Evaluating the effectiveness of two behavior change communication interventions for safe abortion services in Bihar and Jharkhand, India

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Abstract

Though abortion has been legal in India since 1971, it is estimated that over half of the 3.6 million abortions performed in India each year are unsafe. This study evaluates the effectiveness of two behavior-change communication interventions, a high-intensity model (HIM) and a low-intensity model (LIM), that aimed to improve knowledge about safe abortion services and increase uptake of services. A quasi-experimental pre-post design was used. Cross-sectional household surveys were conducted at baseline and endline in HIM, LIM and comparison districts. Logistic regression difference-in-differences (DD) models were used to assess program effectiveness. Between baseline and endline, knowledge about legal status (OR=2.2) and sources of safe abortion services (OR=1.7) increased in HIM districts. However, the LIM model was only associated with improved knowledge of medical methods of abortion (OR=1.8). Though both interventions improved some aspects of abortion knowledge, the HIM model was more effective in improving comprehensive knowledge about abortion.

Background

Of the 6.4 million abortions performed every year in India, 3.6 million (56%) are estimated to be unsafe (Duggal & Ramachandran, 2004). It is also estimated that 8-9% of maternal deaths are due to abortion-related complications (RGI, 2006), and almost 10,000 abortion-related deaths occur each year in India (Banerjee, 2007). Public health facilities are certified to provide abortion services, but the majority of them do not have a trained medical doctor who legally can provide abortion services. In addition, many women are not aware that abortion is legal and available at government facilities, nor are they aware of which facilities are certified by the government to provide abortion services (Bart Johnston, 2002; Banerjee et al 2011).

One way to improve women's knowledge and access to legal abortion services is through behavior change communication (BCC) interventions. Though BCC interventions have successfully been used in India to increase knowledge of contraceptive use, immunization and HIV/AIDS (Sood, Shefner-Rogers, & Sengupta, 2006; Daniel, Masilamani, & Rahman, 2008), BCC has rarely been used to increase awareness of abortion issues. Few formal evaluations of BCC interventions on abortion have been conducted, but evidence from campaigns in India to increase community awareness of safe abortion and postabortion care, suggests that these types of community-based education campaigns can be effective in increasing awareness and utilization of services (Jejeebhoy, Zavier, Acharaya, & Kalyanwala, 2011; Banerjee, Batra, Ganatra & Baird, 2010).

Recognizing the need to ensure comprehensive abortion care (CAC) services to rural women through improved awareness and access to quality services, Ipas piloted two intervention models suitable for rural women. Both models aimed to address barriers to access to service provision by enabling public sector sites to offer quality abortion services, and to address barriers to information on the legal status and sources of abortion services by building knowledge among rural women to access safe, high quality abortion services.

Intervention description

The intervention had a two-pronged approach to increasing accessibility of abortion services, intervening at the community level to improve awareness of legal aspects of abortion services through a BCC campaign and intervening at the facility level through provider training and site strengthening to enable public sector sites to provide CAC services to rural women. Although the facility level interventions were almost identical at all four intervention districts, the community level interventions were significantly different between the two intervention types: the High-intensity Model (HIM) and the Low-intensity Model (LIM).

A multi-pronged BCC strategy was introduced to increase awareness among women in HIM districts. At the community level, communication activities included interpersonal communication (IPC) through group meetings and interactive games, wall signs, street dramas and distribution of low-literacy reference materials. These activities were implemented by local NGOs. Since this was found to be a low literacy population,

communication materials were developed using local dialects and pre-tested in the intervention communities through focus group discussions and in-depth interviews. The campaign was centered on a young woman called "*Kalyani"*, which means auspicious. Using *Kalyani* as the protagonist, the BCC campaign, implemented in two phases (2008-2009 and 2010-2011), highlighted legal aspects, the nearest facilities to access safe abortion, modern and safe-abortion methods, contraceptive services, the negative aspects of sex-selective abortion, and the health consequences of unsafe abortion. The number of intervention activities in the HIM districts is reported in Table 1.

The Low-intensity Model (LIM) sought to link women to CAC services through community-based intermediaries. Unlike HIM, the BCC strategy of the LIM model was focused on the community intermediaries, defined as people women approach for information when an unwanted pregnancy has occurred. Ipas partnered with two local NGOs that specialize in community intervention and training of health workers. A total of 822 community intermediaries, including auxiliary nurse midwifes (ANMs) and accredited social health activists (ASHAs), were oriented on the legality and availability of abortion services, dangers of unsafe abortion, modern methods of abortion (MVA/MMA) and relative efficacy of first trimester abortion (Table 1). Each of these intermediaries was also oriented on how to refer women requesting termination of pregnancy to a nearby health facility. In addition to this, 487 wall signs were displayed in the villages of LIM districts (Table 1).

