



# Gender Equity and Family Planning Outcomes in Health Communication Programs: A Secondary Data Analysis

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# Table of Contents

<b>ACKNOWLEDGEMENTS</b> .....	<b>4</b>
<b>EXECUTIVE SUMMARY</b> .....	<b>5</b>
<i>BACKGROUND</i> .....	5
<i>KEY FINDINGS</i> .....	5
<i>RECOMMENDATIONS</i> .....	5
<b>INTRODUCTION</b> .....	<b>6</b>
DATA.....	8
RESEARCH QUESTIONS .....	9
FORMAT OF THIS REPORT .....	9
<b>THE SUPPORT FOR SERVICE DELIVERY INTEGRATION-COMMUNICATION (SSDI) PROGRAM</b> <b>11</b>	
BACKGROUND .....	11
METHODOLOGY .....	11
<i>Recruitment</i> .....	11
<i>Measures</i> .....	11
<i>Data Analysis</i> .....	12
RESULTS.....	13
<i>Descriptive Statistics</i> .....	13
<i>Bivariate Results</i> .....	15
<i>Multivariate Analyses</i> .....	17
<i>Mediation Analysis</i> .....	18
DISCUSSION .....	19
<b>THE URBAN REPRODUCTIVE HEALTH INITIATIVE</b> .....	<b>21</b>
BACKGROUND .....	21
INITIATIVE EVALUATION .....	21
PROGRAMS OF INTEREST .....	21
<b>URBAN HEALTH INITIATIVE (UHI)</b> .....	<b>22</b>
BACKGROUND .....	22
METHODOLOGY .....	23
<i>Study Design</i> .....	23
<i>Study Population</i> .....	24
<i>Measures</i> .....	24
<i>Data Analysis</i> .....	25
RESULTS.....	26
<i>Descriptive Statistics</i> .....	26
<i>Bivariate Analyses</i> .....	29
<i>Multivariate Analyses</i> .....	31
<i>Mediation and Moderation Analyses</i> .....	32
<i>Checking the Models: Goodness of Fit and Collinearity of Predictors</i> .....	33
DISCUSSION .....	33
<b>NIGERIAN URBAN REPRODUCTIVE HEALTH INITIATIVE</b> .....	<b>34</b>
BACKGROUND .....	34
METHODOLOGY .....	35
<i>Study Design</i> .....	35
<i>Study Population</i> .....	35

<i>Measures</i> .....	35
<i>Data Analysis</i> .....	37
RESULTS.....	37
<i>Descriptive Statistics</i> .....	37
<i>Bivariate Associations</i> .....	40
<i>Multivariate Analyses</i> .....	41
<i>Mediation and Moderation Analyses</i> .....	43
<i>Checking the models: Goodness of fit and collinearity of predictors</i> .....	43
DISCUSSION .....	44
<b>ENGENDERHEALTH ACQUIRE</b> .....	<b>45</b>
BACKGROUND .....	45
METHODOLOGY .....	45
RESULTS.....	46
<i>Women</i> .....	46
<i>Men</i> .....	47
DISCUSSION .....	48
<b>CONCLUSIONS AND RECOMMENDATIONS</b> .....	<b>49</b>
<i>KEY FINDINGS</i> .....	49
<i>LIMITATIONS</i> .....	50
<i>RECOMMENDATIONS</i> .....	51
<b>APPENDIX</b> .....	<b>52</b>
<i>MALAWI</i> .....	52
<i>URBAN HEALTH INITIATIVE</i> .....	55
<i>NIGERIA URBAN REPRODUCTIVE HEALTH INITIATIVE</i> .....	67
<b>REFERENCES</b> .....	<b>81</b>

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# Executive Summary

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## *Background*

Gender constructs and their myriad manifestations are integral to the health and well-being of men and women, girls and boys around the world. Research has demonstrated the multi-level and multifaceted linkages between measures of gender equity/equality and family planning (FP) practices. Yet, major gaps in knowledge about the complex relationship between gender equity and reproductive health (RH) outcomes, including FP use, remain. In particular, it is important to expand our understanding of what role, if any, communication programs designed to improve RH outcomes have on gender equity. To that end, this study was designed to answer three research questions:

1. Is there a significant relationship between gender equity and current use of FP?
2. Is exposure to communication intervention components significantly associated with gender equity?
3. Does gender equity affect (confound, moderate or mediate) the relationship between intervention exposure and current use of FP?

## *Key Findings*

- Through multivariate analyses, this report found that positive and significant associations between exposure and FP ideation and modern contraceptive use held after controlling for background variables for most of the programs assessed.
- This report demonstrates that equitable gender norms are positively associated with modern contraceptive use.
- Of the FP media campaigns examined in this report, only one was associated with enhanced gender norms.
- Results from the mediation and moderation analyses across the four countries indicated that gender equity did not mediate or moderate the relationship between message exposure and FP intention or use.
- The findings indicate that FP-focused interventions are not inherently gender transformative.

## *Recommendations*

Gender equality or gender transformation needs to be explicitly addressed, whether as part of FP campaigns or as complementary campaigns. Whether independent or part of FP campaigns, interventions should be explicit and strategic in addressing the norms they are designed to influence. Such campaigns should be theory-based and make every effort to address the underlying factors that perpetuate gender inequality. Those factors are not sufficiently well understood, whether at the individual, dyadic, community or societal levels. Research to interrogate gender and social norms that delimit everyday practices is necessary, as is working with actors at multiple levels and engaging with power to affect change across social ecological levels.

# Introduction

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Gender equity is an important determinant of health. Influenced by cultural norms and multi-level inequalities that are perpetuated by structural violence, gender inequities in societies around the world have increasingly become the focus of international health and development agencies. In 1994, the International Conference on Population and Development (ICPD) highlighted the importance of women's empowerment and reproductive rights and made gender equity an international priority (UN, 1994). Today, the United Nations 2015 Millennium Development Goals continue to prioritize gender equity (goal 3) and universal access to RH (goal 5) as essential steps to improving health outcomes in countries around the world (UN Women, 2014).

Gender equity is a complex, multi-dimensional construct that is often difficult to measure (Malhotra, Schuler & Boener, 2002). As a result, measures of women's empowerment or gender equity are often composed of multiple indicators of status and autonomy, such as women's socioeconomic status, women's education, mobility, roles in decision-making, partner communication, attitudes toward gender-based violence (GBV), men's and women's sexual and relationship power, or gender preference of children (Blanc, 2001; Chapagain, 2005; Mullany, Hindin, & Becker, 2005; Furuta & Salway, 2006; Senarath & Gunawardena, 2009; Ahmed, Creanga, Gillespie, & Tsui, 2010; Corroon et al., 2014; Harman et al., 2014). Multiple scales and indices have been developed to measure these important dimensions of gender equity (C-Change, 2014; Underwood, Leddy & Morgan, 2014).

Many of the indicators discussed above are commonly used in surveys like the Demographic and Health Survey (DHS, 2014). As a result, it is also common for other large population-based surveys to use similar or identical questions to measure these dimensions of gender equity. However, despite their popularity and use in studies and evaluations in many contexts around the world, it is important to remain critical of how indicators of gender equity have been developed and adapted. For example, many of the DHS measures of gender equity are used in multiple settings around the world (Mumtaz & Salway, 2009). In their critique of the concept of "women's autonomy" in Pakistan, Mumtaz and Salway (2009) questioned the assumption that all women in all cultural contexts desire autonomy. In particular, this research called for researchers to integrate cultural nuances into their understandings of women's positions and mobility within society. Furthermore, much of the research on gender equity and women's empowerment is focused on South Asian settings, resulting in a focus in many peer-reviewed publications on domains like mobility, which may be less relevant in other settings (Upadhyay et al. 2014).

Multiple studies have demonstrated that measures of women's status, including employment and education, are associated with increased utilization of contraception (Mullany, Hindin, & Becker, 2005; Al Riyami, Afifi, & Mabry, 2004; Furuta & Salway, 2006; Wado et al., 2013). Researchers have more recently focused on other dimensions of gender equity and women's empowerment, including the effects of increased mobility, improved roles in household

decision-making, increased partner communication and more critical attitudes toward GBV (Ahmed et al., 2010; Harman et al., 2014; Mosha et al., 2013; Corroon et al., 2014). In a cross-sectional study of DHS data from seven African countries, Do and Kurimoto (2012) illustrated that the contraceptive type used was associated with different levels of empowerment (Do & Kurimoto, 2012). A meta-analysis based on DHS data from 31 countries demonstrated that women who reported greater empowerment had an increased likelihood of using contraception, more than four prenatal visits and an attendant at birth as compared to those with lower empowerment (Ahmed, Creanga, Gillespie, & Tsui, 2010). Much of this work has called for 1) further analyses of the mechanisms through which empowerment is associated with FP behaviors, 2) more complex analyses of effect modification and 3) further exploration of gender-related attitudes (including those of both men and women) and FP and RH behaviors (Do & Kurimoto, 2012; Ahmed et al., 2010; Mishra et al., 2014).

In response to the wealth of research demonstrating the relationship between gender equity and use of contraception and other RH services, international funders have renewed their interests in developing and implementing programs that utilize gender-sensitive and gender-transformative approaches to improving people's health (Greene & Levack, 2010). In Keleher et al.'s (2008) review of household and community interventions targeting gender norms in developing countries, interventions were shown to focus primarily on education, economic empowerment, GBV and harmful traditional practices, such as female genital cutting. In particular, communication interventions that take a gender transformative approach to gender norms in order to improve RH outcomes have become increasingly popular. Programs, like African Transformation, implemented by CCP in Uganda and adapted for use in multiple other African countries, have utilized dialogical approaches to facilitate conversations around gender norms and relations between men and women in hopes of providing the space for community members to identify opportunities for change (Underwood et al., 2011). Other communication-focused interventions, such as the Go Girls! Initiative, the Positive Women: Voices and Choices Program, or the Gender Roles, Equality and Transformation (GREAT) Project<sup>1</sup>, have also attempted to take a gender transformative lens to their communication strategies.

However, despite substantial investment in programs designed to take a gender sensitive or gender transformative approach to improving FP and RH outcomes, there have been limited evaluations of their effectiveness in changing gender norms (Keleher & Franklin, 2008). While Underwood et al. (2011) did find that participation in African Transformation was positively associated with broader gender norms, they did not find an association between program participation and contraceptive use. Schuler et al. (2012a, 2012b) also found that participation in gender-focused programs was associated with more equitable gender norms, but not with contraceptive use. Keleher & Franklin (2008) called for more robust evaluations of interventions

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<sup>1</sup> These model interventions, implemented by CCP, ICW and the Institute for Reproductive Health, each use communication strategies like radio or group dialogues to facilitate discussion around health-related topics through a gender lens in order to improve RH outcomes, reduce experiences of violence and potentially shift attitudes around traditional relations between men and women (Feldman, Manchester, & Maposhere, 2002; IRH, 2014; K4Health, 2014).

to understand their effect on gender norms. In response to this gap, in addition to 1) the increased institutional and intellectual focus on gender equity as a key determinant of health and 2) the gaps in knowledge about the complex relationship between gender equity and FP and RH outcomes, there is a need for researchers to understand the role of gender equity in the effects of communication programs designed to improve RH outcomes like FP use.

Therefore, this report draws on data from four countries (Tanzania, Malawi, India and Nigeria) where substantial interventions with a communication focus have been implemented to improve use of FP, as well as other health outcomes. Through communication campaigns addressing issues like FP, sexual health and reproduction, these communication strategies hope to have an empowering effect on women, men and couples to choose the number of children they wish to have and the timing between pregnancies. Typically, such campaigns model shared decision-making between partners, the equal value of girls and boys and/or husband-wife communication about these important matters. Thus, even if not explicitly designed to change gender constructs, one of the questions this study seeks to answer is whether such programming might positively influence contraceptive use and enhance gender equality. Through a quantitative analysis of survey data from participants in these interventions, this secondary data analysis attempts to shed light on the interplay between being exposed to intervention components, gender equity and RH.

## **Data**

All CCP researchers, as well as HC3 sub-contractors, were contacted and asked whether any studies they had conducted over the past 10 years included variables for (1) communication intervention exposure, (2) gender equity or equality measures and (3) FP outcomes. Of the approximately 20 studies that were so identified, only six data sets met the criteria. Of these, four data sets were available for the secondary data analysis reported herein. (The remaining two may become available in the near future.)

The variables used in the four data sets were not identical, nor were all the variables that would ideally be in such a data set included. Specifically, we would have liked to control for age, current sexual relations, marital status, education, wealth and fertility intentions, but were not always able to do so. Ideally, the studies would have included comprehensive, even if not equivalent, gender equality/equity scales or measures to assess gender equality agency and ideation. Here, ideation refers to how knowledge, attitudinal, social support and social interaction variables together can predict behavior. (Storey and Figueroa, 2012) But, as it turns out, the gender measures did not all focus on the same domains of gender equality. And, finally, measures of program exposure varied across the four studies.

These four data sets were drawn from quantitative evaluations at baseline and midterm of health communication projects in Malawi, India, Nigeria and Tanzania. These projects focused primarily on FP and RH. Data sets were chosen for analysis due to their inclusion of gender equity indicators, as well as their robust assessments of exposure to FP and RH communication campaigns. All of the studies utilized a quasi-experimental design. Parenthetically, please note



that a discussion of the appropriateness of clinical trials for communication programs is beyond the scope of this report.

Data sets from the following projects were analyzed in this report:

- **Malawi:** Support for Service Delivery Integration-Communication (SSDI) project
- **India:** Urban Health Initiative (UHI)
- **Nigeria:** Nigerian Urban Reproductive Health Initiative (NURHI)
- **Tanzania:** EngenderHealth ACQUIRE

## Research questions

The secondary data analyses of data from EngenderHealth ACQUIRE, SSDI, UHI and NURHI were based on the following research questions:

1. Is there a significant relationship between gender equity and current use of FP?
2. Is exposure to communication intervention components significantly associated with gender equity?
3. Does gender equity affect (confound, moderate or mediate) the relationship between intervention exposure and current use of FP?

The hypotheses of the studies examined in this report follow:

1. Exposure to communication programs about FP is associated with:
  - a. Increased odds of modern contraceptive use and FP intentions.
  - b. Increased odds of scoring above the mean on gender equity measures.
2. There will be a dose-response relationship (where data are available), whereby the more types of FP messages to which one is exposed, the more likely one is to use modern contraception and/or intend to use FP.
3. Endorsement of gender equitable norms will be associated with increased odds of modern contraceptive use and FP intentions.
4. Gender equality mediates the relationship between exposure to FP messages and modern contraceptive use and FP intentions.

## Format of this report

This report is based on secondary data analyses performed on studies in Tanzania, Malawi, India and Nigeria. After a brief introduction to the importance of gender equity for health communication efforts to improve RH outcomes, this report outlines the methodology and results for each of the data sets analyzed. For each study, the following information is provided.

- Brief description and background of the project/study.
- Study methodology, including recruitment, information on the study population, measures and data analysis.
- Results, including descriptive, bivariate, multivariate and mediation and moderation analyses.

Following reports on each of the four secondary data analyses, the evidence is summarized in a final discussion section. This section highlights similarities and differences identified in results found in each of these four studies. Implications and next steps are suggested for future work designed to address gender equity and RH.

# The Support for Service Delivery Integration-Communication (SSDI) Program

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## Background

The Service Delivery Integration-Communication (SSDI) program is designed to address the reproductive, maternal, neonatal and child health concerns of people in Malawi. In anticipation of designing the program components, a baseline survey was conducted for the SSDI program. The overall goal was to measure levels of predictors of positive health practices, particularly knowledge, self-efficacy, risk perceptions and social normative perceptions, as well as to establish baseline measures against which to measure change in key health practices across a broad range of health areas, including health communication. It also included a module on gender norms and another on community capacity. Finally, the survey assesses participants' baseline exposure to communication programs designed to address FP. The findings continue to provide meaningful insights into program design, implementation and evaluation plans.

Results from the 2012 SSDI baseline data analyses can be found in a report prepared for USAID. This secondary data analysis explored the relationship between exposure to communication programs already in existence, gender equality and FP outcomes in the Malawi context. Although the survey does include questions about communication program exposure, it does not ask specific questions about the content of these programs. As a result, it is not possible to conclude whether the programs to which men and women report being exposed address gender or are gender transformative. This analysis therefore draws on the 2012 baseline SSDI survey to examine the relationship between exposure to F communication programs, gender equity and FP outcomes in Malawi.

## Methodology

### *Recruitment*

The 2012 SSDI baseline study used a stratified sampling design with selection proportionate to size in each of the 15 intervention and four control districts in Malawi (CCP, 2013). Enumeration areas (EA) in each district were randomly selected and households within each EA were randomly chosen. Respondents in households were randomly selected based on sex (CCP, 2013).

### *Measures*

The sample characteristics recorded included sex, age, educational attainment, relationship status, wealth index, employment status, whether the participant lived in an urban or rural area

and the number of household members. Age, educational attainment and wealth were categorized based on the distribution of participants' responses.<sup>2</sup>

The independent variables of interest were exposure variables and gender equality scores.

- *Exposure variables*: four dichotomous variables assessed whether participants had heard or seen messages about preventing pregnancy, condoms as a method to prevent disease and unwanted pregnancies, contraceptive injections and messages about contraceptive pills in the last six months. One summary exposure variable was also created to assess whether there was a dose effect.<sup>3</sup>
- *Gender equitable norm scale (alpha=0.62)*: this scale consists of 11 items with four answer choices that range from "Strongly disagree" (0) to "Strongly agree" (4). Sample items include: "The important decisions in the family should be made only by the men of the family" and "It should be the responsibility of a man and woman together to decide how many children they should have" (Appendix, Table B1)." Four items were reverse coded so that all questions were in the same direction (higher scores represented more gender equitable norms). Items were summed to obtain the final, continuous, gender equity score. Final scores ranged from 0-44.

The outcome variables of interest were current modern FP use and intention to use FP. The current FP use variable included people who reported currently using a modern FP method. Modern contraception was defined as the use of contraceptive pills, injections, implants, IUD, male condom, female condom, female sterilization and male sterilization. This variable did not include females who were currently pregnant (n=98), as they would inevitably not be using contraception. Unfortunately, the survey did not ask men if they had a partner who was currently pregnant, so the current FP use variable does not exclude these participants. The variable for current modern FP use was dichotomous, defined as no modern contraception (0) and any modern contraception (1). Finally, intention to use FP was coded as a dichotomous variable of no intention (0) and intention (1).

### *Data Analysis*

Of the original 2,233 participants (n=1,134 women; n=1,099 men), 16 percent of women (n=180) and 1 percent of men (n=9) reported past sterilization. These participants were excluded from the data set because their sterilization would not have been affected by a message currently on the air. This yielded a final sample of 2,044 participants (n=1,034 women; n=1,010 men). The sample was drawn proportionate to population size; therefore, sampling weights were not required for the descriptive and statistical analyses. Frequencies and measures of central tendency were first calculated to describe the sample. Bivariate logistic regression analyses were performed to determine if exposure to each of the four FP messages, as well as the summary exposure measure, were significantly associated with increased modern

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<sup>2</sup> This approach was utilized in each of the four data sets analyzed in this report. As a result, categorizations of variables like age and wealth may differ slightly across the four analyses.

<sup>3</sup> Dose was based on the number of unique communication messages or channels to which respondents were exposed, not on the number of times they recalled any given message.

contraceptive use and/or FP intention. Bivariate logistic regression analysis was also conducted to assess the relationship between gender equality and modern contraceptive use and/or FP intention. Additionally, a multivariate analysis was conducted to explore the association between current modern contraceptive use and the summary exposure measure, adjusting for gender equity, sex, relationship status, age, education and wealth index. Finally, another multivariate analysis was performed to determine the relationship between FP intention and the summary exposure measure, adjusting for gender equity, sex, relationship status, age, education and wealth index.

A mediation analysis was also conducted to see if gender equitable norms mediated the relationship between program exposure and current FP use and/or FP intention. In order to assess whether gender equity mediates the relationship between program exposure and FP outcomes, it is first necessary to establish significant bivariate relationships between both of the independent variables, as well as the independent variables and the outcome variable. Thus, in addition to bivariate analyses among exposure and the outcomes, as well as gender equity and the outcome variables, a bivariate analysis was conducted to determine the relationship between program exposure and gender equity.

