Pathways to HIV Infection and Pregnancy: Differences in Predictive Factors among Young Women in Rural KwaZulu/Natal, South Africa

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Introduction

With over 5 million HIV-infected people, South Africa is experiencing one of the world's most severe HIV epidemics. Over half of those infections are in young people aged 15-24. Although the country has fewer than 1% of the global population of young people aged 15-24, it has 15% of infections in this age group. In KwaZulu/Natal province, the site for this study, HIV prevalence is now 14.1% among young people under age 25. Young women are at particularly high risk; gender differences in age of sexual initiation as well as patterns of sexual networking mean that young women are infected at almost twice the rate of men. Although teenage pregnancy is a well-studied topic in South Africa, it has been little examined in the context of the HIV epidemic. Nationally, about one-third of women (35%) experience a first birth by age 19; in KwaZulu/Natal province this rises to over 40 percent. Thus, young South African women face a dual risk for pregnancy and infection. An important question in terms of prevention efforts, however, is whether all women are equally at risk for both outcomes.

Data and Methods

This study was conducted in a rural district of KwaZulu/Natal province, South Africa. KwaZulu/Natal, with a population of over 8 million, is among the poorest of South Africa's nine provinces, with an annual per capita income in many rural areas under US $1000. The site for this study is typical of many rural areas, with few employment opportunities, high levels of out-migration for labor, and a high degree of social isolation.

In this report, which is taken from a larger study of young people's sexual behavior, the outcomes of HIV infection and pregnancy are examined. Data on sexual behavior and associated outcomes were collected through a household survey of adults aged 15-49 (N=2309) using a modified DHS instrument, and a sub-sample of young women aged 15-24 (N=820) was analyzed. Reported pregnancies and births were collected from sexually active women using a standard birth history methodology (N=530). HIV data were collected in a follow-up visit to all study participants, which included collection of a saliva sample along with other physical measurements. Standard lab procedures were used. The response rate was low due to difficulties in locating some participants and some refusals. As a result, HIV data were available for only about one-third of women (N=190).

Bivariate and multivariate analyses were used to measure the correlation between predictive factors and the two outcomes of pregnancy and HIV infection. Explanatory factors included age, education, age at first sex, religious affiliation, community participation, defined as membership in one or more of sports, church, singing, dance or study groups; living in a female-headed household or not; household wealth (low, medium or high); parental residence, defined as living with both, one or no parents; and exposure to television and radio. Household wealth was measured from an asset index, and was derived from a household schedule administered with the survey. Additional sexual risk factors examined in relation to HIV infection were risk perception,

partner's age, perception that a partner has other partners, and condom use. Conditional logistic regression was performed to determine independent predictors of the study outcomes while controlling for all other variables. Data analysis was performed with SPSS.

Results

Pregnancy

A bivariate analysis of pregnancy among sexually active women showed age and schooling status to be significantly correlated with having ever been pregnant. 78.3 percent of sexually active young adult women (aged 20-24) had ever been pregnant, compared with 50 percent of older teens (16-18 years) and 25.7 percent of younger sexually active teen women (14-15 years). Young women not in school were also significantly more likely to have been pregnant, suggesting that pregnancy is a main reason for young women to leave school. Certain partnership characteristics also enhance young women's risk for pregnancy. Having an early sexual debut, defined as age at first sex of 15 years or less, was associated with ever having been pregnant, as was having a partner more than five years older. This may be related to a longer period of exposure to sexual activity, with a higher chance of pregnancy as a result. However, it may also be related to different patterns of sexual risk behaviour in those who initiate sex at younger ages. In addition, some household and community level factors were significantly associated with pregnancy. Young women who lived with neither parent were more likely to have ever been pregnant than those who lived with either both or one parent. And finally, those with a higher level of participation in community groups were less likely to have ever been pregnant. Causal interpretation of these two latter links, however, is not straightforward because motherhood may affect living arrangements and community participation.

In multivariate analysis, the association of age and educational status with pregnancy remained significant after controlling for other factors. Those who were older were more than four times as likely to have been pregnant than younger women (OR=4.16). Likewise, school non-attenders were almost three times as likely to have experienced pregnancy (OR=2.88). It is not known what proportion of these young women left school because they were pregnant, or whether they were at enhanced risk of pregnancy because they had left school. The association between younger age at sexual debut and pregnancy also remained significant in the logistic regression analysis, with women who had experienced a younger age at first sex almost five times as likely to have ever been pregnant (OR=4.87). Some household and community characteristics were also important independent predictors of pregnancy. The associations between lower levels of participation in youth-oriented community groups (OR=1.96) and living with neither parent (OR=1.69) remained as significant predictors of pregnancy in this analysis. Having an older partner was not significantly associated with pregnancy, after controlling for other factors.

