

Improving access to HIV testing for pregnant women in community birth centres in Nigeria: an evaluation of the Prevention of Mother-to-Child Transmission program

Esther Nwanja , Uduak Akpan, Otoyoy Toyo, Pius Nwaokoro, Titilope Badru, Bala Gana, Ifeyinwa Nwanja, Oruayefe Ayabi, Bishop Ayeni, Emem Xavier, Augustine Idemudia, Olusola Sanwo, Hadiza Khamofu and Moses Bateganya

Abstract

Background: The elimination of mother-to-child HIV transmission requires access to HIV testing services (HTS) for pregnant women. In Akwa Ibom, Nigeria, 76% of pregnant women receive antenatal care from traditional birth attendants and may not have access to HIV testing.

Objectives: This study examines the contribution of traditional birth attendants and other healthcare workers in community birth centres in improving access to HTS among pregnant women and their HIV-exposed infants.

Design: A retrospective cross-sectional study of previously collected programme data at two points in time to evaluate the prevention of mother-to-child transmission (PMTCT) programme.

Methods: We assessed programme records before and after introducing an intervention that engaged traditional birth attendants and other healthcare workers in community birth centres to expand access to HTS among pregnant women and their HIV-exposed infants in Akwa Ibom State, Nigeria. Data were abstracted from the programme database for the preintervention period (April 2019 to September 2020) and the intervention period (October 2020 to March 2022). Data abstracted include the number of pregnant women tested for HIV, those diagnosed with HIV, the number of HIV-exposed infants who had samples collected for early infant diagnosis and those diagnosed with HIV. The data were analysed descriptively and inferentially.

Results: Before the intervention, 39,305 pregnant women and 2248 HIV-exposed infants were tested for HIV. After the intervention, the number of pregnant women tested increased to 127,005 and the number of HIV-exposed infants tested increased to 2490. Among pregnant women, the postintervention testing increased by 3.2-fold, with community birth centres reporting 63% of all tests. The intervention also resulted in an 11% increase in HIV-exposed infants benefitting from early infant diagnosis with community birth centres reporting 5% of all tests. Of those diagnosed with HIV, 24% of pregnant women and 12% of infants were diagnosed at community birth centres.

Conclusion: Community-based HIV testing for pregnant women can reduce mother-to-child transmission and improve early diagnosis and treatment of exposed infants. Collaboration with birth attendants is crucial to ensure testing opportunities are not missed. Prospective research is needed to understand the clinical outcomes of intervention programmes in the community.

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Correspondence to:

Esther Nwanja
AHNi, 67, Bennett Bassey
Street (Unit C), Ewet
Housing Estate, Uyo, Akwa
Ibom State, Nigeria
enwanja@ahnnigeria.org
airstarnwanja@gmail.com

Uduak Akpan
Otoyoy Toyo
Bala Gana
Ifeyinwa Nwanja
Oruayefe Ayabi
Bishop Ayeni
Augustine Idemudia
AHNi, Abuja, Nigeria

Pius Nwaokoro
Titilope Badru
Olusola Sanwo
Hadiza Khamofu
FHI 360, Abuja, Nigeria

Moses Bateganya
FHI 360, Durham, NC, USA

Emem Xavier
Akwa Ibom State Ministry
of Health, Nigeria

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Introduction

The elimination of mother-to-child HIV transmission requires equitable access to HIV testing services (HTS) for pregnant women.^{1,2} Globally, an estimated 1.3 million women and girls living with HIV become pregnant annually with 150,000 new HIV infections in their children.¹⁻³

Mother-to-child HIV transmission is 16.9% in Sub-Saharan Africa, with 84.4% of pregnant women having access to services for the prevention of mother-to-child transmission (PMTCT).⁴⁻⁶ In low- and middle-income countries, however, 54% of pregnant women do not have access to HIV tests.^{3,7}

In Nigeria, antenatal care provided within the health facilities is the entry point for PMTCT, and HIV testing is a recognized component of PMTCT in these settings.^{8,9} Only, about a quarter of pregnant women receive antenatal services from health facilities with 42% antiretroviral therapy coverage for PMTCT.^{9,10} Akwa Ibom State has the highest HIV prevalence in Nigeria, and 96% of pregnant women receive their first HIV test during antenatal care.^{11,12} The majority (76%) of pregnant women, however, receive antenatal services from community birth centres such as birth attendants.¹³

