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Prevalence and risk factors of STDs in rural Haiti: implications for policy and programming in resource-poor settings

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Summary:

The goals of the current study are to: (1) estimate the prevalence of sexually transmitted diseases (STDs) among women accessing services at a women's health clinic in rural Haiti; and (2) identify risk factors for STDs in this setting. The design is a case control study, comparing risk factors for women who demonstrated positive laboratory results for chlamydia and/or gonorrhoea to women who tested negative for both of these pathogens. The strongest risk factors for chlamydia and/or gonorrhoea were largely economic variables, with work as a domestic servant increasing the risk by fourfold. Working as a market vendor reduced a woman's risk of having an STD by approximately 45%. Given that economic factors are strongly associated with STD risk in this context, one potential mechanism for reducing the risk of STDs, including HIV, would involve increasing economic opportunities for women in rural Haiti.

Keywords

STDs; HIV; Haiti; developing country

Introduction

Over 40 million children and adults worldwide have been infected with HIV[1]. Globally, the great majority of new HIV infections are sexually transmitted. The situation is gravest in sub-Saharan Africa with an estimated prevalence of 8.8%; however, the Caribbean ranks second, where 2.3% of adults are HIV-infected[2]. In Haiti, the worst affected country in the region, an estimated 5.2% of adults are infected with HIV[3]; other countries such as the Dominican Republic, Jamaica, the Bahamas, and Barbados, also face burgeoning epidemics[4].

In the space of a single generation, HIV has become a ranking cause of death in much of the developing world. Yet, other sexually transmitted diseases (STDs) are also a significant public health problem, ranking them first among the top causes of disability-adjusted-life-

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years (DALYs) lost in urban populations in the developing world[5]. Chlamydia, one of the most common and curable STDs, is often asymptomatic but can have long-term consequences if left untreated, including pelvic inflammatory disease, infertility, and ectopic pregnancy[6]. Transmission of HIV is enhanced by infection with other STDs, as suggested by a report demonstrating a 3–5-fold increase in HIV transmission to individuals with chlamydia or gonorrhoea[7]. Work in Haiti has demonstrated a similar increased risk for HIV infection in individuals with non-ulcerative STDs[8], and a report from Tanzania further indicates that treatment of cervical STDs can decrease transmission of HIV[9].

Accordingly, rapid diagnosis and effective treatment of STDs in areas of high HIV prevalence has been advanced as a cost-effective way to slow the spread of HIV[10]. Over and Piot have argued that control of STDs yields significant health benefits when concurrent STD epidemics are independent and when STDs potentiate HIV transmission[5]. Diagnosis of common STDs, combined with clinical or ‘syndromic’ treatment algorithms, have been advocated as essential aspects of STD control efforts[11].

Although research on the dynamics of HIV transmission has been conducted in rural Haiti[12], the prevalence of other STDs there is not as well known. Recent data suggest a high prevalence of cervical infection with gonorrhoea and chlamydia in urban settings and in a referral hospital in a medium-sized town[13,14]. There have been few studies conducted within villages, where the majority of Haitians still reside. One study from Haiti found that rates of other STDs—notably syphilis—are rising, and that, contrary to the norm in most developing countries, the rural prevalence of STDs is surprisingly similar to that seen in the slums of Port-au-Prince[15].

One of the poorest countries in the world, Haiti has suffered severe economic hardship in the past decade, with the 1991 military coup and subsequent social and economic disarray exacerbating the already difficult living conditions in the hemisphere’ s poorest country (a land racked by drought and soil erosion). We have described previously how economic hardship in rural Haiti has led to new patterns of sexual relationships that are linked with transmission of STDs[16]. The present study estimates the prevalence of STDs in the areas served by a women’s health clinic in rural central Haiti. We also seek to elucidate the relationship of social and economic variables and STD risk.

