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Media Influence on Sexual Activity and Contraceptive Use: A Cross Sectional Survey among Young Women in Urban Nigeria

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Abstract

This study assessed the relationship between recent exposure to family planning (FP) messages in the media (newspaper, radio, television, and mobile phones) and use of modern contraceptive methods among women aged 15-24 years living in six cities in Nigeria. Logistic regression models were used to predict recent media exposure to FP messages and its association with sexual experience and modern contraceptive method use. About 45% of our sample had ever had sex with only a quarter of them using a modern contraceptive method at the time of survey. Approximately 71% of our sample was exposed to FP messages in the media within the three months preceding the survey. The main sources of media exposure were mobile phones (48%), radio (37%), and television (29%). Controlling for relevant factors, recent media exposure to FP messages predicted both sexual experience and use of modern contraceptive methods, although there were city-level differences. *(Afr J Reprod Health 2015; 19[3]: 100-110).*

Keywords: Media Exposure, Sexual Experience, Modern Contraceptive Use

Résumé

Cette étude a évalué la relation entre l'exposition récente à la planification familiale (PF), des messages dans les médias (journaux, radio, télévision, et téléphones portables) et l'utilisation des méthodes contraceptives modernes chez les femmes âgées de 15-24 ans domiciliées dans six villes au Nigeria. Des modèles de la régression logistique ont été utilisés pour prédire l'exposition récente des médias aux messages de la PF et son association avec l'expérience sexuelle et la méthode moderne de l'utilisation de la contraception. Environ 45% de notre échantillon avait jamais eu des rapports sexuels tandis que un quart d'entre elles utilisaient une méthode contraceptive moderne au moment de l'enquête. Environ 71% de notre échantillon a été exposé à des messages de la PF dans les médias au cours des trois mois précédant l'enquête. Les principales sources d'exposition de médias étaient les téléphones portables (48%), la radio (37%), et la télévision (29%). Les mesures pour contrôler des facteurs pertinents, l'exposition médiatique récente de messages de la PF prédisent à la fois l'expérience sexuelle et l'utilisation des méthodes contraceptives modernes, bien qu'il y ait des différences de niveau de la ville *(Afr J Reprod Health 2015; 19[3]: 100-110).*

Mots-clés: exposition médiatique, expérience sexuelle, utilisation de la contraception moderne

Introduction

Nigeria has the highest population in Africa; the 2014 estimate puts Nigeria's population at 177 million[1]. With a young population (63% of the population is aged less than 25 years, with a median age of 18 years) and a population growth rate of 2.5% per year, it is estimated that Nigeria's populace will double in the next 25 years[1-3].

Currently, women make up one-half of the population with those aged 15-24 years constituting about 17% of the total female population in Nigeria[1,2]. About 80% of Nigerian women aged 20-24 years are sexually-experienced; their average age of sexual debut is 17.5 years[2,4]. However, the use of modern contraceptive methods among these young women remains low; only 5% of females aged 15-19 and 13% of those aged 20-24 currently use a modern contraceptive method such as condoms, pills, and injections[2]. Having unprotected sex puts young women at risk of many negative health consequences such as sexually transmitted infections (STIs), unwanted pregnancies, unsafe abortion, and poor maternal and child health outcomes[5-7]. Therefore, there is a need to ensure that young women who are sexually-active have access to and are able to use contraceptive

methods. Family planning (FP) has been shown to contribute to improved maternal health[8]. It is estimated that maternal deaths can be reduced by almost a third by satisfying the unmet need for FP services[9]. With Nigeria having one of the highest maternal mortality rates in the world, there is a need to improve access and use of FP services[2,10].

Factors that contribute to the low levels of modern contraceptive use among young women in Nigeria include limited knowledge of and access to FP services, low quality of FP services, negative provider attitudes, unsupportive gender norms, and high levels of myths and misconceptions about FP[11-14]. According to the health belief model, an individual is likely to use a contraceptive method if s/he perceives the need for contraception, understands its benefit, has the ability to use a particular method, and has cues/reminders to adhere to chosen methods[15]. As shown in Figure 1, the six constructs of the health belief model, when applied to contraceptive use, are perceived susceptibility to unintended pregnancy, perceived severity/ consequence of unintended pregnancy, perceived benefits of contraceptive use, perceived barriers to contraceptive use, cues to action/ contraceptive use, and self-efficacy of contraceptive use. These constructs are expected to influence the probability of a woman using a modern contraceptive method and have been shown to be modified by economic and sociodemographic factors like age, education, marital status, religion, and household wealth[15]. The construct, cue to action, is often defined as reminders to adopt or continue a health behaviour. In this instance, the family planning messages in the media are expected to influence the six constructs of the health belief model, which in turn affect the probability of modern contraceptive use.

