

# Increasing PMTCT knowledge and uptake of services among women of reproductive age using Community Resource Persons (CORPs) in Shendam, Plateau, Nigeria



Apagu D.G<sup>1</sup>, Tagurum Y.O<sup>2</sup>, Hassan Z.I<sup>2</sup>

<sup>1</sup>Federal Capital Territory Primary Health Care Board (FCT PHCB) Abuja, Nigeria. <sup>2</sup>Department of Community Medicine, Jos University Teaching Hospital, Nigeria.

\*Corresponding author: dannyabuth@yahoo.com

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## ABSTRACT

**Background:** In Nigeria, the total number of infants at risk of MTCT, assuming no multiple pregnancies is 259,000 with an estimated MTCT rate of 25-40%. **Aim:** The objective of the study was to determine the effect of training Community Resource Persons (CORPs) on the knowledge and uptake of PMTCT services among women of reproductive age in the communities. **Methods:** The study was a community-based, interventional study conducted among 833 women. Trained CORPs carried out house to house health education intervention for three months. **Results:** There were 833 married women of reproductive age recruited for the study. The mean age of the respondents were  $29.6 \pm 7.0$  and  $28.8 \pm 6.1$  years respectively for the intervention and control groups, the median age for both was 29 years. The comprehensive knowledge of HIV/AIDS was low as only 35.5% of the respondents in the intervention group had good knowledge. This rose to 40.8% following intervention. Those with fair comprehensive knowledge of PMTCT improved from 54.5% to 67.8% at pre and post-intervention respectively, while in the control group it slightly declined from 58.1% to 57.5% at the beginning and end of the study. Uptake of PMTCT services among pregnant women in the intervention population improved from 58.1% to 65.4% compared to 62.7% to 63.0% in the control group. **Conclusion:** The study has demonstrated that the use of CORPs has significantly improved the knowledge and uptake of PMTCT among women of reproductive age in the intervention population. Therefore, CORPs should be used to improve the knowledge and uptake of PMTCT services.

**Key words:** HIV, PMTCT, women of reproductive age, CORPs, knowledge, uptake



## INTRODUCTION

The global epidemic of HIV infection continues to spread, with about 5 million newly HIV-infected individuals annually.<sup>[1]</sup> More than 60 million people worldwide have been infected with the virus and an estimated 40 million are now living with the virus.<sup>[1,2]</sup> In Sub Saharan Africa, there were estimated 22 million people living with HIV at the end of 2007.<sup>[3,4]</sup> As more women become HIV-infected, there is a growing HIV/AIDS epidemic among children, who acquire the infection through Mother-to-Child Transmission (MTCT), which accounts for 10% of HIV transmission.<sup>[3,5,6,7,8]</sup> Each year, more than 700,000 children are born infected with HIV, over 90% of these children contract the infection from their mothers during pregnancy, labour and delivery, or breast feeding.<sup>[9,10]</sup> Two million children in sub-Saharan Africa were living with HIV at the end of 2007, which represent over 85% of all the children living with HIV worldwide.<sup>[11]</sup> The estimated incidence of HIV infection among children of HIV-infected mothers in the United States has declined from approximately 1,800 per year to less than 200 per year because of prevention of mother-to-child transmission (PMTCT) services.<sup>[5]</sup> This contrasts with the estimated 1,800 infants who acquire HIV infection each day in sub-Saharan Africa because of MTCT.<sup>[5]</sup>

In Nigeria, the total number of infants at risk of MTCT, assuming no multiple pregnancies is 259,000 with an estimated MTCT rate of 25-40%.<sup>[12]</sup> The number of HIV positive infants born per annum is 64,900-103,840. In 2006 only 5.25% of women were benefiting from anti-retroviral (ARV) prophylaxis in Nigeria.<sup>[13]</sup> This has been attributed to low awareness and access to HIV counseling and testing (HCT) services owing to the wide gap between the health facilities and the community.<sup>[12,13]</sup>

World Health Organization (WHO) and its United Nations (UN) partners advocated for strategic approaches to the prevention of HIV infection in infants.<sup>[14]</sup> These approaches constitute the four elements of PMTCT: primary prevention of HIV infection in women of reproductive age group and their partners;

prevention of unintended pregnancies among HIV positive women; prevention of HIV transmission from HIV infected mothers to their unborn babies and infants; and care and support for HIV infected women, their children, and family members.<sup>[14]</sup>

The use of community volunteers or CORPS as part of a community directed approach to disease prevention and control has been successfully implemented in the management and control of a number of diseases within and outside Nigeria.<sup>[15,16]</sup> Similarly, in Mozambique, community health workers working within their communities have been used to improve accountability, relevance, and geographical access to basic health services.<sup>[15]</sup> Volunteers have also been used successfully as community-based distributors of Ivermectin within and outside Nigeria in the Community Directed Treatment of Onchocerciasis with Ivermectin (CDTI) programme.<sup>[17]</sup> Moreover, CORPS forms part of the human resources in primary health care implementation in Nigeria.<sup>[17,18]</sup>

This study aimed at bridging the gap between the community and the health facilities; prepare women of reproductive age and their spouses on PMTCT irrespective of their pregnancy status; increase awareness and access to PMTCT services through health education, referrals and linkages; reduce HIV/AIDS stigma by using trained community resource persons CORPS

