Highly Active Antiretroviral Therapy Regimens Protect Against HIV Transmission During Breast-Feeding

Three regimens of highly active antiretroviral therapy (HAART) were equally effective in suppressing HIV-1 during pregnancy and breast-feeding, according to a randomized trial in Botswana.[1] The regimens, which were administered beginning no later than the 34th week of gestation and continued through up to six months of breast-feeding, suppressed the virus at similarly high rates (92–96%) and together achieved a 1.1% rate of mother-to-child transmission at six months—the lowest recorded in a breast-feeding population.

Although HAART is one of the most successful methods for reducing HIV-1 transmission during pregnancy and childbirth, its effectiveness in preventing transmission during breast-feeding has not been established. In the current trial, researchers examined outcomes for three HAART regimens in a sample of 730 HIV-1–positive pregnant women.

The 560 women with CD4 counts of 200 or more cells per ml were randomly assigned to one of two groups, each of which received a different HAART regimen beginning at 26 to 34 weeks' gestation and continuing through weaning or six months postpartum, whichever occurred first. One group (285 women) received a nucleoside reverse-transcriptase inhibitor (NRTI) regimen consisting of abacavir, zidovudine and lamivudine; the other group (275 women) received a protease-inhibitor regimen consisting of lopinavir, ritonavir, zidovudine and lamivudine. A third group of 170 women who had CD4 counts below 200 cells per ml or had an illness indicative of AIDS were not randomized but received the standard regimen for AIDS patients in Botswana: a twice-daily cocktail of nevirapine, zidovudine and lamivudine. Treatment for this "observational group" began at 18 to 34 weeks' gestation and continued indefinitely. All infants in the study received a single dose of nevirapine at birth and a twice-daily dose of zidovudine from birth through four weeks.

Investigators evaluated women's CD4 counts at enrollment, delivery, and three and six months postpartum. They also monitored viral suppression, pregnancy outcomes and side effects in mothers and newborns. Their main goals were to compare rates of viral suppression (defined as having plasma HIV-1 RNA levels of less than 400 copies per ml) in the NRTI and protease-inhibitor groups and to determine rates of mother-to-child transmission in all three groups. They used logistic regression to identify characteristics associated with lack of suppression.

Overall, study participants had 709 live births and 24 stillbirths. Stillbirth rates were 7% in the observational group and 2–3% in the other two groups. The proportion of births that were premature was higher in the protease-inhibitor group (23%) than in the NRTI (15%) or observational group (10%). However, the NRTI, protease-inhibitor and observational groups had similar proportions of low-birth-weight infants (13%, 17% and 15%, respectively).

The median duration of HAART before delivery was 11 weeks in the two randomized groups and 13 weeks in the observational group. Nearly all of the women began breast-feeding while receiving HAART, and 71% continued for at least five months. The NRTI and protease-inhibitor groups had similarly high rates of HIV-1 suppression at delivery (96% and 93%, respectively) and throughout breast-feeding (92% and 93%, respectively). Suppression rates were also high among women in the observational group—94% at delivery and 95% throughout six months of breast-feeding. In both randomized groups, women who began the trial late in the third trimester or had a higher baseline level of HIV-1 had an elevated risk of not achieving suppression.

In an additional analysis, the researchers assessed the proportion of women who had attained a higher degree of viral suppression—i.e., to fewer than 50 copies of HIV-1 RNA per ml. This level of suppression was more common in the NRTI group (81%) than in the protease-inhibitor group (69%) at delivery, but the two groups did not differ during breast-feeding (83% and 77%, respectively). In the observational group, the rate of suppression to fewer than 50 copies per ml was 77% at delivery and 84% throughout six months of breast-feeding.

Mother-to-child transmission rates were low: Among the three treatment groups, only eight newborns (1.1%) were infected by age six months; six were infected during pregnancy and two during breast-feeding. No other study of breast-feeding women has recorded such a low rate.

The trial's limitations, the researchers note, include its lack of sufficient statistical power to detect differences among study groups in rates of mother-to-child transmission. Additionally, because only women with CD4 cell counts of 200 or more were randomized, the results may not be applicable to women with lower counts. Moreover, the study did not examine whether HAART protects against mother-to-infant transmission if women breast-feed for longer than six months.

