

**Association of mass media exposure on family
planning attitudes and practices in Uganda**

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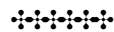
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Abstract

This paper examined the influences of multi-media Behavior Change Communication campaigns on women's and men's use of and intentions to use contraception in target areas of Uganda. Data were primarily drawn from the 1997 and 1999 Delivery of Improved Services for Health evaluation surveys, which collected information from representative samples of women and men of reproductive age in the districts served by the DISH project. Additional time-trend analyses relied on data from the 1995 Demographic and Health Survey. Logistic regressions were used to assess the associations between BCC exposure and family planning attitudes and practices, controlling for individuals' background characteristics. To minimize the biases of self-reported exposure, the analyses also considered cluster-level indices of the penetration of BCC messages in the community. Results indicated that exposure to BCC messages was associated with higher contraceptive intentions and use. While there was some evidence of bias of self-report, the pathways to behavior change appeared different for women and men.

Introduction

There is evidence from a number of studies that individuals' exposure to mass media messages promoting family planning influences contraceptive behavior (Piotrow et al. 1990, Bankole et al. 1996, Westoff and Bankole 1997, Kincaid 2000). For example, in Nigeria, use of modern contraception, intent to use, and desire for fewer children were found to be associated with exposure to media messages on family planning (Bankole et al. 1996). A similar study in Tanzania found that women exposed to a mix of media promoting family planning were more likely to use family planning (Jato et al. 1999).

A number of models have emerged from different fields identifying specific pathways to behavior change and offering insights to programs as they try to influence and change behavior. Several have been very influential in explaining the effects of mass media campaigns on fertility-related behavior. Ideation change, defined as a change in the way of thinking through the diffusion of new ideas and practices, has been identified as an important determinant of fertility decline (Cleland and Wilson 1987). The ideation model derives from the diffusion of innovation theory and includes five stages through which an individual progresses: knowledge, persuasion, decision, implementation, and confirmation (Rogers 1995). The input/output persuasion model considers how various aspects of communication influence the behavioral outcome of communication (McGuire 1989). The Steps to Behavior Change is an adaptation of the diffusion of innovations theory and the input/output persuasion model and consists of five major stages of change: knowledge, approval, intention, practice, and advocacy (Piotrow et al. 1997). This framework emphasizes that there are several intermediate steps that people move through before they change their behavior. This suggests that different messages and approaches in behavior change communication are required to reach people at different stages in the process.

Several empirical studies have confirmed that mass media campaigns have effects at different stages in the process to behavior change. According to a study in Nepal, exposure to mass media had an indirect effect on contraceptive use through increases in interpersonal communication, as well as positive changes in attitudes and perceived social norms regarding family planning (Storey et al. 1999). Similarly, women exposed to a mass media campaign in Tanzania were found to have more positive attitudes towards family planning and to discuss family planning with their spouses (Jato et al. 1999). In Mali, exposure to a campaign was linked to more favorable attitudes towards family planning and a decline in the proportion of men and women who believed that Islam opposes family planning (Kane et al. 1998).

It has been suggested that exposure to messages broadcast through a variety of channels is the most effective way to change knowledge, attitudes, and behavior. Behavior change communication (BCC) campaigns often include a combination of radio spots or advertisements, radio dramas, television advertisements, videos, print materials such as newsletters and leaflets, posters, clinic-based counseling, and community activities such as festivals, theatre, or group meetings (Kincaid et al. 1992, Piotrow et al. 1997). The use of multiple media types is expected to reach a larger audience and help reinforce messages (Piotrow et al. 1997). Studies have also shown that there is a dose-response effect between the amount of exposure to family planning messages in the mass media (as defined by the number of different types of media) and an increase in use of family planning methods. In Tanzania, Jato et al. (1999) found that the more types of media sources of family planning messages, the greater the likelihood of contraceptive use. Likewise, Kane et al. (1998) found that contraceptive knowledge and use and more favorable attitudes towards family planning were positively associated with the number of mass media interventions in Mali.

In Uganda, the Delivery of Improved Services for Health (DISH) project, one of the country's largest reproductive health programs, strove to increase service utilization and change behaviors related to family planning and reproductive health through BCC activities. The project conducted a number of mass media campaigns in collaboration with its implementing partners since its inception in 1995.¹ Focusing on about 30% of the total population, DISH operated in 12 of the country's 56 districts: Jinja, Kampala, Kamuli, Kasese, Luwero, Masaka, Masindi, Mbarara, Nakasongola, Ntungamo, Rakai, and Sembabule.

Several multi-channel campaigns were implemented between 1995 and 1999 to promote the use of modern family planning methods. The campaigns employed short spots on the radio and on television, as well as a weekly radio drama called "Choices" that integrated family health messages. The project assisted the Ministry of Health to distribute the national "Yellow Flower" logo and then the new "Rainbow over the Yellow Flower" logo to identify health facilities offering family planning and integrated reproductive health services respectively, and conducted publicity encouraging couples to visit facilities displaying the logos for information and services. Posters, flip charts for service providers, and a "Health Matters" newsletter were distributed to health facilities. Newsletters were also distributed through newspapers and during community events. A range of other community education activities included drama performances, video shows, and village meetings. All materials were produced in three or four languages. Further activities were carried out in the DISH districts including the broadcast of a weekly radio program called "Capitol Doctor" and the social marketing of contraceptives.² The "Protector" brand condom, "Pilplan" brand oral contraceptives, and "Injectaplan" brand injectables were marketed through radio advertisements as well as billboards and posters at health facilities.

