

In Sub-Saharan Africa, Circumcised Men Are Less Likely Than Uncircumcised Men to Become Infected with HIV

Male circumcision substantially decreased the risk of HIV infection in two recent analyses of data from Sub-Saharan Africa. According to a meta-analysis that pooled data from 28 studies in eight countries, circumcised men are only about half as likely to contract HIV as men who have not been circumcised, and the protective effect of circumcision is even greater for men at high risk of HIV infection.¹ In addition, a population-based cohort study of HIV-negative men and HIV-discordant couples in rural southwestern Uganda found a lower incidence of HIV infection among circumcised men than among uncircumcised men.² Data from the HIV-discordant couples in that study suggest that male circumcision results in lower HIV infection rates among males, and may help to prevent male-to-female transmission when the HIV-positive male partner has a low viral load.

The Meta-Analysis

The authors identified 28 studies, reported in 22 papers published through April 1999, that examined the association between male circumcision and female-to-male transmission of HIV in Sub-Saharan Africa. These studies were conducted in eight countries and included 19 cross-sectional, five case-control, three cohort and one partner study.

Because the association between circumcision and HIV transmission could vary according to the background prevalence of HIV and other sexually transmitted diseases, the authors grouped studies using the following categories: population-based studies, studies of men at high risk of sexually transmitted infections, and other studies (e.g., factory workers, volunteers). They used the relative risk as the standard measure of risk; the odds ratio was substituted for studies where the relative risk was unavailable. A random effects meta-analysis was used to calculate all pooled results.

Crude (i.e., unadjusted) relative risks were available for 27 of the 28 studies. Fourteen of these studies showed a sta-

tistically significant protective effect of circumcision on risk for HIV. When the results of the 27 studies were pooled, circumcised men were only half as likely as uncircumcised men to be infected (relative risk of 0.52).

Fifteen studies reported relative risks adjusted for one or more confounders, such as age, ethnic group, sexual risk behaviors and presence of sexually transmitted diseases; circumcision was found to have a statistically significant protective effect in 10 of them. The pooled adjusted relative risk (0.42) showed a slightly stronger protective effect than the pooled crude estimate.

The authors also calculated pooled adjusted relative risks for the population-based studies and the high-risk studies. The pooled adjusted relative risk calculated from six population-based studies showed circumcision to be protective (0.56). For the 12 studies that calculated crude estimates for men at high risk for HIV, the pooled adjusted analysis using seven high-risk studies found a greatly reduced risk of HIV associated with circumcision (0.29). Sensitivity analyses suggested that the meta-analysis was not unduly influenced by either the study with the largest sample size or by publication bias.

The investigators argue that the significant variation in the relative risk estimates across studies might be expected, given the differences in factors that affect HIV transmission, particularly the prevalence of certain sexually transmitted diseases. They point to a number of weaknesses in the studies used in the meta-analysis, including the limitations of observational studies in establishing causality and the potential inaccuracy of circumcision status determined through self-report rather than through clinical examination, but assert that the evidence is nevertheless compelling. The investigators conclude that consideration should be given to the acceptability of providing safe male circumcision services as an additional HIV prevention strategy in areas

of Africa where men traditionally are not circumcised.

The Cohort Study

The data for analysis came from 5,507 HIV-negative men who participated in a trial of antibiotic treatment for sexually transmitted diseases conducted in 10 community clusters in rural southwestern Uganda between November 1994 and October 1998. These men were observed for a total of 10,231 person-years; HIV incidence per 100 person-years was used to calculate the rate ratio of HIV infection associated with circumcision. The investigators identified 187 HIV-negative men whose female partner was HIV-positive, in order to compare female-to-male transmission rates by circumcision status. In addition, male-to-female transmission rates were calculated based on 223 discordant couples in which the man was the HIV-positive partner.