## Results

### *Descriptive Statistics*

The demographic characteristics are detailed in Table 1. The average age of women was 29 years (SD= 10.5), and 30.4 years for men (SD= 11.4). The majority of participants lived in rural areas (92.2 percent women and 90.7 percent men) and had an educational attainment of primary or below (82.5 percent women and 70.7 percent men). Men had higher levels of educational attainment than women (29.3 percent of men and 17.5 percent of women had some secondary education or more). Men also had higher rates of employment than women. Nearly three quarters of men (71.5 percent) had full-time work, as compared to 67.4 percent of women. There were also more men who were students (11.6 percent v. 4.5 percent) or employed with part-time work (12.2 percent v. 5.1 percent) than women. Accordingly, there were more women who were unemployed (22.9 percent) than men (4.7 percent). The majority of participants were in a relationship (74.6 percent of women and 74.5 percent of men), and had an average of 4.7 household members living in their home. Finally, men tended to have higher scores on the wealth index than women (men: 16.4 percent lowest wealth, 26.4 percent middle wealth, 57.1 percent highest wealth; women: 38.1 percent lowest wealth, 33.4 percent middle wealth, 28.5 percent highest wealth).

Characteristic	Women (n=1,134) n (%)	Men (n=1,099) n (%)
<b>Zone</b>		
North	153 (15.0%)	151 (14.9%)

Central East	227 (21.9%)	204 (20.2%)
Central West	226 (21.8%)	242 (23.9%)
South East	295 (28.5%)	293 (29.0%)
South West	133 (12.8%)	120 (11.9%)
<b>Age</b> mean (SD)	29.1 (10.5)	30.4 (11.4)
16-20 years n (%)	229 (22.2%)	202 (20.1%)
21-30 years	435 (42.2%)	383 (38.0%)
31-40 years	233 (22.6%)	243 (24.1%)
41-50 years	89 (8.6%)	116 (11.52%)
51-60 years	45 (4.4%)	63 (6.2%)
<b>Place of Residence</b>		
Urban	81 (7.8%)	94 (9.3%)
Rural	953 (92.2%)	916 (90.7%)
<b>Educational Attainment</b>		
Primary and below	853 (82.5%)	714 (70.7%)
Some secondary and above	181 (17.5%)	296 (29.3%)
<b>Employment</b>		
Unemployed/Other	237 (22.9%)	48(4.7%)
Student	47 (4.5%)	117(11.6%)
Part-time work	53 (5.1%)	123 (12.2%)
Full-time work	697 (67.4%)	722 (71.5%)
<b>Relationship Status</b>		
Not in a relationship	263 (25.4%)	258 (25.5%)
In a relationship	771 (74.6%)	752 (74.5%)
<b>Wealth Index</b>		
Lowest Wealth	394 (38.1%)	166 (16.4%)
Middle Wealth	345(33.4%)	267 (26.4%)
Highest Wealth	295 (28.5%)	577 (57.1%)
<b>Total # Household Members</b>	4.8 (2.0)	4.6 (2.1)
Mean (SD)	range (1-15)	range (1-13)

Table 2. Family planning outcomes		
Characteristic	Women n (%)	Men n (%)
<b>Current modern FP method<sup>a</sup></b>	383 (40.3%)	501 (53.0%)
<b>Intention to use FP</b>	791 (84.4%)	810 (89.9%)

<sup>a</sup> Percentages are calculated out of the total number of female participants who are *not* currently pregnant (n=946).<sup>4</sup>

<sup>4</sup> Men were not asked if their wives/partners were pregnant; this is a potential limitation because men may have partners who are pregnant and therefore may not be using contraception. Another limitation is that there was no question asking whether partners were trying to get pregnant, which would limit contraceptive use.

Table 3. Exposure variables		
Characteristic	Women n (%)	Men n (%)
<b>Message Exposure in Past Six Months</b>		
Messages about preventing pregnancy	496 (70.9%)	610 (68.8%)
Messages about condoms preventing disease and unwanted pregnancy	469 (67.1%)	666 (75.2%)
Messages about contraceptive injections	429 (61.4%)	506 (57.1%)
Messages about contraceptive pills	414 (59.2%)	453 (51.1%)
<b>Summary Message Exposure</b>		
Not exposed to any messages	496 (47.9%)	265 (26.2%)
Exposed to 1 message	55 (5.3%)	145 (14.4%)
Exposed to 2 messages	62 (6.0%)	116 (11.5%)
Exposed to 3 messages	55 (5.3%)	78 (7.7%)
Exposed to all 4 messages	366 (35.4%)	406 (40.2%)
Table 4. Gender equity		
Characteristic	Women n (%)	Men n (%)
<b>Gender Equitable Norms</b> Mean(SD)	28.3 (5.7)	30.6 (6.9)

## Bivariate Results

### 1. OUTCOME: CURRENT MODERN FAMILY PLANNING USE

Findings from the bivariate analyses of current modern FP use and exposure to the four messages and the summary exposure variable show that exposure to each individual message was associated with statistically significant increased odds of current modern FP use (See Appendix, Table A1). Participants who were exposed to messages about preventing pregnancy were two times more likely to currently be using a modern FP method, as compared to those who were not exposed to this message (OR=2.0, CI[1.5-2.5]). Exposure to messages about condoms as contraception was associated with 1.5 times greater odds of currently using a modern contraceptive method (OR= 1.5, CI[1.2-2.0]). Participants who were exposed to messages about contraceptive injections were 1.6 times more likely to currently use a modern contraceptive method, as compared to those who were not exposed to this message (OR=1.6, CI[1.3-2.0]). Exposure to messages about contraceptive pills was associated with 1.6 times greater odds of current modern FP use (OR=1.6, CI[1.3, 2.0]).

When exploring a dose effect between message exposure and current modern FP use, the bivariate analysis revealed that there was a statistically significant increase in odds of current modern FP use among participants who had been exposed to three or all four of the messages as compared to those who had not been exposed to any messages (See Appendix, Table A1). In particular, as compared to participants who had not been exposed to any messages, participants who had been exposed to three of the messages were 1.7 times more likely to currently be using a modern FP method (OR=1.7, CI[1.1-2.3]), and participants who were exposed to all four messages were 1.8 times more likely to currently be using a modern FP

method (OR=1.8, CI[1.5-2.3]). The test for an overall effect of the summary exposure measure on current modern FP use revealed a statistically significant relationship between the two variables ( $\chi^2(4, N= 2,044)=33.08, p<0.001$ ).

Finally, findings from the bivariate analysis of gender equity and current modern contraceptive use show that gender equity was negatively associated with current modern FP use (OR= 0.02, CI[0.01-0.04]).

## 2. OUTCOME: FAMILY PLANNING INTENTION

Findings from the bivariate analyses of FP intention and exposure to the four messages reveal that exposure to each individual message is associated with statistically significant increased odds of FP intention (See Appendix, Table A2). Participants who were exposed to messages about preventing pregnancy were 1.7 times more likely to intend to use FP, as compared to those who were not exposed to this message (OR=1.7, CI[1.2-2.3]). Exposure to messages about condoms as contraception was associated with 1.6 times greater odds of intention to use FP (OR= 1.6, CI[1.1-2.2]). Participants who were exposed to messages about contraceptive injections were 1.8 times more likely to intend to use FP, as compared to those who were not exposed to this message (OR=1.8, CI[1.3-2.5]). Exposure to messages about contraceptive pills was associated with 1.5 times greater odds of intention to use FP (OR=1.5, CI[1.1, 2.1]).

When exploring a dose effect between message exposure and FP intention, the bivariate analysis revealed there was a statistically significant increase in odds of FP intention among participants who had been exposed to one, three or all four types of messages, as compared to those who had not been exposed to any messages (See Appendix, Table A2). In particular, as compared to participants who had not been exposed to any messages, participants who had been exposed to one of the messages had increased odds of intending to use an FP method (OR=1.8, CI[1.0-3.0]). In addition, participants who were exposed to three of the messages were 2.6 times more likely to intend to use an FP method (OR=2.6, CI[1.3-5.3]), and participants who were exposed to all four messages were 1.9 times more likely to intend to use an FP method (OR=1.9, CI[1.4-2.7]), as compared to participants who were not exposed to any type of FP message. The test for an overall effect of the summary exposure measure on FP intention revealed a statistically significant relationship between the two variables ( $\chi^2(4, N= 2,044)=23.22, p<0.001$ ).

The bivariate analysis of gender equity and FP intention revealed that gender equity was positively associated with FP intention (OR= 1.04, CI[1.0-1.1]).

## 3. OUTCOME: GENDER EQUITY

Bivariate analyses reveal that exposure to each individual message was associated with statistically significantly increased gender equity, except for messages about condoms as contraceptives (See Appendix, Table A3). Participants who were exposed to messages about preventing pregnancy were 1.1 times more likely to have higher gender equity as compared to



those who were not exposed to these messages (OR=1.1, CI[0.4-1.8]). Participants who were exposed to messages about condoms as contraceptives were 0.5 times more likely to have higher gender equity as compared to those who were not exposed to these messages, however, this was not statistically significant (OR=0.5, CI[-0.2-1.2]). Participants who were exposed to messages about contraceptive injections were 1.1 times more likely to have higher gender equity, as compared to those who were not exposed to this message (OR=1.1, CI[0.4-1.7]). Exposure to messages about contraceptive pills was associated with 1.4 times greater odds of having higher gender equity as compared to no exposure (OR=1.4, CI[0.7- 2.0]).

Exposure to one, two and three messages was not statistically significantly associated with gender equity. Exposure to all four messages was associated with 2.4 times increase odds of having higher gender equity, as compared to those who were not exposed to any messages (OR=2.4, CI[1.7-3.0]). The test for an overall effect of the summary exposure measure on gender equity revealed a statistically significant relationship between the two variables ( $\chi^2(4, N= 2,044)=17.39, p<0.001$ ).

## *Multivariate Analyses*

### 1. OUTCOME: CURRENT MODERN FAMILY PLANNING USE

Findings from the multivariate analysis, which explore the association between current modern contraceptive use and the summary exposure measure, adjusting for gender equity, sex, relationship status, age, education and wealth index, show that exposure to all four messages was statistically significantly associated with increased odds of current modern contraceptive use, as compared to participants who had not been exposed to any messages (AOR=1.5, CI[1.2-1.9]). Gender equity was no longer statistically significantly associated with current modern contraceptive use after adjusting for the background variables and exposure (See Appendix, Table A1). Interestingly, participants in a relationship were 2.7 times more likely to be currently using a modern contraceptive method, as compared to participants who were not in a relationship (AOR=2.7, CI[2.1, 3.5]). Additionally, participants who were 21-30 years old, 31-40 years old and 51-60 years old had statistically significantly greater odds of currently using a modern contraceptive method, as compared to participants who were 16-20 years old (See Appendix, Table A1). Furthermore, women had statistically significantly reduced odds of contraceptive use, as compared to men (AOR= 0.8, CI[0.6-0.9]). Education and the wealth index were not significantly associated with modern contraceptive use.

The variance inflation factors (VIFs) were calculated to assess for collinearity among the covariates in the multiple logistic regression model. Collinearity was not an issue because all VIFs were relatively low, ranging from 1.0-2.4. The higher VIFs corresponded to categories of categorized variables, which can be expected. The Hosmer-Lemeshow Goodness of Fit test was non-significant ( $p>0.05$ ), indicating that the model fit the data well.

### 2. OUTCOME: FAMILY PLANNING INTENTION

Results from the multivariate analysis among FP intention and the summary exposure measure, adjusting for gender equity, sex, relationship status, age, education and wealth index, also revealed that exposure to all four messages was statistically significantly associated with increased odds of intention to use an FP method, as compared to participants who had not been exposed to any messages (AOR=1.5, CI[1.0-2.3]). *Gender equity was no longer statistically significantly associated with FP intention after controlling for the covariates* (See Appendix, Table A2). Women had reduced odds of intending to use an FP method, as compared to men (AOR=0.4, CI[0.3-0.6]). Participants in a relationship were 1.8 times more likely to intend to use FP, as compared to participants who were not in a relationship (AOR=1.8, CI[1.2-2.7]). Additionally, participants who were 31-40 years old, 41-50 years old and 51-60 years old had statistically significantly decreased odds of intending to use an FP method, as compared to participants who were 16-20 years old (See Appendix, Table A2). Education and the wealth index were not statistically significantly associated with FP intention (See Appendix, Table A2).

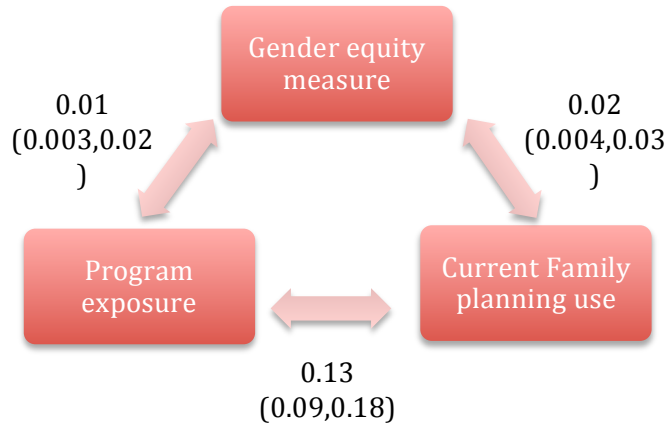
The VIFs were calculated to assess for collinearity among the covariates in the multiple logistic regression model. Collinearity was not an issue because all VIFs were relatively low, ranging from 1.0-2.0. The higher VIFs corresponded to categories of categorized variables, which can be expected. The Hosmer-Lemeshow Goodness of Fit test was non-significant ( $p > 0.05$ ), indicating that the model fit the data well.

### *Mediation Analysis*

In order to test the hypothesis that gender equity mediates the relationship between program exposure and FP outcomes, it is first important to establish whether the bivariate relationships between the variables are statistically significant.

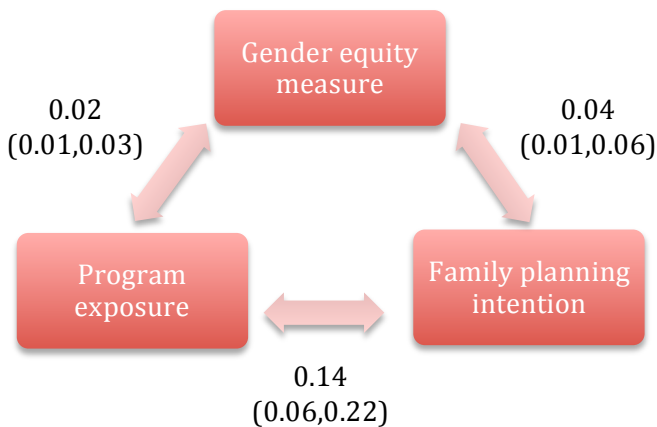
As reviewed above, there was a statistically significant relationship between the summary exposure measure and gender equity ( $\chi^2(4, N= 2,044)=17.39, p<0.001$ ). Additionally, the summary exposure variable was statistically significantly associated with both current modern contraception use ( $\chi^2(4, N= 2,044)=33.08, p<0.001$ ) and FP intention ( $\chi^2(4, N= 2,044)=23.22, p<0.001$ ). The gender equity variable was also significantly associated with current modern contraception use (OR=0.02, CI[0.01-0.04]) and with FP intention (OR=1.04, CI[1.0-1.1]). Accordingly, we conducted a mediation analysis to test the hypothesis that gender equity mediates the relationship between current modern contraception use and the summary exposure variable, as well as FP intention and the summary exposure variable.

The results from the mediation analysis between program exposure and current FP use, with gender equity as the mediating variable, are represented in Figure 1. Although the indirect effects were statistically significant, only 7 percent of the relationship between program exposure and current FP use was mediated by gender equity (Figure 1). This suggests that gender equality has minimal effect on the relationship between program exposure and current FP use.



**Figure 1. Direct and indirect relationships between communication program exposure and current FP use via gender equity as a mediating variable**

The results from the analysis of the relationship between program exposure and FP intention via gender equity as a mediating variable are represented in Figure 2. As with the previous analysis, the indirect effects were statistically significant, but the proportion of the total effect that was mediated by gender equity was small (12 percent). This suggests that gender equality has minimal effect on the relationship between program exposure and FP intention.



**Figure 2. Direct and indirect relationships between communication program exposure and FP intention via gender equity as a mediating variable**

## Discussion

Findings suggest that exposure to messages about preventing pregnancy, using condoms to prevent disease and unwanted pregnancy, as well as messages about contraceptive injections and pills, were generally associated with increased current modern contraceptive use and FP

intention after controlling for gender equity, sex, age, relationship status, education and wealth. Furthermore, there seems to be a dose-response relationship between message exposure and current modern contraceptive use and FP intention. Specifically, the more types of messages (i.e. messages about preventing pregnancy, condoms as a method to prevent disease and unwanted pregnancies, contraceptive injections and messages about contraceptive pills in the last six months) to which participants were exposed, the more likely they were to use modern contraception and intend to use FP in the future.

While other studies in similar contexts (Harrison, O'Sullivan, Hoffman, Dolezal, Morrell, 2006; Mishra et al., 2014) have found that gender equality was statistically and significantly associated with decreased odds of contraception use in multivariate analyses, negative association only held at the bivariate level in this study. The SSDI data do show, however, that gender equality was statistically significantly associated with increased FP intention in the multivariable models. In bivariate analyses, exposure to messages about pregnancy prevention, as well as the contraceptive pill and injections, was statistically significantly associated with higher levels of gender equity. Furthermore, participants exposed to all four messages outlined above were also statistically significantly more likely to endorse gender equitable norms in bivariate analyses. Results from the mediation analysis, however, indicate that gender equity does not mediate the relationship between message exposure and FP intention not with respect to modern contraception use.

# The Urban Reproductive Health Initiative

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## Background

The Urban Reproductive Health Initiative, funded by the Bill and Melinda Gates Foundation, works to improve the health of urban residents in four countries: Senegal, Nigeria, Kenya and India. Integral to this initiative are campaigns targeted at women and men of reproductive age to increase the use of FP services and to address child spacing issues. In addition to communication interventions, efforts have also been made in India to improve quality of care, increase access, and improve funding and policy mechanisms to ensure more long-term accessibility and availability of RH services for poor urban residents.

## Initiative Evaluation

Across all Urban Reproductive Health Initiative countries, baseline, midterm and endline evaluations are vital to determining the effect of the various intervention components of this multi-pronged initiative. The Measurement, Learning & Evaluation (MLE) Project is responsible for the evaluative piece. The MLE Project is centered at the University of North Carolina (UNC) and works with the International Center for Research on Women (ICRW) to perform individual-, facility- and program-level cross-sectional and longitudinal analyses across cities to provide evidence for the effect of intervention components and gather data on suggestions and recommendations for design improvements and future work.

## Programs of interest

This report analyzes data collected from two sites of the Urban Reproductive Health Initiative: India and Nigeria.

# Urban Health Initiative (UHI)

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## Background

The Urban Health Initiative (UHI) is part of the larger five-year, multi-sited Urban Reproductive Health Initiative funded by the Bill and Melinda Gates Foundation. UHI was implemented in India from 2009 to 2014 with a focus on increasing contraceptive use, particularly among the urban poor. A baseline survey was administered in 2010 and included detailed assessment of individual women and men's RH history, socio-demographics, gender inequity, partner communication and exposure to media channels like television or radio. A midterm survey was administered in 2012 to assess individual women's and men's exposure to various FP messages intended to increase use of FP and contraceptive use among couples. Other assessments have included data gathered from health facilities. The endline survey was administered in 2014 and the final report made publicly available at the end of 2014. The purpose of this multi-sited intervention with midterm and endline surveys is to assess 1) the effect of the intervention across different locations in India and 2) the effect of the intervention over time.

As part of the UHI, several communication interventions were implemented across India. These communication strategies used radio, television and other multi-pronged strategies to establish a wide audience for program dissemination. Multiple communication strategies were used, including 1) mass media communications designed to increase awareness of FP and the project, 2) television programs designed to model couple-based decision-making about FP, 3) dissemination of true stories from "role models" who demonstrated success in deciding to use FP and 4) community mobilization events (CCP, 2014c). Some of these communication programs are highlighted below.

**Sambhal lunga:** This program was designed to demonstrate women's ability to decide to receive healthcare services and begin using FP methods. This program was disseminated on television and on radio. This program is a spot that features the story of a woman who "takes control" by deciding to seek out a provider for FP services (MLE, 2012, p. 42).

**Female sterilization spots:** These spots reflected the ability to choose sterilization as an option if no future children were desired. This program was disseminated on television and on radio.

**Male sterilization spots:** These spots highlighted the decision to get sterilized following consultation with a healthcare provider and the benefits of this decision for marriage. This program was disseminated on television and on radio.

**Happy Dampatti Pratiyogita:** This multi-pronged approach utilized television interviews, television short stories, local contests and other dissemination techniques (e.g. wall paintings, mobile phone messaging, or newspapers) to increase exposure and

acceptance of FP use. The Happy Dampatti program is a campaign designed to encourage those individuals using FP services to “be open about their FP use and to be advocates for non-users. In the Happy Dampatti contest communities take on the responsibility to identify and celebrate couples who have successfully accepted FP. These stories are disseminated to city wide audiences through local mass media” (MLE, 2012, p. 38).

**Community events:** Community events focused on FP, such as folk shows, magic shows, or miking<sup>5</sup>, were also employed.