Methods

Setting

The setting for this project is the Péligre basin of Haiti’s Central Plateau, home to several hundred thousand, mostly rural people. Although all parts of Haiti are poor, the Péligre basin is especially so: in 1956, thousands of families living in this region were flooded out by a hydroelectric dam on the Artibonite River, leaving them landless and highly vulnerable to infectious disease and other preventable causes of illness and premature death. Over the past 19 years, the all-Haitian staff of Zanmi Lasante, a local community-based organization, and its sister organization in Boston, Partners In Health, have served these peasants and their children. Built in 1985, the Clinique Bon Sauveur serves approximately 160,000 patients a year, and is the busiest medical facility in Haiti’s central plateau. The free-standing women’s

health clinic at Zanmi Lasante, Proje Sante Fanm, provides free medical services, including the treatment of STDs, to some 10,000–12,000 women annually; through community health workers, the project serves more than 300,000 others.

Sample selection and study design

Patients who sought care at Proje Sante Fanm between June 1999 and March 2001 were asked to participate in the study. In order to ensure a steady recruitment of approximately 120 women per month, 6–8 women were randomly selected on a daily basis. Among new patients, every third or fifth patient in line for services was selected for participation, depending upon the number of women waiting to receive services on that given day. Women were asked to provide written informed consent (in accordance with approval from the Institutional Review Board at Harvard Medical School) and respond to a brief questionnaire before screening for STDs by trained study nurses. In addition, study nurses completed a structured clinic form that documented presence of other STDs as well as STD-related symptoms. Women were asked to return for their test result in one week. Those who tested positive were provided treatment and were asked to bring their spouse or partner in for treatment.

Upon receiving test results, a sub-sample was asked to respond to a detailed questionnaire. This sub-sample comprises those who were enrolled in the case–control study, where all patients who tested positive for chlamydia and/or gonorrhoea were included as ‘cases’ and an equal number of women who tested negative were recruited as controls. For every ‘case’ the following patient listed in the register was asked to participate as a ‘control’ if she tested negative for chlamydia and gonorrhoea. The questionnaire was standardized and included items on sociodemographic characteristics, risk factors for STDs, gynaecologic history, and access to healthcare. Items were included in the questionnaire based on prior literature documenting risk factors for STDs in Haiti[12,13].

Laboratory methods

Endocervical specimens were collected from study participants and processed in the Clinique Bon Sauveur laboratory for *Chlamydia trachomatis* and *Neisseria gonorrhoeae* using the GEN-PROBE PACE 2 System. The PACE 2 is a nonamplified DNA probe assay for the detection of *C. trachomatis* and *N. gonorrhoeae* in endocervical specimens (Gen-Probe, San Diego, CA, USA). Using nucleic acid amplification (the AMP-CT assay also developed by Gen-Probe) as a gold standard, the sensitivity and specificity of the PACE 2 system in detecting chlamydia were 79.3% and 100%, respectively[17]. Laboratory tests for other STDs included the RPR (rapid plasma reagin) test for syphilis, diagnosis through microscopy of vaginal fluid specimens and by Pap smears for trichomoniasis, and the ELISA test for HIV.

Statistical analysis

General descriptive statistics were calculated for sociodemographic characteristics, sexual and gynaecologic history, and STDs. Frequencies were calculated for categorical variables and means (including standard deviations and ranges) were calculated for continuous variables. Prevalence estimates were calculated for all STDs that were assessed using

laboratory tests, including chlamydia, gonorrhoea, HIV, syphilis, and trichomoniasis. In order to examine associations between risk factors and chlamydia and/or gonorrhoea, χ^2 statistics and respective *P* values were calculated as well as odds ratios and 95% confidence intervals. Multiple logistic regression was also performed in order to examine risk factors for chlamydia and/or gonorrhoea while controlling for confounding factors. Epi-Info, version 6.04d (CDC, Atlanta, GA), and SAS, version 7.0 (SAS Institute, Cary, NC) were used to perform data analyses.