More than four-fifths of the circumcised men were Muslim, compared with only 1% of uncircumcised men. Circumcised men were older and were more likely to have more than one wife and to abstain from alcohol. In the bivariate analysis, overall HIV incidence was lower for circumcised men than for uncircumcised men (rate ratio of 0.61). However, this association was not consistent across all subgroups. Circumcision at or before the age of 12 years was significantly associated with a decreased risk of HIV (0.54), but circumcision at 13 years of age or older was not. Similarly, circumcision was protective for selected subgroups such as ever-married men, those reporting no extramarital partners and those who abstained from alcohol consumption, but had no effect on other subgroups.

The authors used a multivariate Poisson regression model to obtain a rate ratio adjusted for age, marital status, age at time of circumcision, number of sex partners in the past year, exchange of sex for money or gifts, condom use and syphilis. Compared with uncircumcised men, circumcised men in general and men who had

been circumcised at or before the age of 12 years were only half as likely to become infected with HIV (adjusted rate ratios of 0.53 and 0.49, respectively). There was no significant association between HIV incidence and circumcision performed at or after 13 years of age. Having three or more sexual partners, testing positive for syphilis, and being 20–39 years old were associated with an increased risk of HIV, independent of circumcision.

The authors were unable to assess how religion affected the association between circumcision and HIV because more than 99% of Muslims reported being circumcised. Among the circumcised men in the study, Muslim men aged 20–29 years had a lower risk of HIV infection than their non-Muslim counterparts (rate ratio of 0.24). Compared with circumcised non-Muslims, circumcised Muslims were significantly younger, were less likely to drink alcohol or to have ever married, and were more likely to have been circumcised before puberty and for religious rather than health reasons.

In the 187 discordant couples in which the woman was the HIV-infected partner, circumcision appeared to be extremely protective: No circumcised men became infected with HIV, while the HIV incidence among uncircumcised men was 16.7 per 100 person-years. This association was present regardless of the female partner's viral load. Among the 223 discordant couples in which the male was the HIV-positive partner, circumcision was significantly associated with lower HIV transmission to female partners only in the subgroup in which the male's viral load was less than 50,000 copies per milliliter. Male-to-female transmission rates were similar for circumcised and uncircumcised men with viral loads above 50,000 copies per milliliter.

While noting that their results suggest that circumcision has a protective effect against HIV infection for men, the authors caution that this effect was not observed in all subgroups and that "the interpretation of these observational data on circumcision [is] complex." They point out that because Muslim affiliation is highly correlated with circumcision and is also associated with behaviors likely to lower the risk of HIV infection, "it may be impossible to determine the effects on reduced HIV incidence caused by Islamic religion and culture from the separate biological effects of circumcision per se." They cited reasons for circumcision and misclassification of reported circumcision status as other potential sources of bias.

Conclusion

According to the authors, these studies break new ground in the investigation of a possible association between male circumcision and HIV incidence: The meta-analysis improves on the methodology and scope of its most recent predecessor, and the cohort study is the first to be conducted using a "representative, population-based cohort."

The authors of the meta-analysis conclude that it provides "compelling evidence of a substantial protective effect of male circumcision against HIV infection in Sub-Saharan Africa," especially among men at high risk for HIV, and recommend that feasibility studies and randomized trials be done to explore the potential of male circumcision as an HIV prevention strategy. The authors of the cohort study are more cautious in interpreting their data, saying only that "male circumcision may protect HIV-negative men from acquiring HIV infection to varying degrees." They suggest that clinical trials are needed before circumcision can be promoted as a means of HIV prevention, but also acknowledge the "major difficulties in design and execution" and "ethical obstacles" that such trials present.—*A. Hirozawa*

References

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Characteristics of Mother, Child Linked to Postnatal HIV Transmission Risk

Among infants born to HIV-positive mothers, those who are breastfed for more than 15 months or who develop oral thrush within six months after birth have an elevated risk of postnatal infection. Their risk is also increased if their mother has nipple or breast lesions during breastfeeding or if her immune system is compromised, according to a study of 412 exclusively breastfed children born to HIV-positive mothers in Nairobi, Kenya.¹

The large majority of childhood cases of HIV-1 infection are acquired from the child's mother, whether before, during or after birth. Though measures such as antiretroviral medications and avoidance of breastfeeding reduce mother-child transmission, these interventions are often unavailable or impractical in the low-income

countries where the burden of HIV is highest. For example, parents in these countries generally cannot afford antiretroviral medications or breast-milk substitutes, nor can governments afford to provide them to all the women who need them. Identifying the risk factors in mothers and children that place a child at particularly high risk for contracting HIV after birth and that are amenable to intervention may allow limited resources to be used to the greatest effect.

