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**The Impact of Media Program Exposure on HIV/AIDS
Awareness and Condom Use in Nigeria:
Results from the VISION Project**

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Abstract

In response to the growing HIV epidemic in Nigeria, the U.S. Agency for International Development (USAID) initiated the VISION project, which aims to increase use of family planning, child survival, and HIV/AIDS services. A key element of the program is a mass-media campaign that focuses on family planning, reproductive health, and HIV/AIDS prevention practices. This paper examines factors associated with exposure to VISION mass media campaign, and assesses to what extent program exposure translated into increased awareness and prevention of HIV/AIDS.

Our analysis is based on data from the 2004 Nigeria (Bauchi, Enugo, and Oyo) Family Planning and Reproductive Health Survey, which was conducted among a representative sample of 3,279 adults living in the VISION project areas. To correct for endogeneity, two-stage logistic regression is used to test the effect of program exposure on 1) discussion of HIV/AIDS with one's partner, 2) awareness that consistent condom use reduces HIV risk, and 3) condom use at last intercourse.

The results show that exposure to the VISION mass media campaign was very high. Program exposure is associated with an increased willingness to discuss HIV/AIDS with one's partner and with an increased awareness that consistent condom use reduces the risk of infection. However, the effect on condom use is less strong.

The results confirm that mass media can be an effective means to reach a large target population, and that exposure to mass media programs on reproductive health and HIV prevention can help reduce barriers to condom use. However, improvements in preventive behaviors are likely to require that these programmatic efforts be continued and scaled up.

The Impact of Media Program Exposure on HIV/AIDS Awareness and Condom Use in Nigeria: Results from the VISION Project

Introduction

Like many African countries, HIV/AIDS is a growing concern in Nigeria. By the turn of the century, it was estimated that the HIV prevalence had exceeded 5%, which corresponds with four million infected people (UNAIDS/WHO 2000; Alubo 2002; VISION Project 2005). Although most Nigerians are aware that condom use can prevent HIV infection, and condoms are widely available, consistent condom use has remained relatively low (Agha et al. 2003b; Araoye 1998; Jinadu 1993; Meekers, Van Rossem, Zellner and Berg 2004; Odujinrin and Akinkuade 1991; Temin 1999, Van Rossem et al. 2001). This is particularly the case for marital relationships, which account for the majority of sexual contacts.

In response to the HIV/AIDS epidemic in Nigeria, the U.S. Agency for International Development (USAID) mission in Nigeria initiated the VISION Project, a three-year project designed to maximize the use of family planning services, Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS) services, and child survival services in Nigeria (Agha et al. 2003a, 2003b; Adewuyi et al. 2005; VISION Project 2005). The project also sought to develop models of high-impact, high-performing family planning and reproductive health (FP/RH) service-delivery networks, built on public-private partnerships, to use as models for the delivery of similar interventions elsewhere. Mass media campaigns about HIV/AIDS prevention practices, and the repositioning of community-based distribution centers were two of the primary activities undertaken by the VISION project to improve access and awareness of reproductive health issues and available FP/RH services. Training curricula

development, capacity-building development, and the development of training sessions for clinical trainers at university-based hospitals were also important project activities for increasing FP/RH awareness and capacity.

The purpose of this paper is twofold: 1) to identify determinants of program exposure, and 2) to assess the impact of a reproductive health mass media campaign on HIV/AIDS awareness and condom use in the target areas of the VISION project. Specifically, this paper tests whether exposure VISION-related mass media programs (TV, radio, and printed advertisements about FP/RH issues) had an effect on individual level willingness to discuss HIV/AIDS (awareness), whether said programs had an impact on individual level perception about condom use for reducing the risk of HIV infection, and whether exposure to mass media programs translates into increased condom use (HIV/AIDS prevention) in selected LGAs.

The VISION Project

The VISION Project was implemented by EngenderHealth, in partnership with IntraHealth, Johns Hopkins University/Center for Communication Programs, and Population Services International. The project targeted 15 local government areas (LGAs) in Bauchi, Enugu and Oyo States and was active from September 2001 through September 2004 (VISION Project 2003, 2004, 2005). The project aimed to increase the demand for and use of family planning and reproductive health services through behavior change communication (BCC) activities and community mobilization efforts.