## METHODOLOGY

### Background of study area

Plateau State with Jos as the capital is sited on an area of 30,913km<sup>2</sup> and located between latitude 8°24'N and longitude 8°32' and 10°38' east.<sup>[19]</sup> It is located in the North Central region of Nigeria, bordered on the Northeast by Bauchi state, Northwest Kaduna state, Southwest Nasarawa state and Taraba state is on the Southeast. It has a population of 3,206,531 people; 1,598,998 males and 1,607,533 females. The state has seventeen Local Government Areas (LGAs) with over 20 ethnic groups who are mainly farmers living in rural areas.<sup>[20]</sup> Shendam LGA is a rural area covering a land mass of about 2,437 km<sup>2</sup> and has an estimated population of 205,119; 101,951 males and 103,168 females. It

shares boundaries with Pankshin LGA in the North, Langtang South in the East, Qua'anPan in the West, Nasarawa and Taraba States in the South. The LGA has 18 political wards and a fairly good road network linking all of them. Shendam is the commercial nerve centre of Southern part of Plateau state. The indigenous ethnic groups in this area are Goemai, Jukun, and Tehl. Other ethnic groups are Hausa, Igbo and Yoruba.<sup>[19]</sup> The main religions practiced are christianity, islam and traditional religion. The inhabitants are mostly farmers and traders. Other occupations in this area include fishing and craft. The citizens have access to the federal and state-owned mass media outfits in some parts of the LGA. There are 58 health facilities in the LGA viz; four secondary health facilities and the rest are primary health care centres.<sup>[20]</sup> The General Hospital in Shendam which is one of the secondary health facilities offers comprehensive HIV/AIDS treatment, care and support.

Mikang LGA, also a rural area was used as the control population. It is located in the southern part of Plateau State with an area of 630 km<sup>2</sup> and a total population of 96,388; 47,584 males and 48,804 females. It is bounded by Pankshin LGA to the North, LangtangNorth LGA to the East, and Qua'anPan LGA to the West. It has 15 political wards and 28 health facilities; one secondary health facility which offers comprehensive HIV/AIDS care and support while the others are primary health care facilities.<sup>[20]</sup> The LGA has a fairly good road network and access to the state owned mass media. The main religions practiced are Christianity, Islam and Traditional worship. The people of Mikang LGA are predominantly farmers. The indigenous ethnic groups are Youm, Tehl, Piapung, Koenoem, Taroh and Tal. Other ethnic groups are Hausa, Igbo and Yoruba.<sup>[21]</sup>

### Study population

Married women of reproductive age (15-49 years) who resided in Shendam and Mikang LGAs for at least one year were used.

### Inclusion and exclusion criteria

All married women of reproductive age residing in the community for at least one year were included in the study, while

visitors, women who have not been residing for up to a year in the town and single ladies were excluded.

### Study design

The study was a community-based, interventional study with pre- and post-interventional components using married women of reproductive age in Shendam as intervention group and married women of reproductive age in Mikang as control group.

### Sample size determination

The minimum sample size was determined using the following formula.<sup>[22,23]</sup>

$$N = \frac{(Z_{\alpha} + Z_{\beta})^2 \times 2 \times p(1-p)}{d^2}$$

$Z_{\alpha}$  =95% confidence level = 1.96

$Z_{\beta}$  =20% B error (80% power) = 0.84

P= the proportion of married women of reproductive age in the population with good knowledge of PMTCT=67.5% (from previous study).<sup>[24]</sup>

d= critical value (10%)

$$N = \frac{(1.96 + 0.8)^2 \times 2 \times 0.675(1 - 0.675)}{(0.1)^2} = 344$$

Minimum sample size=344 for each LGA. This was rounded up to 413 each by adding 20% of the minimum sample to cover for non-response.

### Sampling method

In order to select participants for the study, multistage sampling technique was used.

**Stage 1:** Shendam LGA was selected by balloting from the 17 LGAs in the state while Mikang LGA was balloted to serve as the control area.

**Stage 2:** In each of the LGAs selected, a sampling frame was produced by listing all the political Wards, and Shendam A and Tunkus were balloted on for the intervention and control Wards respectively.

**Stage 3:** From the six communities in Shendam A Ward (AngwanPama, State low-cost, Congo, AngwanSarki, AngwanBerom and AngwanKabari), AngwanSarki community was selected by balloting as the intervention group. Similarly, from the six communities in TunkusWard (Jipta'am, Baltip East, Baltip West, Bashi Andy, BakinRijiya and Baltip North), Baltip West community was balloted to serve as the control group.

**Stage 4:** A list of households in AngwanSarki community was drawn to form

the sampling frame using the already existing PHC numbering in the community (this is done with the assumption that there is at least a woman of reproductive age in each household). There were 887 households from which a sampling fraction (f) of 0.5 was calculated and this gave a sampling interval (k) of 2. From the centre of the town, the first household was selected by spinning a bottle and the closest house hold to the neck of the bottle was selected. Subsequently, using a systematic sampling technique, every 2nd household was selected for the study. Where there was more than one eligible woman in a household at the time of visit, a respondent was picked by balloting. Where there was no eligible woman, the adjacent house hold was selected. Similar criteria were used for selection of study participants in Baltip West which was the control community. It had a total of 903 households which gave a sampling interval of 2.

#### Instruments of data collection

This was divided into two, interviewer administered questionnaire and data extraction form

The interviewer administered questionnaire was divided into three sections.

Section 1: Socio-demographic data; age, occupation, educational level, parity and religion

Section 2: Knowledge about HIV/AIDS and PMTCT

Section 3: Utilization of PMTCT services

The data extraction form was used to capture data from the facilities on ANC visits, PMTCT, facility delivery, post-natal care and HCT three months before intervention and after intervention among adult males (18-60 years) and women of reproductive age (15-49 years).