Nonetheless, given that the rates of HIV-1 suppression in the trial matched or exceeded those in studies of nonpregnant women, the findings suggest that "neither pregnancy nor breast-feeding adversely affects achievable rates of virologic suppression," the authors note. They attribute the high suppression rates to good compliance and to the initiation of therapy before 30 weeks' gestation, a factor that also may have reduced the risk of transmission in utero. They caution, however, that the birth outcomes data from this and previous studies suggest that providers should anticipate a mild increase in prematurity among women using protease inhibitors and that pregnant women with a history of low birthweight could experience problems while taking HAART.

A commentary accompanying the study emphasizes that HAART's success ultimately depends on the presence of services that identify, care for and treat HIV-1-positive women and their infants.[2] "We now have the tools to make a considerable difference in controlling the pediatric HIV-1 epidemic," the author notes.–*A. Kott*

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Rates of Sexual Violence Are High in Democratic Republic of the Congo

Two in five women and one in four men in the war-torn eastern region of the Democratic Republic of the Congo (DRC) report that they have been victims of sexual violence, according to a cross-sectional, population-based study.[1] These rates are significantly higher than those reported in other conflicts. Moreover, among respondents reporting sexual violence, 74% of women and 65% of men said that their assault was related to the conflict. Although these assaults were most often perpetrated by men, women were the sole perpetrators in 41% of the assaults against women. More than half of victims of sexual violence had been depressed or had posttraumatic stress disorder (PTSD) in the past year.

Although the conflict in the eastern DRC, which began in the mid-1990s, is considered one of the worst humanitarian crises in the world, reliable data about the prevalence of sexual violence in the country are lacking; most studies have been qualitative or were based on nonrandom samples. In the two population-based studies that have been conducted, the proportion of respondents who had experienced sexual violence was 16–20%, but both studies had narrow definitions of sexual violence and neither determined if the violence was related to the conflict. The current study is the first to assess the prevalence of all forms of interpersonal violence, the circumstances of the attacks, the characteristics of the perpetrators and the mental and physical effects of the violence.

In March 2010, 998 men and women aged 18 or older in 19 eastern territories of the DRC participated in one-on-one interviews. Respondents were asked about their demographic characteristics, physical and mental health, combat experience, history of sexual violence (including type of violence and perpetrator), household members' experiences of human rights abuse (including type of abuse and perpetrator) and household mortality. Symptoms of PTSD were assessed using the PTSD Symptom Scale Interview, and those of major depressive disorder using the Patient Health Questionnaire–9. The researchers estimated weighted population percentages and means for each outcome and used the adjusted Wald test of association to calculate p values for bivariate comparisons.

The majority of the 405 male and 593 female participants were married and Christian, and worked as farmers or herders; their mean age was 40. Eighty percent of respondents owned land and 61% were literate. One in five had served as a combatant at some point in his or her lifetime.

Overall, 42% of women and 31% of men reported having experienced some form of interpersonal violence, and 43% of respondents reported that someone in their household had experienced a sexual human rights violation related to the conflict. Intimate partner violence was reported by 31% of women and 17% of men, and sexual violence by 40% of women and 24% of men.

Among participants reporting sexual violence, 74% of women and 65% of men said the violence was conflict-related. The vast majority of male victims said they had been assaulted by other men (91%), whereas assaults against women were more evenly split among male (59%) and female (41%) perpetrators. Rape was the most common form of sexual violence reported by female victims (51%) and the second most common among male victims (21%); other frequently reported types of sexual violence included molestation, sexual slavery and being forced to undress (15–29%). The consequences of sexual violence included bleeding (32% of women, 12% of men), being beaten (19% of women, 32% of men) and STIs (21% of women, 5% of men). Depression was a common consequence among men (14%) but not among women (1%).

Sixty percent of sexual violence victims had met the criteria for major depressive disorder at some point in the past year, and 70% had met the criteria for PTSD. Moreover, 38% had thought about suicide in the past year, and 29% had ever attempted suicide. Current substance abuse—defined as using drugs or alcohol at least twice a week, or using them to excess every time—was reported by 28% of sexual violence victims.

