

## Unintended Pregnancy Is Linked to Inadequate Prenatal Care, but Not to Unattended Delivery or Child Health

Pregnancy intention status has little or no effect on medical supervision at delivery, child vaccination or adequacy of growth, once the impact of socioeconomic and demographic characteristics is accounted for; intendedness does appear to independently affect the odds of obtaining adequate prenatal care, however. According to an analysis of Demographic and Health Survey data from five developing countries, only in Peru was unwantedness at conception consistently associated with deficits in all four health indicators.<sup>1</sup> Such associations were less consistent in the other four countries studied, where birth order appears to exert a stronger effect than intention status on maternal and child health outcomes.

The analysis is based on Demographic and Health Survey data from Bolivia (1998), Egypt (1995), Kenya (1998), Peru (1996) and the Philippines (1998). Women who had had a live birth in the previous five years (three years for Kenya) were asked whether, at the time they conceived, they had wanted to be pregnant, would have preferred to wait until later or did not want any more children; unintended conceptions ending in births are thus referred to as mistimed or unwanted births. The investigators used logistic regression to examine whether intendedness at conception influenced whether the woman received inadequate prenatal care (none before the sixth month of gestation) or gave birth outside of a medical institution or without professional supervision. They also investigated whether children whose conception was unintended suffered adverse health effects by assessing the odds of incomplete vaccination coverage (among children aged one or older) and inadequate growth (among all living children).

### Descriptive Data

Unintended (unwanted plus mistimed) births were most common in Peru and least common in Egypt (58% and 29%, respectively, of all births). The proportion of all births that were unwanted ranged from 11% in Kenya to 37% in Peru, and the proportion that were mistimed varied from 10% in Egypt to 39% in Kenya. In

every country, unwanted births became more frequent as birth order increased and mistimed births became less frequent as the interval between births lengthened.

In all five countries, both inadequate prenatal care and unsupervised deliveries were significantly more common for unwanted than for wanted births. Some 27–71% of women who had an unwanted birth had received inadequate prenatal care, compared with 21–65% of those with a wanted birth. In addition, 56–62% of unwanted births were unsupervised by a medical professional, compared with 40–55% of wanted births.

In all countries except Bolivia, children who had been unwanted at conception were significantly more likely not to have been vaccinated by age one. In the four other countries, 21–52% of children who had been unwanted at conception lacked full vaccination coverage, compared with 18–36% of wanted children. In contrast, inadequate growth was related to unwanted conceptions only in Bolivia and Peru, where 34% of children unwanted at conception were stunted, compared with 22–24% of wanted children.

### Multivariate Analyses

In the analysis examining factors affecting the odds of receiving inadequate prenatal care, maternal education had a large, monotonic effect: The odds were 5–16 times as high among the least educated women as among the most educated women. Moreover, in all countries except Peru, birth order had a large independent and positive effect (i.e., the odds of inadequate care were significantly elevated for fifth- or higher-order births), and in Bolivia, Egypt and Peru, the odds of inadequate prenatal care were significantly higher in rural areas than in large cities (1.4–5.4). In all countries except Kenya, women living in the poorest households had significantly higher odds of inadequate prenatal care than those in the richest households (1.7–3.4).

Net of the effects of these variables, Peruvian and Philippino women whose pregnancy was unwanted had independently elevat-

ed odds of having received inadequate prenatal care (odds ratios, 1.4 and 1.2, respectively). Unwantedness had no significant effect on the odds of inadequate prenatal care in Bolivia or Kenya; however, it had a negative effect in Egypt (0.8). In addition, in Kenya, Peru and the Philippines, women with a mistimed birth had higher odds of inadequate prenatal care than those with a wanted birth (1.2–1.3).

Like inadequate prenatal care, unsupervised delivery was associated with higher birth order, lower maternal education, lower household wealth and rural residence. Once the effects of these factors were accounted for, Peruvian women whose pregnancy was unwanted had elevated odds of delivering without professional supervision (1.2); however, the odds for Egyptian women with an unwanted pregnancy were reduced (0.8).