Although these communication programs were focused on FP concerns, they also integrated gender issues into their design. For example, Sambhal lunga highlighted the importance of women’s roles in FP decision-making, which is a key component of many measures of gender equity. Similarly, Happy Dampatti addressed partner communication, which is also intimately linked to gender norms at the household level. Therefore, this secondary data analysis drew on the midterm survey data to explore the complex relationship among UHI communication program exposure, gender equity measures and midterm FP outcomes.

## Methodology

### *Study Design*

UHI was implemented across Uttar Pradesh, India. The intervention activities were first implemented in Agra, Aligarh, Allahabad and Gorakhpur, starting in 2010, with delayed activities implemented in Moradabad, Varanasi, Farrukhabad, Kanpur, Kucknow, Mathura and Varanasi starting in 2011. The women’s baseline survey consists of a representative sample of 17,643 married women aged 15-49 interviewed in the four initial intervention cities, Moradabad and Varanasi.

A multi-stage survey design was utilized to survey women in Uttar Pradesh. Primary sampling units (PSUs) were defined as slum and non-slum, based on characteristics identified using geographic information systems (GIS). At baseline, 30 households were randomly sampled for the women’s survey. At midterm, a sub-sample of 5,790 women from Agra, Aligarh, Allahabad and Gorakhpur were interviewed following a stratified random sample of 60 percent of PSUs utilized for the baseline survey (Nanda, Achyut, Mishra, & Calhoun, 2011, p. 2). These PSUs were equally sampled by slum and non-slum households and thus, slum populations were oversampled. Researchers followed up with all women who had participated in the baseline survey at midterm, even if women were not re-interviewed.

Since midterm data for male participants were not available, this report explores effects based on women’s responses only.

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<sup>5</sup> Autodrive/miking refers to when vehicles drive through communities and use large sound systems to communicate particular messages (MLE, 2012, p. 38).

## Study Population

This exploration focused on responses from women who completed both a baseline and midterm survey as part of UHI. Based on the sampling strategy discussed above, 5,790 women from four cities were surveyed at midterm. Inclusion criteria were assessed at baseline. Women had to be married and between 15 and 49 years of age at baseline to be eligible for participation, but marital status and age were not utilized as criteria for inclusion in the midterm survey.

To address the research questions listed above, current use of FP was utilized as the primary dependent variable of interest. Given this outcome, women who reported 1) menopause, 2) hysterectomy or 3) sterilization prior to the baseline survey (administered in January 2010) were excluded from statistical analyses (n=1,758). Women who were currently pregnant were also excluded (n=248). Therefore, responses from 3,784 women form the basis for analyses discussed in this report.

## Measures

Dependent variables are listed below.

- **Current use of FP.** Women reporting current use were coded as “1,” and “0” otherwise.
- **Use of any modern FP method.** Use of either sterilization, condoms, injectables, pills, implants and/or lactational amenorrhea (LAM) were coded as “1,” and “0” otherwise.
- **Unmet need.** Women reporting either 1) wanting to delay a birth and not currently using FP (unmet need for spacing) or 2) not wanting another children in the next 2 years and not currently using FP (unmet need for limiting) were coded as “1,” and “0” otherwise.

Independent variables of interest are listed below. Multiple intervention exposure variables were created (see Appendix 2). For the purposes of this report, the following program exposures are reported:

- **Overall program exposure.** A dichotomized measure of any exposure to an FP-related UHI communication program (via television, radio or other media) was coded as “1,” with no exposure coded as “0.”
- **Exposure to specific programs.** Any exposure to the “Happy Dampatti Pratiyogita” program was coded as “1” and “0” otherwise. Any exposure to the “Sambhal lunga” program was coded as “1” and “0” otherwise. Any exposure to a sterilization-related program (either on the radio or television) was coded as “1,” and “0” otherwise.
- **Gender equity.** An index was constructed based on women’s responses to six measures of gender equity: 1) role in decision-making about the husband’s money, 2) woman’s employment, 3) decision-making about the woman’s money, 4) decision-making about FP, 5) need for consent for FP and 6) availability of money that women alone could decide how to spend. Example items include “Who decides how the money that your husband earns will be used: Mainly you, mainly your husband, or you and your husband jointly?” and “Do/did you need the consent of your husband or family members to use an FP method?” (Appendix, Table B2). Results of the index were log-transformed based



and standardized into z-scores. Therefore, an increase from zero to one in this standardized gender equity variable reflected an increase from the mean gender equity (log transformed) in this population to one standard deviation above the mean gender equity score.

Various socio-demographic variables controlled for in multivariate analyses are listed below. Age, parity, education, religion and wealth were controlled for based on their demonstrated significance in research on FP use (Mishra et al., 2014). As demonstrated below, variables like age, parity, education and wealth were categorized based on the distribution of UHI participants' responses.<sup>6</sup>

- **Women's age at midterm.** Categorical variable with four age groups: 15-24, 25-34, 35-44 and 45-54 years old.
- **Parity.** Live births at midterm were categorized into four groups: 0-1, 2, 3 and 4 or more live births.
- **Education.** Education at midterm was categorized into four groups: never attended school, attended school and completed 0-8 standards, attended school and completed 9-12 standards, attended school and completed 13-20 standards.
- **Religion.** Women from Hindu households were coded as "1," and "0" otherwise.
- **City.** Women's city of residence was a categorical variable that distinguished between women living in 1) Agra, 2) Aligarh, 3) Allahabad and 4) Gorakhpur.
- **Wealth.** A wealth index was created using principal components analysis (PCA) of a set of durable goods and household characteristics. Weights drawn from the first component identified by PCA was used to represent long-term wealth (Filmer and Pritchett, 2001). Participants were then assigned a composite score based on their ownership and household characteristics. Based on household wealth score, women were assigned to one of five wealth quintiles ranging from lowest to highest wealth.

### *Data Analysis*

Stata version 13 was utilized for all statistical procedures (StataCorp, 2013). Given the complex survey design utilized to administer UHI's baseline and midterm surveys, sampling weights were incorporated into all descriptive and statistical analyses using the SVY command. Descriptive tabulations, as well as regression outputs reflect weighted values. Although the inclusion of sampling weights often does not dramatically affect coefficients in regression analyses, the standard errors calculated in regressions must be adjusted to account for the sampling design.

Following descriptive analyses of variables of interest, bivariate associations between 1) current use of FP, 2) current use of modern contraceptives and 3) unmet FP need and the independent variables described above were performed using cross-tabulations and  $\chi^2$  tests. T-tests and Analyses of variance (ANOVA) were also used to explore the associations between gender

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<sup>6</sup> This approach was utilized in each of the four data sets analyzed in this report. As a result, categorizations of variables like age and wealth may differ slightly across the four analyses.

equity and intervention exposures to determine the possible indirect effects of gender equity on current FP use through intervention components. Finally, t-tests, ANOVA, cross-tabulations and  $\chi^2$  tests exploring the association between socio-demographic variables and gender equity were also performed.

Additionally, the research team hypothesized that sterilization programs may not have an overall effect on current FP use, but that exposure to their messages could have an effect on the likelihood of couples to be sterilized. Therefore, a sub-analysis was performed to determine whether exposure to sterilization programs was associated with reported sterilization since baseline.

Following results from the bivariate analyses, multivariable models were constructed for each intervention exposure variable that included gender equity and adjusted for a set of socio-demographic variables. For all multivariate analyses, regression models with all covariates of interest were initially run. Then, Wald tests of significance were used to determine whether particular covariates contributed to the significance of the model. In order to gather additional evidence in support of excluding covariates, stepwise selection of covariates was run on each model (ignoring sampling weights). Multivariate models presented here were selected as a result of their parsimoniousness, model fit, significant Wald tests and ease of comparison across models.

In light of the use of the SVY command in statistical analyses of UHI, the Hosmer-Lemeshow's Goodness of Fit test is not appropriate. Therefore, multivariable models were tested for robustness by testing interactions between relevant covariates of interest. Collinearity of predictors was assessed by measuring VIFs. Additionally, a recently added method to assess goodness of fit post-estimation for survey sample data was utilized (StataCorp, 2013).

## Results

### *Descriptive Statistics*

Midterm questionnaires were completed by 5,790 women. Responses from 1,758 women were excluded because they 1) had received a hysterectomy, 2) had been sterilized or 3) were menopausal prior to the baseline survey administered in 2010. Women who were currently pregnant were also excluded from analysis (n=248). Due to the oversampling of slum households, sampling weights were incorporated into descriptive and regression analyses. Important socio-demographic characteristics of the sample, drawn from participants' responses to the midterm survey, are summarized in Table 5 and Table 6.

At midterm, 2,497 (66) were currently using an FP method. Among this subpopulation, 1,498 (40 percent) were currently using a modern contraceptive method. Of the 2,497 FP users documented at midterm, 137 (4 percent) utilized male or female sterilization. Among those not using an FP method (n=1179), 166 (16 percent) reported that they or their husband intended to start using an FP method in the next 12 months. Two hundred eighty-three (27 percent) women

reported being unsure of whether or not they intended to use an FP method in the next 12 months.

Among the sample of women analyzed in this report, 47 percent were 25-34 years of age. The mean gender equity measure was 0.29. Since the gender equity index was standardized for the full study population, this indicates that the subpopulation of women analyzed in this study have a higher mean gender equity score than the full sample of UHI women. More women lived in Agra (35 percent) and Allahabad (26 percent) than Aligarh (20 percent) and Gorakhpur (19 percent). The majority of participants were Hindu (81 percent). Twenty-four percent had never attended school, while 28 percent of women had completed at least the 13<sup>th</sup> standard. The majority of participants belonged to historically disadvantaged groups, such as scheduled castes or tribes (21 percent), or other backward or extremely backward classes (37 percent). Having two live births was common among women (36 percent), but many women reported having had at least four live births (26 percent).

Exposure to communication interventions varied by program and type of media used. Over half of all participants had not seen or heard of any communication interventions discussed in the midterm questionnaire (55 percent). Thirty-five percent of women (1,297 women) had seen the Sambhal lunga program on television or heard it on the radio. Only 5 percent of women reported any exposure to Happy Dampatti Pratiyogita. Similarly, only 4 percent of women reported any exposure to community events, such as community theatre, autodrive/miking or magic shows that incorporated FP messages. Exposure to programs about sterilization (either male or female) was more common, with 29 percent of women seeing or hearing of at least one program. Exposure to television-based programs was also common, with 18 percent reporting exposure to one program, 11 percent reporting exposure to two programs and 13 percent reporting exposure to at least three television-based communication programs. However, few women had heard radio programs (5 percent).

Baseline Characteristics	Total ** (Unweighted n=3784)	Total *** (Weighted n=3761)
<b>Mother's age at midterm</b> n(%)		
15-24 yr	530 (14.0%)	475 (12.6%)
25-34 yr	1752 (46.3%)	1747 (46.5%)
35-44 yr	1202 (31.8%)	1217 (32.4%)
45-52 yr	300 (7.9%)	322 (8.6%)
<b>Gender equity index</b> **** mean(SD or SE)	0.21 (SD: 0.97)	0.29 (SE: 0.0248)
<b>City</b> n(%)		
Agra	955 (25.2%)	1297 (34.5%)
Aligarh	1150 (30.4%)	744 (19.8%)
Allahabad	773 (20.4%)	987 (26.2%)
Gorakhpur	906 (23.9%)	733 (19.5%)
<b>Wealth</b> n(%)		
1 (ours)	715 (18.9%);	496 (13.2%);

1 (UHI)	876 (23.2%)	618 (16.4%)
2 (ours)	748 (19.8%);	643 (17.1%);
2 (UHI)	817 (21.6%)	754 (20.1%)
3 (ours)	744 (19.7%);	737 (19.6%);
3 (UHI)	730 (19.3%)	745 (19.8%)
4 (ours)	780 (20.6%);	856 (22.8%);
4 (UHI)	712 (18.8%)	832 (22.1%)
5 (ours)	797 (21.1%);	1029 (27.4%);
5 (UHI)	649 (17.2%)	812 (21.6%)
<b>Religion n(%)</b>		
Hindu	2851 (75.3%)	3042 (80.9%)
Other	933 (24.7%)	719 (19.1%)
<b>Education n(%)</b>		
Never attended school	1138 (30.1%)	907 (24.1%)
Highest Standard completed: 0-8	893 (23.6%)	805 (21.4%)
Highest Standard completed: 9-12	923 (24.4%)	997 (26.5%)
Highest Standard completed: 13-20	830 (21.9%)	1052 (28.0%)
<b>Caste n(%) *****</b>		
Scheduled caste/tribe	842 (22.3%)	771 (20.6%)
Other backward or extremely backward class	1572 (41.7%)	1394 (37.2%)
None of these	1358 (36.0%)	1585 (42.3%)
<b>Parity</b>		
0-1 live births	883 (15.3%)	730 (19.4%)
2 live births	1458 (25.2%)	1338 (35.6%)
3 live births	1298 (22.4%)	709 (18.9%)
4+ live births	2151 (37.2%)	984 (26.2%)
<p>* Exposure to pregnancy excludes women who received a hysterectomy, were sterilized and/or were menopausal when administered the baseline UHI questionnaire (January to **, 2010). Women currently pregnant at the time of the midterm questionnaire were also excluded.</p> <p>** Total reflects a subpopulation of women who had not received a hysterectomy, were not sterilized and were not menopausal when administered the baseline questionnaire (January to **, 2010). Women currently pregnant at the time of the midterm questionnaire were also excluded.</p> <p>*** Total reflects the weighted sample size of the subpopulation of eligible women (women who had not received a hysterectomy, were not sterilized and were not menopausal when administered the baseline questionnaire in 2010) based on the sampling design. Women currently pregnant at the time of the midterm questionnaire were also excluded.</p> <p>**** Log normalized and z-score standardized</p> <p>***** Terms “scheduled caste/tribe” and “backwards or extremely backwards class” were utilized by UHI researchers in their questionnaires and are thus reproduced here. Thirteen (n=13) respondents did not report household caste and thus were coded as missing for this variable.</p>		

Table 6. Intervention exposure among female UHI participants exposed to pregnancy.*		
Intervention exposure	Total ** (Unweighted n=3784)	Total *** (Weighted n=3761)

Individual Program exposure		
<b>Sambhal lunga program n(%)</b>		
None	2530 (66.9%)	2464 (65.5%)
TV and/or radio	1254 (33.1%)	1297 (34.5%)
<b>Happy Dampatti Pratiyogita</b>		
None	3506 (92.7%)	3567 (94.8%)
1+ programs	278 (7.4%)	194 (5.2%)
<b>Other community events mentioning FP</b>		
None	3566 (94.2%)	3599 (95.7%)
1+ programs	218 (5.8%)	162 (4.3%)
Summarized program exposure		
<b>Overall exposure</b>		
None	2086 (55.1%)	2086 (55.5%)
1 program	615 (16.3%)	641 (17.1%)
2 programs	443 (11.7%)	419 (11.1%)
3+ programs	640 (16.9%)	615 (16.4%)
<b>Overall exposure</b>		
None	2086 (55.1%)	2086 (55.5%)
1+ programs	1698 (44.9%)	1675 (44.5%)
<b>Television-based programs</b>		
None	2222 (58.7%)	2188 (58.2%)
1 program	643 (17.0%)	676 (18.0%)
2 programs	410 (10.8%)	403 (10.7%)
3+ programs	509 (13.5%)	495 (13.2%)
<b>Radio-based programs</b>		
None	3562 (94.1%)	3556 (94.6%)
1+ programs	222 (5.9%)	205 (5.4%)
<b>Overall sterilization programs</b>		
None	2655 (70.2%)	2662 (70.8%)
1+ programs	1129 (29.8%)	1099 (29.2%)
<p>* Exposure to pregnancy excludes women who received a hysterectomy, were sterilized and/or were menopausal when administered the baseline UHI questionnaire (January to **, 2010). Women currently pregnant at the time of the midterm questionnaire were also excluded.</p> <p>** Total reflects a subpopulation of women who had not received a hysterectomy, were not sterilized and were not menopausal when administered the baseline questionnaire (January to **, 2010). Women currently pregnant at the time of the midterm questionnaire were also excluded.</p> <p>*** Total reflects the weighted sample size of the subpopulation of eligible women (women who had not received a hysterectomy, were not sterilized and were not menopausal when administered the baseline questionnaire in 2010) based on the sampling design. Women currently pregnant at the time of the midterm questionnaire were also excluded.</p>		

## Bivariate Analyses

### 1. BIVARIATE ASSOCIATIONS WITH CURRENT USE OF FAMILY PLANNING

#### VARIABLES OF INTEREST

Women with higher self-reported gender equity were more likely to use FP. For each standard deviation increase in gender equity (log normalized), women had 1.85 greater odds of using FP (See Appendix, Table A4). Overall, women reporting exposure to any FP-related programs were significantly more likely to use FP than those who reported no exposure (OR: 1.26). Women reporting exposure to the Happy Dampatti program exposure were significantly more likely to use FP compared to women not exposed (OR: 1.34).

#### **CONTROLLING VARIABLES**

Women's age, household wealth, education and parity demonstrated expected associations with current use of FP. Greater age, wealth, education and parity were significantly associated with increased use of FP (See Appendix, Table A4). Women from Hindu households were significantly less likely to use FP (Other religion vs. Hindu OR: 1.32). Additionally, there was no overall effect of city of residence on use of FP among women at midterm ( $p=0.1041$ ).

### **2. BIVARIATE ASSOCIATIONS WITH USE OF ANY MODERN CONTRACEPTIVE METHOD**

The direction of associations between 1) gender equity, communication program exposure or controlling variables and 2) use of any modern contraceptive method was similar to those found for current use of any type of FP.

#### **VARIABLES OF INTEREST**

For every standard deviation increase in women's reported gender equity (log normalized), women had 1.37 greater odds of using FP. Exposure to any program was associated with 1.60 greater odds of using a modern contraceptive method compared no exposure (See Appendix, Table A5). Specifically, women who had seen a television-based communication program were significantly more likely to use modern contraception ( $p=0.0004$ ). Seeing one or two television-based programs was associated with significantly greater odds of use of modern contraceptives (ORs: 1.43, 1.83). Women exposed to any sterilization-related programs (female or male) were 1.47 times more likely to use modern contraception. Women who had heard of the Happy Dampatti program were also more likely to use modern contraception (OR: 1.60).

#### **CONTROLLING VARIABLES**

Greater age, wealth, education and parity were all associated with increased likelihood of using a modern contraceptive method (See Appendix, Table A5). City of residence did not have a significant impact on use of modern contraception.

### **3. BIVARIATE ASSOCIATIONS WITH UNMET NEED FOR FAMILY PLANNING (SUBPOPULATION = 3753)**

The subpopulation for bivariate analyses exploring associations with unmet need was smaller than the subpopulation analyzed with other FP outcomes due to missing responses.

#### **VARIABLES OF INTEREST**

Women with greater gender equity were less likely to have an unmet need for FP. For every standard deviation increase in women's reported gender equity (log normalized), women had

31 percent reduced odds of having an unmet FP need. Unfortunately, there were no significant associations between communication program exposure and unmet need (See Appendix, Table A6).

#### **CONTROLLING VARIABLES**

Women reporting greater age, wealth and education, and being Hindu, were all significantly less likely to have any unmet need for FP (See Appendix, Table A6). Women with more children were more likely to have unmet need than women with one or no children (ORs: 2.2, 2.8, 3.2). Unlike for current use or use of modern contraception, city of residence *was* significantly associated with unmet need ( $p=0.0212$ ). As compared to women from Agra, women from Aligarh were 1.79 times more likely to have unmet need. Similarly, women from Gorakhpur were 1.61 times more likely to have unmet need as compared to women from Agra.

#### **Multivariate Analyses**

Multivariable models for each program exposure were run on three outcome variables: 1) current FP use, 2) use of any modern contraceptives and 3) unmet need for FP. Results from two multivariable models exploring intervention effects on current FP use are presented in the Appendix (See Appendix, Tables A7 and A8). Results from a multivariable model exploring intervention effects on use of any modern contraceptives are presented in the Appendix (See Appendix, Table A9). No multiple logistic regressions on unmet need are presented, due to the surprising lack of significant associations demonstrated between communication program exposure and unmet need in bivariate and multivariate analyses.

### **1. MULTIPLE LOGISTIC REGRESSIONS ON CURRENT USE OF FAMILY PLANNING**

#### **OVERALL PROGRAM EXPOSURE**

After adjusting for gender equity and other socio-demographic variables, there was no significant effect of overall program exposure on current FP use (See Appendix, Table A7). Trends observed in bivariate analyses between gender equity and current use of FP were observed in multivariate analyses. For every standard deviation increase in gender equity (log transformed), women were 1.8 times more likely to use FP ( $p<0.01$ ) after controlling for overall program exposure and other socio-demographic characteristics (See Appendix, Table A7). Greater wealth, educational standard completed and higher parity were also positively associated with current FP use after adjustment (See Appendix, Table A7). Compared to women 15-24, women 45-52 were 84 percent less likely to be currently using FP after statistically adjusting for other socio-demographic characteristics (See Appendix, Table A7).

