Factors associated with contraceptive ideation among urban men in Nigeria

Stella Babalola[a,b], **Bola Kusemiju**[c], **Lisa Calhoun**[d], **Meghan Corroon**[d], and **Bolanle Ajao**[b]

[a]Center for Communication Programs, Johns Hopkins University. 111 Marketplace Street. Baltimore, MD 21202. USA.

[b]Center for Communication Programs, Johns Hopkins University, Baltimore, USA.

[c]NURHI Project, Abuja, Nigeria.

[d]Carolina Population Center, University of North Carolina at Chapel Hill, Chapel Hill, USA

Abstract

Objective: To determine the factors that affects the readiness of urban Nigerian men to adopt contraceptive methods.

Methods: Using multilevel analysis and an ideation framework, this paper examines the factors associative with positive ways of thinking about contraception among a sample of urban Nigerian men.

Results: Significant correlates of ideation operate at the individual, household, and community levels. The correlates include exposure to family planning promotion campaigns, education, age, religion, marital status and community norms.

Conclusion: The findings underscore the need for a comprehensive strategy that includes communication and other behavior change activities tailored to the needs of specific groups of men. A key component of this comprehensive strategy should be community-level interventions designed to mobilize community members and change social norms that hinder the spread of ideational characteristics that favor contraceptive use.

Keywords

Ideation; contraceptive use; urban men; Nigeria

1. Introduction

In Nigeria, only 15.1 percent of currently married women use any contraceptive method and only 9.8 percent use a modern method [1]. Consequences of low contraceptive use include unintended pregnancies and maternal mortality resulting from complications associated with pregnancy and childbirth. Fertility remains high in Nigeria with an average of 5.5 children

per women [1]. Maternal mortality ratio in Nigeria is among the highest in the world, estimated to be 630 deaths per 100,000 births in 2010 [2]. Results of the 2013 DHS show no change in contraceptive prevalence since 2008. Moreover, fertility desires remain high among Nigerian men and women [1,3].

In Nigeria, men are often the final decision-makers on key household issues, including those related to household purchases, health of family members, timing of pregnancies, family size, and education of children. Men's attitudes towards family planning have been known to affect their partner's contraceptive attitudes even when spousal communication about reproductive health is not the norm [4]. Historically, programmatic and policy efforts to promote contraceptive use have focused on women [5]. It soon became clear that women-only programs or those that involve men in a limited way are not sufficient to bring about the magnitude of change in contraceptive use required to lead to fertility decline at a national level [6]. This recognition has prompted a shift towards greater involvement of men and a realization that social construction of masculinity and femininity should inform effective strategies for promoting contraceptive uptake and reducing unplanned pregnancies [7]. Available evidence suggests that engaging men in reproductive health decisions as partners can lead to increased spousal communication about family planning, which in turn fosters contraceptive use [8].

Ideation has been defined as "new ways of thinking and the diffusion of those ways of thinking by means of social interactions in local, culturally homogeneous communities" [9, p. 216]. Ideation is constructed as a model in terms of three components, each comprising several elements: cognitive (knowledge, attitudes, perceived risk, subjective norms, self-image); emotional (emotional response, empathy, self-efficacy); and, social interaction (social support and influence, spousal communication, personal advocacy). This model is predictive with the ideational variables working individually and synergistically to influence health outcomes. Conceptually, ideation measures a person's readiness to act.

Research has linked contraceptive use with individual ideational elements, including spousal communication, perceived spousal approval of contraception, perceived normative support, perceived peer behaviors, perceived self-efficacy for contraceptive use, and positive attitudes about contraception [10–12]. In contrast, negative attitudes such as fear of side effects or perception of disadvantages of contraceptive use are common reasons for lack of contraceptive use [13]. Other studies have linked the ideation model with contraceptive use and contraceptive intention in various settings. Using a score for ideation derived from various ideational variables, these studies have shown that increases in the level of ideation are associated with higher contraceptive prevalence and intention to use [9,14,15].

