Use of Misoprostol to Treat Incomplete Abortion Should Be Limited To the First 12 Weeks of Pregnancy

The use of misoprostol for incomplete abortion should be limited to pregnancies of up to 12 weeks, even if a relatively high dose is used, according to a study conducted in Benin.[1] Over a five-year period, the percentage of incomplete abortion cases that were successfully treated with 800 mcg of misoprostol (i.e., they did not require manual vacuum aspiration to complete uterine evacuation) was 99% among women with pregnancies of 12 or fewer weeks, compared with 26% among women with pregnancies of 13–14 weeks and 28% among women with pregnancies of 15–18 weeks. In addition, the risk of adverse effects from misoprostol was significantly lower during the first 12 weeks of pregnancy than later in pregnancy.

In 2006, in an effort to reduce the country's high maternal mortality ratio, the government of Benin implemented a policy to improve postabortion care for women who had had spontaneous or induced abortions. Sharp curettage was replaced by manual vacuum aspiration, and in 2008, the use of misoprostol was adopted. Although a substantial body of literature has documented the effectiveness of misoprostol to treat early incomplete abortion, no studies have examined misoprostol's success rate at higher doses to treat incomplete abortions after 12 weeks' gestation. To fill this gap, and to provide a picture of misoprostol use in a low-resource environment with a high demand for postabortion care, researchers conducted a descriptive, prospective study between 2008 and 2012 at three maternity hospitals in Cotonou.

Women were eligible for the study if they were admitted to one of the hospitals with a diagnosis of incomplete abortion (determined by ultrasonography and clinical examination), did not have severe complications requiring immediate treatment and had an estimated gestational age of up to 18 weeks. Those who had stable blood circulation and uterine contents of less than 20 mm were given the option of medical treatment, manual vacuum aspiration, sharp curettage or no treatment, and were counseled about possible adverse effects and the importance of follow-up visits. Women choosing medical treatment were given 800 mcg misoprostol sublingually; follow-up visits were scheduled for three days later (to assess progress) and 15 days later (to perform ultrasound). At the latter visit, the treatment was considered successful if the uterus was empty or if the uterine contents were minimal and the woman was asymptomatic. The treatment was considered a failure if the woman was still bleeding or cramping and the uterus was not empty; at this time, manual vacuum aspiration was performed unless the woman was stable and opted for a second 800 mcg dose of misoprostol. If she opted for misoprostol, the woman was examined again 10–15 days later; if the uterus was still not empty, manual vacuum aspiration was performed. Data were collected on choice of treatment, gestational age at abortion, adverse effects, ultrasound results and need for vacuum aspiration after misoprostol. Chi-square testing was used to assess the differences in success rate and in incidence of adverse effects by gestational age.

In all, 3,139 women were admitted for incomplete abortion during the study period; 630 required no further treatment. Of the remaining 2,509 women, 21% chose treatment with misoprostol. At all three sites, the proportion of women who chose misoprostol rose between 2008 and 2011 (from 8–12% to 25–28%) but declined in 2012 (to 21–27%). Some 64% of the women treated with misoprostol were 10 or fewer weeks pregnant, 15% were 11–12 weeks, 13% were 13–14 weeks and 8% were 15–18 weeks. Fifty-six percent of women choosing misoprostol received one 800 mcg dose, and 44% required two doses. Sixty-six percent of women with pregnancies of up to 12 weeks required only one dose of misoprostol; this was true for 34% of women who were 13–14 weeks pregnant and 23% of those who were 15–18 weeks pregnant. Only 6% of the women receiving misoprostol were admitted to the hospital; the remaining women were treated as outpatients.

The success rate of treating incomplete abortion with misoprostol differed substantially by gestational age: Ninety-nine percent of pregnancies of 12 or fewer weeks did not require manual vacuum aspiration after misoprostol, compared with 26% of pregnancies of 13–14 weeks and 28% of pregnancies of 15–18 weeks. These successful cases included those in which ultrasound at the 15-day follow-up revealed residue not requiring intervention (4% of women pregnant 12 or fewer weeks, 10% of those pregnant 13–14 weeks and 14% of those pregnant 15–18 weeks). Eight percent of women with pregnancies of 12 or fewer weeks and 3% of those with pregnancies of 13–14 weeks were lost to follow-up and presumed to have had no complications; no woman with a pregnancy of more than 14 weeks failed to return for follow-up.