The VISION Project worked with local non-governmental organizations (NGOs) active in the selected LGAs to develop “informed clients.” BCC activities aimed to

increase knowledge and to empower individuals and communities to demand quality family planning, STI/HIV/AIDS, reproductive health information and services. The project developed appropriate information and education print materials and radio public service announcements (PSA) for women with an unmet need for family planning, as well as messages aimed at men and youth focusing on male involvement and responsibility in reproductive decision-making. In collaboration with local sports clubs, VISION also developed an outreach strategy primarily aimed at youth called *Sports for Life* to promote healthy lifestyles and spread information on family planning and HIV/AIDS prevention during football competitions.

The VISION Project was a media campaign also included a set of weekly radio programs in each of the three project states to disseminate family planning, HIV/AIDS, and other reproductive health information to the general public. VISION, with its partner NGOs, organized radio listener and discussion clubs in each of the VISION states and provided these clubs with radios. The VISION Project closely worked with local government bodies, traditional and religious leaders, and community groups to gain their support for the various project activities. In addition to these activities, the VISION partners conducted several complementary mass media activities (including radio, TV, and print). For example, the Society for Family Health implemented several radio dramas aimed at increasing awareness of HIV/AIDS, and its causes and consequences. These radio dramas included “One Thing at a Time,” “Garin Muna Fata” (Town of Hope), “Odenjiji,” and “Abule Oloke Merin.” In addition, SFH implemented a television to promote safe sex that featured Nigerian soccer superstar Sunday Oliseh. A billboard campaign to increase awareness that someone who is HIV positive may not have

symptoms supplemented the radio and television campaign (Meekers, Van Rossem, Zellner and Berg 2004).

Materials and Methods

Study areas

Data were collected from households in 5 LGAs in each of 3 states (15 LGAs total): Bauchi State located in the North-East, Eungu State located in the East, and Oyo State located in the South-Western part of Nigeria (Appendix Figure 1). These LGAs represent VISION program areas. LGAs were considered for selection into the VISION program if: 1) the population was over 100,000, 2) the population contained at least 20,000 women of reproductive age, 3) the LGA contained private and public health facilities at the primary and secondary levels, 4) the LGA has access to media resources such as radio, television and newspapers, and 4) the LGA has collaborative support from Nigeria's federal Ministry of Health (MOH) and the relevant state-level Ministry of Health (MOH). VISION partners visited the LGAs and made the selections (VISION Project 2005).

Data

This paper analyses data from the 2004 wave of the Nigeria (Bauchi, Enugo, Oyo) Family Planning and Reproductive Health Survey (Adewuyi et al. 2005). The survey was implemented by the Center for Research, Evaluation, and Resource Development (CRERD). A two-stage cluster design was used to obtain a probability sample of respondents for this study. The target sample size was 1,100 respondents per State,

divided proportionally among 40 enumeration areas in selected LGAs in each state by population size. Within each selected EA, households were selected using systematic random sampling. All adults in the households were listed, and one eligible person was selected using a table of random numbers. Interviewers obtained verbal informed consent from the selected participants. A total of 3,279 respondents across all three states were interviewed.

Data collection was conducted by trained interviewers. All fieldwork supervisors first participated in a 5-day centralized training. Subsequently, supervisors and interviewers jointly participated in 5-day regional trainings.

The survey questionnaire was based on the Demographic and Health Survey questionnaire. In addition to standard demographic and fertility questions, questions related to family planning, sexual activity and behavior, and exposure to various media campaigns were also asked. Specifically, respondents were asked if they had listened to the following programs on the radio: Kusaurara, Dunniya J'atau, A New Dawn (Ayedotun), One thing At A Time, Gari Muna Fati, Abule Olokemerin, or Odenjinjin. These media program cover those by the VISION project perse, as well as by its partners. Respondents were also asked if they had seen the Femi Kuti or Fati Mohammed television campaigns, if they had seen any HIV/AIDS or reproductive health advertisements in the newspaper, or had received any information from clinics or community health workers about HIV/AIDS or reproductive health.

The outcome measures used in this analysis are as follows: 1) Have you ever talked with your partner about ways to prevent getting the virus that causes AIDS? 2)

Can people reduce their chances of getting the AIDS virus by using a condom every time they have sex? and 3) Did you use a condom during your last sexual encounter?

The respondent's age (continuous variable), education (categorized as none, primary, or secondary), religion (categorized as catholic, protestant or other Christian denomination, Muslim, or traditionalist), gender, marital status, place of residence (dichotomized as urban and peri-urban, or rural), knowledge of a condom source (yes/no), State of residence (categorized as Bauchi, Enugu, or Oyo), and whether or not the respondent has had at least 1 partner in the past 12 months, served as control variables in regression models. Exposure to mass media was measured by dichotomizing whether a respondent reads the newspaper at least once a week (yes vs. no), watches television at least once a week (yes vs. no), or listens to the radio at least once a week (yes vs. no). Media exposure variables served as control variables in the first-stage poisson regression models only.