Traditional birth attendants bridge the gap in health services in low-and-middle-income countries resulting from the shortage of obstetrics health professionals.^{14,15,16} The health services provided by birth attendants are utilized due to the women perceiving birth attendants as accessible, knowledgeable, friendly and reliable. Importantly, the unfriendly attitude of healthcare workers, the high cost of services and the lack of transport to health facilities drive the high patronage of community birth centres.¹⁷⁻²⁰ For these reasons, there are recommendations to recognize birth attendants and other lay workers to provide better access to maternal services and neonatal care.^{15,21}

Several studies have used traditional birth attendants to improve the PMTCT programme.²²⁻²⁴ In

Zambia, birth attendants provided saliva-based HIV testing and administered prophylaxis to HIV-exposed infants.²² Hamela and colleagues trained birth attendants to enhance the referral of pregnant women for HTS in health facilities.²³ In Nigeria, the TAP-In model integrated birth attendants into primary health centres to improve HIV testing among pregnant women by referral services.²⁴ These studies, however, reported missed opportunities for the uptake of HIV testing using the referral model.^{23,24}

FHI360's Meeting Targets and Maintaining Epidemic Control (EpiC) Project funded by the US President's Emergency Plan for AIDS Relief (PEPFAR) through the United States Agency for International Development (USAID), a global initiative that aimed to attain and maintain the control of the epidemic across sex and different age groups including PMTCT for pregnant women and HIV-exposed infants.²⁵ The ultimate goal of the PMTCT programme was to scale up prevention, care and treatment services to HIV-positive pregnant and prevent vertical infection in HIV-exposed infants.⁹ To improve access to HTS for all pregnant women irrespective of their care options, the EpiC project collaborated with birth attendants to provide HIV testing to pregnant women receiving antenatal care outside the health facilities (Figure 1). The EpiC project supported antenatal services in health facilities and community birth centres. The community-based HIV services were provided by community ART management teams comprising clinicians, pharmacists, laboratory scientists, counsellor testers, data entry clerks and other health workers.²⁶

To provide HTS to pregnant women in community birth centres, EpiC project conducted advocacy to key stakeholders such as community leaders, leaders of women groups, the association of traditional birth attendants and healthcare workers in primary health centres, to gain their buy-in (Figure 2), validated information on the characteristics of the community birth centres and birth attendants on the state directory and establish antenatal days for the centres. Community birth centres were linked to nearby