Whereas research has demonstrated the importance of ideation for contraceptive use among women, there is a dearth of research on the correlates and effects of ideation among men. Understanding the factors that affect contraceptive ideation among men is relevant for developing appropriate strategies for engaging men. It is along this line that this paper seeks to make a contribution to knowledge. We use a multilevel analytic approach to identify the key correlates of contraceptive ideation among Nigerian men in two urban sites: Ibadan and Kaduna. The two study cities differ in terms of contraceptive methods used. For example,

although a recent survey found that contraceptive prevalence rate (CPR) among in-union women was comparable in Ibadan (36.9%) and Kaduna (35.1%), more than one third of the women who reported contraceptive use in Kaduna were using lactational amenorrhea method (LAM) compared to less than 7% in Ibadan [16]. Conversely, pills, injectables, long-term and permanent methods contribute 64.8% of the CPR in Ibadan compared with only 47.3% in Kaduna [16].

2. Materials and Methods

The data analyzed in this paper are derived from the midterm cross-sectional household survey conducted by the Measurement, Learning & Evaluation Project in 2012 as part of a complex strategy to evaluate the effects of the Nigeria Urban Reproductive Health Initiative (NURHI), a project funded by the Gates Foundation. The survey used a two-stage sampling design with random selection of clusters and then household within each cluster [16]. All eligible men (aged 15 – 59 years) in selected households were approached and asked for consent to be interviewed. A total of 2,358 men from Ibadan and Kaduna had completed interviews. The Nigeria National Research Health Ethics Committee as well as the University of North Carolina at Chapel Hill Institutional Review Board approved this study.

The dependent variable assessed in this manuscript is contraceptive ideation operationalized through 25 items measuring contraceptive awareness, myths and rumors about family planning, approval of family planning, spousal discussion of family planning, approval of government officials' open discussion of family planning, and perceived self-efficacy to use contraception under various conditions (Table 1). The standardized Cronbach's alpha for the 25 items is 0.781. We assessed the predictive values of several independent variables, including those measured at the individual, household, community and city levels. The individual level variables include age, children-ever-born, level of exposure to NURHI's family planning campaign, education, religion, marital status, and employment status. At the household level, we assessed the role of household wealth (city-specific household wealth quintiles derived using principal component analysis of household and environmental assets). At the cluster level, we assessed media saturation in the cluster of residence. Finally, we also evaluated the predictive value of city of residence.

In a population, individuals are, at a minimum, nested in their neighborhoods. Ideally, analytic methods should take this nestedness into consideration. To account for the nested nature of survey data, we used mixed effects linear regression as the main analytic method in this manuscript [17]. To further justify the use of multilevel modeling, we computed the design effect. The standard guideline used is that a design effect greater than 2.0 indicates violations of the independence assumption [17]. In our data, the design effect was 5.88.

We specified fixed effects at the individual, household, cluster and city levels. We also specified random effects at the cluster level. We estimated three models: an empty model without covariates to assess if there is significant group-level variation in ideation; a model with only the individual, household and city-level variables, and, the full model that includes the LGA-level norms as well as the other covariates. Following Clarke & Wheaton [18], we limited the analyses in this manuscript to respondents residing in clusters with at least ten

individuals. This approach reduced our sample for the multilevel analyses by 11 individuals and two EAs, a reduction not likely to affect our results considering our large sample size. The models were estimated using the *mixed* command in Stata 13. We applied sampling weights to correct for the multistage sample design and individual non-response.

3. Results

Table 2 provides the socio-demographic characteristics of the study participants. The table shows that more than four-fifths of the participants have at least post-primary education, a little over half are currently married, and almost 80 percent had worked during the twelve months preceding the survey. In addition, the data indicate that more than half of the respondents were Muslim, the average age was 33.1 years and the mean number of children-ever-born was 2.3.

The score for ideation varied between 7 and 74, with a mean of 49.9, a median of 51 and a standard deviation of 9.4. The results of the multilevel model estimations are presented in Table 3. The results of the empty model (Model 0) reveal considerable variation in mean ideation score across communities; the community-level variance is significant. Moreover, the intra-class correlation (ICC) statistic for this empty model indicates that 24.8% of the variation in ideation score is attributable to differences across clusters.