Following misoprostol administration, 27% of women reported severe pain, 18% experienced chills, 11% felt hyperthermic and 5% had heavy bleeding. The proportion of women reporting adverse effects was lower among those 12 or fewer weeks pregnant than among those with more advanced pregnancies. For example, 8% of women with pregnancies of up to 12 weeks' gestation experienced severe pain, compared with 93–100% of women with pregnancies of longer durations. Heavy bleeding occurred only among women with pregnancies of more than 12 weeks; 7% of women with pregnancies of 13–14 weeks and 44% of women with pregnancies of 15–18 weeks reported this outcome.

In defending the assumption that the women lost to follow-up were likely not to have required surgical evacuation, the researchers noted that the socioeconomic status of these women indicates that they probably would have sought free care at one of the study's three sites had additional treatment been required. Also, they note that while the evaluation "shows that [misoprostol] has been very well accepted by both providers and clients," the study's findings indicate that the drug "did not work...in almost 75% of cases in which gestational age exceeded 12 weeks."

Current guidelines recommend using 600 mcg of misoprostol and limiting use to patients with pregnancies up to 12 weeks; the current study confirms those recommendations, the researchers conclude, and indicates that a higher dose is not routinely effective for more advanced pregnancies.–*L. Melhado*

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Home-Based HIV Care Linked to Increased Uptake Of Antiretroviral Therapy

Having the option to start HIV care at home is associated with increased uptake of antiretroviral therapy among adults who make use of self-administered HIV tests, according to a randomized trial conducted in Blantyre, Malawi.[1] As part of the trial—the first to assess the effects of home-based initiation of treatment—free self-testing kits were provided in the study areas, and participants who tested positive had access to HIV care through local primary care centers. However, residents of the seven randomly selected communities where the option of home-based initiation of care was offered were significantly more likely to begin antiretroviral therapy than were residents of communities where only facility-based HIV care was available (adjusted risk ratio, 2.4).

The cluster-randomized trial was conducted in 2011 in high-density urban neighborhoods in Blantyre, where a previous study had shown the prevalence of HIV to be as high as 18%. Researchers selected 14 noncontiguous community health worker catchment areas to receive self-administered oral HIV tests and posttest counseling. Volunteer counselors trained in HIV testing distributed testing kits and information to adults aged 16 or older who wished to participate. Participants were asked to use their test at home and return it to the counselor so that the results could be tallied; they were not required to disclose results to the counselor. In all study areas, participants with positive test results could go to a study clinic to have their results confirmed and begin antiretroviral therapy if eligible (i.e., if their CD4 cell count was lower than 350 cells/mm3, they were in clinical stage 3 or 4, or they were pregnant or breastfeeding). In half of the study areas, counselors also informed residents about the availability of home-based services; participants who chose this approach received home initiation of HIV care (including two weeks of antiretroviral therapy, if eligible) and a follow-up appointment at a clinic. Researchers tracked the number of adults initiating therapy at home or at clinics. Adherence to antiretroviral therapy regimens was self-reported at 2–4 weeks, three months and six months.

Some 8,194 adults lived in the areas where optional home initiation of HIV care was offered (the "home group"), and 8,466 in the areas where only facility-based care was available (the "facility group"); the two populations generally had similar demographic and other characteristics, although the proportion of households that had reported a death in the past year was higher in the home group than in the facility group (4.1% vs. 2.4%). Participants' mean age was 30; slightly more than half were male, and nearly two-thirds were married or cohabiting.

In the six months that HIV self-testing was available, 58% of adults in the study areas took a kit from community counselors. Uptake did not differ between the two groups. However, participants in the home group were more likely than those in the facility group to report a positive HIV self-test result to counselors (risk ratio, 1.9).

