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Improving HIV Testing Coverage and Linkage to Antiretroviral Therapy Through a Community-Based PMTCT Intervention in Traditional Birth Attendants' Managed Care Centers in Lagos State

Oyeledun B*, Ajibola A, Fatunsin E, Philips A, Jolaoso I, Okunade O, Omogun I, Izere PC, Imarhiagbe C, Ogirima F, Oguntona S

Center for Integrated Health Program (CIHP), Abuja, Nigeria

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***Corresponding author:** Oyeledun B, Center for Integrated Health Program (CIHP), Abuja, Nigeria. Tel: 08099675298, Email: bolanle3@gmail.com

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Abstract

Introduction: Mother to child transmission (MTCT) of HIV remains a significant public health problem globally and in Nigeria. Low utilization of Prevention of Mother to Child Transmission (PMTCT) of HIV services at public hospitals due to low ANC attendance by pregnant women is a significant obstacle to effective implementation of PMTCT programs across many Nigerian States. The Center for Integrated Health Programs (CIHP) implemented an innovative approach to improve HIV Testing Services and linkage to ART for pregnant women attending TBA centers in communities served by the supported health facilities in Lagos State with the aim of improving PMTCT coverage over a periodof six months (May 2020 – October 2020). This was conducted in 149 communities across sevenLGA during the reporting period.

Methods: A descriptive secondary analysis of program data available from 36 CIHP supported health facilities in Lagos and TBA centers within the seven LGAs between May 2020 to 0ctober 2020. Using monthly trend graphs, descriptive statistics with 95% confidence intervals and odd ratios, the analysis compared HIV testing coverage and positivity rates among the target populationof pregnant women in the intervention LGAs between health facility-based testing and communitytesting in TBA centers.

Results: A total number of 6445 (median of 1,189 HIV tests per month) HIV tests were conductedin the health facility over a six-month intervention period compared with 76,879 tests in the community (median of 10585 tests per month). Overall, the proportion of the total target population of pregnant women tested at the TBA centers was 27 times greater than those tested atthe health facility (32% versus 1.2% respectively) during the same period. Whilst overall, HIV positivity was significantly lower in the community than in the health facility {(0.06% [95% CI = – 0.08]) versus (4.67% [95% CI = 4.17 – 5.21]) respec-

tively). In addition, the odds of testingHIV positive were 99% lower among women tested in the community than among those tested atthe health facility (0.012 [0.009 – 0.016]; $p < 0.0001$). In both health facility and community, 346women tested positive to HIV were successfully linked to a health facility to initiate ART (100%linkage).

Conclusions: Higher HIV testing coverage of pregnant women can be achieved by implementingPMTCT interventions in the community through targeting of TBA managed care centers. HIV positive cases identified in these centers can be successfully linked to ART initiation at the healthfacility through a well-planned follow-up and urgent care Community-based HIV testing targetingpregnant women receiving care at TBAs may be critical for improving PMTCT coverage and alsoimpact on structured improved ANC and referrals to health facilities for further care, especially forspecial and urgent care.

Keywords: HIV testing; PMTCT and Community

Background And Rationale

Mother to child transmission (MTCT) of HIV remains a significant public health problem globallyand in Nigeria. MTCT (also known as vertical transmission) refers to the passage of HIV infection from the mother to the child during pregnancy, childbirth, or breastfeeding [1]. Globally in 2020, there were 37.7 million people living with HIV (PLHIV), with 680,000 AIDS-related deaths and 1.5 million new infections. Sub-Saharan Africa accounts for about 67% of the global burden of HIV with 25.4 million PLHIVs. Forty-one percent (41%) of PLHIVs worldwide are women above 15 years of age with 80% of these women living in sub-Saharan Africa. According to UNAIDS (2020), 130,000 children with new infection were from Sub-Saharan Africa, with almost 90% of transmission of HIV in children being through MTCT. In 2020, the global antiretroviral therapy (ART) coverage among pregnant women living with HIV was 85%, and about 32% of positive pregnant women in Nigeria were placed on ART in 2016 [2,3,4].

Nigeria with a prevalence of 1.4% (15-49 years) and a total of 1.8 million PLHIV, accounts for 9%of the global burden of HIV and contributes 23% of new infections among children in sub-SaharanAfrica. According to the World Health Organization (WHO), the prevalence of MTCT in Nigeria is21.6% [5]. This accounts for 30% of the global gap of MTCT and contributes 15% to the total numberof children currently in need of antiretroviral drugs (ARVs) [6].