Preliminary analysis using data from the 1999 DISH Evaluation Survey (DES) suggested that women and men who were exposed to various family planning messages on the radio had higher

levels of modern contraceptive use, and higher intention to adopt family planning in the near future among non-users. For example, 16% of women mentioned radio advertisements as among the influences on their decision to practice family planning. Moreover, an examination of time-trends drawing on additional data from the 1995 Uganda Demographic and Health Survey (UDHS) and the 1997 DES showed strong overall increases in contraceptive use and intent among the population living in the target districts (Katende et al. 2000).

In addition to mass media exposure, it would seem likely that the trends in family planning attitudes and practices observed in the DISH districts were also being conditioned by other factors, notably women's and men's socio-demographic characteristics. In fact, a strong and positive relationship between family planning and education, especially of women, emerges as one of the most consistent findings from empirical analyses of reproductive knowledge, attitudes, and behavior in developing countries (see, for example, Ainsworth 1994, Ezeh et al. 1996, Mboup and Saha 1998, Robey et al. 1992, Rutenberg et al. 1991). Education may be seen as a catalyst in diffusion-innovation theories. It is also typically employed as an indicator of socio-economic development or, among women, as a proxy for gender status. Other socio-demographic factors often cited in the literature as important determinants of changing family planning attitudes and practices include age and parity. Generally speaking, contraceptive use tends to peak in the middle of the reproductive span, likely reflecting greater desire of couples in the middle age bracket, at higher fecundity, to prevent or space additional pregnancies. Likewise, contraceptive use is often found to vary with the number of children ever born, along with the changing nature of family planning goals. Place of residence has repeatedly been found to influence reproductive behaviors, with urban-rural distinctions differentiating access to health facilities, socio-cultural norms, and living situations. Overall, it is probable that women's and men's behavior in reproductive matters is conditioned by a mix of both individual's characteristics and ideological differences.

The aim of the present study was to examine whether observed differences in the levels of modern contraceptive use and intention to use among women and men prior to and after the implementation of a BCC campaign signified a positive relationship between exposure to family planning messages and improved perceptions and use. We used multivariate regression analyses to help elucidate the relationships between intensity of exposure to BCC messages and family planning attitudes and practices, conditioned for the effects of a number of background characteristics including age, parity, education, and place of residence. The analyses considered intensity of exposure in terms of both the dose effects of multi-channel interventions and the influences of particular combinations of media messages. Data sources included three population-level surveys conducted over the course of implementation of BCC activities in the districts served by the DISH project in Uganda.

Data and methods

The data sources for this study were three household surveys conducted between 1995 and 1999 in the DISH project districts.³ The 1995 UDHS provided baseline information on the reproductive health status of women and men of reproductive age (Statistics Department and Macro International 1996). While the survey was national in scope, this analysis used information obtained from the sub-samples of 2,316 women aged 15-49 and 663 men aged 15-54 living in DISH districts. The 1997 DES collected data from 1,697 women and 900 men of the same age groups (Katende et al. 1999), and the 1999 DES gathered information from 1,766 women and 1,057 men in the project districts (Katende et al. 2000).

All surveys used a two-stage sampling procedure, based on random sub-samples of households and enumeration clusters in proportion to district population sizes. The use of similar sampling

frames and questionnaires ensured general comparability between the three rounds. The datasets were pooled together and multivariate regression models were used to assess the influences over time of BCC exposure on women's and men's family planning attitudes and practices. Two dependent variables were considered: current use of a modern contraceptive method and intent to use a modern contraceptive method in next 12 months among current non-users. Current contraceptive practice referred to use as reported by the respondent for either self or any sexual partner. In order to better gauge the demand for family planning, results on intentions to use excluded respondents who said that they or their spouse were infertile as well as those who expressed a desire to have a child "soon" or "now". Note that due to differences in questionnaire design, information on family planning intentions among men collected in the 1997 DES were not comparable with findings from the 1995 UDHS and 1999 DES, and are not presented here.

Multivariate logistic regression models for binary dependent variables were applied using the *Stata* statistical software package (StataCorp 2001). Given the differing levels of aggregation of the data—individual and cluster—a general estimating equation (GEE) was used to take into account the multilevel nature of the regression's error structure. Standard regression models assume that individual observations are independent. However, in two-stage sample surveys such as the DHS and DES, individuals from the same cluster or community are likely to exhibit similar demographic and behavioral characteristics (because of a variety of unmeasured and unmeasurable factors) compared to those selected from different clusters. The GEE allowed specification of assumed intra-cluster correlation (Liang and Zeger 1993).

In addition to intensity of BCC exposure, a number of socio-demographic variables were included as potential confounding factors: age of the respondent, marital status (comprising both formal and consensual unions), parity, place of residence, ethnicity, and educational attainment. The measure for BCC exposure was constructed in two steps. First, a variable was created to capture

the number of media through which an individual reported having been exposed to BCC messages in the last six months. This included the following: i) having heard a family planning message on the radio; ii) having seen a family planning message on television; iii) having seen a family planning poster; and iv) having read any materials promoting family planning in a newspaper, magazine, brochure or leaflet. The total number of media to which the respondent was exposed to BCC messages was summed, to a maximum of four media types.⁴ An individual who had heard messages through two or more different media types was considered to have a high level of BCC exposure. (While intensity can be considered in ways other than number of media types, the surveys used did not collect other information on amount of exposure.)

Additional multivariate models were run for measuring the influences of a number of specific BCC messages disseminated in the target areas using data from the two DES, which contained more detailed information on mass media exposure than the earlier DHS. We also conducted some exploratory analyses considering BCC exposure through an instrumental cluster-level aggregate of the degree of penetration of family planning messages in the community, as a means of minimizing the biases of self-reported exposure.

