Progress Has Been Made in Improving the Sexual And Reproductive Health of Young Ugandans

Among youth aged 15–24 in Uganda, sexual and reproductive health knowledge, knowledge of reproductive health services and reports of sexual risk behaviors improved between 2003–2004 and 2012.[1] Between the two time points, the proportion of youth ever tested for HIV rose from 8% to 48% among males and from 10% to 64% among females. Increased age and level of education were associated with a positive change in most of the indicators examined. However, in 2012, relative to 2003–2004, males were less likely to know where to obtain condoms (odds ratio, 0.7) and to report sexual debut before age 15 (0.8). Despite overall increases in knowledge, knowledge of STI symptoms and of what to do in the event of an STI remained low for both sexes (36–51%).

To assess where resources should be directed to improve the health outcomes of young people in Uganda, researchers examined changes in youths' sexual and reproductive health knowledge, access to services and sexual risk behaviors between 2003–2004 and 2012 using secondary data from cross-sectional, district-level community surveys. The sample was restricted to youth aged 15–24; measures included youths' social and demographic characteristics, their sexual and reproductive health knowledge (the benefits of HIV testing, the signs and symptoms of STIs, actions to take in the event of an STI) and knowledge of services (where to get tested for HIV and where to obtain condoms), as well as their age at first sex and whether they had ever been tested for HIV. Logistic regression was used to assess the changes in the indicators between the two time periods and the characteristics associated with these indicators, stratified by sex.

Between 2003–2004 and 2012, there were improvements in almost all of the indicators, although there were some differences by sex. The biggest improvement was seen in the proportion of youth who had ever been tested for HIV—from 8% to 48% for males and from 10% to 64% for females. In 2003–2004, 79% of males and 72% of females knew one or more benefit of HIV testing; in 2012, the proportions rose to 90% for each. For young men and women, the proportions knowing two or more symptoms of STIs doubled (from 22% to 51% for males and 22% to 47% for females), as did those for knowing where to get an HIV test (from 38% to 85% for males and 35% to 85% for females). The proportion of young women who knew what to do in the event of an STI rose from 28% to 37%, and the proportion who knew where to get a condom rose slightly, from 83% to 85%; the proportion of young men reporting early sexual debut decreased from 15% to 12%.

In multivariate analyses in which the reference group was same-sex 20-year-old youth with a primary education in 2003–2004, young men in 2012 were more likely to know the benefits of HIV testing and to know STI symptoms (odds ratios, 2.4 and 3.8, respectively). In addition, males aged 24 in 2012 had increased odds of knowing the benefits of HIV testing, the symptoms of STIs and what to do in the event of an STI (1.3–1.7); males aged 15 in 2012 had decreased odds for the three knowledge indicators (0.5–0.7). Also, young men with secondary or tertiary education were more likely to report greater knowledge on all three knowledge indicators (secondary, 1.6–2.2; tertiary, 1.6–5.6). Results for females followed the same general pattern with a few exceptions: Young women in 2012 were more likely than those in 2003–2004 to know what to do in the event of an STI (1.5), and having a tertiary education was associated only with increased knowledge of STI symptoms (2.7).

In terms of the knowledge of services indicators, age and education continued to be associated with greater knowledge for both sexes. Young men and women in 2012 were more likely than those in 2003–2004 to know where to get an HIV test (odds ratios, 10.5 and 11.3, respectively), as were older respondents (relative to younger ones, 1.5 and 1.9) and those with secondary or tertiary education (relative to those with primary education, 1.8–2.5). Younger respondents of both sexes were less likely to know where to go for HIV testing (0.6 for males and 0.5 for females). These patterns held for knowledge of where to obtain a condom, with a few differences by sex: In 2012, males were less likely to know a place to get condoms (0.7), and the differences between males with primary education and those with tertiary education were not statistically significant for this indicator. For both males and females, relative to those who were unmarried, those who were single with a partner were more likely to know where to get condoms (4.7 and 1.3, respectively).