The logistic regressions examining child health outcomes included additional controls for the age and sex of the child. The effects of specific socioeconomic characteristics on vaccination coverage and stunting varied widely by country. The effects of pregnancy intention status on vaccination were significant in Egypt, Kenya and Peru, however. For example, the adjusted odds of not having received the full set of vaccinations were significantly elevated among Kenyan and Peruvian children who had been unwanted at conception (1.6 and 1.2, respectively) and among Egyptian children whose conceptions had been mistimed (1.4). No independent association emerged between intendedness and vaccination coverage in Bolivia or the Philippines. Finally, the odds of stunting among children who were unwanted at conception were significantly elevated only in Peru (1.2). (No data were available on this outcome from the Philippines.)

Because unwantedness showed significant interactions with all explanatory variables, the authors stratified the women within each country by both educational level and area of residence. The results were broadly similar to those for the sample as whole.

The authors note that intendedness at conception is difficult to measure precisely. How-

ever, their findings of rising levels of unwantedness with birth order and of mistimed births with birth interval length “demonstrate that these concepts are understood by many women and ... merit serious analysis.” According to the investigators, their key result is the lack of consistent associations between intendedness and three of the four outcomes studied (i.e., unsupervised delivery, incomplete vaccination and stunting). This inconsistency reflects the interrelatedness of intendedness and birth order, given that birth order appears to have an even “stronger and more pervasive influence” than intendedness.

The authors speculate that higher-order children in large families are at a health disadvantage compared with their first- and second-order siblings, and that large benefits for maternal and child health will accrue with the transition to smaller families. In the case of Peru in particular, where unwantedness was consistently associated with all four adverse health outcomes, improved contraceptive use “should lead to improvements in obstetric and child care, and in child growth.”—*L. Remez*

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## In Bangladesh, Women’s Risk of Domestic Violence Is Linked to Their Status

In rural Bangladesh, a married woman’s risk of experiencing domestic violence is associated with her individual autonomy, as well as the autonomy of women within her community.<sup>1</sup> In the more culturally conservative of two study areas, women who had been a member of a credit group for less than two years were more likely than nonmembers to report current physical abuse (odds ratio, 1.3), and the greater a woman’s autonomy, the higher her odds of being abused (1.6). However, in the less culturally conservative area, the proportion of women in a community participating in a credit group and female autonomy at the community level were linked to a reduced risk of domestic violence.

Using data from a 1993 family planning survey of 10,368 currently married women aged 15–49 living in Sirajgonj and Jessore, researchers examined the relationship between

women’s status and current domestic violence—defined as beating by their husband or his family. Indicators of women’s status at the individual level were membership in a savings and credit group and an autonomy score based on women’s responses to five questions about their mobility, familial decision-making power and control of resources. Community-level indicators included the proportion of women in the community who belonged to a credit group and the mean female autonomy score. Multivariate logistic regression analyses controlled for the study area; number of living sons; woman’s age, religion and education; husband’s education; land ownership; family structure; and community level of female education.

Of the women surveyed, 42% reported current physical abuse—47% in Sirajgonj and 39% in Jessore. The proportion of women who had been abused exceeded 50% in about one-half of the communities in Sirajgonj, compared with only one-fifth of communities in Jessore. Nine in 10 women who had experienced physical violence said that attacks were occasional, whereas one in 10 said they were frequent.

Multilevel logistic regression analysis of combined data from the two areas revealed that women in their 20s and Muslims had a significantly higher risk of physical abuse than did women younger than 20 and non-Muslims, respectively. The risk was reduced if a woman’s husband had at least six years of schooling, if she had received at least some schooling and if she belonged to an extended family; also, the greater the household’s land holdings, the greater the reduction in domestic violence. Furthermore, a woman’s level of autonomy had a positive association with physical violence, whereas the proportion of women in a community belonging to a credit group and a community’s average level of female autonomy showed a negative association.

According to the researchers, Sirajgonj is often geographically isolated because of flooding and poor road and communication systems, and it is more culturally conservative than Jessore, which lies next to and trades with India. Compared with women in Sirajgonj, where purdah is strictly followed, women in Jessore more commonly said they had been to a market in the past six months (33% vs. 20%), were not Muslim (19% vs. 3%), had received schooling (42% vs. 29%) and were married to men who had received schooling (58% vs. 38%). Moreover, a higher proportion of women in Sirajgonj than of women in Jessore reported not having permission to talk to male

nonrelatives (23% vs. 14%).