The main hypothesis was that BCC exposure would exercise independent and positive influences on the likelihood of an individual's use of contraceptives or intentions to do so in the near future, and that these influences would be greater at higher intensity of exposure. A secondary hypothesis was that, after controlling for other factors, contraceptive use and intentions would be greater after the implementation of the series of project activities compared to the beginning of the period of observation in the DISH districts. Statistical tests were conducted to assess whether observed patterns and trends among those surveyed were significantly discernible, that is, representing real differences in family planning attitudes and behaviors to a selected degree of certainty, or whether the changes were simply reflecting effects of other characteristics or

sampling variability. Time-trends in the effects of BCC exposure were analyzed through interaction terms of the explanatory variable on the survey period. These interaction terms specified how the influences on family planning attitudes and practices changed over the course of implementation of the mass media activities.

To facilitate interpretation of the results from the logistic models, the estimates are presented here in terms of odds ratios. A ratio greater than one implies that an individual in the given category would have a greater likelihood of using a modern contraceptive (or intending to use one in the near future) compared with a counterpart in the reference category, other factors remaining the same. A ratio lower than one suggests lower likelihood, and a ratio equal to one suggests similar likelihood.

Results

Descriptive Analysis

The population targeted by the DISH project is predominantly rural, with about 70% of women and men interviewed in the 1999 DES residing in rural areas. The urban population was heavily concentrated in Kampala, with Jinja the second most urbanized district. Two-thirds (66%) of women and 58% of men were currently married at the time of the survey; 77% of women had ever given birth. The most common language spoken was Luganda, followed by Runyankole-Rukiga. About one woman in four (22%) and one man in nine (11%) had no formal education.

Survey data revealed strong increases over time in the use of modern contraceptive methods among women and men living in the target areas (Figure 1). In 1999, 20% of women and 30% of men of reproductive age were currently using modern contraception, up sharply from the 1995 prevalence rates of 13% and 14% respectively. Substantial increases in contraceptive use were

also seen over the four-year interval when the heavily urbanized Kampala district was excluded from the tabulation: from 8% to 16% among women, and from 8% to 23% among men.

Condoms were by far the most popular method choice reported by men, used by two-thirds of male contraceptors in 1999.⁵ Injectables were the most used method for women (chosen by one-third of female contraceptors), followed by condoms and pills. Adoption of long-term contraceptive methods (IUD, implants, and male or female sterilization) remained low, and usage of other short-term methods (diaphragm, foam, jelly or female condoms) was negligible among women or men (Katende et al. 2000).

Among current non-users, an overall increase in the intention to adopt family planning was also found. As seen in Figure 2, between 1995 and 1999 the percentage reporting intentions to use a modern contraceptive method within the next 12 months increased from 37% to 43% among women, and from 21% to 32% among men.

At the same time, reported exposure to family planning messages in the media increased considerably. In 1995, fewer than half (47%) of the women surveyed had heard a family planning message on the radio in the last six months, whereas four years later nearly three-quarters (73%) had done so (Figure 3). Among men, the proportion increased from 61% to 79% over the same period. Exposure via television, posters, and print materials, though generally increasing,

Figure 1: Percentage of women and men currently using modern contraception, DISH Districts, 1995-1999

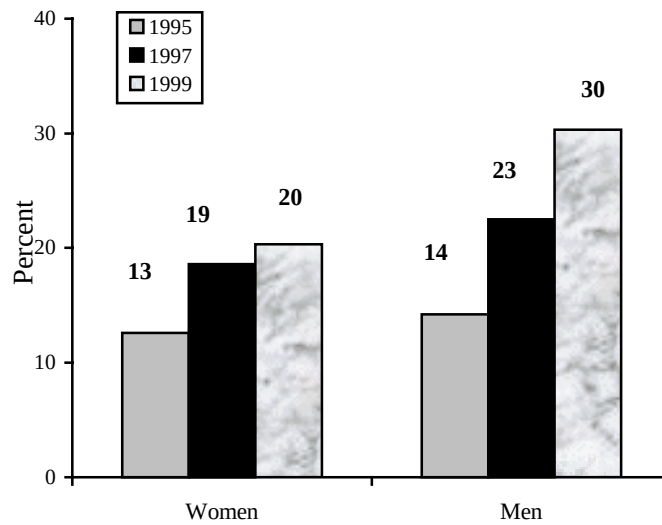


Figure 2: Percentage of women and men not practicing family planning reporting intentions to use modern contraception in the next 12 months, DISH Districts, 1995-1999

