

Increasing Postpartum Contraception in Rural India: Evaluation of a Community-Based Behavior Change Communication Intervention

By Mary Philip Sebastian, Mohammed Ejazduin Khan, Kaushal Kumari and Rukma Idnani

Mary Philip Sebastian is senior program officer, and Mohammed Ejazduin Khan is senior program associate, both at Population Council, New Delhi. At the time this article was written, Kaushal Kumari was assistant research officer, and Rukma Idnani was head, Obstetrics and Gynaecology Department, both at Lala Lajpat Rai Memorial Medical College, Meerut, India.

CONTEXT: The Indian family planning program, though successful in increasing contraceptive use among couples who have achieved their desired family size, has not been equally successful in educating couples about the use of contraceptive methods for birth spacing.

METHODS: An evaluation was conducted of a behavior change communication intervention integrated into the existing government program to increase knowledge and use of the lactational amenorrhea method and postpartum contraception through counseling by community workers. The intervention, which ran between September 2006 and January 2007, was conducted among 959 pregnant women aged 15–24 who lived in Uttar Pradesh, India. The evaluation used logistic regression analyses to measure differences in knowledge and contraceptive use between baseline and the four- and nine-month postpartum follow-up surveys within and between the intervention and comparison groups.

RESULTS: The follow-up data show increases in knowledge of the lactational amenorrhea method and spacing methods and in use of spacing methods. At four months postpartum, women in the intervention group were more likely to know the healthy spacing messages than those in the comparison group (odds ratio, 2.1). At nine months postpartum, women in the intervention group, those with higher knowledge of healthy spacing practices and those with correct knowledge of two or more spacing methods were more likely than others to be using a contraceptive method (1.5–3.5). Use of modern contraceptives for spacing at nine months postpartum was 57% in the intervention group versus 30% in the comparison group.

CONCLUSIONS: Targeted behavior change communication using community workers is an effective and feasible strategy for promoting postpartum contraception.

International Perspectives on Sexual and Reproductive Health, 2012, 38(2)68–77, doi: 10.1363/3806812

More than half a million women die each year as a result of complications related to pregnancy and childbirth in developing countries across the world;^{1,2} in India, there were 68,000 maternal deaths in 2008.³ Of the 7.7 million child deaths reported worldwide in 2010, 22% occurred in India.^{1–3} Recent Indian National Family Health Survey (NFHS) data further show that 12% of children ever born to currently married women have died.⁴ Available studies demonstrate that the chances of infant and maternal survival would be 2.5 times as high with birth intervals of 3–5 years as with intervals of two or fewer years.^{5–8} In this context, the postpartum period is particularly important.

Family planning method use in India leans heavily toward methods that limit fertility. The latest NFHS shows that 77% of sterilized women did not use a family planning method before sterilization.⁴ Between the 1970s and the 1990s, the Indian Family Planning Program emphasized sterilization and set targets for the number of procedures.⁹ As a consequence, the name Family Planning Program became associated with sterilization. Despite changing its name to the Family Welfare Program and removing the target approach, the program has not been successful in educating people about the concept and advantages of in-

terpregnancy spacing or the use of contraceptive methods for spacing births.

Although contraceptive methods are available for free through the public health system at the village level, promotion of spacing methods is not considered important by health workers. Studies suggest that providers tend to focus their counseling on limiting methods and find it challenging to counsel young couples about spacing methods.^{9–13} Counseling about spacing methods can be time-consuming and providers must work against the myths and misconceptions about family planning use that are prevalent in the community. In addition, the lack of decision-making power about contraceptive use among young women makes providers view this counseling as futile.^{12,13} Consequently, the interpregnancy interval has remained short. The median birth interval in India is 31 months; it is only 25 months for women aged 15–19 years.⁴ Young, low-parity, postpartum women in Uttar Pradesh are at high risk of closely spaced births; it is essential that programs focus their attention on this group to help prevent maternal and child mortalities and morbidities.

The dependence of postpartum women on such traditional practices as postpartum abstinence and prolonged

breast-feeding without having correct knowledge of the lactational amenorrhea method also leads to short intervals between pregnancies.^{13,14} Because promotion of the lactational amenorrhea method has not been given importance within the government program,¹³ very few providers are aware of the three conditions necessary for effective pregnancy prevention—the woman must breast-feed exclusively, must not have resumed menstruation and must be less than six months postpartum.

To address this issue, the Population Council, in collaboration with Lala Lajpat Rai Memorial Medical College, Meerut, conducted operations research to assess the feasibility and effectiveness of a behavior change communication intervention using community workers from the Family Welfare Program to promote postpartum contraception and the lactational amenorrhea method to young pregnant women in rural areas of Uttar Pradesh. In these areas, only 18% of births were delivered in a health facility in 2006.¹⁵ Hence, an intervention to raise awareness about the advantages of birth spacing for the health of mother and child would have a better chance of succeeding if it were community-based rather than clinic- or facility-based. The focus of the intervention was the promotion of spacing methods. Currently, oral contraceptives, condoms and Copper T IUDs are the spacing methods provided by the national program; all are available at the village level. This paper discusses the findings from the operations research on and the effects of the intervention promoting postpartum contraception.