When data from the two study areas were analyzed separately, women’s education, household land ownership and having an extended rather than nuclear family were associated with a reduction in physical violence in both areas. In Jessore, age, religion and husband’s education showed associations similar to those in the combined analysis. However, only in Sirajgonj were individual-level status indicators—a woman’s membership in a credit group for less than two years and her level of autonomy—positively linked to abuse (odds ratios, 1.3 and 1.6, respectively). In contrast, community-level factors were significant only in Jessore, where an increase in the prevalence of credit group membership and an increase in average level of female autonomy reduced the risk of domestic violence.

The investigators suggest that in the conservative setting of Sirajgonj, an increase in female autonomy has a “destabilizing effect” on the relationship between a woman and her husband or his family, thereby increasing the risk of domestic violence. By comparison, in the less conservative district of Jessore—where changes in gender relations may already be underway, the researchers note—an increase in overall autonomy among women and membership in credit groups may act to strengthen women’s solidarity, thereby helping to discourage husbands from resorting to violence in the home. The researchers conclude that in rural Bangladesh, “the effects of individual and contextual aspects of women’s empowerment on violence vary significantly according to sociocultural conditions.”—*T. Lane*

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## Method-Related Problems Account for Most Failures Of the Female Condom

The female condom rarely breaks during use, but an efficacy study conducted in 1996–1998 indicates that slippage occurs in nearly one in 10 uses and women may be exposed to semen in up to one in five uses.<sup>1</sup> Although the risk of exposure is higher among women who have mechanical problems with the condom rather than acceptability problems or no problems,

about half of exposures occur during uses in which couples have no problems. A separate set of analyses using the same data set shows that women also have an increased risk of being exposed to semen while using the female condom if they are in a shorter-term relationship, if there is a large disparity between the size of their vagina and the size of their partner's penis, and if intercourse is very active.<sup>2</sup>

The study was conducted among women recruited from family planning clinics and a university population in Birmingham, Alabama. Women were eligible if they were aged 21–49, were using an effective nonbarrier method of birth control, were in a mutually monogamous relationship, had intercourse at least six times per month, were at low risk for sexually transmitted diseases, had a uterus and had used tampons. Women were trained to use the female condom, collect samples of vaginal fluid with swabs before and after intercourse, fill out a form documenting any problems during condom use and record details of intercourse in a coital log. The women returned used condoms, which were inspected to confirm use and detect tears. Researchers assessed semen exposure by comparing concentrations of prostate-specific antigen (PSA) in vaginal fluid collected before and after intercourse.

A total of 210 women participated in the training. The median age in this group was 27 years, and the median monthly income per household member was \$600. Most of the women were white, were married and had completed college. Half had been in their current relationship for at least four years, and half had intercourse at least 12 times per month. None of the women had previously used the female condom.

#### Method-Related Problems and Semen Exposure

In analyses of 2,232 female condom uses by 175 participants who returned at least one condom, women reported either mechanical problems, which could lead to method failure, or acceptability problems, which could result in discontinuation, during 25% of uses. The most common mechanical problems were that the condom rode on the penis (7% of uses), the condom slipped out of the vagina (6%) and the outer ring slipped inside the vagina (3%). Condoms rarely broke (fewer than 1% of uses). The most common acceptability problems were that the woman or her partner felt pain or discomfort (6% and 4% of uses, respectively) and the condom made noise (3%). Overall, problems were more common during the first five uses

than during subsequent uses; however, mechanical or acceptability problems still occurred in nearly one in 10 uses of the 20th condom.

The researchers studied semen exposure by examining data on 1,485 female condom uses that took place 24 hours or more after the previous act of intercourse, and for which PSA results were available; they used two criteria of exposure, to take into account random variations in PSA levels. According to these analyses, women were exposed to semen during 7–21% of uses, depending on the criterion used for exposure. In most cases, the quantity of semen a woman was exposed to was minute.<sup>3</sup> The rate of exposure was highest among women who experienced mechanical problems with the device (22–35% of uses), markedly lower among those reporting acceptability problems (9–20%) and lower still among those who had no problems (5–19%). Nonetheless, at least 53% of exposures occurred during uses for which women did not report any problems.

Results of a multivariate analysis indicated that regardless of how exposure was defined, a woman had a significantly elevated risk of being exposed to semen if her partner's penis entered to the side of the condom, if semen leaked onto her, if the outer ring slipped into her vagina and if the condom broke. A woman's odds of exposure decreased slightly as she and her partner used more female condoms.

