

High Complication Rates and Costs Are Potential Barriers to Using Circumcision to Prevent HIV in Africa

Recent evidence that the risk of female-to-male HIV transmission is reduced among men who have been circumcised has led to suggestions that circumcision programs could become a key component of anti-HIV efforts in Sub-Saharan Africa. However, findings from a pair of recent studies highlight some of the obstacles that large-scale circumcision programs would need to overcome. According to a prospective study conducted in Kenya, 35% of young men circumcised by traditional providers and 18% of those circumcised by medical providers experience complications after the procedure, suggesting that extensive training and resources will be needed if circumcision services are to be substantially expanded in developing nations.¹ The second study found that circumcising all HIV-negative men in Sub-Saharan Africa would be far less cost-effective than distributing free condoms to men who need them.² For example, on average, preventing one HIV infection via circumcision would cost an estimated \$5,845—more than 100 times the cost of preventing a single infection with condoms.

Complication Rates in Kenya

Several studies have shown that circumcision reduces the risk of HIV acquisition by up to 60%, possibly by eliminating the foreskin cells that HIV targets and by promoting formation of a barrier of epithelial cells. As a result, the World Health Organization and the Joint United Nations Programme on HIV/AIDS (UNAIDS) recommended in 2007 that access to circumcision services be increased in countries where circumcision rates are low and HIV prevalence high. Because data on rates of complications from circumcision in developing countries are lacking, researchers examined the safety and costs of the procedure in Kenya, where circumcision is almost universally practiced.

Using a two-stage cluster sampling approach, the researchers identified 1,103 males aged 5–21 in the Bungoma district of Kenya's Western Province who expected to undergo circumcision during the July–August 2004

“circumcision season.” The 1,007 youth who were subsequently circumcised were interviewed 30–89 days after the procedure about their demographic characteristics; their satisfaction with the circumcision; whether it had been performed by a medical practitioner or a traditional one; and the complications they experienced, if any.

To gather additional information on methods, complications and treatments, the researchers observed the first 12 circumcisions performed by medical practitioners and the first 12 performed by traditional providers, and they examined these 24 participants three, eight, 30 and 90 days after their procedures. An additional 298 participants were examined 45–89 days after their circumcisions. Also, 21 traditional and 20 medical practitioners were interviewed to determine their level of training, their experience with circumcision and related complications, and the cost of their services. Finally, the researchers assessed the instruments and supplies of the traditional practitioners, and inventoried supplies at 15 private clinics, three hospitals and one health center. The researchers used logistic regression to examine associations among demographic characteristics, provider type and complications, adjusting for age, residence (rural vs. urban) and number of days since the procedure.

Slightly more than half (56%) of the young men interviewed had had circumcisions performed by medical practitioners; these participants were younger and more likely to live in urban areas than were participants who had obtained circumcisions from traditional providers. Complication rates were higher for procedures performed by traditional providers than for those done by medical practitioners (35% vs. 18%; odds ratio, 2.5). Bleeding was the most commonly reported complication, followed by infection and excessive pain. Infection rates did not differ by provider type, but participants circumcised by traditional providers were less likely than those receiving circumcisions from medical providers to seek postoperative care at a

health facility (odds ratio, 0.7). Among the 24 observed cases, only one participant circumcised by medical practitioners and two circumcised by traditional providers were entirely free of complications.

Examinations of the 298 additional respondents revealed that 45–89 days after their circumcisions, those circumcised by traditional practitioners were less likely than those circumcised by medical providers to have fully healed (79% vs. 90%; odds ratio, 0.4). In particular, young men circumcised by traditional providers were more likely than those circumcised by medical practitioners to have excessive foreskin remaining (12% vs. 2%; odds ratio, 5.3) and significant residual swelling (14% vs. 5%; odds ratio, 3.2); other common complications included lacerations and keloid scarring, each of which was observed in 17% of respondents whose circumcisions had been performed by traditional providers and 10% of those whose procedures had been done by medical practitioners.