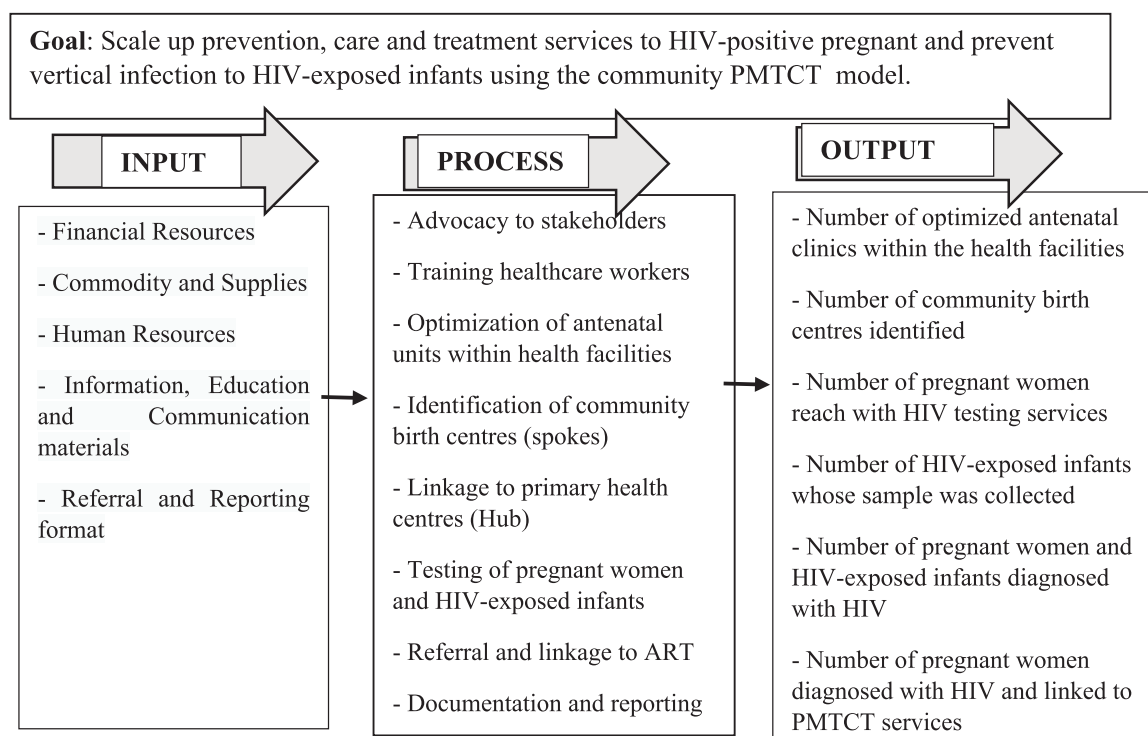


Figure 1. Conceptual framework to improve PMTCT coverage among pregnant women in Akwa Ibom.

primary healthcare centres in a hub-spoke model for ease of referral, data reporting and support for infection prevention and control commodities and services. Already existing community ART management teams were used to provide HTS for pregnant women and HIV-exposed infants (Figure 2) in these centres.

This article, therefore, examines the contribution of birth attendants in community birth centres in improving access to HTS among pregnant women and their HIV-exposed infants.

Methods

Study design

A retrospective cross-sectional study of previously collected programme data at two points in time to evaluate the PMTCT programme.

Setting

This project was conducted in 21 local government areas in Akwa Ibom State, Nigeria.²⁷ These local government areas have a mix of urban, rural

coastal and rural noncoastal region areas.²⁸ A total of 102 health facilities and 767 community birth centres participated, with community birth centres comprising traditional birth homes manned by lay workers, maternity homes manned by trained healthcare workers and congregational homes manned by lay religious personnel.

Sample

Pregnant women who attended antenatal care in 102 health facilities and 767 community birth centres in Akwa Ibom during the preintervention period (April 2019 to September 2020) and the intervention period (October 2020 to March 2022). The database contained a total of 41,100 pregnant women and 2248 HIV-exposed infants preintervention and 128,816 pregnant women and 2490 HIV-exposed infants postintervention who accessed HTS.

Data sources

Trained data entry clerks are responsible for data entry into the national services register, and these registers were routinely validated to eliminate