Some of the common sources of health information for youth in Nigeria are: a) mass media such as radio, newspaper or magazines, television; b) social networks such as family and friends; and c) health personnel[13,16]. Several studies have shown that mass media is the most common source of reproductive health information for Nigerian youth[4,13,16]. Many studies from sub-Saharan Africa, including Nigeria, have shown an association between mass media exposure and contraceptive use[17-23]. However, this evidence is limited as no study, to our knowledge, has assessed media exposure to FP messages among urban youth and how that exposure influences their use of modern contraceptive methods. In addition, a recent study conducted in Nigeria showed direct relationship between sexual behavior and media use; however, this study was conducted in only one city[24], as such differences based on the characteristics of different cities could not be ascertained. Furthermore, the use of mobile phone as a source of the media content was not explored in that study.

Hence, this study aimed to assess: i) if there is a relationship between media exposure to FP messages and modern contraceptive method use among women aged 15-24 years in six cities in Nigeria: Abuja, Benin City, Ibadan, Ilorin, Kaduna and Zaria; and ii) whether there are city-level differences in any observed relationships. A recent study by Babalola and colleagues (2008) found a positive effect of a FP media campaign on young women's contraceptive use; however, they focused only on young women in Northern Nigeria[12]. Our study went a step further by analysing data from young women in both northern cities (Abuja, Kaduna, Ilorin, and Zaria) and southern cities (Benin City and Ibadan). This study adds to the existing evidence on the determinants of modern contraceptive use among young women in Nigeria. The city-level differences are expected to inform city-level policies and programs aimed at increasing modern contraceptive prevalence among youth in Nigeria.

Methods

Data and Sample

This study used data from the 2010 baseline survey for the evaluation of the Nigerian Urban Reproductive Health Initiative (NURHI) – a Bill and Melinda Gates Foundation funded project[25,26]. NURHI is a five-year program, which aims to increase the modern contraceptive prevalence in six Nigerian cities by generating demand for contraceptive methods and strengthening service delivery[26]. The cities included in our study cover four out of the six geopolitical zones of Nigeria. Abuja, the capital city of Nigeria, together with

Ilorin are located in the North-Central zone, Kaduna and Zaria in the North-West zone, Benin City in the South-South zone, and Ibadan in the South-West zone. In each city, a two-stage sample selection approach was undertaken. In the first stage, using the 2006 national census in Nigeria as the sampling frame, a random sample of enumeration areas, also known as primary sampling units (PSU), was selected. For the second stage, a random sample of 41 households from each selected PSU was selected to participate in the survey. All women, ages 15-49, in the selected households were eligible for one-on-one interviews by female interviewers. The total sample of the baseline survey is 16,144 women. This study used a restricted sample of the surveyed women based on age (15-24 years; weighted sample=5765). All study methods and procedures were approved by the National Health Research Ethics Committee, Nigeria and the University of North Carolina Institutional Review Board, North Carolina, USA.

Measures

There are two key dependent variables in this analysis: sexual experience and current use of a modern contraceptive method. For sexual experience, we measured whether the respondent had ever had sex; this is a binary variable (yes/no). Among sexually-experienced young females, we assessed whether they were currently using a modern contraceptive method, hereafter termed modern method. The modern methods included male and female sterilization, male and female condom, daily pills, implants, injections, intrauterine device, emergency pills, spermicides, and lactational amenorrhea. Respondents were coded as '1' if they reported use of any of these methods or '0' otherwise. The key independent variable in this analysis is recent exposure to FP messages in the media. Four media tools were assessed: newspapers, radio, television, and mobile phones. We assessed whether the respondents read, heard, or watched FP messages in any of the media tools in the three months preceding the survey. The response categories are coded as '*yes*' if they did; '*no but exposed to media*' if they used any of the four media tools but were not exposed to FP messages via any of the

tools; and '*not exposed to media*' if they did not use any of the media tools in the three months preceding the survey. All analyses controlled for the respondents' age, education, marital status, religion, religiosity, and household wealth index (see Table 1 for variable classifications). Descriptive statistics are presented to show the demographic characteristics and outcomes across the cities. Logistic regression models were used to access the association between FP in media exposure and the two outcome variables. All analyses are weighted to control for the sampling strategy and were conducted using Stata version 13[27].