Interviews with circumcision providers revealed that medical practitioners had more years of training than traditional practitioners (15.4 vs. 6.8), but had performed fewer circumcisions during the previous two years. Half of the practitioners in each group felt that they could benefit from further training; several traditional providers expressed a desire for information on penile anatomy and for training on how to stop bleeding. However, only one practitioner (a nurse in a government health facility) admitted to feeling inadequately trained to perform circumcisions. Although traditional practitioners charged less than medical practitioners (100–500 vs. 350–2,000 Kenyan shillings), the cost of a traditional procedure can surpass that of a medical one, as the celebration that often accompanies the traditional rite can cost thousands of shillings.

Among circumcisions performed by medical providers, complications occurred in 23% of those performed in private facilities and 11% of those done in public ones. Both types of facilities were frequently missing equipment necessary for safe circumcision; for ex-

ample, working autoclaves (used for sterilizing medical supplies) were found in only 21% of private and 50% of public facilities. About half of both private and public facilities did not have the appropriate sutures; in fact, four of the 12 observed medical circumcisions were performed without stitching.

The rate of complications found in this study is higher than previously reported in Sub-Saharan Africa, note the researchers, who call the 35% complication rate following circumcisions performed by traditional providers “shocking.” Given that this level of complications occurred in Kenya, where male circumcision is routinely practiced, the researchers suggest that extensive training for practitioners and greater resources for supplies and proper equipment will be required if circumcision services are to be ramped up as a means of HIV prevention in Sub-Saharan Africa. Even so, the investigators recommend that circumcision “not be considered a stand-alone medical procedure for HIV prevention, but rather be incorporated into a full complement of HIV prevention and reproductive health services, including, but not limited to, counseling about safe sex, diagnosis and treatment of sexually transmitted infections, HIV testing, and referral to HIV treatment and care.”

Cost-Effectiveness: Circumcision Versus Condoms

Another potential obstacle to large-scale circumcision efforts is cost. Although at least one prior study concluded that circumcision may be a cost-effective strategy for fighting HIV, that analysis used data from a region of South Africa where the prevalence of HIV is extraordinarily high (26%). To assess the economic feasibility of circumcision for all of Sub-Saharan Africa, researchers made two adjustments to the approach used in the South African study. First, in calculating the costs of circumcision, they took complications into account, as these events can substantially increase the true cost of the procedure. Second, they estimated the costs not only for circumcision but for an alternative and possibly cheaper strategy: distributing free condoms.

The researchers assumed that the basic cost of a circumcision would be about US\$55, as in the South African study. However, guided by results from a literature review, they estimated that 20% of circumcision recipients would have complications, such as excessive loss of foreskin; about a quarter of these complications, representing 5% of all patients, would require inpatient treatment costing an

average of \$334. Taking these and other “hidden” costs into account increased the average cost of a circumcision by 31%, to \$73.

Thus, circumcising the estimated 70 million men in Sub-Saharan Africa who are HIV-negative and have not already been circumcised would cost \$5.1 billion—roughly 27 times UNAIDS’ 2006 budgeted core contributions for fighting HIV. Moreover, the annual cost of circumcising all HIV-negative males who reach age 15 each year would exceed \$700 million. Training and educating the providers required to meet this extra demand for circumcision, and providing the additional clinic capacity that would be needed (some clinics in South Africa, for example, already have such lengthy waiting lists that clients must wait 6–8 months for a circumcision), would further add to the costs.

As an alternative, the researchers calculated the costs of providing free condoms for men unable to purchase their own. Producing and distributing such condoms would cost about three cents each; on average, every eligible man would require about 84 condoms per year. Providing these condoms to the 46% of Sub-Saharan African men whose income falls below the poverty line would thus cost about \$224 million per year. Put another way, for the cost of a circumcision, a man could receive a 29-year supply of condoms, which would protect both him and his partner.

