

## Mortality Is Elevated During Infancy and Early Childhood When Births Are Closely Spaced

Short birth intervals are associated with an increased risk of death both for the new infant and for the older sibling, surveillance data from two Nairobi slums confirm.<sup>1</sup> Nearly one-tenth of second or higher order births in the study regions occurred within 18 months of the birth of an older sibling; compared with their counterparts delivered at least 36 months after the birth of a sibling, these infants were substantially more likely to die during the first year of life (hazard ratio, 2.1). In addition, compared with their last-born peers, children who experienced the birth of a younger sibling within 20 months of their own birth had an elevated mortality rate during the second year of life (2.7).

Although short birth intervals have long been linked to infant and child mortality, most research has relied on retrospective data, which may be inaccurate if participating parents misremember the timing of events or omit mention of deceased infants. The few prospective studies that have been conducted in Sub-Saharan Africa have yielded conflicting results, and none have focused on urban areas. Moreover, most studies have not controlled for reverse causality: Some couples may seek a new pregnancy in response to a child's death, so that the short birth interval is the result of rather than the cause of mortality.

To address these issues, Fotso and colleagues analyzed data from the Nairobi Urban Health and Demographic Surveillance System for all infants born in the Viwandani and Korogocho slums between 2003 and 2009. All households in these informal settlements—about 28,000 in all during the study period—are visited every four months to collect information on fertility, mortality, migration, health and related topics. For each birth, investigators calculated the preceding birth interval (time between the birth of the preceding child and the birth of the index child) and the succeeding birth interval (time between the birth of the index child and the birth of the succeeding child). They constructed multivariate models to identify factors associated with death during infancy (the first year of

life) and early childhood (the second year).

The analytic sample consisted of 13,502 births. The majority occurred to mothers who were younger than 25 (56%), were in a union (84%) and had no more than a primary education (74%). About half (48%) of infants were first births, 5% were born within 18 months of an older sibling, 6% were born 18–23 months after a sibling and the remaining 42% were born after an interval of at least two years. Overall, nearly one in 10 second or higher level births occurred within 18 months of the previous birth. Only 4% of index births were followed by another birth within 20 months, a proportion that partly reflects the low fertility rate in these slums.

The overall infant mortality rate was 77 per 1,000 live births, and the overall early childhood mortality rate was 20 per 1,000 live births. Both rates generally declined during the study period.

In a multivariate model that included the preceding birth interval, whether the child was a singleton and whether the interval was ascertained from surveillance or from retrospective report, infants born less than 18 months after a sibling's birth were more likely to die during infancy than were those born after an interval of at least 36 months (hazard ratio, 2.5). This association remained significant, though slightly weaker, in a second multivariate analysis that controlled for child, maternal and household characteristics (hazard ratio, 2.1). Infants also had an elevated risk of mortality if they were a twin or triplet (3.9), or if either the preceding birth interval had been ascertained from maternal report or the infant was the mother's first (1.4); they were less likely to die if their family was in the highest rather than lowest of three household wealth categories (0.6) or they had been born in Viwandani rather than Korogocho (0.7). An alternative model that treated birth interval as a continuous variable and was restricted to second and higher order births found that an infant's risk of death fell with each additional year of spacing from the preceding birth (0.8).

The investigators constructed similar models for early childhood mortality. In the first model, relative to peers born at least 36 months after a sibling, infants born less than 18 months afterward were more likely to die during their second year of life (hazard ratio, 2.6). Moreover, compared with last-born children, those experiencing the birth of a sibling less than 20 months after their own birth had a highly elevated mortality risk (2.8). Risk was also elevated for subsequent birth intervals of 20 or more months (2.6), though this association may in part reflect reverse causation, given that the younger child may have been conceived after the older child had died.

In the second model, the association between birth intervals of less than 18 months and early child mortality was only marginally significant (hazard ratio, 2.1); risk remained elevated, however, for children experiencing the birth of a sibling less than 20 months or at least 20 months after their own birth (2.7 and 2.5, respectively). Infants born to families in the highest wealth tertile had a reduced risk of early childhood mortality (0.6). The third model revealed a marginally significant trend whereby an infant's risk of early childhood mortality fell by about one-tenth with each additional year of spacing from the previous birth (0.9).

