Evidence of Declining STD Prevalence in a South African Mining Community Following a Core-Group Intervention

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Objectives: **To reduce the prevalence of curable sexually transmitted diseases (STDs) in a South African mining community through provision of STD treatment services, including periodic presumptive treatment and prevention education to a core group of high-risk women living in areas around the mines.**

Methods: **Women at high risk for STDs attended a mobile clinic monthly for examination and counseling, and were treated presumptively for bacterial STDs with a directly observed 1-g dose of azithromycin. Gonococcal and chlamydial infection rates were measured by urine ligase chain reaction, and genital ulcers were assessed by clinical examination. Changes in STD prevalence among local miners were assessed through comparison of prevalence in two cross-sectional samples of miners taken 9 months apart, and through routine disease surveillance at mine health facilities.**

Results: **During the first 9 months of the intervention, 407 women used the services. Baseline prevalence of *Neisseria gonorrhoeae* and/or *Chlamydia trachomatis* in women was 24.9%; 9.7% of these women had clinical evidence of genital ulcer disease (GUD). The proportion of women with incident gonococcal or chlamydial infections at the first monthly return visit (69% follow-up rate) was 12.3%, and genital ulcers were found in 4.4% of these women. In the miner population, the prevalence of *N gonorrhoeae* and/or *C trachomatis* was 10.9% at baseline and 6.2% at the 9-month follow-up examination ($P < 0.001$). The prevalence of GUD by clinical examination was 5.8% at baseline and 1.3% at follow-up examination ($P < 0.001$). Rates of symptomatic STDs seen at mine health facilities decreased among miners in the intervention area compared with miners living farther from the site and with less exposure to the project.**

Discussion: **Provision of STD treatment services to a core group of high-risk women may significantly reduce their burden of disease, and may contribute to a reduction in community STD prevalence. In the absence of sensitive and affordable screening tests for STDs in women, periodic presumptive treatment coupled with prevention education is a feasible approach to providing STD services in this population.**

EPIDEMIOLOGICAL[1–3] AND BIOLOGICAL[4–7] evidence support the role of conventional sexually transmitted diseases (STDs) in increasing HIV susceptibility and infectiousness, and the effect of STD treatment in reducing genital viral excretion.[8,9] This evidence has been applied in a community-based randomized trial conducted in Mwanza, Tanzania, where improving STD case management in health facilities resulted in a 40% reduction in HIV transmission.[10]

Public health interventions that reduce community STD prevalence could potentially have a larger impact on HIV transmission.[11] Strategies that have been used to rapidly lower STD prevalence include 1) treatment of general population groups,[12,13] and 2) more selective presumptive treatment of core groups with high rates of both STDs and sexual partner change.[14] For reports on gonorrhea, the effect of one-time mass treatment has been transient, with prevalence returning to previous levels in the absence of other control measures.[13,14] There are few studies reporting the use of periodic presumptive treatment in core-group populations to reduce community STD prevalence.[15] If such an

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approach were effective, it would arguably be more acceptable and cost-effective than population-based mass treatment.

Factors that lead to the disruption of communities or the separation of couples are known to enhance the spread of STDs.[16,17] Commercial sex flourishes under conditions of migrancy[18]; studies conducted early in the African HIV epidemic revealed an association between high urban adult male/female ratios, which is indicative of male migration, commercial-sex activity, and high rates of STDs and HIV.[19] The more recent extension of the HIV epidemic to rural areas in many African countries may be fueled by the movement of migrant laborers to and from their home communities.

Commercial sex is a prominent feature around many South African mines where thousands of male migrant workers live in single-sex hostels, and is regarded to be one of the key factors in the maintenance of high STD rates in mining communities.[20–21] Previous efforts to control STD in these mining communities have had minimal success (personal communication, Ron Ballard, 1999). Historically, mining companies have concentrated their attention exclusively on their employees, and little effort has been made to reach the sexual contacts of the miners.