The researchers also calculated the number of circumcisions and condoms needed to prevent one case of HIV transmission. Using data from several studies, they estimated that 80 circumcisions would be required to prevent one infection. The same outcome would require 1,568 condoms, assuming consistent use with 87% effectiveness. The cost of preventing one infection, therefore, would be \$5,845 for circumcision—about 124 times the cost of preventing an infection with condoms (\$47).

Given these findings, the authors conclude that the high cost of circumcision makes it a “questionable” strategy for preventing HIV transmission. Providing free condoms “is estimated to be significantly less costly” and “more effective” than circumcision, and it has the advantage of protecting both men and women. Thus, they recommend that “before circumcision programs are created and funds are raised, their costs should be compared to other AIDS prevention programs so that a rational decision-making process, to spare as many lives as possible, is employed.”

—L. Melhado and P. Doskoch

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Many Pregnant Women Use Tobacco in Some Developing Countries

Pregnant women’s tobacco use and exposure to secondhand smoke are current or emerging problems in developing countries, according to findings from a multinational (but nonrepresentative) survey.¹ In six of the nine countries included in the study, most pregnant women surveyed said they had never tried cigarettes. However, three-fourths of those in Argentina and Uruguay had smoked at least once in their lifetime, and 10–18% said they were current smokers. Exposure to secondhand smoke was also common, particularly in Pakistan, where half of pregnant women said they were frequently or always exposed to tobacco smoke indoors.

Developing countries account for nearly 70% of tobacco use worldwide. Although half of men in these countries smoke, only one in 10 women do. However, evidence suggests that tobacco use among women in developing nations is rising. Moreover, even low levels of tobacco use among reproductive-age women raise concerns for public health, not only because of the potential effects of tobacco on women themselves, but also because smoking during pregnancy has been linked to preterm delivery, low birth weight and other fetal problems. These complications pose a particular threat in developing countries, where adequate medical care before, during and after delivery is often lacking.

To examine pregnant women’s use of and exposure to tobacco in developing countries, researchers surveyed convenience samples of pregnant women in Argentina, Uruguay, Ecuador, Brazil, Guatemala, Democratic Republic of the Congo, Zambia, India (two states) and Pakistan in 2004–2005. In Brazil and Pakistan, the survey was conducted at a single site; in Argentina, Ecuador and Zambia, participants were recruited from at least seven sites. Data from the Indian states (Orissa and Karnataka) were treated as two distinct samples.

Women were eligible for the study if they were aged 18–46 and in the second or third trimester of pregnancy. At least 700 women were surveyed in each country or state through face-to-face interviews conducted by physicians, nurses and other health professionals; response rates were 98% or better. Key measures included whether the respondent had ever tried a cigarette (even one puff), had ever been a regular smoker or was a current smoker; whether she had ever tried or regularly used, or was a current user of, tobacco products other than cigarettes; whether smoking of tobacco products was allowed in the house and whether the respondent and her young children were exposed to secondhand smoke; and whether she felt it was acceptable for women in her community to smoke cigarettes or use other tobacco products.

Respondents' social and demographic characteristics varied widely, reflecting the diversity of the nine countries. Most women lived in urban areas, except in India and Pakistan, where more than 80% lived in rural communities. In most countries, the mean age was 24–27; more than 90% of respondents were literate, except in Zambia (75%), the two Indian states (60–71%) and Pakistan (24%). Only a quarter (23–27%) of African respondents lived with a tobacco user, but the proportions were higher in Latin America (30–60%) and Asia (56–90%).