When the individual, household and city-level variables are introduced in Model 1, the ICC declines substantially but remains significant. As shown by the Proportional Reduction in Variance (PRV), the correlates in this model account for 44.3% of the between-cluster variance in ideation score. In this model, the single most significant correlate of contraceptive ideation is education level. This variable presents a dose-response relationship with ideation score. Specifically, primary education, secondary education and post-secondary education increase the mean score for ideation by 4.4, 5.2 and 6.7 points, respectively, compared to no education. Exposure to NURHI communication programs is another variable that presents a strong, positive and dose-response relationship with ideation. Other variables associated with increases in contraceptive ideation in this model are socio-economic status and being currently married. In contrast, living in Kaduna and being a Muslim are negatively correlated with ideation. Age appears to have a curvilinear (concave) relationship with ideation. Neither number of children nor employment status is a significant correlate of ideation.

The introduction of community compositional variable into the estimated model results does not result in a change in the ICC and PRV (Model 2). In this model, all the individual, household and city-level variables maintain the same level of significance as in Model 1. The results of this model further show that increased media saturation in the cluster of residence is associated with a higher mean score for contraceptive ideation.

4. Discussion

Prior research has underscored the relevance of addressing ideational factors as a way of promoting the adoption of health-protective behaviors [19,20]. Men are key household decision-makers in Nigeria. Their ideational disposition towards family planning could

hinder couple's adoption and use of contraceptives. However, there is a dearth of data on the factors associated with contraceptive ideation among men. This manuscript examined the factors associated with contraceptive ideation among urban men in Nigeria. The findings indicate that most respondents have low to medium level of contraceptive ideation.

Results of this study echo findings of the few studies that have looked at the correlates of contraceptive ideation among women [14,15]. Exposure to NURHI's communication initiative was a significant correlate of contraceptive ideation. NURHI included a theory-based, research-informed, multimedia strategy aimed at increasing the adoption and sustained use of contraception. The strategy addressed various factors that have been identified through research to affect the use of contraceptive methods, including spousal communication, engaged community leaders, contraceptive information-seeking behaviors, perceived self-efficacy, and myths and rumors about contraceptives.

The dose-response association of ideation with education is as expected and consistent with evidence from prior research [15]. Indeed, it makes intuitive sense that the people with more education and thereby with their greater exposure to non-traditional ideas are more likely to have ideational (cognitive, emotional and social interaction) characteristics that favor contraceptive use.

The finding that ideation is lower on average for Muslims than for Christians is consistent with findings from previous research on the correlates of contraceptive ideation and use in many settings [21,22]. The relationship with household wealth did not show the expected dose-response association. Among Nigerian urban men, increased wealth is not consistently associated with increase in the score for contraceptive ideation. The reason for this unexpected finding is not clear. The difference in contraceptive ideation between Kaduna and Ibadan, even after controlling for religious affiliation and other socio-demographic characteristics of the respondents is striking. The generally lower level of contraceptive ideation in Kaduna compared to Ibadan is reminiscent of the north-south differences in health-protective attitudes and outcomes that several studies have highlighted in Nigeria [23,24]. The data further show a positive relationship between contraceptive ideation and media saturation in one's community of residence.

Finally, the data show considerable clustering of contraceptive ideation at the community level. Even after adjusting for measured individual and community compositional characteristics, the variance in mean ideation score across communities remains strong. This finding indicates that there are factors operating at the community level that affect the way individuals think about family planning and contraception. While our data do not allow us to identify the specific community-level variables, it is reasonable to assume that such factors may include sociocultural norms around fertility and contraception, gender norms, level of fertility in the community, family planning supply factors, level of community organizing around family planning issues, and the support of community and religious leaders [10,11,25–27].

Findings from this study have important implications for policy, programs and further research. For example, the documented dose-response relationship between NURHI's

communication program and ideation points to the relevance of strategically designed communication activities for strengthening audience capacity and readiness to use contraceptives. For a communication program to be effective, it must be theory-based and data-informed. Planners and implementers of such communication interventions should strive to maximize the reach of program activities through the use of multiple channels accessible to the audience groups.

