My Africa

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HIV Infection and AIDS Among Young Women in South Africa

Young women in South Africa are at great risk of being infected with HIV. In 2005, HIV infection prevalence in the age group 15-24 years was 16.9% in women and 4.4% in men (1). The high HIV prevalence in this country is a result of a number of factors which include the following: poverty, violence against women, cultural limitations that promote intergenerational sex, non-condom use and preference for "dry sex," political factors and challenges that possibly prevented an aggressive response against HIV, recreational drug use, and biological factors such as high prevalence of sexually transmitted infections (STI). This essay will present and discuss the prevalence of HIV among young women in South Africa and the reasons for such a high prevalence in the country. I will also give an overview of the intervention programs that are currently under way with an aim to reduce the vulnerability of young women in South Africa. Finally, I will suggest what further interventions need to be provided in order to prevent and control HIV spread in South Africa and other southern African countries.

HIV prevalence among young women in South Africa

HIV prevalence among young women aged 15 years to 24 years in South Africa is estimated at between 15 to 25 percent (2-4). Shisana et al (1) estimated an estimate of 16.9 percent in 2005. HIV prevalence of about 4 to 6% among young men, although high in comparison with Western countries, is still lower than the prevalence among women (3). There are also significant racial differences as shown in Table 1.

Although there is high HIV prevalence among young women, the distribution is not uniform across the country. Kleinschmidt et al (2) have reported that lowest levels of infection are found in inland rural areas of the Western Cape and the highest in northwestern parts of KwaZulu Natal, southern Mpumalanga, and eastern Free State. The major metropolitan areas of Johannesburg and Cape Town have intermediate levels of between 7 and 11%.

Attempting to explore the factors that are associated with high HIV prevalence among South African young women is a daunting

Table 1. Prevalence of HIV infection among South African 2 years or older in 2005*

Race-ethnicity	Number tested	HIV infected (%)
Black	9950	13.3
White	1173	0.6
Mixed race/coloreds	3382	1.9
Indian	1319	1.7
Total	15,851	10.8

*Data from Shisana et al (1)

task, mostly because of the following reasons:

a) Research may examine only a limited scope of factors. For instance, studies designed to explore the role of individual-level determinants of infection (eg, lifetime number of sexual partners, concurrent partners, history of STIs) may not give due recognition to group-level factors, such as percentage of the population living in poverty within a community, racial distribution,, the role of legislation on intimate partner violence, contraceptive use, or availability of health services;

b) limitation in access to communities: much of the studies conducted in South Africa have been conducted in large metropolitan zones or at least in settings which are easily accessible;

c) contradictions arising from studies reporting different effect estimates and different key factors important in the transmission of HIV in a particular setting. For instance, in most of Africa, there is evidence that education level of an individual may be associated with the risk of HIV infection. However, education may be an important factor in one setting but not in another, or the effect of education as an explanatory factor may change over time in the same setting (depending on the stage of the epidemic, a factor such as education may have different associations), or a variable may be measured differently from study to study. For instance, when education is the main variable some studies measure the number of years of schooling completed while other study measure the level of education attained. Certainly, these two measurements may not always measure the same constructs.

d) data on potential confounding variables may not be available from studies conducted in South Africa. It is not always possible to have available data on all aspects of HIV that may potentially affect HIV transmission. For instance, data on injecting drug use in many parts of Africa are lacking. This does not necessarily mean that the practice does not contribute to HIV transmission in these settings. So if injecting illicit drug use and men having sex with men facilitate HIV spread in South Africa, the extent of their contribution to HIV spread is not fully known, as these behaviors are not often studied.

Despite these limitations and potentially many other, there is still a need to explore the "risk factors" of HIV infection and transmission in South Africa, a country which has the largest number of HIV infected persons in the world – an estimated 5 500 000 (95% confidence interval; 4 900 000-6,100,000) (5).