Overall, according to the investigators, the findings validate those of retrospective studies that similarly linked short birth intervals to elevated mortality early in life. Birth spacing could go a long way toward improving infant survival in Sub-Saharan Africa, where many children are exposed to "the double jeopardy of short preceding and succeeding intervals," the researchers maintain; a strategy that emphasized family planning to lengthen the time between births would likely be well received in this region, as contraceptives have been used to space (rather than limit) births to a greater extent there than in Asia or Latin America. "The findings from this analysis lend support to the importance of revitalizing birth spacing as a child survival intervention—especially in sub-Saharan Africa, where levels

of unmet need for birth spacing and failure to avoid mistimed pregnancies remain unacceptably high,” the investigators conclude.—S. London

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## In Tanzania, Women Can Correctly Assess Whether They Can Use the Pill

Tanzanian women of reproductive age can accurately determine whether they are ineligible to use combination oral contraceptives because of medical reasons such as blood clots or diabetes, according to a cross-sectional study conducted in rural and peri-urban regions.<sup>1</sup> Overall, the women’s own assessment of their eligibility or ineligibility, as aided by a poster depicting medically valid contraindications, agreed with the assessment of trained nurses in four out of five cases. Only about one in nine women who said they were eligible were found to be ineligible by nurses.

The study was conducted in 2010 in Tanzanian drug shops that were accredited to dispense combination oral contraceptives to women after assessing their eligibility. The investigators trained nurses to use the 2008 update of the World Health Organization’s *Medical Eligibility Criteria for Contraceptive Use* to screen women for medical contraindications. The nurses approached women who were visiting drug shops (regardless of the reason for their visit) in Tanzania’s Ruvuma and Morogoro regions and asked them to assess their eligibility to use oral contraceptives with the help of a poster. The poster had text and images depicting the World Health Organization contraindications; pregnancy was also included as a contraindication, given that it obviates the need for contraception. The nurses then assessed the women’s eligibility using a checklist of the same contraindications, and measured their blood pressure. Both women and nurses provided the reasons for their eligibility decisions. The investigators calculated the accuracy of the self-assessments, using the nurses’ assessments as the gold standard.

Of the 2,395 women approached by the nurses, 1,776 met the study’s eligibility criteria (they were aged 18–39 and literate) and

1,651 agreed to participate. On average, participating women were 28 years old and had two children. Most were married or cohabiting (71%) and had no more than a primary school education (72%). Fifty-eight percent had used oral contraceptives at some time.

From the self-assessments, 29% of the women concluded that they were ineligible to use oral contraceptives, a proportion similar to the 27% who were ineligible according to the nurse assessments. The overall agreement between self-assessments and nurse assessments was 81%. Only 8% of women said that they were eligible when in fact they were not, and 11% said that they were not eligible when in fact they were.

Women who were ineligible to use oral contraceptives correctly classified themselves 70% of the time (corresponding to the sensitivity of self-assessment), and women who were eligible to use the method correctly classified themselves 85% of the time (corresponding to the specificity of self-assessment); those who said they were eligible were more likely to be correct than those who said they were ineligible. In bivariate analyses, women had an elevated likelihood of correctly assessing their eligibility if they had at least a secondary education (odds ratio, 1.5), had ever been pregnant (1.5), had previously used oral contraceptives (1.4) or were currently using any method (1.4).

The most common medically valid reasons given for women’s ineligibility to use oral contraceptives were current or possible pregnancy, current breast-feeding of an infant younger than six months, severe headaches and hypertension. Each was cited as the reason for ineligibility in 1–5% of self-assessments and 3–7% of nurse assessments.

However, 14% of women and 3% of nurses gave medically invalid reasons for ineligibility, such as fear of side effects and partner disapproval of family planning. In an analysis restricted to women who reported only medically valid reasons for ineligibility, self-assessment had a sensitivity of 63% and a specificity of 97%. Moreover, some participants—notably those who were pregnant or breast-feeding—would not have been screening themselves for oral contraceptive use under real-world circumstances; when these women were excluded from the analysis, along with those classified as ineligible for medically invalid reasons, the proportion of women who were ineligible to use the pill was 13% according to self-assessment and 9% ac-

ording to nurse assessment.

Nurses deemed only 3% of women to be ineligible for oral contraceptive use because of hypertension, despite the fact that 11% of women had blood pressure at or above the threshold for ineligibility proposed by the World Health Organization (140/90 mm Hg). However, the authors note that the health risks posed by pregnancy may exceed the risk of oral contraceptive use among women with hypertension.