To identify these risk factors, researchers followed 412 children born to seropositive mothers at a large maternity hospital in Nairobi for several years, with 871 infants born to seronegative women forming a control group. The HIV status of the mother and child were determined at the time of delivery; at frequent follow-up clinic visits, clinicians rechecked HIV status, performed CD4 cell counts and examined both mother and baby. None of the women or children received antiretroviral medications.

Children were generally classified as having acquired HIV postnatally if they seroconverted after testing negative for HIV for at least three months after birth. Only children who were followed for at least 12 months were included in the study analysis. Of the 412 children born to HIV-positive mothers, 37 became infected in the postnatal period, 51 became infected at or before birth and 310 remained HIV-negative.

In a bivariate analysis, maternal nipple lesions (usually cracked nipples) during breastfeeding and breastfeeding for more than 15 months more than doubled the risk of infant infection (odds ratios of 2.3 and 2.4, respectively), while breast inflammation (mastitis) and infant oral thrush before six months of age almost tripled the risk (2.7 and 2.8, respectively). Moreover, the odds of HIV infection among infants whose mother had a CD4 cell count of less than 400 mm³ were more than four times those of other infants. Of 12 children born to women who seroconverted while breastfeeding, five became infected, suggesting that timing of maternal seroconversion is an important risk factor. Nevertheless, the number affected was too small for meaningful analysis.

In a multivariate logistic regression analysis, the effects of low maternal CD4 cell count, infant oral thrush before six months of age, breastfeeding for more than 15 months and maternal mastitis or breast lesions remained significant. The analysis indicated, however, that children who were breastfed for more than 15

months did not have the same increased risk of infection from maternal nipple or breast lesions as did those who were weaned before that point. The researchers surmise that perhaps only lesions serious enough to cause a mother to shorten the duration of breastfeeding affect the risk of HIV transmission.

The authors point out that several of the risk factors identified in their analysis are amenable to intervention. They note, for example, that treating infants against thrush at birth could lower the risk of HIV infection by preventing thrush-related inflammation of the oral and gastrointestinal tract. The investigators also suggest that mothers should be counseled on ways of preventing nipple cracking and on the importance of seeking prompt treatment for the condition. Where early weaning is feasible, they say, it should be encouraged. They stress, however, that since no screening or intervention program can totally prevent transmission of HIV from mother to child, the most effective means is the prevention of maternal infection.—*A. Brochert*

Reference

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Prevention of Unwanted Births in India Would Result In Replacement Fertility

Women in India can expect to have nearly three births if current rates of fertility hold. Should women have only wanted births, however, India's total fertility rate (TFR) would drop by 25%, to replacement level (2.1 lifetime births). According to the 1998–1999 National Family Health Survey (NFHS-2),¹ while nearly one-half (48%) of currently married women aged 15–49 practice contraception, one method—female sterilization—predominates, accounting for 71% of all use.

The sample for the 1998–1999 NFHS-2 in India, whose population crossed the one billion mark in May 2000, includes more than 90,000 ever-married women aged 15–49. The majority are Hindu (82%), live in rural areas (74%), had not worked in the year before the survey (61%) and are illiterate (58%). At the time of the survey, 94% were married. The survey provides data on castes, tribes or classes the government has designated as socially and economically deserving of protection—18% of the sample belong to an especially disadvantaged caste, 9% to a similarly

disadvantaged tribe and 32% to still other underprivileged classes (designated as “other backward classes”). The remainder (39%) are in middle and higher castes or do not belong to any caste or tribe.

