Short
reportSexually transmitted disease among married
Zambian women: the role of male and female
sexual behaviour in prevention and management

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Objectives: Few studies have evaluated the relation between male and female sexual behaviour and STD among married African women. The objectives of this study were to identify male and female sexual behaviour associated with female STD, and to explore whether incorporating male and female sexual behaviour and male symptoms can improve algorithms for STD management in married African women.

Methods: 99 married couples with one symptomatic member (58 males, 41 females) attending an STD clinic in Lusaka, Zambia were interviewed separately about sexual and contraceptive behaviour, and had physical examinations. Diagnostic tests for *Neisseria gonorrhoeae* (GC), *Trichomonas vaginalis* (TV), and HIV were performed. Bivariate and multivariate odds ratios for the association between sexual behaviour and STD were calculated. Predictive algorithms based on current Zambian guidelines for management of STD in women were created.

Results: Among women at baseline, 10% were positive for GC, 14% for TV, 52% for HIV. Female alcohol use before sex, a male's paying for sex, and a couple's having sex unprotected by condoms or spermicides were associated with female STD. Incorporation of these behaviours along with symptoms of urethral discharge and dysuria among husbands increased the predictive ability of algorithms for management of STD in women.

Conclusions: The addition of male and female sexual behaviour and male STD symptoms to diagnostic algorithms for female STD should be explored in other settings. Both husbands' and wives' behaviour independently predict STD in these women; risk reduction programmes should target both men's and women's sexual behaviour.

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Keywords: sexually transmitted diseases; screening strategy; risk factors

Introduction

Heterosexual transmission accounts for the vast majority of HIV infections in Africa. Sexually transmitted diseases (STD) including gonorrhoea and trichomoniasis have been identified as cofactors in HIV transmission.¹⁻³ While numerous studies have considered risk factors for STD among sex workers, few have examined STD risk factors among married African women.

Studies of African women have identified several behavioural risk factors for HIV infection (for example, a woman having multiple sex partners). Nevertheless, prevalences of such factors among married women are low,^{3,4} and diagnostic algorithms for female STD incorporating female sexual behaviour have low sensitivity and predictive values.^{4,5} Correspondingly, some researchers suggest that women's STD risk results primarily from husbands' behaviour and that prevention programmes should target male sexual behaviour.^{6,7}

However, before this study, no other study has jointly assessed the effects of male and female sexual behaviour on STD among married African women nor considered the incorporation of both male and female behaviour into predictive algorithms for female STD.

Methods

This study was conducted at the National

STD Reference Centre situated at the University Teaching Hospital (UTH) in Lusaka, Zambia. Ninety nine people with symptomatic disease (58 males, 41 females) attending the clinic in 1993-4 who returned with their spouses were enrolled. Socio-demographic, medical history, and sexual and contraceptive behavioural data were collected separately from each partner by questionnaire. Endocervical and urethral swabs for *Neisseria gonorrhoeae* cultures and smears for wet mount (from the posterior fornix of the vagina and urethra) for *Trichomonas vaginalis* were taken during genital examinations. Gonorrhoea specimens were inoculated onto Thayer-Martin culture medium plates. Oxidase test and Gram stain were used to identify positive gonorrhoea cultures. *T vaginalis* was identified by the presence of trichomonads on wet mount.

Bivariate associations of risk factors for gonorrhoea and trichomoniasis were examined by calculating crude odds ratios (OR) and 95% confidence intervals (CI). A restricted set of factors was selected for multivariable analysis using logistic regression. Predictive algorithms were based on current STD management guidelines in Zambia.⁸ Algorithms were created to maximise positive predictive values and likelihood ratios (sensitivity/1 - specificity). Analyses were performed using SAS/STAT (SAS Institute, Cary, NC, USA), and LOGXACT (Cytel Software Corporation, Cambridge, MA, USA).

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Results

Median age was 35 years for males and 29 years for females; 64% of males and 41% of females had at least some secondary education. At admission, 68% of men were HIV+, 10% had gonorrhoea, and 29% reported dysuria or discharge. Among women, 52% were HIV+, 10% had gonorrhoea, and 14% had trichomoniasis. Men reported riskier sexual behaviour (previous 3 months) than women including having multiple sex partners (40% v 6%), exchanging money or gifts for sex (25% v 5%), and alcohol use before sex (37% v 22%).

Both a woman's and her husband's behaviour were associated with STD in women. In bivariate analysis, women using alcohol before sex, men having multiple sex partners, and men paying for sex were strongly associated with cervical gonorrhoea. Other variables, including the woman's age and educational level, her number of sex partners in the previous 3 months, and her husband's alcohol use before sex, were not associated with gonorrhoea in women. Multivariable analysis confirmed the association of female alcohol use before sex (OR = 5.2; 95% CI 1.2–22.7) and her partner paying for sex (OR = 6.6; 95% CI 1.5–29.2) with cervical gonorrhoea controlling for condom and spermicide use by the couple. No variable was significantly associated with *T vaginalis* on microscopy. However, women who used condoms or spermicides inconsistently were more likely to have *T vaginalis* than consistent users (OR = 4.0; 95% CI 0.6–∞) controlling for women's alcohol use and men paying for sex.