Results

The descriptive statistics of our sample is shown in Table 1. About 50% of our sample is aged 15-19 and this pattern is seen across all cities. The majority (69%) of the young women had secondary education, more so in Benin City and Ibadan than in other cities. About a quarter is married with the lowest percent of married young women in Benin City (10%) and the highest in Zaria (42%). Zaria has the highest percentage of young women that are Muslim (87%) followed by Ilorin (69%), Kaduna (56%) and Ibadan (52%). There is no city-level variation in the distribution of household wealth. About 45% of our sample had ever had sex. There are no city variations in the proportion that had ever had sex. Among those who had ever had sex, one-quarter was using a modern method at the time of survey. The city-level modern contraceptive prevalence rate in our sexually-experienced sample ranged from 4% in Zaria to 47% in Benin City. Table 2 shows the proportion of our sample recently exposed to FP messages in the media. About 71% of our sample had recent exposure to FP messages in at least one of the four media tools assessed; 23% were not exposed to FP messages despite the fact that they used at least one of the media tools; while 6% did not use any of the media tools in the three months preceding the survey. The highest proportion of recent exposure to FP messages in the media was in Benin City (82%) while the least was in Kaduna (61%). The top three media tools through which young women had FP message exposures were mobile phones (48%), radio (37%), and television

(29%). The least was newspapers (7%). There are significant city variations in the proportion of young women exposed to the different media tools.

The associations between sociodemographic factors and recent exposure to FP messages in the media are shown in Table 3. Respondents' age and education were positively associated with recent FP media exposure. This trend is observed in all cities except Abuja and Zaria. Being married was found to be negatively associated with recent FP media exposure in Benin City (OR: 0.4, $p<0.05$) and positively associated with recent FP media exposure in Ilorin and Zaria (OR: 2.0; $p<0.05$). Being Muslim is negatively associated with recent FP media exposure only in Kaduna and Zaria (OR: 0.5; $p<0.05$). Compared to those who live in Abuja, young women in Ibadan (OR: 0.6) and Kaduna (OR: 0.5) were less likely to have recent FP media exposure ($p<0.05$).

Table 4 shows the logistic regression results of the recent FP media exposure variables on sexual experience, i.e. ever had sex. In Ilorin, young women who read newspaper but had no recent FP media exposure and those who had recent FP media exposure via newspaper were 50-80% less likely to have ever had sex compared to those who did not recently read a newspaper ($p<0.05$). Reading newspaper, regardless of exposure to FP messages, was not associated with sexual experience in Benin City, Ibadan, Kaduna and Zaria. Recent exposure to FP messages in radio was positively associated with sexual experience in Ilorin (OR: 2.6) and Zaria (OR: 2.5)

but not in other cities ($p<0.05$). There was no association between recent exposure to FP messages in television and sexual experience in all cities ($p>0.05$). We also found that young women who have mobile phones, regardless their exposure to FP messages via their mobile phones, were twice as likely to have had sex compared to those who do not have mobile phones ($p<0.05$). This trend was observed in Benin City, Ilorin, and Kaduna but not in Abuja and Zaria. The odds ratios of the sociodemographic factors were in the expected direction (data not shown): older age was positively associated with sexual experience while secondary or higher education, being strongly religious, and being of higher wealth status were consistently found to be protective of sexual experience in all cities (aOR: ≤0.4; $p<0.05$).