The authors note that the prevalence of sexual violence found in their study is substantially higher than that reported in other conflicts and indicates that widespread human rights violations and sexual violence have occurred in the eastern territories of the DRC. Moreover, their study is the first to document the high prevalence of sexual violence among men and to show that both men and women are perpetrators of physical and sexual violence. In light of these findings, the investigators stress the importance of including men in policies and definitions related to sexual violence. They add that given the pervasiveness of sexual violence in the area, health care programs that focus on sexual violence and mental health are needed in the eastern DRC.—*L. Melhado*

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In China, Sexual Debut Linked to Demographic And Social Factors

School type, socioeconomic status and family structure are important predictors of sexual debut among Chinese youth, according to a national survey.[1] Five percent of youth in grades 10–12 had had sex, and a third of that group reported having had forced (or otherwise unwanted) sex. Youth who attended an ordinary or elite high school were less likely than those who attended a vocational school to have had sex (odds ratios, 0.4–0.6), while the odds of being sexually experienced were elevated among students living in a moderately or highly developed area rather than a developing one (1.1–1.4), and among those not living with both parents (1.7–3.1). These factors were also associated with sexual experience among college students.

The data are from the 2005 Chinese Youth Risk Behavior Survey, a randomized, multistage study conducted among urban adolescents in 18 of China's 31 provinces. The researchers collected information on social and demographic characteristics and sexual behaviors from 109,754 students in grades 10–12 and 33,653 college students. Participants had a median age of 18, and 53% were female. The investigators calculated descriptive statistics on respondents' experiences with sex, forced sex (defined as coerced, un-

wanted or forced sex) and, for college students, condom use at last sex and pregnancy. Predictors associated with these outcomes were identified through logistic regression.

About 5% of high school students reported having had sex. Males were more likely than females to be sexually experienced; among high school students 18 or older, for example, 11% of males and 4% of females had had sex. Sexual experience was more commonly reported by respondents in vocational schools than by those in other types of schools (7% vs. 4%).

One-third (33%) of sexually experienced high school students had had forced sex. This proportion was higher among females and younger respondents than among males and older respondents; it was highest among 15-year-old females (58%). Forced sex was more commonly reported by respondents in elite schools than by those attending other schools (37% vs. 31–33%), and by those living in developing rather than highly or moderately developed areas (37% vs. 31%).

One in nine college students (11%) reported having had sex, and the proportion was again higher among males than females. Sex that was forced, coerced or otherwise unwanted was more commonly reported by sexually experienced students at four-year colleges than among those at junior colleges (25% vs. 20%). Condom use at last sex increased with age among sexually experienced respondents, from 45% among females 18 or younger to 58% among those 22 or older, and from 35% to 51% among males in those age-groups. Depending on age, 22–31% of sexually experienced female college students had been pregnant, and 19–32% of sexually experienced males reported having impregnated a partner.

In the multivariate analysis, several factors were associated with sexual experience among high school students. Among both males and females, the odds of having had sex were lower among those who were attending an elite or ordinary high school rather than a vocational school (odds ratios, 0.4–0.6), and lower among those whose mother had not attended college than among those whose mother had at least a junior college education (0.7–0.8). The odds were higher among students who reported having a stepparent (2.1–3.1) or being raised by someone other than parents or grandparents (1.7–3.1) than among those living with both biological parents, and higher among youth living in a highly or moderately developed area than in a developing area (1.1–1.4). Males whose fathers had less than a junior college education had reduced odds of having had sex (0.8).

Among high school students of both genders, forced sex was positively associated with attending a nonvocational school (odds ratios, 1.3–1.5) and negatively associated with living in a moderately developed, as opposed to a developing, area (0.7–0.8). In addition, the odds of having experienced forced sex were reduced among females in highly developed areas (0.5) and among males with a high school–educated mother (0.6).

The findings were generally similar among college students: Having had sexual intercourse was positively associated with living in a one-parent household or with guardians other than parents or grandparents (odds ratios, 1.2–3.4), as well as with living in a moderately developed area (1.2–1.3); it was negatively associated with having a mother who had less than a college education (0.5–0.7). In addition, freshmen were less likely than seniors to have had sex (0.7 for both genders). Factors associated with sexual experience only among males were being a sophomore (0.8); having a father with a high school education rather than a higher educational level (0.8); and attending a junior rather than a four-year college (1.1). Female college students had elevated odds of having had sex if they had a stepparent (3.4) or lived in a moderately or highly developed area (1.2–1.3).