Key strategies recommended by WHO to mitigate the rate of vertical transmission include to ensure eight antenatal care (ANC) visits, promote health facility delivery, strengthen Prevention of Mother to Child Transmission of HIV (PMTCT), and ART services [7,8]. This has driven innovative efforts toimprove health care delivery to pregnant women in health facilities such as the study conducted bythe Center for Integrated Health Programme (CIHP) in which a compendium of "change ideas" compiled into a single change package aided quality improvement processes among healthcare workers [9]. The entry to prevention of new infection in infants is HIV testing services in pregnant women. HIV positive women identified are placed on ART care and management, with facilitated hospital delivery, management of HIV exposed infants, early infant diagnosis at 6 weeks, exclusive breastfeeding for 6 months, and assessment of child's final outcome at 18 months of age [9]. Anotherstudy by Oyeledun et al. expounded that "the full PMTCT cascade needs to be achieved for mother–infant pairs and sustained across the public health sector" [10]. However, according to the 2018 Nigeria Demographic and Health Survey (NDHS) only 67% of pregnant women in Nigeria received ANC from a skilled provider while 39% had health facility delivery [11]. Lagos state (an estimated 24.6 million population) has an HIV prevalence of 1.4% and is classified in the red category by the PEPFAR program in Nigeria with only 50% of the 120,000 PLHIV in the state on ART [12,13]. In addition, Lagos is one of the priority states for elimination of MTCT (eMTCT) in the country as it accounts for more than 60% of Nigeria's gap [14]. CIHP has been supporting Lagos State HIV programme from 2019 and have built the capacity of the state to provide comprehensive quality integrated HIV services. Subsequently, the rate of identification of HIV positive persons has increased with 100% linkage to ART.

Although the 2018 NDHS reported a relatively high attendance of antenatal clinic by pregnant women (84.6%) and delivery by a skilled birth attendant (80.1%) in Lagos State, more recent service program data suggest a decline in utilization of ANC services in health facilities [15]. Only 33.3% of pregnant women had at least one antenatal visit across health facilities in 2020. This may be linkedto challenges in accessing maternal health services (including PMTCT) due to the COVID-19 lockdown in the second half of the year 2020 and high cost of ANC and delivery services in the state [16]. In addition, studies have shown that many pregnant women are hesitant to seek prenatal treatment in recognized healthcare facilities in their communities due to various factors [17-20]. Notable among these factors is the availability of alternative medicine practitioners and TBAs in their immediate areas, which may serve as preferred alternatives for ANC and maternal care. WHO defines a Traditional Birth Attendant (TBA) as "a person who assist the mother during delivery andearn skills from witnessing deliveries or from conducting deliveries, but without any formal trainingor qualifications" [21]. In rural Nigeria, TBAs conduct about 40-60% home deliveries [22]. Cultural affinity, low cost, proximity, negative attitude of trained health workers are reasons for high patronage of TBA.

With this background, several stakeholders have worked in partnership with TBA in the provisionof HIV, TB, Nutrition, and Maternal health services [23]. As a result, in 2016 National Agency for AIDS Control (NACA) commenced the development of the National Framework for the engagement of non-formal actors in RMNCAH+N/PMTCT services. This framework supports the training of TBAs and a functioning referral system.

In the same vein, the Lagos State traditional medicine board (LSTMB) has conducted series of trainings for TBAs to build their capacities on maternal and child health [23].

Observing a gap in the number of HIV-positive pregnant women accessing ART service, coupledwith low ANC attendance, CIHP sought to improve the retention of positive pregnant women in care by implementing various client-based strategies, which include but not limited to differentiated service delivery, and to intensify efforts in HIV case finding through strategic testing at mapped high HIV prevalence locations within the state. Therefore, CIHP commenced the implementation of facility-based Community PMTCT drive, which involves conducting HIV test for pregnant women at unsupported facilities (Public and Private Hospitals), Mission Houses, and Traditional Birth Attendants sites and linking all identified positive pregnant women to ART services. This paper describes the achievements of HIV testing and linkage to care among pregnant women at both health facilities and communities in seven LGAs of Lagos state from May to October 2020 of implementation.