As expected, a complaint of yellow vaginal discharge (OR = 19.1; 95% CI 2.0–180.6) or yellow or white discharge (OR = 8.2; 95% CI 1.0–67.6) was highly associated with gonorrhoea. Women with cervical erythema were six times more likely to have gonorrhoea (OR = 6.3; 95% CI 1.6–25.2). A husband's complaint of urethral discharge was also highly associated with gonorrhoea (OR = 21.0; 95% CI 4.3–103.5). *T vaginalis* among women was associated with a woman's (OR = 3.4; 95% CI 0.9–13.0) or her husband's (OR = 4.3; 95% CI 1.3–14.0) complaint of dysuria.

In Zambian health centres which cannot conduct pelvic examinations, treatment for gonorrhoea is based on a complaint of vaginal discharge.⁸ In our study, vaginal discharge was highly sensitive for gonorrhoea (90%) but had a low predictive value (16%) and likelihood ratio (1.72) (table). Thus, treatment based on a symptom of vaginal discharge would be inappropriate for most women. The addition of behavioural factors, such as a woman's alcohol use before sex or a husband's paying for sex, to vaginal discharge increases the algorithm's predictive ability. However, incorporating a husband's complaint of urethral discharge results in a highly discriminating algorithm (likelihood ratio 17.6) with adequate predictive value.

Management of gonorrhoea where pelvic examinations are conducted is based on clinical signs.⁸ A sign of yellow vaginal discharge alone had a low predictive value (31%) and likelihood ratio (4.00). Adding either a woman's alcohol use before sex, a husband's paying for sex, or a symptom of urethral discharge to either yellow vaginal discharge or cervical erythema increased both predictive values (to > 56%) and likelihood ratios (to > 11.00).

Management of trichomoniasis in Zambia is also based on symptoms or signs of vaginal discharge. The positive predictive value and likelihood ratio associated with vaginal discharge alone for trichomoniasis is low (table). Algorithms incorporating female or male dysuria to vaginal discharge were more highly predictive.

Discussion

Based on the low prevalence of risky sexual behaviour among married African women, researchers have suggested that their STD risk is associated with their husbands' behaviour.^{6,7} Previous studies, however, were based on women's report of male behaviour. This study suggests that both female and male behaviour predict female STD in married Zambian women. For example, in multivariate analysis, a woman's alcohol use before sex and her husband's paying for sex were highly associated with gonorrhoea in women. These findings imply that prevention programmes should target both wives' and husbands' behaviour in high STD prevalence areas. Similar to previous findings from Africa, we found that the Zambian guidelines for syndromic management of non-ulcerative STD in women⁸ have low predictive value for *N gonorrhoeae* and *T vaginalis*.^{4,9,10} Incorporation of women's sexual behaviour (numbers of sex partners) or sociodemographic factors (age, marital status) improved the predictive values of algorithms in some studies,^{5,9,10} but not in others.⁴

We found that incorporating male and female sexual behaviour and male symptoms enhanced the predictive power of our algorithms. Improving such algorithms can enhance STD management thus reducing inappropriate treatment in resource-poor settings. These algorithms can also be used to

Positive predictive value likelihood ratio, sensitivity, and specificity for clinical signs and symptoms and behavioural variables associated with STD in women

	Positive predictive value	Likelihood ratio	Sensitivity	Specificity
Predictor variables for <i>Neisseria gonorrhoeae</i> :				
Clinics without pelvic exam capacity				
(1) Vaginal discharge (any)	16%	1.72	90%	48%
(2) (1) and female alcohol use	29%	3.52	40%	89%
(3) (1) and male money for sex	29%	3.67	50%	86%
(4) (1) and male urethral discharge	67%	17.60	40%	98%
Clinics with pelvic exam capacity				
(1) Yellow vaginal discharge	31%	4.00	50%	88%
(2) (1) or cervical erythema	31%	3.96	90%	77%
(3) (2) and female alcohol use	67%	17.60	40%	98%
(4) (2) and male money for sex	56%	11.00	50%	95%
(5) (2) and male urethral discharge	67%	17.60	40%	98%
Predictor variables for <i>Trichomonas vaginalis</i> :				
Clinics with or without pelvic exam capacity				
(1) Vaginal discharge (any)	18%	1.32	71%	46%
(2) (1) and female dysuria	40%	4.05	29%	93%
(3) (1) and male dysuria	35%	3.27	50%	85%

improve women's utilisation of health care; a woman with vaginal discharge who discovers a partner's urethral discharge could be instructed to seek care immediately. They can also be used to counsel women at high STD risk about appropriate contraceptive options. However, the ability of a woman to give reliable information on her partner's symptoms and sexual behaviour should be verified.

Several limitations bear mentioning. Firstly, the small study size limits the precision of risk estimates and the scope of the multivariate analyses. Secondly, because the study population were clients who returned to the STD clinic with their spouses, it may not represent all married women attending the clinic. Our study population was similar in age, religion, and educational level with the general married population of Lusaka, however.¹¹ Thirdly, the cross sectional nature of this analysis restricts our conclusions to correlates of prevalent rather than incident STD.

In summary, this study suggests that incorporating female and male sexual behaviour and male symptoms can improve diagnostic algorithms for STD among married African women. Efforts aimed at preventing STD in this population should target both husbands' and wives' behaviour.

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