Women in Latin America had the highest levels of tobacco use. In each of the five Latin American countries, at least a third of women had ever tried a cigarette; three-quarters of women in Argentina and Uruguay, and three-fifths of those in Ecuador, had done so. In contrast, no more than one in seven women in African or Asian countries had ever tried one. Although levels of regular use were generally much lower, 53% of respondents in Uruguay and 44% of those in Argentina said they had ever been a regular smoker; those two countries also had the highest proportion of respondents who admitted to smoking during their current pregnancy (18% and 10%, respectively). Brazil (6%) and Pakistan (3%) were the only other countries in which more than 1% of respondents reported being current smokers. About a third of women in Argentina (35%) and Uruguay (33%) said that cigarette smoking is acceptable for women, but the proportions were lower elsewhere in Latin America (5–19%) and negligible in Africa and Asia (0–4%).

In most countries, fewer than 5% of re-

spondents had ever tried a tobacco product other than cigarettes. The exceptions were the Democratic Republic of the Congo (42%) and the two Indian states (9–34%). Current use of these products was high in Orissa (34%), where nearly every woman who had ever tried them was still using them, but levels of current use were much lower in the Congo (6%) and Karnataka (5%).

Women who did not use tobacco themselves were nonetheless often exposed to secondhand smoke. In Pakistan, 92% of women said that smoking was allowed in their home, and 50% said they and their young children were frequently or always exposed to tobacco smoke indoors. Slightly more than half (54–55%) of respondents in Argentina, Uruguay and Orissa reported that smoking was allowed in their home, and at least a fifth of women in Argentina (31%), Brazil (30%), Uruguay (27%) and Karnataka (20%) said that they were frequently or always exposed to smoke indoors.

The study's limitations include the use of convenience samples, rather than nationally representative cohorts, and the possibility that some respondents did not acknowledge

their tobacco use. Nonetheless, the investigators conclude that cigarette smoking by pregnant women "is a current or emerging problem in the five Latin American nations surveyed," and that use of smokeless tobacco products is a concern in India, particularly Orissa. In contrast, evidence suggests that Africa remains "in the early stages of the tobacco epidemic." The researchers note that "averting an increase in the prevalence of smoking among women in developing nations is widely recognized as a significant public health opportunity." Because women have low social status in many developing countries, it may not be possible for them to ban tobacco from their homes. The most effective way to reduce tobacco use during pregnancy, according to the researchers, is not to focus on pregnant women themselves, but rather to discourage girls and young women from smoking long before they become pregnant.

–P. Doskoch

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Experience of Sexual and Physical Partner Violence Linked to Elevated Risk of HIV in Indian Women

In India, married women who have experienced both physical and sexual violence by their husbands are nearly four times as likely to be infected with HIV as women who have not experienced either type of intimate partner violence, according to a large national study.¹ Physical partner violence alone was not associated with HIV infection among the married, reproductive-age women who were surveyed, nor were women's sexual risk behaviors. However, women who were poorer and less educated were more likely than their wealthier and better educated counterparts to have experienced physical abuse at the hands of their husbands.

The data came from the 2005–2006 National Family Health Survey, a nationally representative, household-based study that collected health information on more than 124,000 women aged 15–49. Subsamples of women completed questions on intimate partner violence and were tested for HIV. The present study used data from the 28,139 currently married, sexually experienced women

who had completed both the intimate partner violence and HIV components.

Women were considered to have experienced physical intimate partner violence if they reported that their husbands had ever pushed, shaken, slapped, punched, kicked or dragged them; beaten or thrown something at them; tried to choke or burn them; or threatened or attacked them with a knife, gun or other weapon. Those who reported that their husbands had ever physically forced them to perform any sexual act (including intercourse) when they did not want to were classified as having experienced sexual interpersonal violence. Women were also asked about social and demographic characteristics, as well as two HIV risk factors: their lifetime number of sex partners and lifetime use of condoms for contraception. Ninety-five percent of eligible women completed the survey, and 91% of those selected for HIV testing provided consent. HIV status was determined via standard diagnostic testing of dried blood spots collected from respondents.