A higher proportion of participants in the home group than in the facility group initiated antiretroviral therapy (2.2% vs. 0.7%; risk ratio, 2.9). This difference remained statistically significant (2.4) after adjustment for household mortality in the past year, a proxy for baseline levels of HIV prevalence and availability of care. Of the 181 participants initiating antiretroviral therapy in the home group, 64% began treatment at home and 36% began at a health facility. After six months, 29% of antiretroviral initiators in the home group and 24% initiators in the facility group were no longer receiving treatment, but the difference was not statistically significant.

The total cost of home-based testing and initiation of antiretroviral treatment was US$20,005, or US$172 per participant who initiated home care. This figure, the researchers say, compares favorably to other community- and facility-based programs.

The researchers attribute the difference in the uptake of antiretroviral therapy between the two groups to the increased convenience and perceived confidentiality offered by home-based care relative to care at a facility. They also point out that home care supplements, rather than replaces, facility-based services, and that because CD4 cell counts were highest among those initiating care at home, home-based care may lead to increased survival for patients. They conclude that "at a time when universal test and treat approaches to controlling the HIV epidemic are being considered, home initiation of HIV care shows high promise as a simple strategy to improve uptake of [antiretroviral therapy] when HIV self-testing is carried out at home."—*H. Ball*

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In Nepal, Contraceptive Use Is Low And Discontinuation Common After Abortion

In Nepal, postabortion contraceptive use is low and characterized by high levels of discontinuation.[1] According to a study that used population-based data, only 56% of women who had had an abortion initiated contraceptive use in the 12 months following the procedure. Although women who had had abortions were more likely than those who had given birth to initiate contraceptive use earlier in the year after the procedure (hazard ratio, 2.3), they were also more likely than women who had given birth to discontinue use of a temporary method earlier during that period (1.3).

Since 2002, abortion has been legal and available without restriction in Nepal. In general, women who have had abortions are motivated to use contraceptives to prevent future unintended pregnancies; however, little is known about postabortion contraceptive uptake at the national level in Nepal or how it compares with postpartum contraceptive uptake. To address this gap, researchers used calendar data from the 2011 Nepal Demographic and Health Survey to examine the timing of contraceptive initiation and the rates of method discontinuation after an abortion or delivery.

The survey collected monthly data on contraceptive use and pregnancy outcomes during the five years preceding the survey, as well as data on women's socioeconomic and demographic characteristics. The current analysis examined initiation of a modern or traditional contraceptive method among married women who had had an abortion, live birth or stillbirth; it was restricted to married women because childbearing in Nepal typically occurs within marriage. Women who had had abortions were considered to require contraception immediately, while those who had had a live birth were allowed a six-month lag to account for such factors as amenorrhea, postpartum abstinence and exclusive breast-feeding. Kaplan-Meier cumulative hazard plots were estimated to determine rates of contraceptive use by pregnancy outcome and discontinuation rates by method type, and discrete-time hazard models were fitted to determine the timing of postabortion or postpartum contraceptive uptake and discontinuation by pregnancy outcome and method type, after adjustment for demographic and socioeconomic characteristics. Analyses of discontinuation examined whether a woman who had initiated a temporary method after her pregnancy outcome was still using the same method. The final sample included 3,190 women—2,506 in the postpartum group (live births and stillbirths) and 684 in the postabortion group.

Overall, 56% of women in the postabortion group initiated contraceptive use in the 12 months following the procedure, while 34% of postpartum women initiated use in the 12 months following the return of fecundity. Among women who initiated contraception in the postabortion group, 28% used injectables, 20% used the pill, 20% a traditional method (primarily withdrawal), 19% condoms, 6% female sterilization, 4% implants and 3% IUDs. The method mix was slightly different for women who starting using contraceptives after a live birth or stillbirth: 40% used injectables, 16% condoms, 16% traditional methods, 15% the pill, 10% female sterilization, 3% IUDs and 2% implants. Among women who had had an abortion, 45% initiated contraceptive use within three months of their procedure; this proportion rose to about 50% at four months and increased only slightly in the next eight months. By contrast, contraceptive uptake was much more gradual in the postpartum group; fewer than 20% initiated contraceptive use within six months of becoming fecund, and the proportion slowly climbed to 34% by the 12th month.