Marriage

Although the median age at first marriage has been rising in India, it has reached only 16.7 years for women aged 20–49—more than one year below the country's legal minimum marriageable age (18 years). Because the traditional custom of *gauna*, in which a husband and wife delay moving in together following their formal marriage, is still followed in some parts of the country, the median age at first cohabitation (17.4 years) is almost one year later than the age at first marriage. Among women aged 25–49, urban women are two years older than rural women when they first move in with their husband (18.6 vs. 16.6), and high school graduates are more than five years older than illiterate women when they do so (21.5 vs. 16.0).

Fertility and Fertility Preferences

For the three years preceding the 1998–1999 survey, the TFR in India was 2.9 lifetime births per woman. This represents a 16% decline from the rate (3.4 lifetime births) recorded in the 1992–1993 National Family Health Survey. The overall TFR masks large differences between states. State TFRs range from below-replacement fertility of 1.8 births in Goa and 2.0 in Kerala to 4.0 in Uttar Pradesh and 4.6 in Meghalaya.

Overall TFRs vary comparatively less by urban or rural residence (a difference of 0.8 births) than by education (a difference of 1.5 births between the least- and most-educated women in the sample). Moreover, by the end of their reproductive years, Muslim women can expect to have more births (3.6) than either Hindu (2.8) or Christian women (2.4).

These differentials in total fertility are echoed in differentials in the median age at first birth. While 25–49-year-old women overall have their first birth at age 19.4, those living in urban areas are 1.6 years older at their first birth than are rural women (20.6 vs. 19.0). High school graduates are 4.8 years older than illiterate women when they first give birth (23.3 vs. 18.5), and women with a high standard of living have their first baby nearly three years later than do women with a low standard of living (21.2 vs. 18.5).

The national TFR of 2.9 is fairly close to the mean number of children that Indian women consider ideal—2.7. This ideal

family includes proportionately more boys than girls—that is, 1.4 sons, one daughter and 0.3 children of either sex. Although 78% of the births occurring in the three years preceding the survey were wanted at the time of conception, 12% were wanted later and 9% were not wanted at all. The proportion of unwanted births was highest among 40–49-year-olds (42%) and among women who already had at least four children (25%). The total wanted fertility rate, which represents the level of childbearing that would result if all unwanted births could be prevented, is 2.1 lifetime births, or 25% fewer than the actual TFR.

Overall, only 30% of women want to have another child (15% want one within two years, 13% want one within a longer period of time and 2% are undecided about the timing), and 28% are still fecund and do not want any more children. An additional 36% have been sterilized or are protected from further childbearing by their partner's vasectomy.

Although the proportion of women wanting at least one son (85%) and the proportion wanting at least one daughter (80%) are similar, son preference still plays a prominent role in Indian women's fertility preferences. For example, among women with two living children, the proportion wanting more children is far greater among those with two daughters (53%) than among those with two sons (17%) or those with one son and one daughter (24%). Women who do not have a daughter are twice as likely to want to stop childbearing as are those who do not have a son (41% vs. 20%). Moreover, when asked the preferred sex of their next child, the proportion preferring a boy was more than four times that preferring a girl (47% vs. 11%). Twenty-eight percent of women said that it does not matter; the remaining 15% left it “up to God.”

Contraceptive Knowledge and Use

Almost all (99%) currently married women in India know of a modern method of contraception. The most widely known methods are female sterilization (98%) and vasectomy (89%). The three modern spacing methods asked about—the pill, IUD and condom—are known by 71–80% of women. Only 49% know of at least one traditional method.

Almost one-half (48%) of currently married 15–49-year-olds were using a method of contraception at the time of the survey, and 55% had used one at some time in their lives. The national contraceptive prevalence rate hides wide differences in

state prevalence rates, which range from 20% for women in Meghalaya to 68% for women in Himachal Pradesh. State contraceptive-use patterns do not always follow state fertility patterns, largely because contraceptive use is only one of the factors that affect fertility. For example, Goa has a contraceptive prevalence rate of 48% (the same as the national average), even though it has the lowest TFR in the country (in part because of the relatively high age at first marriage in Goa, 23 years).