Methods

This is a descriptive secondary analysis of data available from 36 government funded health facilities across seven LGAs in Lagos State following a community intervention carried out in TBA centers to improve the PMTCT coverage in the state through mobilization of pregnant women for HIV testing. Lagos State has different LGAs. A LGAs is a sub-state government level of administrativedivision that oversees a section of a state. CIHP offers programmatic and technical support to thesehealth facilities which include primary, secondary and tertiary health institutions where comprehensive HIV services are rendered and accessed.
This analysis reviews HIV testing coverage and positivity rates among the target population of pregnant women in intervention LGAs in Lagos State from health facility-based testing and community testing in TBA centers from May to October 2020 (6 months duration). Trends in health facility-based testing 6 months before the intervention were examined to better understand the pattern of changes over time. For this analysis, TBA centers refer to places where TBA attends topregnant women that patronize their services, usually within the TBAs home setting.

The Intervention

Location And Mode of The Intervention

CIHP implemented community HIV testing for pregnant women at identified TBA centers in seven LGAs (Mushin, Ikeja, Ibeju-Lekki, Eti-Osa, Ifako, Amuwo and Alimosho) which are grouped into four commands for administrative and programmatic purposes (Alimosho-Ifako, Amuwo-Odofin,Mushin-Ikeja, and Eti-Osa/Ibeju Lekki). TBAs operate in an organized community structure which is recognized by the state and are normally trained by the state to support maternal health promotion in the communities. CIHP instituted a "Hub and Spoke" model for the intervention to ensure proper linkage of HIV positive women and their infants for care and treatment. In this model, a CIHP-supported comprehensive health facility (the "hub") was linked to one or more TBA centers (the "spoke") located in the community within its catchment area (a delineation of ageographical area / population to be served by a heath facility).

A total of 52 counsellor testers, who were already trained in counseling and testing in communitiesby different implementing partners working in the state, were recruited to perform HIV counsellingand testing. These Counselors offer HIV Testing services to all pregnant women attending ANC at TBA center but exempt pregnant women identified to be previously known from testing. They also escort pregnant women who tested positive for HIV to the hub site. The PMTCT focal person in each hub was responsible for coordinating PMTCT activities both at the facility and in the communities of the catchment area. The PMTCT focal person (a government staff in the facility responsible for coordinating PMTCT services) in the hub facility was assigned to work with volunteer counsellor testers to ensure quality service delivery at the community level. DesignatedCIHP staff provide technical oversight for the PMTCT program in the LGAs and support PMTCTactivities at the supported hub facilities, including ensuring availability of material for counsellingand testing. Data generated at the TBA center feed into the corresponding health facility data tools which are documented by data entry clerks at the hub facility.

Engagement And Selection of TBA Centers

Advocacy visit was paid to the executives of the Lagos State Traditional Medicine Board (LSTMB) facilitated by the State PMTCT coordinator. The LSTMB is an arm of the Lagos State

governmentthat train, coordinate, and support TBAs. Through the board, the TBAs were informed about the programs' objective of community HIV testing for pregnant women who patronized them. A comprehensive list of over 1000 TBAs across the seven intervention LGAs was shared by the board with CIHP, out of which 53 TBA centers were recruited using some pre-defined criteria.

A TBA center was selected if they were located in the CIHP supported LGA, had client load of between 5-10 pregnant women per month, located in mapped out communities with high HIV prevalence, and was registered with the LSTMB.

Orientation Meetings

A one-day orientation meeting was conducted for the selected TBA on the benefits of HIV testingfor pregnant women, the mode of intervention and their roles which includes mobilization of pregnant women to the TBA centers, education of pregnant women on the benefits of HIV testing,encourage of uptake of HIV testing, provide privacy for counselling and Testing, supporting linkage by providing escort services to positive women for ART at the hub facility, and supporting HIV positive pregnant women to continue with care and treatment at the hub site.

Another separate orientation program was organized for 36 PMTCT focal persons, 36 Data entry clerks, and the 52 counsellor testers. The meeting introduced the mode of intervention and plannedactivities, TBA entry plans, data collection & entry. These were also reiterated during subsequentsupervisory visits. Quality assessment and continuous improvement activities were discussed to provide a structured approach for improving services as shown by previous research works on quality improvement interventions where HCWs actively engaged in 'change ideas' processes and willingly shared the findings with others. [9]

Data Collection and Data Quality Assurance

The data entry clerks ensure proper documentation of services rendered in appropriate registers. Data collected on the field at individual spoke sites were fed into the hub facilities while aggregatedata were reported at the facility through the facility monthly summary forms (MSFs) and the DHIS platform. The following data element were collected; HIV testing services (including number of HIV tests conducted, test outcomes, and number of positive pregnant women initiating ART) usingthe ANC register, PMTCT HTS register and Maternal Cohort register domiciled at the hub site. Aseparate PMTCT facility monthly summary forms (MSFs) were generated for community intervention and appropriately filed in the hub facility.