Study Setting

The study was carried out in the rural areas of Meerut district in Uttar Pradesh. Uttar Pradesh is the most populous state in India (166 million people), and it has relatively poor socioeconomic development and demographic indicators.¹⁶ Uttar Pradesh is one of the poorest states in India; 33% of its rural population was below the poverty line in 2004–2005.¹⁷ Marriage age is particularly low in this state; according to the 2005–2006 Family Health Survey, 59% of women aged 20–24 years in rural areas had married before the legal minimum age of 18 years. The total fertility rate in Uttar Pradesh was 3.8 children per woman; in rural areas it was 4.1 children per woman.¹⁵

Approximately 30% of births in the state occur within 24 months of the mother's last birth, and another 34% occur within 24–35 months of her last birth.¹⁸ In 2005–2006, the median duration of breast-feeding among last-born children was 26.6 months, but the duration of exclusive breast-feeding was only 2.8 months.¹⁵ The use of spacing methods in Uttar Pradesh was 9% among rural women aged 15–45 years old, but 11% among urban and rural women aged 20–24.¹⁵

Public Health System

In the public sector, a subhealth center (subcenter) is the first contact between the primary health care system and the community. Each subcenter, run by the Department of

Health and Family Welfare, serves a population of 3,000–5,000 and is managed by an auxiliary nurse midwife. Auxiliary nurse midwives are community midwives who have received 18 months of training in nursing and midwifery. To ensure that IUDs are available at the village level, auxiliary nurse midwives also receive special training in the insertion and removal of IUDs.

Working with the auxiliary nurse midwives are community workers—accredited social health activists from the Department of Health and Family Welfare and anganwadi workers from the Integrated Child Development Scheme (ICDS) of the Department of Women and Child Development. Accredited social health activists are volunteers with three weeks of training in various aspects of mother and child care who are supervised by the auxiliary nurse midwives. Working door-to-door, accredited social health activists, who receive a performance-linked fee, are responsible for counseling pregnant women and their family members about ante- and postnatal care, family planning and other topics. Anganwadi workers, who are given a monthly honorarium, run anganwadi centers for preschool-age children in the morning and counsel pregnant and lactating women at home in the afternoon and provide them with supplementary nutrition. They receive one month of job training initially, as well as on-the-job training, and are managed by supervisors from the ICDS program.

The auxiliary nurse midwife goes to a different anganwadi center every week to run an antenatal care clinic; the accredited social health activists and anganwadi workers assist in bringing pregnant women for antenatal care. Pregnant women are advised by the community workers to go for a minimum of three antenatal care visits, with at least one in the last trimester.

Community workers in each village are expected to maintain a register of pregnant and postpartum women. Because there is almost no turnover among the anganwadi workers, their registers were used to identify the pregnant women eligible for the study. In some villages, these registers had to be updated before they could be used.

The Intervention

The intervention consisted of an educational campaign carried out by community workers. (No activities other than those of the government-run health program were conducted in the comparison areas.) Using communication materials (leaflets, posters, wall paintings and booklets), workers educated all pregnant women registered for the study and their mother-in-law or the oldest female family member on healthy timing and spacing of pregnancy (first pregnancy should be delayed until age 18, women should wait at least 24 months after a live birth and six months after an abortion or miscarriage before planning their next pregnancy), postpartum care, the lactational amenorrhea method and postpartum contraception. All of the educational materials and counseling aids were newly developed and pretested for their suitability for semiliterate women, the clarity of the messages, cultural acceptability, familiar-

TABLE 1. Percentage distribution of a sample of pregnant women aged 15–24 in intervention and comparison areas, by study group, according to selected characteristics, Uttar Pradesh, India, 2006

Characteristic	All (N=959)	Intervention (N=477)	Comparison (N=482)
Age			
15–19	11.0	11.3	10.6
20–24	89.0	88.7	89.4
Age at initiation of cohabitation			
15–17	12.7	13.6	11.8
18–20	63.1	64.2	62.1
21–23	24.2	22.2	26.1
Mean (sd)	19.2 (1.8)	19.2 (1.8)	19.3 (1.9)
Woman's education			
Illiterate	29.8	28.1	31.5
Primary school	18.4	19.9	16.8
Middle school	18.1	19.3	17.0
≥high school	33.7	32.7	34.7
Husbands' education			
Illiterate	8.1	7.3	9.0
Primary school	13.6	12.2	14.9
Middle school	18.1	16.8	19.5
≥high school	60.2	63.7	56.6
Religion*			
Hindu	82.2	82.0	82.4
Muslim	16.9	17.8	16.0
Other	0.9	0.2	1.6
Caste**			
Scheduled caste/tribe	28.9	24.3	33.4
Other backward-caste Hindu	25.8	23.7	27.8
High-caste Hindu	27.5	34.0	21.2
Other religious groups	17.8	18.0	17.6
Parity			
0	57.0	57.4	56.6
1	43.0	42.6	43.4
Total	100.0	100.0	100.0

*Difference between intervention and comparison group is significant at $p \leq .05$. **Difference between intervention and comparison group is significant at $p \leq .01$. Notes: Unless otherwise noted, all figures are percentages. Percentages may not add to 100.0 because of rounding. sd=standard deviation.

ity of the audience with the context and relevance for the target audience.¹⁹ There was also a focused educational campaign for husbands and males in the community that taught them about maternity care (with special emphasis on the husband's role in antenatal and postnatal care) and postpartum contraception. Prior to the campaign's imple-

mentation, all community workers received training in the topics covered by the intervention. The intervention was carried out between September 2006 and January 2007.

