REPRODUCTIVE HEALTH AND FAMILY PLANNING BEHAVIOUR IN NORTH WEST NIGERIA: EFFECTS OF A HAUSA LANGUAGE RADIO DRAMA

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Abstract

Contraceptive prevalence (CPR) in North West Nigeria is the lowest in the country coinciding with high fertility driven primarily by large family ideation. Research shows that communication about family planning, especially between spouses/partners leads to adoption of a modern method of contraception. To promote spouse and partner communication and to increase family planning use, an entertainment-education radio serial drama was broadcast featuring characters that modelled how to discuss having smaller families, birth spacing, contraceptive use, and maternal and child health. A post-test representative survey of 649 participants found that 71 percent listened to the programme each week. Multivariate analysis found that regular listeners were 2.4 (95% CI 1.4, 4.3) times more likely than non-listeners to say they "currently use something to delay or avoid pregnancy." On several other behavioural and attitudinal indicators, results showed that regular listeners to the programme had more favourable scores than non-listeners to the programme.

Keywords: *reproductive health, family planning ideation, contraceptive use, maternal health; women's empowerment; long-running radio drama, entertainment-education*

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Introduction

Nigeria is the most populous country in Africa, and this is in part due to its high fertility. In 2007, at the inception of the programme intervention described in this paper, Nigeria had the world's eighth largest population. Its population of 144 million that year was projected to increase to 282 million by 2050. The average level of fertility among Nigerian women aged 15-49, as measured by total fertility rate (TFR) in 2008 was 5.7 (NPC [Nigeria] and ICF Macro 2009) but within this overall figure there are regional variations. TFR is highest in the North West region (7.3) and lowest in the South West at 4.5 (NPC [Nigeria] and ICF Macro 2009). The importance of age at first marriage, and in turn, onset of childbearing as proximate determinants of fertility, is well researched (Bongaarts 1978; NPC and ICF International 2014; Westoff 1992). In 2008, the median age at first marriage for women aged 25-49 was lowest in the North West region, at 15.1. By comparison, the figure was 18.1 in the North East region and highest in the South East, at 22.8 (NPC [Nigeria] and ICF Macro 2009). Marrying early, especially when combined with closely spaced births, has a negative impact on the health of the mother and child.

Similarly, childbearing starts early in the North West. According to the same source, median age at first childbirth for women age 25-49 in the North West was second lowest (18.3) when comparing the six geopolitical zones with the highest in the South East (23.6). Use of contraceptives among married women of reproductive age (15-49) can both lower TFR and help parous women implement healthy birth spacing; however in 2008 the CPR in the North West was as low as 2.8 percent versus 31.7 percent in the South West and the national average of 9.7 percent (NPC [Nigeria] and ICF Macro 2009). Thus, the reported high levels of negative sexual and reproductive health outcomes among men and women of reproductive age residing in this Nigerian zone (Bankole 1994; Bankole et al. 1996) is not surprising.

Ideation factors related to family planning, reproductive health, and women's empowerment have been identified as driving the observed high TFR and low contraceptive use. One of these ideation factors is ideal family size. The number of children desired is a reflection of fertility norms of a society, the demand for children, and ultimately contraceptive use. In 2008, the mean ideal number of children for Nigerian women aged 15-49 was 6.1 but 8.0 in the North West region. Feyisetan and Casterline (2000) noted that women in the North West are more inclined to use contaceptives for spacing. This statement is

supported by the 2008 Nigeria DHS that shows demand for spacing was 23.8 percent nationally compared to 19.5 percent in the North West (NPC [Nigeria] and ICF Macro 2009). Since spacing has less impact on fertility than limiting, this partlially explains the high fertility in that region of Nigeria. Several other reasons for non-use of family planning in Nigeria include "perceived lack of need for contraception, fear of side effects and opposition to contraception on personal, spousal or religious grounds" (Sedgh et al. 2006).

Studies have also found that gender norms, asymmetric gender roles, and low levels of women's empowerment have contributed to the strong forces driving the low use of contraception in the North West region of Nigeria (Kritz et al. 2000) and the rest of the developing world (Agyeman and Casterline 2002; Blanc 2001; Gage 1995; Mason 1997; Mason 1993; Mason and Smith 2000). Cleland and colleagues (2006) highlight the human rights perspective for gender equality and its link to reproductive health by noting "Freeing women from involuntary reproduction was one of the main inspirations for family planning pioneers 100 years ago and remains just as relevant today…..and remains the most important step towards the achievement of gender equality ….".