Methodology

The study aimed to evaluate the effectiveness of the BCC interventions in improving knowledge about safe abortion services. A pre-post quasi-experimental research design was used. Cross-sectional surveys were administered in intervention and comparison districts prior to implementation (HIM and Comparison districts: 2008; LIM districts: 2009), and once again in 2011 after the BCC interventions were implemented in the intervention districts (endline). Four districts were selected for intervention, Patna and Kishanganj in the state of Bihar and Lohardaga and Dhanbad in the state of Jharkhand. Two comparison districts, Saran in Bihar and Gumla in Jharkhand, were subsequently selected because they had socio-demographic characteristics similar to the intervention districts (Banerjee, Andersen, & Mondal, 2009).

Women were selected using two-stage stratified random sampling. In the first stage, villages from each of the four districts were selected using probability proportional to size (PPS) sampling. For the second stage, a detailed household listing was carried out in each selected village to generate the universe of households with eligible women. Women were eligible to participate in the study if they were married and aged 15-49. Women were excluded from the study if they had been using a permanent method of contraception, female or male sterilization, for more than three years. Twenty households with eligible women were selected from each sampled village using systematic random sampling. A total of 2,131and 2,420 women were successfully surveyed at baseline and endline, respectively. Informed consent was obtained from all participants prior to study enrolment. The overall response rate for the study was more than 97% at baseline and follow-up. Surveys were administered in-person by trained interviewers.

To assess program effectiveness, logistic regression models using difference-in-differences (DD) estimation were used; all models adjusted for key socio-demographic characteristics. DD estimation compares the changes in key outcomes between baseline and endline in the intervention and comparison districts to provide evidence of program effectiveness (Gertler, Martinez, Premand, Rawlings, & Vermeersch, 2011). DD can be used with quasi-experimental study designs, using the change in outcomes for the comparison districts as the counterfactual for the change in outcomes observed in the intervention districts (Gertler et al., 2011). The outcome measures assessed in this study included knowledge about safe abortion. Knowledge about abortion was dichotomized into accurate or inaccurate knowledge, and logistic regression models using DD estimation were employed to evaluate these outcomes.

The cross-sectional data were pooled to estimate the impact of the program on the outcome indicator, Y, after controlling for socio-demographic covariates (X) that may potentially confound effects on the outcome measures as specified in the model below:

$$Y_{i,t} = \alpha + \pi_t X_i + \beta D_{i,t} + \delta t + \gamma D_{i,1} + \acute{\varepsilon}_{i,t}$$

Where $Y_{i,t}$ denotes the outcome measure for an individual i at time t. The time variable t itself is a variable coded 1 if the observation is from the endline survey and 0 if it is from the baseline survey, $D_{i,t}$ is an indicator variable coded 1 if the individual i is from the intervention districts and 0 if from the comparison districts, $D_{i,1}$ is an indicator variable coded 1 if the observation is from the intervention districts and from the endline survey and 0 otherwise, and X_i are the covariates for individual i. α is a common constant for all

observations, π_t are the effects of the covariate on the outcome for each of the two time points (baseline and endline), β is a constant for individuals in the intervention districts, δ is the effect of time on individuals in intervention and comparison districts, γ is the treatment effect, i.e., the additional change in outcome due to the program, and $\acute{\varepsilon}_t$ is the difference between errors at time 1 and time 0.

Results

Socio-demographic characteristics are presented for women in HIM, LIM and comparison districts in Table 2. While some variations were observed, overall, women in the intervention and comparison districts were similar. On average, respondents were aged 28 years in intervention districts and 29 years in comparison districts. Slightly more young women ages 15–24 were surveyed at endline in the HIM and comparison districts as compared to LIM districts. The majority of women across all districts reported no schooling. However, the proportion of women who reported completing secondary school or above was slightly higher in the HIM districts. The religious composition was found to be slightly different by district type, primarily because of differences in the tribal and non-tribal populations of these districts. More women in the LIM districts reported being Muslim and fewer identified as Sarna[1] when compared to the other districts. Women in the HIM and comparison districts reported more joint or extended families, while LIM district reported more nuclear families. Women surveyed were overwhelmingly from the lowest socio-economic strata. However, substantial improvements in socio-economic status have been recorded at endline in HIM, LIM and comparison districts when compared to baseline.

[1] A tribal religion seen in Jharkhand

Table 3 presents data on change in exposure to messages on safe abortion issues between baseline and endline in each intervention group. Exposure to messages on safe abortion increased by almost 60 percentage points in HIM districts ($p<0.001$), 45 percentage points in LIM districts ($p<0.001$), and 10 percentage points in comparison districts ($p<0.001$). All sources of abortion messages increased between baseline and endline in the intervention districts, while only sources such as health intermediaries and neighbors or relatives increased in the comparison districts.