• **Intervention training.** A three-tier training model was developed. First, a one-day orientation meeting was organized for the medical, district health and ICDS officers to inform them about the study, its objectives and the proposed intervention. Medical officers from the Department of Health and Family Welfare and child development project officers from the Department of Women and Child Development who served in the intervention areas were chosen as trainers and received a one-day training session on the topics to be covered by the intervention. Working together, the medical and child development project officers trained all of the community workers from a village together in groups of 25 over two days. Twenty-seven auxiliary nurse midwives, 108 accredited social health activists and 117 anganwadi workers received this special in-service training. Their knowledge was tested pre- and posttraining through a questionnaire with 15 multiple choice questions covering such topics as messages on healthy timing and spacing of pregnancy, antenatal care, postpartum care, the lactational amenorrhea method and other contraceptive methods. Prior to training, 14% of the community workers correctly answered all questions except the question on the lactational amenorrhea method (no one knew the method before training began). After training, 95% answered all questions correctly, including the question on the three conditions required for the lactational amenorrhea method. Practice sessions on counseling young couples were an important component of the training. Participants performed role-plays of house visit scenarios and the group of trainees analyzed each enacted scene. The analysis and subsequent discussion identified which messages had been successfully passed on during the scenarios and which required more counseling.

• **Monitoring and supervision during intervention.** Despite belonging to two different departments, community workers complement each others' efforts. To ensure that this expected coordination takes place during the intervention, considerable time was spent during training to familiarize the workers with the objectives of the study and to assist them in charting their work plan. During this activity, the workers from both government departments specified activities to be carried out jointly and activities and roles to be performed individually.

TABLE 2. Percentage of women reporting having received counseling on various topics at baseline, four months postpartum and nine months postpartum, by study group

Topic	Intervention (N=477)			Comparison (N=482)		
	Baseline	4 mos. postpartum	9 mos. postpartum	Baseline	4 mos. postpartum	9 mos. postpartum
Need for checkup first week postpartum	12.0	49.5**	na	8.5	10.4	na
Lactational amenorrhea method	3.6	65.5**	na	1.9	2.0	na
Use of spacing methods after delivery	14.1*	82.7**	92.9**	9.8	63.2	68.7
STIs	7.6*	15.5**	44.2**	4.2	1.6	2.9
HIV/AIDS	10.5	32.8**	49.5**	9.1	3.3	6.6

*Significantly different from comparison group at $p \leq .05$. **Significantly different from comparison group at $p \leq .01$. Note: na=not applicable.

During their routine visits to the villages, supervisors performed spot checks of random families to gauge how well the pregnant women were assimilating knowledge of the topics covered in counseling by the community workers. Throughout the intervention period, project staff visited the households of pregnant women to determine the quality of counseling given by the community workers and the extent to which the intervention topics had been covered. The supervisors continued their spot checks after the intervention period.

METHODS

The evaluation used a randomized experimental pre- and posttest design. Meerut district is divided into 12 blocks. Of these, two blocks each were randomly assigned to the comparison and intervention groups; thus, four blocks in Meerut were part of the study. Twelve villages with populations of 2,000 or more people were selected from each block for inclusion, for a total of 48 villages, 24 in each group.

Women from the study villages who were younger than 25, had one child or no children and were 4–7 months pregnant* were eligible for the study. Because young women tend to have low contraceptive prevalence and short birth intervals, a contraceptive prevalence rate of 10% among women aged 24 or younger was taken as the base value for estimating the sample size.²⁰ A sample size of 541 women in each arm of the study was estimated as sufficient for detecting a five percentage-point increase in the prevalence of contraceptive use at nine months postpartum.²¹ The sample size was increased to 600 to compensate for 10% loss to follow-up at nine months postpartum.

Before the commencement of the intervention, a baseline survey was carried out among the 1,197 women who had agreed to participate. Follow-up interviews were conducted at four months and nine months postpartum. The responses of the 959 women (477 from the intervention group and 482 from the comparison group) who participated in all three interview rounds were included in the analyses in this article.

Data were collected in the local language; informed consent was received from respondents prior to participation in each of the surveys. No incentives were offered; participation was completely voluntary. Ethical approval for the study was obtained from the institutional review board of the Population Council.

Measures

The women's current age was categorized as 15–19 and 20–24. Because it is not unusual for women in India to marry young and then join their husband when they are older, participants were asked about their age at the time of cohabitation, categorized as 15–17, 18–20 and 21–23 years; this categorization allowed us to capture those who began cohabiting before the legal minimum age.

For educational attainment, respondents were categorized as illiterate, or as having completed primary school, middle school, or high school or higher; those who could

TABLE 3. Percentage distribution of women in the intervention group reporting exposure to educational campaign materials, four and nine months postpartum

Indicator	4 mos. postpartum (N=477)	9 mos. postpartum (N=477)
Received booklet		
Yes	78.5	81.9
No	21.5	18.1
Read the booklet†		
Herself	47.6	66.5
Someone read it to her	19.0	31.2
Neither read nor heard it	33.4	2.3
Showed booklet to husband†		
Yes	63.5	88.7
No	36.5	11.3
Showed booklet to mother-in-law†		
Yes	29.9	47.5
No	60.4	42.8
Mother-in-law deceased/ living elsewhere	9.7	9.7
Showed booklet to otherst		
Yes	22.4	25.3
No	77.6	74.7
Saw at least one poster		
Yes	47.8	48.2
No	52.2	51.8
Saw at least one wall painting		
Yes	u	32.3
No	u	67.7
Attended group meeting		
Yes	u	16.6
No	u	83.4
Total	100.0	100.0

†Restricted to those who received the booklet; this figure is 374 for the four-month postpartum survey and 391 for the nine-month postpartum survey. Notes: Percentages may not add to 100.0 because of rounding. u=unavailable.

read and write but who had not attended school were included in the primary education category. Being illiterate was coded as 0, and the highest education level was coded as 3. Husbands' educational attainment was categorized in the same way as their wives', but was not included in the multivariate analysis; there were high levels of correlation between husbands' and wives' education level.