Finally, we assessed the association between recent FP media exposure and modern method use among sexually-experienced young women while controlling for sociodemographic factors (see Table 5). There was no association between recent exposure to FP message via newspaper and current use of modern methods across all cities. Recent exposure to FP messages via radio was found be to positively associated with modern method use in Ibadan and Kaduna. Specifically, compared to those who did not listen to radio in the three months preceding the survey, those who were exposed to FP messages in the radio were seven times and five times as likely to use a modern method in Ibadan and Kaduna respectively ($p<0.05$). However, in Ilorin, those who were

Table 1: Characteristics of Young Women Aged 15-24 in Urban Nigeria by City

Characteristics	Total (%)	Abuja (%)	Benin City (%)	Ibadan (%)	Ilorin (%)	Kaduna (%)	Zaria (%)
Age Group							
15 – 19 years	50.5	47.2	48.2	53.5	44.8	49.6	56.0
20 – 24 years	49.5	52.8	51.8	46.5	55.2	50.4	44.0
Education*							
Primary or less	15.8	14.2	7.0	8.5	12.1	17.9	27.4
Secondary	68.8	68.4	77.6	77.3	58.2	69.8	63.9
Tertiary	15.4	17.4	15.4	14.2	29.7	12.3	8.7
Marital Status*							
Single	74.6	74.2	90.3	78.7	81.6	73.9	58.1
Married	25.4	25.8	9.7	21.3	18.4	26.1	41.9
Religion*							
Christian	46.8	74.4	96.1	47.9	31.4	44.0	13.5
Muslim	53.2	25.6	3.9	52.1	68.6	56.0	86.5
Religiosity*							

Somewhat/not religious	27.6	30.8	21.6	44.0	17.9	25.5	27.9
Strongly religious	72.4	69.2	78.4	56.0	82.1	74.5	72.1
Wealth Index						
Poorest	21.2	22.5	18.6	21.4	28.4	21.5	17.3
Poor	18.6	17.2	18.3	21.9	17.0	19.9	17.3
Middle	19.2	21.2	20.3	18.0	17.1	18.8	19.7
Rich	20.4	21.5	22.7	17.2	18.3	19.2	22.9
Richest	20.6	17.6	20.1	21.5	19.2	20.6	22.8
Ever had sex						
Yes	44.9	46.0	44.4	43.5	49.1	41.2	45.9
No	55.1	54.0	55.6	56.5	50.9	58.8	54.1
Current modern method use ⁱ *						
Yes	25.0	29.3	47.3	41.6	20.4	23.7	3.7
No	75.0	70.7	52.7	58.4	79.6	76.3	96.3
Weighted N	**5765**	**650**	**884**	**845**	**881**	**1125**	**1378**

*All percentages presented are weighted. *statistically significant difference across cities at p <0.05. Ɨ Among sexually-experienced young women (weighted N=2587)

Table 2: Percentage of Young Women aged 15-24 in Urban Nigeria Who Were Exposed To Fp Messages in the Media in the previous three Months, by City

FP in media exposure	Total (%)	Abuja (%)	Benin City (%)	Ibadan (%)	Ilorin (%)	Kaduna (%)	Zaria (%)
FP info in newspaper *							
Yes	6.8	11.4	19.9	3.5	4.9	2.6	2.7
No but read newspaper	9.8	26.7	10.1	7.7	8.5	8.4	4.1
Did not read newspaper	83.4	61.9	70.0	88.7	86.6	89.0	92.2
FP info in radio*							
Yes	37.3	35.3	33.9	37.6	36.8	23.8	51.3
No but listened to radio	33.8	33.3	23.8	46.8	30.2	40.1	29.7
Did not listen to radio	28.9	31.4	42.3	15.5	33.0	36.1	19.0
FP info in television*							
Yes	29.1	37.8	51.5	29.8	13.4	29.8	19.5
No but watched television	11.7	8.6	4.7	12.2	16.9	8.5	16.8
Did not watch television	59.2	53.6	43.8	58.0	69.7	61.7	63.7
FP info in mobile phone*							
Yes	48.0	60.5	65.0	44.3	60.3	39.3	32.5
No but have access to mobile phone	32.5	24.5	24.7	32.9	19.9	38.1	44.8
Do not have access to mobile phone	19.5	15.0	10.3	22.8	19.8	22.6	22.7
Any FP info in media *							
Yes	70.8	79.2	82.0	66.0	71.1	61.1	70.2
No but had media exposure	23.4	14.6	14.5	29.3	21.1	30.5	25.2
Did not have media exposure	5.8	6.2	3.5	4.7	7.8	8.4	4.6
Weighted N	**5765**	**650**	**884**	**845**	**881**	**1125**	**1378**

*All percentages presented are weighted. *statistically significant difference across cities at p <0.05

Table 3: Multivariate Analysis of 'any Exposure to FP Messages in the Media in the previous three Months' among Young Women in Urban Nigeria