Theoretical Framework: Ideation, Entertainment-Education and Reproductive Behaviour

The importance of ideation processes in influencing the adoption of contraception in recent fertility transitions is well documented. The role of ideation theory, as an alternative theory in explaining contemporary fertility in developing countries came into prominence due to the lack of evidence supporting conventional demographic transition theory as the main force behind fertility declines globally. Demographic transition theory has not fully explained the historical fertility decline in Europe (Coale and Watkins 1986; Knodel and van de Walle 1979), the fertility declines in Asia and Latin America, and more recently the incipient declines in sub-Saharan Africa (Caldwell and Caldwell 1992; Cleland 1985; Hirschman 1994; Kirk 1996). This alternative theory, sometimes referred to as diffusion of innovations/diffusion of fertility decline theory, is defined as new ways of thinking (Cleland 1985; Cleland and Wilson 1987; Freedman 1987; Tsui 1985) that spread across individuals, social groups, and regions, or diffuse within a culture by means of social influence or social interaction (Bongaarts and Watkins 1996; Montgomery and Casterline 1996; Rosero-Bixby and Casterline 1993). Thus, close and constant interactions across individuals, groups, and networks provide the catalyst for the diffusion of new ideas (Bongaarts and Watkins 1996; Montgomery and Casterline 1996). The spread of these novel ideas in turn leads women and men to begin to find legitimacy in them, internalise them and ultimately align their behaviour, preferences, and attitudes with those of the group.

Findings from extensive behaviour change entertainment-education (EE) research corroborates the theoretical association between radio dramas using EE and ideational changes in family planning and reproductive health (Babalola et al. 2008; Bankole et al. 1996; Barker 2012; Bertrand and Anhang 2006; Kane et al. 1998; Meekers et al. 2007; Nariman 1993; Piotrow et al. 1997; Rogers 1995; Rogers et al. 1999; Ryerson 2010; Singhal 2004; Smith et al. 2007; Vaughan and Rogers 2000; Westoff and Bankole 1997).

Population Media Center (PMC) is a US-based non-profit organisation working in the US and the developing world to promote positive change in family planning, reproductive health, and other social issues. PMC uses a unique type of EE that is based on an integrated contextual multi-disciplinary theoretical framework that uses the long-running serial drama format broadcast via radio, TV, and more recently other social media. A long-running format leads to audience behaviour change because it allows time for (1) audience members to identify with characters, (2) characters to change their own attitudes at a believable pace, and (3) audience members to test the attitudinal and behaviour changes themselves (Ryerson 2010). Each aspect of a drama is developed according to PMC's theory of change and an

empirical research-based formula in order to reinforce a coherent set of interrelated values that is tied to specific prosocial behaviours. PMC's change theory is informed by Social Cognitive Theory (SCT) and other theories in EE (Barker 2012; Sood 2004) via mediated role models who inspire increased confidence or self-efficacy to perform a specific behaviour. Not only can new behaviours be learned from such models, but many cognitive and affective responses to a behavioural situation can be learned as well (Bandura 1986).

The Nigerian government subscribes to UNFPA's objectives of improving reproductive health, and maternal and child health through the promotion of family planning. A framework to achieve these objectives is found in Nigeria's National Population Policy (NPC), one goal of which is to "promote behavioural change communication (BCC) programmes to increase reproductive and sexual health knowledge, awareness, and behavioural change among Nigerians" (NPC 2004).

Programme Development

To contribute to the Nigerian government's effort to achieve the targets set at the 1994 Cairo International Conference on Population and Development (ICPD), the Millennium Development Goals (MDGs) declared by 189 nations in 2000 at the United Nations Headquarters, New York, and UNFPA's objectives in the country, PMC established a Nigeria office and programme team that produced and broadcast a 208-episode radio serial drama[1], *Ruwan Dare*[2] in Hausa, the dominant language of the North West. The drama promoted and modelled ideational change, specifically spousal communication, birth spacing, contraceptive use, and smaller family size. Four states, Kaduna, Kano, Katsina, and Sokoto, in the highest fertility North West geopolitical zone[3] were identified as the targets for the broadcast.

PMC trained Hausa-speaking writers and radio producers in the use of the PMC's Methodology to create the drama. In line with PMC's research-oriented methodology and to inform the programme, a Nigerian research firm conducted formative research, beginning with a review of the literature and the country's policy framework on ideational processes that influence family planning and reproductive attitudes and behaviours, with special emphasis where possible on North West Nigeria. The firm also conducted an infrastructure and media analysis that identified family planning service points in the broadcast area.

The formative research also identified media habits and ideal listening times of potential audience members and included a pre-test of preliminary versions of the first four episodes of the drama. Audience research in the form of qualitative focus groups and individual in-depth interviews was conducted within the community to identify reproductive health and family planning ideation processes of concern and to assess potential audience members' attitudes towards these issues. Thus, the formative research enabled the creative team to design appropriate, realistic, and credible characters for the drama that featured

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[1] Radio is the most widely consumed media in Nigeria because of its accessibility and affordability, and is the optimal channel for family planning messages. In the North West 70 percent of households own a radio and this medium is cited most frequently as a source of family planning messages for both women (19.8 percent) and men (27.1 percent). (NPC and ICF International 2014)

[2] *Ruwan Dare* can be translated as "Midnight Rain" or "Midnight Dew" in Hausa. Writers created the title as a metaphor for the human interactions and activities that transpire in the late night (Okon 2011). Under this conceptual metaphor, the storyline and related characters presented both positive and negative views related to making key life decisions (See Appendix A) and modelled how to discuss sensitive issues such as birth spacing, contraceptives, family size, and how to seek prenatal care to promote maternal and child health.