The relatively lower level of contraceptive ideation among younger and unmarried men compared to their middle age and married peers suggest the need for communication and other behavior change interventions that target men early in life with messages and activities designed to strengthen their capacity to use contraceptives later in life. Such interventions could use school or community-based activities to reach teenagers or young adult men. The negative relationship between Islamic religious affiliation and contraceptive ideation underscores the need for strategies that specifically target Muslim men with appropriate messages. Such strategies may consider using Islamic religious leaders and other credible sources as channels of contraceptive use information.

The finding that contraceptive ideation clusters at the community level underscores the need for a social norm approach that considers the local context, and actively engages the community. Central to this approach should be forums that allow community members to critically examine prevailing myths and rumors about contraceptives, discuss the implications of contraceptive use for health and wellbeing in the community, and question their own contraception-related values and beliefs. The African Transformation (AT) program (based on the Arab Women Speak Out program) is an effective community-based intervention that program planners could adapt to address sensitive issues such as contraceptive use, change negative social norms and promote health-protective attitudes and behaviors [28,29]. The AT program involves the use to videotaped stories of ordinary men and women who have overcome significant odds and are exhibiting the desired health-protective attitudes and behaviors. The videotapes are then used in small group settings to guide discussions of sensitive issues among community members [28].

This study has some limitations that deserve mention. The cross-sectional nature of the data precludes any attempt at causal inference. The relationships reported in this manuscript are mere associations. Nonetheless, the large sample size, analytic methods (multivariable and multilevel) employed, and the magnitude of the documented relationships indicates that the findings are relevant for determining programmatic actions. Another limitation of the study is the ideation score is based on self-reported data. It is however pertinent to note that researchers took appropriate steps during data collection to strengthen the validity of the responses and minimize the effects of social desirability, including appropriate training for data collectors, interviews conducted in private locations without the presence of third parties, and assurance to participants that the responses would not be shared with third parties.

In conclusion, the results of this study echo some of the findings regarding the correlates of contraceptive ideation among women. Significant correlates of ideation operate at the individual, household, and community levels. The findings underscore the need for a

comprehensive strategy that includes communication and other behavior change activities tailored to the needs of specific groups of men. A key component of this comprehensive strategy should be community-level interventions designed to mobilize community members and change social norms that hinder the spread of ideational characteristics that favor contraceptive use.

References

[1]. National Population Commission (NPC) and ICF International. Nigeria Demographic and Health Survey 2013: Preliminary report. Calverton, MD: NPC & ICF; 2013.

[2]. World Health Organization Trends in maternal mortality: 1990 to 2010: WHO, UNICEF, UNFPA and The World Bank estimates. Geneva: World Health Organization; 2012

[3]. National Population Commission (NPC) [Nigeria] and ICF Macro. Nigeria Demographic and Health Survey 2008. Abuja, Nigeria: National Population Commission and ICF Macro; 2009

[4]. Miller W, Severy L, Pasta D. A framework for modelling fertility motivation in couples. Popul Stud 2004;58(2),193–205.

[5]. Greene ME, Biddlecom AE. Absent and Problematic Men: Demographic Accounts of Male Reproductive Roles. Popul Dev Rev 2000;26(1):81–115

[6]. Bankole A, Singh S. Couples' fertility and contraceptive decision-making in developing countries: hearing the man's voice. Int Fam Plan Perspect 1998;24(1):15–24.

[7]. Greene M, Mehta M, Pulerwitz J, Wulf D, Bankole A., Singh S. Involving men in reproductive health: Contributions to development. Background paper prepared for the UN Millennium Project to contribute to the report Public Choices, Private Decisions: Sexual and Reproductive Health and the Millennium Development Goals. Millennium Project; 2006.

[8]. Shattuck D, Kerner B, Gilles K, Hartmann M, Ng'ombe T, Guest G. Encouraging contraceptive uptake by motivating men to communicate about family planning: The Malawi Male Motivator project. Am J Public Health 2001;101(6).

[9]. Kincaid DL. Social networks, ideation, and contraceptive behavior in Bangladesh: A longitudinal analysis. Soc Sci Med 2000;50(2):215–231. [PubMed: 10619691]

[10]. Samandari G, Speizer IS, O'Connell K. The role of social support and parity on contraceptive use in Cambodia. Int Fam Plan Perspect 2010;36(3):122–131.