Biological susceptibility to HIV infection among young women

Pettifor et al (4) have reported the high efficiency of HIV transmission from men to women in South Africa. They reported that, contrary to previous findings, many HIV infected young women in South Africa had not had significantly more sexual partners than women of similar age in the developed nations. Mean number of lifetime sexual partners was 2.3, but HIV infection prevalence was 21.2%. In many developed countries, infection prevalence estimates are below 1% (4). Although the results by Pettifor et al may have been affected by under-reporting, there is no reason to believe that South African women would under-report more than the women elsewhere. The finding that many HIV-infected South African young women reported relatively low-risk sexual behaviors is not unusual (4). A report by Moyo et al (6) suggests that young people who were in a relationship for at least a year and had sex in the past month were less likely to have used condoms consistently. HIV-infected women in North Carolina (7) reported that a third of them did not report any known "high risk" behaviors.

The high HIV man to woman transmission rate may be a manifestation of the efficiency of

the male "transmitter" and the susceptibility of the woman (4). Sexually transmitted infections in a male sex partner are important facilitators of HIV transmission (8,9). Furthermore, the immature cervix of the young female is particularly susceptible to the entry of HIV. Other biological factors that have been studied and possibly modulate the susceptibility of young women are the use of hormonal contraceptives, pregnancy, and abnormal vaginal flora (10-12).

South African women may be exposed to HIV infection due to the following reasons: limited treatment opportunities for sexually transmitted infections; young women having sex with young men who are likely to have recent infection; and high pregnancy rates. McPhail et al (13) surveyed 3618 sexually active young women, 52% of which reported the use of contraceptives in the last 12 months. However, no definitive conclusion has been reached regarding the role of contraception and HIV transmission.

The role of the CCR gene

In the past several years, there has been a growing interest in genetic factors that may help to explain the large differences in HIV prevalence between Africa as opposed to Europe and North America. This resulted in a search for possible genetic differences among races; although race-ethnicity itself is a social and not genetic construct (14). The CCR5 gene, relatively more common among Caucasians but almost not present among people of African descent, has been suggested to partly be responsible for the differences in HIV prevalence between Africa and Europe and North America (15-18). Iqbal et al (19) have postulated that the protection from HIV infection in sex workers in Nairobi, Kenya, may be explained by the CCR5 gene. However, the CCR5 gene is not that prevalent even among Caucasians and so its role in the epidemic nature of HIV transmission in southern Africa remains unclear.

Poverty and low status of women

Poverty, both at the individual and the societal level, has been associated with HIV prevalence (20-23). Poor neighborhoods do not have the necessary social infrastructure, which may promote HIV spread. Poor individuals, due to lack of alternatives for earning a livelihood, may be more likely to engage in sex work or other forms of transactional sex. Lopman et al (24) have reported that HIV prevalence is lower among higher socio-economic classes in that country. As a consequence of Apartheid and the associated racial segregation and discrimination, many South African young women, especially black ones are not educated. Their earning potential within the job market is, therefore, compromised. South Africa has high rates of poverty and unemployment (almost 40% of unemployed).

Transactional sex has been associated with high risk of HIV acquisition in both the developing and developed nations (25). The most common nationally representative survey of sexual behaviors and HIV infection is the Demographic Health Survey, which is conducted periodically with funding from the United States Agency for International Development of ORC Macro (Maryland) and developing nations' governments. Survey respondents are simply asked whether men have either provided money or material resources to their non-marital partner. Women are also asked whether they have received money or material gifts from a sexual partner. Any person who reports "yes" to this question is classified as having offered or obtained transactional sex.

Transactional sex has consistently been associated with a high risk of sexually transmitted infections and HIV. While "transactional sex" may be also understood as sex work from the western standpoint, some reports from Africa suggest that exchange of money and material

resources may be a different cultural practice (26). Maganja et al (27) have reported that in Tanzania, committed sexual partnerships among youth are associated with the expectation that the male will provide material and financial resources to the female partner. The ability of the male partner to provide financial and material resources affects both the duration and the exclusivity of the relationship.

Poulin (28) has also explored the role of money transfers among youth in a rural southern district of Malawi. This author found that monetary transfers were expected in male-female sexual relationships. Women were described as gauging the marriage potential of a prospective partner by assessing how much money transfers he was able to make. On the other hand, young men perceived such women as "gold diggers" and not really committed to marriage.