Female sterilization dominates contraceptive use in India and is used by 34% of currently married women, accounting for 71% of all use. The next most popular methods are the condom or rhythm (used by 3% each) and the pill, the IUD or the partner's vasectomy (2% each). (Reliance on vasectomy has declined over time, as only 2% of all sterilizations performed within the nine years before the survey were male procedures, compared with 10% of all sterilizations performed 10 or more years prior to the survey.)

The median age at female sterilization in India is 25.7 years. Muslim women are much less likely to be sterilized than are either Hindu or Christian women (20% vs. 36–37%). In addition, women who have not finished middle school are far more likely than high school graduates to be sterilized (41% vs. 26%).

In line with the dominance of female sterilization in India's method mix, the most important sources of modern methods are government and municipal hospitals (46%). Overall, 76% of modern-method users obtain their method from a public provider, 17% from a private provider and the remaining 5% from other sources, such as nonspecialized shops.

Overall, 16% of currently married Indian women are categorized as having an unmet need for family planning,* with equal proportions of that need for methods to limit births (8%) and for methods to space births (8%). If India's unmet need for contraception were met, overall prevalence would reach 64%, an increase of one-third.

Maternal and Child Health

Although both infant and child mortality have been declining steadily, in the 10-year period preceding the survey, 73 of every 1,000 babies died before their first birthday, and 101 died before they were five years old. The mortality rate among

*Unmet need is the proportion of married women who are fecund and at risk of pregnancy—and who do not want any more children or want to wait at least two years before having another child—but are not using any contraceptive method.

children younger than five is 70% higher in rural than in urban areas, and 29% higher among Hindus than among Muslims (mostly because Muslims are more likely to live in urban areas). Rates of child mortality also fall precipitously with increasing education—i.e., from 123 child deaths per 1,000 among babies born to illiterate women to 37 per 1,000 among those born to high school graduates.

The mothers of 34% of the babies born in the three years preceding the survey had had no prenatal check-ups; the main reasons were that such check-ups were considered unnecessary (60%) or too costly (15%), and because the family would not grant the woman permission to have them (9%). Among women who did have a prenatal check-up, the median number was 2.8. Overall, most Indian women (53%) gave birth in their own home, while 17% did so in private health facilities, 16% in public health facilities and 12% in their parents' home.

Sexual and Reproductive Health

Responses to a module on reproductive health indicate that 36% of ever-married women experienced abnormal vaginal discharges or symptoms of a urinary tract infection in the three months preceding the survey. Overall, 39% reported at least one reproductive health problem. Sixty-six percent of women with a reproductive health problem, however, did not seek any advice or treatment for it.

Knowledge of AIDS is quite low in India, which, because of its size, currently is among the two countries with the most HIV-infected people in the world. Only 40% of ever-married women had ever heard of AIDS. Of women who know of the syndrome, 33% could not mention any way of avoiding it; another 40%, however, believed that AIDS can be prevented by having sex with only one partner, 30% by using clean needles or avoiding injections, and 25% by avoiding sex with prostitutes. Just 20% mentioned condoms as a way of avoiding AIDS.

Domestic Violence

The majority of Indian women (56%) agree with at least one reason that would justify a husband beating his wife. The most commonly endorsed reasons are that the wife neglects the home or the children (40%), that she goes out without telling her husband (37%), that she shows disrespect for her in-laws (34%), that she is suspected of being unfaithful (33%) and that she does not cook food properly (25%). In terms of experience, 21% admit to ever

having been beaten or physically mistreated at age 15 or older (90% by their husband), with 11% having been abused within the past year.—*L. Remez*

Reference

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For Breech Births, Cesarean Section Poses Fewer Risks Than Vaginal Delivery

Planned vaginal delivery holds significantly higher risks than planned cesarean section for term infants in breech presentation.¹ According to data from a multinational randomized trial, infants scheduled to be delivered by cesarean section are 77% less likely to die and 64% less likely to experience serious neonatal health problems than are those scheduled to be delivered vaginally. The type of delivery planned, however, does not affect the occurrence of serious maternal complications or death.