Characteristics	Total OR (95% C.I.)	Abuja OR (95% C.I.)	Benin City OR (95% C.I.)	Ibadan OR (95% C.I.)	Ilorin OR (95% C.I.)	Kaduna OR (95% C.I.)	Zaria OR (95% C.I.)
Age Group							
15 – 19 years	1.0	1.0	1.0	1.0	1.0	1.0	1.0
20 – 24 years	1.7 (1.4 – 2.0)***	1.7 (0.8 – 3.4)	2.9 (1.8 – 4.6)***	1.6 (1.1 – 2.4)**	1.7 (1.1 – 2.7)*	2.2 (1.5 – 3.3)***	1.2 (0.9 – 1.5)
Education							
Primary or less	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Secondary	2.1 (1.7 – 2.5)***	3.6 (1.9 – 6.9)***	2.8 (1.5 – 5.3)**	2.1 (1.2 – 3.6)*	2.9 (1.7 – 4.8)***	3.2 (2.0 – 5.1)***	1.2 (0.9 – 1.7)
Tertiary	4.4 (3.1 – 6.1)***	5.4 (2.3 – 12.6)***	2.1 (0.8 – 5.0)	5.3 (2.5 – 11.3)***	13.2 (6.3 – 27.7)***	4.6 (2.4 – 8.9)***	3.0 (1.6 – 5.5)***
Marital status							
Single	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Married	1.2 (0.9 – 1.5)	0.7 (0.3 – 1.4)	0.4 (0.2 – 0.9)*	1.1 (0.6 – 1.8)	2.0 (1.1 – 3.4)*	1.0 (0.6 – 1.8)	1.8 (1.3 – 2.5)**
Religion							
Christian	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Muslim	0.6 (0.5 – 0.7)***	0.6 (0.3 – 1.0)	1.4 (0.8 – 2.4)	0.8 (0.6 – 1.8)	0.8 (0.5 – 1.2)	0.5 (0.3 – 0.8)**	0.5 (0.3 – 0.8)**
Religiosity							
Somewhat/not religious	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Strongly religious	1.0 (0.8 – 1.2)	1.4 (0.8 – 2.3)	1.4 (0.8 – 2.4)	1.6 (1.2 – 2.3)**	0.6 (0.3 – 1.1)	0.5 (0.3 – 0.8)**	1.0 (0.7 – 1.5)
Wealth Index							
Poorest	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Poor	1.0 (0.8 – 1.2)	1.1 (0.5 – 2.2)	0.7 (0.3 – 1.4)	1.1 (0.7 – 1.7)	0.8 (0.4 – 1.4)	1.0 (0.6 – 1.5)	1.0 (0.6 – 1.7)
Middle	1.0 (0.8 – 1.3)	1.3 (0.4 – 4.4)	0.5 (0.2 – 1.1)	1.3 (0.8 – 2.1)	1.3 (0.7 – 2.4)	0.7 (0.4 – 1.1)	1.2 (0.7 – 2.0)
Rich	0.9 (0.7 – 1.2)	1.3 (0.5 – 3.3)	0.8 (0.4 – 1.6)	1.2 (0.7 – 2.3)	1.1 (0.6 – 1.9)	0.8 (0.5 – 1.3)	0.9 (0.5 – 1.5)
Richest	1.1 (0.8 – 1.4)	1.0 (0.5 – 2.2)	0.9 (0.5 – 1.8)	1.6 (0.9 – 2.8)	1.6 (0.9 – 2.9)	0.8 (0.4 – 1.3)	1.1 (0.6 – 1.8)
City							
Abuja	1.0	---	---	---	---	---	---
Benin City	1.0 (0.7 – 1.6)	---	---	---	---	---	---
Ibadan	0.6 (0.4 – 0.8)**	---	---	---	---	---	---
Ilorin	0.7 (0.5 – 1.1)	---	---	---	---	---	---
Kaduna	0.5 (0.3 – 0.7)***	---	---	---	---	---	---
Zaria	1.0 (0.6 – 1.5)	---	---	---	---	---	---

*Wt. N=2586. *p≤0.05; **p≤0.01; ***p≤0.001

Table 4: Multivariate Analysis of Sexual experience on Exposure to FP Messages in the media in the Previous three Months among Women aged 15-24 in Urban Nigeria