Despite the fact that there are forms of transactional sex that may not carry higher HIV transmission potential, in general though, transactional sex is more likely to be associated with risk behavior. An individual is less likely to insist on "safer sex" when if she or he were to benefit materially or financially from the sexual transaction. Transactional sex is also associated with casual sex and concurrent sexual partnerships, which are then associated with high likelihood of HIV transmission. The power imbalance that may exist between the person providing the money and the person receiving the money facilitates HIV transmission, since partners are not selected on the basis on criteria other than money.

The role of migrant labor

The role that labor migration has played in the spread of HIV in Southern Africa has been discussed elsewhere (29,30). During the Apartheid period, South Africa had been a major recipient of migrant labor from neighboring countries such as Zimbabwe, Botswana, Swaziland, and even from Zambia and Malawi. Some authors have also described the process of "circular migration" where individuals cycle through urban and rural areas in search of jobs in urban areas and living a subsistence livelihood in rural areas. South African authors have ascribed the spread of HIV to and from South Africa to the way migrant labor camps were run. Adult men (laborers) that are employed in the mines are confined to migrant labor camps. Men are not allowed to come to the mines with their spouses, so a vibrant sex industry and an environment that encourages men having sex with men are probably created. This has at least three important implications. First, the men would transmit HIV and other sexually transmitted infections to their sex partners back home during their holidays or upon the return. Second, these men would also bring sexually transmitted infections acquired in their homeland to the migrant labor camps. Finally, disturbed sex ratios may stimulate the relationships with multiple and concurrent partners and transactional sex. Labor migration within South Africa, where mostly men leave their rural areas in search of employment in urban areas is probably a main driver of HIV spread in South Africa (31,32). Migrant labor movement still continues in South Africa, as people work in large farms and in the mines.

Intergenerational sex

Doherty et al (33) have reported that dissortative sex, ie, sexual partnerships between individuals from high risk and from low risk groups (mixing of risk groups) is an important driving force of the HIV epidemic. This is contrasted to assortative sexual mixing, ie, sexual partnerships between individuals of similar HIV risk, which would not foster the spread of HIV.

Intergenerational sex, where young women have sex with older men (more than 5 years age difference), is one of the different forms of dissortative sex. Young people, who have had less exposure to sex, are sexual-

ly connected with adults, whose HIV infection rates are likely to be higher.

The mechanisms by which inter-generational sex may facilitate HIV transmission are as follows: there is likely to be significant power differentials when the ages of the partners are so much different; condoms are less likely to be used in these relationships; likelihood of HIV discordancy at start of relationship likely to be high.

Research on intergenerational sex suggested that all intergenerational sex is associated with power imbalances, no condom use, manipulation, poverty and the sheer need for economic survival. While such factors may be at play in many intergenerational partnerships, exceptions do exist. Nkosana and Rosenthal's qualitative research showed that some relationship between young girls and older men were associated with desire for pleasure, enjoyment and sense of equal partnership by the younger partner (34). However, young women involved in such kind of relationship may fail to appreciate the precarious nature of such relationships.

High risk intergenerational sex may also occur when older men, who know they are infected with HIV, seek unprotected sex with younger women or children (35,36). In South Africa, and many parts of southern Africa, there is a belief that having sex with a virgin is a cure for HIV. The extent to which such practices could be driving the HIV epidemic in South Africa is likely to be small though.

Alcohol and other recreational drug use

There is growing research interest in the role of alcohol and other recreational drugs in the spread of HIV in South Africa (37,38).The growth of the number of taverns and shebeens in poor peri-urban South Africa and its associated lifestyles are a consequence of segregation and discrimination during the Apartheid era. Such places, located largely in the poor neighborhoods, also very often associated with sex work (39).

Violence against women and rape

Violence against women, and especially rape, are significant problems in South Africa, where it is estimated that more than one woman is raped each second. Jewkes and Abrahams (40) report that representative community-based surveys have found that among women in the 17-48 age group, there were 2070 such incidents of rape per 100 000 women per year. Compared to consensual sex, rape is a rare event. However, the fact that rape is unsolicited, and is likely to be unsafe (no condom use, tears), makes it an important aspect of the HIV transmission in South Africa. The risk of HIV infection may be minimized by the provision of drug prophylaxis, which may not be readily available, especially in remote rural parts of South Africa (41,42).