To complement services provided by the mine clinics, we designed an intervention to provide acceptable and effective STD treatment and preventive services to women living around the mines. The objective of this study was to assess the impact of STD treatment and prevention services for high-risk women on these women and the male migrant community in the intervention area. Specific objectives were to 1) measure STD incidence and preventive behavior among the women during the intervention; and 2) to assess STD prevalence and clinic attendance rates for STD treatment in male mine workers before and after implementation.

Methods

Study Design

This intervention-linked research used a longitudinal study design with repeated measurements of STD infection among women participants. High-risk women were referred by peer outreach workers to a mobile clinic where monthly examination and presumptive treatment, prevention education, and condoms were provided. Syndromic STD management was offered to women with symptomatic STDs. The prevalence of STDs and behavioral indicators were determined at monthly intervals for the women participants. The prevalence of STDs among miners was measured in two separate cross-sectional samples at baseline and 9 months later. Outpatient records at mine health facilities were examined to monitor rates of symptomatic STD among miners in the area.

Intervention Site

The intervention was conducted from October 1996 to June 1997 in a Free State mining town in South Africa with an estimated population of 80,000 persons, including approximately 13,000 miners. Ninety percent of these miners live in single-sex hostels near the mine shafts where they work. A mobile clinic service for high-risk women was established near a commercial area surrounded by 3 mine hostels (H2, H3, H4) with a miner population of approximately 3,700. Two other hostels (V1, V2) were located at an intermediate distance (2–4km), and two hostels (M1, M3) were located more than 5 km from the project area. Community mapping was carried out to identify taverns, shebeens (unlicensed liquor outlets), and other meeting places where miners relaxed after work. Previous ethnographic research conducted in the area had shown that many women frequenting these establishments provide sexual services to the miners in exchange for some material benefit.

Recruitment of Women

Project staff conducted focus-group discussions with women contacted at identified meeting places to discuss the intervention and pretest data collection instruments. Peer educators were then selected and trained to provide information to women about sexual risk reduction, condom use, and the advantages of using the clinical services. After training, peer educators distributed clinic referral cards to high-risk women, and encouraged them to attend the mobile clinic monthly. No incentives other than the services themselves were used to encourage clinic attendance.

Intervention

Sexually transmitted disease services for high-risk women were provided at a mobile clinic staffed by a professional nurse who was trained in the study protocol. All women referred to the clinic received an initial assessment and treatment or referral; those women who met the risk-based inclusion criteria (i.e., reporting commercial sex work or having at least three regular or nonregular partners) were enrolled and advised to return for monthly clinic visits.

Upon enrollment, each woman was administered a standardized questionnaire to obtain information regarding demographics, obstetrics, sexual history, and current symptoms. A genital examination, which included speculum, was performed and a urine sample was collected. Venipuncture was performed to obtain serum for serologic testing for syphilis. Urine specimens were stored in a cold box in the mobile clinic and transported daily to the laboratory in Johannesburg, where the specimens were aliquoted and frozen at −20 °C. Specimens were analyzed for *Neisseria gonorrhoeae* and *Chlamydia trachomatis* using ligase chain reaction (LCR) (LCx, Abbott, Chicago, IL). Serum was

tested for quantitative rapid plasma reagin assay (Immutrep, Omega Diagnostics, Alloa, Scotland).

All participants were given presumptive treatment with one 1-g dose of azithromycin under direct observation. Azithromycin was chosen for its activity against *C trachomatis*, *N gonorrhoeae*, and *Haemophilus ducreyi*, which are common pathogens in the community.[22–25] It was emphasized that the medication was effective for only a few STDs, and that taking the medication was not a substitute for other preventive measures such as partner reduction and condom use. In addition, women with genital ulcerations that were noted on examination were administered a single intramuscular injection of 2.4 million units benzathine penicillin to provide coverage for primary syphilis; women found to have vaginal discharge on examination were given one 2-g dose of metronidazole to cover *Trichomonas vaginalis* infection and bacterial vaginosis, and 200 mg clotrimazole vaginal suppositories for 3 days for yeast infection in addition to their azithromycin therapy. At the first follow-up visit, all women with reactive syphilis serology were treated with a single injection of 2.4 million units benzathine penicillin.