[3] Nigeria comprises 36 states and a Federal Capital Territory (FCT) and is grouped into six geopolitical zones: North Central, North East, North West, South East, South South (or Niger Delta), and South West. A total of 774 local government areas (LGAs) are constitutionally recognized in the country.

discussion of reproductive and family planning issues. Local staff established a production advisory committee to assure high quality and appropriate content of the programme and set up listeners' clubs with male and female audience members in the four targeted North West states to provide ongoing feedback to the creative team.

Methods

A regionally representative endline cross-sectional survey was used to evaluate the impact of the drama. Women (15-49) and men (15-59) of reproductive age from urban and rural areas of Kaduna, Kano, Katsina, and Sokoto states in the North West geopolitical zone of Nigeria were interviewed for the study. The endline study was conducted in July of 2009, one week after broadcast of the last episode of the drama.

Sampling

A stratified two-stage cluster sampling method was employed to generate the study sample. The four broadcast states in the North West were considered the universal population to be surveyed. In the first stage, Local Government Areas (LGAs)[4] in the four states were sorted into eight strata defined by the intersection of state and urban-versus-rural status and five LGAs were sampled from each of the eight strata with equal probability totalling 40 LGAs in the sample. These formed the first stage "clusters" and became the primary sampling unit (PSU) for the study. In the second stage, within each LGA cluster, systematic random sampling was used to select households. In each cluster, enumerators conducted a complete household listing operation in anticipation of achieving a fixed sample take of 20 households per cluster. Once this was completed fieldwork commenced with enumerators approaching the single starting household in the cluster and continuing to the next identified household. An inter-household gap of 3 houses in rural areas and 6 houses in urban areas was established to assure randomness and to make the data collection relatively widespread within each urban and rural cluster.

Selection of individuals within households was also conducted systematically with an *a priori* probability of selection skewed 60 percent female and 40 percent male. This was facilitated by utilising six female interviewers and four male interviewers. Because the North West region is primarily Muslim, men and women customarily do not interact in a situation such as an interview, thus male enumerators interviewed males and female enumerators interviewed females for the study. To select females for an interview, female enumerators approached the selected house and asked for the first wife of the household. If that individual was not available, a request was made to interview the second wife and so on. If an eligible female was not available for the interview at that time, an appointment was made to return to the house for a second attempted interview. To select males for an interview, male enumerators asked for the male head of the household. If that individual was not available, a request was made to interview the oldest eligible male resident. If an eligible male was not available at that time, an appointment was made to return to the house for a second attempted interview. Using this systematic approach, interviews continued (with a maximum of three attempts) and enumerators followed instructions to satisfy the 6 to 4 female to male ratio in the field.

Selection Probability

In each surveyed state, the probability (P) of a Local Government Area (*lg*) being selected was done

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[4] The rural-urban delineation of LGAs in each state was determined using the following criteria: rural LGAs comprise villages and small settlements situated away from the cities; they have few, low-level, none or dilapidated infrastructure facilities in health services, education and transportation. They are also far away from large-scale markets and other amenities that operate daily. Urban LGAs are defined as the opposite of the rural definition.

according to the following formula: Plg = (a/A), where **a** is the total number of LGAs selected and A represents the total number of LGAs in the state. Regarding the selection of participants and based on the 60-40 ratio in favour of females, the final individual probability of the **i-th** respondent selected could be estimated as follows: Pi = (r$_i$/R)*0.4 for a male respondent and Pi = (r$_i$/R)*\0.6 for a female, where r is the specific participant and R stands for the total number of participants selected in the LGA.

Survey Implementation

Prior to the fieldwork, training was conducted for enumerators and supervisors on the protocol for implementing the survey. The training included asking questions in English, translating questions into Hausa and back translating into English to ensure accuracy and consistency. Training of male and female enumerators stressed the need to pay attention to courtesy, confidentiality, and to the sensitivities, culture, religion, and values of participants. The Centre for Reproductive Health and Development Research (CEDER) and the Department of Economics, Faculty of Social Management Sciences at Kaduna State University in Nigeria conducted the project evaluation. Data entry and management was done using SPSS Version 12.

Measures

Face to face interviews were conducted with the sampled participants using standardized items from the Nigeria Demographic and Health Surveys (DHS) relevant to the drama as well as an "exposure module" to establish listenership status of *Ruwan Dare.* In line with ideation theory and PMC's theory of change, our measures of ideation included knowledge, attitudinal, and behavioural measures of family planning and reproductive health, as presented below. Because we used logistic regression in our estimations our dependent and independent measures were dichotomized, with "1" being the estimated outcome and "0" being the reference; similarly control measures were either dichotomised or categorised.

Independent Variable

We established "regular listener" to the drama as the main independent variable for the study. To capture this, participants were asked "Have you ever heard about the radio serial drama *Ruwan Dare*?" Those participants that indicated "Yes" were then asked "Have you ever listened to one or more episodes of the radio serial drama *Ruwan Dare*?" Those saying "Yes" were asked "How often did you listen to the drama *Ruwan Dare* each week?" with three as the maximum number of episodes.[5] "Regular listeners" were categorised as participants that listened to one or more episodes per week. "Non-listeners" were categorised as either those that never listened to the drama or who did not listen weekly.