In the multivariate discrete-time models, women in the postabortion group were more likely than those in the postpartum group to have initiated contraceptive use earlier within 12 months (hazard ratio, 2.3). Earlier contraceptive initiation was more likely among women who had used traditional methods or modern methods before the index pregnancy than among those who had not used a method (3.4 and 1.8, respectively). Women aged 25–30 or 30–34 had a greater likelihood of earlier contraceptive initiation than did those aged 15–24 (1.2–1.3). Compared with women with other family compositions, women with two sons were more likely to have initiated contraceptive use earlier (1.2).

Women reporting autonomy in household decision making had a higher likelihood of earlier contraceptive initiation than women without autonomy (1.5). Earlier method initiation was positively associated with wealth and education (1.4–2.1), and negatively associated with having a husband who migrated for work (0.6). Unexpectedly, compared with women in the relatively remote and economically deprived midwestern region, those in the eastern, central and western regions were less likely to initiate contraceptive use earlier within 12 months (0.7–0.8).

Overall, 44% of women who had initiated any temporary method of contraception discontinued use within 12 months; this proportion was higher among women in the postabortion group than among those in the postpartum group (48% vs. 44%). Modern method users were more likely to discontinue use earlier than were traditional method users, especially among women who had had abortions. For example, at six months, about 50% of postabortion injectable users had discontinued use, compared with 40% of postpartum injectable users. Overall, by 12 months, only 30% of modern method users and 60% of traditional method users were still using their method.

Women in the postabortion group had a higher rate of earlier method discontinuation in the first 12 months than did women in the postpartum group (hazard ratio, 1.3). Those with at least a secondary education were more likely than those with no education to have discontinued their method earlier (1.3–1.4). Women whose husbands were migrants had a higher risk of earlier discontinuation than women whose husbands lived at home (2.2). Users of traditional methods had a lower rate of earlier discontinuation than users of modern methods (0.5), and women in older age-groups were less likely to discontinue their method earlier than were women aged 15–24 (0.6–0.8). Finally, women from the eastern and central regions had a lower rate of earlier discontinuation than did women from the midwestern region (0.7–0.8).

The researchers note that the data did not permit examination of the reasons for contraceptive nonuse or discontinuation, and that the sample size for the analysis on discontinuation precluded disaggregation by method type. They conclude that "there is a dire need [in Nepal] to strengthen the abortion program and ensure effective family-planning counseling and user follow-up,...[especially for] marginalized groups living in hard-to-reach and remote locations." Moreover, "given the diverse topography and service delivery challenges in the country, context-specific innovations in policy and programs are warranted to increase the use of [postabortion family planning] services." *–L. Melhado*

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Men's Data Are Needed To Estimate Unmet Need Among Couples

Estimates of unmet need for contraception calculated using only women's reported fertility intentions and contraceptive use may not be representative of couples' need. According to an analysis of Demographic and Health Survey (DHS) data from monogamous couples in three West African countries, the proportion of couples in which at least one partner reported having unmet need ranged from 31% to 37%.[1] In fewer than half (41–49%) of such couples did both partners individually report having unmet need; unmet need was reported by the wife only in 33–40% of couples and by the husband only in 15–23%.

Typically, research studies on unmet need for contraception estimate levels among married women and assume that their reports about fertility intentions and contraceptive use represent those of couples. To directly examine rates of unmet need among couples, researchers used DHS data from three West African countries: Benin (2006), Burkina Faso (2003) and Mali (2001); West Africa was chosen because of its high level of unmet need, and the three surveys were used because they were the only ones available from West African countries with the measures to calculate unmet need among couples. The three surveys had a combined sample of 7,821 couples.

Unmet need for contraception was determined separately for women and men on the basis of their fecundity, contraceptive use and fertility intentions. Women who were currently pregnant or experiencing postpartum amenorrhea and who were not practicing contraception were considered to have unmet need if they reported that their current or last pregnancy, respectively, was mistimed or unwanted; other fecund women who were not practicing contraception were considered to have unmet need if they reported wanting to wait at least two years before becoming pregnant, not wanting any more children or being undecided about future childbearing. For men, unmet need was defined in a similar way, using their reports of their fertility intentions but their wife's reports of fecundity, pregnancy and postpartum amenorrhea. Contraceptive use among women and

men was based on a couple-level measure: A couple was considered to be practicing contraception if the wife reported use of a female-controlled method, the husband reported use of a male-controlled method or both.