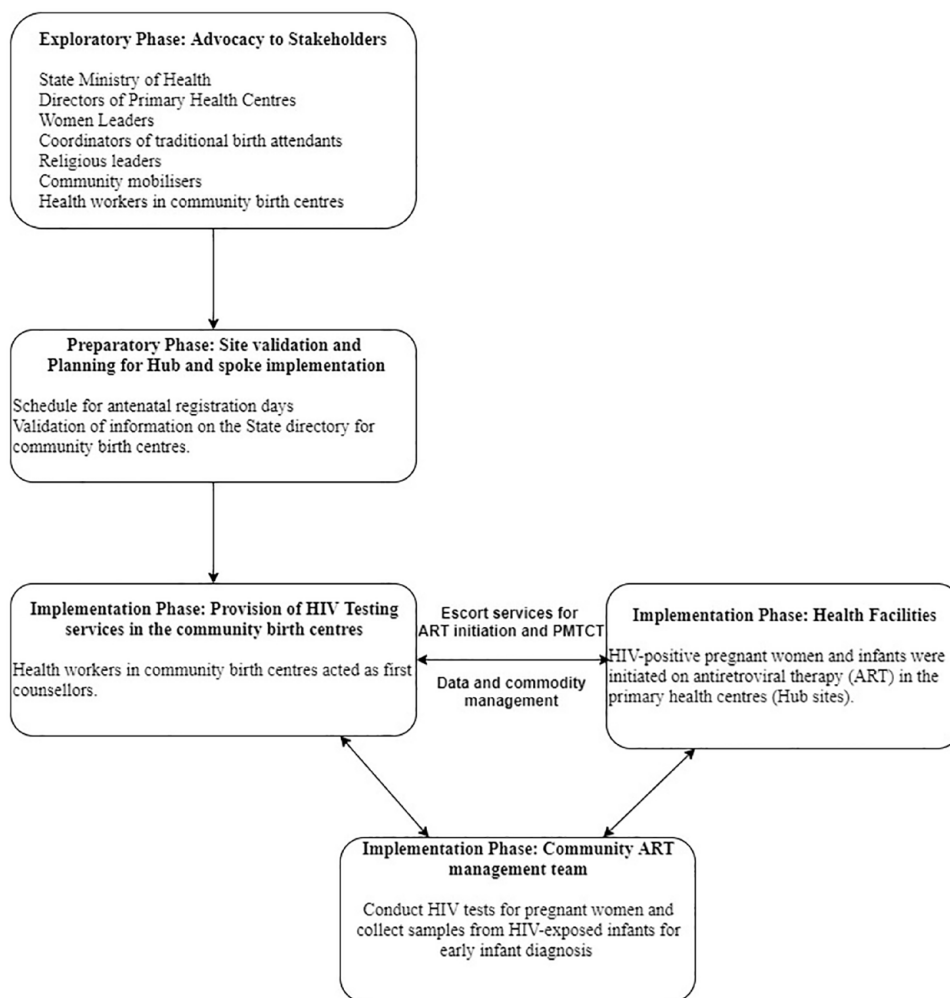


Figure 2. Flow diagram for the intervention using birth attendants in community birth centres setting to improve HIV testing services among pregnant women and HIV-exposed infants in Akwa Ibom, Nigeria.

transcription errors from the source document. In the service register, data entry for every month begins on a new page of the register to avoid overlap between months. Data were also abstracted monthly for the preintervention and intervention periods. Service registers were separated into facility and community based on where HIV testing was provided to the women. All service registers are kept in a confidential area in the facility.

All abstracted data were entered into Microsoft Excel and manually cleaned to remove duplicates and other transcription errors. Aggregate data from service delivery registers were abstracted for the number of new antenatal care attendees, their

HIV testing status and the number of newly diagnosed HIV-positive pregnant women linked to ART. In addition, data were also abstracted for the number of samples collected for early infant diagnosis from HIV-exposed infants and their HIV status. Whereas, data on the characteristics of the traditional birth attendants and other healthcare workers in community birth centres were extracted from the healthcare workers' directory.

The primary outcomes measured included the volume of HIV tests done – the number of pregnant women and HIV-exposed infants who received HIV tests, disaggregated by location of the test, age group and HIV status; the positivity

rate – the proportion of pregnant women diagnosed with HIV; the testing contribution – the proportion of tests done at the community birth centres for pregnant women and HIV-exposed infants and the linkage rate – the proportion of HIV-positive pregnant women linked to antiretroviral therapy.

Data analysis

The data were analysed descriptively and inferentially. The characteristics of birth attendants and other workers in community birth centres were summarized using frequencies. Change in the volume of testing before and after the intervention was also analysed and presented in percentages. Mann–Whitney test was used to compare groups at a significance p value set at <0.05 using STATA 14.²⁹ Missing data (0.1% of total data abstracted) were excluded from the analysis.

Results

Characteristics of facilities and providers

The majority (78.4%) of community birth centres were traditional birth homes manned by individuals with primary or secondary education (48.8% and 44.1%, respectively). Most (77.1%) of the community birth centres had a maximum of one birth attendant (Table 1).

HIV testing uptake and outcomes among pregnant women and HIV-exposed infants

A total of 39,305 pregnant women were tested for HIV before the intervention, while 127,005 were tested during the intervention (Table 2). This resulted in a 223% increase in HIV testing with community birth centres contributing 63.4% of all tests done. In addition, sample collection for early infant diagnosis increased by 11% from 2248 before the intervention to 2490 during the intervention with community birth centres contributing 5% (Table 2).

As seen in Table 3, the positivity rate was higher in the preintervention period compared with the intervention period (2.2% *versus* 0.6%). Contrary to other age groups, the positivity rate among young adolescents aged 10–14 years was higher during the intervention compared with the preintervention period (5.0% *versus* 0.0%) (Table 3).