Most of the women were Hindu (81%), and 47% had no education. Fewer than 2% had had more than one sex partner, and the vast majority (85%) had never used a condom. More than one-third had experienced physical intimate partner violence, either by itself (28%) or in combination with sexual intimate partner violence (8%). About one in 450 women (0.2%) tested positive for HIV.

The lifetime prevalence of any intimate partner violence was greater among women aged 25 or older (36–37%) than among younger respondents (32%). It was higher among women with no education than among those with at least a secondary education (45% vs. 22%), and it increased with declining wealth, peaking at 47% among women in the lowest wealth quintile. Intimate partner violence was reported more often by Hindu (35%) and Muslim (39%) women than by those with neither religious affiliation (29%). Both sexual risk behaviors were associated with partner violence: Fifty-two percent of women who had had more than one sex partner had been abused, compared with 35% of those who had had only one partner, and women who had never used condoms were more likely to have been abused than those who had used them (36% vs. 31%). The prevalence of HIV infection among physically and sexually abused women was 0.7%, compared with 0.2% among women who had experienced no abuse. The only demographic measure associated with HIV status was religion: The prevalence among Hindu women (0.3%) was more than three times that among Muslim or other women (0.1%). Neither sexual risk behavior was associated with HIV.

In a regression analysis that adjusted for demographic characteristics and women's sexual risk behaviors, women who had experienced both physical and sexual intimate partner violence were more likely to be HIV positive than those who had not experienced either type of violence (odds ratio, 3.9). Physical abuse alone was not associated with HIV status. Women's own sexual risk behaviors (lifetime number of partners and lifetime condom use) did not predict their HIV status.

The researchers posit that sexual intimate partner violence increases HIV risk because the physical trauma (e.g., lacerations) women may experience as a result of forced sex may provide the virus with a means of entry. Furthermore, other studies have shown that abusive husbands are more likely than nonabusive ones to participate in risky sexual

behaviors and to control their wives' sexual and protective behaviors. According to the researchers, recognizing that intimate partner violence "may represent both a risk marker and risk factor for increased HIV prevalence among women" is vital to serving survivors of abuse, as well as to providing preventive education to both men and women. They point specifically to the need for "innovative efforts to work with men to change gender norms that promote both abusive and HIV risk behaviors."—*H. Ball*

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In Uganda, Fewer Partners And More Condom Use Were Key to Drop in HIV

The decline in the prevalence of HIV that occurred in Uganda during the 1990s can be attributed to a reduction in the number of premarital and nonmarital partners and to increased use of condoms with these partners, according to a multifaceted analysis.¹ Data from diverse sources, ranging from newspaper articles and donor reports to nationally representative surveys, suggest that Ugandans began changing their sexual behavior in the late 1980s, as the incidence of HIV peaked, and then began using condoms a few years later, accelerating the decline in transmission.

Because an understanding of the factors that led to the epidemic's decline in Uganda may provide guidance for anti-HIV programs elsewhere, several studies have examined the events in that country. Although these studies concluded that behavioral changes played an important role in the decline, they have not yielded a consensus regarding the nature and timing of these changes. To shed further light on the matter, the researcher who devised the current analysis sought evidence from numerous, diverse sources, including models of HIV incidence and prevalence in Uganda; newspaper articles and surveys about sexual behavior; reports on donated condom shipments; and documents from AIDS programs in Uganda.

The models were crucial because nationally representative data on trends in HIV incidence and prevalence in Uganda are not available for the first two decades of the epidemic. Howev-

er, models of data from sources such as women seeking antenatal care or voluntary HIV tests suggest that the incidence of infection in Kampala (Uganda's capital) rose steadily for most of the 1980s, peaked around 1987, declined slowly for about five years, and then fell rapidly, returning to circa-1982 levels by 1993. Few data are available for other areas of Uganda, although models for several major Ugandan towns suggest that the incidence peaked a few years after it did in Kampala. Because of the time lag commonly seen between incidence and prevalence, the pattern for the latter is slightly different: Prevalence rose rapidly in Kampala from the early 1980s until 1987 and then increased at a slower pace until 1992; the prevalence then declined rapidly for several years before beginning a slower descent.