Our indicators of program exposure included a total count of the number of family planning and reproductive health radio programs heard, television programs seen, or printed FP/RH advertisements (1/0) seen over the past 6 months (0 – 10). A separate count of the number of radio programs exposed to (0 – 7), and the number of TV programs exposed to (0 – 2), were also used as indicators of program exposure. Estimated and observed values were then categorized as low program exposure (0) if estimation was < 1 , medium program exposure (1) if greater than 1 and less than 2, and high program exposure (2) if 2 or more exposures.

Data analysis

Data analyses were done using STATAtm 7.0. Chi-square statistics and two-stage logistic regression models were used to analyze the data (Bollen et al. 1995, Chen and Guilkey 2003). The Durbin–Wu–Hausman test (augmented regression test) was performed at the onset to test for endogeneity between program exposure and the respective outcomes (Davidson and MacKinnon 1993). Since the results showed evidence of endogeneity, two-stage logistic regressions were performed using instrumental variables of program exposure. At the first stage, Poisson regression was used to estimate the total number of sources of exposure to VISION programs using a set of exogenous variables. Estimated values were then categorized as defined above, and used as indicators of program effectiveness in subsequent logistic regressions. Observed values were also categorized as low program exposure (0) if no exposure was reported, medium program exposure if one source of exposure was reported, and high program exposure if more than one source of exposure was reported, and analyzed using logistic regression. Wald statistics and log-likelihood ratios were used to identify variable significance and model fit, with alpha set at 0.05. Standardized state-level sampling weights, based on the relative population size of program LGAs in each State, were applied to the data for between State descriptive estimates. A self-weighting design was used for within State estimates. To control for the effect of clustering within enumeration areas (EA), the Huber-White-Sandwich estimator of variance was used to obtain empirically estimated standard errors, with the EA defined as the *cluster*. State level probability sample weights (*pweight*) were also applied at the onset. Regression analyses were done using respondents who reported having ever had sex.

Results

Socio-demographic characteristics of the population are presented in Table 1. The average age (28.1) of the respondents and the mean number of sexual partners in the past year (1.2) were similar across States. In Bauchi, 73% of the respondents were married; 45% reported being married in Enugu and 60% reported being married in Oyo. Seventy-four percent of respondents in Oyo reported living in urban or peri-urban areas; 35% of respondents in Bauchi and 36% of respondents in Enugu reported living in urban or peri-urban areas. The States also differed in educational attainment, with Bauchi reporting the lowest proportion of respondents reporting secondary or higher education (20.4%) and Enugu reporting the highest proportion of respondents reporting secondary or higher education (60%). Oyo had the highest proportion of Protestants/other Christians (55%), Bauchi had the highest number of Muslims (89%), and Enugu had the highest proportion of Catholics (71%). Knowledge of a condom source also varied by State, with 57% of respondents in Oyo, and 51% and 26% of respondents in Enugu and Bauchi, respectively, reporting that they know where to get condoms.

Exposure to media program by the VISION partners

Figure 1 illustrates the proportion of respondents exposed to the various VISION media programs by gender. In general, more males were exposed to programs than females, although more females were exposed to clinic-based information. Program exposure statistics are presented in Table 2. The mean number of radio program exposures was highest in Bauchi (1.38) and lowest in Enugu (0.65). Bauchi also reported

the highest mean number of TV program exposures (0.36). Seventy-seven percent of all respondents reported listening to the radio at least once a week and 47% reported watching TV at least once a week. On average, 59% of respondents heard at least 1 FP/RH radio program in the past 6 months, and 24% saw a FP/RH TV program. Forty-seven percent were exposed to at least 1 advertisement about HIV/AIDS, sexual abstinence or condom use in the last 6 months. Over 96% of all respondents thought it was acceptable to discuss HIV/AIDS on TV, the radio, or in the newspaper.

Table 3 presents the results of the first stage poisson regressions. The socio-demographic variables included were almost all significantly related to the total number of program exposures, as well as the number of radio and TV program exposures, respectively. Males were more likely to be exposed to media programs than females, and secondary education was positively associated with the number of programs exposures. Respondents located in urban and peri-urban areas were also more likely to have been exposed to programs than those located in rural areas. Because socioeconomic data were not available, it is difficult to capture whether location is also serving as a proxy for wealth or access to resources. No significant relationship was detected between whether the respondent has been sexually active in past year and program exposures. As expected, significant positive relationships exist between whether respondents watch TV, read the newspaper, or listen to the radio, and program exposure.