The analysis included 2,083 women with a term pregnancy who were enrolled at 121 centers in 26 countries around the world between January 1997 and April 2000. Women were eligible to participate in the study if their fetus was in a frank or complete breech presentation.* They were excluded if there was evidence that the fetus was too large to pass through the mother's pelvis, if the fetus was clinically large or weighed 4,000 g or more, if the fetal head was hyperextended, if there was evidence of a fetal anomaly or of any condition that could cause difficulties in delivery, if there was a contraindication to labor or vaginal delivery, or if the fetus had a lethal congenital anomaly. Participating women were randomly assigned to either planned cesarean section or planned vaginal birth.

The 1,041 women allocated to planned cesarean section were scheduled for delivery at 38 weeks of gestation or later. For a variety of reasons, however, 100 women in this group delivered vaginally. Among the 1,042 women allocated to planned vaginal birth, 451 were delivered by cesarean section; these switches occurred primarily because of problems during labor, because of contraindications to vagi-

*A fetus in breech presentation is positioned buttocks down rather than head down. In complete breech presentation, its hips and knees are flexed, but the feet are not below the fetal buttocks. In frank breech presentation, the hips are flexed and the knees extended.

nal delivery or because of patient or physician preference.

Both groups were monitored for perinatal or neonatal mortality within 28 days after birth, for serious neonatal morbidity and for maternal mortality or serious morbidity within six weeks after delivery.

A total of 21 infants died, five of whom were excluded from all analyses because death was caused by congenital defects. Of the other 16 deaths, six were linked to difficult vaginal delivery, four to fetal heart-rate abnormalities during labor and six to a variety of other problems; these 16 infants were excluded from analyses of neonatal morbidity.

Overall, the risk of perinatal or neonatal mortality or serious neonatal morbidity was 67% lower in the planned cesarean section group than in the planned vaginal birth group. When these outcomes were examined in separate analyses, the risk of death during the perinatal or neonatal period was 77% lower among infants whose

mothers had been randomized to the planned cesarean section group, and the risk of serious morbidity was 64% lower. No significant differences were found between the two groups in serious maternal morbidity or maternal mortality.

Thirteen of 14 subgroup analyses designed to assess the generalizability of the findings found no interactions between the women's characteristics and the planned method of delivery. However, the reduction in the risk of any perinatal or neonatal problem was much greater in countries that had a national perinatal mortality rate of no more than 20 deaths per 1,000 births than in those that had a perinatal mortality rate of more than 20 deaths per 1,000 (93% vs. 34%), as was the reduction in the risk of serious neonatal morbidity (92% vs. 8%).

The investigators point out that although this clinical trial was restricted to facilities with physicians skilled in vaginal breech delivery, the infants of women

randomized to planned cesarean section were less likely to die or to experience poor neonatal outcomes than were those of women assigned to planned vaginal birth. A policy of planned cesarean section, they estimate, would save one baby from death or serious morbidity for every 14 additional cesarean sections performed; the number of additional cesareans needed to prevent one infant from having an adverse outcome could be as low as seven in countries with low perinatal mortality or as high as 39 in countries with high perinatal mortality. The researchers conclude that "a policy of planned vaginal birth is no longer to be encouraged for singleton fetuses in the breech presentation."—*F. Althaus*

Reference

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Risk of Mother-Child Transmission of Syphilis Is Elevated if the Woman Has Clinical Signs of Disease

Four percent of Bolivian women giving birth to live-born children have laboratory-confirmed maternal syphilis. According to a study project that involved maternity patients in seven hospitals in Bolivia,¹ 14% of the live-born infants born to infected women had confirmed congenital syphilis. Women with less than a high school education and those with a history of syphilis were more likely, once other potentially confounding factors were controlled, to have been diagnosed with syphilis at delivery than were other women. In contrast, women who had watched television in the previous week (a proxy for socioeconomic status) were less likely than others to have syphilis. Infected women with clinical signs of disease were more likely to transmit syphilis to their children.

Maternity patients who delivered from June through November 1996 in seven participating hospitals in the cities of La Paz, El Alto and Cochabamba were eligible for the study, which was designed to identify the factors affecting the risk of maternal and congenital syphilis. Overall, 1,428 women with a live birth agreed to participate.