Survey data documenting sexual behavior around the time that incidence peaked is not available, but articles in Uganda's primary English-language newspaper indicate that at least some Ugandans were changing their behavior. For example, articles published in 1987 reported that visits to sex workers in a fishing village had greatly declined as visitors and residents became aware that HIV was sexually transmitted; other articles from the period noted that the epidemic had "ruined business" for sex workers in Kampala and elsewhere and that men were "staying home" more. Condom use was generally mentioned only briefly, or not at all, in these articles.

Data from two large surveys—the nationally representative Demographic and Health Surveys, conducted in 1988–1989 and 1995, and the subnationally representative Global Program on AIDS Surveys, conducted in 1989 and 1995—confirm that behavioral changes were taking place by the late 1980s and early 1990s. The 1989 Global Program on AIDS survey found that 9% of respondents had changed their sexual behavior (e.g., by avoiding casual or transactional sex, or being faithful to their spouse), and 60% had made or were intending to make other behavioral changes (e.g., avoiding people with AIDS). In the 1995 Demographic and Health Survey, more than half of never-married adults reported that they had delayed having sex, stopped having sex or limited their number of partners. Condom use remained relatively uncommon, as only 17% of never-married men, and 3% of never-married women, said they had begun to use condoms. Use was much higher, however, among certain subgroups and in certain contexts; for example,

62% of men in urban areas had used a condom the last time they had had sex with a casual partner. Moreover, comparisons between the 1995 surveys and their earlier counterparts revealed decreases in sexual risk behaviors. The proportion of women aged 15–54 who had had sex in the past year (regardless of marital status) declined from 82% to 75%, and the proportion of men who had had extramarital sex declined from 23% to 16%.

Data on condom shipments to Uganda (which manufactured no condoms of its own during the 1980s and 1990s) and documents from AIDS programs support the idea that condom use did not become common until after the incidence of HIV had already begun to fall. In 1989, about 15 million condoms were shipped to Uganda, but until then the number had never exceeded a few million per year. Shipments declined during the next few years, but reached 20 million in 1993 and generally exceeded that level for the rest of the decade. Moreover, documents reveal that the Ugandan government's reaction to the AIDS crisis, beginning in 1986, was to emphasize messages such as “be faithful” and “love carefully”; although condoms were sometimes mentioned, the public's belief in myths about condoms hindered widespread use. Not until the early 1990s, several years after behavioral changes had taken place, did the government, the media and religious groups make concerted efforts to promote condom use.

Although none of the evidence sources used in the analysis is ideal, the strengths of one often offset the limitations of another, the researcher notes. For example, demographic surveys may examine large, representative samples, but they cannot pinpoint the timing of behavioral changes; conversely, newspaper articles can identify the timing of events, but the persons involved may not be representative of the general population. Together, these sources suggest that the incidence of HIV peaked around 1987, at which time behavioral changes began to take hold, and the subsequent decline in incidence was accelerated when condom use became common. Considered in tandem with analyses of data from elsewhere in Sub-Saharan Africa, the findings suggest that “giving a strong emphasis to partner reduction while also encouraging condom use (and abstinence) is much more effective” in reducing HIV transmission than promoting condom use or abstinence by themselves, the researcher concludes.

–P. Doskoch

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Nigerian Women Would Like to Receive Social Support During Childbirth

Most pregnant women receiving antenatal care at a Nigerian hospital said they would prefer to have someone with them during childbirth to provide social support, a practice not allowed in many Nigerian facilities.¹ Although 86% said their husband would be their preferred companion, 67% indicated that they would be happy to have their mother or another relative with them. Professional women, those belonging to minority ethnic groups, and those without children were more likely than other women to want someone to accompany them in the labor room.