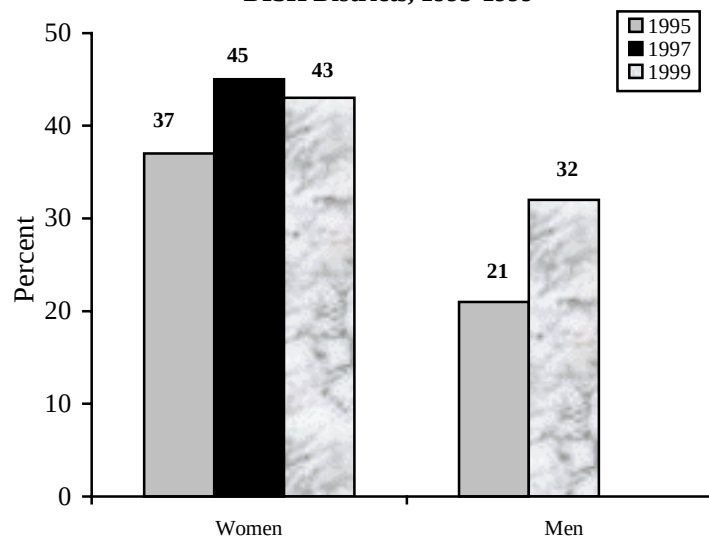
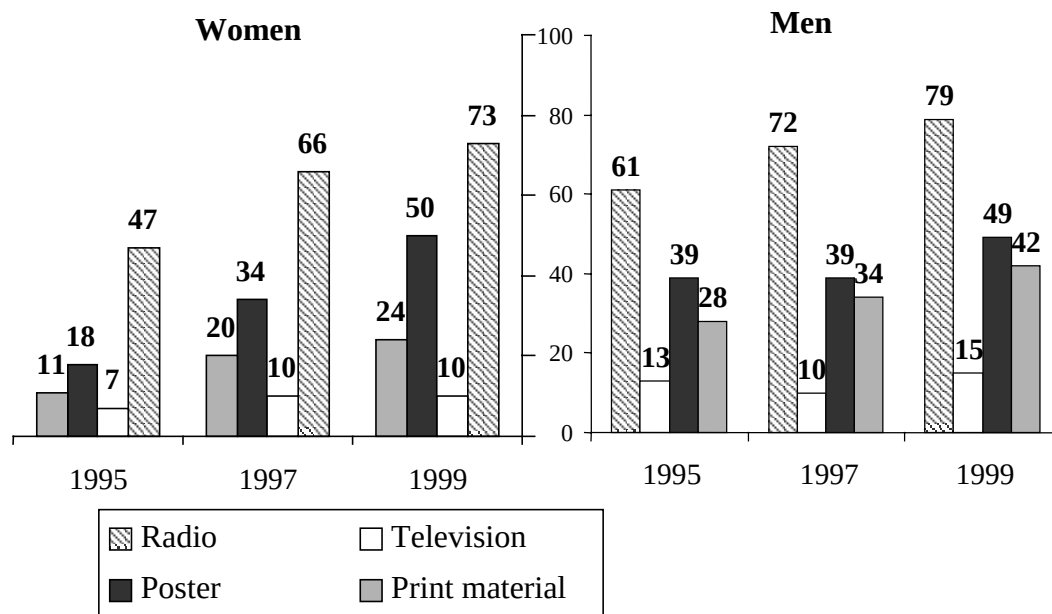


Figure 3: Percentage of women and men reporting exposure to family planning BCC messages in the media, DISH Districts, 1995-1999



remained much less frequent. Men tended to be more exposed to family planning messages than women, reflecting a pattern of higher proportions listening to the radio or watching television overall (Katende et al. 2000).

Moreover, women and men who had heard BCC messages in the media were more likely to practice family planning, or intend to do so in the near future, compared to those with little or no campaign recall (Table 1). Contraceptive prevalence was much higher among women who had heard messages on the radio (35% in 1999) or television (37%) compared to those who had not heard any messages (6%). The most rapid increase in women's contraceptive use between 1995 and 1999 occurred among those who had heard radio messages (from 19% to 35%); changes were less appreciable when considering trends via other media channels. A positive association was

also found between exposure to BCC messages and intentions to use modern contraception in the next 12 months among current non-users. The intent to use was reported by about one-half of women who had heard family planning messages in the media, compared to only around one-third of those with no campaign exposure.

Similar trends were found among men. In 1999, contraceptive prevalence ranged from 34% to 56% among those who were exposed to BCC messages in the various media, compared to a low of 14% among those with no exposure. Intentions to use were about twice as high for those who had heard messages compared with those who had not. Rapid increases in both contraceptive use and intentions were observed over the four-year period among men with all types of BCC exposure, especially via posters.

It was expected that factors other than mass media exposure were also influencing women's and men's family planning attitudes and practices. For example, according to the 1999 DES, contraceptive prevalence among women ranged from 6% for those with no formal education to 36% for those with at least some secondary schooling (Table 2). Likewise, whereas only 35% of women with no education reported intent to use family planning in the near future, among those in the highest educational category the figure stood at 47%. Strong differentials in contraceptive use and intentions by education attainment were likewise noted among men.

Table 1: Percentage of women and men reporting exposure to family planning BCC messages in the media, according to family planning use and intentions, DISH Districts, 1995-1999.

Media Type	Women					
	Currently using modern contraception			Intends to use modern contraception in the next 12 months		
	1995	1997	1999	1995	1997	1999
Radio	19	23	35	49	50	46
Television	40	43	37	56	36	48
Poster	26	29	28	58	52	49
Print material	27	33	37	51	52	48
No BCC exposure	7	9	6	27	35	30

Media Type	Men					
	Currently using modern contraception			Intends to use modern contraception in the next 12 months		
	1995	1997	1999	1995	1997	1999
Radio	19	27	34	30	..	36
Television	40	40	56	25	..	36
Poster	19	34	42	23	..	42
Print material	27	41	47	35	..	41
No BCC exposure	7	6	14	9	..	19

Source: 1995 UDHS, 1997 DES and 1999 DES (figures weighted to reflect sampling procedures).

.. = unavailable due to questionnaire design

Table 2: Percentage of women and men by educational attainment, according to family planning use and intentions, DISH districts, 1995-1999.

Highest level of schooling	Women					
	Currently using modern contraception			Intends to use modern contraception in the next 12 months		
	1995	1997	1999	1995	1997	1999
No education	2	6	6	28	35	35
Some primary schooling	11	16	19	40	50	45
Some secondary or over	27	38	36	42	44	47

Highest level of schooling	Men					
	Currently using modern contraception			Intends to use modern contraception in the next 12 months		
	1995	1997	1999	1995	1997	1999
No education	2	15	13	10	..	18
Some primary schooling	9	15	23	19	..	33
Some secondary or over	26	39	46	28	..	36

Source: 1995 UDHS, 1997 DES and 1999 DES (weighted figures).

.. = unavailable due to questionnaire design

Multivariate Analysis

Effects on Women's Contraceptive Use and Intentions

Table 3 shows the results of the multivariate regression analyses used to disentangle the relationships between women's and men's socio-demographic characteristics and exposure to BCC messages in the media, in order to assess the independent influences of BCC exposure on family planning use and intentions. Women's exposure to BCC messages was found to be significantly associated with increased contraceptive use, all else being equal. Not only were women with no exposure less likely to be using contraceptives compared to their counterparts who were exposed to any one message type, but also greater likelihood of contraceptive use with exposure through multiple media channels showed evidence of a dose-response effect.