Religion was categorized as Hindu, Muslim or other. Hindu participants were also asked to identify the caste to which they belonged: scheduled caste, other backward caste Hindu and high-caste Hindu. In the study villages, there were very few tribal people; they were grouped with scheduled castes. We decided to use castes (and code Muslim and other religious groups together) in the multivariate analysis to capture the intricacies of the division among the Hindus.

One of the inclusion criteria of the study was parity zero or one. (Although miscarriages occurring before the re-

*Women very rarely report their pregnancy to community workers or go for antenatal care during the first trimester; hence, women with first-trimester pregnancies were not included in the study.

TABLE 4. Percentage of women with correct knowledge of contraceptive methods and healthy pregnancy spacing messages, at baseline, four months postpartum and nine months postpartum, by study group

Topic	Intervention (N=477)			Comparison (N=482)		
	Baseline	4 mos. postpartum	9 mos. postpartum	Baseline	4 mos. postpartum	9 mos. postpartum
Knew IUD is placed in uterus	44.2	66.0**	84.3**	30.6	31.2	45.8
Knew IUD is effective for 10 yrs.	0.4	29.9**	47.8**	0.4	2.5	5.4
Knew correct pill use	60.6	79.5	92.2*	53.9	75.6	86.3
Knew correct condom use	81.6	93.0*	94.3*	80.9	84.0	85.5
Knew correct emergency contraceptive use	0.9	8.6**	19.7**	1.2	0.2	3.7
Knew all 3 conditions required for lactational amenorrhea method	0.0	64.4**	na	0.0	0.2	na
Mentioned 3–5 yrs. spacing between births	86.6	92.2	na	89.8	91.6	na
Mentioned at least 3 undesirable outcomes of short-spaced pregnancy	32.1*	55.4**	na	38.2	25.5	na
Mentioned health of woman, last child and fetus affected by short-spaced pregnancy	30.2	70.0*	na	28.4	63.7	na

*p≤.05. **p≤.01. Note: na=not applicable.

ported pregnancy were captured in the survey, only parity was considered for the purpose of analysis.) Women with no living children were coded as parity zero and those with one living child were coded as parity one.

The knowledge indicators used in the multivariate regression were knowledge of healthy timing and spacing of pregnancy practices and correct knowledge of the spacing methods available in the national program. For the knowledge of healthy spacing messages measure, respondents received one point for each of the following: mentioning that 3–5 years' spacing between births is healthy spacing and that the health of the mother, last child and fetus could be affected by a short pregnancy interval; and citing at least three potential undesirable or adverse health outcomes for mother and child of a short pregnancy interval. Scores of 2 and 3 were coded as one and those of 0 and 1 were coded as zero. We opted for this dichotomy because the majority of the women mentioned the need for 3–5 years between births at baseline. For the knowledge of spacing methods measure, those who knew the correct use of two or more methods were coded as one and those with knowledge of one method or no methods were coded as zero.

For the logistic regression carried out to gauge the association between knowledge increase and the adoption of protective behavior, that is, adoption of a modern con-

traceptive method to prevent unwanted pregnancy, a dichotomous variable was created, with zero denoting those not using a modern contraceptive method at nine months postpartum and one denoting contraceptive users.

Analyses

Only women who had responded to all three follow-up surveys and whose child was alive at nine months postpartum were included in the multivariate analyses. To determine if the intervention was associated with increased knowledge and use of postpartum contraception, we used regression analyses. The outcome indicators for which logistic regression was carried out were change in knowledge of healthy spacing messages between baseline and the four-month postpartum follow-up survey and change in knowledge of correct use of spacing methods between baseline and the nine-month follow-up survey. Ability to mention all three conditions of the lactational amenorrhea method was not included in the logistic regression because only 0.2% of women in the comparison group knew about the method at four months postpartum.

For each model, the dependent variable was the follow-up survey value of the knowledge indicator that the intervention targeted. The first model estimated included only two variables, the baseline measurement of that variable and study group assignment. The second model added a set of potentially confounding individual characteristics—educational attainment, age, age at the time of cohabitation, caste and parity.

For the regression analyses assessing adoption of a method, background variables were entered into the first model along with study group assignment. In the second model, other covariates indicating knowledge level were added. Knowledge of the lactational amenorrhea method was excluded from the model because very few women in the comparison group knew the method. For the same reason, lactational amenorrhea method use was not entered into the model. All statistical analyses were conducted by using STATA version 10.

TABLE 5. Percentage of women reporting death of index child, pregnancy status and discussions of pregnancy timing and spacing methods with husband, nine months postpartum, by study group

Indicator	All (N=959)	Intervention (N=477)	Comparison (N=482)
Index child died/ stillborn/miscarried	12.0	11.5	12.5
Currently pregnant	13.5	10.5**	16.4
Discussed when to have next child with husband	84.6	84.9	84.2
Discussed family planning methods with husband	50.9	62.5**	39.4

**Significantly different from comparison group at p≤0.01.

RESULTS

Except for their religion and caste, respondents were similar in their background characteristics across the two study groups (Table 1, page 70). The great majority of women in both the intervention and comparison areas were aged 20–24 years. The mean age at the initiation of cohabitation was about 19.2 years. Most women were literate (as were their husbands), and most did not work for pay (98%—not shown). There were more women belonging to religious groups other than Hindu or Muslim and to scheduled tribes in the comparison area. In the two groups, women were almost equally distributed among Hindu castes (scheduled castes, other backward castes and high castes). Very few (about 3%) were in scheduled tribes and were living in the comparison area (not shown).