#### Data collection

**Pre-intervention:** Five research assistants (resident doctors) were given one-day training by the researcher on the research objective and data collection tool in order to standardize the process. Baseline data on knowledge of HIV/AIDS, PMTCT and HCT services were captured in both intervention and control groups using the interviewer administered semi structured questionnaires. The data extraction form was used to

capture three months records of HCT, ANC attendance, PMTCT, facility delivery and post-natal clinic attendance in the catchment PHCs in both intervention and control groups.

**Intervention:** After the base-line data had been collected, with the assistance of the village health committee, 10 CORPs were then selected for training. Criteria used in selection included; must be a resident of the community, previous experience with community-based programmes, active membership in an existing community or faith-based organization, willingness to participate, and literacy level. Those who are not literate and not residents of the community were excluded.

**a. Training of CORPs:** The training was conducted at PHC Shendam for duration of five days. The training was conducted in English and translations into Hausa language was done when necessary. This facilitated not only understanding by the CORPs but also established local terminologies to be used in community health education intervention. Posters and flipcharts were used during the training sessions. Writing materials such as notebooks and pens were provided for each volunteer. The training consisted of lectures on the basic topics on HIV/AIDS, PMTCT, referrals and linkages, HIV Counseling and Testing (HCT) using a training manual, adopted from the WHO PMTCT training manual 2008. A copy of the manual was given to each of the CORPs.

To demonstrate that learning had taken place, the CORPs performed different role-plays on how they would educate their community members, for instance on the benefit of knowing one's HIV status and the benefit of early presentation at a health facility for HCT. At the end of the training, each CORP was given a target of reaching at least 20 households in a week with minimum of two visits. They were asked to draw up a work plan on how he/she was going to educate and mobilize their communities. The CORPs were also given notebooks in which to record a summary of their activities. One of the ten CORP was chosen by the others as the lead volunteer and him co-ordinated the activities of the other nine volunteers. Thereafter, each of

the CORP commenced house to house health education of community members of HIV/AIDS and this included visits and re-visits. Community members were mobilized and those willing were referred by the CORPs to the PHC facility for HCT using referral forms made available by the researcher.

**b. Supervision of the CORPs:** Weekly supervisory visits were carried out by the researcher to supervise the activities of the volunteers. A checklist was designed and used by the researcher during the supervisory visits to ensure uniformity of the supervision and to verify their activities in the community. The check list was adopted from the AIDS prevention initiative Nigeria/Community Directed Initiative (APIN/CDI) program. [25] During the visits, each of the CORPs was observed as they went about their community health education activities. At the end of the supervision, any observed lapses on the part of the CORPs were corrected. Households were also selected at random for interview to verify the activities of the CORPs. Regular communication with the CORPs via phone calls was also done to ensure that their activities went on well and any challenges that came up were dealt with immediately.

**Post Intervention:** Three months after the intervention, the same study instruments were administered to both the intervention and the control groups to generate the post-intervention data.

#### **Ethical consideration**

Ethical clearance was obtained from the Jos University Teaching Hospital (JUTH) Ethical Committee. An advocacy visit was paid to the Commissioner of Health, Local Government Chairmen and the village Heads and they gave their support. A written permission was also obtained from the Commissioner of Health, Local Government Chairmen of both the study and the control communities. An informed consent was obtained from the community Heads and the participants.

#### **Data analysis**

Data generated at baseline and post-intervention were processed and analyzed by the use of the EPI info 3.4.2 version 2005

statistical software. Qualitative variables such as levels of education, religion, occupation, etc. were presented as percentages, while quantitative variables such as age were described using mean and standard deviation. The chi-square test was used to determine any association between certain socio-demographic variables and intervention outcomes in the two groups. A confidence interval of 95% was used in this study and a *P*-value of  $\leq 0.05$  was considered significant.

In order to assess knowledge, respondents' answers were scored and graded against the correct answers expected and the total for each respondent was used to grade level of knowledge. There are 10 questions on knowledge of HIV/AIDS, a mark was awarded for each correct answer given and no mark was awarded for a wrong answer. The grading of the knowledge was done as follows:

A score of 0-3 was assessed as poor knowledge

A score of 4-6 was assessed as fair knowledge

A score of 7-10 was assessed as good knowledge

Similarly, there are 14 questions on knowledge of PMTCT, a mark was awarded for each correct answer given and no mark was awarded for a wrong answer. The grading of the knowledge was done as follows:

A score of 0-6 was assessed as poor knowledge

A score of 7-9 was assessed as fair knowledge

A score of 10-14 was assessed as good knowledge

## **RESULTS**

There were eight hundred and thirty three (833) married women of reproductive age recruited for the study, for both intervention and control groups. Four hundred and eighteen (418) respondents in the control group and four hundred and fifteen (415) in the intervention group at the base line study. Post-intervention, 414 (99.0%) responded in the control while there were 413 (99.5%) who responded fully to the questions in the intervention group. The mean age of the

Table 1: Socio-demographic characteristics of women of reproductive age in Shendam (intervention) and Mikang (control) LGA, Plateau state-July 2010