Effect of exposure to media programs by VISION partners on HIV/AIDS awareness, HIV/AIDS perception and prevention

Figure 2 illustrates the outcome measures used in this analysis. The proportion of respondents that used condom at last sex was lowest in Bauchi and greatest in Enugu. The proportion of respondents that have discussed ways to prevent getting HIV/AIDS with their partner was over 50% for Enugu and Oyo, and over 36% for Bauchi. The proportion of respondents that believe consistent condom use reduces risk of HIV infection was well over 40% in all 3 States. Nevertheless, the percentage of respondents who used a condom at last intercourse was relatively low (less than 15%).

The effect of exposure on the odds that respondents were willing to discuss HIV/AIDS with their partner is shown in table 4. Because slight endogeneity was detected (results not shown), this analysis focuses on the results of the 2nd-stage regressions. Those with high program exposure were almost one and a half (O.R. = 1.47) time more likely than those with no exposure to have discussed HIV/AIDS with their partner, after controlling for the potential confounding effects of socio-demographic variables. The results for models testing the effect of individual programs (i.e. radio programs and TV programs) on the odds that respondents discussed HIV/AIDS with their partners were not significant. Strong positive associations were detected between education and the odds of the outcome occurring, as evidenced by highly significant odds ratios for both primary and secondary education categories for all models. Married respondents were nearly three times more likely than unmarried respondents to have discussed HIV/AIDS (O.R. = 2.01, 2.01, 1.98, 1.98, 2.11, 2.00 for models 1 – 6, respectively). Lastly, there appears to be a strong positive association between those

reporting that they know where to obtain condoms, and willingness to discuss HIV/AIDS with their partners (OR=2.60, 2.83, 2.72, 2.84, 2.70, 2.85 for models 1-6, respectively).

The effect of program exposure on the belief that consistent condom use can reduce the risk of HIV infection is shown in table 5. Again, the potential for endogeneity necessitates the interpretation of 2nd-stage regressions. Those with high program exposure were over twice (O.R. = 2.20) as likely as those unexposed to know that consistent condom use can reduce risk of HIV infection. Those with moderate program exposure were almost 1 and a half (O.R. = 1.42) times more likely than those unexposed to know that condom use reduces risk of HIV infection. Model 4 indicates that exposure to at least 1 radio program is also significantly associated (O.R. = 1.33) with the odds of the outcome occurring, as compared to those not exposed to radio programs. Exposure to TV programs alone was not associated with the outcome. Also noteworthy is the strong significant association between secondary or higher education, and knowing that condoms reduce risk of HIV infection (O.R. = 1.78, 1.49, 1.90, 1.85, 2.00, 2.00 for models 1 – 6, respectively). Those reporting knowledge of a condom source were almost four times more likely to also know that condoms can reduce the risk of HIV infection in all models. Those respondents located in Enugu were about half as likely as those in Oyo to know that condoms reduce risk of HIV. The effect of exposure on condom use at last sexual intercourse is shown in table 6. To avoid the bias associated with endogeneity, 2nd-stage regression statistics are interpreted. Program exposure had no significant impact on reported condom use at last sex. Similarly, radio program exposure had no significant effect. However, those with medium TV program exposure were 2.79 times more likely than those unexposed to have used a condom at last sexual encounter. Males

were also more likely than females to have used a condom at last sex, for all program exposure models; those reporting knowledge of a condom source were approximately 9 times more likely than those without such knowledge to have used a condom at last sex. Married respondents were consistently less likely than the unmarried to have used a condom at last sex; those respondents located in Bauchi, were also less likely than those in the other two States to have used a condom at last sexual intercourse.

Conclusions

Nigeria is one of several sub-Saharan African countries trying to deal with the current HIV/AIDS epidemic. In response to this need, the USAID-funded VISION project launched a mass media campaign focusing on HIV/AIDS awareness, perception, and behavior modification. The purpose of this paper was to assess the determinants of program exposure, and test whether exposure to FP/RH program information translates into increased knowledge, awareness, and prevention of HIV/AIDS.