#### **HAPPY DAMPATTI PROGRAM**

In a multiple logistic regression exploring the effects of any exposure to the Happy Dampatti program demonstrated that after adjusting for gender equity and other relevant socio-demographic characteristics, women who had heard of Happy Dampatti were 1.6 times more likely to use FP ( $p<0.05$ ; See Appendix, Table A8). Greater gender equity, wealth, educational standard completed and increased parity were also significantly associated with current use of FP (See Appendix, Table A8) when controlling for whether women reported hearing of Happy

Dampatti. Interestingly, compared to women 15-24, women 45-52 had 84 percent reduced odds of using FP after adjustment (See Appendix, Table A8).

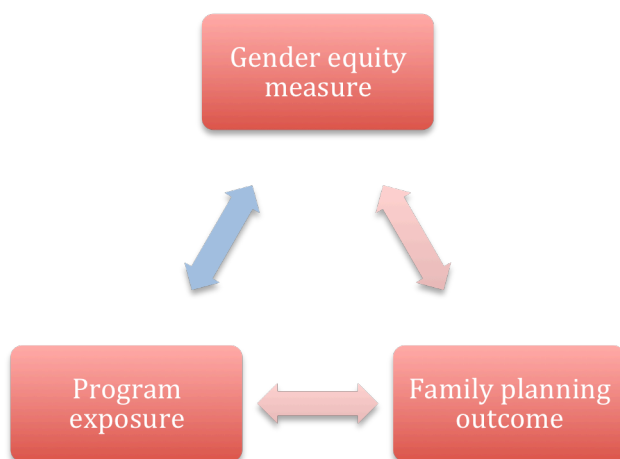
## 2. MULTIPLE LOGISTIC REGRESSION ON USE OF ANY MODERN CONTRACEPTION

### **OVERALL PROGRAM EXPOSURE**

In a multiple logistic regression exploring associations with use of modern contraceptives, women reporting exposure to any communication programs were more likely to use modern contraceptives after controlling for gender equity and other socio-demographic characteristics (OR: 1.4; See Appendix, Table A9). Similarly, women with greater gender equity were more likely to report use of modern contraception after adjustment for program exposure and other socio-demographic variables (OR: 1.3; See Appendix, Table A9). Women reporting higher education and greater parity were more likely to use modern contraception after controlling for program exposure, gender equity and other socio-demographic characteristics of respondents (See Appendix, Table A9). Unlike in multiple logistic regressions exploring current FP use, increased household wealth was not significantly associated with increased use of modern contraceptives after adjustment (See Appendix, Table A9). Furthermore, as compared to women 15-24, women 35-44 and women 45-52 were less likely to use modern contraceptives after adjusting for program exposure and other socio-demographic variables ( $p < 0.01$  and  $< 0.05$ ; See Appendix, Table A9).

### **Mediation and Moderation Analyses**

To address the potential mediating effect of gender equity on the relationship between intervention components and current FP use, bivariate associations between intervention components and gender equity were performed to determine whether possible indirect effects of gender equity exist (the blue arrow in Figure 1).



**Figure 1. Hypothesized direct and indirect relationships between communication program recall and FP outcome via gender equity as a mediating variable**

As demonstrated in the Appendix, there were no significant associations between women’s scores on the gender equity index and intervention exposure (See Appendix, Table A10). Given the lack of association between program exposure and gender equity, there was limited evidence of indirect effects of communication program exposure through a gender equity pathway (See Appendix, Table A10).

To 1) ensure that the gender equity index was not masking individual indicators’ moderating effects and 2) to test the robustness of the multiple logistic regressions, interaction variables



between individual gender equity indicators and program exposure were created and assessed in complete multivariable models. As shown in the Appendix (See Appendix, Table A11), the overall F-statistics for two interaction terms were not significant for multiple logistic regressions discussed in this report (See Appendix, Table A11).

### *Checking the Models: Goodness of Fit and Collinearity of Predictors*

In light of the complex survey methodology utilized in the UHI data, the Hosmer-Lemeshow Goodness-of-Fit test is not appropriate to use for assessing goodness of fit. Instead, a survey sample data-specific goodness of fit test was performed. Therefore, interactions, collinearity and this goodness of fit test were used to test multivariable models. For models on current FP use, as well as use of any modern method, multiple interactions among covariate predictors were run, with no significant interactions found. A post-estimation technique (VIFs) was used to assess collinearity the specific set of covariates. The mean VIF was 2.00, which is greater than 1. This suggests slight collinearity of predictors, but none of the covariates have VIF scores that are large enough to raise concern. Finally, the goodness of fit tests for all models discussed here were not significant ( $p>0.05$ ), suggesting that the models were a good fit of the data.

## **Discussion**

Together, these analyses indicate that communication program exposure was associated with an increased likelihood of using FP. In analyses on current FP use after controlling for gender equity and socio-demographic characteristics like city of residence, wealth, age, education, religion, caste and parity, there was no longer a significant association between communication programs and use of FP (which included both traditional and modern use). In this analysis, gender equity was a strong predictor of current FP use after adjusting for other socio-demographic characteristics and controlling for program exposure. In further analysis, we excluded traditional use and the positive relationship between communication program exposure and use of any *modern* method was once again significant after controlling for other variables of interest. This may be a reflection of the content of these FP-related UHI programs, which targeted modern contraception rather than traditional methods. Therefore, it would make sense that the relationship between program exposure would be stronger with use of modern contraception, rather than use of any method. Another important finding was that there were no associations between program exposure and unmet need – an important indicator of appropriate contraceptive use – at either the bivariate or multivariate level.

Finally, the lack of sufficient evidence to support gender equity's mediating or moderating effects on FP use suggests that gender equity was not associated with communication program exposure.

# Nigerian Urban Reproductive Health Initiative

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## Background

The Nigerian Urban Reproductive Health Initiative (NURHI) is part of the larger five-year multi-sited Urban Reproductive Health Initiative funded by the Bill and Melinda Gates Foundation and implemented from 2009 to 2014. Implemented in Nigeria, NURHI utilizes communication programs disseminated on television and on radio to increase individuals' awareness of and engagement with FP. In addition to these entertainment programs, a mass media campaign entitled "Know, Talk, Go" uses multiple forms of media to increase knowledge and improve communication around FP. In addition to working at the policy level to advocate for improve access to FP services for people in Nigeria, NURHI utilized other communication technologies to facilitate capacity building among healthcare providers to improve provision of care (CCP, 2014a).

As part of the evaluation of NURHI, a baseline survey was administered in 2010 and included detailed assessment of individual women and men's RH history, socio-demographics, gender inequity, partner communication and exposure to media channels like television or radio. A midterm survey was administered in 2012 to assess individual women's and men's exposure to various FP messages intended to increase use of FP and contraceptive use among couples. Other assessments have included data gathered from health facilities. The endline survey data are expected in early 2015 and are not yet publicly available.

Initially, this exploration was focused on responses of women who completed both baseline and midterm NURHI questionnaires. However, a thorough review of relevant indicators in the midterm survey revealed that the midterm questionnaire did not include the gender equity section that was utilized in the NURHI baseline questionnaire. Although a few questions addressing decision-making on FP and future children were included, the research team did not deem these indicators sufficient for a more in depth exploration of the role of gender equity in how communication interventions to increase use of FP and RH ultimately affect FP/RH outcomes.

In response to the limited gender equity variables included in the midterm survey instrument, this analysis examined NURHI baseline data from participating women aged 15-49 in Nigeria to address the research questions outlined in the introduction to this report. In these baseline questionnaires, men and women were asked whether they read, heard, watched or were sent FP messages in newspapers or magazines or on the radio, television or mobile devices. Although this analysis did not enable the researchers to address the impact of NURHI's newly created communication interventions, participants' responses allowed an examination of the complex relationship between "generic" communicate FP messages, gender equity and FP outcomes among women in Nigeria.

## Methodology

### *Study Design*

NURHI was implemented in multiple cities across Nigeria. Intervention activities were implemented in four cities (Abuja, Ibadan, Kaduna and Ilorin) and two scale-up cities (Benin City and Zaria). The women's baseline survey was administered to a representative sample of 16,144 women aged 15-49. For the midterm survey, 4,331 women were interviewed following a random sample of EAs between September and November 2012.

In Nigeria, census EAs were randomly sampled based on probability proportion to size (PPS). Within each EA, households were randomly sampled and women within the households (residents or visitors) were interviewed. At midterm, 65 percent of EAs from the four intervention cities were randomly selected, and women who had participated in the baseline questionnaire were interviewed again.

Men were randomly sampled from a subsampled group of households (one-half of total households sampled); 5,547 men aged 15-59 were surveyed as part of the baseline survey across four cities in Nigeria. A second cross-sectional survey among a different subset of 2,451 men aged 15-59 from two cities (Ibadan and Kaduna) was administered at midterm (MLE, NURHI, & NPC, 2011; MLE & NPC, 2013).

Since responses from men and women were sampled from different households and thus, not linked, analysis of baseline responses are restricted to women's responses. Additionally, since gender equity measures were not included in the midterm survey administered to women, the analysis of NURHI data was limited to baseline responses – and participants' exposure to generic communication programs that had been or were on the air at the time of the survey.

### *Study Population*

To explore the relationships between communication program exposure, gender equity and FP outcomes, current use of FP was utilized as the primary dependent variable of interest. As a result, currently pregnant women were excluded (n=1,233). Therefore, responses from 14,911 women form the basis for analyses of NURHI data. Since some predictors were only asked of women in union (e.g. male dominance), and some women are missing relevant socio-demographic data, the number of observations for bivariate and multivariable models are provided.

### *Measures*

For a more detailed discussion of how variables were created for analysis purposes, see Appendix 2.

Dependent variables are listed below.

- **Current use.** Women reporting current use were coded as "1," and "0" otherwise.

- **Use of any modern FP method.** Use of either sterilization, condoms, injectables, pills, implants and/or lactational amenorrhea (LAM) were coded as “1,” and “0” otherwise.
- **Unmet need.** Women reporting either 1) wanting to delay a birth and not currently using FP (unmet need for spacing) or 2) not wanting another children in the next two years and not currently using FP (unmet need for limiting) were coded as “1,” and “0” otherwise.

Independent variables of interest are listed below.

- **FP message exposure.** Categorical variable with three groups: no exposure, exposure to one FP message, and exposure to two or more messages.
- **Gender equity.** Measured using four indicators. Men’s prohibition of women’s activities, women’s attitudes against violence and women’s role in decision-making were categorized based on the distribution of the responses (as indicated below).
  - **Men’s prohibition of women’s activities (alpha=0.83).** Based on responses to six questions, prohibition of more than one activity was coded as “0,” prohibition of one activity was coded as “1” and no prohibition was coded as “2.”
  - **Women’s attitudes against violence (alpha=0.91).** Based on seven questions, violence ever acceptable was coded as “0” and violence never acceptable was coded as “1.”
  - **Women’s role in decision-making (alpha=0.73).** Based on four questions, women’s involvement in no decisions was coded as “0,” involvement in one to two activities was coded as “1” and involvement in three to four activities was coded as “2.”
  - **Whether women had money they alone could decide how to spend.** “Yes” was coded as “1” and “no” was coded as “0.”

Various socio-demographic variables were controlled for in multivariate analyses. Variables like age, parity, education and wealth were categorized based on the distribution of participants’ responses.<sup>7</sup>

- **Women’s age at midterm.** Categorical variable with three age groups: 15-24, 25-34 and 35-49 years old.
- **Parity.** Live births at midterm were categorized into 4 groups: 0, 1-2, 3-4 and 5 or more live births.
- **Education.** Education at midterm was categorized into five groups: never attended school, attended Quranic school only, attended primary school, attended junior secondary school, attended senior secondary school and attended higher than senior secondary school.
- **Religion.** Women from Muslim households were coded as “1” and “0” for Christian and “other” households.

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<sup>7</sup> This approach was utilized in each of the four data sets analyzed in this report. As a result, categorizations of variables like age and wealth may differ slightly across the four analyses.

- **Marital status.** Women who were currently married or living with a partner were coded as “1,” and “0” otherwise.
- **Wealth.** A wealth index was created using principal components analysis (PCA) of a set of durable goods and household characteristics as done for UHI and in other published studies of NURHI data (Corroon et al., 2014). Participants were then assigned a composite score based on their ownership and household characteristics. Based on household wealth score, women were assigned to one of five wealth quintiles ranging from lowest to highest wealth.

### *Data Analysis*

The same statistical analysis plan employed to explore the UHI midterm data set was used to analyze the baseline responses from female NURHI participants.

## **Results**

### *Descriptive Statistics*

NURHI Baseline questionnaires were completed by 16,144 women. Responses from 1,233 women were excluded because they reported being pregnant when administered the survey in 2010. Sampling weights were incorporated into descriptive and regression analyses. Important socio-demographic characteristics of the sample, drawn from participants’ responses to the midterm survey, are summarized in Table 7 and Table 8. Counts and percentages reported below include weights.

At baseline, 4,572 (31 percent) women reported currently using a FP method. Over 3,000 women reported using any modern contraceptive method (n=3,399, 23 percent).

Among non-pregnant baseline respondents, 35 percent were 25-34 years of age. Among women in union (n=8,933), 67 percent reported that their husbands did not prohibit them from engaging in any activities. Among all non-pregnant respondents (n=14,950), 67 percent reported that intimate partner violence was never acceptable. Furthermore, based on four questions about household decision-making, 46 percent of women reported having an important role in decision-making (i.e. were engaged in three or four household decisions). Twenty percent of women reported no involvement in any of the four household decisions. Finally, 8,714 women (61 percent of n=14,185) reported having money that they alone could decide how to spend.

The majority of women were currently married or living with a partner (59 percent). Only 1,273 women (9 percent) had never attended school and 3,626 women (25 percent) had attended higher than senior secondary school. Approximately half of the sample was Muslim (49 percent). Many women reported having had no live births (38 percent), while approximately 3,246 women (22 percent) had three to four live births.

Exposure to communication interventions varied by type of media used. Nearly one half of respondents reported no exposure to FP messages either on paper, on the radio, on television

or via text message (45 percent). More than four thousand (n=4218, 28 percent) had heard of a message via one of these media and 26 percent had been exposed messages by more than form of media. Exposure to paper-based programs was not common, with only 1190 women (8 percent) reporting exposure a FP message on paper. Women often heard of radio FP messages (41 percent) and television messages (35 percent), but had not been exposed to these messages via text (239 women, 2 percent).

Table 7. Socio-demographic characteristics of non-pregnant NURHI participants *		
Baseline Characteristics	Total ** (Unweighted n=)	Total *** (Weighted n=)
<b>Gender: Prohibition of women's activities n(%)</b>	n=8985 (women in union only)	n=8933 (women in union only)
Husband prohibits >1 activities	1408 (15.7%)	1340 (15.0%)
Husband prohibits 1 activity	1787 (19.9%)	1631 (18.3%)
Husband does not prohibit activities	5790 (64.4%)	5963 (66.7%)
<b>Gender: Binary prohibition</b>	n=8985	n=8933
Husband does not prohibit actions	5790 (64.4%)	5963 (66.7%)
Husband prohibits at least 1 action	3195 (35.6%)	2971 (33.3%)
<b>Attitudes against violence n(%)</b>	n=14911	n=14950
Violence never acceptable	9777 (65.6%)	10002 (66.9%)
Violence acceptable for at least 1 situation	5134 (34.4%)	4948 (33.1%)
<b>Gender: decision-making n(%)</b>	n=14911	n=14950
Women involved in no decisions	3281 (22.0%)	2981 (19.9%)
Women involved in 1-2 decisions	5236 (35.1%)	5121 (34.3%)
Women involved in 3-4 decisions	6394 (42.9%)	6848 (45.8%)
<b>Gender: Role in decision-making n(%)</b>	n=14911	n=14950
High	6394 (42.9%)	6848 (45.8%)
Low	8517 (57.1%)	8102 (54.2%)
<b>Gender: financial autonomy n(%)</b>	n=14182	n=14185
Yes	8935 (63.0%)	8714 (61.4%)
No	5247 (37.0%)	5471 (38.6%)
<b>Age n(%)</b>	n=14911	n=14950
15-24 yr	5377 (36.1%)	5365 (35.9%)
25-34 yr	5030 (33.7%)	5150 (34.5%)
35-49 yr	4504 (30.2%)	4435 (29.7%)
<b>Religion n(%)</b>	n=14848	n=14874
Muslim	7669 (51.7%)	7234 (48.6%)
Christian/Other	7179 (48.3%)	7640 (51.4%)
<b>Education n(%)</b>	n=14792	n=14818
Never attended school	1292 (8.7%)	1273 (8.6%)
Attended Quranic school only	547 (3.7%)	395 (2.7%)
Attended primary school	2127 (14.4 %)	2066 (13.9%)
Attended junior secondary school	1706 (11.5%)	1628 (11.0%)
Attended Senior secondary school	5639 (38.1%)	5830 (39.3%)
Higher	3481 (23.5%)	3626 (24.5%)

<b>Marital status n(%)</b>	n=14771	n=14796
Currently married/living together	8858 (60.0%)	8790 (59.4%)
Not	5913 (40.0%)	6006 (40.6%)
<b>Parity n(%)</b>	n=14911	n=14950
0 live births	5611 (37.6%)	5670 (37.9%)
1-2 live births	3115 (20.9%)	3190 (21.3%)
3-4 live births	3214 (21.5%)	3246 (21.7%)
5+ live births	2971 (19.9%)	2845 (19.0%)
<b>Wealth n(%)</b>	n=14911	n=14950
Lowest	2696 (18.1%)	2690 (18.0%)
Low	2917 (19.6%)	2842 (19.0%)
Middle	2875 (19.3%)	2986 (20.0%)
High	3101 (20.8%)	3154 (21.1%)
Highest	3322 (22.3%)	3278 (21.9%)
<b>City n(%)</b>		n=14950
Abuja	1999 (13.4%)	1932 (12.9%)
Benin City	2392 (16.0%)	1987 (13.3%)
Ibadan	2734 (18.3%)	2963 (19.8%)
Ilorin	2266 (15.2%)	2447 (16.4%)
Kaduna	2649 (17.8%)	2863 (25.8%)
Zaria	2871 (19.3%)	1758 (11.8%)
* Excludes 1233 women self-reporting pregnancy during baseline questionnaire.		
** Unweighted sample sizes.		
*** Weighted sample sizes include weights based on sampling design.		

Table 8. Family planning use and exposure to family planning messages among non-pregnant NURHI participants \*

Baseline Characteristics	Total ** (Unweighted)	Total *** (Weighted)
<b>Current use of FP</b>	n=14911	n=14950
Using	4345 (29.1%)	4572 (30.6%)
Not using	10566 (70.9%)	10378 (69.4%)
<b>Use of any modern contraceptive method</b>	n=14911	n=14950
Use	3201 (21.5%)	3399 (22.7%)
No use	11710 (78.5%)	11551 (77.3%)
<b>Unmet need</b>	n=8799	n=8723
No unmet need	7059 (80.2%)	7007 (80.3%)
Any unmet need	1740 (20.0%)	1716 (19.7%)
<b>Exposure to FP messages on paper n(%)</b>	n=14879	n=14919
Exposure	1262 (8.5%)	1190 (8.0%)
No exposure	13617 (91.5%)	13729 (92.0%)
<b>Exposure to FP messages on the radio n(%)</b>	n=14875	n=14909
Exposure	6394 (43.0%)	6145 (41.2%)
No exposure	8481 (57.0%)	8763 (58.8%)

<b>Exposure to FP messages on the television n(%)</b>	n=14885	n=14921
Exposure	5118 (34.4%)	5197 (34.8%)
No exposure	9767 (65.6%)	9724 (65.2%)
<b>Exposure to FP messages via text message n(%)</b>	n=14771	n=14928
Exposure	252 (1.7%)	239 (1.6%)
No exposure	14635 (98.3%)	14689 (98.4%)
<b>Overall program exposure n(%)</b>	n=14911	n=14950
0 messages	6661 (44.7%)	6868 (45.9%)
1 message	4367 (29.3%)	4218 (28.2%)
2+ messages	3883 (26.0%)	3865 (25.9%)
* Excludes 1233 women self-reporting pregnancy during baseline questionnaire.		
** Unweighted sample sizes.		
*** Weighted sample sizes include weights based on sampling design.		

## *Bivariate Associations*

### **1. BIVARIATE ASSOCIATIONS WITH CURRENT USE OF FAMILY PLANNING**

#### **VARIABLES OF INTEREST**

Among women in union, those who reported that their husbands did not prohibit their activities were more than two times as likely to be currently using FP than women with husbands that prohibited more than one activity (OR: 2.1). Women who thought that violence was never acceptable were 18 percent more likely to be currently using FP than women who thought that violence was acceptable in at least one situation. Women with greater involvement in decision-making were also more likely to be currently using FP (See Appendix, Table A12). Finally, women with financial autonomy were more than 2.5 times more likely to be currently using a FP method.