As in many Sub-Saharan African countries, the availability and quality of maternal health care is often inadequate in Nigeria. Only one-third of Nigerian women have skilled birth attendants when they deliver, in part because obstacles such as poverty, health workers' negative attitudes toward patients, and policies prohibiting relatives from being in the labor room discourage women from delivering at public hospitals. As a result, many women rely on traditional birth attendants, who allow them to obtain social, emotional and other forms of support from family members or friends.

To assess pregnant women's attitudes about these types of support and identify related factors, the investigators surveyed a random sample of pregnant women aged 18–44 who were visiting an antenatal hospital clinic in Ibadan in August–November 2006. All women who were approached agreed to participate. In addition to providing information on social and demographic characteristics, the women answered questions about whether they wished to have support during delivery, their preferred sources of support and the types of support they desired.

The 224 respondents were, on average, 31 years old, and most worked outside the home as professionals (e.g., accountants or engineers; 28%), teachers (17%) traders (15%) or artisans (11%); relatively few were housewives (9%) or students (9%). The majority

(75%) had a postsecondary education. Three-quarters were Christian, and the remainder were Muslim. Nearly four in 10 were pregnant for the first time, and almost half had never given birth. One-fourth had had at least one abortion or miscarriage.

Overall, 75% of the women said they wished to have support during delivery. The proportion was higher among women with postsecondary education than among those with less education (79% vs. 66%), and higher among Christians than among Muslims (79% vs. 63%). The desire for support was greater among professionals than nonprofessionals (89% vs. 70%) and among members of minority ethnic groups than among Yoruba women (88% vs. 73%). Eighty-five percent of women who had never been pregnant, and 84% of those who had never given birth, preferred to have a companion, compared with 67–68% of those who had been pregnant before or had given birth.

Among women who wanted someone to accompany them during labor, the vast majority (86%) preferred their husband; seven percent chose their mother, while the remainder preferred a sibling, friend or someone else. However, 67% said they would be happy to have a relative with them during labor. About seven in 10 women were willing to pay extra to have a professional source of support, such as a doula. When asked about the kind of support they would desire most from their labor room companion, 80% of women cited emotional support (e.g., providing words of encouragement and comfort), 18% chose spiritual support (e.g., assuring them that God would protect them), 9% wanted someone who could run errands (e.g., fetching caregivers) and 7% desired physical support (e.g., massaging the patient's back).

In addition to receiving support during delivery, women said they wanted to be better prepared for giving birth. Three-quarters expressed interest in receiving information about labor, and more than half wanted the chance to visit the labor ward prior to delivery.

A multivariate analysis revealed that women who were professionals were more likely than others to want a companion during delivery (odds ratio, 3.1). The odds of wanting support were also elevated among women having their first child (3.6) and those who were members of a minority ethnic group (2.9). The only factor that was associated with favoring one's husband to other sources of support was education: The odds of preferring one's spouse were

three times as high among women who had a postsecondary education as among women who had less education (3.0).

Given that hospital staff in Nigeria are often overworked and ill-equipped to provide the support that patients desire, the researchers encourage public hospitals to give women the option of having a companion during labor and to provide educational materials prior to delivery. They note that having a companion of the same cultural background and prior knowledge of the labor process have been associated with reduced anxiety and labor pain. Husbands may have been women's preferred choice for a companion in part because most respondents were well-educated and thus more likely than other Nigerian women to be in monogamous marriages. The investigators recommend that men be included in future research, as "the question of whether Nigerian husbands are ready to be their spouse's doula/companion in labour remains unresolved."—*S. Ramashwar*

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Cameroonian Women Who Marry Later Have Increased Risk of HIV Infection

In Cameroon, women who marry later and those who have longer periods between age at first sex and age at first marriage have elevated rates of HIV infection, most likely because they have more partners than other women, according to a nationally representative survey.¹ Among married women aged 20-29, those who first married at age 20 or older are more likely than those who married by age 16 to be HIV-positive (odds ratio, 2.7), as are women who had longer periods between first sex and marriage (1.1 for each additional year). Women aged 20-24 have elevated odds of infection for each additional year between these two events (1.2), whereas they have reduced odds for each year they postponed having first sex (0.8). In addition, women of higher socioeconomic status are at elevated risk of HIV infection, as are those who report a greater number of lifetime sexual partners.