Results

This population of women accessing services at Proje Sante Fanm was fairly young (mean age=28.7 years, range 17–61) and almost all lived in poverty. Only 51% had ever attended school, and many of these attended sporadically, commonly dropping out after days or weeks; only 16% attended school beyond the 6th grade. Income levels in this population were low, with well over half reporting a monthly household income of less than 500 *goud* ($20). Although 90% of households planted crops, nearly 80% of families spent at least half of their monthly income on food, given that crop yields are not enough to sustain the population. Only 30% of these women had a latrine at their home and 32% owned a radio at the time of the interview. Housing was generally of poor quality, with nearly half of families living in thatched (‘wattle-and-daub’) houses; 39% reported that their roof was also thatched.

Over 90% of these women were living in a stable sexual union (either married or *plase*, a long-term union well-described in the ethnographic literature)[18]. Spouses/partners tended to be older (mean age 33.5 years, range 20–55) and also had little formal education, although 23% had attended more than six years of school. Approximately 80% of women’s partners were peasant farmers, reflecting the communities’ dependence on farming for survival even though they lived in a region where the quality of the land is poor and inhospitable for cultivation.

In terms of gynaecologic and sexual history, mean age at first sexual intercourse was 18 years (range 10–31). Over half of the women reported having only one partner in her lifetime with a mean number of lifetime sex partners of 1.7 (see Table 1). Although this preliminary profile may suggest a low level of risk for STDs, only 11% of this group had ever used a condom and 23% reported ‘yes’ and 17% reported ‘don’t know’ when asked if their partner had other sexual partners. In addition, 57% reported that they had been forced or pressured into having sex. Fifty-five percent of the women were pregnant at the time of the interview with a mean number of lifetime pregnancies of 4.1 (range 0–17). Although 9% had indicated that they had a history of an STD, a greater proportion reported chronic pelvic pain (56%) or a history of infertility (51%).

Approximately 5% of women screened between June 1999 and March 2001 had positive laboratory results for chlamydia and 6% were positive for chlamydia and/or gonorrhoea. The prevalence of other STDs was also significant in this rural population, with 13% having trichomoniasis, 4% having syphilis, and over 3% were infected with HIV (see Table 2).

In addition to estimating the prevalence of STDs, we examined risk factors for chlamydia and/or gonorrhoea for women enrolled in the case–control study (see Table 3). For the univariate analysis, a number of factors placed women at risk of these STDs. Younger women (⩽30 years of age) were four times more likely to have chlamydia and/or gonorrhoea compared with women older than 30. Women who were not married (including women in *plase* relationships) were 1.9 times more likely to have an STD compared with women who were married (95% confidence interval (CI): 1.1–3.2). Number of sex partners was also associated with chlamydia and/or gonorrhoea. Comparing women who reported one lifetime sex partner with those reporting more than one lifetime partner, the risk increased by two-fold; the risk increased by over three-fold (odds ratio (OR)=3.4) if a woman reported more than one partner in the past six months, although this was of borderline statistical significance (95% CI: 0.79–14.3). If the women reported 'yes' or 'don't know' to the question as to whether their partner had other sex partners, the risk for chlamydia and/or gonorrhoea increased by 50% (OR=1.5; 95% CI: 0.91–2.4) and if they indicated that they had been forced to have sex, the risk increased by 30% (OR=1.3; 95% CI: 0.81–2.1). Although these findings were not statistically significant, they suggest mechanisms that may contribute to women's risk for STDs in this setting.

A number of factors were protective for risk of chlamydia and/or gonorrhoea in the univariate analysis. These included being married, having a stable relationship with a partner for more than four years, primary occupation of farming (for women and their partners), or being a market vendor (for women only). If a woman was a farmer or market vendor her chance of being infected with chlamydia and/or gonorrhoea was reduced by approximately 40% (see Table 3). In contrast, women who reported working as domestic servants were six times more likely to have chlamydia and/or gonorrhoea compared with women who pursued other activities. Reports of difficulty finding food (OR=1.6; 95% CI: 0.98–2.6) or employment (OR=1.6; 95% CI: 1.0–2.6) increased the risk of chlamydia or gonorrhoea by 60%. Difficulties in transport to a local health care centre were also associated with chlamydia and/or gonorrhoea infection (OR=2.3). These results from rural Haiti suggest that women who are more economically vulnerable are at a higher risk of these STDs.