Overall, women who had heard FP-related messages via one type of media and two or more types of media were more likely to report current use of FP (ORs: 1.5 and 2.4 respectively; See Appendix, Table A12).

#### **CONTROLLING VARIABLES**

Women's age, household wealth, education and parity demonstrated expected associations with current use of FP. Greater age, wealth, education and parity were significantly associated with increased use of FP (See Appendix, Table A12). Muslim women were significantly less likely to use FP (OR: 0.47). Married women also had 2.5 times the likelihood of using FP as compared to women not married or living with a partner.

### **2. BIVARIATE ASSOCIATIONS WITH USE OF ANY MODERN CONTRACEPTIVE METHOD**

The direction of associations between 1) gender equity, communication program exposure or controlling variables and 2) use of any modern contraceptive method was similar to those found for current use of any type of FP.



### **VARIABLES OF INTEREST**

Women with more equitable responses on all four dimensions of gender equity (women reporting no prohibition of activities, negative attitudes against violence, increased role in decision-making and financial autonomy) were more likely to use any modern contraceptive method (See Appendix, Table A13). Exposure to one FP message was associated with 1.5 greater odds of using a modern contraceptive method compared no exposure (See Appendix, Table A13). Women who had heard of two or more messages were 2.3 times as likely to use a modern method.

### **CONTROLLING VARIABLES**

Greater age, wealth, education and parity were all associated with increased likelihood of using a modern contraceptive method (See Appendix, Table A13). Women currently married and non-Muslim women were also more likely to use a modern contraceptive method.

## **3. BIVARIATE ASSOCIATIONS WITH UNMET NEED FOR FAMILY PLANNING**

The subpopulation for bivariate analyses exploring associations with unmet need was smaller than the subpopulation analyzed with other FP outcomes due to missing responses.

### **VARIABLES OF INTEREST**

Women with more gender equitable responses for all four gender dimensions were less likely to have an unmet need for FP (See Appendix, Table A14). Individuals who had heard of one or two or more FP messages were 15 percent and 18 percent less likely to have an unmet need for FP.

### **CONTROLLING VARIABLES**

Women reporting greater age, wealth and education were all significantly less likely to have any unmet need for FP (See Appendix, Table A14). Women with more children were more likely to have unmet need than women with one or no children (ORs: 3.0, 3.5, and 5.9). Muslim women were more likely to have an unmet need (OR: 1.5; See Appendix, Table A14).

### ***Multivariate Analyses***

Multivariable models presented here explore associations between exposure to FP-related messages and use of FP after adjusting for socio-demographic characteristics and gender equity. Since information of husband's prohibition of women's activities was gathered for women in union only, these multivariate analyses reflect results for non-pregnant women in union.<sup>8</sup>

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<sup>8</sup> Appendix D includes results of multivariate analyses excluding two dimensions of gender equity: 1) prohibition of women's activities and 2) attitudes towards violence in order to explore associations among both married and non-married women. Violence was excluded due to its lack of significance in the full multivariable models.

## 1. MULTIPLE LOGISTIC REGRESSION ON CURRENT USE OF FAMILY PLANNING

### **OVERALL PROGRAM EXPOSURE**

After adjusting for four dimensions of gender equity and other socio-demographic variables, women who had heard FP messages from two or more types of media were 1.5 times more likely to be currently using a method of FP (See Appendix, Table A15). Trends observed in bivariate analyses between gender equity and current use of FP were observed in multivariate analyses. After controlling for exposure to FP messages and other socio-economic characteristics, women with husbands who did not prohibit their activities were 1.5 times as likely to use FP currently as compared to those whose husbands prohibited more than one activity. Attitudes about violence were no longer significant in adjusted regressions. Women with greater roles in decision-making and who had financial autonomy were also more likely to use FP currently (See Appendix, Table A15). Greater wealth, educational standard completed and higher parity were also positively associated with current use after adjustment (See Appendix, Table A15). As expected, older women were less likely to be currently using FP as compared to women 15-24 in multivariate analyses. Muslim women were 36 percent less likely to use FP currently after controlling for other characteristics.

## 2. MULTIPLE LOGISTIC REGRESSION ON USE OF ANY MODERN CONTRACEPTION

### **OVERALL PROGRAM EXPOSURE**

In a multiple logistic regression exploring associations with use of modern contraceptives, women who had heard one or two or more FP messages were 37 percent and 47 percent more likely to use any modern contraceptive method (See Appendix, Table A16). As observed in multiple logistic regressions on current FP use, women who reported that their husbands did not prohibit their activities, had greater roles in decision-making and had financial autonomy were more likely to use modern contraceptives (See Appendix, Table A16). Attitudes toward violence were not significant after controlling for socio-demographic and exposure variables. Women reporting higher education, greater wealth, greater parity and being non-Muslim were more likely to use modern contraception after controlling for other predictor variables (See Appendix, Table A16). Interestingly, as compared to women 15-24, women 25-34 and 35-49 were less likely to use modern contraceptives after adjusting for program exposure and other socio-demographic variables ( $p < 0.05$  and  $p < 0.01$ ; See Appendix, Table A16).

## 3. MULTIPLE LOGISTIC REGRESSION ON UNMET NEED FOR FAMILY PLANNING

### **OVERALL PROGRAM EXPOSURE**

In a multiple logistic regression exploring associations with unmet need for FP after controlling for socio-demographic characteristics, only those women reporting exposure to one FP message, and not those who had heard two or more messages, were less likely to have an unmet need for FP, as compared to women reporting no exposure to FP messages (OR: 0.82; See Appendix, Table A17). Husband prohibition of activities was not significantly associated with unmet need after adjusting for other predictor variables. Women who had negative views on violence were 19 percent less likely to report an unmet need, and this association was also

seen for women with greater roles in decision-making and who had financial autonomy (See Appendix, Table A17). Older women were also less likely to report an unmet need for FP (ORs: 0.64, 0.70). Education was also not a significant predictor of unmet need after adjustment, but women who had more live births (ORs: 2.9, 4.0 and 6.1 for all categories) were significantly more likely to have an unmet need for FP.

### *Mediation and Moderation Analyses*

A similar process was performed for baseline NURHI and midterm UHI data to assess the potential mediating effect of gender equity on the relationship between exposure to FP messages and current FP use.

As demonstrated in the Appendix, all four dimensions of gender equity (men's prohibition of women's activities, attitudes about violence, decision-making and women's financial autonomy) showed significant bivariate associations with women's baseline exposure to FP messages (See Appendix, Table A18). Although the specific content of the FP-related programs to which participants reported being exposed is not known, this demonstrates an unadjusted association between gender equity and these FP communication strategies in Nigeria.

Mediation analyses using dichotomous measures of gender equity were used in bivariate mediation analyses. However, indirect effects of these gender equity measures on all three FP outcomes did not exceed 30 percent. Therefore, it was concluded that there was no significant indirect effect of FP messages via gender equity on FP outcomes.

To test effect modification of different measures of gender equity and program exposure and to test the robustness of the multiple logistic regressions, interaction variables between individual gender equity indicators and program exposure were created and assessed in complete multivariable models. As shown in the Appendix, the overall F-statistics for three interaction terms were significant in multiple logistic regressions on 1) use of any modern contraceptive method and 2) unmet need for FP ( $p < 0.0001$ ,  $p = 0.0434$  and  $p = 0.0279$ ; See Appendix, Table A19). However, interpretation of these terms is difficult since interactions were not significant for each step of these categorical variables (See Appendix, Table A19).

### *Checking the models: Goodness of fit and collinearity of predictors*

In light of the complex survey methodology utilized in the NURHI data, the Hosmer-Lemeshow Goodness-of-Fit test is not appropriate to use for assessing goodness of fit. Instead, tests of interactions, collinearity and a survey sample data-specific test of goodness of fit can be used to test multivariate models. For models on current FP use, as well as use of any modern method, multiple interactions among covariate predictors were run, with only two significant interactions found with limited interpretability. A post-estimation technique (VIFs) was used to assess collinearity among the specific set of covariates. The mean VIF was less than 3 for all models, which is greater than 1. This suggests slight collinearity of predictors, but none of the covariates have VIF scores that are large enough to raise concern. Goodness of fit statistics were not significant ( $p > 0.05$ ) for all three models, suggesting that these models were a good fit of the data.

## Discussion

In analyses on current FP use and use of any modern method, exposure to an FP-related communication program was significantly associated with increased use of FP after adjusting for four measures of gender equity, city of residence, age, education, religion, wealth and parity. In multivariate analyses of unmet need, women exposed to program messages had reduced likelihood of reporting an unmet need for FP after controlling for gender equity and socio-demographic characteristics. These results also suggested a modest dose effect of FP program exposure. Exposure to two or more programs resulted in higher odds of using FP (measured by either current FP use or use of any modern method).

All four measures of gender equity were positively related to use of FP. For all outcomes, women being involved in decision-making were significantly more likely to be currently using FP and to use any modern method. They were also less likely to have unmet FP need. Similarly, women who reported having financial autonomy over were also more likely to use FP after adjusting for other socio-demographic characteristics and exposure to FP-related communication programs. Attitudes around violence were less consistently associated with FP use, since reporting violence as never acceptable (as compared to violence being acceptable in at least one situation) was only significantly associated with reduced unmet FP need. Finally, having a husband who does not prohibit or control one's actions was positively related to current FP use and use of any modern method, but not unmet need for FP, even after adjustment for other variables of interest.

Although some mediation analyses suggested that these dimensions of gender equity may minimally mediate the relationship between communication program exposure and FP use, these effects were not large enough to be scientifically relevant. Similarly, there was little convincing evidence that these measures of gender equity moderate the relationship between program exposure and FP utilization.

# EngenderHealth ACQUIRE<sup>9</sup>

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## Background

The EngenderHealth ACQUIRE Tanzania Project (ATP) was a five-year project funded by USAID and implemented in Tanzania from 2007 to 2012. The EngenderHealth ACQUIRE project is part of the *Green Star* national program on FP in Tanzania. The EngenderHealth components are interpersonal and community-based interventions that focus on equipping facilities and proficient staff to provide services to and quality interactions with clients in a way that focuses on building knowledge and empowerment around multiple FP options. The intervention was delivered through brochures, provider/client interactions and community-based events.

The ACQUIRE campaign was primarily a mass media intervention with the aim of increasing FP use and improving RH. This campaign was designed to increase individuals' awareness and knowledge of long-acting and permanent contraceptive methods (LA/PMs) and other FP services. Working with the Ministry of Health and Social Welfare, this program utilized the phrase "Have a Plan for Your Family" to tie radio and print-based materials to the ACQUIRE campaign.

The data analyzed in this section are from a household-based survey administered in 2014 to evaluate the impact of mass media, information and communication technology (ICT), community-level events and interpersonal communication on the FP and RH behaviors, as well as related psychosocial variables of Tanzanians. The study covered the USAID-funded projects and interventions in all regions of Mainland Tanzania. The goal of the study was to understand the impact of each of the health communication channels individually and collectively in order to determine whether the use of multiple channels had an added value for improved outcomes. The focus of this short summary, however, is a single campaign, namely, EngenderHealth's ACQUIRE campaign (hereafter, "the Engender campaign" or "the campaign").

## Methodology

The household-based survey was conducted between January and March 2014 in mainland Tanzania with randomly selected participants, ages 18-49 years old. Because women participate in a majority of FP behaviors, 75 percent of the sample was women (~3,100) and 25 percent men (1,100). Sampling weights were not incorporated into descriptive and statistical analyses.

Gender measures in this survey focused on sexual relationship power ("relationship power" or "power" hereafter) and did not assess gender norms beyond this specific aspect of dyadic relationships. Those participants who currently have or at one point had a main sexual partner

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<sup>9</sup> Kaufman, M., Harman J.J., Tsang S. CCP draft report, in progress (details forthcoming).

were asked an adapted version of the relationship control subscale of the Sexual Relationship Power Scale (Pulerwitz, Gortmaker & DeJong, 2000). This scale was originally developed to measure power of female partners in intimate heterosexual relationships. It was adapted to the Tanzanian context and for use with both female and male partners. Responses were given on a four-point Likert scale, ranging from “strongly disagree” to “strongly agree.” The items in this scale address decision-making dominance, relationship control and commitment, condom use and freedom of thought within the relationship (Pulerwitz et al., 2000). Examples of the statements included:

- If you said to your partner, “we should use FP,” he would get angry.
- Your partner has more say than you do about important decisions that affect your relationship.

The research team relied on the aforementioned report, which reported strong correlations for the original scale development.

## Results

### Women

#### 1. BIVARIATE ANALYSES

A MANOVA was first conducted to determine whether exposure to the Engender campaign within the last six months was related to power, self-efficacy for using FP methods and attitudes toward women using contraceptives (variable 419 reversed). Campaign exposure was a statistically significant predictor of self-efficacy for using FP methods ( $F(1,2158)= 16.53, p < .001$ ) and attitudes toward women using contraceptives ( $F(1,2158)= 9.34, p < .01$ ), but not power ( $F(1,2158)= 1.89, p = .17$ ).

#### 2. MULTIPLE LOGISTIC REGRESSION ON EVER HAVING USED MODERN CONTRACEPTIVES

A step-wise logistic regression was run to determine whether exposure to the campaign was associated with ever having used modern contraceptives (dummy coded 1= used one or more forms, 0= never having used any). Every use was incorporated into the second step of the modeling so that the research team could control for it in the final step of the model, which looked at current use. (Please note that this does not imply that the campaign was associated with prior use.) Campaign exposure was entered at the first step, which resulted in a good fit for the data ( $\chi^2(1) = 6.32, p < .01$ ). Campaign exposure was a statistically significant predictor of ever having used modern contraceptives (OR= 1.33, CI = 1.06 to 1.66,  $p = .01$ ). Women who had been exposed had 33 percent greater odds of having used modern contraception than women who had not. When power, self-efficacy and attitudes toward contraceptive use for women were entered into the model at the second step, the model fit was significantly improved ( $\chi^2(1) = 104.44, p < .001$ ). With all of these variables in the model, only self-efficacy and attitudes

toward women's use were statistically significant. Women with higher self-efficacy had 86 percent greater odds of ever having used modern contraceptives than women who had lower self-efficacy (OR= 1.86, CI= 1.62 to 2.13,  $p < .001$ ), and women who disagreed with the statement that women who use contraception are promiscuous had 13 percent greater odds of ever using modern contraception than women who agreed (OR= 1.86, CI= 1.62 to 2.13,  $p < .001$ ). The campaign was associated with increased self-efficacy and more positive attitudes about modern contraceptive use, and these two factors were associated with ever having used modern contraceptives. Power was not related to either campaign exposure or having used modern contraceptives.

### 3. MULTIPLE LOGISTIC REGRESSION ON CURRENT USE OF MODERN CONTRACEPTIVES

A second step-wise logistic regression was conducted to determine whether exposure to the campaign was associated with currently using modern contraceptives (dummy coded 1= used one or more forms, 0= never having used any). Campaign exposure was entered at the first step, which did not result in a good fit for the data ( $\chi^2(1) = 2.69, p = .10$ ). Campaign exposure was not a statistically significant predictor of current modern contraceptive use (OR= 1.18, CI = 0.97 to 1.44,  $p = .0$ ). When power, self-efficacy and attitudes toward contraceptive use for women were entered into the model at the second step, the model fit was significantly improved ( $\chi^2(1) = 51.48, p < .001$ ). With all of these variables in the model, only self-efficacy was statistically significant. Women with higher self-efficacy had 54 percent greater odds of ever having used modern contraceptives than women who had lower self-efficacy (OR= 1.54, CI= 1.34 to 1.77,  $p < .001$ ), even with all the other variables in the model.

## Men

### 1. BIVARIATE ANALYSES

A MANOVA was first conducted to determine whether exposure to the Engender campaign within the last six months was related to power, self-efficacy for using FP methods and attitudes toward women using contraceptives (variable 419 reversed). Campaign exposure was a statistically significant predictor of self-efficacy for using FP methods ( $F(1,758)= 15.78, p < .001$ ), and attitudes towards women using contraceptives ( $F(1,758)= 3.81, p = .05$ ), but not power ( $F(1,758)= 0.21, p = .64$ ).

### 2. MULTIPLE LOGISTIC REGRESSION ON CURRENT USE OF MODERN CONTRACEPTIVES

Finally, a step-wise logistic regression was conducted to determine whether exposure to the campaign was associated with currently using modern contraceptives (dummy coded 1= used one or more forms, 0= never having used any). Campaign exposure was entered at the first step, which did not result in a good fit for the data ( $\chi^2(1) = 0.88, p = .35$ ). Campaign exposure was not a statistically significant predictor of current modern contraceptive use (OR= 1.18, CI = 0.83 to 1.67,  $p = .35$ ). When power, self-efficacy and attitudes toward contraceptive use for women were entered into the model at the second step, the model fit was significantly

improved ( $\chi^2(1) = 31.54, p < .001$ ). With all of these variables in the model, self-efficacy and attitudes about women using contraceptives were statistically significant. Men with higher self-efficacy had 60 percent greater odds of ever having used modern contraceptives than men who had lower self-efficacy (OR= 1.60, CI= 1.27 to 2.02,  $p < .001$ ), men who had 60 percent greater odds of ever having used modern contraceptives than women who had lower self-efficacy (OR= 1.60, CI= 1.27 to 2.02,  $p < .001$ ), and men who disagreed with the statement that women who use contraception are promiscuous had 27 percent greater odds of ever using modern contraception than men who agreed (OR= 1.27, CI= 1.09 to 1.49,  $p < .01$ ).

## Discussion

Among women as well as men, campaign exposure was positively associated with self-efficacy to use contraception and positive attitudes about contraceptive use. In short, the campaign affected current use of contraceptive indirectly through self-efficacy, but not directly. There were no associations between campaign exposure and gender norms (relationship power). And there were none between campaign exposure and current use.

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# Conclusions and Recommendations

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## *Key Findings*

The media programs examined in this report were designed to influence FP ideation and contraceptive use. Through multivariate analyses, this report found that positive and significant associations between exposure and FP ideation and modern contraceptive use held after controlling for background variables for most of the programs assessed. The major exception was the Engender campaign, which was positively associated with self-efficacy to use FP, but not with current FP use.

This report demonstrates that equitable gender norms are positively associated with modern contraceptive use. These results provide evidence to answer the first research question: Is there a significant relationship between gender equity and current use of FP? In response to these findings, this report calls for future studies to examine these campaigns more closely to determine the characteristics of FP-focused campaigns that engendered normative change around FP use.

Overall, except in Malawi, exposure to the media campaigns examined in this report was not associated with broader or more inclusive gender norms. Interestingly, of the many campaigns assessed in this review, only the Engender campaign was explicitly designed to influence gender relations. The focus of the Engender campaign was on sexual relationship power rather than on gender norms more broadly defined, and there were no associations between the campaign and relationship power among women or among men. This may be due to the fact that the factors associated with relationship power were not adequately addressed – or are not fully understood. Therefore, further analyses are needed to more completely address the second research question and determine whether exposure to communication intervention components is significantly associated with gender equity.

Results from the mediation and moderation analyses across the four countries indicated that gender equity did not mediate or moderate the relationship between message exposure and FP intention or use. In short, although there was evidence of the positive association between the campaign and FP use, the campaign and gender norms (in Malawi), and gender norms and FP use, none of the campaigns had significant 1) indirect (or mediation) effects or 2) interactions between campaign exposure and gender equity. Thus, no evidence was found to support the hypothesis that gender equity affects (confounds, moderates or mediates) the relationship between intervention exposure and current use of FP.

The key focus of this research was the underlying assumption that communication campaigns designed to address FP, sexual health and/or reproduction, could well have empowering effects on women and/or lead to broader gender norms because such mediated programs implicitly address inequitable gender norms through modeling couples' communication, more equitable decision-making and gender equality more generally. Nonetheless, the results indicate that FP-focused interventions are not 'naturally' gender-transformative.

With respect to programming, these findings point to the fact that communication interventions must address gender norms purposively if they are to be affected. Whether explicitly, in settings where it would be appropriate, or implicitly, where less directive messaging would be more acceptable, communication programs should model positive and equitable gender roles.

With respect to research, assumptions about both the direct and indirect effects of gender constructs on FP outcomes should be reflected in the research instruments. It would be useful to develop a standard “gender equality ideation and agency” module for inclusion in future research studies. Such a module would go beyond a singular focus on women’s empowerment, masculinity or gender equality as a zero-sum game, and in addition to measures of women’s and men’s gender-related attitudes and values, might include measures of dyadic decision-making related to household chores, short-term and long-term plans, as well as measures that get at the interconnectedness of husbands and wives, male and female partners.