Noting that semen exposure, a novel measure of condom failure, has advantages over traditional measures, the researchers nevertheless point out that further studies are needed “to determine which semen exposure levels, as measured by PSA, predict the risk for pregnancy and [sexually transmitted disease] and to compare the female condom with the male condom.”

#### Partner Characteristics and Semen Exposure

Characteristics of couples and intercourse associated with semen exposure were assessed in a multivariate analysis of 1,149 female condom uses by 100 women for which both coital log data and PSA data were available. These results showed that the odds of exposure to semen were about doubled if women reported that intercourse was more active than usual (odds ratio, 1.7) or if they had been in the relationship for less than two years (2.4). Women also had elevated odds of exposure (2.7) if they had a relatively large vagina (i.e., diaphragm size, 75–80 mm, as measured by a nurse practitioner at the beginning of the study) and their

partner's penis was below the median size (as measured by the women, according to instructions they received at enrollment).

Further analyses revealed that women with a large vagina were at increased risk of having their partner's penis enter to the side of the condom (odds ratio, 3.0) and of having the condom's outer ring slip into their vagina (3.5). Women living in households in which the monthly income was more than \$900 per member were substantially less likely than women living in households with lower incomes to be exposed (0.3). In this analysis, a woman's odds of exposure to semen did not change as couples became more experienced using the female condom.

Commenting on the findings, the researchers note that even though the female condom may not offer perfect protection, it provides complete protection against semen in most uses. They add that couples with a large mismatch between vaginal size and penis size and couples having very active intercourse might want to consider methods of protection other than the female condom.—S. London

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## Contraceptive Use Among Chinese Couples Changes Over Life of Relationship

The proportion of couples in Shanghai, China, practicing contraception and the method chosen vary substantially by the stage of the relationship.<sup>1</sup> Twelve percent of couples had had premarital intercourse, and they were unprotected by a contraceptive method two-thirds of the time. Between marriage and first birth, 43% of couples practiced contraception, although more than half of those couples used traditional methods. After their first birth, 98% of couples adopted a contraceptive method—mostly the IUD—although discontinuation and failure rates remained high.

To investigate contraceptive method choice, switching and discontinuation before marriage,

between marriage and first birth and after first birth, researchers used public records to identify newly married couples in two districts of Shanghai between August 1987 and August 1988. All couples who planned to delay having a child were invited to participate in the study (N=7,220); in addition, 691 couples who did not intend to delay having a child were randomly selected. The researchers interviewed participating couples three months after their wedding, and then again one and five years later. The interviews covered the couples' demographic characteristics, sexual behavior, and reproductive and contraceptive histories. Infertile couples were excluded from the analyses.

The researchers examined the data using simple tabular analysis and single-decrement life-table methods. They categorized couples as using the IUD, the pill, the condom, traditional methods (periodic abstinence or withdrawal) or "other methods" (e.g., ointments, suppositories and spermicides); the IUD, the pill and the condom were designated as "effective" methods, whereas traditional and "other" methods were considered "less effective."

Overall, 7,336 fertile couples participated in the study. The mean age at marriage was 26.6 for women and 28.7 for men; at first pregnancy, the mean age was 27.4 for women and 29.4 for men. Approximately 70% of both male and female participants had at least a high school education, and about 25% were white-collar workers.

### Contraceptive Use

Of the 912 couples (12%) who had had premarital intercourse, one-third had ever used contraceptives. Twenty-four percent of the 629 premarital pregnancies ended in induced abortion; 73% were carried to term—with all couples being married before the birth—and 3% ended in miscarriage or other outcomes. To delay the birth of their first child, 43% of the couples in the study practiced contraception after marriage; on average, the time from marriage to conception was 10 months longer for those who used a method than for those who did not (13.5 months vs. 3.7 months). Between marriage and first birth, there were 7,859 pregnancies, of which 88% ended in live births, 9% in miscarriages or stillbirths and 3% in induced abortions. After their first birth, 98% of couples practiced contraception. Approximately 3,700 pregnancies occurred after first birth, with 2% ending in live births, 2% in miscarriages or stillbirths and 96% in induced abortion.