In comparison with youth in 2003–2004, young men—but not women—in 2012 were less likely to report sexual debut before age 15 (odds ratio, 0.8); older respondents were also less likely to report early debut (0.8 for males and 0.6 for females). For both sexes, being younger (males, 1.3; females, 2.0), having no education (males, 2.3; females, 2.0) and being single with a partner (1.9 for males, 2.7 for females) were all associated with higher odds of reporting early sex; for females, ever being married also was associated with increased odds of early debut (2.5). Results for having ever been tested for HIV were similar for both sexes: Respondents in 2012, older respondents, those with secondary or tertiary education, single respondents with partners and those who had ever been married were more likely to have ever been tested for HIV (1.6–24.1). Young women with no education were less likely than those with primary education to have ever had an HIV test (0.5); the difference was not significant for young men.

The researchers note that although the data are representative of the districts covered by the survey, they are not nationally representative. They conclude that "further efforts are required to ensure universal access and sufficient health education to facilitate the continued improvement of safe sexual behaviors among youth aged 15–24 years."*–L. Melhado*

REFERENCE

1. Crossland N et al., Sexual and reproductive health among Ugandan youth: 2003–04 to 2012, *Journal of Adolescent Health,* 2015, doi: 10.1016/j.jadohealth.2015.06.015.

Ghana's R3M Program Is Associated with Greater Provision of Safe Abortions

Ghana's Reducing Maternal Mortality and Morbidity (R3M) program helps to increase provision of safe abortion services and postabortion care, according to a quasi-experimental study of provider survey data.[1] Compared with providers not exposed to R3M, those exposed to the program were more likely to provide safe abortions and postabortion care (odds ratios, 4.0 and 2.0, respectively). Neither provider attitudes about abortion nor knowledge of abortion law was associated with these outcomes, but provider confidence in performing the procedure was a strong positive predictor.

The R3M program was launched in 2006 in seven districts in the Greater Accra, Ashanti and Eastern regions of Ghana, and provides technical and financial support to improve access to and provision of comprehensive abortion care and family planning services. To investigate the program's effect, investigators compared providers from the districts exposed to R3M with two control groups of providers from nonexposed districts: one group in the same regions (who may have had some exposure because of geographic proximity) and one in the distant Brong Ahafo region. Data were collected in 2011–2012 through face-to-face interviews with providers who were legally eligible to provide abortions and worked in facilities having the capacity to offer gynecologic care. Providers were asked questions about their characteristics and those of their facility, as well as about their abortion training, experience and attitudes. The investigators used propensity score analysis and estimated associations of the R3M program exposure with two outcomes: provision of safe abortion services and provision of postabortion care.

Analyses were based on data from 197 providers in the districts exposed to the R3M program, 148 providers in nearby nonexposed districts and 112 providers in remote nonexposed districts. Larger proportions of providers exposed to R3M than of those not exposed provided safe abortion services (54% vs. 13%) and postabortion care (66% vs. 33%), had been trained in at least one abortion technique (84% vs. 52%), correctly answered six or more questions probing knowledge of abortion law (80% vs. 62%), had confidence in their ability to provide safe abortions (77% vs. 36%) and felt that their facility supported abortion provision (81% vs. 37%).

In multivariate analyses, exposed providers were more likely than all nonexposed providers to provide safe abortion services (odds ratio, 4.0); the difference was smaller when exposed providers were compared with only the nonexposed providers in the same regions (2.5) and much larger when they were compared with only the nonexposed providers in the distant Brong Ahafo region (15.7). Exposure to the program was associated with a similar increase in the odds of providing safe abortion services when analyses were restricted to providers who were trained in at least one method of abortion (3.8).

Compared with peers who had low confidence in their ability to perform abortions, more confident providers had greater odds of providing safe abortion services (odds ratio, 7.7). In contrast, providers' knowledge of abortion law, attitude toward abortion, perceived facility support for abortion and religion were not associated with this outcome in the study sample as a whole; however, among providers who were trained in at least one method of abortion, Catholics were less likely than peers of other religions to provide services (0.4).