Taken together, the study’s findings show that “poster-based self-screening is a good test,” according to the investigators. They propose that women’s ability to accurately self-assess their contraindications to combination oral contraceptives may also apply to progestin-only contraceptives, such as injectables, which have fewer contraindications and potentially could be administered by trained staff in drug shops. “The present results support the case for over-the-counter sales of [combined oral contraceptives] with self-screening for contraindications by women in Tanzania,” they conclude.—S. London

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## Women’s Autonomy Not Always Related to Men’s Help with Maternal Care

Increases in women’s autonomy and in men’s involvement in maternal health care—two social trends that may contribute to improved maternal health outcomes—do not necessarily occur in tandem, according to a recent study conducted in rural Nepal.<sup>1</sup> Instead, the researchers find that aspects of women’s autonomy bear both positive and negative relationships to a husband’s involvement in pregnancy care. For example, women’s autonomy in making economic and domestic decisions is negatively associated with the likelihood that they had discussed their health with their husband during pregnancy and that the husband had attended antenatal care visits (odds ratios, 0.5–0.8). However, women who report higher levels of spousal communication on community, health and reproductive issues—another measure of autonomy—have elevated odds of having discussed their health with

their husband during pregnancy (2.0), and of their husband having prepared for (1.6) and attended (1.3) the birth.

The data come from a mixed-methods study fielded in four rural villages in Kailali district in 2011. The researchers interviewed 275 married women, randomly selected from local health records, who had had a live birth in the previous year and had lived with their spouse at the time of pregnancy, delivery and the survey. To assess husbands' involvement in four aspects of maternal health, the researchers asked women whether their spouse had discussed her health during her most recent pregnancy, made preparatory arrangements for the birth, accompanied her to antenatal care visits and attended the delivery. They also evaluated four types of women's autonomy: economic and domestic autonomy, each measured in terms of whether certain household decisions were made by the women (either alone or jointly with their husbands); movement autonomy, defined by whether women needed permission to go to the market, the local health facility, group meetings, friends' or relatives' houses, and religious institutions; and spousal communication, defined as speaking with one's husband about community affairs, money, desired family size, health and use of family planning. Positive responses to the autonomy questions were summed to create five-point scales. In addition, women were asked to provide social and demographic information, including ethnicity, marriage type (love or arranged), and education levels for themselves and their husband.

The researchers also conducted 16 in-depth interviews with married women and men, mothers-in-law and members of the health service community, as well as two focus group discussions (one with women and one with men).

Themes emerging from the qualitative data included perceptions that social norms were gradually changing to accept greater male involvement in maternal health care, although participants indicated that some men who offer assistance to their pregnant wives experience stigmatization. Husbands were perceived to provide social support and advice to their pregnant wives, but were generally said to be absent during antenatal visits; husbands participating in the study, however, expressed interest in increasing their involvement in their wives' care.

On average, women who took part in the

quantitative survey were 23 years old, had married at age 18 and had had their first child just over a year later. Some 53% reported being in a love marriage, rather than an arranged one, and 75% lived in a household that included family members other than their spouse and children. During their most recent pregnancy and delivery, 97% of women had had at least one antenatal care visit, 72% had delivered with the assistance of a skilled provider and 69% had given birth in a health facility.

More than four-fifths of women reported that their husband had discussed their health with them during the pregnancy and prepared for the birth (e.g., by saving money or arranging for transportation). Some 78% indicated their husband had been present at delivery, though this proportion was lower among those delivering in a health facility (59%), and a substantial minority of women (41%) said their husband had attended antenatal care appointments. On the five-point autonomy scales, women scored lowest on economic (1.7) and movement (2.3) autonomy; mean scores were higher for domestic decision making (4.0) and spousal communication (4.5).

A bivariate analysis showed that women's autonomy and other characteristics were associated with husbands' involvement in maternal health care. Women's economic autonomy and domestic autonomy were both negatively associated with couples having discussed the woman's health during pregnancy (odds ratios, 0.8 and 0.6, respectively), and women's domestic decision-making autonomy and movement autonomy were negatively associated with husbands' presence during antenatal care (0.8 and 0.7). Women's domestic and movement autonomy and spousal communication were positively associated with husbands' birth preparedness (1.2–1.8); spousal communication was also positively associated with both discussion of the wife's health during pregnancy (1.8) and the husband's presence at delivery (1.6). Arranged marriage was a strong predictor of having discussed maternal health (3.4), and husbands were generally more likely to have been involved in pregnancy care if they or their wives had at least a secondary education (1.8–4.8) or if the woman had been exposed to the radio, television or print media in the past week (2.4–3.3).