At the same time, contraceptive prevalence was found to have increased significantly over time. Women were about 75% more likely to be using modern contraception in 1999 compared to 1995, around the time of the launch of the DISH project. Some of the increase might be attributable to positive impacts of other project interventions in the target areas, such as training of family planning service providers or improved availability of contraceptive methods at health facilities, or to other wider changes occurring in Ugandan society.⁶

As expected, several socio-demographic factors were seen to exercise important independent effects on women's modern contraceptive use, including age, marital status, parity, place of residence, and educational attainment. Women in their middle reproductive years (ages 20-29 and 30-39) were nearly twice as likely to report current contraceptive use compared to adolescents (ages 15-19) and older women (ages 40 and above). Women in the youngest and oldest age categories may be less likely to practice family planning because they perceive lower risk of pregnancy due to less frequent sexual activity or lower fecundity. The same may hold for

Table 3: Odds ratios from the logistic regression models measuring effects of women's and men's mass media BCC exposure and socio-demographic characteristics on family planning use and intentions, DISH districts, 1995-1999.

Characteristic	Current use of modern contraception		Intent to use modern contraception in the next 12 months	
	Women (N=5778)	Men (N=2617)	Women (N=3766)	Men (N=899)
BCC Exposure: Individual level				
No BCC exposure	0.69**	0.89	0.57***	0.68
Exposed to one message type (r)	1.00	1.00	1.00	1.00
Exposed to multiple message types	1.88***	1.85*	1.49*	1.67
Survey Period				
1995 (r)	1.00	1.00	1.00	1.00
1997	1.68**	1.67	1.26	..
1999	1.73**	2.05**	1.17	2.08**
Interaction: BCC Exposure-Survey				
High exposure-1995 (r)	1.00	1.00	1.00	1.00
High exposure-1997	0.82	1.38	0.79	..
High exposure-1999	0.87	1.64	0.72	0.89
Age Group				
15-19 (r)	1.00	1.00	1.00	1.00
20-29	1.76***	1.42*	0.82	1.17
30-39	1.95***	1.07	0.44***	0.63
40 +	1.44	0.71	0.14***	0.35**
Marital status				
Never in union (r)	1.00	1.00	1.00	1.00
Currently in union	0.84	1.12	1.77***	1.16
Formerly in union	0.48***	1.17	0.90	0.47
Parity				
No children (r)	1.00	1.00	1.00	1.00
1-3 children	2.55***	1.37	1.61**	1.62
4 or more children	4.06***	1.83*	2.55***	2.82*
Ethnicity				
Luganda	1.13	1.37*	1.55***	1.45
Runyankole	0.89	0.80	1.08	2.57***
Other (r)	1.00	1.00	1.00	1.00
Residence				
Rural (r)	1.00	1.00	1.00	1.00
Urban	3.43***	2.41***	1.44**	1.17
Education				
No education (r)	1.00	1.00	1.00	1.00
Some primary schooling	2.61***	1.03	1.24*	1.74
Some secondary or over	4.54***	1.86**	1.14	2.11*

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

Source: 1995 UDHS, 1997 DES, and 1999 DES

(r) = reference category

.. = unavailable due to questionnaire design

formerly married women, who were less than half as likely to use contraceptives as their married or single counterparts. Older and unmarried women may also tend to prefer traditional or folk methods for family planning purposes, which were not considered in the present analysis.

Contraceptive use was found to increase with parity. Women with one to three children were over twice as likely to report contraceptive use than their counterparts with no children, while those with four or more children were about four times as likely, underlining the motivation for family size limitation. Anecdotal evidence strongly points to the high costs of raising children, especially education, as a factor driving the preference for smaller family sizes in Uganda.

Not surprisingly, urban and better-educated women were significantly more likely to use modern contraceptives. Women living in urban areas, who may have better access to family planning information and services, were over three times as likely to use contraceptives as those living in rural areas. Likewise, women with at least some primary schooling were over twice as likely to use contraceptives as their uneducated counterparts, and those with secondary schooling some four times as likely. Women having more education may better appreciate the health and economic advantages of smaller family sizes, and be more likely to protect themselves from unplanned pregnancy—and also from sexually transmitted infections (STIs) including HIV/AIDS—through modern contraceptive use.

As with family planning practices, women's self-reported exposure to BCC messages in the media was significantly associated with more favorable family planning attitudes. Women reporting no exposure to BCC messages in the six months preceding the survey were about half as likely to intend to use a modern contraceptive method in the near future compared to their counterparts reporting exposure to one message type, while those reporting exposure through multiple

channels stood almost 50% more likely to express contraceptive intentions. Moreover, these effects were statistically significant after controlling for other socio-demographic variables.

With respect to influences of background variables, intent to use was found to decline significantly with age. Adolescent women (ages 15-19) were most likely to intend to use a modern method in the near future while older women (ages 40 and above) were the least likely. Lower contraceptive intentions among older women may reflect a perceived lower risk of becoming pregnant due to declining fecundity, as well as perhaps a certain reluctance to adopt new practices. Marital status was found to have independent effects, with intentions to use almost twice as high among currently married women than among women either never or formerly married. Married women may perceive greater need for family planning due to more frequent sexual activity. Contraceptive intentions increased with parity. Women with four or more children were more than two and a half times as likely to intend to use a method as women with no children. Again this may be driven by the desire to limit family size in response to socio-economic conditions.

In contrast to the patterns observed for current contraceptive use, place of residence and educational attainment were found to exercise smaller independent influences on family planning intentions. Women living in urban areas were only somewhat more likely to intend to use compared to their rural counterparts, and the effects of higher education were marginal.