Exposed providers were twice as likely as all those not exposed to provide postabortion care (odds ratio, 2.0). However, no difference was found when the exposed group was compared with either the nearby nonexposed group or the remote nonexposed group individually, or when analyses were restricted to providers who knew of at least one method of abortion. Here also, confident providers were much more likely to provide postabortion care than nonconfident peers (odds ratio, 4.9). And provider type played a role too, as midwives, nurses and medical assistants were less likely than doctors to provide this care (0.3). Knowledge, attitudes, perceived facility support and religion were not associated with this outcome in the study sample as a whole.

The authors comment that the study's results "show that any intervention to improve comprehensive abortion care in Ghana should focus on providing training in abortion techniques and on building provider confidence in service provision" and "hopefully encourage the expansion of the R3M programme to cover the entire country, especially the more remote areas." They acknowledge that their analysis was limited by the lack of facility-level data, and suggest that future research could assess the program's impact on both women and facilities, and examine the interplay between provider and facility characteristics. *–S. London*

REFERENCE

1. Sundaram A et al., The impact of Ghana's R3M programme on the provision of safe abortions and postabortion care, *Health Policy and Planning,* 2015, 30(8):1017–1031.

Community Stigma Attached To HIV and AIDS Is a Common Barrier to Obtaining Care

In a 27-country study of women receiving HIV services, the most commonly reported barrier to care was community stigma regarding HIV and AIDS.[1] More than three quarters of women said that such stigma was a barrier to obtaining care, and more than half of women in Latin America and China said that it was a major impediment. Other important barriers included poor community knowledge of HIV, an unsupportive work environment, lack of employment opportunities and inadequate personal financial resources, each of which was reported by 65–72% of respondents. On average, women in the global sample had experienced 6.2 of the 12 barriers assessed in the study, though women in China had experienced 10.9.

Although a variety of studies have identified barriers to HIV care, these studies have been small and geographically limited. To obtain a broader picture of the prevalence and severity of these barriers, Johnson and colleagues conducted a cross-sectional epidemiological study in 27 countries in 2012–2013. Women were recruited sequentially during routine visits at 114 sites where HIV care was provided, including 17 sites in six Latin American countries (Argentina, Brazil, Chile, Colombia, Mexico and Venezuela) and three sites in China; the remaining sites were in Europe and Canada. Women were eligible to participate if they were 18 or older and had received a positive HIV diagnosis at least three months earlier. Participants completed four questionnaires, including the Barriers to Care Scale, which asks respondents to rate the severity of 12 potential barriers in four categories: geography and distance; medical and psychologi-

cal services; community stigma; and personal resources. Using a scale from 1 (no problem at all) to 4 (major problem), respondents indicated the extent to which each barrier made it difficult for them to obtain care or services. In addition to calculating descriptive statistics on the prevalence and severity of barriers, the researchers conducted a multivariate analysis to identify women's characteristics associated with barrier severity.

Overall, more than three-fourths of the eligible women agreed to participate, which yielded a sample of 1,931 women, including 519 from Latin America and 120 from China. On average, women in the global sample were 40 years old; 58% had received their HIV diagnosis at least five years earlier, and 40% were married. Slightly more than half of the participants were living with a partner, 46% of whom were HIV-positive. The vast majority of women (92%) were receiving antiretroviral therapy. Substantial regional variation was apparent for some characteristics, however: For example, 81% of Chinese women were married, compared with only 33% of women in Latin America, and 76% of Chinese women had been infected within the five years before interview, compared with 40% of their Latin American counterparts.

The most commonly reported barrier to care was community stigma against HIV and AIDS, cited by 78% of women globally; more than half of women in Latin America and China said that such stigma was severe, compared with slightly more than a third of those in Central and Eastern Europe. Other barriers frequently reported by the global sample were poor community HIV knowledge (72%), lack of employment opportunities (70%), lack of a supportive work environment (69%) and inadequate personal financial resources (65%). For all of these barriers, as well as for the remaining barriers in the survey, prevalence was highest in China.