[11]. Kaggwa EB, Diop N, Storey JD. The role of individual and community normative factors: A multilevel analysis of contraceptive use among women in union in Mali. Int Fam Plan Perspect 2008;34(2):79–88. [PubMed: 18644759]

[12]. Ryan S, Franzetta K, Manlove J. Knowledge, perceptions, and motivations for contraception: Influence on teens' contraceptive consistency. Youth Soc 2007; 39(2),182–208.

[13]. Bajwa SK, Bajwa SJS, Ghai GK, Singh K, Singh N. Knowledge, attitudes, beliefs, and perception of the north indian population toward adoption of contraceptive practices. Asia Pac J Public Health 2012;24(6):1002–1012 [PubMed: 21807625]

[14]. Babalola S, Vondrasek C, Brown J, Traoré R. The impact of a regional family planning service promotion initiative in sub-Saharan Africa: Evidence from Cameroon. Int Fam Plan Perspect 2001;27(4):186–216.

[15]. Kincaid DL. Mass Media, Ideation, and Behavior: A Longitudinal Analysis of Contraceptive Change in the Philippines. Communic Res 2000;27(6);723–763

[16]. Measurement, Learning & Evaluation (MLE) Project; National Population Council (NPC). Measurement, Learning & Evaluation of the Urban Reproductive Health Initiative: Nigeria, 2012 Midterm Survey [TWP 2–2013]. Chapel Hill, NC, USA: Measurement, Learning & Evaluation Project; 2013

[17]. Maas CJ, Hox JJ. Sufficient sample sizes for multilevel modeling. Methodology (Gott) 2005;1(3): 86–92.

[18]. Clarke P, Wheaton B. (2007). Addressing data sparseness in contextual population research: Using cluster analysis to create synthetic neighborhoods. Sociol Methods Res 2007;35(3);311–351.

[19]. Figueroa ME, Kincaid DL. Social, Cultural and Behavioral Correlates of Household Water Treatment and Storage Center Publication HCI 2010–1: Health Communication Insights, Baltimore: Johns Hopkins Bloomberg School of Public Health, Center for Communication Programs; 2010.

[20]. Babalola S, Brasington A, Agbasimalo A, Helland A, Nwanguma E, Onah N. Impact of a communication programme on female genital cutting in eastern Nigeria. Trop Med Int Health 2006;11(10);1594–1603. [PubMed: 17002734]

[21]. Blake M, Babalola S. "Impact of a Male Motivation Campaign on Family Planning Ideation and Practice in Guinea," Field Report No. 13. Baltimore: Johns Hopkins University Bloomberg School of Public Health, Center for Communication Programs; 2002

[22]. Agadjanian V, Scott TY, Lubayna F. "History, community milieu, and Christian-Muslim differentials in contraceptive use in sub-Saharan Africa," J Sci Study Relig 2009:48(3);462–479

[23]. Adebayo SB, Gayawan E, Ujuju C, Ankomah A. Modelling geographical variations and determinants of use of modern family planning methods among women of reproductive age in Nigeria. J Biosoc Sci 2013;45(1);57–77 [PubMed: 22739073]

[24]. Bankole A, Sedgh G, Okonofua F, Imarhiagbe C, Hussain R, Wulf D. Barriers to safe motherhood in Nigeria. Washington DC: Guttmacher Institute; 2009.

[25]. Decker M, Constantine NA. Factors associated with contraceptive use in Angola. Afr J Reprod Health 2011;15(4):68–77 [PubMed: 22571108]

[26]. Nanda G, Schuler SR, Lenzi R. The influence of gender attitudes on contraceptive use in Tanzania: new evidence using husbands' and wives' survey data. J Biosoc Sci 2013;45(3): 331–344 [PubMed: 23312349]

[27]. Farid H, Siddique SM, Bachmann G, Janevic T, Pichika A. (2013). Practice of and attitudes towards family planning among south Asian American immigrants. Contraception 2013;88(4): 518–522. [PubMed: 23643155]

[28]. Underwood C, Brown J, Sherard D, Tushabe B, Abdur-Rahman A. (2011). Reconstructing gender norms through ritual communication: a study of African Transformation. J Commun 2011;61(2):197–218.