At monthly follow-up visits, risk behavior was assessed using a brief questionnaire to determine symptoms, number and types of sexual partners, and condom use. The physical examination was repeated, and urine was collected for LCR testing. All women were given azithromycin, and specific signs and symptoms of STDs were treated as described above. The importance of consistent condom use was stressed by the nurse at each clinic visit and by peer educators in the field.

To evaluate the impact of the intervention on community STD prevalence, miners living in hostels in the intervention area were examined. Two separate samples of consecutive miners presenting for annual preleave physical examinations were screened for signs and symptoms of STDs at baseline and 9 months later. Discharge and ulcers were noted, and a first-catch urine sample was collected for LCR testing for *N gonorrhoeae* and *C trachomatis*, as described above. Results were returned within 2 weeks, and free treatment was provided to miners with positive test results.

Mine hospital records of outpatient visits were available for the period of December 1995 to June 1997. Average attendance rates for STD were computed for each mine hostel during the periods of December 1995 to June 1996 and December 1996 to June 1997; these rates were compared with the total number of outpatient visits for those periods. Rates from hostels in the intervention area were compared with those from more distant hostels.

Analysis

Data analysis was performed using EpiInfo (Centers for Disease Control and Prevention, Atlanta, GA) and SAS (SAS Institute, Cary, NC) statistical packages. The chi-square test was used to compare proportions, and the generalized estimating equation (GEE)[26,27] was used to analyze repeat measures of STD infection in women. Temporal explanatory variables including time enrolled in the study, time between visits, and calendar time were modeled to predict infection with the primary STD response variables. In modeling explanatory variables, discriminant analysis was used to determine breakpoints for transforming continuous variables to categorical variables.

Results

Women Using the Services

During the initial 9 months of the intervention, 407 women were seen at the project clinic at least once, and 710 follow-up visits were registered. Follow-up rates were 69%, 48%, and 32% respectively for visits 2, 3 and 4. The median interval between visits was 29 days (range 17–195 days).

The mean age of women attending was 32.9 years at baseline; 70% of these women were South African, and 29% were from neighboring Lesotho. The median length of stay in the area was 3 years, 22% of the women had arrived within the past 1 year. Whereas less than 1% of women were married, 30% reported living with a man, and more than 80% of women reported having one or more regular partners who provided some monetary or in-kind support. Baseline risk profiles and preventive behavior for all women, for women who attended the clinic at least three times, and for women who dropped out before the third visit are summarized in Table 1. Women who returned to the clinic at least three times were slightly older than but had similar risk profiles to women who attended only once or twice.

At the initial visit, 17.3% of women tested positive for *N gonorrhoeae*, and 14.3% of women tested positive for *C trachomatis*. One in four women (24.9%) had a gonococcal or chlamydial infection or both. Genital ulcers were noted during examination in 9.7% of women. A total of 33.8% women had a reactive syphilis serology, and 49.4% of the women had evidence of one or more of the previously described infections. There was no significant difference in the prevalence of any STD measured at the first visit when comparing women who attended the clinic at least three times with women who attended less than three times (data not shown).

After treatment, rates for all STDs measured at follow-up visits were significantly lower than at baseline. Table 2 shows the prevalence of gonorrhea, chlamydial infection, and GUD at the first four visits; rates are also shown for the subgroup of women who returned for at least three visits. Posttreatment prevalence is an approximation of the incidence rate of new infection, and suggests high levels of STD exposure (Figure 1).

TABLE 1. Baseline Risk Profile and Preventive Behavior Among Women Using STD Services

	All Women	Women With < 3 Visits	Women With ≥ 3 Visits	P
Number	407	235	172	
Mean age	32.9	32.1	33.9	0.01
Report clients	25.9%	25.7%	26.1%	0.26
Mean no. casual clients	2.3	2.3	2.4	0.38
Condom use sometimes	25.5%	20.7%	31.8%	0.20
Condom use last work day	2.9%	0.0%	6.8%	0.13
Report regular partners	84.5%	85.5%	83.1%	0.51
Mean no. regular partners	1.9	1.9	1.9	0.58
Any condom use with partner	23.9%	22.1%	26.1%	0.56
Past history of STD	66.1%	66.8%	65.1%	0.72
Received no treatment	43.5%	44.2%	42.9%	0.87

STD = sexually transmitted disease.