Variables	Intervention group (N=415)		Control group ( N=418 )		x <sup>2</sup>	P-value
	Freq	(%)	Freq	(%)		
Age (years)						
15-19	24	(5.8)	12	(2.9)		
20-24	73	(17.6)	87	(20.8)		
25-29	116	(28.0)	121	(28.9)		
30-34	87	(21.0)	106	(25.4)	1.7522*	>0.05
35-39	55	(13.3)	63	(15.1)		
40-44	53	(12.8)	27	(6.5)		
45-49	7	(1.7)	2	(0.5)		
Occupation						
Housewife	111	(26.7)	56	(1.4)		
Farmer	107	(25.8)	173	(41.4)	53.4321	0.000...
Trader	94	(22.7)	118	(28.2)		
Civil servant	62	(14.9)	52	(12.4)		
Artisan	29	(7.0)	16	(3.1)		
Teacher	12	(2.9)	13	(3.1)		
Highest level of education						
None	92	(22.2)	106	(25.4)		
Primary	102	(24.6)	120	(28.7)	8.6243	0.1250
Secondary	151	(36.4)	143	(34.2)		
Tertiary <sup>70</sup>	(16.9)		49	(11.7)		
Religion						
Christianity	341	(82.2)	351	(84.0)		
Islam	62	(14.9)	24	(5.7)	35.5068	0.000...
Others	12	(2.9)	43	(10.3)		
Parity						
Nulliparous	25	(6.0)	19	(4.5)		
Multipara	269	(64.8)	276	(66.0)	3.3497	0.3408
Grand-Multipara	111	(26.7)	105	(25.1)		
Great grand-Multipara <sup>∞</sup>	10	(2.4)	18	(4.3)		

\*t test      <sup>∞</sup> more than 10 deliveries

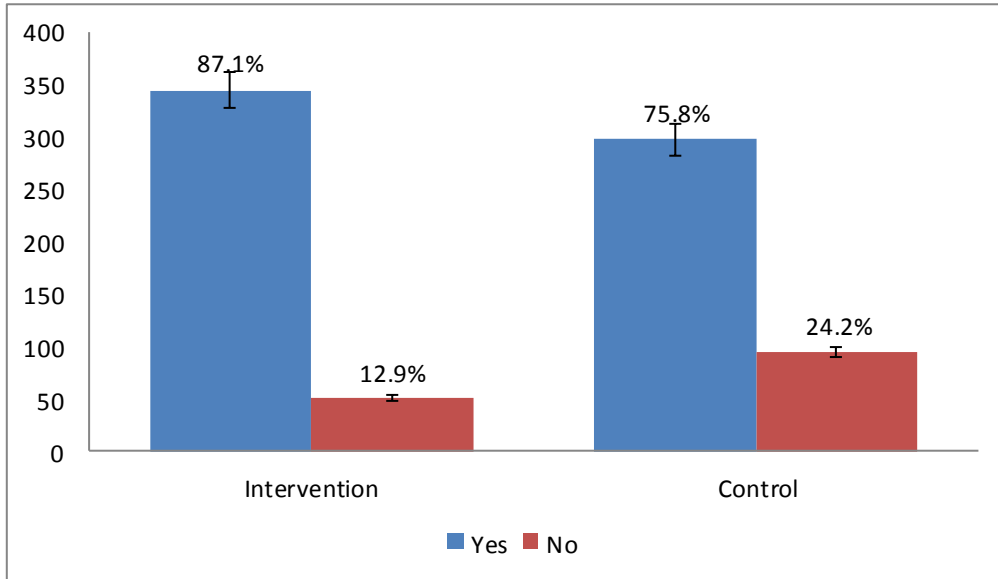


Figure 1: ANC attendance in the last pregnancy among women of reproductive age in Shendam (intervention) and Mikang (control) LGA, Plateau state-July 2010

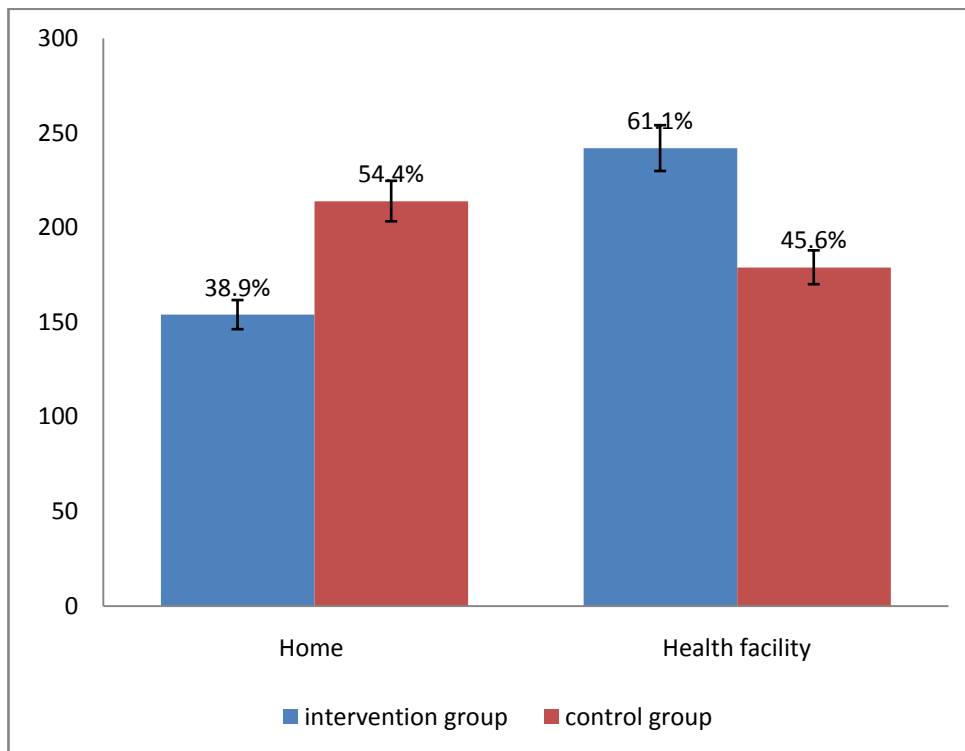


Figure 2: Place of last delivery among women of reproductive age in Shendam (intervention) and Mikang (control) LGA, Plateau state-July 2010

Table 2: Source of information on HIV/AIDS to women of reproductive age in Shendam (intervention) and Mikang (control), Plateau state, July-September 2010