Characteristics	Total OR (95% C.I.)	Abuja OR (95% C.I.)	Benin City OR (95% C.I.)	Ibadan OR (95% C.I.)	Ilorin OR (95% C.I.)	Kaduna OR (95% C.I.)	Zaria OR (95% C.I.)
FP info in newspaper							

	Total	Abuja	Benin City	Ibadan	Ilorin	Kaduna	Zaria
Did not read	1.0	1.0	1.0	1.0	1.0	1.0	1.0
No but read	0.7 (0.5 – 0.9)*	0.4 (0.2 – 0.9)*	0.6 (0.3 – 1.3)	1.1 (0.5 – 2.5)	0.5 (0.2 – 0.9)*	0.6 (0.2 – 1.6)	1.4 (0.5 – 3.7)
Yes	1.0 (0.7 – 1.5)	0.9 (0.3 – 2.3)	1.6 (0.8 – 3.0)	1.6 (0.5 – 5.9)	0.2 (0.1 – 0.6)**	0.5 (0.1 – 1.8)	0.8 (0.3 – 2.2)
FP info in radio							
Did not listen	1.0	1.0	1.0	1.0	1.0	1.0	1.0
No but listened	1.1 (0.9 – 1.4)	1.1 (0.6 – 2.1)	1.1 (0.7 – 1.8)	0.9 (0.5 – 1.6)	1.6 (0.8 – 3.1)	0.8 (0.5 – 1.3)	1.3 (0.8 – 2.1)
Yes	1.6 (1.3 – 2.1)***	1.4 (0.6 – 3.4)	1.8 (1.0 – 3.4)	1.1 (0.5 – 2.5)	2.6 (1.3 – 5.1)**	1.0 (0.5 – 1.9)	2.5 (1.6 – 3.7)***
FP info in television							
Did not watch	1.0	1.0	1.0	1.0	1.0	1.0	1.0
No but watched	0.9 (0.7 – 1.2)	1.8 (0.5 – 5.6)	0.3 (0.1 – 1.1)	1.6 (0.7 – 3.7)	1.1 (0.5 – 2.4)	0.8 (0.4 – 1.6)	0.6 (0.4 – 1.0)
Yes	0.9 (0.7 – 1.1)	0.8 (0.5 – 1.6)	1.1 (0.7 – 1.8)	0.8 (0.4 – 1.6)	0.8 (0.2 – 2.8)	1.2 (0.7 – 2.0)	0.7 (0.4 – 1.2)
FP info in mobile phone							
Do not have mobile phone	1.0	1.0	1.0	1.0	1.0	1.0	1.0
No but have mobile phone	1.6 (1.3 – 2.0)***	0.8 (0.3 – 2.0)	2.3 (1.2 – 4.5)*	1.7 (1.0 – 3.0)	1.4 (0.8 – 2.7)	1.6 (1.1 – 2.5)*	1.4 (0.9 – 2.3)
Yes	2.0 (1.6 – 2.5)***	1.4 (0.6 – 3.2)	2.3 (1.3 – 4.2)**	2.4 (1.2 – 4.5)	2.5 (1.2 – 5.6)*	1.6 (1.1 – 2.5)*	1.5 (0.9 – 2.3)

*All models controlled for age, education, marital status, religion, religiosity, and wealth index. Wt. N=5765. $p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$

Table 5: Multivariate Analysis of Modern Method use on Exposure to FP Messages in the Media in the Previous three Months among Sexually-Experienced Young Women aged 15-24 in Urban Nigeria