Repeated measurement analysis was used to compare STD prevalence rates at follow-up visits to rates measured at baseline. Several time covariates (i.e., time between visits, time in the study, and calendar time) were included in the model. Prevalence of all infections were significantly lower than at baseline when the interval between visits was less than 1.3 months ($P = 0.003$, chlamydia; $P = 0.002$, gonorrhea; $P = 0.02$, symptomatic GUD). The prevalence of gonorrhea among women seen around the Easter holiday was significantly higher than that measured at baseline ($P = 0.01$). In the presence of these other time covariates, overall time in the study was not a significant factor in explaining the probability of infection compared with the baseline.

Reported condom use with all clients during the woman's last working day increased significantly from 2.0% at the first visit to 7.4%, 27.6%, and 33.3% at the second, third, and fourth visits, respectively (chi-square for trend, $P < 0.00001$), although only a minority of women admitted to having casual clients. No significant change was noted in condom use with regular partners.

Sexually Transmitted Disease Prevalence Among Miners

Prevalence rates of *N gonorrhoeae*, *C trachomatis*, and GUD in miners from the intervention area presenting for routine preleave examinations before the intervention (n = 608) and 9 months later (n = 928) are presented in Table 3 (Figure 2). The prevalence of gonorrhea and/or chlamydia decreased from 10.9% to 6.2% ($P < 0.001$), and the prevalence of GUD decreased from 5.8% to 1.3% ($P < 0.001$).

Mine hospital outpatient records were monitored for changes in rates of visits for new STD episodes. In the year preceding the intervention, 1,130 STD visits were recorded for a miner population of 10,559 (10.7 visits per 100 miners). Table 4 presents mean monthly rates of STD visits by mine hostel group for the periods of December 1995 to June 1996 and December 1996 to June 1997. During the postintervention period, STD attendance rates decreased for miners at the Harmony mines (H2/H3/H3) closest to the intervention area; for more distant hostels, the difference was inversely related to distance from the intervention. This pattern was most evident with GUD (Figure 3). The ratio of STD visits to all outpatient visits also decreased for hostels closest to the intervention when compared with more distant hostels.

Discussion

The results of this intervention research suggest that provision of effective curative and preventive services to

TABLE 2. Sexually Transmitted Disease Prevalence Rates in Women at Baseline and Follow-up Visits

	n	Gonorrhea	Chlamydia	Gonorrhea and/or Chlamydia	Genital Ulcer	Symptomatic Ulcer*
All enrolled women						
First visit	407	17.3%	14.3%	24.9%	9.7%	6.4%
Second visit	260	8.3%	4.0%	12.3%	—	1.5%
Third visit	172	7.6%	2.9%	10.6%	—	1.2%
Fourth visit	108	4.7%	0.9%	5.7%	—	0.9%
Women with ≥3 visits						
First visit	172	14.6%	13.5%	22.8%	10.0%	7.6%
Second visit	172	9.6%	5.4%	15.0%	—	0.6%
Third visit	172	7.6%	2.9%	10.6%	—	1.2%

* Women presenting with genital ulcers that were confirmed on examination; asymptomatic women were not routinely examined for ulcers at follow-up visits.

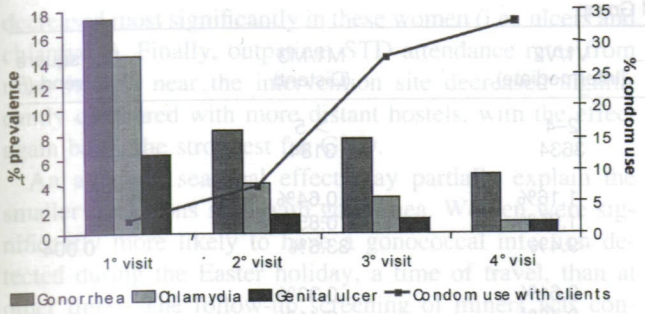

Fig. 1. Sexually transmitted disease prevalence and reported condom use in women at baseline and follow-up visits (from Table 2).