Moreover, all too often studies are designed to measure effects on *women’s individual* self-improvement or empowerment (Wilson 2008), leaving unchallenged a range of structural and socially defined constraints that limit the ability of “empowered” women to exert agency. While women’s empowerment is a necessary component of gender equality, it is not sufficient for achieving it. It is also important to acknowledge – and measure – ways in which men have been disempowered, whether as a result of modernity or through development programs (Silberschmidt 2001). Therefore, structural factors that constrain or enable the full participation of women and men in families, communities and nations also need to be measured. This calls for multi-level analysis, which could include both compositional and contextual measures at the community level along with individual-level data.

Finally, this report suggests that gender equity/equality is both constitutive of good health and social well-being as well as instrumental to health and well-being. As both means and ends to improved health outcomes, gender equality should be a key focus of health programs.

### *Limitations*

The data analyzed constituted a “convenience sample” of available data sets, since the authors only had access to data sets shared with them. It is worth noting that relatively few data sets were identified that had all three types of variables, namely, gender equity/equality measures, campaign exposure and FP-related outcomes. Attempts to obtain and conduct secondary analysis on data sets other than those examined above were not successful.

None of the data sets included community-, district- or structural-level measures. Since both gender norms and FP use are affected by extra-individual-, as well as individual-level variables, it might be that the data are not sufficient to adequately test the possible mediation effects of gender constructs.

### *Recommendations*

Gender equality or gender transformation needs to be explicitly addressed, whether as part of FP campaigns or as complementary campaigns. Whether independent or interdependent, campaigns to influence gender constructs *and* FP ideation and use must be more explicit and strategic in addressing the norms they are designed to influence. Such campaigns should be theory-based and make every effort to address the underlying factors that perpetuate gender inequality. Those factors are not sufficiently well understood, whether at the individual, dyadic, community or societal levels. Future studies should include measures to assess barriers and opportunities to gender equality across multiple levels. Research to interrogate gender and social norms that delimit everyday practices is necessary, as is working with actors at multiple levels and engaging with power to affect change across social ecological levels.

## Appendix

In this appendix, results of bivariate, multiple logistic regression, mediation and moderation analyses are presented for the Malawi SSDI baseline survey (Tables A1-A3), the Urban Health Initiative (Tables A4-A12) and the Nigerian Urban Reproductive Health Initiative (Tables A13-A19). Additionally, items in the gender scales for each analysis are presented (Tables B1-B2).

### Malawi

Table A1. Results of bivariate and multiple logistic regression analyses for the Malawi Baseline Survey. Current modern family planning use is the outcome variable.				
Independent Variables	Crude		Multiple adjusted	
	OR (95% CI)	p-value	AOR (95% CI)	p-value
Messages about pregnancy prevention	2.0 (1.5-2.5)	<0.001	--	--
Messages about condoms as contraception	1.5 (1.2-2.0)	<0.001	--	--
Messages about contraceptive injections	1.6 (1.3-2.0)	<0.001	--	--
Messages about contraceptive pills	1.6 (1.3-2.0)	<0.001	--	--
Summary Exposure				
Not exposed to any messages	1.0	--	1.0	--
Exposed to 1 message	1.5 (1.0-2.1)	0.03	1.3 (0.9-1.9)	0.14
Exposed to 2 messages	1.3 (0.9-1.8)	0.20	1.1 (0.8-1.6)	0.55
Exposed to 3 messages	1.7 (1.1-2.3)	<0.05	1.5(1.0-2.3)	0.05
Exposed to all 4 messages	1.8 (1.5-2.3)	<0.001	1.5(1.2-1.9)	<0.01
Overall effect of summary exposure variable (Chi2)	33.08	<0.001		
Gender equity	1.0 (1.01-1.04)	<0.01	1.0 (0.9-1.0)	0.23
Sex	0.7(0.6-0.8)	<0.001	0.8 (0.6-0.9)	<0.05
Relationship status	2.8(2.2-3.6)	<0.001	2.7(2.1-3.5)	<0.001
Age				
16-20 years	1.0	--	1.0	--
21-30 years	2.0(1.5-2.6)	<0.001	1.6 (1.2-2.1)	<0.01
31-40 years	2.5(1.8-3.3)	<0.001	1.8(1.4-2.6)	<0.001
41-50 years	1.4(0.9-2.0)	0.10	1.0(0.7-1.5))	0.97
51-60 years	0.4(0.2-0.7)	<0.01	0.3(0.2-0.5)	<0.001
Education	1.4 (1.1-1.7)	<0.01	1.1(0.8-1.4)	0.48
Wealth Index				
Lowest wealth	1.0	--	1.0	--
Middle wealth	1.1(0.9-1.4)	0.39	0.9(0.7-1.1)	0.31
Highest wealth	1.7(1.4-2.2)	<0.001	1.2(0.9-1.6)	0.12

Table A2. Results of bivariate and multiple logistic regression analyses for the Malawi Baseline Survey. Family planning intention is the outcome variable.				
Independent Variables	Crude		Multiple adjusted	
	OR (95% CI)	p-value	AOR (95% CI)	p-value
Messages about pregnancy prevention	1.7 (1.2-2.3)	<0.01	--	--
Messages about condoms as contraception	1.6 (1.1-2.2)	<0.01	--	--
Messages about contraceptive injections	1.8 (1.3-2.5)	<0.001	--	--
Messages about contraceptive pills	1.5 (1.1-2.1)	<0.05	--	--
Summary Exposure				
Not exposed to any messages	1.0	--	1.0	--
Exposed to 1 message	1.8 (1.0-3.0)	<0.05	1.4(0.7-2.8)	0.31
Exposed to 2 messages	1.0 (0.6-1.6)	0.96	0.8(0.4-1.5)	0.50
Exposed to 3 messages	2.6 (1.3-5.3)	<0.05	1.9(0.8-4.5)	0.12
Exposed to all 4 messages	1.9 (1.4-2.7)	<0.001	1.5(1.0-2.3)	<0.05
Overall effect of summary exposure variable (Chi2)	23.22	<0.001		
Gender equity	1.0 (1.0-1.1)	<0.001	1.0 (0.9-1.1)	0.11
Sex	0.6(0.5-0.8)	<0.001	0.4(0.3-0.6)	<0.001
Relationship status	1.2(0.9-1.7)	0.15	1.8(1.2-2.7)	<0.01
Age				
16-20 years	1.0	--	1.0	--
21-30 years	1.2(0.7-2.2)	0.44	1.0(0.6-1.9)	0.90
31-40 years	0.5(0.3-0.9)	<0.05	0.4(0.2-0.7)	<0.01
41-50 years	0.09(0.05-0.2)	<0.001	0.1(0.03-0.1)	<0.001
51-60 years	0.01(0.008-0.03)	<0.001	0.01(0.004-0.02)	<0.001
Education	4.0(2.4-6.4)	<0.001	1.6 (0.9-2.9)	0.08
Wealth Index				
Lowest wealth	1.0	--	1.0	--
Middle wealth	1.5(1.0-2.1)	<0.05	0.9(0.6-1.5)	0.89
Highest wealth	1.8(1.3-2.5)	<0.01	1.0 (0.6-1.6)	0.92

Table A3. Results of the linear regression analyses for the Malawi Baseline Survey. Gender equity is the outcome variable.		
	Crude	
Independent Variables	OR (95% CI)	p-value
Messages about pregnancy prevention	1.1 (0.4-1.8)	<0.01
Messages about condoms as contraception	0.5 (-0.2-1.2)	0.14
Messages about contraceptive injections	1.1 (0.4-1.7)	<0.01
Messages about contraceptive pills	1.4 (0.7-2.0)	<0.001
Summary Exposure		
Not exposed to any messages	1.0	--
Exposed to 1 message	0.9 (-0.06-1.92)	0.06
Exposed to 2 messages	-0.8 (-1.8-0.3)	0.15
Exposed to 3 messages	0.4 (-0.8-1.6)	0.51
Exposed to all 4 messages	2.4 (1.7-3.0)	<0.001
Overall effect of summary exposure variable (Chi2)	17.39	<0.001

*Urban Health Initiative*

Table A4. Results of bivariate regression analyses for the Urban Health Initiative. Crude associations (odds ratios) between independent variables and current FP use are shown.			
	Crude		
	OR	95% CI	p-value
<b>Mother's age at midterm</b>			
15-24 yr (reference)	1.0		
25-34 yr	<b>2.36</b>	<b>1.71-3.26</b>	<b>&lt;0.0001 ***</b>
35-44 yr	<b>1.88</b>	<b>1.32-2.67</b>	<b>&lt;0.0001 ***</b>
45-52 yr	<b>0.432</b>	<b>0.288-0.649</b>	<b>&lt;0.0001 ***</b>
<b>Gender equity index</b>	<b>1.85</b>	<b>1.56-1.94</b>	<b>&lt;0.0001 ***</b>
<b>City</b>			
Agra (reference)	1.0		0.1041
Aligarh	<b>0.748</b>	<b>0.587-0.952</b>	<b>0.018 *</b>
Allahabad	0.943	0.698-1.27	0.700
Gorakhpur	0.857	0.655-1.12	0.260
<b>Wealth</b>			
1 (ours) (reference) 1 (UHI)	1.0		
2 (ours) 2 (UHI)	<b>1.41</b> <b>1.40</b>	<b>1.03-1.92</b> <b>1.05-1.87</b>	<b>0.032 *</b> <b>0.021 *</b>
3 (ours) 3 (UHI)	<b>1.57</b> <b>1.76</b>	<b>1.17-2.11</b> <b>1.32-2.34</b>	<b>0.003 *</b> <b>&lt;0.0001 ***</b>
4 (ours) 4 (UHI)	<b>2.10</b> <b>1.75</b>	<b>1.50-2.93</b> <b>1.31-2.34</b>	<b>&lt;0.0001 ***</b> <b>&lt;0.0001 ***</b>
5 (ours) 5 (UHI)	<b>2.12</b> <b>2.15</b>	<b>1.59-2.84</b> <b>1.55-2.97</b>	<b>&lt;0.0001 ***</b> <b>&lt;0.0001 ***</b>
<b>Religion</b>			
Hindu (reference)	1.0		
Other	<b>1.32</b>	<b>1.06-1.65</b>	<b>0.013 **</b>
<b>Education</b>			
Never attended school (reference)	1.0		
Highest Standard completed: 0-8	<b>1.37</b>	<b>1.05-1.78</b>	<b>0.022 *</b>
Highest Standard completed: 9-12	<b>1.65</b>	<b>1.26-2.15</b>	<b>&lt;0.0001 ***</b>
Highest Standard completed: 13-20	<b>2.22</b>	<b>1.72-2.88</b>	<b>&lt;0.0001 ***</b>
<b>Caste</b>			
Scheduled caste/tribe (reference)	1.0		
Other backward or extremely backward class	1.14	0.876-1.48	0.283
None of these	1.35	0.997-1.84	0.052
<b>Parity</b>			

0-1 live births	1.0		
2 live births	<b>2.65</b>	<b>2.09-3.35</b>	<b>&lt;0.0001 ***</b>
3 live births	<b>2.01</b>	<b>1.49-2.70</b>	<b>&lt;0.0001 ***</b>
4+ live births	<b>1.58</b>	<b>1.21-2.06</b>	<b>0.001 **</b>
<b>Sambhal lunga program</b>			
None (reference)	1.0		
TV and/or radio	1.08	0.870-1.34	0.483
<b>Happy Dampatti Pratiyogita</b>			
None (reference)	1.0		
1+ programs	<b>1.34</b>	<b>1.00-1.79</b>	<b>0.047 *</b>
<b>Other community events mentioning FP</b>			
None (reference)	1.0		
1+ programs	1.38	0.868-2.20	0.172
<b>Overall exposure</b>			
None (reference)	1.0		0.0458
1 program	1.25	0.994-1.57	0.056
2 programs	<b>1.43</b>	<b>1.01-2.03</b>	<b>0.044 *</b>
3+ programs	1.17	0.899-1.51	0.246
<b>Overall exposure</b>			
None (reference)	1.0		
1+ programs	<b>1.26</b>	<b>1.05-1.50</b>	<b>0.011 *</b>
<b>Television-based programs</b>			
None (reference)	1.0		
1 program	1.12	0.89-1.41	0.329
2 programs	<b>1.66</b>	<b>1.18-2.34</b>	<b>0.004 **</b>
3+ programs	1.03	0.765-1.38	0.865
<b>Radio-based programs</b>			
None (reference)	1.0		
1+ programs	1.45	0.959-2.20	0.078
<b>Overall sterilization programs</b>			
None (reference)	1.0		
1+ programs	1.21	0.988-1.49	0.065
* p<0.05, ** p<0.01, *** p<0.0001			



Table A5. Results of bivariate regression analyses for the Urban Health Initiative. Crude associations (odds ratios) between independent variables and use of modern contraceptives are shown.

	Crude		
	OR	95% CI	p-value
<b>Mother's age at midterm</b>			
15-24 yr (reference)	1.0		
25-34 yr	<b>1.89</b>	<b>1.39-2.57</b>	<b>&lt;0.0001 ***</b>
35-44 yr	1.24	0.916-1.67	0.165
45-52 yr	<b>0.342</b>	<b>0.209-0.559</b>	<b>&lt;0.0001 ***</b>
<b>Gender equity index</b>	<b>1.37</b>	<b>1.22-1.51</b>	<b>&lt;0.0001 ***</b>
<b>City</b>			
Agra (reference)	1.0		
Aligarh	1.01	0.772-1.33	0.928
Allahabad	1.21	0.873-1.68	0.252
Gorakhpur	0.975	0.756-1.29	0.858
<b>Wealth</b>			
1 (ours) (reference) 1 (UHI)	1.0		
2 (ours) 2 (UHI)	1.21 1.11	0.897-1.62 0.855-1.45	0.214 0.429
3 (ours) 3 (UHI)	1.25 1.28	0.927-1.69 0.957-1.70	0.142 0.096
4 (ours) 4 (UHI)	<b>1.60</b> <b>1.56</b>	<b>1.18-2.17</b> <b>1.17-2.08</b>	<b>0.003 **</b> <b>0.003 **</b>
5 (ours) 5 (UHI)	<b>2.96</b> <b>1.91</b>	<b>1.41-2.73</b> <b>1.36-2.68</b>	<b>&lt;0.0001 ***</b> <b>&lt;0.0001 ***</b>
<b>Religion</b>			
Hindu (reference)	1.0		
Other	0.933	0.744-1.17	0.552
<b>Education</b>			
Never attended school (reference)	1.0		
Highest Standard completed: 0-8	<b>1.57</b>	<b>1.19-2.07</b>	<b>0.001 **</b>
Highest Standard completed: 9-12	<b>1.83</b>	<b>1.37-2.46</b>	<b>&lt;0.0001 ***</b>
Highest Standard completed: 13-20	<b>2.59</b>	<b>1.96-3.44</b>	<b>&lt;0.0001 ***</b>
<b>Caste</b>			
Scheduled caste/tribe (reference)	1.0		
Other backward or extremely backward class	1.21	0.897-1.63	0.211
None of these	1.33	0.966-1.69	0.086
<b>Parity</b>			
0-1 live births	1.0		

2 live births	<b>1.84</b>	<b>1.42-2.40</b>	<b>&lt;0.0001 ***</b>
3 live births	<b>1.48</b>	<b>1.11-1.97</b>	<b>0.008 **</b>
4+ live births	1.27	0.982-1.64	0.069
<b>Sambhal lunga program</b>			
None (reference)	1.0		
<b>TV and/or radio</b>	<b>1.36</b>	<b>1.11-1.66</b>	<b>0.003 **</b>
<b>Happy Dampatti Pratiyogita</b>			
None (reference)	1.0		
<b>1+ programs</b>	<b>1.60</b>	<b>1.17-2.19</b>	<b>0.003 **</b>
<b>Other community events mentioning FP</b>			
None (reference)	1.0		
1+ programs	1.39	0.876-2.22	0.161
<b>Overall exposure</b>			
None (reference)	1.0		
<b>1 program</b>	<b>1.55</b>	<b>1.19-2.02</b>	<b>0.001 **</b>
<b>2 programs</b>	<b>2.17</b>	<b>1.61-2.93</b>	<b>&lt;0.0001 ***</b>
3+ programs	1.35	0.989-1.84	0.059
<b>Overall exposure</b>			
None (reference)	1.0		
1+ programs	<b>1.60</b>	<b>1.31-1.97</b>	<b>&lt;0.0001 ***</b>
<b>Television-based programs</b>			
None (reference)	1.0		0.0004 **
<b>1 program</b>	<b>1.43</b>	<b>1.09-1.87</b>	<b>0.009 **</b>
2 programs	<b>1.83</b>	<b>1.34-2.51</b>	<b>&lt;0.0001 ***</b>
3+ programs	1.27	0.918-1.75	0.148
<b>Radio-based programs</b>			
None (reference)	1.0		
1+ programs	1.36	0.908-2.03	0.135
<b>Overall sterilization programs</b>			
None (reference)	1.0		
<b>1+ programs</b>	<b>1.47</b>	<b>1.19-1.82</b>	<b>&lt;0.0001 ***</b>
* p<0.05, ** p<0.01, *** p<0.0001			

Table A6. Results of bivariate regression analyses for the Urban Health Initiative. Crude associations (odds ratios) between independent variables and unmet need for family planning are shown.

	Crude		
	OR	95% CI	p-value
<b>Mother's age at midterm</b>			0.0023 **
15-24 yr (reference)	1.0		
25-34 yr	<b>0.696</b>	<b>0.464-1.05</b>	<b>&lt;0.0001 ***</b>
35-44 yr	0.968	0.627-1.49	0.882
45-52 yr	1.58	0.961-2.61	0.071
<b>Gender equity index</b>	<b>0.689</b>	<b>0.599-0.794</b>	<b>&lt;0.0001 ***</b>
<b>City</b>			0.0212 *
Agra (reference)	1.0		
Aligarh	<b>1.79</b>	<b>1.23-2.61</b>	<b>0.002 **</b>
Allahabad	1.46	0.942-2.25	0.090
Gorakhpur	<b>1.61</b>	<b>1.09-2.38</b>	<b>0.016 *</b>
<b>Wealth</b>			0.0126 *
1 (ours) (reference) 1 (UHI)	1.0		
2 (ours) 2 (UHI)	0.795 <b>0.615</b>	0.533-1.18 <b>0.412-0.919</b>	0.259 <b>0.018 *</b>
3 (ours) 3 (UHI)	<b>0.577</b> <b>0.513</b>	<b>0.383-0.868</b> <b>0.47-0.760</b>	<b>0.009 **</b> <b>0.001 **</b>
4 (ours) 4 (UHI)	<b>0.519</b> 0.682	<b>0.326-0.826</b> 0.463-1.00	<b>0.006 **</b> 0.052*
5 (ours) 5 (UHI)	<b>0.570</b> <b>0.457</b>	<b>0.390-0.833</b> <b>0.301-0.693</b>	<b>0.004 **</b> <b>&lt;0.0001 ***</b>
<b>Religion</b>			
Hindu (reference)	1.0		
Other	<b>0.620</b>	<b>0.442-0.869</b>	<b>0.006 **</b>
<b>Education</b>			0.0018 **
Never attended school (reference)	1.0		
Highest Standard completed: 0-8	<b>0.590</b>	<b>0.408-0.855</b>	<b>0.005 **</b>
Highest Standard completed: 9-12	<b>0.684</b>	<b>0.504-0.930</b>	<b>0.016 *</b>
Highest Standard completed: 13-20	<b>0.493</b>	<b>0.333-0.730</b>	<b>&lt;0.0001 ***</b>
<b>Caste</b>			
Scheduled caste/tribe (reference)	1.0		
Other backward or extremely backward class	0.919	0.593-1.42	0.703
None of these	0.872	0.565-1.35	0.539
<b>Parity</b>			
0-1 live births	1		

2 live births	<b>2.19</b>	<b>1.41-3.40</b>	<b>0.001 **</b>
3 live births	<b>2.83</b>	<b>1.69-4.73</b>	<b>&lt;0.0001 ***</b>
4+ live births	<b>3.19</b>	<b>1.99-5.13</b>	<b>&lt;0.0001 ***</b>
<b>Sambhal lunga program</b>			
None (reference)	1.0		
<b>TV and/or radio</b>	0.976	0.731-1.30	0.869
<b>Happy Dampatti Pratiyogita</b>			
None (reference)	1.0		
1+ programs	0.726	0.451-1.17	0.186
<b>Other community events mentioning FP</b>			
None (reference)	1.0		
1+ programs	0.589	0.321-1.08	0.086
<b>Overall exposure</b>			
None (reference)	1.0		
1 program	0.733	0.521-1.03	0.074
2 programs	0.669	0.445-1.01	0.053
3+ programs	0.943	0.621-1.43	0.783
<b>Overall exposure</b>			
None (reference)	1.0		
1+ programs	0.792	0.618-1.02	0.066
<b>Television-based programs</b>			
None (reference)	1.0		00707
<b>1 program</b>	0.817	0.575-1.16	0.257
2 programs	<b>0.572</b>	<b>0.368-0.888</b>	<b>0.013 *</b>
3+ programs	1.09	0.674-1.78	0.714
<b>Radio-based programs</b>			
None (reference)	1.0		
1+ programs	0.759	0.435-1.32	0.330
<b>Overall sterilization programs</b>			
None (reference)	1.0		
1+ programs	0.848	0.610-1.18	0.324
* p<0.05, ** p<0.01, *** p<0.0001			

Table A7. Results of a multiple logistic regression analysis for the Urban Health Initiative. Adjusted associations from a multiple logistic regression model of current use on binary overall exposure are shown.