Lack of male circumcision

From the mid 1980s, evidence has been accumulating that male circumcision could be associated with lower transmission of HIV (43-47). Countries with high prevalence of circumcision are also likely to have lower prevalence of HIV infection (48,49). However, most of these studies were cross-sectional and, therefore, could not estimate causation (50). Therefore, randomized controlled trials were conducted in Orange Farm (South Africa), Kisumu (Kenya), and Rakai (Uganda). These studies have demonstrated a protective efficacy of circumcision against HIV acquisition among men of about 60% (51-53).

South Africa's male circumcision prevalence is below 30% and the majority of men were traditionally circumcised as a rite of passage from childhood into adulthood (54). Circumcision protects against HIV acquisition potentially through many mechanisms, as has been discussed elsewhere (55). In brief

however, the reduced surface area of potential exposure to HIV, the prevention of sexually transmitted diseases (other than HIV), and the keratinization of the glans penis are all postulated as mechanisms through which circumcision prevents HIV transmission among men. In a community where men are less likely to be infected with HIV (as a consequence of circumcision) women are also likely not to be infected. The fact that a small percent of men in South Africa is circumcised (56) could at least in part explain the high HIV prevalence among women.

There is already interest to provide circumcision to adolescents and young men in South Africa in order to prevent HIV transmission. Rennie et al (57) have discussed the operational and ethical issues that may need to be considered in such a scaling-up. These issues include the age of circumcision, consent and assent issues, safety of the procedure within a health system with limited supplies and human resources, and stigma that may be associated with circumcision.

"Dry sex" preference

In many parts of Southern Africa, women insert detergents, antiseptic powders into their vagina in order to make them "dry" or "tight" (58,59). In these settings, it is believed that a highly lubricated vagina diminishes sexual pleasure during insertive penile vaginal sex. A dry vagina or a dry vagina with herbal particles is likely to suffer lesions during sex which may either facilitate transmission of HIV or acquisition of the virus.

While the practice may be blamed for the spread of HIV, its prevalence is not known. Much of the data on this practice has come from studies with small sample size and among selected groups such as sex workers.

The role of AIDS "denialists"

The claim by South Africa's president Thabo Mbeki and his minister for health that HIV is not the cause of AIDS may have derailed many prevention, treatment, care, and support efforts by various stakeholders in South Africa (60,61). It was not until the South African government lost in courts that significant progress started to be made in the country (62,63).

To what extent the government's response to HIV has facilitated the rapid spread of infection or not can be debated. This is because South Africa has continued to attract both domestic and international resources in the fight against the virus. There is no doubt, though, that AIDS treatment programs, including the prevention of mother to child transmission through the use of nevirapine, were all delayed because of the government's reluctance. How this may have affected HIV infection prevalence estimates among young women is probably not known.

Education and HIV infection

South Africa, as a middle-income country, has a much better education system than many other southern African nations. However, educational opportunities are not evenly shared among the provinces and among the different racial groups (blacks, Asian, coloreds or mixed race, and whites). The blacks are less likely to receive education than the whites or Asians. Education has been reported to be associated with HIV infection, either negatively or positively, depending on the setting and circumstances. In a study in India, Radhakrishna et al reported that individuals with low education were more likely to be infected with HIV (64). In a study in Zambia, however, Gabrysch et al reported that high education was a risk factor for HIV infection (20). Bärnighausen et al (65) have reported a 7% reduction in the hazard of acquiring HIV infection in a general population in South Africa.

Racial and urban-rural differences

In a study on HIV infected persons receiving care in rural and urban South Africa, Lurie et al

(66) reported that urban residents were more likely to use condoms with both regular and casual sex partners. Furthermore, HIV prevalence is associated with ethnicity, urban status, and unemployment. According to Shisana et al, HIV prevalence in 2005 was 9.1% in urban formal sector; 17.6% in urban informal sector; 11.6% in rural informal sector, and 9.9% in rural formal sector. These estimates may also need to be viewed in the light of the findings that showed that 13.3% of the blacks were infected, as opposed to 0.6% of the whites, 1.9% of coloreds, and 1.6% of Indian (1).

The racial and rural-urban divide in HIV prevalence estimates in South Africa is likely to be associated with the distribution of poverty, access to health care, unemployment, migrant labor and crime. Black South Africans in general are more likely to be exposed to these social ill than the other racial/ethnicity group. I doubt that the differences have to do with genetic differences at all.