Among female college students, the likelihood of having experienced forced sex was elevated among freshmen (odds ratio, 2.3) and youth from a single-parent family (1.8). Females and males attending a junior rather than four-year college had reduced odds of forced sex (0.6–0.7). Among females, having not used a condom at last sex was positively associated with being a freshman (3.0), sophomore (2.7) or junior (1.8) rather than a senior; among males, it was associated with being a sophomore (1.5) and with living in a moderately developed area (0.7). Finally, the odds of having become pregnant (or of having impregnated a partner) were elevated among freshman and sophomore females (2.0–2.5), and reduced among members of both sexes whose mothers had not attended senior high school (0.5–0.6).

The researchers speculate that the lower likelihood of sexual experience among students at elite high schools might be related to the greater resources, more motivated student bodies and better learning environments at elite schools. They add that the inverse relationship between place of residence and sexual experience might be due to the more traditional beliefs (and thus more conservative sexual attitudes) among residents of less developed areas. Increased school-based sex education, they conclude, may help Chinese youth avoid unprotected sex as well as protect "themselves from being victims of high-risk sexual behaviors," such as unwanted sex.–*H. Ball*

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Why Is Kenya's Fertility Rate Still High? HIV Epidemic May Be a Factor

The HIV epidemic may have contributed to the lack of decline in Kenya's fertility rates, primarily through its associations with elevated child mortality and reduced duration of breast-feeding, according to an analysis of Demographic and Health Survey (DHS) data.[1] Although having AIDS was associated with reduced levels of fertility, women were less likely to want to stop childbearing and more likely to have had a recent birth if a young child of theirs had died—a common scenario in AIDS-ravaged areas. Moreover, the mean duration of breast-feeding in a community was inversely associated with recent childbearing, suggesting that women who opted not to breast-feed because of fears of mother-to-child HIV transmission were putting themselves at increased risk for pregnancy.

According to the 2003 DHS, Kenya's fertility rate was about five births per woman, indicating that the decline in fertility that occurred through the mid-1990s had stalled. The prevalence of HIV was also high—about 7% overall, and nearly 9% among women, in 2003. In principle, high HIV prevalence might contribute to lower fertility by discouraging sexual activity and spurring condom use, as well as through various biological mechanisms (rates of fetal loss and infertility are elevated among women with AIDS). However, the epidemic may help keep fertility rates high because couples might choose to

have extra children (to replace those who have died of AIDS or as insurance against losing future children). Moreover, both infected women and those who do not know their HIV status—which in Kenya includes most women—may refrain from breast-feeding to avoid transmitting the virus to their infants, and thus may be at increased risk for pregnancy because they do not benefit from breast-feeding's contraceptive effects.

To explore these competing scenarios, investigators analyzed 2003 DHS data on a nationally representative sample of 8,195 women aged 15–49 and 3,578 men aged 15–54. First, they sought to identify factors associated with two aspects of women's fertility preferences: whether women wanted more children and whether their ideal family size was three or fewer children. Next, the investigators examined predictors of recent fertility (i.e., whether a woman had had a birth in the past three years). Factors of interest in both analyses included demographic variables (educational attainment, parity, union status), experiences of child loss (loss of a child younger than five, fetal loss), HIV-related measures (serostatus, perceived HIV risk, level of HIV knowledge, knowing a person who has or has died of AIDS) and community-level factors (proportions of local residents who have experienced a child loss, have HIV, perceive their HIV risk as moderate or high, or know someone who has or has died of AIDS). Most of these measures were based on women's survey responses, but data from both men and women were used to calculate the community-level measures. The researchers conducted bivariate and multivariate regression analyses.