Multiple logistic regression was performed to examine these risk factors while controlling for confounding variables. In the multivariate model, age, number of lifetime sex partners, and difficulty in transport to clinic remained important variables. However, even after controlling for these risk factors, working as a domestic servant still increased the risk by four-fold while working as a market vendor remained a significant factor in reducing one's risk (OR=0.54). Farming as an occupation, for either the woman or her partner, was no longer associated with STD risk in the multivariate model. However, a suggestion of an association between partner's occupation as construction worker and the risk of STDs remained at over two-fold.

Discussion

With the advent of HIV, sexually transmitted infections are now more than ever ranking threats to health. This is especially true for women living in poverty. In urban Haiti, the persistence of well known pathogens—syphilis, gonorrhoea, and chlamydia—and the rapid

rise of HIV have been demonstrated in prior research. In studies from urban slums in Haiti, HIV prevalence is over 10%, and reaches nearly 50% among certain high-risk subgroups[19]. The prevalence of other STDs is similarly elevated: one study of women attending antenatal clinics in an urban slum found that 11% of women were seropositive for syphilis, 12% had gonorrhoea or chlamydia (or both), 35% had trichomoniasis and 47% had at least one STD[13]. Though lower than that in urban areas, HIV prevalence is elevated in rural regions as well. Fitzgerald and co-workers demonstrated that HIV prevalence was over 4% in an antenatal clinic in a medium-sized rural town[15]. They also found that over 40% of women presented with at least one STD—an ominous sign, considering that the presence of certain STDs increases HIV transmission by up to five times, in urban Haiti as elsewhere in the developing world[7].

In the central plateau of rural Haiti, where this research was conducted, the prevalence estimates of chlamydia and gonorrhoea were previously unknown. Given the increasing incidence of HIV and its interaction with other STDs, we undertook a series of biosocial research projects attempting to wed conventional epidemiological inquiry with laboratory and qualitative data; these studies were themselves linked to over a decade of ethnographic inquiry, which had suggested that risk for HIV transmission was linked tightly to poverty and gender inequality[20]. When, in the early 1990s, the first group of young women diagnosed with HIV infection at Zanmi Lasante were compared with age-matched, seronegative controls, it was clear that women who worked as servants in the city, and not women who governed their own affairs as rural market women, were those more likely to have HIV infection[16].

This much larger study confirms these earlier findings while at the same time affording new data regarding the prevalence of STDs. Those enrolled in this study were among the thousands of women who seek care at Proje Sante Fanm, a free women's clinic in a very poor part of Haiti. Although this clinic was founded for women living in a small region of the Central Plateau, the growing poverty and collapse of the public health system in Haiti, in part related to the current aid embargo, has meant that women come from farther and farther away even for basic prenatal care[21].

There are several clinical and policy implications of this research. It is clear that sexually transmitted diseases are a significant cause of morbidity and mortality among rural Haitian women and that they often present without symptoms. Indeed, nearly 20% of new patients in our women's health clinic had at least one STD. Due to the decline of the public health system, however, only our clinic and a few other sites in the country offer free comprehensive STD screening and treatment. In rural Haiti, most health centres lack even basic laboratory equipment, and pregnant women are rarely tested for gonorrhoea, syphilis, chlamydia, or HIV. This is reflected in high rates of congenital syphilis and other complications—including mother-to-child transmission of HIV—among this population that has little access to anti-retroviral therapy. In order to significantly improve the diagnosis and treatment of STDs in Haiti, it is essential that we improve the public health system, so that all women have access to screening and treatment. In such settings, users' fees will likely exclude the poorest women who are at highest risk of disease.