Dependent variables

For the study we examined dependent variables that both aligned well with prominent storylines and character role modelling in the drama and that reflect measures of ideation. These included 3 behavioural, 11 attitudinal, and 2 knowledge outcomes relating to family planning and reproductive health for a total of 16 outcome variables.

    Behavioural Variables:- To assess behaviour change as a result of the programme we included the following three variables in the survey: 1. Current use of family planning asked participants "Are you currently using something to delay or avoid pregnancy?", 2. Discussion of family planning with others asked participants "In the last 3 months, have you discussed the practice of family planning with your

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[5] The programme aired twice per week from July 2007 to October 2008, then three times per week until July 2009.

family, friends, or neighbours?", and 3. <u>Frequency of discussion of family planning with spouse/partner</u> asked: "How often have you talked to your husband (or wife)/partner about family planning in the last 3 months?" with response categories "never", "once or twice", and "more often". For this variable we coded the negative response category "never" as 0 and combined the response categories "once", "twice", and "more often" for the outcome response and coded it 1.

Attitudinal Variables:- *Family Planning and Reproductive Health*. These attitudinal variables were used to assess programme outcomes. The first three included attitudinal statements presented to participants: 1. <u>Spacing births</u>: "Couples should space their children at least 2.5 to 3 years apart", 2. <u>Couples sharing responsibility for family planning</u>: "Couples should share responsibility for making family planning decisions", and 3. <u>Attitude toward family planning</u>: "People should plan how many children they have", all with response categories "agree" or "disagree". 4. <u>Attitude toward closely spaced pregnancies asked</u> "Can becoming pregnant every year put the health of the mother at risk?". 5. For the variable <u>mean ideal number of children</u> (intended to measure ideal desired family size) participants with children were asked "If you could go back to the time when you did not have any children and could choose exactly the number of children to have in your whole life, how many would that be?" and participants without children were asked: "If you could choose exactly the number of children to have in your whole life, how many would that be?" Both items had numeric response categories. 6. To assess <u>attitude toward contraception</u> in the context of a highly religious Muslim population in the North West of Nigeria, we asked "Is using contraception against the will of Allah/God?" 7. Lastly, we assessed attitude toward <u>educating children about the use of condoms to prevent HIV</u> by asking "Should children age 12-14 be taught about using a condom to avoid HIV/AIDS?"

Attitudinal Variables: Women's Empowerment and Reproductive Health. Four attitudinal statements focusing on women's empowerment as it relates to reproductive health were also included in the survey: 1. <u>Attitude toward ideal age of marriage</u> asked participants "What do you consider to be the ideal marriage age for a female?" with a numeric category as the response. The next series of items provided statements related to opinions about <u>a wife refusing to have sex with her husband</u>: "Please tell me if you think a wife is justified in refusing to have sex with her husband when: a. She knows her husband has a sexually transmitted infection, b. She knows her husband has sex with women other than his wives, and c. She is tired or not in the mood?" The latter three all used "yes" or "no" as response categories.

Knowledge Variables: Source of Family Planning and AIDS prevention. The final two indicators assessed 1. <u>Knowledge of a place to get family planning</u> and asked: "Do you know of a place where you can obtain a method of family planning?" and 2. <u>Knowledge of reducing risk of HIV/AIDS by using a condom that asked</u>: "Can people reduce their chances of getting the AIDS virus by using a condom every time?"

Control variables

People who reside in urban areas and who have higher educational attainment tend to be more oriented toward ideational changes regarding family planning and reproductive health. Marital status, age, sex, and urban/rural location can obscure the association between ideation and mass media. Accordingly, our analyses controlled for these five important correlates of family planning ideation (Table 1).

Analysis

We undertook an analysis strategy that aimed to understand the effects of "regular listenership" to the drama on the 16 dependent variables controlling for demographic co-variables. Given the complexity of the study's data collection design (i.e., two-stage sampling as opposed to simple random sampling), it was

necessary to utilise statistical procedures capable of accounting for the stratification of states and clustering in the two sampling stages. The use of a Complex Sampling procedure was made even more imperative by the fact that all the clusters in the four states were sampled with equal probability. The Complex Samples module in SPSS (Version 22) allows one to incorporate complex design specifications into different types of data analysis (e.g., descriptive analysis and logistic regression), thereby enhancing the accuracy of generated standard errors and validity of results[6].

Sample weights

Because our sample was selected with equal probability regardless of LGA size, we applied sample weights to adjust for differences in this selection probability and to make the sample representative of the population of the four states under study in the North West. The individual weight of a participant's case in the sample is derived from the product of the household weight and the inverse of the participant response rate based on his/her individual response rate group. Specifically, the inclusion at each stage is the proportion of the units sampled; the overall inclusion probability is the product of each of the stage-wise inclusion probabilities; and the final sampling weight is the reciprocal of this product as illustrated below:

$$1/Pi = (1/ni)*(nj/NJ)*5/NK)$$

Where Pi is the individual sample weight, ni is the number of eligible individuals within the i-th person's household; nj is the number of households sampled in the j-th LGA; NJ is the total number of households in the j-th LGA; and NK is the number of LGAs within the k-th stratum.