Unmet among couples was based on the couple-level measure of contraceptive use; wives' reports of fecundity, pregnancy and postpartum amenorrhea; and husbands' and wives' fertility intentions. Four categories of couples' unmet need were created: neither partner has unmet need, only the wife has unmet need, only the husband has unmet need and both partners have unmet need. Categories that included at least one partner with unmet need were further divided by whether the unmet need was for limiting or spacing.

For their analytic sample, the researchers selected the 3,848 monogamous couples for whom complete fertility intention data were available; couples in which either partner reported being in a polygynous union or having had an extramarital relationship in the past year were excluded. Analyses examined levels of unmet need among wives, husbands and couples, as well as concordance of partners' reports of unmet need within couples.

The levels of unmet need among wives and husbands were 24% and 21%, respectively, in Benin, 27% and 20% in Burkina Faso, and 30% and 22% in Mali. In all three countries, a greater proportion of unmet need was for spacing (16–24% among wives and 15–19% among husbands) than for limiting (6–8% among wives and 3–6% among husbands).

Overall, the proportion of couples in which at least one partner reported having unmet need was 31% in Benin, 32% in Burkina Faso and 37% in Mail; unmet need was reported by the wife only in 10–15% of couples, by the husband only in 5–7% of couples and by both partners in 14–16% of couples. Among couples with unmet need; 41–49% were concordant (that is, both partners reported having unmet need); the remaining couples had discordant unmet need, reported either by the wife only (33–40%) or the husband only (15–23%). In all three countries, the proportion of couples in which both spouses reported having unmet need for spacing was greater among couples with 0–4 living children (30–38%) than among those with five or more (8–16%), whereas the proportion of couples in which both spouses reported unmet need for limiting was greater among couples with five or more living children (17–33%) than among those with 0–4 (1–5%).

The study had several limitations, as noted by the authors. For example, more than half of couples were excluded from analyses because of polygamy or extramarital affairs, which limits the study's generalizability. In addition, social desirability bias may have led to exaggeration of male-controlled contraceptive use and underestimation of husbands' and couples' unmet need. Furthermore, couple-level fecundity was determined using only wives' reports, possibly underestimating husbands' infecundity and overestimating couples' unmet need.

Nonetheless, the authors conclude that determining unmet need solely on the basis of women's reports overestimates concordant unmet need among couples. They suggest that more research is needed, which would require that "the same questions...be asked of men and women...so that couples' unmet need can be assessed using DHS data in a wider variety of settings." They also suggest that "the DHS could improve researchers' ability to explore [unmet need in polygynous settings] by systematically including questions directed toward men in polygynous unions concerning their contraceptive use with each partner and their fertility preferences with each partner."—*J. Rosenberg*

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Greater Amounts of Financial Compensation Linked to Increased Uptake of Male Circumcision

Certain levels of financial incentive may be effective in increasing adult men's uptake of medical circumcision, according to a randomized trial conducted in western Kenya.[1] Among the 1,502 uncircumcised participants aged 25–49 randomly selected to receive food vouchers of varying amounts (or no compensation) if circumcised within two months, uptake was higher among those who received vouchers worth US$15 or US$8.75 (9% and 7%, respectively) than among those who received vouchers worth US$2.50 or no compensation (2% each). In logistic regression analyses, men in the two higher compensation groups were more likely than those in the no compensation group to get circumcised (odds ratios 6.2 and 4.3, respectively); no difference was found between men in the US$15 group and those in the US$8.75 group.