To ensure good data quality, each register/community intervention template was appropriately labelled as PMTCT community Outreach. Clients that were tested at the TBAs were given serialized identifier codes which also denoted the month of the test and that testing was done at the TBA. Positive pregnant women referred from the community intervention and identified to be previouslyknown at the facility were not reported.

Table 1: Inclusion and exclusion criteria for data reported from the community

Inclusion criteria	Exclusion criteria
Pregnant women tested at TBA Center	Previously known positive pregnant women at TBA Center

Data Analysis

Descriptive statistics (median and range) were computed for the number of HIV tests. We used graphs to show monthly trends over the period of the intervention (and before the intervention forhealth facility-based testing). We estimated HIV test coverage based on the target population of pregnant women for the commands and overall, comparing health facility and community.However, we did not perform hypothesis test for these estimates, as they were population figures (not samples). For HIV positivity (percentage of pregnant women with positive results among those tested), we estimated 95% confidence intervals around the point estimates and computed odd ratiosfor comparing health facility and community. All analyses were done using Stata version 16. Thelevel of statistical test of significance was set at p-value <0.05.

Ethical considerations

Permission for the implementation of the intervention was obtained from the Lagos State Ministryof Health. All HIV tests were conducted under strict confidentiality, privacy and adequate counselling with clients' willingness. Data were analyzed at an aggregated level without individual level data.

Results

HIV Testing

During the 6-month pre-intervention period (between October 2019-March 2020), a total numberof 9091 HIV tests were conducted, ranging from 1381 to 1771 tests monthly (median of 1490.5 tests per month) across the participating facilities. However, in the following 6 months corresponding tothe intervention period in the community, a declining trend was observed culminating in a recordlow of 326 tests in October 2020 (Figure 1). During this intervention period, a lower total numberof 6445 tests were conducted (median of 1189 tests per month).

At the level of the commands, the number of HF-based HIV tests conducted in the Alimosho-Ifakocommand (ranging from 850-999) was remarkably higher compared to all the other 3 commands over the 6 months before the intervention. This dropped drastically to comparable low levels with the other commands during the intervention period. HIV testing was lowest in Amuwo-Odofin command throughout the pre-intervention months, ranging from 16-41. However, this increased substantially, ranging from 245 to 289 tests in the subsequent months between May and September 2020.