Women and their infants were tested for syphilis at the time of delivery. Blood samples were taken from women and from their newborn at birth, and hospital staff were trained to analyze the samples on-site using rapid plasma reagin testing. The

samples were sent for both repeat testing and for additional confirmatory testing to one of two established reference laboratories in Bolivia, to assess the accuracy of the on-site diagnoses made by the newly trained hospital staff.

Moreover, a small proportion of the blood samples, and the umbilical cord samples collected from babies whose mothers had syphilis, were sent to the U.S. Centers for Disease Control and Prevention (CDC) in Atlanta for further testing. The researchers examined standardized prenatal records to determine whether women had been tested for syphilis during a prenatal care visit.

Most of the women (76%) had received some prenatal care, but only 17% had documentation of syphilis testing during their pregnancy. Overall, 61 women (4%) tested positive for syphilis at delivery; only 5% of these women had physical signs (such as rash or genital ulcers) indicative of syphilis infection. (Forty-three additional maternity patients whose babies were stillborn also participated in the study; 11 of these women—26%—tested positive for syphilis at the time they delivered.) The rapid results from on-site hospital testing agreed with the Bolivian reference laboratory results and with the CDC results at least 94% of the time.

Bivariate analysis showed that a confirmed diagnosis of maternal syphilis was

significantly more likely if the woman spoke an indigenous language and if she had not finished high school or if her steady partner had not done so. That likelihood was also increased if she had not received prenatal care, if she had a history of syphilis, if she earned a below-average monthly income, if she had had more than one partner during her pregnancy and if she had not watched television during the past week.

Once the effects of all of these variables were controlled for, only four were independently associated with the risk of a laboratory-confirmed syphilis diagnosis among women delivering a live-born child. Three factors significantly raised that risk—not having finished high school (odds ratio, 3.1), having had a previous diagnosis of syphilis (6.7) and having had more than one partner during pregnancy (28.5). One factor, having watched television in the past week, significantly lowered the likelihood of maternal syphilis (odds ratio, 0.5).

Among the babies born to women with syphilis, eight of the 57 whose umbilical cords were tested (14%) were confirmed as having congenital syphilis. Mothers whose children were infected were more likely than those whose children were not to have physical signs of syphilis, and they were less likely to have a stable partner at the time at delivery; the two groups of women, however, did not differ by lan-

guage spoken at home, by educational attainment, by receipt of prenatal care, by area of residence (urban or rural) or by age. Among infants born to women with syphilis, those who had a confirmed diagnosis were more likely than those who did not to be underweight at birth and to be born prematurely.

According to the investigators, the study had several limitations that might lead to an underestimate of the incidence of maternal and congenital syphilis—its hospital-based setting in a country where 40% of births occur outside of hospitals; a low participation rate at some hospitals; and higher rates of low birth weight or

prematurity (which may be caused by syphilis) among nonparticipants than among participants.

The researchers note that high rates of agreement between the results of the participating hospitals and the reference laboratories led to the development of a national syphilis prevention program in Bolivia involving free routine syphilis testing for pregnant women and free treatment with penicillin. They recommend that programs in other resource-poor settings adopt the following measures: offer low-cost on-site syphilis testing during prenatal care to yield same-day results, followed by immediate treatment; teach

providers that in high-prevalence areas, treatment can be initiated on a diagnosis from rapid plasma reagin alone (without additional confirmatory testing); treat any infant, with or without symptoms, born to a woman diagnosed with syphilis at delivery; develop a culturally appropriate partner-notification system; and devise a national reporting system of all cases of maternal and congenital syphilis.
—L. Remez

Reference

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In Rural Gambia, Men's Marital and Reproductive Patterns Differ Sharply from Those of Women

Men and women in rural Gambia have very different fertility patterns, with men becoming fathers later, having more children and doing so later in life than women, according to a study of nearly 3,000 men and women in 21 villages in the Gambia.¹ During a four-year period, men's total fertility rate was 12.0 lifetime births per man, while women's was 6.8 lifetime births per woman. Men achieved higher fertility than women through serial and polygynous marriages. Among men who gave a specific number, the total mean desired number of children was 15.2 and the total mean desired number of children with each wife was 7.3; the mean desired age at the birth of their last child was 68.