Characteristics	Total OR (95% C.I.)	Abuja OR (95% C.I.)	Benin City OR (95% C.I.)	Ibadan OR (95% C.I.)	Ilorin OR (95% C.I.)	Kaduna OR (95% C.I.)	Zaria OR (95% C.I.)
FP info in newspaper							
Did not read	1.0	1.0	1.0	1.0	1.0	1.0	1.0
No but read	1.3 (0.8 – 2.0)	1.2 (0.5 – 3.0)	0.8 (0.2 – 3.5)	0.9 (0.3 – 2.4)	1.2 (0.4 – 3.9)	3.7 (0.8 – 16.8)	2.9 (0.5 – 15.4)
Yes	1.2 (0.8 – 1.8)	0.4 (0.1 – 1.0)	1.6 (0.8 – 3.2)	2.5 (0.6 – 10.0)	1.1 (0.4 – 3.5)	0.4 (0.1 – 1.9)	1.7 (0.2 – 12.0)
FP info in radio							
Did not listen	1.0	1.0	1.0	1.0	1.0	1.0	1.0
No but listened	1.1 (0.8 – 1.5)	1.2 (0.4 – 3.7)	0.7 (0.3 – 1.4)	3.0 (1.2 – 7.8)*	0.9 (0.4 – 2.2)	1.2 (0.5 – 2.9)	2.1 (0.1 – 28.1)
Yes	1.3 (0.8 – 2.1)	2.2 (0.5 – 9.3)	0.9 (0.5 – 1.7)	6.9 (1.9 – 23.6)**	0.2 (0.1 – 0.6)**	4.6 (1.6 – 12.8)**	4.6 (0.3 – 66.4)
FP info in television							
Did not watch	1.0	1.0	1.0	1.0	1.0	1.0	1.0
No but watched	1.4 (0.8 – 2.6)	0.7 (0.1 – 2.4)	1.1 (0.3 – 4.6)	0.5 (0.2 – 1.7)	8.1 (2.1 – 30.6)**	0.4 (0.1 – 1.3)	2.2 (0.6 – 7.6)
Yes	1.6 (1.1 – 2.3)*	1.7 (0.4 – 6.7)	1.5 (0.8 – 2.7)	0.7 (0.3 – 1.7)	3.0 (1.1 – 8.8)*	1.0 (0.4 – 2.4)	1.6 (0.4 – 6.5)
FP info in mobile phone							
Do not have mobile phone	1.0	1.0	1.0	1.0	1.0	1.0	1.0
No but have mobile phone	0.8 (0.5 – 1.4)	0.8 (0.1 – 12.7)	0.6 (0.1 – 4.2)	1.4 (0.7 – 2.8)	0.5 (0.2 – 1.7)	0.5 (0.2 – 1.4)	0.7 (0.1 – 8.0)
Yes	1.9 (1.2 – 2.9)**	1.4 (0.2 – 7.8)	1.4 (0.3 – 7.5)	2.8 (1.4 – 5.7)	1.6 (0.7 – 3.7)	1.7 (0.7 – 4.2)	2.6 (0.2 – 26.3)

*All models controlled for age, education, marital status, religion, religiosity, and wealth index. Wt. N=2586. $p \leq 0.05$; **$p \leq 0.01$; ***$p \leq 0.001$

exposed to FP messages in the radio were 80% less likely to use a modern method compared to those who did not recently listen to radio. Exposure to FP messages in television is positively associated with modern method use only in Ilorin (OR: 3.0; *p*<0.05). In the pooled sample, those who were exposed to FP messages via mobile phones were twice as likely to use a modern method compared to those who do not have a mobile phone (OR: 1.9; *p*<0.05). However, there was no city-specific association observed. The sociodemographic factors found to be positively associated with modern method use are age, education, and living in Ibadan versus Abuja; while the factors found to be negatively associated with modern method use are being married and being Muslim (*p*<0.05; data not shown).

Discussion and Conclusion

Recent exposure to FP messages in the media is prevalent in our sample and was found to be associated with sexual experience and use of modern methods. This is consistent with the results of a study conducted in 2008 on a nationally representative sample of Nigerian adolescents that showed a relationship between media use and sexual experience[27]. We found that about 45% of our sample had ever had sex; this is consistent with the 40% and 50% reported in previous studies[13,16]. Our finding that age and education positively predicted exposure to FP messages in the media is consistent with previous finding from urban Nigeria[3,4]. These studies also found that age and education were positively associated with sexual activity and modern contraceptive use, just like we found in our study.

We found that recent FP message exposure via mobile phones was positively associated with sexual experience and modern method use. The use of mobile phones in Nigeria increased in the last decade from about 1% in 2001 to 25% in 2006 to 57% in 2010[29,30]. Despite the generalized use of mobile phones in many communities, the use of mobile phones is more prevalent in urban areas and among the youth[31] hence, mobile phones can serve as an effective medium to reach young people with accurate information about sexual and reproductive health. This means that channeling