Male circumcision has been shown to reduce men's risk of HIV; however, the prevalence of circumcision generally remains low among adult African men, who commonly cite loss of wages during and after the procedure as a barrier to uptake. To investigate whether small incentives could partially offset this barrier and increase circumcision among adult men, researchers conducted a study between June 2013 and February 2014 in three districts of Kenya's Nyanza region, where HIV prevalence is 15%. They used a two-stage sampling technique to randomly select a sample of uncircumcised men aged 25–49. Consenting participants were interviewed and given information about medical male circumcision; they were then randomly assigned to one of four study groups and referred to area clinics for a free circumcision procedure. Men assigned to the three intervention groups were told that they would receive about US$2.50, US$8.75 or US$15 worth of food vouchers (amounts chosen to approximate transportation costs and 0–3 days' worth of lost wages) if they underwent circumcision within two months of study enrollment; men in the control group would not be compensated if they underwent circumcision.

The analytic sample consisted of 1,502 men, approximately 375 in each of the four study groups. Descriptive and logistic regression analyses were conducted to examine circumcision uptake by study group. Additional subgroup analyses examined uptake by individual characteristics among men who received high compensation (US$8.75–$15) or low compensation (US$0–2.50).

Virtually all men in the sample were from the Luo ethnic group, and 84% were married; the men's mean age was 34. On average, participants worked 47 hours during the week prior to the interview, earned the equivalent of US$5 a day and lived 6 km from the nearest clinic. Ninety-two percent of men reported having a primary sex partner, and 15% had had a sex partner other than a primary partner in the past year. When asked about their likelihood of getting circumcised in the future, 25% said "definitely yes," 61% "maybe," 7% "unlikely" and 8% "definitely not." In general, men's characteristics were similar across the four study groups.

The two-month circumcision uptake rate was 2% for men in the US$2.50 group, 7% for those in the US$8.75 group and 9% for those in the US$15 group; the rate for the control group was 2%. In logistic regression analyses, men in the US$15 and US$8.75 groups had greater odds than those in the control group of having undergone circumcision within two months of enrollment (odds ratios, 6.2 and 4.3, respectively); the likelihood of circumcision uptake did not differ between the two higher compensation groups.

In all subgroup analyses by individual characteristics, men offered high compensation (US$15 or US$8.75) were more likely than those offered low compensation (US$2.50 or US$0) to get circumcised. For example, men older than 33 who were offered high compensation had 4.5 times the odds of their peers offered low compensation of having undergone circumcision; among men who reported having had a sex partner other than a primary partner in the past year, those who were offered high compensation had 11.8 times the odds of their peers offered low compensation of having undergone circumcision.

The authors mention several limitations of their study, such as the intervention's potential lack of generalizability and the small sam-

ple sizes and limited statistical power in the subgroup analyses. Despite these limitations, they suggest that their study "adds to an as yet small evidence base on effective strategies to create demand for male circumcision," and conclude that "the effects of more intense promotion or longer implementation require further investigation."—*J. Rosenberg*

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Increased Use of Facilities Helped Reduce Maternal Mortality in Bangladesh

A variety of factors—some related to health care provision and some not—have contributed to the recent dramatic decline in maternal mortality in Bangladesh, a wide-ranging analysis suggests.[1] Data from the Bangladesh Maternal Mortality Surveys indicate that between 2001 and 2010, the country's maternal mortality ratio fell from 322 to 194 maternal deaths per 100,000 live births, equivalent to an annual rate of decline of 5.6%. One likely reason for the decline was increased access to and use of health facilities (for example, the proportion of births that occurred in facilities tripled), though other factors, such as reductions in births to high-risk groups, probably also played a role. Overall, the authors estimate that half of the maternal deaths that otherwise would have occurred in 2010 were averted because of decreases in the risk of maternal mortality and other trends.

At present, Bangladesh is one of only nine countries on track to achieve Millennium Development Goal 5, which encouraged countries to try to reduce their maternal mortality ratio by 75% of its 1990 level by 2015. To explore the reasons for Bangladesh's success, Arifeen and colleagues used data from several sources, notably the 2001 and 2010 Bangladesh Maternal Mortality Surveys, which collected data from nationally representative samples of about 100,000 and 174,000 households, respectively. Respondents provided information about their social and demographic characteristics, birth histories, health seeking behaviors and related topics. In addition, interviewers conducted verbal autopsies with relatives of all women aged 13–49 who had died in the three years before each survey; at least two independent physicians reviewed each case to assign a cause of death. To interpret trends in the mortality findings, the analysts drew on other data sources, including the Bangladesh Demographic and Health Surveys conducted between 1993 and 2011 and various government policy documents and technical reports.