While the VISION project communication strategy predominantly focused on radio communications and community health workers, some of the VISION partners also used other media. The results from our study show that in combination these media activities had very high reach among the target population. Exposure to radio communication was highest, with 61% of the population reporting to have heard at least one advertisement or radio program. Exposure to TV programs was the lowest media source, with less than 25% of the population reporting having seen at least one program. Exposure to printed advertisements was also low, with fewer than 48% having seen an

advertisement. Community health workers and visits to the clinic were also important venues, with over 25% of the population having been exposed to one or the other.

In short, the evidence shows that the FP/RH media campaign by VISION and its partners is reaching a large share of the project target population. Further, there is evidence to suggest that program exposure is increasing the communities' willingness to discuss HIV/AIDS with partners, as well as increasing the communities' knowledge about the benefits of consistent use of condoms for reducing HIV/AIDS risk. Less clear however, is the effect of the respective programs on condom use, as evidenced by insignificant estimated values, significant observed values, and differences in the magnitude of the effect between models. It may take much longer for the effect of radio and TV programs to affect condom use within the community. In so much as this is true, it will be necessary to scale up the coverage, content, and distribution of media campaigns in the future, to ensure that HIV/AIDS information is readily available and understandable to the majority of the population.

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Figure 1: Percentage of respondents exposed to media programs implemented by the VISION project and its partners, by gender (n = 3,279).

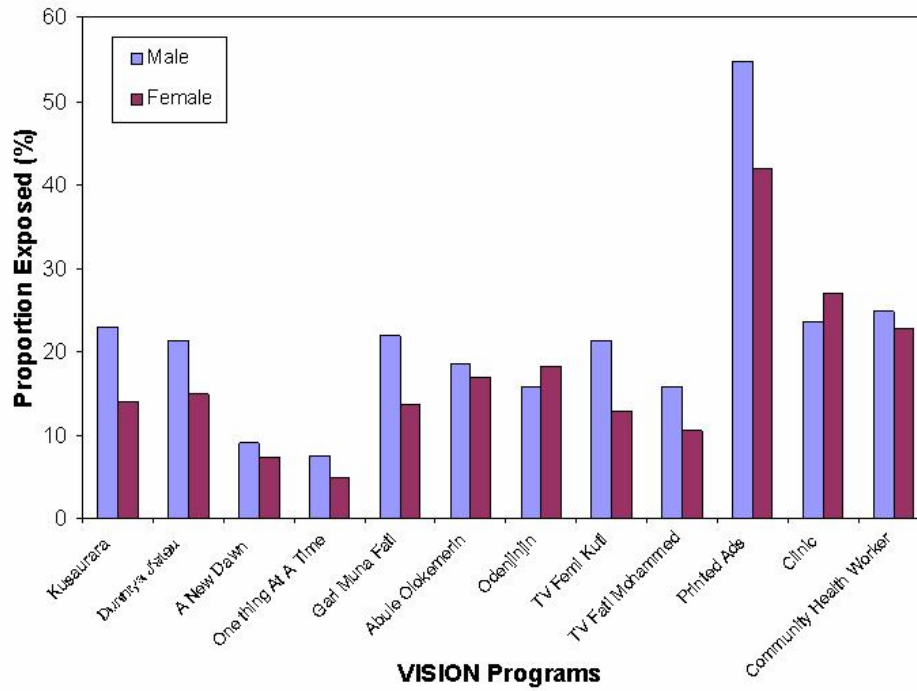


Figure 2: Graph showing: 1) Percentage of respondents that used condom at last sex; 2) Percentage of respondents that have discussed ways to prevent getting HIV/AIDS with partner; and 3) Percentage of respondents that believe consistent condom use reduces risk of HIV infection. Aggregated estimates were calculated using weighted data.