Having created sample weights, the data were then processed using Complex Samples procedures. Statistical comparisons using chi-square and multivariate logistic regression methods were made between regular listeners and non-listeners on the dependent variables to identify any changes among the audience. Statistics for regular listenership were used in conjunction with the 2006 state level census estimates for Nigeria (NPC 2007) for age adjustments to estimate the audience size for the programme, cost of listenership, and cost per behaviour change.

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[6] The dataset that was originally constructed during the programme evaluation did not contain sample weights and some of the design variables. In order to ensure the computation of accurate variance estimates under the Complex Samples procedures, we had to create a Complex Sample analysis plan that specified the structure of the sampling, estimation methods for each sampling stage, inclusion probabilities of sampled clusters and sample weights. Based on the sampling design information received from our data collection researchers, we were able to satisfy these requirements in two steps, namely 1) Computing the inclusion probabilities of the units at different sampling stages and the sampling weights; 2) Creating an analysis plan, which includes three sub-steps. The first step to creating an analysis plan is to compute the sampling stage-wise inclusion probabilities and sampling weights. For this study purposes, we considered calculating inclusion probabilities at two stages: the LGA level and the household level, which in turn allowed us to calculate sample weights. In the second step, we created an analysis plan by first specifying the design variables considered under step 1 and using the four North West states as strata for variance estimation, followed by the selection of an estimation method consistent with the sampling design, and finally specifying the inclusion probabilities calculated in step 1.

Table 1: Percentage (and mean values) of Participants' Background Characteristics (covariates) by Regular Listeners and non-Listeners, Ruwan Dare 2007, North West Nigeria

	Non-listeners (%)	Regular listeners (%)	Total (% or mean)
Independent Variable (Listenership)	28.6 (ref)	71.4	100
		Sample size	
	193	456	649
Covariates (Demographic characteristics)			
Mean age	35.6	34.8	35.0
Age in completed years (%)			
45-59	16.0	9.4	11.2
30-44	46.8	56.8	54.0
15-29 (ref)	37.2	33.9	34.3
Sex			
Male	45.2	44.7	44.8
Female (ref)	54.8	55.3	55.1
Current marital status			
Married/cohabiting	76.4	90.1***	86.3
Not married or in union (ref)	23.6	9.9	13.7
Education			
Higher	33.2	25.6	27.7
Secondary	24.1	26.7	26
Primary	16.3	23.4	21.4
None (ref)	26.5	24.2	24.9
First language			
Hausa	66.4	90.4***	83.2
Other (ref)	33.6	9.6	16.7
Region of residence (ns)			
Urban	54.8	58.9	57.7
Rural (ref)	45.2	41.1	42.3

***Differences significant at $p \leq .001$

Results

Of a possible 793 participants drawn for the sample, 649 completed the survey for a response rate of 82 percent. While the sampling strategy targeted 60 percent of participants to be female and 40 percent to be male, the final sample achieved after fieldwork resulted in a 55/45 ratio of females to males. Characteristics of the participants reveal that the majority (54 percent) of the sample is in their prime adult reproductive years (30-44); 34 percent are in their youth or early adulthood (15-29), and 11 percent fall under the later adult or post-reproductive years (45-59); and 86 percent of the participants are either married or cohabiting. One quarter (25 percent) have no formal education while more than half (54 percent) are educated at the secondary (26 percent) or higher (28 percent) levels, while 21 percent have a primary school education. Fifty-eight percent reside in urban areas (Table 1).

More than seven out of ten (71 percent) participants in the four target states reported regularly listening to *Ruwan Dare* one or more times per week, with slight gender differences (females - 72 percent, males 71 - percent). The show was popular with regular listeners who were married/cohabitating and whose first language is Hausa. On t-test analysis we found significant differences between regular listeners and non-listeners on both of these demographic variables at the p<.001 level (Table 1). This is understandable given that the show was recorded and performed in Hausa and targeted married and sexually active individuals. There were no other significant differences in characteristics between regular listeners and non-listeners in the sample.

On most of our ideation indicators, results found that participants that regularly listened to *Ruwan Dare* had more favourable scores (more so at the descriptive level than multivariate level) than those who did not listen regularly. For current use of family planning, a significantly higher percentage of regular listeners (61 percent) than non-listeners (39 percent) reported currently using some form of contraception to delay or avoid pregnancy, with no differences between females and males. Consistent with the descriptive evidence, multivariate results show that regular listeners were 2.4 (95% CI 1.4, 4.3) times

more likely than non-listeners to say they "currently use something to delay or avoid pregnancy." The impact of the drama on discussion of family planning with others was higher for regular listeners (55 percent) compared to non-listeners (37 percent). Multivariate results indicate that listeners were 1.7 (95% CI 1.0, 2.9) times more likely than non-listeners to say they had "discussed the practice of family planning with family members, friends, or neighbours in the past 3 months." While the variable discussion of family planning with spouse/partner showed a higher percentage of regular listeners (44 percent) than non-listeners (28 percent) multivariate results found no discernible difference between the two groups.