Overall, 42% of the women wanted to have no more than three children. The proportion was greater among women who had never been tested for HIV than it was among those who had been tested (57% vs. 40%), and greater among the quartile who scored highest on the HIV/AIDS knowledge index than among those in the lowest quintile (55% vs. 28%). In the multivariate analysis, the desire for a small family was associated with having a primary or higher education (regression parameter estimates, 0.3–0.9) and with higher community levels of HIV/AIDS knowledge (0.8); women who lived in areas with higher levels of child mortality were less likely than other women to want three or fewer children (−0.5). Ideal family size was not associated with having ever lost a child or fetus, HIV status or knowing someone with AIDS.

Thirty-six percent of all women said they did not want any children in the future. In the bivariate analysis, this desire varied strikingly according to perceived HIV risk: Almost half (46%) of women who considered themselves at high risk did not want a child, compared with 30% of those with little or no perceived risk. In the multivariate analysis, however, desire for children was not associated with perceived risk, nor with actual HIV status or knowing someone with AIDS. Rather, the desire to stop childbearing was positively associated with having any degree of schooling (parameter estimates, 0.1–0.2), having any children (0.2 for all parities above 0) and living in a community with higher scores on the HIV/AIDS knowledge index (0.1). Women were less likely to want to stop childbearing if they had lost a child younger than five (−0.5) or had ever experienced fetal loss (−0.2).

Thirty-six percent of all women, and 46% of sexually active women, had had a birth in the past three years. As in prior studies, women who had HIV and those who knew someone with AIDS were less likely than other women to have had a recent birth (parameter estimates, −0.4 and −0.2, respectively). However, recent fertility was negatively associated with mean duration of breast-feeding in a community (−0.1), indicating that fertility rose when breast-feeding declined. Moreover, having lost a child aged five or younger at least three years before the survey was positively associated with a recent birth (0.3).

Although the data cannot show causality, the findings are consistent with the possibility that HIV/AIDS has had, and may still be having, diverse effects on fertility in Kenya. On the one hand, the authors note, the epidemic may have contributed to reduced fertility because women with AIDS tend to refrain from childbearing and may be less fertile than other women. Conversely, the epidemic may have contributed to increased fertility through increased infant and child mortality (leading to replacement births) and reduced duration of breast-feeding. "It is possible," the researchers contend, that "in communities at advanced stages of the HIV/AIDS epidemic," levels of child mortality and declines in breast-feeding have become "substantial enough to result in a reversal of fertility decline." They add, however, that because factors such as lack of progress in economic development can also keep fertility at high levels, the HIV epidemic should be viewed as one, rather than the sole, factor that may explain recent fertility trends in Kenya.

—P. Doskoch

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Psychological Abuse During Pregnancy Linked To Depression in Brazil

Psychological abuse by an intimate partner during pregnancy is associated with postpartum depression among Brazilian women, according to a population-based study conducted in the northeastern state of Pernambuco.[1] Compared with women who had not been abused, those who had experienced psychological abuse had a substantially increased likelihood of being depressed (odds ratio, 1.6), as did those who had suffered psychological abuse plus either physical or sexual abuse (1.8). In analyses that controlled for these other types of abuse, women who reported the highest levels of psychological abuse had particularly elevated odds of becoming depressed after pregnancy (2.3). Neither physical nor sexual violence alone was associated with postpartum depression.

The study, conducted between July 2005 and December 2006, focused on 1,045 pregnant women who resided in a low-income section of Recife, the state's capital city, and had lived with their partner at some point during the pregnancy. Women were eligible for the study if they were 18–49 years old, in their last trimester and enrolled in the city's primary health care program (which covers three-quarters of the population). Almost all eligible women (94%) agreed to participate.

In an interview prior to delivery, women provided information about their social and demographic characteristics, history of mental illness, sources of social support (none, some or many) and relationship with their current or most recent live-in intimate male partner, including the quality of communication with this partner (categorized as good or poor) and the extent of his controlling behavior (none, moderate or very).

Women were asked if their partner had subjected them to physical abuse (e.g., chok-

ing, beating or injuring them with a weapon), sexual abuse (e.g., coercing them into having sex) or psychological abuse (e.g., threatening or insulting them) during the pregnancy. Respondents also reported how often various types of psychological abuse occurred, and their responses were converted to an abuse score. In addition, women completed questionnaires that screened for common mental illnesses (notably depression and anxiety). Postpartum depression was assessed at follow-up interviews that took place an average of eight months after delivery.