The prevention implications are in many ways the most difficult to address. This study supports the thesis that it is not only multiple sexual partners that places these women at risk of STDs. It is, rather, the economic situation in rural Haiti that pushes young women towards sexual unions that are often based on the quest for even temporary financial security. It has been well described, in Haiti and throughout the developing world, that men in relatively economically secure occupations—such as soldiers and truck drivers—tend to engage in behaviours which increase their risk of contracting STDs[22,23]. Rural Haitian women are in a precarious position—most of them have had little schooling, and few can read or write. Lacking employment opportunities, they often enter sexual relationships out of economic necessity. Typically, they do not have the power to demand their partner use a condom. As this study demonstrates, although two-thirds of women reported it was not very difficult to procure a condom, approximately one-quarter of those surveyed said they had difficulty getting their partners to wear condoms. In addition, over 55% of the women in this population reported being forced to have sex. Most HIV prevention messages continue to stress either abstinence or the male condom, neither of which are under the control of most of these women.

In order to decrease the prevalence of HIV and other STDs among rural Haitian women, it will be essential to expand the public health system and to increase women's economic opportunities. Currently, the public health system is deteriorating due to lack of resources. Given the severe poverty throughout the country, internal capacity to generate resources is limited. At the same time there is an aid embargo that has been imposed on Haiti by the US during the past two years. From a public health standpoint, the aid embargo should end in order to prevent unnecessary morbidity and mortality[21]. However, until the aid embargo is lifted, humanitarian assistance needs to be dramatically increased in order to reduce the incidence of preventable illnesses and the possible transmission of STDs, particularly among women living in poor rural areas of Haiti.

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Table 1.

Sexual history (*n*=549)

Sexual history	
Mean number of lifetime sex partners (*n*=546)	1.7 (1–10)
< 16 yrs of age at first intercourse (*n*=490)	20%
Ever forced or pressured into having sex	57%
Condom use	
Ever used a condom	11%
Not very difficult to procure condom	66%
Somewhat or very difficult to get partner to use a condom	23%
Partner does not like to use a condom	21%

Table 2.

STD prevalence

	Prevalence (proportion)
Chlamydia	4.8% (84/1742)
Gonorrhoea	1.3% (23/1727)
Chlamydia and/or gonorrhoea	5.9% (102/1727)
Syphilis	3.6% (52/1462)
HIV	3.2% (47/1466)
Trichomoniasis	12.9% (190/1471)

Table 3.

Risk factors for chlamydia and/or gonorrhoea infection *

	Univariate analysis		Multivariate analysis†	
Predictors	**OR**	**95% CI**	**Adjusted OR**	**Adjusted 95% CI**
Sociodemographic factors				
Age (⩽30 vs. >30), (*n*=545)	4.0	2.1–7.5	3.3	1.7–6.7
Length of time in a relationship (⩽4 yrs vs. >4 yrs), (*n*=530)	2.3	1.5–3.8	1.2	0.67–2.1
Sexual history factors				
Number of lifetime sex partners (> 1 vs. 1)	2.1	1.3–3.4	1.9	1.1–3.1
Partner works in city (*n*=526)	2.5	1.3–4.8	2.0	0.84–4.9
Economic factors				
Difficulty in transport to clinic (yes vs. no)	2.3	1.4–3.6	2.5	1.5–4.3
Farming as occupation	0.57	0.35–0.90	0.79	0.43–1.5
Market vendor as occupation	0.61	0.37–1.0	0.54	0.30–0.97
Domestic servant as occupation	6.0	2.8–12.7	4.1	1.6–10.4
Partner’s occupation, farming	0.52	0.30–0.91	1.1	0.49–2.5
Partner’s occupation, construction worker (*n*=529)	2.3	1.1–5.0	2.2	0.94–5.2

* *n*=549 unless otherwise indicated. Fewer than 549 observations indicate missing data in column on the left indicates missing data for the univariate analysis

† *n*=521 for multivariate model due to missing data