Table 2: Percentage of Participants' study outcomes (descriptive comparisons) and Multivariate Comparisons by Regular Listeners and Non-listeners, Ruwan Dare 2007-2009, North West Nigeria

		Descriptive Comparisons			Multivariate Comparisons of Listeners and Non-listeners	
		Non-listeners (%)	Regular listeners (%)	Total (%)	Adjusted odds ratio	95% confidence interval
Dependent Variables						
Behaviors						
Current use of family planning	Yes	39.3	60.8**	54.8	2.4**	1.4-4.3
Discuss FP with others	Yes	37.1	54.6**	49.8	1.7*	1.0-2.9
Discuss FP with spouse/partner	Yes	27.6	43.8**	39.2	1.5	0.8-2.7
Attitudes: Reproductive Health and Family Planning						
Couples should space their children 2.5-3.0 years	Agree	66.5	77.6*	74.3	2.6**	1.4-5.0
Couple should share responsibility for family planning	Agree	73.0	79.3	77.4	1.7#	0.9-3.3
Plan family size	Agree	61.1	67.1	65.3	1.4	0.8-2.7
Close pregnancies detrimental to mother's health	Yes	62.3	64.5	63.9	1.7#	0.9-3.2
Ideal family size	Mean	5.4	6.3	6.1		
	5 or Less	67.2	55.4	58.4	0.7	0.3-1.8
Using contraceptives is against Allah' will	No	44.8	47.8	47.0	1.2	0.7-2.1
Teach children about condoms to prevent AIDS	Yes	32.8	35.8	35.0	1.6	0.8-3.0
Attitudes: Reproductive Health (Women's Employment)						
Ideal marriage age	Mean	20.2	19.7	19.9		
	19 yrs or older	65.3	66.8	66.3	1.7*	1.0-2.9
Wife should refuse sex if husband has STDs	Yes	74.0	92.1***	86.7	7.5***	3.4-16.9
Wife should refuse sex if husband is unfaithful	Yes	70.5	89.3***	83.7	5.2***	2.5-11.0
Wife should refuse sex if she is tired/not in the mood (ns)	Yes	59.7	59.6	59.6	1.2	0.6-2.1
Knowledge						
Can AIDS risk be reduced by using condoms?	Yes	65.8	70.6	69.2	1.8*	1.0-3.4
Know source of FP (ns)	Yes	62.2	67.2	65.8	1.1	0.6-1.9

$p \leq .10$;* $p \leq .05$; **$p \leq .01$; ***$p \leq .001$; ns=not significant

The eight family planning (relating to reproductive health) attitudinal ideation variables showed mixed results; furthermore, they were not as strongly impacted relative to the behavioural indicators. More regular listeners (78 percent) than non-listeners (67 percent) agreed with the statement that "couples should space their children between 2.5 and 3 years" and on this indicator listeners were 2.6 (95% CI 1.4, 5.0) times more likely than non-listeners to think that "couples should space children 2.5 to 3 years." For the variables, "sharing responsibility for family planning" and "having close births", no significant differences were found between regular listeners and non-listeners. However, multivariate results showed an odds ratio of 1.7 in both cases, in favour of regular listeners when comparing the groups, but the

strength of the associations are of borderline significance (p<.10). The remaining four attitudinal variables were not impacted at all.

Results of the four attitudinal indicators of women's empowerment as it relates to reproductive health (bottom of Table 2) found mean ideal marriage age was approximately 20 years for the entire sample. To permit comparison of regular listeners with non-listeners on this indicator, we established a cut-off age of 19 years or older. Sixty seven percent of regular listeners and 65 percent of non-listeners considered the ideal marriage age for a woman to be 19 years and older but these differences are not statistically significant. Notwithstanding, the multivariate results on this indicator is statistically significant at the p<.05 level, underscoring the importance of controlling for differences in individual characteristics: regular listeners were 1.7 (95% CI 1.0, 2.9) times more likely than non-listeners to regard 19 years and older as the ideal marriage age for women (Table 2).

Two of the three remaining empowerment outcomes were strongly impacted by the programme. Ninety two percent of regular listeners compared with 74 percent of non-listeners think that "a wife is justified in refusing to have sex with her husband if he has a sexually transmitted infection." Further, the multivariate results showed that regular listeners were 7.5 (95% CI 3.4, 16.9) times more likely than non-listeners to think the same. Likewise, more regular listeners (89 percent) than non-listeners (71 percent) think that "a wife is justified in refusing to have sex with her husband if he has sex with women other than his wives, and based on the multivariate estimate, regular listeners were 5.2 (95% CI 2.5, 11.0) times more likely than non-listeners to think that "a wife is justified in refusing her husband sex if he has sex with women other than his wives".