Counseling on all five topics—the need for a first-week postpartum checkup, the lactational amenorrhea method, the use of spacing methods after delivery, STIs and HIV—was reported by 2–14% of women at baseline (Table 2, page 70). At baseline, only knowledge on the need to use spacing methods after delivery and knowledge on STIs were significantly higher in the intervention area than in the comparison area. The postpartum follow-up surveys revealed significant increases in counseling on all the topics in the intervention group compared with the comparison group. At the time of their four-month postpartum follow-up, 50% of women in the intervention area reported having been counseled to have a one-week postpartum checkup and 66% reported having been counseled about the lactational amenorrhea method. By the nine-month postpartum follow-up, 93% of women in the intervention area reported having received counseling on the use of spacing methods after delivery.

Women from the intervention area were asked whether they had received a booklet, seen posters or wall paintings, or participated in any group meetings organized by the community workers to educate women on timing and spacing of births (Table 3, page 71). The majority of the women had received the booklet—79% by four months postpartum and 82% by nine months postpartum. Most women had shown the booklet they received to their husband (64% by four months postpartum and 89% by nine months postpartum), but fewer reported sharing the booklet with their mother-in-law (30% by four months postpartum and 48% by nine months postpartum). At each follow-up point, about half reported having seen the messages on posters. Only 17% of the women had attended group meetings by nine months postpartum.

Knowledge of the various contraceptive methods was significantly higher in the intervention group compared with the comparison group at four months postpartum; these differences were even greater at the nine-month postpartum survey (Table 4). Sixty-four percent of women from the intervention area knew all three conditions required for the lactational amenorrhea method at four months postpartum. However, this did not translate into practice, as the majority of the woman said that they had started

TABLE 6. Percentage distribution of women reporting contraceptive method use and percentage reporting modern method use, by method, according to study group, nine months postpartum

Method	All (N=959)	Intervention (N=477)	Comparison (N=482)
Modern contraceptive	43.5	57.0**	30.1
Pill	10.5	13.8	7.1
Condoms	31.7	40.9	22.6
IUD	1.0	1.9	0.2
Sterilization	0.3	0.4	0.2
Traditional method (including abstinence)	22.1	18.9**	25.3
No method	34.4	24.1**	44.6
Total	100.0	100.0	100.0

**Significantly different from comparison group at $p \leq 0.01$.

to bottle feed because they did not have sufficient breast milk (not shown). As a result, only 23% from the intervention area had used the lactational amenorrhea method as a contraceptive method. Although none of the women in the comparison area were aware of the lactational amenorrhea method, 13% of them fulfilled the three conditions of the method and were therefore protected from pregnancy.

TABLE 7. Unadjusted and adjusted odds ratios from logistic regression analyses identifying associations between selected characteristics and knowledge of healthy spacing practices at four months postpartum and of spacing methods at nine months postpartum

Characteristic	Knowledge of healthy spacing messages		Knowledge of ≥ 2 spacing methods	
	Unadjusted odds ratio	Adjusted odds ratio	Unadjusted odds ratio	Adjusted odds ratio
Study group				
Comparison (ref)	1.00	1.00	1.00	1.00
Intervention	2.18**	2.07**	2.06**	1.96**
Baseline value	0.98	0.97	2.00**	1.53*
Woman's education				
Illiterate (ref)	na	1.00	na	1.00
Primary school	na	0.96	na	1.11
Middle school	na	1.11	na	2.07**
\geq high school	na	1.31	na	3.18**
Age				
15–19 (ref)	na	1.00	na	1.00
20–24	na	1.65*	na	1.46
Age at initiation of cohabitation				
15–19 (ref)	na	1.00	na	1.00
20–23	na	0.93	na	0.77
Caste				
Scheduled caste/tribe (ref)	na	1.00	na	1.00
Other backward-caste Hindu	na	1.27	na	1.26
High-caste Hindu	na	1.93**	na	1.66
Other religious groups	na	1.41	na	1.39
Parity				
0 (ref)	na	1.00	na	1.00
1	na	0.89	na	0.82
<i>-log likelihood</i>		490.25		382.59
<i>Pseudo R²/R²</i>		0.04		0.08

* $p \leq 0.05$, ** $p \leq 0.01$. Notes: ref=reference group, na=not applicable.

TABLE 8. Odds ratios (and 95% confidence intervals) from logistic regression analyses assessing associations between selected variables and postpartum contraceptive use, nine months postpartum

Variable	Model 1	Model 2
Study group		
Comparison (ref)	1.00	1.00
Intervention	3.66 (2.72–4.91)**	3.51 (2.56–4.82)**
Woman's education		
Illiterate (ref)	1.00	1.00
Primary school	1.39 (0.90–2.14)	1.33 (0.84–2.11)
Middle school	1.30 (0.83–2.04)	1.11 (0.68–1.79)
≥high school	1.88 (1.27–2.79)**	1.72 (1.13–2.63)
Age		
15–19 (ref)	1.00	1.00
20–24	1.10 (0.64–1.89)	1.06 (0.60–1.88)
Age at initiation of cohabitation		
15–19 (ref)	1.00	1.00
20–23	1.09 (0.83–1.42)	1.11 (0.83–1.48)
Caste		
Scheduled caste/tribe (ref)	1.00	1.00
Other backward-caste Hindu	1.60 (1.07–2.38)*	1.55 (1.01–2.37)
High-caste Hindu	1.30 (0.87–1.95)	1.19 (0.77–1.83)
Other religious groups	1.04 (0.67–1.62)	1.03 (0.64–1.66)
Parity		
0 (ref)	1.00	1.00
1	1.17 (0.86–1.61)	1.34 (0.96–1.87)
Knowledge of healthy spacing messages		
≤1 message (ref)	na	1.00
≥2 messages	na	1.52 (1.06–2.18)*
Correct knowledge of spacing methods		
≤1 method	na	1.00
≥2 methods	na	2.67 (1.62–4.42)**
<i>-log likelihood</i>	531.86	447.06
<i>Pseudo R²</i>	0.09	0.12

* $p \leq .05$. ** $p \leq .01$. Note: ref=reference group. na=not applicable.

