

Challenges of a Hidden Epidemic: HIV Prevention Among Women in the United States

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Abstract: HIV/AIDS trends in the United States depict a concentrated epidemic with hot spots that vary by location, poverty, race/ethnicity, and transmission mode. HIV/AIDS is a leading cause of death among US women of color; two-thirds of new infections among women occur in black women, despite the fact that black women account for just 14% of the US female population. The gravity of the HIV epidemic among US women is often not appreciated by those at risk and by the broader scientific community. We summarize the current epidemiology of HIV/AIDS among US women and discuss clinical, research, and public health intervention components that must be brought together in a cohesive plan to reduce new HIV infections in US women. Only by accelerating research and programmatic efforts will the hidden epidemic of HIV among US women emerge into the light and come under control.

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INTRODUCTION

HIV incidence in the United States has remained an estimated 56,000 cases annually since 1991.¹ The lack of substantive progress in reducing new HIV infections for almost 20 years is noteworthy despite remarkable advances,² including the advent of rapid HIV testing, opt-out testing, and a variety of potent once-daily antiretroviral therapies and the availability of evidence-based behavioral interventions.³

Unlike the generalized epidemic in regions of sub-Saharan Africa, the US HIV epidemic is concentrated among certain subpopulations, particularly men who have sex with men (MSM) and persons of color.⁴ Although the high HIV prevalence among MSM in the United States is well recognized, the impact of HIV on women is less widely appreciated. Moreover, women at risk for HIV acquisition frequently do not appreciate this risk. The HIV epidemic among US women is, in many ways, hidden from effective dialogue, both among the populations at risk and within the broader scientific community. We summarize current epidemiology of HIV/AIDS among US women and discuss critical components that must be brought together in a cohesive plan to reduce new HIV infections in US women.

DISCUSSION

Epidemiology of HIV in US Women

Prevalence and incidence trends depict a concentrated epidemic with hot spots that vary by location, poverty rate, race/ethnicity, and transmission mode. By 2003, an estimated 1.1 million US adults and adolescents were HIV infected; approximately 21% of HIV-infected individuals are unaware of their infection.^{5,6} Although US HIV incidence estimates peaked at 150,000 cases per year during the mid-1980s, followed by a plateau at about 56,000 cases per year since 1991,¹ the annual rate of new HIV cases has been increasing in certain subgroups, particularly MSM and black and Latina women. Eighty percent of HIV cases in women occur in black and Hispanic women, who together constitute just 25% of the US female population.⁷ Using back-calculation modeling, Rosenberg and Biggar⁸ reported that although HIV incidence was declining in white men aged 20–25 years, it was increasing in women in the same age group.

The HIV epidemic among US women is concentrated in the Northeast and South, with a significantly higher proportion

of HIV infections occurring in areas with high poverty rates.⁹ Heterosexual activity has been the major mode of HIV acquisition for US women since 1995, when it surpassed injection drug use (IDU).¹⁰ Of women newly identified as HIV infected, 83% are estimated to have acquired HIV heterosexually, with most of the remaining acquiring HIV through IDU.⁷

Trends in AIDS rates among US women are of particular concern. Although women accounted for only 15% of AIDS cases from 1981 to 1995, they accounted for 27% of AIDS cases from 2001 to 2004.¹¹ The Centers for Disease Control and Prevention reported a 15% increase in AIDS cases among women from 1999 to 2003, compared with a 1% increase in men.¹¹ In addition, estimated AIDS diagnoses are 23 times greater in black women than in white women.¹²

Mortality trends among women with HIV are striking. Although the death rate due to HIV has decreased, HIV remains the third most common cause of death among black women aged 35–44 and the fourth most common cause of death among younger black women aged 25–34.¹² The age-adjusted annual death rate due to HIV among black women during 2001–2005 was higher than that observed in every racial/ethnic group except non-Hispanic black males.¹³ Similarly, when compared with white women, black women with HIV have a 13-fold mortality risk ratio.¹⁴

Why Are Women at Risk for HIV?

Many factors contribute to HIV acquisition among women. Gender inequalities, both social and economic, hamper some women's abilities to negotiate condom use and other safer sex behaviors.^{15,16} Interpersonal violence is a risk factor for HIV among women, regardless of race or ethnicity.¹⁷ Factors associated with transmission of HIV and other sexually transmitted infections (STIs) include poverty, lack of access to medical care, poor knowledge about HIV/AIDS, lower social status,^{18,19} financial dependence on male partners, assortative mixing within HIV prevalence communities,²⁰ feelings of invincibility, low self-esteem, and alcohol and drug use.²¹

However, individual risk behaviors do not explain the dramatic racial disparities in STI and HIV rates.^{22,23} In one study, black men and women with "low-risk" behaviors had 25-fold higher incidence of HIV and STIs compared with their white counterparts,²³ a disparity that remains unexplained. Black women may underestimate the HIV risk status of their male partners; 6% of HIV-infected black women versus 14% of HIV-infected white women reported having a bisexual male partner, despite the fact that more than twice as many black HIV-infected men as white HIV-infected men (34% vs 13%) reported sex with both men and women.²⁴ More black men and women than white are unaware of their HIV infection.^{25,26} These data may reflect a number of factors, including differences in HIV testing uptake, HIV prevalence, and structural features of the social environment. Sexual networks shaped not only by individual preferences and behaviors but also by macroeconomic, political, societal, and other structural features of the environment play a critical role in HIV acquisition among women.^{20,27,28} Concurrent sexual partnerships can amplify HIV transmission, particularly when one partner has early HIV infection, a period with high transmissibility.^{27,29} The higher

prevalence of concurrent partnerships observed in US black and Hispanic men may contribute to racial disparities in HIV rates among US women.³⁰ Sexual mixing patterns connecting women at low risk for HIV with men at higher risk may increase HIV acquisition in women; such mixing patterns have been observed among black men and women in the southeastern US.²⁰