Openness about sexuality and HIV among young people

South Africa, like many countries in southern Africa, has experienced enormous social changes in the past two decades. Harrison (67) has explored the experience of sexuality among South African young people within an environment that emphasizes "good behavior," conformity with traditional norms, and where it is considered to be "wrong" that young unmarried women have sex. Relationships, especially in rural areas, are conducted in secrecy, and risk being of stigmatized when discovered by society militates against an open discussion of adolescent sexuality and decision making. Kennedy et al (68) has reported that adolescent African American men were likely to assume that they know the sexual risk behaviors of their partners.

Orphanhood and HIV

In a study of 200 girls in a peri-urban area of Zimbabwe, maternal orphans were more likely to be sexually active, to have had an STI, to have been pregnant, and to have been infected with HIV. Paternal orphans were more likely to have ever been homeless and to be out of school (69). Birdthistle et al (70) have also reported higher HIV infection prevalence among orphan girls and women aged 15 to 19 years (17%), as opposed to non-orphan girls (14%). These authors also found that orphans had an earlier age of sexual debut and were likely to have had multiple sexual partners. Herpes simplex virus type 2, an indicator of sexual experiences, was higher among orphan than non-orphan children.

The high HIV prevalence among orphans could be explained by exposure to sexual risk factors for the acquisition of HIV. Another plausible explanation would be that orphaned children were infected from their mother by vertical HIV transmission. However, this alternative explanation cannot be applicable in Zimbabwe, where antiretroviral therapy has not been used long enough to affect the survival of infants and children who may have acquired HIV vertically. The importance of such a possibility, though, is likely to be increasingly reasonable as HIV treatment possibilities expand in southern Africa and more HIV infected children survive to reach into adolescence.

Orphans are likely to be exposed to HIV risk behavior via a number of mechanisms. First, due to death of their parents and losing their source of livelihood, they may be more likely to engage in transactional sex. Multiple sex partnerships are also likely as one may need more than a single partner to satisfy the diverse economic needs. Second, orphan children may miss the guidance and supervision that parents normally provide within the community. Previous data on adolescents' tobacco use have suggested that adolescents who are often supervised by adults are less likely to engage in cigarette smoking and illicit drug use.

Incarceration and HIV

Violent crime is fairly rampant in South Africa, largely as a consequence of years of Apartheid. The blacks are more likely to be incarcerated than the whites. The South African Department of Correctional Services reported 5285 HIV cases in the prison system in 2002, compared with 623 in 1995. Between 1996 and 2000, departmental statistics show that the system has experienced a 40% increase in the number of HIV/AIDS cases. It is estimated that HIV prevalence among the prison population was 41%, much higher than the national adult average prevalence estimates (71).

There are limited data on the epidemiology of HIV among incarcerated populations in South Africa. HIV infection in correctional settings is, therefore, a relatively neglected issue in southern Africa (72). However, emerging data from the United States suggest that the role of incarceration in the spread of HIV has been under-recognized.

Wherever data are available, the HIV infection prevalence estimates of incarcerated populations are higher than in the general population (73). In Malawi, Chimphambano et al (74) estimated an HIV prevalence rate 36.6%; 29.9% among men and 50% among women in a prison population. This estimate was also three-times the prevalence of the general adult population (75). This may not necessarily imply that HIV transmission or incidence in jails and prisons is higher than in the general population. One important reason for the high HIV prevalence within jails and prisons is that the incarcerated people already had background HIV risk factors while they were still in the general community. Many are likely to be injecting drug users (76), procure or provide transactional sex, be poor, have limited education, and multiple sexual partners. Individuals living "in the margins" of society are likely to be incarcerated just as they are likely to be infected. Furthermore, while incarcerated, and in a high HIV prevalence environment, any sexual penetrative sexual activity is likely to be of high risk.

Incarceration also affects HIV transmission via the associated societal disruption and encouragement of high risk partnerships (77). In South Africa, just like in many other settings, the jail and prison population is largely male. A disruption of the male to female ratio through the disproportionate incarceration of men leads to a limited choice of sexual partners for women (in heterosexual terms). The remaining and available men are, therefore, likely to be "shared" by the women. Furthermore, as the man is usually the main bread-winner in the family, his incarceration lead to a loss of earnings for the household and an increased likelihood for the woman to engage in transactional sex. The incarcerated man may also be exposed to multiple same-sex encounters within prison or jail.