Effects on Men's Contraceptive Use and Intentions

As was observed for women, men's contraceptive prevalence was significantly higher in 1999 compared to 1995. Likewise, men's contraceptive intentions were about twice as high at the end of the period of observation. However, self-reported exposure to family planning BCC messages in the media was only somewhat associated with use of contraceptives or intentions to use among

current non-users. While men exposed to multiple messages were more likely to be contraceptive users, there was no discernible difference among men who had heard one or no type of message.

Rather, several distinct influences of socio-demographic characteristics were observed. Age, parity, ethnicity, place of residence, and educational attainment were all found to affect men's contraceptive use. Men aged 20-29 were significantly more likely to use a modern method than adolescents (15-19 years), a pattern that had previously been noted for women. Men with four or more children were also much more likely to use than their counterparts with no children, again as had been found with women. Ethnicity played a role, with Lugandan men more likely to use than men of other ethnic groups. Men living in urban areas and those with at least some secondary education were about twice as likely to use contraceptives as their rural and less educated counterparts respectively.

Many of the same variables—age, parity, ethnicity, and educational attainment—were found to influence men's contraceptive intentions, albeit in a somewhat different manner. Intent to use a modern method in the near future was significantly lower among older men. In fact, men in the oldest age group (40 years and over) were only 35% as likely to intend to use compared to those in the youngest group (15-19 years). Contraceptive intentions were found to increase with parity. Men with four or more children were about three times as likely to intend to use as men with no children. Influences of ethnicity were seen, with Runyankole men being the most likely to intend to use among the ethnic groupings. Secondary or higher educational attainment was also associated with increased intentions to use.

Interestingly, the influence of marital status, which had been found statistically significant for women's family planning attitudes and practices, was minimal for men. As previously mentioned, the primary contraceptive method reported among male users in the target areas was the condom,

a method that men may be more likely to use with non-marital partners. In addition, men may be less aware whether their partners, either marital or non-marital, are using contraception or even more likely to consider it their spouse's responsibility.

Influences of specific messages

The most common medium for BCC exposure among women and men was by far the radio. The DISH Evaluation Surveys collected additional information on exposure to specific radio messages broadcast in the project districts. In 1999, 47% of women reported having listened to either the "Choices" or "Capitol Doctor" reproductive health programs, 46% recalled having heard advertisements for family planning services, and 35% had heard advertisements for at least one of the socially marketed contraceptives. Among men, the proportions were 57%, 42%, and 46% respectively. In addition, the strong majority of survey respondents (81% of women and 85% of men) reported having seen or heard of either the "Yellow Flower" family planning logo or the "Rainbow over the Yellow Flower" reproductive health logo.

Multivariate models were run for assessing the independent influences of exposure to three specific messages: radio programs on reproductive health, radio advertisements for family planning services or socially marketed contraceptives, and family planning logos. The results showed that women's exposure to family planning logos was significantly associated with higher contraceptive use and intentions to use (Table 4). After controlling for effects of selected socio-demographic characteristics, women who had seen or heard of family planning logos were about twice as likely to be contraceptive users, or to intend to be using in the near future among current

Table 4: Adjusted odds ratios[§] from the multivariate logistic regression models measuring effects of women's and men's exposure to specific BCC messages on family planning use and intentions, DISH districts, 1997-1999.

Characteristic	Current use of modern contraception		Intent to use modern contraception in the next 12 months	
	Women	Men	Women	Men
Exposure to specific BCC messages: Individual level				
No exposure (r)	1.00	1.00	1.00	1.00
Exposed to FP radio programmes	1.09	1.72***	1.13	1.58*
Exposed to FP radio advertisements	1.16	1.92***	1.35*	1.19
Exposed to FP logos	2.68***	1.35	1.65***	1.01
Survey Period				
1997 (r)	1.00	1.00	1.00	..
1999	0.69	0.98	0.85	..
Interaction: BCC Exposure-Survey				
High exposure-1997 (r)	1.00	1.00	1.00	..
High exposure-1999	1.51	1.41	0.96	..

[§] Odds ratios adjusted for age, marital status, parity, ethnicity, place of residence, and education.

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

(r) = reference category

Source: 1997 and 1999 DES.

.. = unavailable due to questionnaire design

non-users, compared to those who had not been exposed to such logos. Exposure to radio advertisements for family planning services or contraceptives was also found to have positive effects on intentions to use. Among men, a strong influence of exposure to the family planning radio programs broadcast in DISH areas (“Choices” or “Capitol Doctor”) was seen on both contraceptive use and intentions. Men who were exposed to radio advertisements were also more likely to be contraceptive users, all else being equal.

Potential biases of self-reported BCC exposure

Such findings, although encouraging for BCC programming, require a cautionary statement regarding the association between self-reported exposure to family planning messages and contraceptive intentions and use relying on cross-sectional survey data. Respondents who practice family planning may also exhibit other characteristics that favor increased media listening habits, or may simply recall the BCC messages better when asked in a survey. Similarly, persons who already intended to adopt family planning may be more likely to listen to radio programs or

notice materials about family planning. Ignoring self-selectivity or endogeneity (in which exposure affects behavior and behavior affects exposure) could lead to biased measures of the effects of BCC campaigns on family planning outcomes.

Multivariate regression techniques can be used to examine the significance of the relationship between the explanatory variable and the outcome of interest, controlling for a certain number of confounding effects. However, positive effects of self-reported BCC exposure do not necessarily imply a direct causation, since precise information on the timing of changes in individuals' contraceptive attitudes and practices with respect to mass media exposure was lacking. Ideally such information could be collected using a longitudinal survey approach. In the absence of such sources, interaction terms for the survey periods provided a reasonable proxy to evaluate time-trends. As all three surveys employed similar sampling designs and data collection tools, the datasets could be pooled together and interactions used to compare the direction and magnitude of influences on the outcome variables over time. In none of our models were the interaction terms statistically significant, suggesting stability in the magnitude of BCC influences between the beginning and end of the period of campaign implementation.