The majority of respondents were nonwhite, aged 25 or older, had at least five years of education and were currently living with a partner (78–87%). Seventy percent described their partner as being somewhat or very controlling and 34% reported that they did not have any social support. At least one type of abuse during pregnancy was reported by 31% of women—17% reported psychological abuse alone, 3% physical or sexual abuse alone and 11% all three. Some 12% had had a mental illness prior to pregnancy, 43% had been depressed or had an anxiety disorder while pregnant and 26% had postpartum depression.

Bivariate analyses revealed that a woman's odds of depression after delivery were elevated if she had four or fewer years of education (odds ratio, 1.6), did not currently have a live-in partner (1.8) or had a partner who communicated poorly (1.4). The odds of being depressed were also higher among women whose partner controlled them to some degree (2.0–4.3) than among those whose partner was not controlling, and higher among women who had little or no social support (2.0–5.7) than among those with many sources of support. In addition, postpartum depression was associated with mental illness that had occurred before or during pregnancy (3.2 and 5.3, respectively).

In logistic regression analyses that controlled for respondents' social and demographic background, psychological characteristics and relationship quality, women who had experienced psychological abuse, either by itself or in combination with physical or sexual violence, had elevated odds of postpartum depression relative to women whose partner had not been abusive (odds ratios, 1.6 and 1.8, respectively). An analysis that examined associations between postpartum depression and various levels of psychological abuse (adjusting for physical and sexual violence) found that the more psychologically abusive a woman's partner had been, the greater the likelihood that she suffered postpartum depression. Women with the highest psychological abuse scores were more than twice as likely as those who had not been subjected to such mistreatment to have postpartum depression (2.3); the odds were also elevated among those who had an intermediate abuse score (2.0).

Although the study used a large, population-based sample and had a high response rate, the researchers caution that cultural attitudes regarding abuse and the women's low-income status limit the generalizability of their findings. They also acknowledge that the questionnaire used in this analysis may not have accurately captured women's postpartum depression, because the ideal cut-off point for their instrument remains unclear. The investigators note, however, that this study goes beyond existing research on the relationship between abuse during pregnancy and postpartum depression by minimizing recall bias and examining the impact of psychological as well as physical violence. They note that psychological abuse may reinforce "a belief in the omnipotence of the aggressor" and lead to "feelings of defeat and loss," and suggest that interventions that address this form of abuse (as well as physical and sexual violence) could "reduce the substantial burden of postnatal depression."–*S. Ramashwar*

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Rates of Recent Sexual Activity Lessened Among South African Youth in Risk-Reduction Program

A school-based HIV and STI risk-reduction intervention was effective in reducing sexual risk-taking behaviors among sixth-grade students in South Africa, according to a randomized controlled trial.[1] Pooled data from three follow-up assessments revealed that students who participated in the intervention were less likely than those who took part in a general health promotion program to have had unprotected vaginal intercourse in the past three months (2.2% vs. 4.2%). In addition, they were less likely to have had vaginal intercourse (4.8% vs. 7.2%) or multiple sex partners (1.8% vs. 3.2%) during that period. However, the proportion of students who had ever had sex did not differ between groups.

South Africa has approximately 5.5 million people living with HIV—more than any other country in the world. The incidence of infection is particularly high among those aged 15–24, underscoring the need for interventions aimed at young people. To assess one such program, investigators randomly selected and matched nine pairs of schools from Eastern Cape Province—seven pairs of urban schools from Mdantsane, the second largest South African township, and two pairs of rural schools from Berlin, a nearby settlement. One school in each pair was randomized to the risk-reduction intervention, while the other was assigned to the general health promotion program.

The intervention, which was rooted in various behavioral theories, and the general health program were each presented on six consecutive school days in two-hour sessions. Both included interactive exercises, games, brainstorming, role-playing and group discussions. The risk-reduction intervention focused on increasing students' knowledge of ways to reduce HIV and STI risks, their appreciation of the importance of using condoms and postponing sex, and their ability to use condoms and to talk with their partner about abstinence and condom use. The intervention sessions also addressed young women's vulnerability to rape and other acts of male domination by discussing sexuality, sexual maturation, appropriate sex roles and rape myths. The health promotion program focused on behaviors associated with heart disease, hypertension, stroke, diabetes and cancer; its goal was to increase students' activity levels and their consumption of fruit and vegetables, and to reduce their use of cigarettes and alcohol.