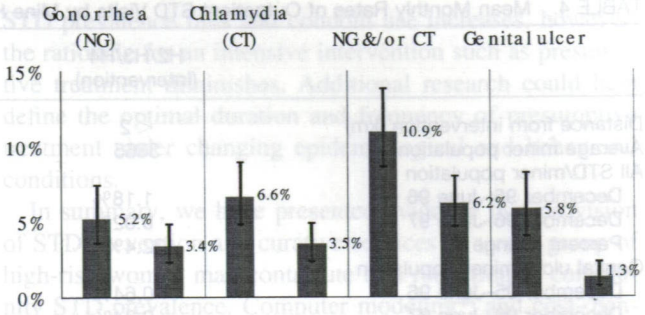

Fig. 2. Sexually transmitted disease prevalence in miners before and 9 months after start of intervention (from Table 3).

high-risk women may have a significant impact on STD rates in these women and on community STD prevalence. Despite its short duration, the study reported here offers evidence of the utility of a core-group approach to STD control, and information on what may constitute feasible and effective STD services for high-risk women.

Epidemiologic treatment has been advocated as a strategy for reducing STD prevalence in areas of high endemicity.[28,29] One such approach, general-population mass treatment, has an advantage over clinic-based care because people with asymptomatic or minimally symptomatic infections are reached. A randomized community-controlled trial of mass treatment of all consenting adults 15–59 years was recently conducted in the rural Rakai district of Uganda.[12] This approach had a significant impact on community prevalence of some STDs; however, concerns have been raised about the logistics and costs of such an intervention and its replicability outside of a research setting.[30] In addition, intermittent mass treatment may have little effect on underlying STD transmission dynamics and resultant incidence of new infections.

Interventions focusing on core groups (e.g., commercial sex workers and their clients) are potentially more effective and cost-effective in reducing community prevalence of STD than general population efforts.[11,31] Focal outbreaks of syphilis and chancroid in North America have been contained through interventions with commercial sex workers and their clients,[15,32] and evidence from Nairobi and Zimbabwe[33] suggests that targeted peer interventions with commercial sex workers have contributed to lower community STD prevalence. Thailand's 100% Condom Program[34] provides perhaps the best example of the potential of a core-group intervention; applied on a national scale, promotion and enforcement of condom use in commercial sex establishments led to reductions of more than 80% in STD incidence and an apparent decline in HIV incidence.[35,36]

Other approaches to reducing STD prevalence in core groups may be possible. Commercial sex workers and their partners have significantly higher rates of STD than the general population,[37–39] yet health-care services are often not available, accessible, or acceptable to these high-risk populations. In the few demonstration projects where quality STD services have been made available to commercial sex workers, decreases in STD and increases in prevention behavior have been documented.[37,40,41] A major limitation faced by providers of such services is the expense and low sensitivity of screening tests.[42,43] The high proportion of asymptomatic infections in women makes identification of persons who need STD treatment problematic.

Against this background, we sought to design and implement effective STD preventive and curative services that would be acceptable to high-risk women living in this mining community, and to look for evidence of an affect on STD prevalence in the wider community. Data are thus presented on two distinct populations: women at risk who received project services, and miners living in the area of

TABLE 3. Sexually Transmitted Disease Prevalence in Miners Before and 9 Months After Start of Intervention

	Before	After	*P*
Gonorrhea	5.2%	3.4%	0.075
Chlamydia	6.6%	3.5%	0.005
Gonorrhea and/or Chlamydia	10.9%	6.2%	< 0.001
Genital ulcer	5.8%	1.3%	< 0.001

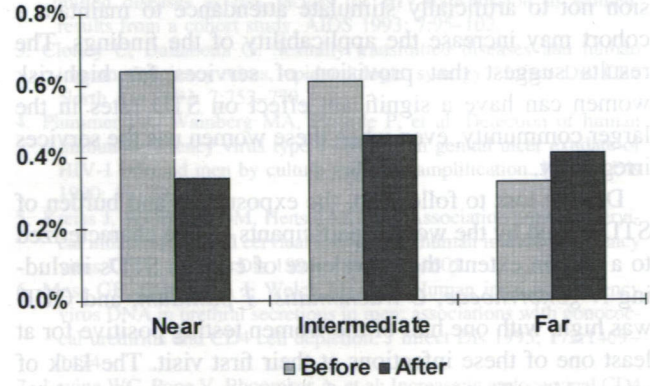

Fig. 3. Mean monthly rates of outpatient GUD visits by distance from intervention.