At nine months postpartum, an equal proportion of women in each group reported discussing the timing of their next child with their husband (85% and 84%; Table 5, page 72). A significantly higher proportion of those in the intervention group than of those in the comparison group reported discussing methods for spacing births with their husband (63% vs. 39%, respectively), and a significantly higher proportion of those in the comparison area than of those in the intervention area reported being pregnant at the time of the nine-month postpartum survey (16% vs. 11%, respectively). None of these pregnancies were among woman who had reported the death of a child (not shown).

A higher proportion of women in the intervention group than of those in the comparison group reported modern contraceptive use at the nine-month postpartum follow-up—57% vs. 30% (Table 6, page 73). The method most commonly used in both areas was the condom (41% intervention, 23% comparison), which is one of the least effective methods. The IUD, a long-acting method, was used by only 2% of women in the intervention area and 0.2% in the comparison area. About one-fifth of women in the in-

tervention group and one-quarter of those in the comparison group reported using a traditional method. Only 24% of women in the intervention area were not using a family planning method at the time of nine-month postpartum follow-up, compared with 45% in the comparison area.

Regression Findings

Belonging to the intervention group was associated with increased knowledge of messages on healthy spacing and knowledge of spacing methods communicated through the intervention (Table 7, page 73). Despite the fact that many women in both groups knew that 3–5 years' spacing between births is ideal and that short interpregnancy intervals can negatively affect the health of the woman, her last child and her fetus, women in the intervention group were significantly more likely to know the healthy spacing messages four months postpartum than were those in the comparison group (odds ratio, 2.1). Similarly, even though more than half of the women in both study groups had correct knowledge of condom and pill use at baseline and the proportions with this knowledge increased in both groups by nine months postpartum, the results indicate that the intervention was associated with an increase in correct knowledge of spacing methods. The odds of knowing the correct use of two or more methods were twice as high for women in the intervention area as for those in the comparison area. Higher education was also associated with increased odds of knowledge of correct use (2.1–3.2). Women aged 20–24 years and high-caste Hindus had higher odds of knowing healthy spacing messages than younger women and those from scheduled caste (1.7 and 1.9, respectively).

In the analyses of associations between postpartum contraceptive use and selected variables (Table 8), the results suggest that compared with others, those belonging to the intervention group and those with knowledge of at least two healthy spacing messages and at least two spacing methods had higher odds of adopting a modern contraceptive method during the postpartum period (odds ratios, 1.5–3.5).

DISCUSSION

The current study was undertaken to test a comprehensive, community-based behavior change communication intervention for its effectiveness in training community workers to educate young couples, families and community members in poor, rural settings in India about healthy pregnancy spacing, postpartum contraception to increase the interval between pregnancies and the use of the lactational amenorrhea method. The intervention, which included in-service training, provision of job aids and educational materials, education of young couples and monitoring of the educational campaign, was feasible and effective. Despite increases in the proportion of couples who were aware of the lactational amenorrhea method, few of them adopted the method and, of those who did, a relatively small proportion switched to a modern contraceptive when they

could no longer use the method (not shown). The fact that the community workers knew nothing of the lactational amenorrhea method before the intervention and that differing breast-feeding beliefs and practices exist within the community²² suggest that a longer intervention may be required to improve adoption of the method.^{13,23}

Studies have shown that, in general, women who desire another child do not want to conceive for at least 18 months after their last birth;²⁴⁻²⁶ this holds true in India as well.^{10,24} However, this desire to delay pregnancy often does not translate into the use of contraceptives. Even in the intervention area, the majority of women reported condoms as the postpartum contraceptive method they used. There is evidence that misconceptions about long-acting contraceptive methods exist.²⁷ In the light of the current study and other research conducted in India,²⁸ the Indian Family Welfare Program adopted communication materials developed by the Population Council to promote the Copper T IUD. Messages debunking misconceptions about the method were included in these materials. Emphasis by community workers that this is a different IUD without the side effects women fear has helped increase IUD acceptance.²⁹

A review of the family planning program in India suggested that community workers provided poor-quality counseling and spent an inadequate amount of time explaining topics to women.¹¹ Qualitative data collected along with the quantitative data used in the current study also pointed to poor quality of antenatal and postnatal family planning advice.¹⁰ Studies conducted in other countries suggest that community workers need special training in the skills needed for counseling young couples and should be provided with appropriate educational and counseling aids.³⁰⁻³² Given the misconceptions about and lack of acceptability of spacing methods in the community, having group meetings with men and mothers-in-law and asking pregnant woman to share educational materials with family members might improve the acceptability of spacing methods and increase their adoption in the long run.^{23,30,31} Because young women lack decision-making power, changing the community's image of spacing methods may encourage its acceptance by husbands and mothers-in-law, who often make health care decisions for young women.^{12,25,26,33,34}

To enhance the quality of counseling, emphasis should be given to the monitoring and supervision of community workers. During the intervention, project staff selected random households from the study villages for spot checks to determine the extent of the counseling and the woman's retention of knowledge. The supervisors were trained to continue with the spot checks when the project staff withdrew from their activities. Doing spot checks is crucial if supervisors are to ensure the quality and scope of the counseling. Previous studies have shown that receiving high-quality family planning advice and care is linked to contraceptive use.^{11,13,31,32,34}

Given the high levels of unwanted pregnancies and un-

met need for family planning in India, there is a need to devise easy-to-implement and effective programs that increase contraceptive knowledge and use. The intervention in this study was very simple and easy to implement. Because the intervention involved enhancing the counseling skills of the workers through practice training and use of job aids and was built into the existing government system, it was sustainable. In the context of India, this study demonstrates that cooperation between the anganwadi workers and the accredited social health activists and the auxiliary nurse midwives, who work for two different departments, is feasible and that working together as a team benefits both programs. The willingness of the district-level officials to cooperate with each other made this study successful. The united effort of the two government departments ensures that one or the other community worker has counseled the woman on all of the important maternal and child health topics. Having seen the results of this intervention, the departments involved in the program have scaled up the activities to other blocks of Meerut district.