On average, women in China reported that 10.9 of the 12 barriers had been problematic to some degree, compared with 6.2 in the global sample and 6.1 in Latin America. Barrier severity was also highest in China: The average severity rating was 2.8 on the scale from 1 to 4, compared with 2.1 globally and 2.2 in Latin America. Mean severity ratings were particularly high for barriers related to community stigma, both in the full sample (2.8) and in China and Latin America (3.1 each). In Latin America, the severity ratings for barriers related to distance and geography and to medical and psychological services were similar to those in Europe and Canada (<2.0); again, severity ratings were highest in China (2.4–2.9). Overall, mean severity ratings were 3.0 or higher for six barriers in China and two barriers in Latin America, but for none of the barriers in developed countries.

In multivariate analyses, the strongest predictors of barrier severity scores were residence in China (vs. Western Europe or Canada), having three or more comorbidities (vs. none), having to pay out of pocket for the full cost of HIV services (as opposed to having expenses fully covered by public or private insurance) and having changed treatment facilities in the past year. Severity was also elevated among women who were younger than 50, were unemployed or smoked, or who had missed scheduled appointments, lacked access to contraceptives or had access to routine HPV testing.

The authors note several limitations of the study, including the omission of women who were not receiving services (for whom barriers likely are especially severe), the relatively small sample from China and the lack of data from Africa (where HIV prevalence is highest). Nonetheless, the results suggest that community barriers, especially stigma, are especially important barriers and may lead to "missed appointments or reluctance to access...needed health-care services" other than primary care. Overall, the authors conclude that their findings "reinforce the need to continue efforts to educate the general community and healthcare providers on HIV to lessen stigma, increase disclosure, and decrease worldwide incidence of HIV."*–P. Doskoch*

REFERENCE

1. Johnson M et al., Barriers to access to care reported by women living with HIV across 27 countries, *AIDS Care,* 2015, 27(10):1220–1230.

Women Married by Age 18 May Receive Reduced Benefits from Partner Violence–Reduction Programs

Interventions aimed at reducing intimate partner violence (IPV) may be less effective among women married at a young age than among other married women, according to secondary analysis of data from a randomized controlled trial assessing a combined economic empowerment and gender norms program conducted in rural Côte d'Ivoire between 2010 and 2012.[1] Among female participants who had married at age 18 or older, those exposed to the full intervention—which involved gender dialogue discussion groups as well as a group savings program—were less likely than those exposed to only the group savings program to have experienced emotional IPV and economic abuse in the preceding year (odds ratios, 0.4 each); exposure to the gender dialogue discussion groups was also marginally associated with reduced odds of having experienced physical IPV, sexual IPV or both (0.5 each). Among women who had married before age 18, however, exposure to the gender dialogue discussion groups was associated with reduced odds of having experienced economic abuse in the past year (0.3), but not any form of IPV.

Previous research has shown that women who marry before age 18 are disproportionately affected by IPV and have elevated risks for poor sexual and reproductive health outcomes, but few studies have examined the effectiveness of interventions in reducing such risks. In this study, researchers analyzed data from a randomized controlled trial for which village savings and loan associations were established in 24 villages in Côte d'Ivoire; each association included 15–30 women, and enabled them to pool their funds, obtain loans for livelihood activities and receive shares from interest after loans were repaid. About half of saving and loan associations were then randomly selected to the intervention group to receive a gender norms component, which consisted of eight gender dialogue discussion group sessions for women and their male partners; sessions focused on gender inequality, the importance of nonviolence and women's contributions to household functioning. Baseline and follow-up surveys in 2010 and 2012, respectively, measured past-year experience of physical (e.g., being hit, kicked or threatened with a weapon), sexual (i.e., forced to have sex) or emotional (e.g., being intimidated or threatened) IPV, as well as economic abuse (e.g., a partner's refusal of money for necessities). Generalized linear regression analyses assessed associations between these measures and exposure to the gender dialogue groups, stratified by whether women had been married before age 18.