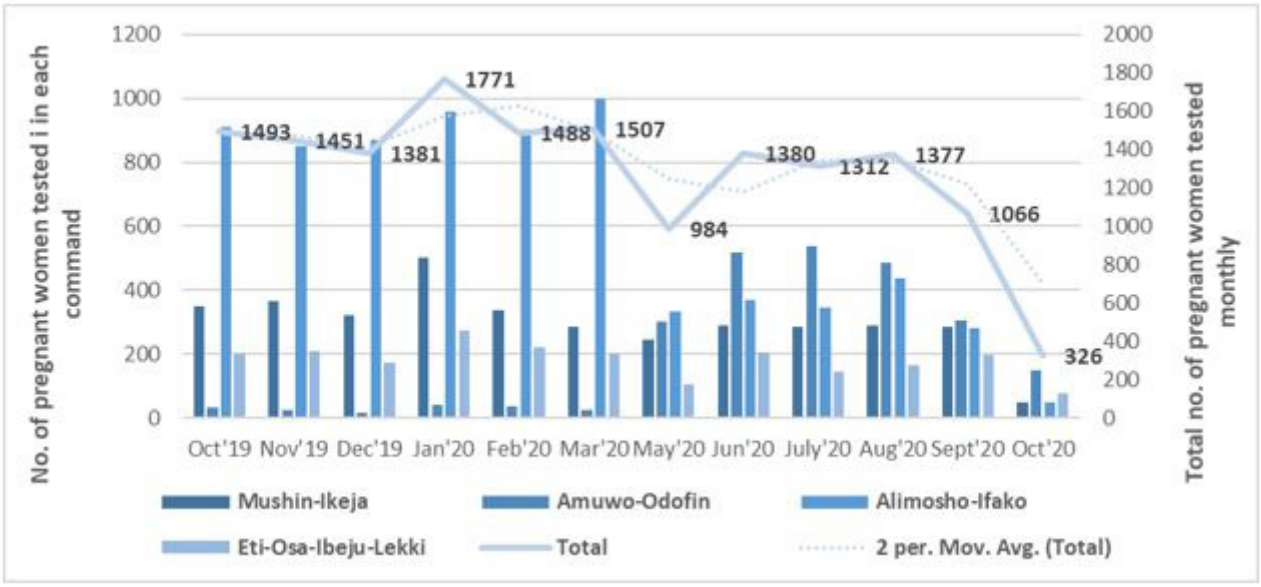

Figure 1: Trends in HIV testing of pregnant women at the health facilities between October 2019-October 2020

In contrast to the observation for HF-based testing, HIV testing at the 149 community TBA centersshowed a rapidly increasing trend in the total numbers of pregnant women tested per month in the6-month intervention period, ranging from 4,625 in the first month (May) to 23,779 in the penultimate month – September (Figure 2). A sharp drop by 50% (from 23,779 to 11,771 tests) washowever observed in the last month (October). Over this period, this was due to shortage of HIV test in the program. A total of 76,879 HIV tests were conducted with a median number of 10584.5 per month.

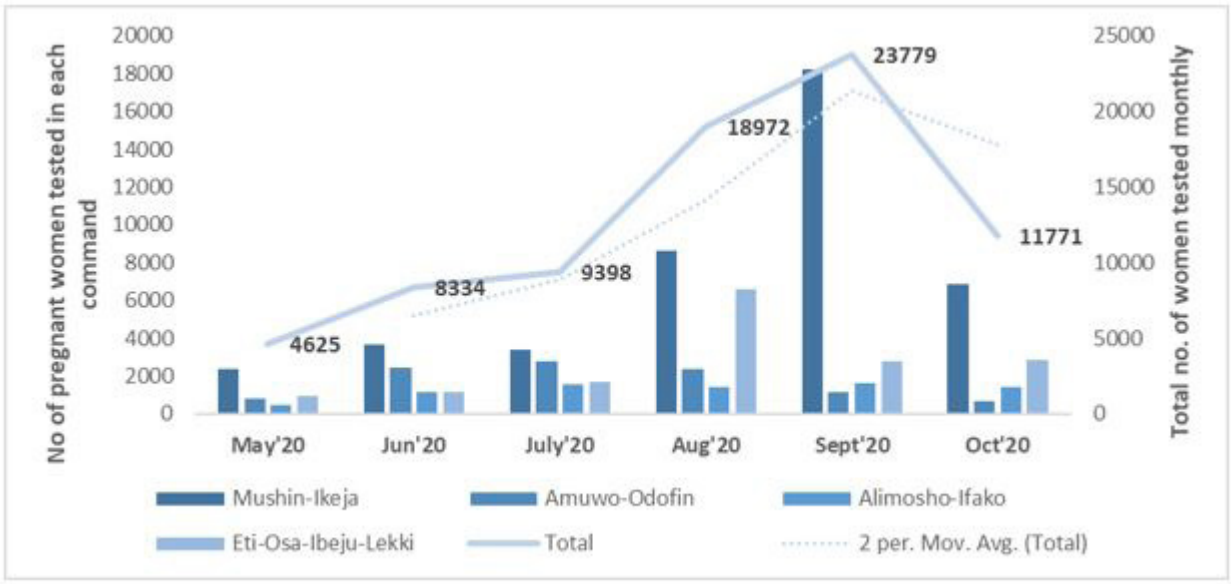

Figure 2: Trends in HIV testing of pregnant women receiving antenatal care at TBA centers between May-October 2020 (community intervention period)

Overall, 32% of the total target population of pregnant women in the four commands received HIVtests at the TBA centers during the intervention period, about 27 times greater than a mere 1.2 % ofthe same population who were tested in the health facilities during the same period. (Table 1) Amuwo-Odofin had the highest proportion (3.8%) of target population tested at the health facility compared to other commands. HIV testing at TBAs was highest at Mushin-Ikeja (83.3%). Both health facility-based (0.6%) and TBA center-based (5.7%) testing was lowest in Alimosho-Ifako compared to other commands. In all the commands, TBA-based testing rate was remarkably higherthan health facility-based testing ranging from about 11 times higher (in Amuwo-Odofin) to 69 times higher (in Mushin-Ikeja) (Table 2)