To assess the net effect of exposure to the BCC intervention on women's knowledge about abortion-related issues, multivariate logistic regression was conducted using the DD model, after controlling for potential confounders. The results of the multivariate analyses are presented in Table 4. These models show that the BCC intervention was effective in increasing knowledge about abortion in the intervention districts between baseline and endline, compared to the change observed in the comparison districts. Between baseline and endline, women living in the HIM districts had a significant increase in their knowledge of the legal status of abortion (OR=2.2) and knowledge of a source of abortion services (OR=1.7). However, the same pattern of intervention effect was not observed in the LIM districts. The only significant increase was in women's knowledge of a medical method of abortion (OR=1.8).

Discussion

The HIM intervention was successful in improving knowledge about the legal aspects of abortion in India and improving knowledge about where to access safe abortion services.

Though both intervention types improved some aspects of abortion knowledge, the HIM model was more effective in improving comprehensive knowledge about abortion. The DD analysis showed that after controlling for key socio-demographic characteristics, there were significant improvements in knowledge under the HIM model compared to the comparison group, especially knowledge of the legal status of abortion in India and nearby sources of safe abortion services. The LIM model was less successful in improving knowledge; the only significant difference between the LIM group and the comparison group was increased knowledge about medical abortion methods. These differences in knowledge are likely to be a result of the nature and intensity of the intervention. Women in the HIM districts often received information through interactive intervention components (IPC and street dramas), while women in the LIM districts were most commonly exposed to wall signs, which foster more passive learning. This evaluation provides evidence that a more intensive intervention is more effective in increasing knowledge about safe abortion services, but questions of sustainability remain.

Study Limitations

Our findings should be viewed within the context of the study's limitations. Household surveys rely on self-report by the respondents and reporting and recall bias are possible. The findings of this study are based on six selected districts and cannot be generalized to the whole of Bihar and Jharkhand. However, most of the study's findings on women's knowledge, attitudes, and behavior are in line with other published research in these states.

Due to the small number of women who had abortions within the past three years, we were unable to compare changes in use of abortion services in the intervention districts between baseline and endline, compared to the change observed in the comparison districts using DD analysis. As a result, we had to use changes in knowledge as our outcome variables rather than changes in behavior, which we would have preferred. Due to multiple exposures and small sample size, it was also not possible to assess the relative efficacy of any specific communication channel after controlling the confounding effects of other sources. Another limitation was the possible diffusion of intervention effects into the comparison districts. During the course of the project, CAC training of providers was extended throughout Bihar and Jharkhand, including comparison districts.

Conclusions

This evaluation has guided several recommendations for the use of BCC interventions to increase awareness about safe abortion services and utilization of available safe services in Bihar and Jharkhand. The HIM model is more effective than the LIM model in increasing comprehensive knowledge about safe abortion services. Though the HIM model requires a greater investment of resources, it is likely to result in better outcomes than the LIM model.

Sustainability of the HIM intervention could be increased by training an existing cadre of health intermediaries such as ANMs, ASHAs or AWWs to share basic information on abortion along with other maternal and child health issues in their communities. ASHAs are already a known and trusted source of reproductive health information in their

communities, and expanding their role to include abortion information may increase women's access to safe abortion services. However, orientation of health intermediaries in isolation, without any other BCC activities, as in the LIM districts does not work well.

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Table 1. Number of BCC and facility-level intervention activities in HIM and LIM districts

Intervention activities	HIM Districts	LIM Districts
Interpersonal Communication (IPC) meetings	12,000	--
Wall Signs	851	487
Street Drama	819	--
Orientation of community intermediaries (ASHA & ANM)	--	822
Activated public health facilities for providing CAC services	15	8
Number of villages received BCC intervention	877	949
Number of NGOs involved in BCC activities	3	2

Table 2. Socio-demographic characteristics of respondents at baseline and endline by intervention type