For couples who practiced contraception

prior to marriage or between marriage and first birth, traditional methods accounted for 52–55% of episodes of use, and the condom for 22–37%. However, after the first birth, the IUD was used in nearly half (47%) of all episodes of contraceptive use, whereas the condom and traditional methods were used in 23% and 21%, respectively.

As couples moved through stages of their relationship, both the proportion of months of exposure to the risk of conception that were protected by use of contraceptive methods and the proportion that were protected by effective methods increased. Before marriage, 32% of months of exposure were protected—22% by traditional methods, 8% by effective methods and 2% by other methods. Between marriage and first birth, the proportion of exposure that was protected increased to 42%—18% by traditional methods, 18% by effective methods and 6% by other methods. By the third year after first birth, 96% of exposure was protected—6% by traditional methods, 88% by effective methods and 2% by other methods.

Of the three effective methods, the pill protected the smallest proportion of months of exposure—about 2% before marriage and 1% in each subsequent interval. The proportion of exposure protected by the IUD, however, rose from about 2% before marriage to 76% by the third year after first birth. The condom protected almost 4% of months of exposure before marriage, a proportion that rose to a peak of 17% during the first year after first birth and then declined gradually to 11% by the third year after first birth.

Among newly married couples who wished to wait less than six months before becoming pregnant or had no reproductive plans, 72% reported not using a contraceptive method, 17% reported relying on effective methods, 8% traditional methods and 2% both; the mean time from marriage to conception among these couples was seven months. In comparison, 6–10% of couples who wished to wait six or more months before becoming pregnant used no method, 34–48% effective methods, 33–44% traditional methods and 10–17% both; their mean time from marriage to conception was 12–20 months.

### Contraceptive Discontinuation

The 12-month probability of and reasons for discontinuing contraceptive use varied by the type of method and the phase of the relationship. The overall probability of discontinuing any method was 70% before marriage. It was

44% for non-method-related reasons (i.e., access difficulties or the recommendation of another person), 22% for desire for a child, 21% for method failure and 10% for method-related reasons (i.e., side effects, inconvenience, health concerns and method ineffective). The probability of discontinuing was greater for effective methods than for less-effective methods (76% vs. 67%). Effective methods were more likely than less-effective methods to be discontinued because of contraceptive failure (43% vs. 13%) and method-related reasons (21% vs. 5%); less-effective methods were more likely than effective methods to be discontinued because of desire for a child (23% vs. 19%) and non-method-related reasons (48% vs. 30%).

Between marriage and first birth, the overall probability of contraceptive discontinuation decreased to 55%; desire for a child was the most commonly cited reason (29%). The probability of discontinuation for the IUD (31%) was lower than that for other effective or less-effective methods (54–57%). In addition, the IUD had a lower probability of discontinuation than other effective methods or less-effective methods because of desire for a child (11% vs. 29–30%), method failure (4% vs. 7% each) and non-method-related reasons (7% vs. 18–21%).

The overall probability of contraceptive discontinuation continued to decrease after first birth, to 41% within two years after first birth and to 20% at year three or later after first birth. The risk of discontinuation after first birth because of desire for a child was stable at less than 1%; however, the probability for method failure, method-related reasons and non-method-related reasons declined from 14–19% within the first two years after first birth to 4–9% at year three or later.

Although the probability of discontinuation for the IUD dropped to 11% in the first two years after first birth and then remained relatively stable, the probability for other effective methods did not decrease until three years after first birth, when it dropped to 32%. For less-effective methods, the risk of discontinuation increased to 71% during the two years following first birth before decreasing to 40% at year three.

The researchers comment that the low level of contraceptive use found within premarital relationships may, in part, be caused by a combination of social stigma and the fact that modern contraceptive methods require visits to a medical or family planning center. They de-

scribe the neglect of sexually active single people as the “most important defect of family planning provision in Shanghai,” and suggest that “the provision of free condoms, together with appropriate information, education, and communication materials, to everyone, regardless of marital status, would be a step in the right direction.”