About 75% of women were farmers or small business owners, had no education and had four or more children. Three in 10 women had married before age 18. Greater proportions of women who had married before age 18 than of those who had married later had no education (83% vs. 70%), were Muslim (26% vs. 13%), were aged 18–24 (16% vs. 5%) or 25–34 (32% vs. 26%) and had a partner who was a farmer (90% vs. 80%). Twenty-two percent of women reported experiencing any physical or sexual IPV in the last year, 15% any physical violence, 12% any sexual violence, 44% any emotional violence, and 33% economic abuse. There were no differences in reported IPV or abuse by child marriage status.

Among women married before age 18, exposure to the gender dialogue discussion groups was associated with reduced odds of having experienced economic abuse in the previous year (odds ratio, 0.3), but was not found to be associated with any of the types of violence studied. Among women who had married at age 18 or older, exposure to the gender dialogue discussion groups was associated with decreased odds of reporting emotional violence or economic abuse in the past year (0.4 for each); in addition, exposure to the intervention was marginally associated with decreased odds of physical violence, sexual violence or both (0.5 each).

The researchers identified several limitations of their study: that it was not designed to assess intervention effects by child marriage status, its use of a convenience sample, the potential undersampling of women married before age 18 and the possibility of cohort effects. Nonetheless, they suggest that women who marry early may receive less benefit from economic and gender empowerment interventions than women who marry at a later age, and that their study "reinforces the benefits of delaying early marriage as a potential means of reducing women's risk" for intimate partner violence. Moreover, the researchers believe that, "given the pervasiveness of child marriage in Côte d'Ivoire, there is an urgent need to develop and evaluate interventions to reduce [intimate partner violence] that are tailored to this large and highly vulnerable population."–*J. Thomas*

REFERENCE

1. Falb KL et al., Differential impacts of an intimate partner violence prevention program based on child marriage status in rural Côte d'Ivoire, *Journal of Adolescent Health,* 2015, 57(5):553–558.

Efavirenz-Based ART May Reduce the Effectiveness Of Contraceptive Implants

Use of antiretroviral therapy (ART) regimens that are based on the drug efavirenz may compromise the effectiveness of the contraceptive implant, according to a retrospective longitudinal cohort study of HIV-positive Kenyan women.[1] Among implant users, the adjusted incidence of pregnancy for those whose ART regimen was based on efavirenz was three times that for peers whose regimen was based on nevirapine, a drug from the same class that causes less activation of the enzyme that metabolizes hormonal contraceptives. In contrast, the pregnancy rate among users of the contraceptive injectable did not differ significantly by ART regimen. Implant users had a lower risk of pregnancy than users of other contraceptive methods except IUDs and permanent methods, both in the subsample of women on efavirenz-based regimens and in the entire study cohort.

Study participants were HIV-positive women aged 15–45 enrolled at HIV health facilities in western Kenya, where efavirenz-based therapy is now recommended as initial therapy. From electronic medical records, the investigators extracted data collected during clinic visits made by women between 2011 and 2013; typically, women visited the clinic every 1–6 months. For each visit, the researchers categorized the contraceptive method women were using and the ART regimen they were on at the time. Pregnancies were ascertained from women's self-report or presenting as pregnant during a clinic visit. Poisson multivariate analyses were used to examine pregnancy rates for various combinations of contraceptive method and ART regimen.