Table 1. Characteristics of community birth centres and the healthcare providers of services in these centres, Akwa Ibom, Nigeria ($N=767$).

Characteristics	Total N (767), n (%)
Facility type	
Traditional birth homes	601 (78.4%)
Congregational homes	155 (20.2%)
Maternity homes	11 (1.4%)
Highest level of education of the owner	
No formal	47 (6.1%)
Primary education	327 (48.8%)
Secondary	338 (44.1%)
Tertiary	55 (7.2%)
Years of experience of owner	
Less than 10 years	278 (36.2%)
10–19 years	311 (40.5%)
Greater than 20 years	178 (23.2%)
Number of birth attendant(s)	
1	591 (77.1%)
2	113 (14.7%)
3	31 (4.0%)
4	15 (2.0%)
5	17 (2.2%)
Setting	
Metropolitan	129 (16.8%)
Rural-costal	188 (24.5%)
Rural noncostal	450 (58.7%)

Of the 805 pregnant women and 155 infants diagnosed with HIV during the intervention, 24% of the pregnant women and 12% of the infants were identified through community birth centres (Figure 3).

Table 2. Summary outcomes from using community birth centres to improve access to HIV testing services for pregnant women and their HIV-exposed infants in Akwa Ibom, Nigeria.

Outcome measures	Number of pregnant women	Number of HIV-exposed infants
Number of new antenatal care attendances before intervention	41,100	–
Number tested for HIV before intervention (excluding women previously diagnosed –1795)	39,305	2248
Number of new antenatal care attendances after the intervention	128,816	–
Number tested for HIV after the intervention (excluding women previously diagnosed –1811)	127,005	2490
Contribution of health facilities after the intervention	46,483	2379
Contribution of community birth centres after the intervention	80,522	111
Percentage contribution from community birth centres after the intervention	63%	5%
Percentage increase in HIV testing services after the intervention	223%	11%

There was no significant difference in the linkage to ART among pregnant women diagnosed with HIV between periods (98% before the intervention *versus* 99% during the intervention, $p = 0.96$) (Figure 4).

Discussion

Collaboration with traditional birth attendants and other health workers in community birth centres resulted in a significant increase in access to HTS for pregnant women and early infant diagnosis for HIV-exposed infants. Postintervention testing among pregnant women increased by 3.2-fold, similarly, there was an 11% increase in HIV-exposed infants benefitting from early infant diagnosis. Over 60% of the pregnant women tested for HIV and 24% of those diagnosed with HIV during the intervention were reached at the community birth centres, while linkage to treatment for HIV-positive pregnant women remained optimal (99%).

The increase in the number of pregnant women reached with HIV testing in this study was consistent with similar ones carried out in other parts of the world in which traditional birth attendants were engaged to improve access to HIV testing

among pregnant women.^{23,24,30} In Malawi, over 50% of pregnant women who received antenatal care at traditional birth homes were successfully referred for HIV testing.²³ In northern and eastern Nigeria, the integration of traditional birth attendants with primary health centres significantly increased the number of pregnant women reached with HTS from a monthly average of 200–1500 in northern Nigeria, and by over 50% in eastern Nigeria.^{24,30}

In this study, all pregnant women who received antenatal care at community birth centres were provided HIV testing compared with other studies in which pregnant women were referred from the traditional birth centres to the primary health centres for HIV testing.^{23,30} The lack of transportation to ensure complete referral was one of the major reasons for the missed opportunities reported in these studies.^{23,30} The use of the existing community ART management teams in our setting to provide HTS at the community birth centres could be responsible for the zero missed opportunities for pregnant women during the intervention period.

This study showed a higher (5.0%) HIV positivity rate among young pregnant adolescents

Table 3. Distribution by age-band of pregnant women provided HIV testing services and outcomes from health facility and community birth centres, April 2019 to March 2022, Akwa Ibom, Nigeria.