safe sex and FP messages through mobile phone "may be" effective in our sample of urban young women. Hence, mHealth technologies and intervention maybe successful and should be promoted in this context. We also found that, recent FP message exposure via radio was positively associated with sexual experience while recent exposure to FP messages in television was positively associated with modern method use. This means that both radios and televisions have the potential to serve as effective media communication tools through which FP messages can reach target audiences. Our findings are similar to those of previous studies which indicate that exposure to media increases contraceptive prevalence[12,20-23,31]. However, the previous studies only looked at FP messages disseminated via radio and television programs. " our study looked at exposure to a broader array of media sources – newspaper, radio, television, and mobile phones. Just like in the Piotrow et al. study[31] where exposure to FP messages on the television in three Nigerian cities including Ibadan and Ilorin led to increase in contraceptive use, our study found that young women who were exposed to FP messages while watching television were more likely to use a modern method compared to those who did not watch television. Likewise, we found similar results to that in the Babalola et al. study[12] where exposure to radio was associated with use of modern contraceptive methods; though in our study, the association was only significant in Ibadan, Ilorin, and Kaduna.

Looking specifically at the cities, we found that in Abuja, the capital city of Nigeria, exposure to FP messages was mainly through mobile phones and that education predicted exposure to FP messages in the media; however, recent exposure to FP messages in the media did not predict sexual experience or modern method use. In Benin City, exposure to FP messages was mainly through mobile phones; age, education, and marital status predicted this exposure; FP message exposure via mobile phone predicted sexual experience but none of the media exposures predicted modern method use. Likewise in Ibadan, exposure to FP messages was mainly through mobile phones; age, education, and religiosity predicted this exposure; none of the FP media exposure predicted sexual

experience although FP message exposure via radio predicted modern method use. In Ilorin, exposure to FP messages was mainly through mobile phones; age, education, and marital status predicted this exposure; newspaper, radio, and mobile phone FP message exposure predicted sexual experience while radio and television FP media exposures predicted modern method use. In Kaduna, exposure to FP messages was mainly through mobile phones; age, education, religion, and religiosity predicted this exposure; mobile phone FP message exposure predicted sexual experience; while radio FP message exposure predicted modern method use. The case is different in Zaria as exposure to FP messages was mainly through radio; education, marital status, and religion predicted the exposure; listening to FP messages in the radio predicted sexual experience but none of the media exposures predicted modern method use. Our results show that although there are some similarities across the cities, there are city-level differences indicating that no single intervention can fit all the cities. These city-level differences should inform sexual and reproductive health communication campaign programs in the different cities.

There are three main strengths of our study; we assessed: i) exposure to FP messages in the media in the three months prior to survey thereby minimizing the effect of recall bias; ii) a broader range of media tools than seen in previous studies; and iii) city-level similarities and variations that is needed for city-specific FP interventions. A limitation of this study is the possibility of underreporting of sexual experience. As was found in a study conducted among young people in Kenya[33] 20% of adolescents inconsistently reported whether they had ever had sex or not with about 50% of the sexually-active youth providing inconsistent information about their sexual behaviour such as timing of their first sexual activity This is therefore expected that young females may be prone to underreporting of their sexual behaviours due to cultural and societal restrictions placed on female sexuality. The Nigerian culture promotes abstinence so it is possible that underreporting of sexual experience and use of modern methods may have occurred in our study. Another limitation of this study is that neither the content nor the duration of exposure to the FP messages in the media can be controlled for in this study, both of which are expected to have an effect on sexual activity and/or modern method use.

The findings from this study can guide in formulating policies in urban Nigeria especially among young women. Only a quarter of the sexually-experienced young women in our sample were using a modern method. The Government needs to make concerted efforts to increase modern contraceptive prevalence among the youth. Since young people have been shown to have limited access to FP services in health facilities[2], innovative strategies to improve their access to information on sexual and reproductive health services are needed. Many young women reported being exposed to television, radio, and mobile phones. Hence, channelling FP messages through these media tools may increase the level of FP knowledge. As is described in the Health Belief Model, having higher knowledge of health behaviour increases the probability of its adoption. This was illustrated in Nigeria in 2004 when a multimedia campaign (Zip-up) targeted at increasing knowledge of safe sex practices led to a 10% increase in proportion of young people who engaged in communication about abstinence[34]. Furthermore, the city-level differences suggest that city-specific policies will need to be formulated. These policies should take into account the differences in sociodemographic factors in the cities and also the effect of different media sources to sexual practices and modern contraceptive use. In conclusion, exposure to the different forms of media tools has a role to play in increasing modern contraceptive prevalence among young women in Nigeria and should be adequately utilised.

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