Positive influences of self-reported BCC exposure may further have been related to the modeling problems of endogenous variables. A number of statistical models to address issues of endogeneity have been proposed in the literature. Guilkey et al. (1995) used a simultaneous-equations estimation method to assess the impact of a communication program on women's fertility desires and family planning practices in Tunisia following an experimental approach. The model jointly estimated the self-selection process for reporting media exposure and influences on the outcome variables. However, the application of multi-equation models can be extremely difficult for evaluating the impacts of BCC activities, in part because of the difficulties in identifying variables from survey datasets like the DHS and DES that may affect whether or not a

respondent recalls hearing the messages but that are not also associated with outcome behaviors such as contraceptive use. Moreover, the authors concluded that, while testing for potential endogeneity of explanatory variables was essential, use of complicated multi-equation models was not always warranted.

Another solution to overcome the biases of including an endogenous variable is to substitute the explanatory variable with an “instrument” that is correlated with the explanatory variable but not the regression model’s error term (see, for example, Briscoe et al. 1990). We proposed adapting this approach, designing a cluster-level exposure index of the relative penetration of BCC messages in the community. Such an aggregate measure held both methodological and (perhaps more convincingly) substantive interest. A cluster can be considered a proxy for women’s and men’s immediate surroundings, reflecting local “culture”. Entwisle et al. (1989) argued that persons in the same community often talked to each other and, therefore, were more likely to share messages about family planning and exhibit similar contraceptive behaviors.

In constructing our index of penetration of BCC messages in the community, we aggregated the individual-level responses at the cluster level, that is, the number of women or men interviewed in the same cluster or community by exposure to mass media BCC messages. The cumulated measure was transformed into an index ranging between 0 and 1, with 0 if no respondents in the cluster reported any BCC exposure and 1 if all respondents reported exposure through all four different media types (radio, television, poster, and print materials). A community characterized with an index over 0.3 was considered to have high penetration of BCC messages.

Using this index (and controlling for intra-cluster correlation in the regression model), the influences of BCC exposure remained statistically significant for women’s contraceptive intentions and for men’s contraceptive use (Table 5). The greater the penetration of BCC

messages in communities, the more likely a resident woman would intend to use modern contraceptives in the near future. This result suggested that BCC campaigns may influence social attitudes towards family planning that lead to greater intentions to use, regardless of other individual factors. Likewise, the greater the penetration of BCC mass media messages in a community, the more likely a man living in that community would be using a contraceptive method. On the other hand, when considering BCC exposure from the community perspective, influences on women's contraceptive use were not discernible. This was in contrast to the findings above using individual-level exposure, pointing to some degree of uncertainty in using self-reported measures alone.

TABLE 5:
Adjusted odds ratios[§] from the multivariate logistic regression models measuring effects of community-level mass media BCC exposure on women's and men's family planning use and intentions, DISH districts, 1995-1999.

Characteristic	Current use of modern contraception		Intent to use modern contraception in the next 12 months	
	Women	Men	Women	Men
BCC Exposure: Cluster level				
Community index	1.01	1.17**	1.19**	1.03
Survey Period				
1995 (r)	1.00	1.00	1.00	1.00
1997	1.42	2.32**	1.26	..
1999	1.83**	2.39**	0.92	2.16*
Interaction: BCC Exposure-Survey				
High exposure-1995 (r)	1.00	1.00	1.00	1.00
High exposure-1997	1.21	0.86	0.83	..
High exposure-1999	0.93	1.18	1.04	0.80

[§] Odds ratios adjusted for age, marital status, parity, ethnicity, place of residence, and education.

Ratios for the community BCC exposure variable refer to a 0.10-increase in the index at the cluster level.

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

(r) = reference category

Source: 1995 UDHS, 1997 DES, and 1999 DES

.. = unavailable due to questionnaire design

Additional models were run for measuring the influences of specific BCC messages (family planning radio programs, radio advertisements, and logos) using the community-level instrument with data from the latter two DISH Surveys. It is possible, for example, that some respondents may have been exposed to the logos while attending health facilities for family planning services,⁷ so subsequent analyses would be biased if endogeneity was left unrecognized. The community index of BCC exposure was calculated on a continuous scale from 0 and 1, with 0 if no respondents in the cluster reported exposure to any of the specific messages and 1 if all respondents reported exposure to all three message types. The community BCC exposure index remained significantly associated with women's contraceptive use and intentions as well as with men's contraceptive use ($p < 0.05$, not shown).

Overall, the patterns with regard to effects of socio-demographic variables were similar across the models using individual-level and cluster-level measures (not shown), suggesting consistency in the magnitude of their effects.

Discussion

The aim of this study was to assess the effects of women's and men's exposure to multi-channel media messages promoting family planning on contraceptive intentions and use. Our main analytical tool was multivariate logistic regressions drawing on data from three representative household surveys conducted between 1995 and 1999 in the areas targeted by the DISH project of Uganda. Results showed that, after controlling for the effects of a number of socio-demographic characteristics, reported exposure to BCC messages in the media was strongly associated with current use of a modern contraceptive method, or intent to do so in the near future among non-users. This relationship generally held true for both sexes (though the programmatic influences on men's intents tended to be less).

Such findings echoed earlier results of an evaluation strategy for the 1992-1994 Uganda Family Planning Promotion Project, for which survey results pointed to greater use of family planning among respondents who reported higher campaign exposure, after controlling for selected background characteristics (Kiragu et al. 1996).