Age group (years)	Preintervention					Intervention				
	HIV testing		HIV-positive		Positivity rate	HIV testing		HIV-positive		Positivity rate
	Total (n)	% contribution	Total (n)	% contribution		Total (n)	% contribution	Total (n)	% contribution	
10–14	74	0.2%	0	0.0%	0.0%	159	0.1%	8	1.0%	5.0%
15–19	3270	8.3%	69	7.9%	2.1%	10,197	8.0%	52	6.5%	0.5%
20–24	9261	23.6%	264	30.2%	2.9%	29,981	23.6%	210	26.1%	0.7%
25–29	12,602	32.1%	280	32.1%	2.2%	39,462	31.1%	271	33.7%	0.7%
30–34	9350	23.8%	185	21.2%	2.0%	29,027	22.9%	158	19.6%	0.5%
35–39	3987	10.1%	66	7.6%	1.7%	13,505	10.6%	91	11.3%	0.7%
40–44	643	1.6%	6	0.7%	0.9%	3942	3.1%	13	1.6%	0.3%
45–49	118	0.3%	3	0.3%	2.5%	705	0.6%	2	0.2%	0.3%
50+	0	0.0%	0	0.0%	0.0%	27	0.0%	0	0.0%	0.0%
Total	39,305	100.0%	873	100.0%	2.2%	127,005	100.0%	805	100.0%	0.6%
Setting										
Urban	20,412	51.9%	385	44.1%	1.9%	39,721	31.3%	282	35%	0.7%
Rural coastal	9399	23.9%	246	28.2%	2.6%	35,340	27.8%	270	34%	0.8%
Rural noncoastal	9494	24.2%	242	27.7%	2.6%	51,944	40.9%	252	31%	0.5%
Total	39,305	100.0%	873	100.0%	2.2%	127,005	100.0%	805	100%	0.6%

(10–14years) during the intervention compared with the low (2.6%) prevalence seen among this age group in the Tsepamo Study.³¹ Our result is in keeping with the recent finding that shows that despite the declining number of new infections globally, the incidence remains high among adolescents.³² The high incidence of HIV among adolescents under 15 years may be a result of the declining age of sexual debut, other sexual practices and the increasing trend in sexual violence among children.^{33–36} Although the new focus for the HIV programme includes young persons aged 15–24 years, the high incidence of HIV among adolescents under 15 years calls for reprogramming for young adolescents using an integration of age-appropriate sexual and reproductive messaging and services into existing platforms for this subpopulation.

Only a small proportion (4.5%) of HIV-exposed infants had their samples collected through

referrals from the community birth centres. Although the scope of this study did not investigate the reasons for the poor sample collected through community birth attendants, a study in Malawi reported that nondisclosure of HIV status by pregnant women to the birth attendants was a major reason for the poor uptake of prophylaxis for pregnant women and HIV-exposed infants postpartum.²³

This study had some limitations. First, community birth centres may have provided HTS to their clients before the intervention; however, because the data were not linked to any health facility, it was unavailable for this study. Second, the data from the different categories of community birth centres were not disaggregated; hence, analysis of their contribution was not done. Despite these limitations that are inherent in observational studies with a before and after design especially

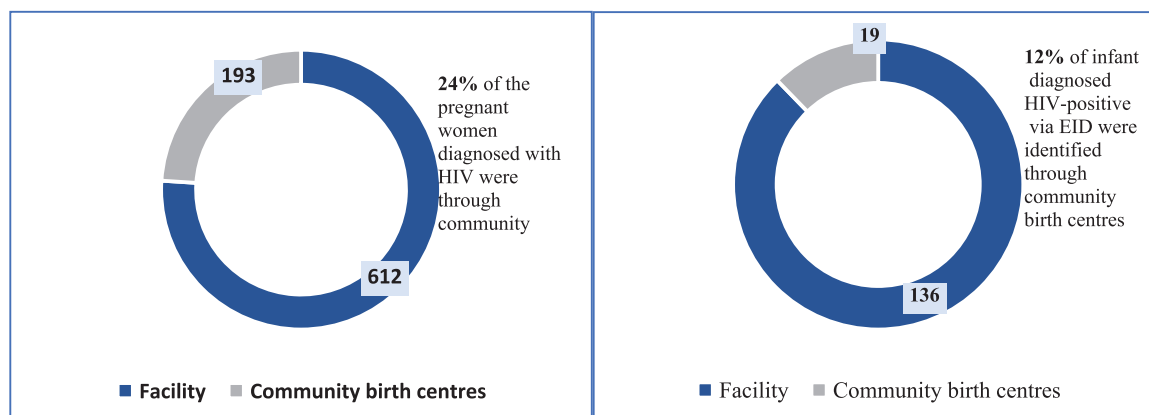


Figure 3. Contributions of community birth centres to the number of pregnant women and HIV-exposed infants (HEIs) diagnosed with HIV during the intervention, Akwa Ibom, Nigeria.