TABLE 4. Mean Monthly Rates of Outpatient STD Visits by Mine Hostel Group

	H2/H3/H4 (Intervention)	V1/V2 (Intermediate)	M1/M3 (Distant)	Chi-square for Trend (*P*)
Distance from intervention (km)	< 2	2–4	> 5	
Average miner population	3665	3634	3184	
All STD/miner population				
December 95–June 96	1.18%	1.16%	0.64%	
December 96–June 97	0.92%	1.05%	0.85%	
Percent change	−22.4%	−9.4%	33.6%	0.004
Genital ulcer/miner population				
December 95–June 96	0.64%	0.61%	0.33%	
December 96–June 97	0.34%	0.46%	0.41%	
Percent change	−46.8%	−24.4%	26.3%	0.002
STD visits/all outpatient visits				
December 95–June 96	2.82%	2.92%	1.37%	
December 96–June 97	1.81%	2.09%	1.71%	
Percent change	−35.9%	−28.4%	25.2%	0.04

Mine hostels are grouped by distance from intervention site. H2/H3/H4 = near; V1/V2 = intermediate; M1/M3 = far.
STD = sexually transmitted disease.

the intervention. The project sought to improve STD services for the former, and to measure changes in STD rates among the latter—a group that received no direct intervention as a result of the project. The prevalence of STDs among miners was carefully measured from cross-sectional samples before and after initiation of services for the women and through monitoring of health-facility use to test the hypothesis that provision of services for high-risk women has an impact on STD prevalence in the community. We were confident that provision of services, including monthly presumptive treatment with a highly effective antibiotic, would reduce morbidity due to the common curable STD among the women using the services.

In this study, emphasis was placed on designing a feasible intervention that could be replicated outside of a research setting. To assess important operational aspects of service provision, including feasibility and acceptability of the services to the women, no incentives to attend the services other than the services themselves were offered. The follow-up rates reported represent actual use patterns of a socially marginalized and highly mobile population, but introduce potential bias when analyzing trends. The decision not to artificially stimulate attendance to maintain a cohort may increase the applicability of the findings. The results suggest that provision of services for high-risk women can have a significant effect on STD rates in the larger community, even when these women use the services irregularly.

Despite loss to follow-up, the exposure to and burden of STDs faced by the women participants can be characterized to a certain extent; the prevalence of curable STDs including *N gonorrhoeae*, *C trachomatis*, *T pallidum*, and GUD was high, with one half of the women testing positive for at least one of these infections at their first visit. The lack of acceptable, effective services for these women may partially explain these high rates of curable conditions.

The rate of repeated exposure to STD pathogens was also high. After initial presumptive treatment, the incidence of gonococcal and/or chlamydial infection was more than 12% among women who returned for their initial monthly follow-up visits. If STD exposure continued at this rate, prevalence would be expected to return to baseline levels within several months. Rapid return to initial prevalence rates following one-time presumptive treatment has been described elsewhere,[13,14] and emphasizes the importance of sustaining preventive and curative efforts.

During the intervention period, we documented significant reductions in STD prevalence and increases in condom use that were robust to a subgroup analysis of women who attended the clinic consistently. These changes act to reduce a woman's burden of disease; even with continued STD exposure, early treatment shortens the duration of any new infection, thereby reducing the risk of complications in these women, whereas condom use acts at the primary prevention level to limit exposure. At the community level, the impact of a reduction in STD prevalence among high-risk women can be significant for STD control. Because a male partner's risk of infection is proportional to STD prevalence among his sex partners, transmission opportunity in high-risk encounters would be reduced. Because of the dynamic nature of STD transmission, reduced STD incidence and prevalence in men would decrease subsequent risk for their casual and regular partners.[11]