[29]. Jabre B Arab women speak out to create an environment for self-empowerment. Communication World 2003;20(4):54–55.

Synopsis:

Significant factors that predict the contraceptive ideation of urban Nigerian men include: exposure to family planning promotion campaigns, education, age, religion, marital status and community norms.

Table 1:

Items used to compute the score for contraceptive use ideation

1.	Aware of female sterilization
2.	Aware of male sterilization
3.	Aware of oral pill
4.	Aware of IUD
5.	Aware of injectables
6.	Aware of implants
7.	Aware of female condom
8.	Aware of LAM
9.	Level of disagreement with the statement that use of contraceptive injection can make a woman permanently infertile
10.	Level of disagreement with the statement that people who use FP end up with health problems
11.	Level of disagreement with the statement that contraceptives reduce women's sexual urge
12.	Level of disagreement with the statement that contraceptives can cause cancer
13.	Level of disagreement with the statement that contraceptives can lead to deformed babies
14.	Level of disagreement with the statement that contraceptive are dangerous to women's health
15.	Level of disagreement with the statement that women who use FP may become promiscuous
16.	Approve that government officials should speak openly in favor of FP
17.	Perceived self-efficacy to start a conversation with partner about FP
18.	Perceived self-efficacy to convince partner that they should use FP
19.	Perceived self-efficacy to get to a place where FP offered if he decided to use
20.	Perceived self-efficacy to obtain FP if he decided to use
21.	Perceived self-efficacy to use FP even if partner opposed use
22.	Perceived self-efficacy to use FP even if none of his friends/neighbors used
23.	Perceived self-efficacy to use FP even if religious leader did not think that he should
24.	Discussed contraceptive use with partner during the last 6 months
25.	Approved of FP

Table 2:

Descriptive statistics of selected socio-demographic and other characteristics of the respondents, Ibadan and Kaduna, Nigeria, 2012. (n=2341)[1]

Variable	n	Unweighted average/%	Weighted average/%
Level of exposure to NURHI communication programs	363	15.5	15.9
Zero	651	27.8	27.7
Low	635	27.1	26,2
Medium	692	29.6	30.2
High			
Education	136	5.8	5.1
None	238	10.2	11.0
Primary	1221	52.2	53.0
Secondary	746	31.8	30.9
Post-secondary			
Religion	989	48.0	46.4
Christians	1352	52.0	53.6
Moslem			
Marital Status	983	42.0	41.4
Never married	1315	56.2	57.0
Currently married/cohabiting	43	1.8	1.6
Divorced/Widowed/Separated			
Employment Status	1808	77.2	78.4
Worked during last 12 months	533	22.8	21.6
Did not work during last 12 months			
Household socio-economic status	455	19.4	19.8
Very poor	424	18.1	20.5
Poor	467	20.0	19.9
Medium	468	20.0	20.3
Rich	527	22.5	19.4
Very rich			
City of Residence	1218	52.0	52.4
Ibadan	1123	48.0	47.6
Kaduna			
Average age in years (95% CI)	2341	33.2	33.1 (32.4, 33.9)
Average number of children-ever-born (95% CI)	2341	2.2	2.3 (2.0, 2.6)
Average media saturation in community (EA) of residence (95% CI) (range: 0-3)	2341	1.77	1.79 (1.71, 1.87)

Six men who were neither Moslem nor Christian were excluded for statistical reasons. Additionally, 11 men who lived in clusters with fewer than 10 subjects were also excluded from the analysis.