Source*	Intervention group				Control group			
	Pre-intervention (n=415) Freq (%)	Post-intervention (n=413) Freq (%)	$\chi^2$	P	Beginning of study (n= 418) Freq(%)	End of study (n= 414) Freq (%)	$\chi^2$	P
Media	392 (94.4)	372 (90.1)	1.09	0.297	228 (54.5)	161 (38.9)	5.14	0.023
Health workers	240(58.1)	265 (64.2)	0.76	0.384	253 (60.5)	145 (35.0)	13.54	0.000
Friends	160 (38.6)	197 (47.7)	1.80	0.179	171 (40.9)	187 (45.2)	0.33	0.568
Relatives	61 (14.7)	75 (18.2)	0.33	0.570	83 (19.9)	47 (11.4)	3.09	0.078
Spouse	37 (8.9)	44 (10.7)	0.22	0.637	28 (6.7)	51 (12.3)	1.45	0.227
CORPs	0 (0.0)	114 (27.6)	30.27 <sup>b</sup>	0.000..	0 (0.0)	38 (9.2)	9.42	0.001 <sup>∞</sup>
Others	10 (2.4)	10 (10.4)	5.67	0.017	17 (4.1)	5 (1.2)	1.85	0.174

\*Multiple responses allowed <sup>b</sup>yates corrected <sup>∞</sup>fisher exact test

Table 3: Awareness of cause of HIV/AIDS among women of reproductive age in Shendam (intervention) and Mikang (control) LGA, Plateau state, July-September 2010

Cause	Intervention group				Control group			
	Pre-intervention		Post-intervention		Beginning of study		End of study	
	Freq	(%)	Freq	(%)	Freq	(%)	Freq	(%)
Don't know	285	(68.7)	120	(29.0)	260	(62.2)	261	(63.0)
Germ	117	(28.2)	272	(65.9)	142	(34.0)	130	(31.4)
Spirit	8	(1.9)	9	(2.2)	8	(1.9)	10	(2.4)
Insect bite	5	(1.2)	12	(2.9)	8	(1.9)	13	(3.1)
Total	415	100	413	100	418	100	414	100

$\chi^2 = 131.920$ ;  $df = 3$ ;  $P = 0.000...$

$\chi^2 = 1.925$ ;  $df = 3$ ;  $P = 0.5880$

Table 4: Comprehensive knowledge of HIV/AIDS among women of reproductive age in Shendam (intervention) and Mikang (control) LGA, Plateau state, July-September 2010

Knowledge	Intervention group				Control group			
	Pre-intervention (n= 415)		Post-intervention (n= 413)		Beginning of study (n= 418)		End of study (n= 414)	
	Freq	(%)	Freq	(%)	Freq	(%)	Freq	(%)
Poor	78	(18.8)	50	(12.1)	100	(23.9)	190	(45.9)
Fair	198	(47.7)	211	(51.1)	201	(48.1)	189	(45.7)
Good	139	(33.5)	152	(36.8)	117	(28.0)	35	(8.5)
Total	415	100	413	100	418	100	414	100

$\chi^2 = 18.7906$ ;  $df = 2$ ;  $P = 0.0001$

$\chi^2 = 67.1502$ ;  $df = 2$ ;  $P = 0.000...$



Table 5: Relationship between level of education and HIV knowledge among women of reproductive age in Shendam (intervention) and Mikang (control), Plateau state, July 2010

Edu. Level	Intervention (n=415)			Control (n=418)		
	Poor Freq (%)	Fair Freq (%)	Good Freq (%)	Poor Freq (%)	Fair Freq (%)	Good Freq (%)
None	40 (43.5)	34 (37.0)	18 (19.6)	63 (59.4)	35 (33.0)	8 (7.5)
Primary	19 (19.8)			24 (20.0)	74 (61.7)	22 (18.3)
Secondary		56 (58.3)	27 (28.1)	11 (7.7)	72 (50.3)	60 (42.0)
Tertiary	16 (10.6)			2 (4.1)	20 (40.8)	27 (55.1)
	3 (4.3)	78 (51.7)	57 (37.7)			
		30 (42.9)	37 (52.9)			

$\chi^2 = 63.2806$ ;  $df=6$ ;  $P=0.000...$

$\chi^2 = 139.7417$ ;  $df=6$ ;  $P=0.000...$

Table 6: Relationship between ANC attendance and HIV knowledge among women of reproductive age in Shendam (intervention) and Mikang (control), Plateau State, July 2010

ANC attendance	Intervention(n=415)			Control(n=418)		
	Poor Freq (%)	Fair Freq (%)	Good Freq (%)	Poor Freq (%)	Fair Freq (%)	Good Freq (%)
Yes	55 (16.0)	160 (56.5)	129 (37.5)	33 (11.1)	157 (52.7)	108 (36.2)
No	23 (32.9)	37 (52.9)	10 (7.2)	67 (55.8)	44 (36.7)	9 (7.5)

$\chi^2 = 18.6127$ ;  $df=2$ ;  $P=0.0001$

$\chi^2 = 101.4552$ ;  $df=2$ ;  $P=0.000...$

Table 7: Comprehensive knowledge of PMTCT among women of reproductive age in Shendam (intervention) and Mikang (control) LGA, Plateau State, July-September 2010

Knowledge	Intervention group				Control group			
	Pre-intervention		Post-intervention		Beginning of study		End of study	
	Freq	(%)	Freq	(%)	Freq	(%)	Freq	(%)
Poor	144	(34.7)	83	(19.9)	154	(36.8)	168	(40.6)
Fair	225	(54.2)	280	(67.8)	243	(58.1)	238	(57.5)
Good	46	(11.1)	51	(12.3)	21	(5.0)	8	(1.9)
Total	415	100	413	100	418	100	414	100