According to the researchers, their “most surprising” finding was the delay in adoption of methods until two or more years following first birth, especially in light of China’s one-child policy. They suggest as a possible explanation that sterilization is not considered an attractive option in Shanghai because of the possibility that a child might die and because of the hope that the one-child policy might be relaxed. —J. Rosenberg

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## Relative Risk of Cervical Cancer Rises with Duration Of Oral Contraceptive Use

The relative risk of cervical cancer rises the longer a woman is on the pill. According to a meta-analysis based on data from 28 studies,<sup>1</sup> women who use the pill for 10 or more years are 2.2 times as likely as never-users to develop cervical cancer, whereas the relative risks among users for 5–9 years and fewer than five years are 1.6 and 1.1, respectively. Among women infected with human papillomavirus (HPV), the virus associated with virtually all cases of cervical cancer, long-term pill users are 2.5 times as likely as never-users to develop cervical cancer. The results were broadly similar among the studies, despite the wide variation in the individual variables that were statistically controlled for.

To assess the relationship between use of hormonal contraceptives (primarily the pill) and cervical cancer, the researchers pooled data from four cohort and 24 case-control studies published from 1986 through 2002 on users’ risks of developing cervical cancer relative to that of never-users. The researchers examined relative risks of cervical cancer for three durations of pill use—fewer than five years (short-term), 5–9 years (medium-term) and 10 or more years (long-term). Wherever possible, they cat-

egorized use as current or recently discontinued (i.e., within eight years) versus discontinued further in the past (i.e., eight or more years ago). Each of the 28 studies controlled for one or more of the following variables: the woman’s HPV infection status, number of sexual partners, history of cervical screening, smoking and history of barrier method use. Some studies focused exclusively on the developed or the developing world, on HPV-positive or HPV-negative women, on invasive or in situ cervical cancers, or on squamous cervical cancers or adenocarcinomas of the cervix. Only the most fully adjusted data were used in the meta-analysis.

The studies, about half of which were conducted in the developing world, included 12,531 women with invasive or in situ cervical cancer. Among controls, the proportion reporting ever-use of the pill ranged from 19% to 92% in the studies conducted in developed countries and from 25% to 65% in those carried out in developing countries; the proportion who took the pill for longer than five years was 18–62% in developed countries and 8–20% in developing countries.

For all 28 studies combined, the relative risk of cervical cancer rose with increasing duration of pill use: The risk of diagnosis among short-term pill users relative to never-users was 1.1, whereas the relative risk for medium-term users was 1.6, and that for long-term users was 2.2. The general finding of increasing risk with increasing duration of pill use was broadly similar among all 28 studies, irrespective of the control variables used.

Data from the 12 studies that assessed cervical cancer risk among HPV-positive women suggest that the relative risk rose with longer periods of use, but it was significantly elevated for long-term users only (2.5). The three studies that examined the association between injectable use and cervical cancer indicate that use of this method for five or more years was associated with a slight, marginally significant increase in cervical cancer risk (1.2).

Eleven studies had data on both how recently pill users had stopped their method and their total duration of use. These suggested that the risk of cervical cancer might decline after use is stopped. Among short-term users, women who were still using the pill or had stopped within the last eight years had a higher relative risk than those who had stopped at least eight years ago (1.4 vs. 1.1). Similarly, among long-term pill users, the relative risk of cervical cancer was 2.1 among women who were still on the pill or had gone off it more re-

cently, whereas the relative risk among those who had stopped in the more distant past was 1.4 and only marginally significant.

According to the researchers, combining the studies’ results indicated that cervical cancer risk rose with increasing duration of pill use “in virtually every way that the data were examined.” They warn, however, that the variation in methodologies, study design and HPV measurement suggest that their summary indicators should be interpreted with caution. Further, none of the studies controlled simultaneously for all potentially confounding variables, and although the data suggest that risk may decline after women stop hormonal contraceptive use, the researchers acknowledge that their meta-analysis was “hampered by the lack of published data cross-classifying women by duration of use and time since last use.” Since the question of whether and how long effects of hormonal contraceptive use persist is “critical,” to answer it they recommend that the data be reanalyzed with uniformly defined variables.—L. Remez

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## The Risk of HIV Infection Among Brazilian Men Is Twice That Among Women

Among Brazilians, injecting cocaine, having an HIV-positive partner and having male-male sexual relations may each significantly increase the risk for HIV infection. These risk factors were identified in a cross-sectional study of voluntarily tested adolescents and adults in which HIV was most prevalent among those who had syphilis or an HIV-infected partner or who injected cocaine or shared injection equipment.<sup>1</sup> The researchers of the study note that their results may be particularly useful because “risk factors for HIV infection have been scarcely studied in developing countries.”