A total of 1,057 sixth-graders (558 girls and 499 boys), with an average age of 12, participated in the trial. Most of the students lived in Mdantsane; 8% lived in Berlin. Fewer than half (39%) lived in a household with their father. In addition to completing a confidential questionnaire before the trial, students completed follow-up questionnaires three, six and 12 months afterward.

All participants attended the initial inter-

vention session. Attendance at the next five sessions was nearly universal, ranging from 97% to 99%. Participation at each of the three follow-up evaluations was also very high (97%). Follow-up attendance was not related to gender, father's presence in the household, area of residence or sexual behavior.

At baseline, nearly all participants (97%) reported never having had vaginal intercourse. Young women were more likely than young men to report being sexually inexperienced (99% vs. 94%). While the proportion of sexually inexperienced students dropped to 77% by the 12-month follow-up, no difference was apparent between students in the intervention group and those in the control group. Moreover, no evidence emerged that the intervention postponed sexual initiation.

However, in generalized estimating equation analyses that averaged data from the three follow-up evaluations and controlled for baseline characteristics, students assigned to the risk-reduction intervention were less likely than those in the general health program to report having had unprotected vaginal intercourse (2.2% vs. 4.2%) or intercourse with multiple partners (1.8% vs. 3.2%) in the past three months (odds ratios, 0.5 for each). Additionally, the proportion of students who reported having had vaginal intercourse in the past three months was lower in the intervention group than in the control group (4.8% vs. 7.2%). The intervention's effectiveness did not change across the three follow-up periods. To validate the strength of findings from individual analyses, the researchers conducted meta-analyses of school-level intervention effects and found similar results.

The investigators noted that the relatively low rates of teenagers' sexual activity precluded use of STI or HIV incidence as outcome measures. Other limitations of the study, they said, include its reliance on self-reports of behavior and its unknown relevance to other South African adolescents. However, they pointed out strengths—the study's lack of self-selection bias (students did not know the content of the two interventions before enrollment), the use of a randomized design, and high rates of enrollment, intervention attendance and follow-up retention.

The researchers emphasize that the study is the first large-scale, community-level, randomized intervention trial to demonstrate significant effects on the sexual risk behaviors of young South African adolescents. "Sexual transmission of HIV is a major risk faced by adolescents in Sub-Saharan Africa, and interventions are needed urgently to reduce their risk," the investigators note. "Our results indicate that a theory-based, contextually appropriate HIV/STD risk-reduction intervention delivered in schools can be effective in shaping the sexual behavior of young adolescents before or at the beginning of their sexual lives."–*A. Kott*

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In Sub-Saharan Africa, HIV-Serodiscordant Couples Often Use Condoms—But Not Other Forms of Contraceptives

While African women whose partner's HIV status does not match their own generally use condoms, they do not typically use other forms of contraceptives consistently, according to data from a multinational trial testing an antiviral drug.[1] By the end of the two-year study, more than 90% of women were consistently using condoms. However, only 30% of HIV-positive women with uninfected male partners and 14% of HIV-negative women with infected male partners were consistently using a form of contraception other than condoms. Consistent dual contraceptive use was reported at 16–24% of study visits. Women who had had unprotected sex (i.e., without condoms) in the past month were more likely than those who had consistently used condoms to have used another form of contraception every time they had sex (odds ratios, 1.3–1.4).

Most cases of HIV transmission in Africa involve couples in stable relationships. Serodiscordant couples (those in which one partner has HIV and the other does not) in such relationships may be concerned about preventing pregnancy, preventing HIV transmission or both. Dual contraceptive use, which combines a condom with a highly effective form of contraception, is an effective strategy for addressing both issues.