$\chi^2 = 18.9565$ ;  $df= 2$ ;  $P=0.0001$

$\chi^2 = 1.6846$ ;  $df= 2$ ;  $P=0.4307$

Table 8: Relationship between level of education and PMTCT knowledge among women of reproductive age in Shendam (intervention) and Mikang (control) LGA, Plateau state, July 2010

		Knowledge Intervention (n=415)			Control (n=418)		
Education Level	Poor Freq (%)	Fair Freq (%)	Good Freq (%)	Poor Freq (%)	Fair Freq (%)	Good Freq (%)	
None	56 (60.9)	31 (33.7)	5 (5.4)	76 (72.4)	29 (27.6)	0 (0.0)	
Primary	31 (30.7)			42 (35.3)	71 (59.7)	6 (5.0)	
Secondary		57 (56.4)	13 (12.9)	28 (19.7)	102 (71.8)	12 (8.5)	
Tertiary	46 (30.7)			5 (10.2)	41 (83.7)	3 (14.3)	
	9 (12.9)	89 (59.3)	15 (10.0)				
		48 (68.6)	13 (18.6)				
$\chi^2= 50.2598$ ; df=6; $P= 0.000...$				$\chi^2=97.7815$ ; df=6; $P=0.000...$			

Table 9: Relationship between ANC attendance and PMTCT knowledge among women of reproductive age in Shendam (intervention) and Mikang (control) LGA, Plateau state, July 2010

		Knowledge Intervention (n=415)			Control (n=418)		
ANC attendance	Poor Freq (%)	Fair Freq (%)	Good Freq (%)	Poor Freq (%)	Fair Freq (%)	Good Freq (%)	
Yes	106 (30.8)	194 (56.4)	44 (12.8)	75 (25.4)	201 (68.1)	19 (6.4)	
No	36 (52.2)	31 (44.9)	2 (2.8)	76 (63.3)	42 (35.0)	2 (1.7)	
$\chi^2= 14.0631$ ; df=2; $P=0.0009$				$\chi^2= 53.5289$ ; df=2; $P= 0.000...$			

Table 10: PMTCT uptake among women of reproductive age in Shendam (intervention) and Mikang (control) LGA, Plateau state, July-September 2010

HCT	Intervention group		Control group	
	Pre-intervention Freq (%)	Post-intervention Freq (%)	Beginning of study Freq (%)	End of study Freq (%)
Yes	241 (58.1)	270 (65.4)	262 (62.7)	261 (63.0)
No	174 (41.9)	143 (34.6)	156 (37.3)	153 (37.0)
Total	415 100	413 100	418 100	414 100
$\chi^2= 4.0004$ ; $P=0.0454$			$\chi^2= 0.0465$ ; $P=0.8293$	

Table 11: Relationship between comprehensive PMTCT knowledge and PMTCT uptake among women of reproductive age in Shendam (intervention) and Mikang (control) LGA, Plateau state, July 2010

Knowledge	Intervention(n=414) PMTCT Uptake			Control (n=418)		
	Yes Freq (%)	No Freq (%)	Total	Yes Freq (%)	No Freq (%)	Total
Poor	57 (41.6)	80 (58.4)	137	57 (36.8)	98 (63.2)	155
Fair	148 (66.7)	75 (33.3)	223	191 (78.3)	53 (21.7)	244
Good	37 (68.5)	17 (31.5)	54	16 (84.2)	3 (15.8)	19

$\chi^2$  for trend= 19.159; P=0.000...  $\chi^2$  for trend=66.599; P=0.000..

Table 12: Relationship between level of education and PMTCT uptake among women of reproductive age in Shendam (intervention) and Mikang (control), Plateau state, September 2010

Educational level	Intervention (n=413)			Control (n=414)		
	Yes Freq (%)	No Freq (%)	Total	Yes Freq (%)	No Freq (%)	Total
None	27 (34.6)	51 (65.4)	78	31 (25.8)	89 (74.2)	120
Primary	55 (51.4)	52 (48.6)	104	73 (64.0)	41 (36.0)	114
Secondary	102 (68.5)	47 (31.5)	149	118 (84.3)	22 (15.7)	140
Tertiary	60 (75.9)	19 (24.1)	79	36 (90.0)	4 (10)	40

$\chi^2$  for trend= 35.359; P= 0.000...  $\chi^2$  for trend= 100.315; P= 0.000..

Table 13: Awareness of partner's HIV status among women of reproductive age in Shendam (intervention) and Mikang (control) LGA, Plateau state, July-September 2010

Response	Intervention group		Control group	
	Pre-intervention Freq (%)	Post-intervention Freq (%)	Beginning of study Freq (%)	End of study Freq (%)
Yes	167 (40.2)	225 (54.5)	176 (42.1)	183 (44.2)
No	248 (59.8)	188 (45.5)	242 (57.9)	231 (55.8)
Total	415	413	418	414

$\chi^2 = 15.6463; P=0.0000$   $\chi^2=0.7116; P=0.3989$

respondents in the intervention group was  $29.6 \pm 7.0$  years and  $28.8 \pm 6.1$  years for the control group, the median age for both intervention and control groups was 29 years (table 1).

The predominant occupation of the intervention group was farming, 173 (41.5%) as compared to the control group where there were more housewives; 111 (28.5%) than farmers (25.8%). One hundred and forty three (34.2%) of the respondents had secondary education in the intervention group compared with 151 (34.4%) in the control group. Only 49 (11.7%) of the respondents in the intervention and 70 (16.9%) in the control group had tertiary education. The respondents in both intervention and control groups were predominantly Christians; 351 (84.0%) and 341 (82.2%) respectively. Most, 276 (66.0%) in study group and 269 (64.8%) in the control group were multiparous. Ten (2.4%) of the intervention and 18 (4.3%) of the respondents were great grand multiparous (table 1).