HIV Infection

First, women who responded to the HIV component of the survey were compared with non-responders according to key demographic and sexual risk characteristics, including age, education, religious affiliation, household wealth, age at sexual debut, partner's age and the perception that a partner has other partners. Some differences were observed between the two groups: women were more likely to participate if they were Zionist Christians, if they had weekly exposure to television, and if they were frequent condom users. Most of the obvious risk factors for HIV infection (sexual activity status, age at first sex, partner's age, perception that partner has other sexual relationships, self-perceived risk) are not related significantly to

compliance and thus there is no reason to believe that the HIV estimates are seriously affected by participation bias, although interpretation needs to be cautious.

Bivariate analysis of HIV infection and key explanatory factors indicated that young adult women (aged 20-24) were more likely than teen women to be HIV infected (34.7% vs 21.3%). 15.4 percent of women currently attending school were HIV infected, compared with 35.5 percent of those not in school. Similarly, 19.1 percent of those who had never been pregnant were HIV infected, compared with 33.9 percent of those who had experienced pregnancy. Having an older partner and not belonging to any community group were also associated with HIV infection. Women who perceived that their partners had other partners were also significantly more likely to be HIV infected than those who did not. Poorer women were significantly more likely to be HIV infected: 13 percent of women from the wealthiest households were HIV infected, compared with 40 percent of those from the least wealthy households.

These same factors were examined in a logistic regression model, in relation to the outcome of HIV infection. Two models were developed to examine the association of 1) various socio-economic factors with HIV infection, and 2) the association of selected socio-economic factors along with all partnership characteristics found to be significantly associated with HIV status in the bivariate analysis.

In Model 1, household wealth, age and educational status were found to be significantly associated with being HIV infected. Women from less wealthy households were more than twice as likely (OR=2.27) to be HIV infected than women from households of medium or high wealth. Being in the young adult age group (OR=2.01) and not being in school (OR=3.14) were also independent predictors of HIV status.

In Model 2, the sexual risk categories that were significant in the bivariate analysis were examined in a model along with age, educational status, religion, household wealth, and community participation. Other socio-demographic variables were excluded from the model if they had not been significant in the bivariate analysis. This allowed for examination of socio-economic effects on HIV status, while controlling for the variables with the strongest association to HIV infection. To the extent that all sexual risk factors for HIV acquisition are adequately represented in Model 2, relationships between socio-economic characteristics and HIV status should disappear.

It is therefore not surprising that, in Model 2, there were no significant predictors of being HIV infected at the 95 percent confidence level. Most notably, the effect of schooling disappears and the effect of household wealth is attenuated. By contrast the association with community participation increases somewhat. In Model 2, the only significant predictor of HIV infection is women's perception that their partner has other partners and this association is of borderline significance (OR=3.61, $p=0.08$). Household wealth, or specifically coming from a household in the lowest economic tier, was thus associated with HIV status except after controlling for sexual risk factors, including the women's perception that their partner had other partners.

Discussion

In this study, about two-thirds of sexually active women under age 25 have ever been pregnant, and 28.4 percent of those same women are HIV infected. Bivariate analyses indicated that women with partners more than five years older, not in school, and aged 20 or older were more likely to have ever been pregnant *and* to be HIV infected. Women who initiated sexual

activity at age 15 or younger, did not participate in any community organization, and lived with neither parent were also significantly more likely to have experienced a pregnancy. Women from poorer households, who had ever been pregnant, and those who perceived their partner to have other partners were more likely to be HIV infected. In the multivariate analysis, however, different independent predictors of the two outcomes emerge when controlling for other factors. There is an association between lower household wealth and HIV infection, except when controlling for sexual risk factors. In contrast, pregnancy is strongly correlated with several risk factors, including age, education and early sexual debut. This raises questions about the differences in risk for infection and pregnancy, the factors that determine this, and the relative contribution of partner choice versus unprotected sex to each outcome.

The finding that factors predictive of pregnancy are not also associated with HIV status is interesting and deserves comment. Although pregnancy and HIV are often thought to be closely associated outcomes because unprotected sexual intercourse is a risk factor for both, they are in fact very different. In particular, some young women may want to become pregnant whereas it is safe to assume that HIV infection is not a desired outcome. The risk of pregnancy does not depend on the type of partner, although becoming infected with HIV does, and the explanation for the different risk profiles associated with HIV and pregnancy may lie in choice of partner. This is particularly likely as household wealth is not correlated with pregnancy, and so the difference must lie in some characteristic of partnerships and associated risk. Women from the wealthiest households had slightly lower levels of participation in the HIV component of the survey, and this may have biased the relationship between wealth and seropositivity. Finally, it is important to consider that the different correlates of HIV infection and pregnancy could be related to differences in partnership characteristics, particularly if women in more stable unions, such as marriage, had higher pregnancy rates but were at lower risk for HIV infection. Although fewer than 1% of women in the age groups under consideration were married, it is possible that those who were pregnant but not infected were in more stable unions. In spite of these limitations, the association of wealth with HIV status in this analysis is potentially important, even though it is not possible to definitely assess their relationship.