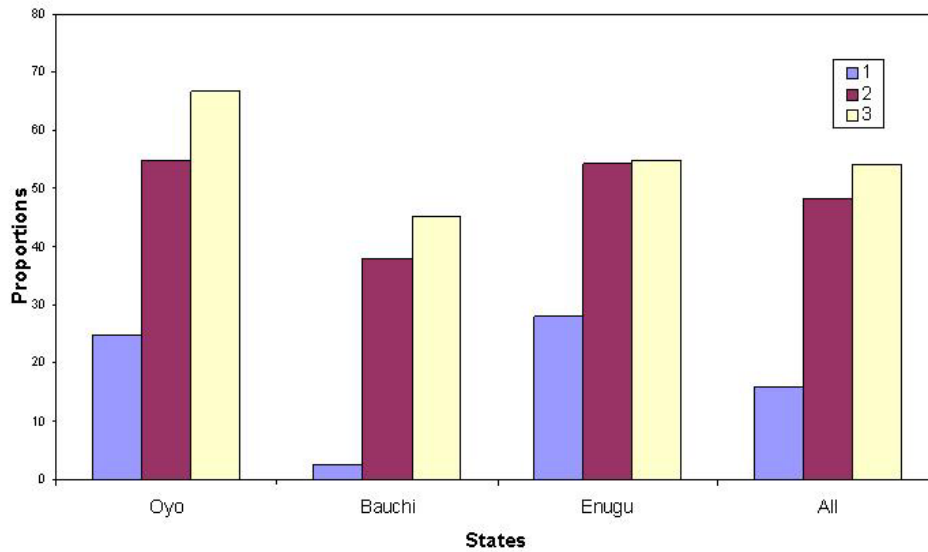


Table 1: Respondent characteristics by State (Standard Error)

	Oyo (n = 1,083)	Bauchi (n = 1,096)	Enugu (n = 1,100)	All* (n = 3,279)
	# (S.E.)			
Mean age of respondents	29.6 (0.281)	27.2 (0.28)	28.0 (0.282)	28.1 (0.165)
Mean number of sexual partners in past year	1.2 (0.026)	1.2 (0.041)	1.1 (0.252)	1.2 (0.021)
	% (S.E.)			
Proportion of respondents that are married or living with partner	59.7 (0.015)	72.8 (0.013)	44.9 (0.015)	60.1 (0.009)
Proportion of respondents that know where to get condoms	57.1 (0.015)	25.8 (0.013)	51.2 (0.015)	42.8 (0.009)
Religion of household respondents				
Catholic	3.7 (0.006)	2.0 (0.004)	70.9 (0.139)	24.4 (0.008)
Muslim	41.5 (0.015)	88.6 (0.000)	0.8 (0.003)	47.3 (0.009)
Protestant/other Christians	54.5 (0.015)	9.0 (0.009)	25.8 (0.013)	27.1 (0.008)
Traditional/other	0.4 (0.002)	0.4 (0.002)	2.5 (0.005)	1.1 (0.002)
Location of household				
Urban/Peri-urban	74.2 (0.013)	34.9 (0.014)	35.5 (0.014)	46.2 (0.009)
Rural	25.8 (0.013)	65.1 (0.014)	64.5 (0.014)	53.8 (0.009)
Sex of respondent				
Male	42.9 (0.015)	49.5 (0.015)	36.5 (0.015)	43.5 (0.009)
Female	57.1 (0.015)	50.5 (0.015)	63.5 (0.015)	56.5 (0.009)
Education of respondent				
None	21.2 (0.013)	59.4 (0.015)	12.2 (0.000)	33.6 (0.009)
Primary	20.2 (0.012)	20.3 (0.012)	28.4 (0.136)	22.9 (0.007)
Secondary or higher	57.9 (0.015)	20.4 (0.012)	59.5 (0.015)	43.6 (0.009)

*Aggregated parameter estimates across States were calculated using weighted data.

Table 2: Characteristics of VISION media program exposure among respondents by State (Standard Error)

	Oyo	Bauchi	Enugu	All*
	# (S.E.)			
Mean number of VISION radio programs exposed to	0.91 (0.026)	1.38 (0.039)	0.65 (0.025)	1.01 (0.020)
Mean number of VISION TV programs exposed to	0.32 (0.018)	0.36 (0.019)	0.19 (0.013)	0.29 (0.010)
	% (S.E.)			
Percentage of respondents that read the newspaper at least once a week	32.1 (0.014)	14.6 (0.011)	30.9 (0.014)	24.8 (0.008)
Percentage of respondents that listen to the radio at least once a week	84.2 (0.011)	72.2 (0.014)	75.5 (0.013)	76.6 (0.008)
Percentage of respondents that watch TV at least once a week	64.9 (0.015)	28.5 (0.014)	54.4 (0.015)	47.1 (0.009)
Percentage of respondents that heard a program reproductive health message on the radio in last 6 months	63.5 (0.015)	62.9 (0.015)	50.6 (0.015)	59.1 (0.009)
Percentage of respondents that saw a program reproductive health programs on the TV in last 6 months	25.0 (0.013)	28.5 (0.014)	17.0 (0.011)	23.8 (0.008)
Percentage respondents that saw any printed advertisements about HIV/AIDS, sexual abstinence, or condom use in last 6 months	52.5 (0.015)	38.8 (0.015)	53.4 (0.015)	47.3 (0.009)
Percentage of respondents that believe it is acceptable to discuss HIV/AIDS in newspaper	96.8 (0.006)	95.8 (0.007)	97.4 (0.005)	96.6 (0.003)
Percentage of respondents that believe it is acceptable to discuss HIV/AIDS on TV	98.7 (0.004)	96.4 (0.006)	98.5 (0.004)	97.7 (0.003)
Percentage of respondents that believe it is acceptable to discuss HIV/AIDS on radio	98.4 (0.004)	96.5 (0.006)	98.3 (0.004)	97.6 (0.003)