On our knowledge indicators, the drama impacted only one of the two. Seventy one percent of regular listeners versus 66 percent of non-listeners think that condoms can reduce the risk of HIV/AIDS. Multivariate results found regular listeners were 1.8 (95% CI 1.0, 3.4) times more likely than non-listeners to know that regular use of condoms can help one reduce the risk of AIDS (Table 2). Yet, findings indicate that listeners to *Ruwan Dare* are no more likely than their counterpart non-listeners to know of a place to obtain family planning methods.

Programme Reach and Cost Effectiveness Analysis

To determine the reach of the programme, we used the 2007 state level census estimates for Nigeria (NPC 2007) and the 2008 Nigeria Demographic and Health Surveys to adjust our listenership levels according to the North West population age structure and radio listenership. Once these adjustments were made, it was estimated that approximately 12.2 million Nigerians (women: 15-49, men: 15-59) residing in the North West listened regularly to *Ruwan Dare*. This equals a cost of US .08 cents per listener. The cost per behaviour change per new adopter of family planning was $0.18[7].

Discussion

The results presented in this paper suggest that *Ruwan Dare,* a Hausa language EE radio serial drama targeting men and women of reproductive age in North West Nigeria, benefited regular listeners of the programme by influencing positive knowledge, attitudinal, and behaviour changes through ideation processes. Findings confirm the important role of the long-running PMC style drama on family planning and reproductive health ideation.

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[7] Cost per listener = total cost of programme divided by number of regular listeners. Cost per behaviour change = total cost of programme divided by estimated number of regular listeners adopting a family planning method divided by number of thematic areas showing behavioural impact.

Firstly, the increase in contraceptive use and the amount of discussion about family planning that took place among families, friends, or neighbours - both behavioural ideation outcomes - are notable. These two findings corroborate the theoretical literature on the positive role of ideation processes in family planning and reproductive health, especially through stimulating interpersonal and social-group discussions and social norms (Bongaarts and Watkins 1996; Papa et al. 2000).

Second, the findings are also consistent with research evidence elsewhere (Rogers et al. 1999) and from Nigeria (Bankole et al. 1996). Bankole and his co-authors (1996) concluded that contraceptive use and intention are positively associated with exposure to mass media messages.

Third, the behavioural findings highlight the effectiveness of the PMC Methodology, as is reflected in regular listeners (female and male) identifying strongly with both the female and male characters in the Azumi storyline. In this story, Azumi and Asibi, along with their respective husbands, struggle with difficult decisions about family size, family planning, and other reproductive health issues. Despite many obstacles, these characters were able to successfully model how to discuss sensitive issues such as whether or not to space births, to use contraceptives, and to ensure the health of the mother and child. Listeners, in turn, were able to weigh the positive and negative consequences of their actions and eventually adopt some of the positive behaviours and attitudes modelled for them.

Fourth, the evidence indicates that the programme had also shifted attitudes toward acceptability of family planning within the context of the Islamic culture in Nigeria's North West. This can be seen in the large and significant likelihood of those exposed to the drama, relative to those who were not exposed, agreeing with the spacing of births by couples, agreeing to the need for couples to share the responsibility for family planning, and recognizing the detrimental link between closely spaced pregnancies and maternal health; however, the latter two effects are weak.

Fifth, and consistent with existing theoretical and research evidence, our findings also indicate an important promising link between radio serial EE dramas and attitudinal factors surrounding women's empowerment and its link to reproductive health. Across all the study outcomes, the drama effects were strongest with respect to ideational changes regarding the women's empowerment outcomes, with those exposed to the drama being considerably more likely than those not exposed to agree that a wife should refuse having sex with her husband if she knows that he has STDs or is unfaithful.

Conversely, the reverse is observed for the last empowerment indicator: "A wife is justified in refusing to have sex with her husband when she is tired or not in the mood." This implies that the target audience and by extension the population of the four North West States in Nigeria do not consider a wife's "tiredness or not being in the mood" as justification for refusing to have sex with her husband. The fact that, unlike the first two of these three empowerment indicators, the programme did not alter the last indicator speaks to the difficulty of changing deeply held patriarchal or asymmetric gender views. *Ruwan Dare's* use of the PMC methodology, with its emphasis on honouring values and encouraging audience input throughout the programme, may have contributed to the observed shift in attitudes, especially those related to gender norms.