	Multiple adjusted		
	OR	95% CI	p-value
<b>Mother's age at midterm</b>			
15-24 yr (reference)	1.0		
25-34 yr	1.35	0.914-1.99	0.131
35-44 yr	0.859	0.552-1.34	0.498
45-52 yr	<b>0.160</b>	<b>0.0938-0.274</b>	<b>&lt;0.0001 ***</b>
<b>Gender equity index</b>	<b>1.79</b>	<b>1.55-2.07</b>	<b>&lt;0.0001 ***</b>
<b>City (overall)</b>			
Agra (reference)	1.0		
Aligarh	0.762	0.572-1.02	0.064
Allahabad	0.886	0.625-1.26	0.498
Gorakhpur	0.867	0.636-1.18	0.366
<b>Wealth</b>			
1 (ours) (reference)	1.0		
1 (UHI)	--		
2 (ours)	<b>1.40</b>	<b>1.03-1.91</b>	<b>0.033 *</b>
2 (UHI)	--	--	--
3 (ours)	<b>1.52</b>	<b>1.07-2.16</b>	<b>0.021 *</b>
3 (UHI)	--	--	--
4 (ours)	<b>2.04</b>	<b>1.36-3.08</b>	<b>0.001 **</b>
4 (UHI)	--	--	--
5 (ours)	<b>1.96</b>	<b>1.26-3.04</b>	<b>0.003 **</b>
5 (UHI)	--	--	--
<b>Education</b>			
Never attended school (reference)	1.0		
Highest Standard completed: 0-8	1.32	0.979-1.77	0.069
Highest Standard completed: 9-12	1.35	0.998-1.84	0.051
Highest Standard completed: 13-20	<b>1.85</b>	<b>1.24-2.76</b>	<b>0.003 **</b>
<b>Parity</b>			
0-1 live births	1.0		
2 live births	<b>2.93</b>	<b>2.20-3.90</b>	<b>&lt;0.0001 ***</b>
3 live births	<b>3.16</b>	<b>2.23-4.48</b>	<b>&lt;0.0001 ***</b>
4+ live births	<b>3.09</b>	<b>2.08-4.58</b>	<b>&lt;0.0001 ***</b>
<b>Overall exposure</b>			
None (reference)	1.0		
1+ programs	1.098	0.895-1.35	0.368

\* p<0.05, \*\* p<0.01, \*\*\* p<0.0001

Table A8. Results of a multiple logistic regression analysis for the Urban Health Initiative (UHI). Adjusted associations from a multiple logistic regression model of current use on exposure to

Happy Dampatti are shown.			
	Multiple adjusted		
	OR	95% CI	p-value
<b>Mother's age at midterm</b>			
15-24 yr (reference)	1.0		
25-34 yr	1.35	0.918-1.77	0.127
35-44 yr	0.852	0.550-1.32	0.474
45-52 yr	<b>0.158</b>	<b>0.0925-0.270</b>	<b>&lt;0.0001 ***</b>
<b>Gender equity index</b>	<b>1.80</b>	<b>1.55-2.08</b>	<b>&lt;0.0001 ***</b>
<b>City</b>			
Agra (reference)	1.0		
<b>Aligarh</b>	<b>0.715</b>	<b>0.537-0.952</b>	<b>0.022 *</b>
Allahabad	0.892	0.629-1.26	0.519
Gorakhpur	0.870	0.640-1.18	0.371
<b>Wealth</b>			
1 (ours) (reference)	1.0		
1 (UHI)	--		
2 (ours)	<b>1.40</b>	<b>1.03-1.91</b>	<b>0.031 *</b>
2 (UHI)	--	--	
3 (ours)	<b>1.52</b>	<b>1.07-2.15</b>	<b>0.020 *</b>
3 (UHI)	--	--	--
4 (ours)	<b>2.05</b>	<b>1.36-3.09</b>	<b>0.001 **</b>
4 (UHI)	--	--	
5 (ours)	<b>1.96</b>	<b>1.27-3.02</b>	<b>0.003 **</b>
5 (UHI)	--	--	
<b>Education</b>			
Never attended school (reference)	1.0		
Highest Standard completed: 0-8	1.32	0.990-1.77	0.059
Highest Standard completed: 9-12	1.36	0.993-1.86	0.056
Highest Standard completed: 13-20	<b>1.85</b>	<b>1.24-2.75</b>	<b>0.002 **</b>
<b>Parity</b>			
0-1 live births	1.0		
2 live births	<b>2.93</b>	<b>2.21-3.88</b>	<b>&lt;0.0001 ***</b>
3 live births	<b>3.15</b>	<b>2.23-4.46</b>	<b>&lt;0.0001 ***</b>
4+ live births	<b>3.09</b>	<b>2.09-4.57</b>	<b>&lt;0.0001 ***</b>
<b>Happy Dampatti Pratiyogita</b>			
None (reference)	1.0		
1+ programs	<b>1.56</b>	<b>1.06-2.29</b>	<b>0.024 *</b>

\* p<0.05, \*\* p<0.01, \*\*\* p<0.0001

Table A9. Results of a multiple logistic regression analysis for the Urban Health Initiative. Adjusted associations from a multiple logistic regression model of use of any modern contraceptives on binary overall exposure are shown.

	Multiple adjusted		
	OR	95% CI	p-value
<b>Mother's age at midterm</b>			
15-24 yr (reference)	1.0		
25-34 yr	1.15	0.827-1.61	0.398
35-44 yr	<b>0.636</b>	<b>0.439-0.923</b>	<b>0.017 *</b>
45-52 yr	<b>0.146</b>	<b>0.0809-0.263</b>	<b>&lt;0.0001 ***</b>
<b>Gender equity index</b>	<b>1.32</b>	<b>1.18-1.48</b>	<b>&lt;0.0001 ***</b>
<b>City</b>			
Agra (reference)	1.0		
Aligarh	1.00	0.749-1.34	0.996
Allahabad	1.10	0.779-1.56	0.585
Gorakhpur	0.943	0.701-1.27	0.698
<b>Wealth</b>			
1 (ours) (reference)	1.0		
1 (UHI)	--		
2 (ours)	1.04	0.746-1.45	0.816
2 (UHI)	--	--	--
3 (ours)	0.998	0.696-1.43	0.992
3 (UHI)	--	--	--
4 (ours)	1.17	0.800-1.71	0.420
4 (UHI)	--	--	--
5 (ours)	1.37	0.871-2.15	0.174
5 (UHI)	--	--	--
<b>Religion</b>			
Hindu (reference)	1.0		
Other	<b>0.762</b>	<b>0.589-0.984</b>	<b>0.038 *</b>
<b>Education</b>			
Never attended school (reference)	1.0		
Highest Standard completed: 0-8	<b>1.71</b>	<b>1.25-2.34</b>	<b>0.001 **</b>
Highest Standard completed: 9-12	<b>1.85</b>	<b>1.31-2.62</b>	<b>0.001 **</b>
Highest Standard completed: 13-20	<b>2.83</b>	<b>1.95-4.11</b>	<b>&lt;0.0001 ***</b>
<b>Parity</b>			
0-1 live births	1.0		
2 live births	<b>2.14</b>	<b>1.56-2.94</b>	<b>&lt;0.0001 ***</b>
3 live births	<b>2.48</b>	<b>1.84-3.35</b>	<b>&lt;0.0001 ***</b>
4+ live births	<b>2.96</b>	<b>2.06-4.26</b>	<b>&lt;0.0001 ***</b>
<b>Overall exposure</b>			
None (reference)	1.0		
1+ programs	<b>1.44</b>	<b>1.16-1.78</b>	<b>0.001 **</b>

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.0001$



Table A10. Bivariate results for linear regression analyses for the Urban Health Initiative. Unadjusted associations (betas) are shown for program exposures. Gender equity is the outcome variable.

Intervention exposure	Crude Betas	95% CI	p-value
<b>Sambhal lunga program</b>	F-test: p=0.4373		
None (reference)	<b>Constant: 0.274</b>	<b>0.212-0.336</b>	<b>&lt;0.0001 ***</b>
TV and/or radio	0.0330	-0.0505-0.116	0.437
<b>Happy Dampatti Pratiyogita</b>	F-test: p=0.9099		
None (reference)	<b>Constant: 0.285</b>	<b>0.235-0.334</b>	<b>&lt;0.0001 ***</b>
1+ programs	0.0125	-0.204-0.229	0.910
<b>Other community events mentioning FP</b>	F-test: p=0.1395		
None (reference)	<b>Constant: 0.276</b>	<b>0.228-0.323</b>	<b>&lt;0.0001 ***</b>
1+ programs	0.222	-0.0730-0.518	0.140
<b>Overall exposure</b>	F-test: p=0.7066		
None (reference)	<b>Constant: 0.265</b>	<b>0.199-0.331</b>	<b>&lt;0.0001 ***</b>
1 program	0.0382	-0.0640-0.140	0.462
2 programs	0.0324	-0.0881-0.153	0.597
3+ programs	0.0606	-0.0505-0.172	0.284
<b>Overall exposure</b>	F-test: p=0.2485		
None (reference)	<b>0.265</b>	<b>0.199-0.331</b>	<b>&lt;0.0001 ***</b>
1+ programs	0.0450	-0.0316-0.122	0.248
<b>Television-based programs</b>	F-test: p=0.5514		
None (reference)	<b>Constant: 0.281</b>	<b>0.214-0.347</b>	<b>&lt;0.0001 ***</b>
1 program	-0.0327	-0.126-0.0609	0.431
2 programs	0.0238	-0.0896-0.137	0.679
3+ programs	0.0589	-0.0670-0.185	0.358
<b>Radio-based programs</b>	F-test: p=0.2845		
None (reference)	<b>Constant: 0.280</b>	<b>0.230-0.331</b>	<b>&lt;0.0001 ***</b>
1+ programs	0.0917	-0.0766-0.260	0.285
<b>Overall sterilization programs</b>	F-test: p=0.4566		
None (reference)	<b>Constant: 0.277</b>	<b>0.218-0.335</b>	<b>&lt;0.0001 ***</b>
1+ programs	0.0296	-0.0485-0.108	0.457

Table A11. Evidence of interaction between program exposure variables and gender equity based on results from multivariable models for the Urban Health Initiative.

	Current Use			Use of modern contraception		
	OR	95% CI	p-value	OR	95% CI	p-value
<b>Happy Dampatti Pratiyogita</b>						
None (reference)	1.0					
1+ programs	0.681	0.441-1.05	0.083			
<b>Overall exposure</b>						
None (reference)	1.0			1.0		
1+ programs	1.02	0.791-1.31	0.880	1.09	0.889-1.35	0.394

\* p<0.05, \*\* p<0.01, \*\*\* p<0.0001

*Nigeria Urban Reproductive Health Initiative*

Table A12. Results of bivariate regression analyses for the Nigerian Urban Reproductive Health Initiative. Crude associations (odds ratios) between independent variables and current FP use are shown.

	Crude		
	OR	95% CI	p-value
<b>Gender: Prohibition of women's activities</b>			
Husband prohibits >1 activities	1		
Husband prohibits 1 activity	0.983	0.811-1.19	0.862
Husband does not prohibit activities	<b>2.10</b>	<b>1.80-2.45</b>	<b>&lt;0.0001</b>
<b>Gender: Binary prohibition</b>			
Husband prohibits at least 1 action	1.0		
Husband does not prohibit actions	<b>2.12</b>	<b>1.90-2.38</b>	<b>&lt;0.0001 ***</b>
<b>Attitudes against violence</b>			
Violence acceptable for at least 1 situation	1.0		
Violence never acceptable	<b>1.18</b>	<b>1.08-1.29</b>	<b>&lt;0.0001 ***</b>
<b>Gender: decision-making</b>			
Women involved in no decisions	1.0		
Women involved in 1-2 decisions	<b>2.74</b>	<b>2.39-3.14</b>	<b>&lt;0.0001 ***</b>
Women involved in 3-4 decisions	<b>3.67</b>	<b>3.22-4.19</b>	<b>0.0001 ***</b>
<b>Gender: Role in decision-making</b>			
Low	1.0		
High	<b>1.83</b>	<b>1.68-1.99</b>	<b>&lt;0.0001 ***</b>
<b>Gender: financial autonomy</b>			
No	1.0		
Yes	<b>2.56</b>	<b>2.31-2.83</b>	<b>&lt;0.0001 ***</b>
<b>Age</b>			
15-24 yr	1.0		
25-34 yr	<b>3.58</b>	<b>3.19-4.02</b>	<b>&lt;0.0001 ***</b>
35-49 yr	<b>3.26</b>	<b>2.90-3.66</b>	<b>&lt;0.0001 ***</b>
<b>Religion</b>			
Christian/Other	1.0		
Muslim	<b>0.468</b>	<b>0.429-0.510</b>	<b>&lt;0.0001 ***</b>
<b>Education</b>			
Never attended school	1.0		
Attended Quranic school only	<b>0.566</b>	<b>0.368-0.869</b>	<b>0.009 **</b>
Attended primary school	<b>2.24</b>	<b>1.83-2.74</b>	<b>&lt;0.0001 ***</b>
Attended junior secondary school	<b>1.58</b>	<b>1.27-1.97</b>	<b>&lt;0.0001 ***</b>
Attended Senior secondary school	<b>2.20</b>	<b>1.83-2.65</b>	<b>&lt;0.0001 ***</b>
Higher	<b>3.72</b>	<b>3.07-4.50</b>	<b>&lt;0.0001 ***</b>
<b>Marital status</b>			
Not	1.0		

Currently married/living together	<b>2.53</b>	<b>2.30-2.78</b>	<b>&lt;0.0001 ***</b>
<b>Parity</b>			
0 live births	1.0		
1-2 live births	<b>2.24</b>	<b>1.99-2.53</b>	<b>&lt;0.0001 ***</b>
3-4 live births	<b>3.82</b>	<b>3.40-4.29</b>	<b>&lt;0.0001 ***</b>
5+ live births	<b>2.30</b>	<b>2.04-2.61</b>	<b>&lt;0.0001 ***</b>
<b>Wealth</b>			
Lowest	1.0		
Low	<b>1.46</b>	<b>1.26-1.69</b>	<b>&lt;0.0001 ***</b>
Middle	<b>1.77</b>	<b>1.53-2.06</b>	<b>&lt;0.0001 ***</b>
High	<b>1.66</b>	<b>1.43-1.92</b>	<b>&lt;0.0001 ***</b>
Highest	<b>1.51</b>	<b>1.31-1.75</b>	<b>&lt;0.0001 ***</b>
<b>Overall program exposure</b>			<b>Overall p: &lt;0.0001 ***</b>
0 messages	1.0		
1 message	<b>1.47</b>	<b>1.32-1.63</b>	<b>&lt;0.0001 ***</b>
2+ messages	<b>2.43</b>	<b>2.20-2.70</b>	<b>&lt;0.0001 ***</b>
<b>City</b>			
Abuja	1.0		
Benin City	0.896	0.782-1.03	0.115
Ibadan	1.03	0.899-1.17	0.711
Ilorin	<b>0.613</b>	<b>0.527-0.712</b>	<b>&lt;0.0001 ***</b>
Kaduna	<b>0.414</b>	<b>0.355-0.482</b>	<b>&lt;0.0001 ***</b>
Zaria	<b>0.118</b>	<b>0.0985-0.142</b>	<b>&lt;0.0001 ***</b>
* p<0.05, ** p<0.01, *** p<0.0001			

Table A13. Results of bivariate regression analyses for the Nigerian Urban Reproductive Health Initiative. Crude associations (odds ratios) between independent variables and use of any modern contraceptive are shown.

	Crude		
	OR	95% CI	p-value
<b>Gender: Prohibition of women's activities</b>	n=8985 (women in union only)		n=8933 (women in union only)
Husband prohibits >1 activities	1.0		
Husband prohibits 1 activity	0.919	0.726-1.16	0.481
Husband does not prohibit activities	<b>2.29</b>	<b>1.92-2.74</b>	<b>&lt;0.0001 ***</b>
<b>Gender: Binary prohibition</b>			
Husband prohibits at least 1 action	1.0		
Husband does not prohibit actions	<b>2.40</b>	<b>2.10-2.75</b>	<b>&lt;0.0001 ***</b>
<b>Attitudes against violence n(%)</b>			
Violence acceptable for at least 1 situation	1.0		
Violence never acceptable	<b>1.16</b>	<b>1.05-1.28</b>	<b>0.003 **</b>
<b>Gender: decision-making</b>			
Women involved in no decisions	1.0		
Women involved in 1-2 decisions	<b>2.57</b>	<b>2.21-3.0</b>	<b>&lt;0.0001 ***</b>
Women involved in 3-4 decisions	<b>3.16</b>	<b>2.72-3.66</b>	<b>&lt;0.0001 ***</b>
<b>Gender: Role in decision-making</b>			
Low	1.0		
High	<b>1.63</b>	<b>1.49-1.80</b>	<b>&lt;0.0001 ***</b>
<b>Gender: financial autonomy</b>			
No	1.0		
Yes	<b>2.36</b>	<b>2.11-2.64</b>	<b>&lt;0.0001 ***</b>
<b>Age</b>			
15-24 yr	1.0		
25-34 yr	<b>2.91</b>	<b>2.57-3.30</b>	<b>&lt;0.0001 ***</b>
35-49 yr	<b>2.49</b>	<b>2.19-2.83</b>	<b>&lt;0.0001 ***</b>
<b>Religion</b>			
Christian/Other	1.0		
Muslim	<b>0.513</b>	<b>0.466-0.564</b>	<b>&lt;0.0001 ***</b>
<b>Education</b>			
Never attended school	1.0		1.0
Attended Quranic school only	<b>0.458</b>	<b>0.269-0.781</b>	<b>0.004 **</b>
Attended primary school	<b>1.87</b>	<b>1.49-2.34</b>	<b>&lt;0.0001 ***</b>
Attended junior secondary school	<b>1.41</b>	<b>1.10-1.81</b>	<b>0.006 **</b>
Attended Senior secondary school	<b>1.87</b>	<b>1.53-2.30</b>	<b>&lt;0.0001 ***</b>
Higher	<b>2.94</b>	<b>2.38-3.62</b>	<b>&lt;0.0001 ***</b>
<b>Marital status</b>			
Not	1.0		
Currently married/living together	<b>1.93</b>	<b>1.74-2.14</b>	<b>&lt;0.0001 ***</b>

<b>Parity n(%)</b>			
0 live births	1.0		
1-2 live births	<b>1.80</b>	<b>1.58-2.06</b>	<b>&lt;0.0001 ***</b>
3-4 live births	<b>2.73</b>	<b>2.41-3.09</b>	<b>&lt;0.0001 ***</b>
5+ live births	<b>1.82</b>	<b>1.59-2.08</b>	<b>&lt;0.0001 ***</b>
<b>Wealth n(%)</b>			
Lowest	1.0		
Low	<b>1.45</b>	<b>1.23-1.71</b>	<b>&lt;0.0001 ***</b>
Middle	<b>1.62</b>	<b>1.37-1.92</b>	<b>&lt;0.0001 ***</b>
High	<b>1.62</b>	<b>1.38-1.91</b>	<b>&lt;0.0001 ***</b>
Highest	<b>1.46</b>	<b>1.24-1.71</b>	<b>&lt;0.0001 ***</b>
<b>Overall program exposure</b>			Overall p: <0.0001 ***
0 messages	1.0		
1 message	<b>1.49</b>	<b>1.33-1.67</b>	<b>&lt;0.0001 ***</b>
2+ messages	<b>2.30</b>	<b>2.06-2.58</b>	<b>&lt;0.0001 ***</b>
<b>City</b>			
Abuja	1.0		
Benin City	<b>0.749</b>	<b>0.646-0.868</b>	<b>&lt;0.0001 ***</b>
Ibadan	0.991	0.863-1.14	0.902
Ilorin	<b>0.643</b>	<b>0.547-0.755</b>	<b>&lt;0.0001 ***</b>
Kaduna	<b>0.471</b>	<b>0.399-0.555</b>	<b>&lt;0.0001 ***</b>
Zaria	<b>0.126</b>	<b>0.102-0.155</b>	<b>&lt;0.0001 ***</b>
* p<0.05, ** p<0.01, *** p<0.0001			

Table A14. Results of bivariate regression analyses for the Nigerian Urban Reproductive Health Initiative. Crude associations (odds ratios) between independent variables and unmet need are shown.