The effects of incarceration on the transmission of HIV do not only manifest while an individual is in jail or prison. Even after release, people who had been incarcerated more often have multiple sexual partners than before the incarceration and so do their sexual partners (78,79). Stephenson et al (80) have reported that upon release from prisons, individuals were more likely to have unprotected sex with their regular partners. In Zambia, it is believed that unsafe tattooing practices in correctional facilities could be responsible for the spread of HIV (81).

Like many other countries in southern Africa, South Africa has devoted significant resources to the scaling-up of HIV treatment, care, and support. Treatment with highly active antiretroviral therapy is provided for free to incarcerated people. There are several ways how incarceration can influence HIV treatment. First, individuals who were on HIV treatment outside jail or prison are likely to miss treatment, as they may not have taken their medications with them. Even those who may have had their medications with them may be unwilling to take their medications in the prison

as their HIV status may be revealed to the fellow inmates or warders. In a study from North Carolina (82), 93% of prison officers and 94% of medical staff agreed with the statement: "If an inmate is taking medications in jail, other inmates will know about it."

Then, there are those who may start HIV treatment during a long-term stay in prison. Such persons may have well-controlled HIV infection while incarcerated due to the availability of medications and reasonable nutrition. Such quality of care may not be available when they are released. As has been reported elsewhere (82,83), individuals who had received reasonable medical attention with adequate HIV viral suppression while incarcerated may not be able to access it when released, which results in a rebound of the HIV viral load. High viral load is an important determinant of HIV transmission, ie, the higher the viral load the greater are the chances that HIV will be transmitted via penetrative or insertive sex.

Unlike other African countries where same sex intercourse is outlawed (84), in South Africa there is no such legal practice. This gives the opportunity for public health intervention programs to be provided with the correctional facilities without much legal hurdles. Condoms are therefore provided routinely in South African facilities. However, for condoms to make an impact on HIV transmission, they need to be used correctly and consistently.

Limited human resources for intervention programs

As is the case in many southern African countries, South Africa has an inadequate number and uneven spread of health sector workers, especially in HIV treatment programs (85,86),. It is, therefore, neccesary that prevention programs face human resources challenges as the country scales-up HIV prevention efforts.

Treatment of STIs

STIs other than HIV facilitate HIV transmission. Some of these infections manifest as ulcerative lesions which may act as portals of entry of HIV (87,88). An STI results in an increase in genital HIV viral load, which means that having sex with a person with an STI implies an exposal to a higher viral load (88). Furthermore, STIs also result in the recruitment of macrophages and lymphocytes which are virotrophic (87-92). A person with STI and exposed to HIV infection through sex is likely to acquire the infection due to the breached epithelium and/or increase in white cells to which HIV will get attached for entry.

In an over-stretched health system, especially in rural areas, prompt and effective treatment of STIs may not be always available and untreated STIs are likely to fuel HIV transmission.

What can be done to reduce HIV in South Africa

There are many interventions being implemented to reduce the HIV transmission. Some of the programs aim to delay sexual debut, prevent intergenerational sex, and promote condom use (4). Other programs are structured within the ABC (abstinence, being faithful to one's partner, and condom use) guidelines. However, evaluating the impact of any of these programs is fraught with methodological challenges, including the fact that there is a multiplicity of programs and adolescents are simultaneously exposed to many of them. However, these interventions should be scaled-up, as not all geographical areas of the country have been equally included. Furthermore, as new challenges emerge, eg, injecting drug use and men having sex with men, there is a need to adapt these interventions.

Many factors affect the prevalence and incidence of HIV in a country. The following measures, many of which are already been employed within South Africa, are suggested: delaying age at sexual debut among adolescents; promoting consistent and

correct condom use (encouraging distribution and training on correct use); promoting mutual monogamy; prompting treatment for sexually transmitted infections; providing sterile needles; promoting formal education, especially among the blacks; introducing employment programs to reduce poverty; preventing rape and sexual violence, and promoting safe male circumcision.

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