Table 3:

Mean score for contraceptive ideation by selected socio-demographic and other characteristics of the respondents, Ibadan and Kaduna, Nigeria, 2012

Variable	Mean score	95% CI	F[1]/p

Level of exposure to NURHI communication programs
  Zero (RC)
  Low
  Medium
  High
	47.8
	48.5
	50.1
	52.1
		46.0, 49.5
		47.4, 49.5
		49.0, 51.2
		50.9, 53.1
			22.8/ <.001

Education
  None
  Primary
  Secondary
  Post-secondary
	42.9
	49.4
	49.2
	52.4
		40.4, 45.3
		47.5, 51.2
		48.3, 50.2
		51.4, 533
			53.5 / <0.001

Religion
  Christians
  Moslem
	52.1
	48.0
		51.3, 52.8
		46.9, 49.2
			49.8 / <0.001

Marital Status
  Never married
  Currently married/cohabiting
  Divorces/Widowed/Separated
	48.6
	50.9
	44.5
		47.6, 49.7
		50.0, 51.9
		39.7, 49.3
			7.8 / <0.01

Employment Status
  Worked during last 12 months
  Did not work during last 12 months
	50.3
	48.5
		49.3, 51.2
		47.3, 49.7
			9.9 / <0.01

Age group
  15 – 34 years
  35 – 59 years
	49.1
	50.9
		47.2, 50.1
		49.9, 51.9
			15.1 / <0.001

Children-ever-born
  None
  At least one
	48.5
	51.0
		47.4, 49.5
		50.1, 52.0
			31.8 / <0.001

Household socio-economic status
  Very poor
  Poor
  Medium
  Rich
  Very rich
	47.2
	49.8
	49.4
	51.4
	51.6
		45.8, 48.5
		48.4, 51.3
		48.1, 50.8
		50.2, 52.5
		50.2, 53.0
			21.6 / <0.001

City of Residence
  Ibadan
  Kaduna
	51.8
	47.8
		50.8, 52.8
		46.5, 49.2
			21.8 / <0.001

All respondents	49.9	49.0, 50.8	---
Number of observations		2341	

Notes:

[1]For the difference of means between the category with the largest score and the category with the lowest score

Table 4:

Results of the multilevel estimation of the factors associated with contraceptive ideation in Ibadan and Kaduna, Nigeria, 2012

Variable	Model 0[1]	Model 1[2]	Model 2[3]
Fixed Effects			
Level of exposure to NURHI communication programs 　Zero (RC) 　Low 　Medium 　High	---	0.00 0.874 2.137 *** 3.379 ***	0.00 0.881 2.150 ** 3.413 ***
Current age in years	---	0.236 *	0.254 *
Square of age	---	−0.003 *	−0.003 *
Education 　None (RC) 　Primary 　Secondary 　Post-secondary	---	0.00 4.402 *** 5.234 *** 6.703 ***	0.00 4.411 *** 5.269 *** 6.737 ***
Marital Status 　Never married (RC) 　Currently married/cohabiting 　Divorces/Widowed/Separated	---	0.00 1.584 ** −1.203	0.00 1.623 ** −1.208
Employment Status 　Did not work during last 12 months (RC) 　Worked during last 12 months	---	0.00 −0.320	0.00 −0.341
Religion 　Christian 　Muslim	---	0.00 −1.838 ***	0.00 −1.733 ***
Children-ever-born	---	−0.083	−0.075
Household socio-economic status 　Very poor 　Poor 　Medium 　Rich 　Very rich (RC)	---	−1.542 * −0.181 −0.276 0.650 0.00	−1.463 * −0.085 −0.195 0.698 0.00
City of Residence 　Ibadan 　Kaduna		0.00 −4.394 ***	0.00 −6.396 ***
Media saturation in community (EA) of residence	---	---	1.222 *
Random Effects			
Community-level variance (SE)	22.71 *** (3.34)	12.64 *** (1.81)	12.62 *** (1.88)
Proportional change in variance[4]	---	44.4%	44.4%
Intra-class correlation	24.8%	16.9%	16.8%
AIC	16825.5	16546.2	16543.9
Number of groups	113	113	113
Average group size	20.7	20.7	20.7
Number of observations	2341	2341	2341

Notes:

*
p<0.05

**
p<0.01

***
p<0.001

1
Empty model without covariates

2
Model with individual, household and city-level measured variables

3
Full model with individual, household, city-level measured variables and EA compositional variable

4
Compared to the empty model; RC- Reference category