Majority, 345 (87.1%) of respondents in the intervention group and 298 (75.8%) of the control group attended ANC in their last pregnancy (figure 1).

Two third, 242 (61.1%) of respondents in the intervention had their last delivery in the health facility as compared to control where only 179 (45.6%) delivered in the health facility (figure 2).

Before intervention, 392 (94.4%) of the respondents in the intervention group said media was their source of information while 253 (60.5%) of control cited health workers as their main source at the beginning of the study. After intervention, CORPs were the source of information for 114 (27.6%) respondents in the intervention group, while friends were the main source 187 (45.2%) for the control group (table 2).

Awareness on the cause of HIV/AIDS improved from 117 (28.2%) at pre-intervention to 272 (65.9%) at post-intervention among respondents in the intervention group (table 3).

Those with good comprehensive knowledge of HIV/AIDS among the intervention group improved from 139 (33.5%) to 152 (36.8%) at pre and post-intervention respectively (table 4).

Only 3 (4.3%) of those with tertiary education in the intervention group and 2 (4.1%) in the control group had poor HIV/AIDS knowledge as compared to, 40 (43.5%) in the intervention group and 63 (59.4%) in the control group, among those with no formal education. There is generally increase in knowledge as the educational level increases (table 5).

There is a statistically significant association between ANC attendance and HIV knowledge in both intervention and control groups. Only 10 (7.2%) of those who did not attend ANC had good knowledge as compared to 129 (37%) of those that attended in the intervention group, and 9 (7.5%) as against 108 (36.2%) in the control group (table 6).

There was an increase in the overall PMTCT knowledge of the participants in the intervention group, from 54.5% to 67.8% (fair) and 11.1% to 12.3% (good). In the control group, there was a slight decline from 58.1% to 57.5% (fair) and 5.0% to 1.9% (good) (table 7).

There is a statistically significant association between level of education and PMTCT knowledge in both intervention and control groups. Majority of those with poor knowledge, 56 (60.9%) in the intervention group and 76 (72.4%) in the control group had no formal education (table 8).

There is a statistically significant association between ANC attendance and PMTCT knowledge in both intervention and control groups (table 9).

In the intervention group, HCT uptake increased from 241 (58.1%) at pre-intervention to 270 (65.4%) at post-intervention. There was no statistically significant difference in HCT uptake at the beginning and end of studies in the control group (table 10).

There is a positive trend between PMTCT knowledge and PMTCT uptake in both intervention and control groups. PMTCT uptake increases with increasing knowledge (table 11).

There a trend between educational level and PMTCT uptake in both intervention and control groups. The higher the educational level the higher the uptake (table 12).

There was 14.3% increase in the number of women who knew their partners HIV status (table 13).

## DISCUSSION

The socio-demographic variables of the studied subjects were mostly comparable. Majority in the intervention and control groups were between the age range of 25-29 years and same median age of 29 years. The mean ages for the intervention and control groups were;  $29.6 \pm 7.0$  years and  $28.8 \pm 6.1$  years respectively. Both groups share similar levels of education where about one third attended secondary school but about a quarter never had any formal education. This finding is lower than the literacy level among women in Nigeria where the adult female literacy is 43.7% with 32.6% attending secondary school.<sup>[26]</sup> The high level of illiteracy will significantly impact on the level of knowledge and uptake of PMTCT services in these communities.

Nigeria is among the nations with a very high fertility rate (5.7 per woman) because of low uptake of contraceptives and early marriage.<sup>[26]</sup> In this study, majority of the respondents in the intervention and control groups were multiparous even when the majority of the respondents are below 30 years (table 1). This finding is similar to the findings from the Nigeria Demographic and Health Survey where 23.5% of married women surveyed had at least five pregnancies.<sup>[27]</sup> In terms of occupation, most of the respondents in the intervention group were housewives, while in the control group, majority were farmers. Even though the two groups were predominantly Christians, there were more Muslims in the intervention group (14.9%) as compared to the control group (5.7%).

Antenatal care attendance was as high as 87.1% in the intervention group and 75.8% in the control group. This finding was higher than the ANC attendance found during the recent Nigeria Demographic and Health Survey where 65.1% attended ANC in the last pregnancy in the North Central zone and the national average was 57.7%.<sup>[28]</sup> This high ANC attendance may be as a result of the increased awareness campaign being done on radio and television on importance of ANC and the free ITN and anti-malaria drugs being distributed to pregnant women in the PHC clinics in Plateau state.

Institutional delivery in Nigeria has remained low despite increased ANC visit. In this study, only 45.6% of the respondents in the control group had their last delivery in the health facility as compared to 61.1% of the intervention group. This is also higher than the one found in Nigerian Demographic and Health survey, where only 41.0% of women in North Central Nigeria had their last baby in the health facility and the average national figure was 35.0%.<sup>[28]</sup> Thirty eight percent (38%) of women that attended ANC in the intervention group delivered at home compared to the higher rate of forty two percent (42%) in the control group. The high rate of home delivery could mostly be as a result of attitude of health workers, poverty, ignorance and some cultural believes were home delivery is termed as a 'super woman' and facility delivery is only for the weak ones. This has serious implication on PMTCT program as some of these women do not know their HIV status there by risking transmission to their unborn babies.