*Aggregated parameter estimates across States were calculated using weighted data

Table 3: Poisson regression results estimating exposure to the number of radio programs heard, TV programs or advertisements viewed over the past 6 months

Covariates (PSU = 120)	Total (n = 3,249)	Radio (n = 3,249)	TV (n = 3,252)
Watch television once a week	0.237**	0.082	0.664**
Listen to the radio once a week	0.634**	0.787**	0.407*
Read newspaper once a week	0.174**	0.151*	0.296*
Age (continuous variable)	-0.002	-0.007**	0.015**
At least 1 partner in past 12 months	0.039	0.033	0.013
Education (No formal education: Reference)			
Primary	0.139*	0.112	0.104
Secondary	0.270**	0.151*	0.257*
Residence (Rural: Reference)			
Urban/peri-urban	0.193**	0.185	0.869**
Sex (Female: Reference)			
Male	0.135**	0.108*	0.185*
Married or living with partner	0.013	0.104*	-0.289**
State (Oyo: Reference)			
Bauchi	0.531**	0.578**	0.808**
Enugu	-0.103	-0.264*	-0.156

[§]Weighted data were used for logistic regression models.

[†]Standard errors were estimated using a sandwich estimator.

*Significant with p-value <0.05

**Significant with p-value <0.001

Table 4: Logistic regression results estimating the odds that a sexually experienced respondent has discussed HIV/AIDS with partner in past 6 months (n = 2,504).

Covariates (PSU = 120)	Program Exposure Indicator Use (Adjusted Odds ratio: 95% CI)					
	Total Exposure		Radio exposure		TV exposure	
	1	2	3	4	5	6
Exposure (Total programs)						
Observed High	1.72**					
Observed Medium	1.17					
Estimated High		1.47*				
Estimated Medium		1.12				
Exposure (Radio programs)						
Observed High			1.52**			
Observed Medium			1.28*			
Estimated High				1.16		
Estimated Medium				1.27		
Exposure (TV programs)						
Observed High					1.91	
Observed Medium					1.61**	
Estimated High						N/A
Estimated Medium						0.97
Age (continuous variable)	1.02*	1.01*	1.02*	1.02*	1.01*	1.02*
Education (No formal ed: Reference)						
Primary	1.66**	1.56*	1.67**	1.66**	1.66**	1.70**
Secondary	3.10**	2.93**	3.30**	3.25**	3.20**	3.43**
Residence (Rural: Reference)						
Urban/peri-urban	0.83	0.81	0.89	0.90	0.80	0.91
Sex (Female: Reference)						
Male	1.13	1.09	1.14	1.13	1.15	1.16
Religion (Catholic: Reference)						
Protestant/other Christians	1.06	1.09	1.07	1.09	1.08	1.09
Muslim	0.70	0.76	0.71	0.76	0.74	0.76
Traditionalist	0.64	0.62	0.63	0.61	0.59	0.62
Knows where to get condoms	2.60**	2.83**	2.72**	2.84**	2.70**	2.85**
Had at least 1 partner in past year	1.15	1.12	1.15	1.14	1.14	1.15
Married or living with partner	2.01**	2.01**	1.98**	1.98**	2.11**	2.00**
State (Oyo: Reference)						
Bauchi	0.96	0.96	1.01	0.99	0.94	1.09
Enugu	1.01	1.08	1.04	1.15	1.03	1.04
Pseud-R ²	13.3%	12.8%	12.8%	13.0%	12.7%	13.3%

[§]Weighted data were used for logistic regression models.

[†]Standard errors were estimated using a sandwich estimator.

*Significant with p-value <0.05

**Significant with p-value <0.001

Table 5: Logistic regression results estimating odds that a sexually experienced respondent knows that consistent use of a condom can reduce the risk of HIV transmission (n = 2,464).