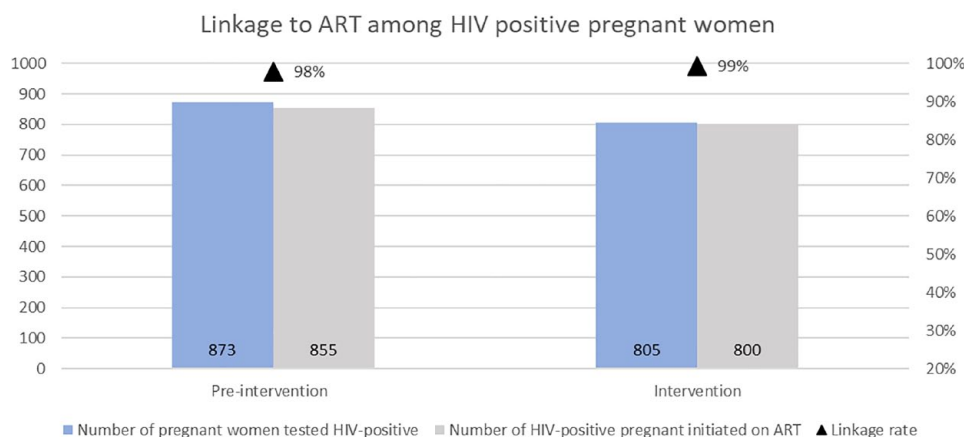


Figure 4. Linkage of HIV-positive pregnant women to antiretroviral therapy before and after the intervention, Akwa Ibom (April 2019 to March 2022).

those that use routine programme data, this study setting covered different types of community birth centres including those manned by trained healthcare workers (nurses and midwives). This is also one of the few studies that have reported involvement with birth attendants beyond access for pregnant women to include their HIV-exposed infants. We believe that the findings from this study that was carried out at multiple sites over a wide catchment area in Akwa Ibom State have important programming and implementation implications in similarly resourced settings.

Conclusion

Community-based programmes that provide HTS to pregnant women can play a crucial role in reducing mother-to-child transmission of HIV and facilitating early diagnosis and treatment of HIV-exposed infants. Collaboration with birth attendants is a critical factor in the success of such programmes, especially in addressing missed opportunities for pregnant women who receive antenatal care in community birth centres. More prospective research is necessary to understand the clinical outcomes of intervention programmes implemented in the community.

Declarations

Ethics approval and consent to participate

This study was conducted in line with the Declaration of Helsinki and was approved by FHI's Office of International Research Ethics (project no. 1759454-1) with an exemption from informed consent. Individual consent was not required for statistical analysis of aggregate de-identified data. The raw data extracted from the directory of healthcare workers in community birth centres and service registers including names were de-identified.

Consent for publication

Not applicable.

Author contributions

Esther Nwanja: Conceptualization; Formal analysis; Methodology; Supervision; Visualization; Writing – original draft; Writing – review & editing.

Uduak Akpan: Conceptualization; Formal analysis; Methodology; Validation; Writing – review & editing.

Otoyo Toyo: Conceptualization; Writing – original draft; Writing – review & editing.

Pius Nwaokoro: Writing – review & editing.

Titilope Badru: Formal analysis; Methodology; Visualization; Writing – review & editing.

Bala Gana: Data curation; Methodology; Supervision; Writing – original draft.

Ifeyinwa Nwanja: Data curation; Formal analysis; Writing – original draft.

Oruayefe Ayabi: Methodology; Writing – original draft.

Bishop Ayeni: Data curation; Formal analysis; Writing – original draft.

Emem Xavier: Methodology; Writing – review & editing.

Augustine Idemudia: Writing – review & editing.

Olusola Sanwo: Writing – review & editing.

Hadiza Khamofu: Writing – review & editing.

Moses Bateganya: Writing – review & editing.

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Competing interests

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Availability of data and materials

Data will be made available on request.

ORCID iD

Esther Nwanja  <https://orcid.org/0000-0003-4376-9656>

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