The level of awareness of HIV/AIDS among married women is generally high even though it tends to be superficial.<sup>[29,30,31]</sup> This is so because their main source of information was largely informal: media, friends, close relatives and spouse whom themselves do not know much about the infection. There are so many misconceptions about the cause of HIV/AIDS. In this study, only 28.2% of the intervention group and 34.0% of the control group knew the correct cause of HIV/AIDS. Following intervention however, there was a statistically significant improvement in knowledge on cause of the disease among the respondents in the intervention group ( $P=0.000$ ).

Misconceptions about HIV/AIDS are prevalent among women in most rural areas in Nigeria because of low level of literacy and poor access to facilities where correct information can be obtained. Most awareness programmes on HIV/AIDS are not done in local culture and dialects of the rural populace and this could affect the clear understanding of the disease by the local people.

The overall knowledge (comprehensive) of HIV/AIDS is very important as those with good comprehensive knowledge are more likely to accept and access available PMTCT services in their communities. In this study, only 35.5% had good knowledge of HIV/AIDS at the baseline. There was statistically significant increase of 5.3% following the intervention by the CORPs. There was a statistically significant association between comprehensive HIV knowledge and level of education in both intervention and control groups. Knowledge of comprehensive HIV/AIDS increased with increase in educational level. This finding was similar to studies done in Dehrandun where knowledge of HIV improved with level of education.<sup>[29]</sup> There was also significant relationship between ANC attendance and HIV knowledge at pre and post-intervention in both groups.

Over half of the respondents in both intervention and control populations had fair comprehensive knowledge of PMTCT of HIV at baseline. Post-intervention, there was statistically significant improvement in the comprehensive knowledge of PMTCT among the intervention group ( $P=0.0001$ ). Even though the proportion of respondents with fair comprehensive knowledge of PMTCT significantly increased from 54.5% to 67.8% among the intervention group, those with good comprehensive knowledge of PMTCT in the same group only increased marginally from 11.1% to 12.3%. This marginal increase might be as a result of low literacy level among the participants and short period of intervention. This finding was by far lower than the figures reported by Plateau State AIDS Control Agency in the same location where 65.7% were said to have good knowledge of PMTCT.<sup>[24]</sup> The Agency might however be reporting facility-based data which may not reflect the true situation in the

communities. Similar findings were reported in Ogun State and other parts of Nigeria.<sup>[31,33]</sup>

There was a statistically significant association between PMTCT knowledge and level of education in both groups. This was similar to the findings from the Nigeria Demographic and Health Survey (NDHS) where knowledge of PMTCT was better among the educated.<sup>[28]</sup> Similarly, at pre-intervention, there was a statistically significant association between PMTCT knowledge and ANC attendance in both intervention ( $P=0.0009$ ) and control ( $P=0.0000$ ) groups.

The uptake of HCT is among the various interventions that play an important role both in treatment and prevention of HIV. It is the main entry point for HIV treatment and care. Counseling and testing help women to make decisions about the options available for infant feeding, future pregnancies, and HIV prevention including PMTCT. At baseline, 58.1% in the intervention and 62.7% in the control groups were counseled, tested and collected results. Post-intervention, 65.4% of the intervention population and 63.0% of the control group had HCT in the present/last pregnancy (table 10). This gave an increase in HCT uptake among the intervention and the control groups by 7.3% and 0.3% respectively. This study is similar to the study done in Kenya and other African countries where there was a 9% increase in HCT uptake after a community based intervention programme.<sup>[29, 30, 34]</sup> The baseline findings of this study were higher than the national figure, where only 11% of the pregnant women had access to HCT.<sup>[35]</sup> The increase in HCT uptake among respondents in the intervention population from pre to post-intervention was statistically significant ( $P=0.0454$ ). The message on HIV/AIDS and PMTCT needs to be continuous and sustained in order to achieve behavioral changes.

There was 14.3% increase in the number of spouses who shared their HIV status with their wives among the intervention population following the intervention. The intervention probably resulted in increased communication among couples regarding HIV/AIDS translating into this high number of women knowing their partners status.

With increasing knowledge, there was a corresponding increase in HCT uptake for PMTCT such that 84.2% of the respondents with good knowledge had HCT for PMTCT as compared to only 36.8% of those with poor knowledge (table 11). These findings are similar to the studies done in urban centres in Asia where areas that had high HCT uptake for PMTCT corresponded to areas with high HIV/AIDS awareness.<sup>[28,36,37]</sup> These findings further stress the need for creating more awareness on HIV/AIDS and PMTCT. Similarly, there was a positive trend between the respondent's level of education and PMTCT uptake. Ninety percent of those with tertiary education had HCT for PMTCT as compared to 25.8% among those without education. This finding implies that female education is paramount in improving the health of children. This is because an educated woman apart from being economically empowered is likely to seek appropriate health care for her child when the need arises.

## CONCLUSION

The intervention has improved the comprehensive knowledge of HIV/AIDS among the intervention group. Those with fair comprehensive PMTCT knowledge improved from 54.5% to 67.8% among the intervention population at pre and post-intervention respectively. Following the intervention, there was a significant increase in the proportion of women who knew their spouse's HIV status among the intervention population. The uptake of PMTCT services among pregnant women in the intervention population also rose from 58.1% to 65.4% at post-intervention. This study has demonstrated that the use of CORPs has significantly improved the knowledge and uptake of PMTCT services among women of reproductive age in the intervention population.

## RECOMMENDATIONS

It is recommended that house to house HIV/AIDS and PMTCT health education intervention should be encouraged because of the wide knowledge gap in the communities especially in the rural areas. Also, Organizations involved in HIV/AIDS

intervention programs should utilize members of the community (CORPS) in their strategies since this has demonstrated to improve access, acceptance, utilization and program ownership.

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