To explore use of contraceptives in HIV-serodiscordant relationships, investigators conducted a secondary analysis of data from 3,407 heterosexual serodiscordant couples in East and southern Africa who had participated in a randomized trial examining whether the antiviral drug acyclovir reduces HIV transmission in couples affected by herpes simplex virus type 2. In 67% of couples, the woman had HIV; in 33%, the man did. Most of the women were married, were younger than 35, had completed no more than eight years of school, earned no income and had at least two children. All participants received risk reduction counseling, free condoms and treatment for STIs during the two-year trial. HIV-positive participants were monitored monthly; visits for HIV-negative participants were quarterly. At each study visit, women reported their sexual behavior and condom and contraceptive use with their partner during the past month. Most participants—92% of HIV-positive and 84% of HIV-negative women—remained in the study for two years.

For some analyses, researchers combined data from all follow-up visits; data from visits when the woman was pregnant and those that followed seroconversion were excluded. The investigators used generalized estimating equations to analyze, separately by women's HIV status, the relationships between contraceptive use and demographic and behavioral characteristics, as well as between unprotected sex and contraceptive use.

At enrollment, more than two-thirds of women reported having consistently (always) used condoms in the past month—71% of HIV-positive women and 73% of women without HIV. Twenty-four percent of HIV-positive women and 21% of HIV-negative women reported having consistently used some type of contraceptive besides condoms (IUD, tubal ligation, hysterectomy, or an oral, injectable or implanted hormonal method). The prevalence of consistent contraceptive use was higher at baseline among women from southern Africa (30% of HIV-positive and 29% of HIV-negative women) than among those from East Africa (20% of HIV-positive and 18% of HIV-negative women).

By the final study visit, two years later, the prevalence of consistent condom use had increased substantially, to 93–96%. However, only 30% of HIV-positive women and 14% of HIV-negative women reported consistent use of other contraceptives. Twelve percent of women with HIV and 7% of those without reported consistent use of contraceptives (excluding condoms) at every study visit, and an additional 34% of HIV-positive women and 28% of HIV-negative women reported con-

sistent contraceptive use at least once.

Injectable contraceptives were the most popular method, reported by HIV-positive and negative women at 17% and 9%, respectively, of all study visits. Consistent use of oral contraceptives was reported at 5% of visits by HIV-positive women and 3% of those by HIV-negative women, while female sterilization, implants and IUDs were used even more infrequently (1–4% of visits each). At most visits, HIV-positive and negative women reported having had sex with their partner in the past month (81% and 84%, respectively). Although reports of unprotected sex were relatively uncommon, 26% of women with HIV and 25% without reported having had unprotected sex at least once after enrollment.

Consistent dual contraceptive use in the past month was reported at 24% of visits by HIV-positive women and 16% of those by HIV-negative women. While dual contraceptive use increased among HIV-positive women during the study period, no change occurred among uninfected women.

In multivariate analyses that controlled for demographic and socioeconomic variables, the odds that an HIV-positive woman reported consistent contraceptive use at a visit were lower if the woman was 45 or older than if she was aged 18–24 (odds ratio, 0.3); the odds were also reduced among women who were from East Africa (0.6) or married (0.8) or had had a live birth since their last study visit (0.6). The odds of contraceptive use were elevated for women who had at least one living child (2.4–4.6, depending on parity), had had unprotected sex with their partner during the previous month (1.3) or had had sex with an outside partner during the past month (2.0). For visits by HIV-negative women, the odds of consistent contraceptive use were reduced among those who were from East Africa (0.6) or had had a live birth since their last study visit (0.1), but elevated among women with one or more living children (2.3–3.3) and those who had had unprotected sex with their partner during the prior month (1.4).

The odds that a woman reported having had unprotected sex with her partner were elevated at visits where use of a contraceptive method other than condoms was reported (odds ratios, 1.3). No increase was observed, however, among women who had used contraceptives inconsistently.

According to the authors, the study's limitations include its lack of measures of fertility goals and views on contraception, and its reliance on self-reports of contraceptive use; however, among its strengths are its large, diverse sample and high retention rate during follow-up. The investigators endorse ongoing efforts to understand fertility desires and behaviors, increase use of dual protection and reduce unintended pregnancies among high-risk couples. "As dual contraceptive use has great potential to prevent unintended pregnancy and avert new HIV infections, it should be a high priority for programs counseling women in HIV serodiscordant partnerships," they contend.–*A. Kott*

REFERENCE

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