Covariates (PSU = 120)	Program Exposure Indicator Use (Adjusted Odds ratio: 95% CI)					
	Total Exposure		Radio exposure		TV exposure	
	1	2	3	4	5	6
Exposure (Total programs)						
Observed High	2.22**					
Observed Medium	1.80*					
Estimated High		2.20**				
Estimated Medium		1.42*				
Exposure (Radio programs)						
Observed High			2.04**			
Observed Medium			1.43*			
Estimated High				1.30		
Estimated Medium				1.33*		
Exposure (TV programs)						
Observed High					0.80	
Observed Medium					0.97	
Estimated High						N/A
Estimated Medium						0.91
Age (continuous variable)	0.99	0.99	0.99	0.99	0.99	1.00
Education (No formal ed: Reference)						
Primary	1.19	1.03	1.19	1.19	1.24	1.23
Secondary	1.78*	1.49*	1.90**	1.85**	2.00**	2.00**
Residence (Rural: Reference)						
Urban/peri-urban	0.87	0.80	0.96	0.97	1.01	0.99
Sex (Female: Reference)						
Male	1.00	0.93	1.02	1.01	1.03	1.04
Religion (Catholic: Reference)						
Protestant/other Christians	0.75	0.78	0.75	0.79	0.79	0.79
Muslim	0.68	0.78	0.67	0.79	0.79	0.78
Traditionalist	1.18	1.23	1.24	1.23	1.24	1.22
Knows where to get condoms	3.49**	3.72**	3.57**	3.77**	3.86**	3.8**
Had at least 1 partner in past year	0.94	0.92	0.94	0.94	0.95	0.94
Married or living with partner	0.98	0.98	0.97	0.96	0.97	0.98
State (Oyo: Reference)						
Bauchi	0.70*	0.62*	0.68*	0.69*	0.80	0.79
Enugu	0.52*	0.59*	0.56*	0.62*	0.55*	0.55**
Pseudo-R ²	13.5%	12.9%	13.3%	12.5%	12.4%	12.3%

[§]Weighted data were used for logistic regression models.

[†]Standard errors were estimated using a sandwich estimator.

*Significant with p-value <0.05

**Significant with p-value <0.001

Table 6: Logistic regression results estimating odds that a sexually experienced respondent used a condom at last sexual intercourse (n = 2,099).

Covariates (PSU = 120)	Program Exposure Indicator Use (Adjusted Odds ratio: 95% CI)					
	Total Exposure		Radio exposure		TV exposure	
	1	2	3	4	5	6
Exposure (Total programs)						
Observed High	2.77**					
Observed Medium	2.56*					
Estimated High		1.40				
Estimated Medium		0.95				
Exposure (Radio programs)						
Observed High			1.25			
Observed Medium			1.58*			
Estimated High				1.73		
Estimated Medium				1.42		
Exposure (TV programs)						
Observed High					2.23*	
Observed Medium					1.31	
Estimated High						N/A
Estimated Medium						2.79*
Age (continuous variable)	0.99	0.99	0.99	0.99	0.99	0.99
Education (No formal ed: Reference)						
Primary	1.54	1.51	1.58	1.47	1.54	1.44
Secondary	1.57	1.58	1.78	1.57	1.69	1.56
Residence (Rural: Reference)						
Urban/peri-urban	1.40	1.41	1.56*	1.58*	1.46	1.57
Sex (Female: Reference)						
Male	1.79**	1.68*	1.82**	1.72**	1.75**	1.79
Religion (Catholic: Reference)						
Protestant/other Christians	0.88	0.87	0.88	0.88	0.88	0.90
Muslim	0.49*	0.51*	0.49*	0.53*	0.51*	0.53*
Traditionalist	0.56	0.47	0.53	0.46	0.46	0.47
Knows where to get condoms	8.72**	9.55**	9.17**	9.58**	9.18**	9.71**
Had at least 1 partner in past year	1.02	0.99	1.02	1.00	1.04	1.01
Married or living with partner	0.14**	0.14**	0.14**	0.14**	0.15**	0.15**
State (Oyo: Reference)						
Bauchi	0.25**	0.25**	0.30**	0.23**	0.23**	0.18*
Enugu	0.88	0.91	0.88	1.09	0.90	0.88
Pseudo-R ²	45.0%	44.4%	44.5%	44.4%	44.6%	44.5%

[§]Weighted data were used for logistic regression models.

[†]Standard errors were estimated using a sandwich estimator.

*Significant with p-value <0.05

**Significant with p-value <0.001

Appendix 1: Map of VISION program areas in Bauchi, Enugu, and Oyo States, Nigeria.