The researchers calculated maternal mortality ratios (maternal deaths per 100,000 live births) and rates for the three years preceding each Maternal Mortality Survey. In addition, they conducted Poisson regressions to identify variables associated with changes in the risk of maternal death between 2001 and 2010, and used a nonlinear decomposition method and other calculations to analyze these changes.

The survey data indicated that between 2001 and 2010, the maternal mortality ratio for the previous three years declined from 322 maternal deaths per 100,000 live births to 194 per 100,000. This decrease is equivalent to an annual decline of 5.6%, slightly higher than the 5.5% annual rate required for countries to meet Millennium Development Goal 5. The rate of decline was similar in urban and rural areas.

Examination of government documents revealed that the decline in maternal mortality coincided with government initiatives to shift provision of health services from home-based care to community clinics, and with major investments in health care that resulted in the upgrading of facilities that provide emergency obstetric care, the training of skilled birth attendants and the strengthening of health education efforts. Moreover, the number of facilities offering routine and emergency delivery services rose substantially between 2001 and 2008, particularly in the private sector. For example, the number of private facilities providing comprehensive emergency obstetric care increased from 562 to 1,463. As a result, between 2001 and 2010, the proportion of women who lived within a hour of a public or private facility that provided delivery services increased from 74% to 91%, and the proportion who lived with two hours of such a facil-

ity increased from 93% to 99%.

Although home births remained the norm in Bangladesh, the proportion of births that occurred at a facility tripled between 2001 and 2011, from 9% to 29%. (The proportions at which a trained medical provider was present were slightly higher—12% and 32%, respectively—because such providers were also present at some home births.) While use of health facilities for deliveries increased among women in all socioeconomic strata, disparities remained. Among women in the wealthiest quintile, the proportion of deliveries that occurred in a facility doubled between 2001 and 2011, from 30% to 60%; among the poorest women, the proportion was substantially lower, even though it quadrupled from 2.5% to 10%. Similar disparities—and similar increases in facility usage—occurred by women's education level.

While the use of facilities may have contributed to the decline in maternal mortality, contextual factors also likely played a role, according to the authors. For example, between 2001 and 2010, women's educational attainment and economic status improved, residence in urban areas increased and the proportion of births that occurred to women in high-risk groups (e.g., teenagers and high-parity women) fell. To determine which of these factors may have contributed to the decline in maternal mortality, the researchers conducted a series of multivariate analyses. In the final model, the risk of maternal death was positively associated with having a fourth or higher-order pregnancy and with being 35 or older, and negatively associated with having a first pregnancy. In addition, there was a marginally significant negative association with the proportion of deliveries in a community that were attended by a trained provider. However, analyses indicated that available measures explained only a third of the decrease in the risk, indicating that unmeasured or imprecisely measured factors explained a substantial proportion of the change.

Finally, the authors calculated that if fertility and maternal mortality rates by age and parity had remained constant between 2001 and 2010, then the number of maternal deaths in 2010 would have been 14,310 instead of 6,848. Thus, 52% of potential maternal deaths were averted—21% because of the decline in the country's fertility rate, 7% because of changes in the characteristics of women who gave birth (e.g., fewer births occurred to high-risk women) and 24% because of reduction of risk within age and parity categories. The aversion of the latter deaths, the researchers believe, can be attributed to the improvements in access to and use of maternal health care.

Limitations of the study, according to the authors, include the lack of data on potentially relevant variables, such as women's nutritional status and the prevalence of maternal complications. Nonetheless, they write, the findings suggest that "the decrease [in maternal mortality in Bangladesh] was the result of factors both within and outside the health sector," and provide "a strong rationale" for improving access to "health-care facilities providing care for maternal complications and safe delivery services," as well as for pursuit of "a broader developmental agenda" that should improve women's status.—*P. Doskoch*

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