The study was conducted in Porto Alegre, one of the most populous cities in southern Brazil, between April and November 1996. The study enrolled persons visiting one of three participating counseling and testing centers to be tested, anonymously and free of charge, for HIV infection, presumably because they suspected possible infection. Participants completed a detailed questionnaire before undergoing testing.

Participants were considered to be infected with HIV if they had a positive result on two enzyme-linked immunosorbent assays and on indirect immunofluorescent assay. (Persons with an initial positive test result unconfirmed by positive fluorescence were excluded from analysis.) The researchers assessed the prevalence of HIV infection in various subgroups. Their analyses examined numerous independent variables, relating to socioeconomic and demographic characteristics, social behavior, sexual behavior, drug use and characteristics of sexual partners. All independent variables were self-reported on the study questionnaire, except for syphilis, which was determined by laboratory analysis.

Of the 3,045 participants, 48% were women and 52% were men; most considered themselves white (78%). The median age was 25 years; persons younger than 20 composed 16% of the sample. Most participants (74%) resided in Porto Alegre; the rest lived in the surrounding metropolitan area or elsewhere in the Brazilian state of Rio Grande do Sul. Nearly all (99%) had had at least one sexual encounter.

Twelve percent of the overall sample tested positive for HIV. The proportion of participants with HIV infection was higher among men than among women (15% vs. 8%), and it was higher among nonwhites than among whites (14% vs. 11%). Prevalence tended to increase with age and to decrease with level of education.

In univariate analyses, several social and sexual behaviors were associated with HIV infection. Study participants who had been in prison and those who had tattoos were more likely than others to be infected. Prevalence tended to increase with decreasing age at first intercourse and with increasing number of lifetime partners. Participants who were homosexual or bisexual men and those who had ever had anal intercourse were more likely than other participants to be HIV-positive, as were those who had exchanged sex for money, gifts, drugs or food. A lifetime history of gonorrhea also was associated with HIV-positive status, as was current infection with syphilis.

The univariate analyses also showed associations between drug use or sexual partner characteristics and HIV-positive status. For example, men who had ever had sex with a transvestite or male prostitute were more likely than other male participants to be HIV-positive. Moreover, the researchers observed a relatively high prevalence of infection among participants who knew or suspected that a partner had used injection drugs or had HIV infection. High proportions of infection were also seen

among persons who themselves used cocaine and persons who shared needles or syringes.

After adjustment for effects of potentially confounding variables in a regression analysis, several socioeconomic and demographic variables emerged as independent risk factors for HIV infection. The odds of infection were elevated among men (odds ratio, 2.1), participants aged 20 to 39 years (2.1–2.7) and those with 1–10 years of schooling (2.2–2.8).

Sexual and social behaviors independently associated with higher odds of HIV infection were male homosexuality (3.9), previous juvenile or prison detention (1.5), age of 11–12 years at first intercourse (1.9) and a positive result on the syphilis test (3.5). Of the variables related to sexual partner, several were associated with elevated odds of infection: HIV-positive status was more likely in participants who had had sex with a male prostitute (2.6) or with a partner known to have HIV infection (3.5) or to inject illicit drugs (1.9). Finally, using cocaine—by snorting (2.4) or by injecting (4.5)—and sharing injection equipment (2.6) were each independently associated with a higher likelihood of infection.

The authors acknowledge that their self-selected study group composed a biased sample, but they nonetheless believe that their findings may be useful for identifying at-risk groups and planning targeted interventions. They note that among the many variables associated in the univariate analyses with HIV infection, relatively few proved to have an independent association with HIV infection. They assert, therefore, that “some putative risk factors for HIV infection,” such as tattoos or number of lifetime partners, “may just be proxies of the true risk factors.”—C. Coren

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## Abused Women's Children Have an Increased Risk Of Dying Before Age Five

Children of women who experience physical or sexual violence—whether before, during or after pregnancy—are significantly more likely to die before age five, according to a study in León, Nicaragua.<sup>1</sup> The odds of losing a child among women who had ever been physically

or sexually abused by an intimate partner or a nonpartner were two to four times as high as they were among women who had not been abused; women who had experienced both physical and sexual partner violence had an even higher risk of child loss.