Recent studies demonstrate strong associations between prior incarceration⁹ or incarceration of a partner³¹ with HIV infection in US women. Though correctional inmates may view themselves at low or no risk for HIV acquisition,³² HIV prevalence among prisoners is more than 2.5 times higher than the general US population with a relatively high proportion of HIV-infected persons passing through the correctional system.^{33–35} The racial disparity of incarceration is striking: 1 in 9 black men between the ages of 20 and 34 is incarcerated, compared with 1 in 30 US men in the same age group.³⁶ Incarceration influences sexual networks by disrupting stable sexual partnerships and has been associated with concurrent partnerships and dissortative mixing that promote HIV transmission.^{20,31,37} To date, incarceration has not been consistently used as an HIV prevention opportunity; condoms and clean injection equipment are unavailable to inmates in some correctional systems. Similarly, HIV testing policies vary widely among correctional systems.

HIV Prevention for US Women: Current Status

Early domestic HIV prevention successes included implementation of mandatory blood product screening and effective programs for prevention of mother-to-child transmission.² Harm reduction programs throughout the United States have contributed to sharp declines in new HIV diagnoses among IDUs.^{38,39}

Unfortunately, although consistent male condom use is known to be efficacious in reducing HIV transmission⁴⁰ and female condoms have been assumed to be similar to male condoms in preventing HIV,⁴¹ condom implementation has not been effectively realized to decrease numbers of new HIV infections. Over the past decade, multiple microbicide trials have been disappointing.^{42–46} However, a number of ongoing trials are assessing new vaginal microbicides and antiretroviral drugs for pre-exposure prophylaxis,^{47,48} and results from the CAPRISA 004 microbicide study (a double-blind randomized placebo-control study among 989 women) recently demonstrated tenofovir 1% vaginal gel to have 40% efficacy in preventing HIV acquisition.⁴⁹ To date, multiple vaccine trials have failed to prevent HIV transmission,^{50,51} with the possible exception of a recombinant canarypox vector vaccine (ALVAC-HV) plus 2 booster injections of recombinant gp120, which demonstrated vaccine efficacy of 31.2% (95% CI: 1.1 to 52.1; $P = 0.04$) in modified intent-to-treat analysis.⁵² Although statistically significant and perhaps useful to inform development of future vaccines, this 6-injection vaccine series did not demonstrate statistically significant efficacy in the per protocol analysis and had no effect on the level of HIV-1 viremia.

Antiretroviral treatment as a strategy to decrease HIV transmission has been the subject of recent interest.^{53–56} However, individuals with known HIV infection in the United States confront an array of barriers to health care access, medication adherence, and achievement of optimal

virologic outcomes needed for this approach to effectively prevent HIV transmission.⁵⁷

Multiple behavioral interventions to prevent HIV acquisition by women have been developed. However, a recent review of this area identified only 7 behavioral interventions demonstrating subsequent reductions in unprotected sexual intercourse³ and STIs,^{58,59} and none of the studies used HIV incidence as an end point. An additional limitation of most of these studies was a requirement that participating women attend multiple sessions, limiting the feasibility of broad implementation of these interventions in at-risk communities. Furthermore, few of the interventions attempted to directly influence social networks or sexual behaviors of women's partners—a critical component to HIV prevention in US women.^{60–62} Of 11 interventions listed as effective for women of color by the Centers for Disease Control and Prevention,⁶³ none have assessed effect on HIV acquisition.

The Way Forward

Four areas must be urgently addressed to effectively decrease new HIV infections in US women. First, an absence of rigorous HIV incidence data among at-risk women impedes design of prevention trials with HIV incidence as primary end point; sample size calculations are not feasible without reliable estimates of incidence in the target population.

Second, behavioral strategies addressing male partners of women are needed. To date, only limited research has attempted to alter the sexual attitudes and behaviors of heterosexual and bisexual men.^{58,61,62} Research evaluating strategies that favorably influence gender norms and behaviors of men are critically needed. Although data suggest that sexual networks may be effectively used to identify cases of undiagnosed HIV,⁶⁴ few sexual or social network interventions have been evaluated in women.⁶⁵

Third, expanded HIV testing and linkage to care and effective antiretroviral treatment of individuals with HIV are critical to successful HIV prevention. Novel programs must be developed to facilitate effective virologic suppression among persons living in social chaos (ie, high poverty rates, high community violence, homelessness, and fragile social supports).

Finally, it is heartening that a national HIV/AIDS Strategy for the United States has recently been created.⁶⁶ Moving forward, we must assure that HIV prevention plans continue to recommend implementation of proven strategies and promptly incorporate future HIV prevention trial results.

CONCLUSIONS

The ongoing HIV epidemic among US women, particularly black and Hispanic women, must receive the attention it is due. Research is needed to identify effective interventions that decrease US women's risk of HIV infection and are feasible to scale up in these populations. In addition, there is an urgent need to establish programs that enable US women to protect themselves. New, innovative prevention programing must build upon knowledge gained from past HIV prevention trials. Equally critical is the effective implementation of a multidimensional HIV prevention plan

incorporating community, correctional institutions, and treatment programs (including support services such as substance abuse programs). Only by accelerating both research and programmatic efforts will the hidden epidemic of HIV among US women emerge into the light and be effectively addressed.

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