Analyses were based on 24,560 women who contributed 94,162 observations. Women's mean age at the start of the study was 31 years; 44% were married or cohabiting. Women were using the implant in 7% of observations, the injectable in 17%, the pill in 3%, the IUD or permanent methods in 3% and less effective methods (condoms or natural methods) in 37%; in 33% of observations, women were not practicing contraception. With respect to ART, women were on a nevirapine-based regimen in 49% of observations, an efavirenz-based regimen in 14%, and a lopinavir- and ritonavir-based regimen in 4%; in 32% of observations, women were not receiving ART. Overall, women had 3,337 pregnancies during follow-up, which corresponds to an unadjusted pregnancy rate of 8.9 per 100 person-years.

The pregnancy rate among all women using the implant (after adjustment for factors potentially affecting this outcome) was 1.4 per 100 person-years; however, the pregnancy rate was 3.3 among women on efavirenz-based ART regimens and 1.1 among those on nevirapine-based regimens—a difference that translated to an adjusted pregnancy rate ratio of 3.0. Findings were similar whether women were using the etonogestrel implant or the levonorgestrel implant. In contrast, the incidence of pregnancy among injectable users did not differ by ART regimen. The findings held up in sensitivity analyses that used more stringent definitions of contraceptive and ART exposure, and of pregnancy.

In the entire study cohort (irrespective of ART receipt and regimen), the adjusted pregnancy rate for users of other types of contraceptives—except the IUD and permanent methods—was 3–4 times that for implant users. Specifically, compared with a pregnancy rate of 1.4 per 100 person-years for implant users, the rates for injectable users, pill users and users of less effective methods were 4.3, 5.8 and 5.6, respectively; the rate for women not using any method was 4.8. Similarly, in the entire subset of women on an efavirenz-based ART regimen, the adjusted pregnancy rate for users of other types of contraceptives—except the IUD and permanent methods—was 2–3 times that for implant users. Specifically, compared with a pregnancy rate of 3.3 for implant users, the rates for injectable users, pill users and users of less effective methods were 5.4, 9.3 and 5.4, respectively; the rate for women not using any method was 4.0.

Study limitations included possible inaccurate documentation of contraceptive use and uncertainty about dates of initiation, higher than expected pregnancy rates among women using more effective methods, lack of information on pregnancy intentions, and inability to account for certain important covariates, such as sexual activity and ART adherence. Despite these, the authors comment that their findings add to evidence that efavirenz-based ART may reduce the effectiveness of the implant, but also suggest that the implant is still among the most effective reversible contraceptives, even among women on efavirenz-based ART. They suggest that prospective

research is needed on interactions between hormonal contraceptives and ART regimens that assesses pharmacokinetics and more rigorously ascertains contraceptive and ART adherence and pregnancies. The authors conclude that "HIV programmes, providers, and ministries of health should continue to offer HIV-positive women the choice of selecting concomitant implants and efavirenz-based ART until better contraceptive and ART alternatives are shown to be more effective and become readily available."

The authors of an accompanying commentary[2] note that current guidance for South Africa recommends that women on efavirenz-based ART not use implants, and use the IUD or injectable instead. They caution that the newly reported pregnancy rates should be interpreted with caution because of the study's reliance on medical records and the approach to analysis. Nonetheless, they conclude that "these data might encourage reconsideration of blanket guidance against concomitant use of implants and efavirenz, or emphasis on potentially less-effective alternative methods, and focus on appropriate counselling to help HIV-positive women choose the contraceptive method most suited to their situation." *–S. London*

REFERENCES

1. Patel RC et al., Pregnancy rates in HIV-positive women using contraceptives and efavirenz-based or nevirapine-based antiretroviral therapy in Kenya: a retrospective cohort study, *Lancet HIV,* 2015, 2(11):e474–e482.

2. Morroni C, Bekker LG and Rees H, Contraceptive implants and efavirenz-based ART: friend or foe? *Lancet HIV,* 2015, 2(11):e454–455.

Prenatal Care Linked to Reduced Risk of Postpartum Hospitalization Among Women Who Deliver Vaginally

The use of adequate prenatal care may be beneficial to women's postpartum health. According to an analysis of data from a nationally representative sample of 8,222 Taiwanese women who gave birth in 2005, approximately 70% had received adequate prenatal care.[1] Among women who had delivered vaginally, adequate prenatal care was associated with a 44% reduction in the risk of rehospitalization within six months postpartum; no association was found among women who had delivered by cesarean section.