Core-group theory maintains that interventions reaching persons with the highest rates of partner change will have the greatest effect on community STD prevalence.[31] Data from three sources support the finding of a decrease in STD prevalence in this mining community during the intervention period. As expected, significant decreases in prevalence were documented in women participating in the intervention, while miners in the intervention area experienced marked decreases in prevalence of the same STDs that

decreased most significantly in these women (i.e., ulcers and chlamydia). Finally, outpatient STD attendance rates from mine hostels near the intervention site decreased significantly compared with more distant hostels, with the effect again being the strongest for GUD.

An apparent seasonal effect may partially explain the smaller reductions seen with gonorrhea. Women were significantly more likely to have a gonococcal infection detected during the Easter holiday, a time of travel, than at other times. The follow-up screening of miners was conducted immediately after this period, and may reflect increased transmission, perhaps seeded from imported cases. This observation is consistent with with experience from mass treatment trials[13,14] and the known transmission dynamics of gonorrhea, including a high efficiency of transmission, short incubation period, and long duration of infectivity. Because of its more volatile epidemiology, gonorrhea may be more resistant to control measures, including monthly presumptive treatment, than other bacterial STDs.

Concerns regarding presumptive treatment include development of antibiotic resistance and an inadvertent promotion of a false sense of security that could impede adoption of preventive behavior. Within the limitations of this intervention research, we examined both of these issues. Azithromycin was chosen for its efficacy against the common bacterial pathogens in the community and for its single orally administered dose. Monthly treatment was given under direct observation, which minimized the possibility of subtherapeutic doses due to poor compliance. Clinical trials[22–25] have shown high cure rates for 1 g azithromycin for *H ducreyi*, *C trachomatis*, and *N gonorrhoeae*; however, some advisors have recommended 2 g azithromycin for gonorrhea,[22] which, although poorly tolerated, may delay the development of resistance. In this series, the monthly urine LCRs served as a test-of-cure by which the effectiveness of the antibiotic treatment could be monitored. Gonorrhea and chlamydia were eliminated from the genital tract of all infected women who returned for follow-up visits (n = 81, gonorrhea; n = 50, chlamydia), although several women had positive results on consecutive visits. Given the high incidence of infection with these organisms, it is likely that most persistent positive results were reinfections versus treatment failures; however, as with any strategy involving antibiotic treatment, ongoing surveillance is indicated to detect emerging resistance.

Because of a concern that monthly treatment might have a negative impact on the adoption of preventive measures, adequate risk-reduction education was provided from the start of the intervention, and reported condom use with clients increased significantly with women's use of services. This finding is consistent with a prevention-care synergy reported elsewhere,[37] whereby provision of curative services reinforced the adoption of preventive measures. As STD prevalence falls and condom use increases, however, the rationale for an intensive intervention such as presumptive treatment diminishes. Additional research could help define the optimal duration and frequency of presumptive treatment under changing epidemiological and behavioral conditions.

In summary, we have presented evidence that provision of STD prevention and curative services to a core group of high-risk women may contribute to a reduction in community STD prevalence. Computer modeling[44] and cost–benefit analysis suggest that decreases in STD prevalence that were measured during the short intervention period may have a significant impact on HIV transmission, resulting in a high margin of potential benefit to intervention costs. Of course, improved health-care services and public-health interventions are not substitutes for structural changes that could influence the environmental determinants of disease transmission.[45] To the extent that migrant labor practices separate families, they create a high-risk environment for STD and HIV transmission. Public health measures to lower prevalence in the short term must be seen within this context as temporary measures.

We have also shown that periodic presumptive treatment, combined with preventive education and syndrome management of symptomatic women, is a viable option for STD service delivery in this population of high-risk women. Although there may be other options (e.g., screening and treatment), these must take into account the high prevalence and continued high levels of exposure to STDs, and the asymptomatic nature of the majority of infections. In the absence of accurate, affordable screening tests for women, periodic presumptive treatment—at least in the short term—may be an appropriate curative approach for similar populations of high-risk women.

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