	Crude		
	OR	95% CI	p-value
<b>Gender: Prohibition of women's activities</b>			
Husband prohibits >1 activities	1.0		
Husband prohibits 1 activity	0.818	0.669-1.00	0.052
Husband does not prohibit activities	<b>0.747</b>	<b>0.631-0.884</b>	<b>0.001 **</b>
<b>Gender: Binary prohibition</b>			
Husband prohibits at least 1 action	1.0		
Husband does not prohibit actions	<b>0.833</b>	<b>0.733-0.945</b>	<b>0.005 **</b>
<b>Attitudes against violence</b>			
Violence acceptable for at least 1 situation	1.0		
Violence never acceptable	<b>0.831</b>	<b>0.731-0.945</b>	<b>0.005 **</b>
<b>Gender: decision-making</b>			
Women involved in no decisions	1.0		
Women involved in 1-2 decisions	<b>0.672</b>	<b>0.572-0.788</b>	<b>&lt;0.0001 ***</b>
Women involved in 3-4 decisions	<b>0.603</b>	<b>0.513-0.707</b>	<b>&lt;0.0001 ***</b>
<b>Gender: Role in decision-making</b>			
Low	1.0		
High	<b>0.781</b>	<b>0.688-0.886</b>	<b>&lt;0.0001 ***</b>
<b>Gender: financial autonomy</b>			
No	1.0		
Yes	<b>0.693</b>	<b>0.599-0.801</b>	<b>&lt;0.0001 ***</b>
<b>Age n(%)</b>			
15-24 yr	1.0		
25-34 yr	<b>0.730</b>	<b>0.603-0.885</b>	<b>0.001 **</b>
35-49 yr	0.948	0.786-1.14	0.576
<b>Religion</b>			
Christian/Other	1.0		
Muslim	<b>1.48</b>	<b>1.31-1.69</b>	<b>&lt;0.0001 ***</b>
<b>Education n(%)</b>			
Never attended school	1.0		
Attended Quranic school only	1.20	0.906-1.59	0.204
Attended primary school	0.872	0.711-1.07	0.187
Attended junior secondary school	<b>0.769</b>	<b>0.599-0.988</b>	<b>0.04 *</b>
Attended Senior secondary school	<b>0.660</b>	<b>0.544-0.800</b>	<b>&lt;0.0001 ***</b>
Higher	<b>0.458</b>	<b>0.367-0.572</b>	<b>&lt;0.0001 ***</b>
<b>Marital status n(%)</b>			
Not	1.0		
Currently married/living together	1 (omitted)		
<b>Parity</b>			

0 live births	1.0		
1-2 live births	<b>2.99</b>	<b>1.93-4.63</b>	<b>&lt;0.0001 ***</b>
3-4 live births	<b>3.48</b>	<b>2.26-5.38</b>	<b>&lt;0.0001 ***</b>
5+ live births	<b>5.90</b>	<b>3.83-9.10</b>	<b>&lt;0.0001 ***</b>
<b>Wealth</b>			
Lowest	1.0		
Low	<b>0.792</b>	<b>0.660-0.950</b>	<b>0.012 *</b>
Middle	<b>0.657</b>	<b>0.542-0.797</b>	<b>&lt;0.0001 ***</b>
High	<b>0.642</b>	<b>0.530-0.778</b>	<b>&lt;0.0001 ***</b>
Highest	<b>0.572</b>	<b>0.467-0.699</b>	<b>&lt;0.0001 ***</b>
<b>Overall program exposure</b>			Overall p: 0.0163 *
0 messages	1.0		
1 message	<b>0.851</b>	<b>0.737-0.982</b>	<b>0.027 *</b>
2+ messages	<b>0.819</b>	<b>0.701-0.957</b>	<b>0.012 *</b>
<b>City</b>			
Abuja	1.0		
Benin City	<b>1.66</b>	<b>1.29-2.14</b>	<b>&lt;0.0001 ***</b>
Ibadan	1.06	0.831-1.35	0.642
Ilorin	<b>1.86</b>	<b>1.46-2.36</b>	<b>&lt;0.0001 ***</b>
Kaduna	<b>2.12</b>	<b>1.66-2.70</b>	<b>&lt;0.0001 ***</b>
Zaria	<b>2.31</b>	<b>1.85-2.89</b>	<b>&lt;0.0001 ***</b>
* p<0.05, ** p<0.01, *** p<0.0001			



Table A15. Results of a multiple logistic regression analysis for the Nigerian Urban Reproductive Health Initiative. Logistic regression of current use of any FP method on all gender constructs after adjustment for relevant socio-demographic indicators is shown.

	Multiple adjusted		
	OR	95% CI	p-value
<b>Gender: Prohibition of women's activities</b>			
Husband prohibits >1 activities	1.0		
Husband prohibits 1 activity	0.934	0.751-1.16	0.537
Husband does not prohibit activities	<b>1.49</b>	<b>1.25-1.78</b>	<b>&lt;0.0001 ***</b>
<b>Attitudes against violence</b>			
Violence acceptable for at least 1 situation	1.0		
Violence never acceptable	1.09	0.959-1.25	0.180
<b>Gender: decision-making</b>			
Women involved in no decisions	1.0		
Women involved in 1-2 decisions	<b>1.33</b>	<b>1.09-1.63</b>	<b>0.004 **</b>
Women involved in 3-4 decisions	<b>1.82</b>	<b>1.49-2.21</b>	<b>&lt;0.0001 ***</b>
<b>Gender: financial autonomy</b>			
No	1.0		
Yes	<b>1.24</b>	<b>1.06-1.44</b>	<b>0.007 **</b>
<b>Age</b>			
15-24 yr	1.0		
25-34 yr	<b>0.782</b>	<b>0.621-0.986</b>	<b>0.037 *</b>
35-49 yr	<b>0.524</b>	<b>0.405-0.677</b>	<b>&lt;0.0001 ***</b>
<b>Religion</b>			
Christian/Other	1.0		
Muslim	<b>0.638</b>	<b>0.550-0.740</b>	<b>&lt;0.0001 ***</b>
<b>Education</b>			
Never attended school	1.0		
Attended Quranic school only	1.19	0.738-1.91	0.479
Attended primary school	<b>1.76</b>	<b>1.38-2.24</b>	<b>&lt;0.0001 ***</b>
Attended junior secondary school	<b>1.73</b>	<b>1.30-2.30</b>	<b>&lt;0.0001 ***</b>
Attended Senior secondary school	<b>2.41</b>	<b>1.89-3.05</b>	<b>&lt;0.0001 ***</b>
Higher	<b>3.18</b>	<b>2.43-4.17</b>	<b>&lt;0.0001 ***</b>
<b>Parity</b>			
0 live births	1.0		
1-2 live births	<b>9.19</b>	<b>5.96-14.17</b>	<b>&lt;0.0001 ***</b>
3-4 live births	<b>20.2</b>	<b>13.0-31.3</b>	<b>&lt;0.0001 ***</b>
5+ live births	<b>23.0</b>	<b>14.6-36.3</b>	<b>&lt;0.0001 ***</b>
<b>Wealth</b>			
Lowest	1.0		
Low	1.11	0.904-1.36	0.319
Middle	1.17	0.951-1.44	0.136
High	<b>1.25</b>	<b>1.01-1.56</b>	<b>0.042 *</b>

Highest	1.12	0.886-1.43	0.337
<b>Overall program exposure</b>			
0 messages	1.0		
1 message	<b>1.32</b>	<b>1.13-1.53</b>	<b>&lt;0.0001 ***</b>
2+ messages	<b>1.55</b>	<b>1.33-1.80</b>	<b>&lt;0.0001 ***</b>
<b>City</b>			
Abuja	1.0		
Benin City	0.828	0.659-1.04	0.103
Ibadan	<b>1.26</b>	<b>1.03-1.55</b>	<b>0.024 *</b>
Ilorin	<b>0.776</b>	<b>0.617-0.975</b>	<b>0.030 *</b>
Kaduna	<b>0.485</b>	<b>0.389-0.605</b>	<b>&lt;0.0001 ***</b>
Zaria	<b>0.185</b>	<b>0.143-0.240</b>	<b>&lt;0.0001 ***</b>
* p<0.05, ** p<0.01, *** p<0.0001			

Table A16. Results of a multiple logistic regression analysis for the Nigerian Urban Reproductive Health Initiative. Logistic regression of modern contraceptive use on all gender constructs after adjustment for relevant socio-demographic indicators is shown.

	Multiple adjusted		
	OR	95% CI	p-value
<b>Gender: Prohibition of women's activities</b>			
Husband prohibits >1 activities	1.0		
Husband prohibits 1 activity	0.885	0.683-1.15	0.356
Husband does not prohibit activities	<b>1.79</b>	<b>1.47-2.19</b>	<b>&lt;0.0001 ***</b>
<b>Attitudes against violence</b>			
Violence acceptable for at least 1 situation	1.0		
Violence never acceptable	1.03	0.897-1.19	0.653
<b>Gender: decision-making</b>			
Women involved in no decisions	1.0		
Women involved in 1-2 decisions	<b>1.34</b>	<b>1.08-1.67</b>	<b>0.008 **</b>
Women involved in 3-4 decisions	<b>1.53</b>	<b>1.23-1.90</b>	<b>&lt;0.0001 ***</b>
<b>Gender: financial autonomy</b>			
No	1.0		
Yes	<b>1.29</b>	<b>1.09-1.53</b>	<b>0.003 **</b>
<b>Age</b>			
15-24 yr	1.0		
25-34 yr	<b>0.767</b>	<b>0.597-0.986</b>	<b>0.038 *</b>
35-49 yr	<b>0.546</b>	<b>0.414-0.721</b>	<b>&lt;0.0001 ***</b>
<b>Religion</b>			
Christian/Other	1.0		
Muslim	<b>0.683</b>	<b>0.584-0.799</b>	<b>&lt;0.0001 ***</b>
<b>Education</b>			
Never attended school	1.0		
Attended Quranic school only	1.01	0.563-1.80	0.984
Attended primary school	<b>1.47</b>	<b>1.13-1.92</b>	<b>0.005 **</b>
Attended junior secondary school	<b>1.53</b>	<b>1.12-2.09</b>	<b>0.008 **</b>
Attended Senior secondary school	<b>1.78</b>	<b>1.37-2.31</b>	<b>&lt;0.0001 ***</b>
Higher	<b>2.10</b>	<b>1.57-2.82</b>	<b>&lt;0.0001 ***</b>
<b>Parity</b>			
0 live births	1.0		
1-2 live births	<b>8.68</b>	<b>5.02-15.03</b>	<b>&lt;0.0001 ***</b>
3-4 live births	<b>15.4</b>	<b>8.86-26.7</b>	<b>&lt;0.0001 ***</b>
5+ live births	<b>17.4</b>	<b>9.88-30.6</b>	<b>&lt;0.0001 ***</b>
<b>Wealth</b>			
Lowest	1.0		
Low	1.14	0.908-1.43	0.258
Middle	1.09	0.863-1.38	0.467
High	<b>1.30</b>	<b>1.02-1.67</b>	<b>0.034*</b>

Highest	1.13	0.863-1.47	0.380
<b>Overall program exposure</b>			
0 messages	1.0		
1 message	<b>1.37</b>	<b>1.17-1.60</b>	<b>&lt;0.0001 ***</b>
2+ messages	<b>1.47</b>	<b>1.25-1.72</b>	<b>&lt;0.0001 ***</b>
<b>City</b>			
Abuja	1.0		
Benin City	<b>0.548</b>	<b>0.430-0.697</b>	<b>&lt;0.0001 ***</b>
Ibadan	1.11	0.903-1.36	0.328
Ilorin	<b>0.752</b>	<b>0.595-0.949</b>	<b>0.016 *</b>
Kaduna	<b>0.570</b>	<b>0.452-0.719</b>	<b>&lt;0.0001 ***</b>
Zaria	<b>0.210</b>	<b>0.158-0.280</b>	<b>&lt;0.0001 ***</b>
* p<0.05, ** p<0.01, *** p<0.0001			

Table A17. Results of a multiple logistic regression analysis for the Nigerian Urban Reproductive Health Initiative. Logistic regression of unmet FP need on all gender constructs after adjustment for relevant socio-demographic indicators is shown.

	Multiple adjusted		
	OR	95% CI	p-value
<b>Gender: Prohibition of women's activities</b>			
Husband prohibits >1 activities	1.0		
Husband prohibits 1 activity	0.916	0.739-1.13	0.420
Husband does not prohibit activities	0.895	0.743-1.08	0.246
<b>Attitudes against violence</b>			
Violence acceptable for at least 1 situation	1.0		
Violence never acceptable	<b>0.813</b>	<b>0.702-0.941</b>	<b>0.006 **</b>
<b>Gender: decision-making</b>			
Women involved in no decisions	1.0		
Women involved in 1-2 decisions	0.843	0.704-1.01	0.064
Women involved in 3-4 decisions	<b>0.823</b>	<b>0.680-0.995</b>	<b>0.045 *</b>
<b>Gender: financial autonomy</b>			
No	1.0		
Yes	<b>0.775</b>	<b>0.663-0.906</b>	<b>0.001 **</b>
<b>Age</b>			
15-24 yr	1.0		
25-34 yr	<b>0.637</b>	<b>0.507-0.801</b>	<b>&lt;0.0001 ***</b>
35-49 yr	<b>0.697</b>	<b>0.542-0.896</b>	<b>0.005 **</b>
<b>Parity</b>			
0 live births	1.0		
1-2 live births	<b>2.90</b>	<b>1.86-4.54</b>	<b>&lt;0.0001 ***</b>
3-4 live births	<b>3.99</b>	<b>2.55-6.25</b>	<b>&lt;0.0001 ***</b>
5+ live births	<b>6.12</b>	<b>3.89-9.61</b>	<b>&lt;0.0001 ***</b>
<b>Wealth</b>			
Lowest	1.0		
Low	0.901	0.740-1.10	0.298
Middle	<b>0.758</b>	<b>0.614-0.935</b>	<b>0.010 *</b>
High	<b>0.734</b>	<b>0.592-0.911</b>	<b>0.005 **</b>
Highest	<b>0.722</b>	<b>0.572-0.912</b>	<b>0.006 **</b>
<b>Overall program exposure</b>			
0 messages	1.0		
1 message	<b>0.823</b>	<b>0.705-0.962</b>	<b>0.014 *</b>
2+ messages	0.958	0.809-1.14	0.624
<b>City</b>			
Abuja	1.0		
Benin City	<b>1.38</b>	<b>1.04-1.82</b>	<b>0.026 *</b>
Ibadan	0.925	0.712-1.20	0.561
Ilorin	<b>1.69</b>	<b>1.29-2.21</b>	<b>&lt;0.0001 ***</b>
Kaduna	<b>1.69</b>	<b>1.31-2.19</b>	<b>&lt;0.0001 ***</b>
Zaria	<b>1.57</b>	<b>1.22-2.03</b>	<b>0.001 **</b>

\* p<0.05, \*\* p<0.01, \*\*\* p<0.0001

Table A18. Evidence of interaction between FP program exposure and gender constructs of interest based on results from multivariable models for the Nigerian Urban Reproductive Health Initiative.^

	FP Program exposure			Overall p-value of interaction
	0 messages	1 message	2 or more messages	
<b>Gender: Prohibition of women's activities<sup>1</sup></b>				<b>&lt;0.0001 ***</b>
Husband prohibits >1 activities	--	--	--	
Husband prohibits 1 activity	--	<b>0.551</b> (0.317-0.960) p-value: <b>0.035 *</b>	<b>0.338</b> (0.197-0.580) p-value: <b>&lt;0.0001 ***</b>	
Husband does not prohibit activities	--	0.794 (0.504-1.25) p-value: 0.320	<b>0.302</b> (0.194-0.470) p-value: <b>&lt;0.0001 ***</b>	
<b>Gender: decision-making<sup>1</sup></b>				<b>0.0434 *</b>
Women involved in no decisions	--	--	--	
Women involved in 1-2 decisions	--	0.802 (0.515-1.25) p-value: 0.328	0.645 (0.409-1.02) p-value: 0.06	
Women involved in 3-4 decisions	--	<b>0.631</b> (0.0.408-0.975) p-value: <b>0.038 *</b>	<b>0.528</b> (0.339-0.822) p-value: <b>0.005 **</b>	
<b>Gender: decision-making<sup>2</sup></b>				<b>0.0279 *</b>
Women involved in no decisions	--	--	--	
Women involved in 1-2 decisions	--	<b>1.55</b> (1.06-2.27) p-value: <b>0.023 *</b>	<b>1.89</b> (1.21-2.96) p-value: <b>0.006 **</b>	
Women involved in 3-4 decisions	--	1.08 (0.724-1.60) p-value: 0.718	1.40 (0.893-2.20) p-value: 0.142	

\* p<0.05, \*\* p<0.01, \*\*\* p<0.0001; ^ OR, 95% CI, and p-values drawn from multivariate analyses following adjustment for relevant socio-demographic variables.

<sup>1</sup> **Multivariable model:** Use of any FP method on FP program exposure, gender indicators, and socio-demographic characteristics: <sup>2</sup> **Multivariable model:** Unmet need on FP program exposure, gender indicators, and socio-demographic characteristics

Table A19. Results for logistic regression analyses for the Nigerian Urban Reproductive Health Initiative. Bivariate associations (odds ratios) between FP program exposure and gender constructs of interest are shown.

	Overall exposure (summed)			Overall (corrected) Chi2 p-value
	0 messages OR 95% CI p-value	1 message OR 95% CI p-value	2+ messages OR 95% CI p-value	
<b>Gender: Prohibition of women's activities</b>				<b>7.41</b> <b>&lt;0.0001 ***</b>
Husband prohibits >1 activities				
Husband prohibits 1 activity				
Husband does not prohibit activities				
<b>Gender: Binary prohibition</b>				
Husband prohibits at least 1 action	1.0			
Husband does not prohibit actions	1.0	1.03 0.919-1.17 0.574	<b>1.27</b> <b>1.12-1.44</b> <b>&lt;0.0001 ***</b>	<b>7.31</b> <b>0.0007 **</b>
<b>Attitudes against violence</b>				
Violence acceptable for at least 1 situation	1.0			
Violence never acceptable	1.0	<b>1.12</b> <b>1.03-1.24</b> <b>0.012 *</b>	1.03 0.932-1.13 0.585	<b>3.23</b> <b>0.0394 *</b>
<b>Gender: decision-making</b>				<b>63.9</b> <b>&lt;0.0001 ***</b>
Women involved in no decisions				
Women involved in 1-2 decisions				
Women involved in 3-4 decisions				
<b>Gender: Role in decision-making</b>				
Low	1.0			
High	<b>1.0</b>	<b>1.27</b> <b>1.16-1.40</b> <b>&lt;0.0001 ***</b>	<b>1.72</b> <b>1.56-1.89</b> <b>&lt;0.0001 ***</b>	<b>62.99</b> <b>&lt;0.0001 ***</b>
<b>Gender: financial autonomy</b>				
No	1.0			
Yes	1.0	<b>1.56</b> <b>1.42-1.73</b> <b>&lt;0.0001 ***</b>	<b>1.67</b> <b>1.51-1.85</b> <b>&lt;0.0001 ***</b>	<b>65.49</b> <b>&lt;0.0001 ***</b>

Table B1. SSDI Gender Equality Scale Items	
1.	The important decisions in the family should be made only by the men of the family.
2.	A married woman should be allowed to work outside the home if she wants to.
3.	Household chores are for women only, not for men, even if the woman works outside the house.
4.	It should be the responsibility of a man and woman together to decide how many children they should have.
5.	It is up to the woman, not the man, to be careful to avoid unwanted pregnancies.
6.	Women have the right to tell men to use condoms.
7.	A typical man needs more than one woman to be sexually satisfied.
8.	A man has the right to force his wife to have sexual intercourse if she's reluctant to.
9.	Women, as well as men in the family, should have the right to inherit land and property.
10.	A man has the right to beat his wife if she is disrespectful in front of other people.
11.	Women should get involved in politics.

Table B2. UHI Gender Equality Index items	
1.	Who decides how the money that you earn will be used: Mainly you, mainly your husband, or you and your husband jointly?
2.	Who decides how the money that your husband earns will be used: Mainly you, mainly your husband, or you and your husband jointly?
3.	Do you have any money of your own that you alone can decide how to use?
4.	Do/did you need the consent of your husband or family members to use a family planning method?
5.	Who decides which type of contraceptive method to use or not to use? Is it mainly your decision, mainly your husband's\ decision, or did you both decide together or other?
6a.	Some women take up jobs for which they are paid. Others sell things, have a small business or work on the family farm or business. In the last seven days, have you done any of these things?
6b.	Have you done any work in the last 12 months?



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