Commands	**Estimated target population (Pregnant women)***	**Health facility testing**		**Community TBA-center testing**		**TBA/HF Ratio**
		Number tested	% of target populationtested	Number tested	% of target populationtested	
Mushin-Ikeja	51,685	622	1.2	43067	83.3	69.4
Amuwo Odofin	24,725	939	3.8	10280	41.6	10.9
Alimosho Ifako	132544	770	0.6	7596	5.7	9.6
Eti-Osa-Ibeju Lekki	31494	438	1.4	15936	50.6	36.1
Total	240,448	2769	1.2	76879	32.0	26.6

* Lagos State PMTCT Program Data

Table 2: HIV testing conducted in health facility and TBA centers among pregnant women receiving antenatal care between May – October 2020 (intervention period)

HIV Test Positivity

Of a total of 83,324 tests conducted among the pregnant women during this period in both health facility and community, 346 were found HIV positive (0.42% [95% CI=0.37 – 0.46]). Across thecommands, the number of HIV positive tests ranged from 0 to 71 (in Amuwo Odofin and MushinIkeja, respectively) at the health facilities and 1 to 30 at the community (in Alimosho-Ifako and Amuwo Odofin, respectively). (Table 3). The 30 positive pregnant women identified from the communities in Amuwo LGA were 12 newly diagnosed and 18 previously known who registered at the TBA centers.

Overall, the HIV positivity estimated during the period of the intervention was remarkably and significantly lower in the community than in the health facility. Of the 76,879 pregnant women tested in the community, 301 (4.67% [95% CI = 4.17 – 5.21]) tested positive compared to 45 of the 6445 (0.06% [95% CI = 0.04 – 0.08]) tested at the health facility (Table 3). The odds of testing positive were about 99% lower among women tested in the community than among those tested atthe health facility (0.012 [0.009 – 0.016]; p < 0.0001). (Table 2).

However, at the level of the individual commands, while HIV positivity from community testing was significantly lower (compared to health facility) in each of the other commands, the reverse was thecase in Amuwo-Odofin command where the HIV positivity was significantly higher at the community (0.29 [95% CI = 0.20 – 0.42]) than in the health facility (0.00 [95% CI = 0.00–0.16]).

In both health facility and community, all women (100%) tested positive to HIV were successfullylinked to a health facility to initiate ART. was 12 newly diagnosed PW and 18 Previously known identified from the community in Amuwo LGA. Giving a total of 30 positive PW linked from the LGA

Commands	Health facility testing			Community TBA-center testing		
	No. of HI tests	No. tested positive	HIV positivity (%) [95% CI[a]]	No. of HIV tests	No. tested positive	HIV positivity (%) [95% CI[a]]
Mushin-Ikeja	1439	71	4.93 [3.87 – 6.18]	43067	5	0.01 [0.00 – 0.03][b]
Amuwo-Odofin	2291	0	0.00 [0.00– 0.16][b]	10280	30	0.29 [0.20 – 0.42]
Alimosho-Ifako	1821	170	9.33 [8.04– 10.77]	7596	1	0.01 [0.00 – 0.07][b]
Eti-Osa-Ibeku-Lekki	894	60	6.71 [5.16 – 8.55]	15936	9	0.06 [0.03 - 0.11][b]
Total	6445	301	4.67 [4.17 – 5.21]	76879	45	0.06 [0.04 – 0.08][b]
Odd ratio [95% CI]	0.012 [0.009 – 0.016]; p < 0.0001					

[a] CI = Confidence interval; Exact binomial (Clopper-Pearson) CI computed unless otherwise stated

[b] Wilson Score confidence interval used

Table 3: Comparison of HIV positivity among HIV positive pregnant women between healthfacility-based and community-based TBA testing during the intervention period