From a set of 40 villages surrounding Farafenni, one of the largest of the Gambia's 15 towns, the researchers identified 21 representative villages, based on size, socioeconomic status, distance from town and ethnic composition. Between February and June 1998, they conducted interviews with 1,315 men aged 18 or older and 1,621 women aged 15–54.

The questionnaires covered marriage and pregnancy history, including infant mortality and current residence of living children, proximate determinants of fertility for women, and marriage and fertility intentions for men. Respondents also were asked the name of the other biological parent for each pregnancy, and men were asked separate questions regarding extramarital relationships and any resulting births. In April 1999, the researchers conducted qualitative interviews with 15 men about their marriage and fertility intentions.

At the time of the interview, men's mean age was 41 and women's was 31.

Men reported 1,985 marriages and women reported 1,615. Of the respondents who were married, 40% of men and 54% of women were in polygynous relationships. The men reported 6,152 live births and women reported 5,962. No men younger than 20 reported being responsible for a live birth. Ninety-three percent of currently married women had been pregnant at least once; the mean number of pregnancies among these women was 5.2.

Compared with women, men married and began having children later in life, had more children and had children at later stages in life. For men, the average age at first marriage was 25, and they fathered their first child between ages 20 and 24; for women, the average age at first marriage was 15, and childbearing began between ages 15 and 19.

For the period 1993–1997, the total fertility rate was 12.0 lifetime births per man and 6.8 lifetime births per woman. While women's childbearing peaked between the ages of 25 and 29 and tapered off after age 50, men's fertility peaked between the ages of 45 and 49 and continued through their early 70s. Ten percent of men between ages 60 and 74 were responsible for a birth every year while they were in that age-group. Men reported 1,430 current marriages, 61% of which were polygynous; on average, they had married 2.1 times. Men continued to marry throughout their lives and, based on the total marriage rate, the average man in the sample had three marriages. By the time they were 40–45 years old, almost all of the men had married for the first time. By age 35, more than 20% of the sample had more than one wife, and by age 50, more than half had more than one.

Almost all women in the sample were

married by the time they were between ages 25 and 30; by the time women were 30 years old, half had at least one co-wife. Women in polygynous relationships reported an average of 1.3 co-wives.

Thirty-five percent of the men said they would like to marry within one year. When researchers asked men about their desired number of additional children, 36% responded that this number was “up to God”; 23% gave this response when researchers asked them how old they would like to be when their last child was born. Among those who provided specific numbers, the mean number of additional children they desired was 9.1 and their mean desired age at the birth of their last child was 68.

The men had very different expectations for male and female fertility. Researchers asked men about their desire for additional children with each of their wives. The married men who gave a specific number for their own fertility wanted an average of 8.7 more children and an average total of 15.2 children. On average, these men desired each of their wives to have an additional 3.7 children and an average total per wife of 7.3 children.

The subsample of 15 men who participated in the qualitative interviews did not favor trying to limit births or to have a certain number of children because they believed they should welcome the number of children they were given. They also explained that while God grants fertility, marriage is their own responsibility.

The investigators note that men's fertility preferences place a heavy burden on their wives to contribute to their husband's fertility goals and conclude that “men use the vehicle of marriage as the principal means of spreading their reproduction

over a wide age range and increasing the total number of their offspring.”

According to the researchers, additional studies that include men and examine their reproductive experiences are needed to develop a greater understanding of “how reproduction and reproductive interests are negotiated between the sexes.”

They also recommend development of policies that would promote reduced fertility goals among men as one way to encourage smaller families in West African countries. In addition, the researchers say that the complex nature of marriage in these societies requires interventions that “consider the circumstances of individu-

als in the changing contexts of their unions.”—*B. Brown*

Reference

1. Ratcliffe AA, Hill AG and Walraven G, Separate lives, different interests: male and female reproduction in the Gambia, *Bulletin of the World Health Organization*, 2000, 78(5):570-579.