Furthermore, and conflicting with findings in Nigeria (Feyisetan 2000) and elsewhere in the developing world (Bawah 2002; Flink 2011; Meekers et al. 2007), discussion of family planning between spouses, although significant between listeners and non-listeners, showed no impact after comparisons using multivariate analysis. This suggests that a follow-on programme is needed in the North West zone of Nigeria to help couples overcome socio-cultural barriers to spousal/partner communication about family planning. Likewise, no drama effects were observed for the remaining family planning attitudinal outcomes: ideal family size, planning how many children to have, using contraceptives is against the will of Allah, and teaching children (age 12-14) about condom use for HIV prevention. Ideally, listeners who had adopted a method of family planning because of listening to the broadcast would also report wanting

fewer children and demonstrate anticipated effects on these three attitudinal/belief outcomes relating to family planning. Such a result would align along the continuum of behaviour change beginning with shifts in knowledge, attitudes/norms, and resulting in the adoption of a suite of related new behaviours validating ideation theory. However, this was not the case. One explanation for this is that listeners may have adopted a method of family planning in order to space births rather than to reduce family size; as portrayed in two storylines of *Ruwan Dare*, child spacing was emphasised as an excellent method to protect the health of the mother and child (and future children). The promotion of spacing was the entry point for widening the acceptability of family planning within a highly religious population, in which planning how many children to have or teaching children about the use of condoms for HIV prevention are unacceptable on religious grounds. Another explanation may be that other similar interventions aimed at increasing use of family planning may have influenced these scores. During the project period 2007-2009, both the Government of Nigeria and Rotary International had programmes promoting birth spacing and family planning in an effort to reduce maternal mortality and fistula in the North West states and those programmes may have had an influence on results of this study.[8]

Finally, because our findings show an increased level of regular listeners reporting discussing family planning with other groups (families, friends, and neighbours), non-listeners may have benefited from these discussions as well. An argument can be made that regular listeners discussed the programme and its issues with non-listeners and thus non-listeners' scores on the indicators were affected. This is in alignment with both the PMC methodology and the ideation/diffusion of innovations theory (Bongaarts and Watkins 1996; Montgomery and Casterline 1996; Montgomery et al. 2001; Rogers 2004; Rosero-Bixby and Casterline 1993; Singhal et al. 2004); although evidence for this possibility was not obtained because of the design of this study.

Limitations

There are several limitations to this study. First, data collected from participants are self-reported, including contraceptive use, sexual behaviour, and listenership and this may have introduced bias into the study. Second, for the evaluation of *Ruwan Dare*, it was not feasible to design the study using a randomized controlled trial within the context of a mass media radio broadcast in North West Nigeria. Instead the study used a cross-sectional endline survey representative of the four North West states, with two-stage cluster sampling design as a cost saving measure to select participants. There are several threats to validity with this research design, as described by Cook and Campbell (1979). Often, this type of sampling increases the variance of survey results, producing wider confidence intervals than methods such as simple random sampling (Dean et al. 1995). A second threat to validity is related to the sequencing of events leading to the possibility of reverse causation (Greene and Merrick 2005; Schultz 2005) or the difficulty of making causal inference (Moffitt 2003; 2005; Schultz 2005) because such data capture one moment in time and is insufficient to infer causal influence (Thornton 2001).

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[8] The Rotary Action Group for Population Growth and Sustainable Development (RFPD) initiated a pilot project from 2005-2010 in the North West states Kano and Kaduna. The programme, "Improvement of Maternal Health-Prevention and Treatment of Obstetric Fistula" introduced quality assurance in obstetrics in 10 hospitals. The programme, of which PMC was a partner included awareness efforts using multiple media and communication channels including radio, TV, town criers, billboards, public plays, and community dialogues. The Federal Government of Nigeria, in collaboration with the United Nations Population Fund (UNFPA) developed A National Strategic Framework Plan for Vesico Vaginal Fistula (VVF) Eradication that was implemented between 2005 and 2010. The goal of the plan was to eliminate obstetric fistula and thus improve the quality of life of women.
A birth spacing media campaign with the slogan "Well-spaced children are every parent's joy" was heard or seen by 11 percent of women in North West Nigeria during the PMC program.

Another threat to making accurate interpretation concerns selection and endogeneity bias (Axinn and Thornton 1992). As it relates to this research, it is uncertain whether it is listening to the drama that caused participants to adopt a method of family planning, or whether they were interested in and listened to the drama because they approve of or are using family planning, or whether the association is reciprocal (i.e., works in both ways). Nevertheless, comparing listeners and non-listeners as to their exposure experience while "controlling for background differences, provides researchers with an opportunity to measure dose-response effects on the fertility or family planning outcomes of interest" (Mwaikambo et al. 2011). In our efforts to control for influencing variables, we used multivariate regression, and this statistical method is widely believed to increase the validity of cross-sectional studies.

Strengths

From the late 1990's until the interventions described above (including *Ruwan Dare*), Nigeria along with other West African countries experienced a neglect of family planning programmes and services. Perhaps more importantly, excluding a few studies (Babalola et al. 2008; Bankole 1994; Bankole et al. 1996) there was little if any communication research on the effects of mass media campaigns on family planning and reproductive health ideation in Nigeria. This paper and the results presented fill the gap in the literature for interventions and subsequent communication research on ideation for the period 2007-2009 in North West Nigeria. An EE radio programme to promote family planning, gender issues, and encourage safe motherhood, if designed with audience input and listener feedback, can benefit couples who are seeking legitimate information to make decisions about family planning, contraceptive use, and maternal health. The findings also confirm that PMC style dramas not only deliver important social and health information and messages to sizeable audiences, but can also motivate people to modify attitudes and adopt new family planning behaviours through ideation processes.

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