A dose response effect between BCC exposure and both of the outcomes of interest was observed among women. As the number of mass media channels through which respondents were exposed to BCC messages increased, especially from one to two or more, so did the likelihood of contraceptive use and intent. Some messages exercised particularly important influences in the DISH target areas, notable reproductive health logos advising of service availability (the “Yellow Flower” and “Rainbow over the Yellow Flower” logos) and, to a smaller extent, radio advertisements for family planning services or socially marketed contraceptives. Independent effects of exposure to family health radio programs (“Choices” or “Capitol Doctor”) were seen on men’s contraceptive attitudes and practices. Influences of these radio programs may have been stronger among men given their content increasingly emphasizing prevention of HIV/AIDS and other STIs through condom use—the method most preferred among males. In a separate analysis of 1999 DES data, men’s listening to “Capitol Doctor” was also found to be positively associated with condom use at last sex, an indicator commonly used in assessing behaviors in STI/HIV prevention (Bessinger et al. 2002).

At the same time, a number of socio-demographic characteristics were included in the models to control for differences among respondents exposed to the mass media that also may help explain their family planning attitudes and practices. As could be expected, women who were in the midst of their reproductive years, currently single or married, of higher parity, living in urban areas, and better educated tended to be more likely to use modern contraceptives. Women who were younger, married, of higher parity, urban, and better educated (to a smaller degree) were also

more likely to intend to use a modern method in the next 12 months. While there were some differences for men, particularly with respect to the magnitude of the effects, findings were generally quite similar. Only marital status was not significantly associated with either men's current use or intent to use. It is probable that men are motivated not only by prevention of pregnancy but also transmission of HIV/AIDS and other STIs, especially with non-marital partners.

The availability of data from repeated, independent cross-sectional surveys offered a valuable opportunity for estimating time-trends. Overall, once considering the effects of BCC exposure and other background characteristics, contraceptive prevalence among women and men as well as contraceptive intentions among men were found to be significantly higher in 1999 compared to 1995—or around the time of the launch of the DISH project. Increased contraceptive use and intentions over the course of the project's first phase may also have been partly attributable to broader societal changes occurring in Uganda that may have positively affected family planning attitudes and behaviors, or perhaps to the impacts of other DISH programmatic interventions, such as improved family planning service availability or quality of health care provision.

Certain limitations of evaluating the impacts of BCC exposure via cross-sectional data were addressed. The statistical problems of modeling the relationships between self-reported BCC exposure and demographic outcomes bears underlining. Individuals with prior positive attitudes towards and experiences with family planning may be more likely than others to show an interest in mass media messages about family planning, and to recall these messages when asked in a survey. While many previous studies have acknowledged this selectivity bias, few have offered straightforward means to address it in their empirical analyses. Some provided no modeling options other than self-reported exposure, and others presented estimates using computationally cumbersome and sometimes problematic structural or multi-process models.

We experimented with a reduced form model instead, substituting instrumental measures of BCC exposure: cluster-level indices of the relative penetration of mass media messages in the community. We would expect this measure to be highly correlated with individual exposure, but not with the modeling error term associated with individual family planning use and intent. Using this measure could be a simple way to help overcome some (though perhaps not all) of the bias inherent in this type of study. On the whole, the findings from the models with the community exposure index were encouraging, although there was some evidence of bias of self-reported exposure on current contraceptive practices among women and on contraceptive intentions among men. Identification and inclusion of adequate exposure variables in future data collection instruments—such as times of listening to radio or watching television in conjunction with broadcast schedules of BCC messages—could eventually allow for more robust analyses.

These findings underlined the need for further investigation regarding the process of social change in family planning attitudes and practices in Uganda. While exposure to BCC messages among individuals and their communities was generally found to be a significant predictor of contraceptive intentions and use, little is known on the pathways through which BCC programming operate, only the overall effect. Influences of family, neighbors, and social networks as catalysts for promoting change emerge as areas warranting research attention. Moreover, it appears likely that there are other aspects of DISH project interventions exercising important influences. The impacts of availability and quality of family planning services could present additional topics for future research.

Notes

1. The DISH project was funded by the United States Agency for International Development (USAID) through a bilateral agreement with the Ugandan Ministry of Health. The prime contractor for the project's first phase (1994-1999) was Pathfinder International. Collaborating partners were the Johns Hopkins University Center for Communication Programs (JHUCCP), University of North Carolina Program for International Training in Health (INTRAH), and E. Petrich and Associates. For the DISH project's second phase (1999-2002), JHUCCP was the prime contractor, with INTRAH and Management Sciences for Health as implementing partners.
2. Other BCC activities, including social marketing of condoms, pills, and injectables, were conducted under arrangements with the USAID-supported projects Social Marketing for a Change (1994-1999) and Commercial Market Strategies (1999-2002).
3. While the district of Kasese was targeted by DISH project activities, it was not covered in the 1997 and 1999 DES due to fieldwork security concerns. In order to maintain comparability, all data presented here refer to the DISH project districts excluding Kasese.
4. The DISH BCC efforts also included community-based activities such as festivals and village meetings; however, exposure to these activities was not assessed in the surveys.
5. It is possible that some respondents may have reported condoms as their current family planning choice even if they were using this barrier method primarily for STI/HIV prevention. It should also be noted that current condom use for family planning purposes does not necessarily imply use with all sexual partners or even consistent use with any partner.
6. While 1995 modern contraceptive prevalence rates were appreciably higher in the DISH districts compared to the country as a whole (13% versus 7% among women), preliminary evidence from the 2001 DHS suggests that prevalence has also been rising nationally (16% among women).
7. Survey questions on exposure to family planning and reproductive health logos asked whether the respondent had seen or heard of the relevant logos. The specific source of exposure—via a BCC message encouraging couples to look for these logos for information and services, or at a health facility itself—was not captured.

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