The study examined whether HIV risk among married Cameroonian women in their

20s varied by their age at first marriage or the length of time between first sex and first marriage. While previous studies in Cameroon have been limited to women living in large cities, this one was based on the 2004 Cameroon Demographic and Health Survey, a nationally representative survey and the first to include HIV testing. More than 90% of eligible women agreed to be tested, yielding a sample of 1,481 women with both interview data and conclusive HIV results. Age at first marriage was defined as the age at which a woman began living with a husband or consensual partner, and was categorized as 16 or younger, 17-19, or 20 or older. Initial regression analyses were conducted separately for place of residence (urban or rural) and age-group (20-24 or 25-29), and further analyses controlled for age, residence, household wealth, number of lifetime sexual partners and use of condoms at last sex.

Between 1991 and 2004, the median age at first marriage among Cameroonian women aged 20-24 rose from 17.3 to 18.3, and the interval between median age at first sex and median age at first marriage increased from 1.1 to 1.6 years. Nonetheless, nearly half (48%) of women in the current analysis had married by age 16. Age at first marriage varied by socioeconomic characteristics; women who were poorer, had less education and lived in rural areas married earlier. Mean age at first sex was 15.8, and it increased with higher age at first marriage. However, the number of lifetime partners was greater among those who married later, partly because of the longer duration of their premarital sex lives.

Eight percent of married respondents aged 20-29 tested positive for HIV. In multivariate analysis controlling only for current age, women who had first married at age 20 or older had higher odds of being HIV-positive than those who married by age 16 (odds ratio, 2.7); this was particularly the case among rural women (3.4). Among women aged 20-24, the odds of having HIV were reduced for each additional year they had postponed having first sex (0.8). In a similar analysis, the risk of being HIV-positive increased with each additional year between first sex and first marriage for the entire sample (1.1), as well as among rural women and those aged 20-24 (1.2 each).

Regression analysis that controlled for residence, wealth and several sex-related behaviors found no significant association between HIV infection and age at first marriage. How-

ever, household wealth and number of lifetime sexual partners were associated with infection: Women in the three highest wealth quintiles had higher odds of having HIV than did those in the lowest quintile (odds ratios, 2.7-3.4), and respondents' odds of infection increased with each additional lifetime partner (1.1). In a separate analysis, HIV infection was not associated with the number of years between first sex and first marriage, but it was again associated with being in the three highest wealth quintiles (2.8-3.5) and with having more partners (1.1 for each additional partner).

The researcher believes that the increased HIV risk among later-marrying women, as well as among those with a longer period of premarital sex, is mostly explained by the greater number of partners these women tended to have. Hence, he recommends that policy and program interventions focus on this premarital period, and specifically on reducing the number of partners. Furthermore, he warns that if the trend toward "long-term increase[s] in the age at marriage and the length of time between first sex and marriage in Cameroon" continues, "there will be an even greater need in [the] future to protect women during the premarital sexual period from contracting HIV," and effective interventions will require significant financial support.—*J. Thomas*

REFERENCE

1. Adair T, HIV status and age at first marriage among women in Cameroon, *Journal of Biosocial Science*, 2008, 40:743-760.

Correction

In the Digest section of the September 2008 issue, the head of the third item (p. 147) should be "Pregnancy and Marriage Are Not the Main Reasons for Leaving School in Africa." The erroneous head also appears in the Table of Contents.