To examine the association between violence against mothers and deaths among their children, the researchers searched a demographic database of nearly 10,000 households in and around León for all live-born children who had died before the age of five between January 1993 and June 1996. Each such child was matched for sex and age at death to two randomly selected live children. Trained interviewers collected social and demographic information from the mothers of all the children in the sample and asked about their exposure to physical violence and sexual violence within 12 months before and after the index pregnancy; in addition, the mothers of children who had died were asked about the circumstances leading to their child's death. Overall, 313 mothers—110 of children who had died before age five and 203 of living children—completed questionnaires. The data were analyzed using logistic regression analyses.

Of the children who had died before age five, 84% died within a year of birth. Forty-three percent of deaths within the first 29 days after birth were caused by complications of prematurity and low birth weight, whereas 37% of deaths before age five were attributed to diarrhea and infection.

Among mothers of children who had died before age five, 61% had ever experienced some type of violence, compared with 37% of mothers of living children. Half of the mothers of children who had died and one-third of mothers of living children had been abused by a current or former intimate partner; smaller proportions (3–7%) had experienced nonpartner violence from relatives, friends or strangers. Ninety percent of women who had experienced physical abuse reported it as being severe (i.e., punches, kicks, bites, blows with objects, or any type of forced sex).

In bivariate analyses, researchers found significant associations between violence and child mortality. Mothers who had ever been physically abused by an intimate partner, a nonpartner or both, or sexually abused by a partner were significantly more likely than others to have had their child die before age five (odds ratios, 2.2–4.3). Having experienced severe violence was associated with elevated odds of losing a child (2.3), as was having been abused be-

fore becoming pregnant, or during pregnancy and the 12 months preceding the child's death (2.1–2.5). Furthermore, children born to mothers who had had no formal education, had had more than five births, were aged 35–49 or lived in a rural area were more likely than others to die before their fifth birthday (3.0–3.4).

In a multivariate analysis adjusted for education, parity, area of residence and socioeconomic status, the loss of a child before age five was associated with the mother having experienced physical or sexual violence from either an intimate partner (odds ratio, 2.1) or a non-partner (4.1); women who had experienced both physical and sexual violence from an intimate partner had even higher odds of losing a child (6.3). Using these findings, the re-

searchers estimate that approximately one-fourth of the deaths among children younger than five could be attributed to physical or sexual violence toward women by their partners.

The researchers suggest various explanations for the association between violence against women and child mortality. First, mothers exposed to physical or emotional stress are more likely than others to have low-birth-weight infants, who in turn have an increased risk of dying during childhood. Another theory is that the capacity of women to raise a child may be diminished because of emotional issues associated with abuse, such as depression, anxiety and post-traumatic stress, or because they are physically prevented from obtaining care for their children.

The authors of an accompanying commentary note that the study questionnaire did not include items regarding whether a child's birth was intended and whether the child was abused.<sup>2</sup> They comment that in the absence of such data, the findings are "likely to overestimate substantially the true association" between violence against women and the risk of death among their children.—*J. Rosenberg*

#### REFERENCES

1. Åsling-Monemi K et al., Violence against women increases the risk of infant and child mortality: a case-referent study in Nicaragua, *Bulletin of the World Health Organization*, 2003, 81(1):10–16.
2. Butchart A and Villaveces A, Violence against women and the risk of infant and child mortality, *Bulletin of the World Health Organization*, 2003, 81(1):17.

## CALL FOR PAPERS

The reproductive health of women around the world is compromised by violence, often perpetrated by intimate partners or used as a strategy of social control or a tactic of intimidation during war. Still, relatively little is known about its frequency and effects, and how it varies geographically and culturally. To address this lack of information, the December 2004 issue of *International Family Planning Perspectives* will focus on gender-based violence. We are seeking papers on levels of violence and the effects of actual and threatened violence on contraceptive use, protection against HIV and other sexually transmitted infections, fertility and other aspects of reproductive health. We are also interested in gender-based violence occurring during war and in refugee camps. We will consider commentaries as well as qualitative and quantitative research.

To be eligible for the special issue, submissions must be received by February 1, 2004. Authors should follow the journal's style, as detailed in the Guidelines for Authors, which can be found in this issue and on our Web site, at [www.guttmacher.org/guidelines](http://www.guttmacher.org/guidelines).

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**Deadline: February 1, 2004**