In a multivariate analysis that controlled for other social and demographic covariates, the relationships between women's au-

tonomy and men's involvement in maternal health care were generally similar to those in the bivariate analysis. The likelihood of having discussed the woman's health during pregnancy remained negatively associated with wives' involvement in economic and domestic decision making (odds ratios, 0.8 and 0.5, respectively), and positively related to spousal communication (2.0). Both domestic and movement autonomy were negatively associated with husbands' presence during antenatal care (0.7 and 0.6), while spousal communication was positively associated with husband's birth preparedness and presence at delivery (1.6 and 1.3).

According to the authors, these findings suggest that communication between spouses may enhance both women's autonomy and men's involvement in maternal health care. The negative relationship between other forms of autonomy and men's involvement presents a mixed picture, however, and suggests that a rise in women's autonomy may not be accompanied by greater spousal involvement in maternal care. The authors recommend that policies to improve maternal health "combine a continuous effort to enhance women's autonomy through education and economic support with stimulating husbands' involvement in their wives' health care."—*H. Ball*

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## Levels of Risky Sex Did Not Rise When HIV Therapy Was Initiated in KwaZulu-Natal

Levels of unsafe sexual behavior did not increase when antiretroviral therapy became available in a rural region of KwaZulu-Natal, South Africa, and in some regards residents' sexual behavior became safer, according to an analysis of seven years of surveillance data.<sup>1</sup> For example, from 2005 to 2011, the proportion of adults who reported having used a condom the last time they had sex with their regular partner rose by an average of 2.6 percentage points annually among men and by 4.1 points annually among women; increases were apparent among both HIV-positive respondents and those who were uninfected. Moreover, the proportion of respondents

who had had more than one partner in the past year declined, as did the prevalence of concurrency.

Several studies have found that levels of sexual risk behaviors decrease when patients begin antiretroviral therapy. However, evidence has been lacking on whether similar trends occur in the general population; one concern has been that risky behavior may increase if the public believes that the threat posed by HIV is declining (e.g., because treatments are now available). To examine this issue, McGrath and colleagues analyzed surveillance data from Umkhanyakude district, a rural area of KwaZulu-Natal where HIV prevalence is extremely high (29% in 2011) and where data from more than 11,000 households have been collected since 2000 by the Africa Centre for Health and Population Studies.

The current analysis focused on the period from 2005 (around the time the local HIV treatment program was initiated) to 2011. During that time, all residents aged 15 or older were eligible each year to be tested for HIV and to take part in a behavioral survey; they could participate in one, both or neither. A stratified random sample of 10% of nonresident household members was also invited to participate. Respondents provided information on a range of behaviors, including whether they were sexually active, the number of partners they had had in the past year, whether they had had concurrent partners and whether they had used a condom the last time they had sex with their regular and casual partners. The number of survey participants in a given year varied from 9,400 to 13,300, but generally declined during the study period; participation rates ranged from 26% to 42% among men and from 38% to 54% among women. The researchers used sampling weights to account for nonparticipation, and multiple imputation to adjust for missing responses to specific behavioral questions.

Throughout the study, women were more likely than men to report having ever had sex, reflecting their younger age at sexual debut, but they consistently had had fewer partners and casual partners in the past year and reported lower levels of concurrency. The proportion of participants who said they knew their HIV status rose substantially among both women (from 46% to 82%) and men (from 30% to 55%).

Despite the availability of treatment for HIV, participants' sexual behavior tended to get safer, not riskier. Notably, the proportion

of respondents who reported having used a condom the last time they had sex with their regular partner increased by 2.6 percentage points annually among men and by 4.1 points annually among women. Moreover, the proportion who had had more than one partner in the past year declined, again among both men (by 1.2 points per year) and women (by 0.4 points per year), and the prevalence of concurrency decreased as well (by 0.1–0.6 points annually). Trends were generally similar, though not always statistically significant, in subgroup analyses that categorized respondents according to their age and marital status (30 or older and married, 30 or older and unmarried, or younger than 30) and knowledge of HIV status. No changes occurred, either in the full sample or in most subgroups, in the proportion of respondents who had had a casual partner in the past year, in the proportion who had used a condom the last time they had sex with a casual partner, or in the mean age difference between respondents and their regular partner.

Regardless of gender, the proportion of participants who reported having used a condom the last time they had sex with their regular partner increased among both HIV-positive and HIV-negative respondents, and among those who knew their HIV status and those who did not. HIV-positive women were

consistently more likely than their uninfected counterparts to have used a condom at last sex with their regular partner; however, men's condom use with their regular partner did not differ by HIV status.