REFERENCES

1. World Health Organization (WHO), *Maternal Mortality in 2005: Estimates Developed by WHO, UNICEF, UNFPA and the World Bank*, Geneva: WHO, 2007.
2. Shah IH and Say L, Maternal mortality and maternity care from 1990 to 2005: uneven but important gains, *Reproductive Health Matters*, 2007, 15(30):17-27.
3. United Nations Interagency Group for Child Mortality Estimation, *Levels & Trends in Child Mortality*, New York: United Nations Children's Fund, 2011.
4. International Institute for Population Sciences (IIPS) and Macro International, *National Family Health Survey (NFHS-3), 2005-06, India, Vol. 1*, Mumbai: IIPS, 2007.
5. Rutstein S, *Relationships Between Pregnancy Intervals and Prenatal Mortality: Proceedings of the 2nd Champions Meeting on Birth Spacing*, Washington, DC: CATALYST Consortium, 2002, pp. 15-22.
6. Setty-Venugopal V and Upadhyay UD, Birth spacing: three to five saves lives, *Population Reports*, 2002, Series L, No. 13.
7. Whitworth A and Stephenson R, Birth spacing, sibling rivalry and child mortality in India, *Social Science & Medicine*, 2002, 55(12):2107-2119.
8. Winikoff B, The effects of birth spacing on child and maternal health, *Studies in Family Planning*, 1983, 14(10):231-245.
9. Sangwan N and Maru RN, The target-free approach: an overview, *Journal of Health Management*, 1999, 1(1):71-96.
10. Khan ME, Sebastian MP and Aeron A, Promoting healthy timing and spacing of pregnancy: barriers and possible intervention: observation from a qualitative study in Uttar Pradesh, *Research Update*, New Delhi: Population Council/Frontiers, 2007, No. 13.
11. Koenig MA, Foo GH and Joshi K, Quality of care within the Indian family welfare programme: a review of recent evidence, *Studies in Family Planning*, 2000, 31(1):1-18.
12. Stephenson R and Tsui AO, Contextual influences on reproductive health service use in Uttar Pradesh, India, *Studies in Family Planning*, 2002, 33(4):309-320.
13. Varkey LC et al., Involving men in maternity care in India, *Frontiers Final Report*, New Delhi: Population Council, 2004.
14. Nath DC, Land KC and Singh KK, The role of breast-feeding beyond postpartum amenorrhoea on the return of fertility in India: a life table and hazards model analysis, *Journal of Biosocial Science*, 1994, 26(2):191-206.

15. IIPS and Macro International, *National Family Health Survey (NFHS-3), 2005-06, India, Uttar Pradesh*, Mumbai: IIPS, 2008.
16. Ministry of Home Affairs, Government of India, Census data 2001, <http://www.censusindia.gov.in/Census_Data_2001/India_at_glance/popul.aspx>, no date, accessed Feb. 4, 2010.
17. Planning Commission, Government of India, Poverty estimates for 2004-05, 2007, <<http://planningcommission.nic.in/news/prmar07.pdf>>, accessed Feb. 18, 2012.
18. Access Family Planning Initiative, U.S. Agency for International Development, Family planning needs during the extended postpartum period in Uttar Pradesh, India, 2008, <http://www.k4health.org/system/files/DHS_Uttar%20Pradesh%2C%20India_0.pdf>, accessed Feb. 4, 2010.
19. Sebastian MP, Khan ME and Roychowdhury S, Promoting healthy spacing between pregnancies in India: need for differential education campaigns, *Patient Education and Counseling*, 2010, 81(3):395-401.
20. IIPS and ORC Macro, *National Family Health Survey (NFHS-2), 1998-99, India, Uttar Pradesh*, Mumbai: IIPS, 2001.
21. Lwanga SK and Lemeshow S, *Sample Size Determination in Health Studies: A Practical Manual*, Geneva: WHO, 1991.
22. Population Council, Increasing early and exclusive breastfeeding in UP: implications for behavior change communication, *Policy Brief*, New Delhi: Population Council, 2010, No. 5.
23. Mwaikambo L et al., What works in family planning interventions: a systematic review, *Studies in Family Planning*, 2011, 42(2):67-82.
24. Zavier F and Padmadas SS, Use of a spacing method before sterilization among couples in Kerala, India, *International Family Planning Perspectives*, 2000, 26(1):29-35.
25. Marchant T et al., Planning a family: priorities and concerns in rural Tanzania, *African Journal of Reproductive Health*, 2004, 8(2): 111-123.
26. Samandari G, Speizer IS and O'Connell K, The role of social support and parity in contraceptive use in Cambodia, *International Perspectives on Sexual and Reproductive Health*, 2010, 36(3):122-131.
27. Khan ME et al., Repositioning of IUD program in Gujarat: findings from baseline survey, *Research Update*, New Delhi: Population Council/FRONTIERS, 2007, No. 11.
28. Khan ME et al., The model works! Repositioning of IUD in public health program in India, *Research Update*, New Delhi: Population Council/FRONTIERS, 2008, No. 15.
29. Sebastian MP, Khan ME and Kumari K, Increasing postpartum check-ups and contraceptive use to reduce maternal and child mortality, *Research Update*, New Delhi: Population Council, 2011, No. 1.
30. Leon FR et al., Length of counselling sessions and the amount of relevant information exchanged: a study in Peruvian clinics, *International Family Planning Perspectives*, 2001, 27(1):28-33 & 46.
31. Leon F et al., Effects of IGSS' job aids-assisted balanced counselling algorithms on quality of care and client outcomes, *FRONTIERS Final Report*, Washington, DC: Population Council, 2005.
32. Arends-Kuenning M, The equity and efficiency of doorstep delivery of contraceptives in Bangladesh, *Policy Research Division Working Papers*, New York: Population Council, 1997, No. 101.
33. Raj A et al., Prevalence of child marriage and its effect on fertility and fertility-control outcomes of young women in India: a cross-sectional, observational study, *Lancet*, 2009, 373(9678):1883-1889.
34. Jayaraman A, Mishra V and Arnold F, The relationship of family size and composition to fertility desires, contraceptive adoption and method choice in South Asia, *International Perspectives on Sexual and Reproductive Health*, 2009, 35(1):29-38.