Discussion

Low utilization of PMTCT services at public hospitals is one of the most significant obstacles to effectively preventing mother-to-child transmission (PMTCT) programs in Nigeria and involving Traditional Birth Attendants (TBAs) has been shown to be a significant way of actualizing the prevention of mother-to-child transmission of HIV (PMTCT).[17] In this paper, we found that a substantially greater HIV testing coverage of pregnant women can be achieved in the community,especially when places more often visited by this population, such as TBA centers, are targeted forPMTCT interventions. It should be noted that the sharp drop observed in the last month in the community was due to shortage of test kits. On the other hand, the declining trend in HIV testing atthe health facility during the intervention period corresponded to the period of general restrictionsin public movement due to the COVID-19 pandemic lockdown in Lagos. Also, hospital attendanceacross the country, including ANC attendance, at this period was significantly lower than usual in public health facilities. This may be related to similar observations in other states and largely due to Government restrictions and lockdown across the country. For instance, WHO reported that the focus on the COVID-19 response led to reduced hospital attendance and routine essential health services of more than 50% in Kaduna State [24]. A CIHP study also revealed that ANC utilization atthe health facility was affected by the COVID-19 Government preventive measures, which includes restriction to movement leading to increase in transportation fare, with a drop of 13.5% in ANC1visit to health facilities in Kaduna state [25]. However, the observation that the absolute number of HIV testing was remarkably lower in health facility than in the community at any given time suggests that there may be other factors (apart from COVID-19 factors) responsible for lower testing rates.Studies have shown that many pregnant women are hesitant to seek prenatal treatment in recognized healthcare facilities in their communities due to various factors. These factors include poor awareness of services at healthcare facilities, long wait times, different hospital appointments for different services, cost of transportation to healthcare facilities, and availability of alternative medicine practitioners and TBAs in their immediate areas [17-20].

The preference of pregnant women to receive ANC and maternity care at TBAs is well documented.In resource-poor countries, between 60% and 90% of deliveries in rural areas are assisted by TBAs [26]. In Nigeria, 65% of births take place at homes and are often attended by traditional birth attendants (TBAs) [27]. Also, 28% of 246 women in a North-West Nigerian study cited non-use of antenatal care services due to preferring services of a TBA with 38.1% of them utilizing care by a TBA [28]. This provides great opportunity to improve PMTCT coverage by expanding related services such as HIV testing to these places of community maternal care. In our intervention, the mobilization of pregnant women by TBAs, as mandated, for HIV testing may be a crucial factor for increasing HIVtesting coverage.

The finding of a much higher positivity yield at the health facility compared to that at the TBA centers supports findings in other studies which suggest that HIV tests at the health facilities are more likely to be positive than those conducted at the community. Sharma et al showed through asystemic review that "community-based strategies for the general population had lower HIV positivity (6–11%) than facility HTC (18–20%)" [29]. Okonko in a Nigerian study paper conducted inIbadan in 2019, showed an even higher facility HIV prevalence for pregnant women (26.4%) compared to the five percent observed in our analysis [30].

Notably, the intervention recorded a 100% linkage to ART initiation of both HIV positive pregnant women tested at the health facility and community. This achievement particularly in the community confirms suggestions that community-based HIV tests can be associated with high linkage when there is appropriate support for linkage by the programme [29].

Limitations

The analysis of data at the aggregated level did not allow for examining personal variables (e.g. sex, age, and other clinical details). This may have been useful in explaining individual level variations in HIV testing coverage or positivity. Also, community level data was not available prior to the intervention which could have shown trends prior to the intervention and the pattern of potential changes. Future studies may consider examining pre and post-intervention effects while assessing personal level variations in HIV testing coverage and positivity with randomized clusters of TBAcenters.

Conclusion

Elimination of Mother to Child transmission (EMTCT) requires that all pregnant women are reached with PMTCT services everywhere they may be found, as this will reduce HIV new infection among children. This paper found that higher HIV testing coverage of pregnant women can be achieved by implement-

ing PMTCT interventions in the community through targeting of pregnantwomen in TBA centers. This provides opportunity for identification of HIV positive pregnant women for ART initiation and prevention of mother to child transmission of HIV. This study alsoreveals that health facility-based testing have significantly higher yield than community-based. HIV testing programs should continue at the health facility and the community to reach positive pregnant women faster, thereby reducing MTCT towards the achievement of eMTCT. Furthermore, positivecases identified in the TBA centers can successfully be linked to ART initiation at the health facility through a well-planned follow-up system. Community-based HIV testing targeting pregnant women receiving care at TBAs may therefore be critical for rapidly increasing PMTCT coverage, and achieving eMTCT.

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