Limitations of the study include the high rates of nonparticipation and the possibility that the reductions in risky behavior reflected increased social desirability bias. Nonetheless, the findings reveal “no evidence of an increase in risky sexual behaviour at the population level as access to [antiretroviral therapy] expanded,” the researchers note; moreover, the fact that condom use increased even among individuals who did not know their HIV status suggests that the trend toward higher condom use in the general population was not merely the result of more people learning their status and adjusting their behavior accordingly. While these findings are “welcome news,” continued monitoring of sexual behavior is necessary to ensure that changes in such behavior do not undermine the population-level effects of antiretroviral therapy programs, the authors conclude.

—P. Doskoch

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## Researchers Posing as Clients Find Inadequate Contraceptive Care by Some Kenyan Providers

Poor quality of care—including long waits, inappropriate fees and misinformation about contraceptive methods—may impede women's use of family planning services in Kenya, according to a recent study using simulated clients.<sup>1</sup> Posing as contraceptive clients, six women visited 52 providers at public and private clinics in Kisumu East District. At most visits, the simulated clients received the method they requested, but in one-tenth of cases, providers refused to offer a method without a medically unnecessary pregnancy test or proof of menstruation. One-fifth of visits took five or more hours from arrival to departure, and all simulated clients reported being treated rudely or disrespectfully by at least one provider.

The researchers employed a simulated client approach to obtain accurate data about the quality of clinical services without the obstruction of a third-party observer. They trained

six female data collectors to observe and report on a number of aspects of family planning care during clinic visits in which they pretended to be contraceptive clients. The women were aged 23–30 and had 0–3 children; half were married, and half were slum residents. Each simulated client was assigned to request a particular contraceptive method: Three sought pills, and one each asked for an IUD, implant or injectable. After each clinic visit, the simulated clients filled out a short checklist on aspects of service quality and provided additional comments about the visit, most of which concerned interpersonal relations, provider competence, provider accessibility and inappropriate charges. The 19 clinics they visited—14 public and five private—represented all medium- and high-volume health care facilities providing contraceptive services in the Kisumu East District.

The supervisors of all facilities consented to have their clinic included in the study.

The simulated clients made a total of 134 visits to 52 providers. Although the quantitative data collection tool did not solicit informal feedback, clients volunteered accounts of five visits in which they had had a positive interaction with their provider; for instance, the provider had been friendly or encouraging or had thoroughly discussed family planning options with the client. However, using the checklist, clients reported 24 visits in which providers failed to greet them in a respectful or friendly manner. All six simulated clients reported rude or disrespectful treatment by at least one provider; these incidents included a provider who shouted and another who accused a woman of trying to abort an undisclosed pregnancy through use of an injectable contraceptive.

At the vast majority of visits, the simulated clients were offered their preferred contraceptive method, but at 13 visits (10%) women were denied their method of choice until they could prove they were not pregnant (either by paying for a pregnancy test or by returning to the clinic once they were menstruating), even though contraceptives do not interrupt an established pregnancy. In most of these cases, the woman was not offered an alterna-

tive form of birth control. Some providers also appeared to be misinformed about certain methods. Further, three of the individuals who served clients at public facilities did not appear to have been trained in family planning provision; these included a volunteer and a lab worker.

At three facilities, at least one client was turned away after a long wait without having seen a provider or having obtained a contraceptive method. During visits in which clients did see a provider, the total time spent at the clinic between arrival and departure averaged three hours; 19% of visits lasted five hours or longer. On seven occasions, care was delayed because the provider arrived after the clinic's scheduled opening time, did not return from a break or asked the client to return on a different day.

The clients were overcharged at three out of four visits at which they received oral contraceptives (prices were not discussed for the other methods, since women did not accept medically unnecessary contraceptive procedures). In some cases, women were charged fees even though the clinic's policy was to provide pills at no charge. At 12 visits, simulated clients paid fees that differed from those paid by other simulated clients, and in two instances the simulated client was refused a

receipt and observed the provider pocketing the money.

The researchers found no discernible pattern of quality of care issues across participating facilities and providers. However, the observed instances of misinformation, inappropriate requirements and fees, and poor client relations represent situations that could prevent women from obtaining contraceptive care and put them at risk for unintended pregnancy. The researchers point out that an important first step in improving service quality is "to better understand the perspective[s], needs, and motivations of the service providers," which in turn can help ensure "a manageable workload, timely and adequate pay, and respectful workplace practices." Further, they advocate offering providers training in counseling skills to improve interactions with clients, instructing them to use a checklist to determine pregnancy status (in lieu of requiring tests that may cause delays in service), and improving supervision and accounting systems to prevent absenteeism and corruption.—*H. Ball*

#### REFERENCE

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