RESUMEN

Contexto: El programa de planificación familiar en la India, aunque ha sido exitoso en aumentar el uso de anticonceptivos en las parejas que han alcanzado el tamaño deseado de su

familia, no ha sido igualmente exitoso en educar a las parejas sobre el uso de métodos anticonceptivos para el espaciamiento de los hijos.

Métodos: Se evaluó una intervención de comunicación para el cambio de conductas integrada en el programa gubernamental existente. La intervención tuvo el fin de aumentar los conocimientos y uso del método de amenorrea por lactancia y la anticoncepción postparto, a través de consejería impartida por trabajadores comunitarios. La intervención, que se llevó a cabo entre septiembre de 2006 y enero de 2007, se aplicó a 959 mujeres embarazadas en edades de 15-24, que vivían en Uttar Pradesh, India. La evaluación utilizó análisis de regresión logística para medir las diferencias en conocimientos y uso de anticonceptivos entre las encuestas de línea de base y las de seguimiento a los cuatro y nueve meses postparto, dentro y entre los grupos de intervención y comparación.

Resultados: Los datos de seguimiento muestran aumentos en los conocimientos del método de amenorrea por lactancia y de los métodos de espaciamiento, así como en el uso de los métodos de espaciamiento. A los cuatro meses del período postparto, las mujeres en el grupo de intervención tuvieron mayor probabilidad de conocer los mensajes de un espaciamiento saludable que las mujeres en el grupo de comparación (razón de momios, 2.1). A los nueve meses después del parto, las mujeres en el grupo de intervención, aquellas con un mayor conocimiento de las prácticas saludables de espaciamiento y aquellas con un conocimiento correcto de dos o más métodos de espaciamiento, tuvieron mayor probabilidad de usar un método anticonceptivo que otras mujeres (1.5-3.5). A los nueve meses postparto, el nivel de uso de anticonceptivos modernos para espaciar el nacimiento fue de 57% en el grupo de intervención, versus 30% en el grupo de comparación.

Conclusiones: La comunicación dirigida al cambio de conductas usando trabajadores comunitarios es una estrategia efectiva y factible para promover el uso de la anticoncepción durante el período postparto.

RÉSUMÉ

Contexte: Bien qu'ayant réussi à accroître la pratique de la contraception parmi les couples ayant atteint leur nombre d'enfants désiré, le programme de planification familiale indien n'a pas remporté autant de succès en ce qui concerne la sensibilisation des couples à la contraception lorsqu'il s'agit d'espacer les naissances.

Méthodes: Une étude d'évaluation a été effectuée sur une intervention de communication pour le changement comportemental intégrée dans le programme gouvernemental existant dans le but d'accroître la connaissance et la pratique de la méthode de l'aménorrhée lactationnelle et de la contraception post-partum à travers le conseil d'agents de communauté. L'intervention, réalisée entre septembre 2006 et janvier 2007, a porté sur 959 femmes enceintes de 15 à 24 ans résidentes de l'état d'Uttar Pradesh, en Inde. L'évaluation procède par analyses de régression logistique afin de mesurer les différences de connaissance et de pratique contraceptive entre les enquêtes de base et le suivi post-partum à quatre puis à neuf mois dans et entre les groupes d'intervention et de comparaison.

Résultats: Les données de suivi indiquent un accroissement de la connaissance de la méthode de l'aménorrhée lactationnelle et des méthodes d'espacement, ainsi que de la pratique de ces dernières. À quatre mois post-partum, les femmes du groupe d'intervention sont plus susceptibles de connaître les messages d'espacement sain que celles du groupe témoin (OR, 2,1). À neuf mois post-partum, les femmes du groupe d'intervention, celles mieux sensibilisées aux pratiques d'espacement sain et celles faisant preuve d'une connaissance correcte d'au moins deux méthodes d'espacement sont plus susceptibles que les autres de pratiquer une méthode contraceptive (1,5–3,5). La pratique contraceptive moderne à des fins d'espacement à neuf mois post-partum s'élève à 57% dans le groupe d'intervention, par rapport à 30% dans celui de comparaison.

Conclusions: La communication ciblée pour le changement comportemental à travers les agents de communauté offre une stratégie efficace et faisable de promotion de la contraception post-partum.

Acknowledgments

This study was funded by the United States Agency for International Development (USAID) under Cooperative Agreement No. HRN-A-00-98-00012-00. The contents are the responsibility of the FRONTIERS Program of the Population Council and do not necessarily reflect the views of USAID or the U.S. government.

Author contact: msebastian@popcouncil.org