To examine the relationship between the receipt of adequate prenatal care and maternal health, researchers analyzed claims data for inpatient and outpatient visits from Taiwan's Longitudinal Health Insurance Database, which collects data from the country's national health insurance program. The researchers chose to use data from Taiwan because its national health insurance program covers virtually the country's entire population and provides pregnant women with a package of maternal care services that includes free prenatal care, free delivery services and postnatal care with only a small copayment.

Analyses focused on two nationally representative samples of women who gave birth in 2005: those who delivered vaginally and those who delivered by cesarean section. An identifier unique to each beneficiary was used to link individual women to their service utilization records for prenatal care within 40 weeks of delivery, as well as for all health services in 2004 and in the six months after delivery. The researchers constructed a measure of adequate prenatal care utilization on the basis of five conditions (e.g., had not received any prenatal care by the 16th week of pregnancy, had four or fewer prenatal care visits by the 34th week of pregnancy); women who met none of the conditions were considered to have had adequate prenatal care. Recursive bivariate probit models were used to estimate the association between adequate prenatal care and women's risk of hospitalization within the six months after delivery.

Analyses were based on 5,403 women who had delivered vaginally and 2,819 women who had had a cesarean section. In general, the characteristics of the two groups were similar. However, 22% of the vaginal delivery group were aged 24 or younger, 38% were 25–29, 30% were 30–34 and 10% were 35 or older; the proportions for the cesarean group were 13%, 33%, 34% and 19%, respectively. Also, the mean amount spent on medical expenditures in 2004 was NT$77,982 (US$2,599) among women who had delivered vaginally and NT$74,952 (US$2,498) among women who had had a cesarean section. Some 45% of the vaginal delivery group lived in the North region of Taiwan, 27% in the Center, 26% in the South and 2% in the East; the proportions for the cesarean group were 47%, 22%, 28% and 2%, respectively.

The proportion of women who had received adequate prenatal care was 68% in the vaginal delivery group and 70% in the cesarean group. The rehospitalization rate was 0.6% among women who had delivered vaginally and 0.7% among women who had had a cesarean section. In addition, the mean postpartum medical expenditure was NT$19,122 (US$637) for the vaginal delivery group and NT$32,310 (US$1,077) for the cesarean group. Among women who had delivered vaginally, the rehospitalization rate was 0.5% for those who had had adequate prenatal care and 0.8% for those who had not; mean postpartum medical expenditures of women who had received adequate prenatal care were less than half those of women who had not. However, the rehospitalization rates were reversed among women who had had a cesarean section (0.8% among women with adequate prenatal care and 0.5% among those without), and mean medical expenditures did not differ by prenatal care.

Results from the recursive bivariate probit models showed that receipt of adequate prenatal care varied by geographic location, facility type and physician's gender in both the vaginal delivery and cesarean groups. In addition, among women who had delivered vaginally, having received adequate prenatal care was associated with a 44% reduction in the risk of rehospitalization within six months of delivery; no association was found between prenatal care and rehospitalization among the cesarean group.

The authors acknowledge some limitations of their study, such as their narrow measure of maternal health; their ability to measure only prenatal care quantity, not quality; and the lack of data on women's previous pregnancies and other characteristics known to be associated with prenatal care use. Even so, they comment that "it is clear that adequate prenatal care is in fact beneficial for the well-being of the vaginal delivery group of mothers." The authors conclude that "governments around the world need to more actively promote the use of prenatal care and reach out to women who might have difficulties in seeking prenatal care so as to improve the health of both newborns and mothers."*–J. Rosenberg*

REFERENCE

1. Liu TC et al., Does prenatal care benefit maternal health? A study of postpartum maternal care use, *Health Policy,* 2015, 119(10):1382–1389.