >2 sex partners in past 5 years and vulval ulcers	0	0	100	0

*Total number of women with each risk factor or combination of risk factors.
†Positive predictive value.

Table 3 Sensitivity, specificity and positive predictive of diagnostic algorithm (Vuylsteke et al)[15] for gonorrhoea with varying cut-off points

History and examination variables	*Sensitivity*	*Specificity*	*PPV**
Cut-off >8	98%	15%	5%
Cut-off >13	80%	30%	5%
Cut-off >20	58%	56%	6%
Cut-off >28	38%	76%	7%
History variables only	*Sensitivity*	*Specificity*	*PPV**
Cut-off >8	97%	17%	5%
Cut-off >13	72%	37%	5%
Cut-off >20	45%	65%	5%
Cut-off >28	15%	89%	5%

*Positive predictive value.

pregnant women in their study, sensitivity of the algorithm was low—only 38% when examination variables were included, but with a high specificity (76%). When we used a cut-off of 8, as for prostitutes in their study, sensitivity improved but specificity was substantially lowered; positive predictive value was around 5% in all combinations. In order to estimate the potential impact of our lack of data on chlamydia, we estimated the effect on positive predictive value, assuming a prevalence of chlamydia of 5%, as in the Vuylsteke[15] study. When we assumed that the sensitivities and specificities of a combined algorithm for chlamydia and gonorrhoea (from table 3) were similar to those for the algorithm for gonorrhoea alone, positive predictive value improved to a maximum of 13% (data not shown).

Discussion

The risk factors studied varied in importance between the different STDs. Although some trends emerged for all STDs, such as positive associations with variables relating to sexual behaviour, other risk factors varied between STDs and in some cases showed associations in opposite directions. Education was not consistently associated with the STDs studied, as higher education was inversely associated with trichomoniasis, but positively associated with gonorrhoea and candida. In addition, a woman's occupation was also not consistently predictive of risk. These differences between STDs may be due to the presence of different core groups for STD transmission,[16] or a variety of complex behavioural, biologic and ecologic factors, potentially including STD treatment, that influence the rate of spread and distribution of STDs.[17]

We observed several associations between contraceptive use and STDs. An inverse association of OC use with risk of trichomoniasis has also been reported in other studies.[18 19 20] Few studies have examined the association between IUD use and lower genital tract infections.[21 22] In our study, IUD users were at increased risk of trichomoniasis and syphilis; there may be a biological explanation, such as facilitation of infection by mechanical means, or this may be a chance finding or confounding by unmeasured factors. A positive association of trichomoniasis with current IUD use was also found in a similar study in Nairobi,[18] but these findings require further confirmation.

Condom use has been shown to provide good protection against most STDs for men, but the data for women are equivocal.[23] Rosenberg *et al*[24] found that users of condoms had a reduced risk of gonorrhoea and trichomoniasis in a US population, but few studies have reported a protective effect for STDs in African women where the prevalence of condom use is generally very low.[11 25] Although there was a suggestion of an inverse association of regular condom use with most STDs in our study, the number of regular condom users was too small to draw conclusions.

We observed several significant associations between the different STDs, and also between STDs and candidiasis. As previously reported by Kapiga *et al*,[11] HIV in this population was associated with other STDs, a finding consistent with other studies. A possible explanation for the strong inverse association of candidiasis and gonorrhoea is that antibiotic treatment for vaginal discharge may increase risk of candidiasis, although we did not have data on recent treatment of STDs to directly assess this issue. Candidiasis was not associated with any of the known STD risk factors in our data. The associations between different STDs, emphasises the importance of considering combined treatment even if a woman is diagnosed with only one STD.

There are several limitations of cross sectional designs in studying STD transmission. Ideally, incidence of STDs should be studied within a cohort study with data on STD treatment, but such studies are difficult and expensive to perform especially in settings where follow up is problematic. Prevalence of STDs, the measure of disease frequency used in cross sectional studies, is a proxy for true incidence and depends on a number of factors including the availability of treatment. In addition, the temporal nature of associations cannot be determined. Furthermore, as many variables were examined for each outcome, some findings may be due to chance, and associations inconsistent with prior hypotheses should be interpreted carefully.

The sensitivity and positive predictive value of combinations of signs and symptoms in the diagnosis of individual STDs was generally low, but specificity remained high. Positive predictive value (PPV) of any screening test is directly proportional to the prevalence of the STD being screened for, suggesting that algorithms with high PPV in high prevalence settings such as STD clinics will have a lower PPV in more general population based settings such as family planning clinics. An important limiting factor in our study in assessing performance of these algorithms is that screening for *C trachomatis* was not performed. If women infected with *C trachomatis* have the same risk profiles as the other STDs, then our estimates of PPV will be lower than if we had been able to include chlamydia as an outcome. Indeed, when we examined the performance of the algorithm of Vuylsteke *et al*[15] under the assumption of a prevalence of chlamydia of 5%, PPV improved moderately but remained low. Because of the relatively high number of

false positives from the gonorrhoea algorithm, PPV will remain low, even if chlamydia were determined with perfect algorithm sensitivity. Thus if we had data on chlamydia, we would expect the algorithm to perform only moderately better than our estimate, dependent on the age-specific prevalence of chlamydia in the population.

The use of STD algorithms, based on clinical signs and symptoms for symptomatic women has been advocated for use in developing countries by the World Health Organisation (WHO).[26] Such algorithms were used recently in a randomised trial of STD treatment in Tanzania which demonstrated that the diagnosis and treatment of STDs substantially reduced HIV incidence.[27] However, these algorithms have been shown to have relatively low sensitivity and specificity when tested in both high and low prevalence populations.[15 18 28] Algorithms which use scoring systems, based on coefficients from logistic models, show an improved sensitivity and specificity over list-based systems.[15] In our study, the maximum sensitivity reached using this method was around 80%, but at the expense of low specificity, which would result in the unnecessary treatment of potentially large numbers of women detected as false positives. These observations reinforce the continuing need for inexpensive field tests to diagnose specific STDs and improvement of clinical diagnostic algorithms to reduce the impact of STDs and HIV in developing countries.

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