	HIM Districts			LIM Districts			Comparison Districts		
	BL (%) **N=702**	**EL** (%) **N=786**	**p**	**BL** (%) **N=720**	**EL** (%) **N=820**	**p**	**BL** (%) **N=709**	**EL** (%) **N=814**	**p**
Age of Women (in years)									
15-19	3.3	8.5	<0.001	9.7	8.3	0.32	3	10.2	<0.001
20-24	19.5	29.4	<0.001	27.5	26.7	0.72	16.9	21.7	0.02
25-29	31.9	27.4	0.05	25.3	25.6	0.88	30	24.1	0.01
30-34	21.1	17	0.05	16.5	17.3	0.68	22.6	19.7	0.16
35-39	16.7	10.6	<0.001	13.1	11.7	0.42	19.7	13	<0.001
40 & above	7.5	7.1	0.75	7.9	10.4	0.09	7.8	11.3	0.03
Mean age (SD)	28.9 (6.0)	27.7 (7.0)	<0.001	27.9 (7.2)	28.5 (7.5)	0.12	29.4 (6)	29.1 (7.6)	0.4
Education									
Never attended school	64.5	56.1	<0.001	69.7	66.8	0.22	59.2	64.7	0.03
Primary	4.7	8	0.01	7.5	6.2	0.32	3.1	7.4	<0.001
Middle	19.1	23.4	0.04	16.9	17.6	0.75	25	19.7	0.01
Secondary	7.4	8	0.66	3.3	4.8	0.16	8.5	4.5	<0.001
Sr. Secondary & above	4.3	4.5	0.86	2.5	4.6	0.03	4.2	3.7	0.58
Mean schooling# (SD)	8.1 (2.9)	7.5 (3.2)	0.02	6.7 (3.0)	7.7 (3.3)	<0.001	8.2 (2.7)	2.5 (3.0)	<0.001
Religion									
Hindu	56.4	60.2	0.14	49.7	48.5	0.64	66.1	61.7	0.07
Muslim	11.7	17.2	<0.001	47.4	46.7	0.79	9.9	8.6	0.39
Christian	4.4	2.2	0.01	0	0.1	0.34	7.9	8.5	0.68
Sarna	27.5	20.5	<0.001	2.9	4.6	0.08	15.9	21.3	<0.001
Caste									
General	10.4	8.5	0.21	10.8	35.4	<0.001	13.5	11.3	0.18
Scheduled Caste	9.1	17.2	<0.001	13.9	12.2	0.32	7.6	11.7	<0.001

Scheduled Tribe	34.2	26.1	<0.001	10	9.3	0.63	29.2	34.3	0.03
Other Backward Classes	46.3	48.2	0.46	65.3	43.2	<0.001	49.6	42.8	<0.001
Family Type									
Nuclear	47.2	46.2	0.7	55.3	58.5	0.197	40.9	41.3	0.88
Joint/extended	52.8	53.8	0.7	44.7	41.5	0.19	59.1	58.7	0.88
Standard of Living									
Low	82.9	49.6	<0.001	66.4	54.9	<0.001	83.4	74.4	<0.001
Medium	12.3	36.5	<0.001	24.6	33.5	<0.001	11.6	20	<0.001
High	4.8	13.7	<0.001	9	11.6	0.1	5.1	5.5	0.69
Worked in last 3 months									
Yes	29.8	30.9	0.63	90.6	19.4	<0.001	15.5	32.9	<0.001
No	70.2	69.1	0.63	9.4	80.6	<0.001	84.5	67.1	<0.001

calculated amongst women attended school

Table 3. Exposure to messages on abortion-related issues at baseline and endline by intervention type

	HIM Districts			LIM Districts			Comparison Districts		
	BL (%) N=702	EL (%) N=786	p	BL (%) N=720	EL (%) N=820	p	BL (%) N=709	EL (%) N=814	p
Received message on abortion									
Yes	15.1	74.6	<0.001	10	54.9	<0.001	10.3	19.9	<0.001
No	84.9	25.4	<0.001	90	45.1	<0.001	89.7	80.1	<0.001
Source of messages									
IPC group or one-to-one meetings	0.4	39.3	<0.001	0.1	8.3	<0.001	0.4	0.4	0.86
Wall sign	1.7	35.2	<0.001	0.3	38.5	<0.001	0.6	0.7	0.67
Street Drama	--	24.7	<0.001	--	1.5	nc	--	0.2	0.18
Health Intermediaries	13.8	7.6	<0.001	0.4	7.3	<0.001	10.7	5.4	<0.001
Neighbors & relatives	4.7	23.3	<0.001	5.2	15	<0.001	4.5	12.2	<0.001
Private provider	2	1.5	0.49	--	2	--	1.7	2	0.69

--: no data; nc: not calculated

Table 4. DD models of intervention effectiveness in increasing women's knowledge about safe abortion, by intervention type

	HIM districts		LIM districts	
Dependent variable	**Odd ratio (Exp-β)**	**95% CI**	**Odd ratio (Exp-β)**	**95% CI**
Know that abortion is legal in India	2.2***	1.6 - 2.9	1.1	0.8 - 1.6
Know legal gestational age limit for abortion in India	1.2	0.4 - 3.6	2.3	0.3 – 19
Know any surgical method of abortion	0.3*	0.1 - 1.0	0.8	0.4 - 1.5
Know medical method of abortion	0.9	0.6 - 1.4	1.8***	1.2 - 2.5
Accurate knowledge of where to access safe abortion services	1.7***	1.2 - 2.3	1.4	1.0 - 1.9

*p<0.05; **p<0.01; ***p<0.001

Note: All models adjust for age, education, standard of living, family composition, caste, religion, and children ever born and use the comparison group as the reference group