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“Making the most of our situation”: A qualitative study reporting health providers’ perspectives on the challenges of implementing the prevention of mother-to-child transmission of HIV services in Lagos, Nigeria

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3 **“Making the most of our situation”: A qualitative study reporting health providers’**
4 **perspectives on the challenges of implementing the prevention of mother-to-child**
5 **transmission of HIV services in Lagos, Nigeria**
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ABSTRACT

Objectives: To investigate the challenges of, and opportunities for effective delivery of PMTCT services from the perspectives of primary health care providers in Lagos, Nigeria.

Design: A qualitative study consisting of nine focus group discussions with 59 health providers, data were transcribed, de-identified, and thematically analyzed.

Setting: Thirty-eight primary health care facilities in the central and western districts of Lagos, Nigeria.

Participants: Participants included nurses, nursing assistants, community health workers (CHWs), laboratory workers, pharmacists, pharmacy technicians, and medical records personnel.

Results: Providers' challenges include frustration with the healthcare system where unmet training needs, lack of basic amenities for effective and safe treatment practices, low wages, and inefficient workflow were discussed. Providers also discussed encounters with patients, including concerns about patients' refusal to accept HIV positive tests and to enroll in care. Health providers' suggestions for addressing challenges included the provision of adequate supplies and training for healthcare workers at all levels. To mitigate stigmatization, participants suggested home-based care, working in partnership with traditional birth attendants and religious institutions, and designating a second level of CHWs for each neighborhood.

Conclusions: Findings illustrate the complex nature of PMTCT service delivery and illuminate issues at the patient and health system levels. These results may be used to inform strategies for addressing identified barriers and improve the provision of PMTCT services leading to better outcomes for women and families.

Strengths and limitations of this study:

- Few studies report on experiences of health providers involved in PMTCT service delivery.
- Findings describe challenges and opportunities for intervention at the health system, community, and individual levels.
- Diverse participant pool with representation from multiple cadres of the health workforce.
- PMTCT challenges may be location and time specific.
- Findings are based only on provider perspectives.

INTRODUCTION

According to the 2019 results of the Nigeria HIV/AIDS Indicator and Impact Survey, the prevalence of HIV in the country is 1.5% among adults aged 15-64 years.¹ Nearly 2 million adult Nigerians live with HIV/AIDS and this number is one of highest in sub-Saharan Africa (SSA). Although the country has made significant progress in addressing HIV/AIDS, it still records the largest number of HIV infections among children each year globally, with only 18% of infants under eight weeks tested for HIV.² Nigeria accounted for over 23% of global pediatric HIV infections in 2016;³⁻⁶ in 2018, only 35% of HIV-positive children 0-14 years of age were receiving treatment.² While many countries in SSA made significant strides in reducing the burden of pediatric HIV infection, Nigeria failed to meet the 2015 Global Plan target of eliminating new HIV infections among children by 90%.⁷

Despite the availability of inexpensive effective antiretroviral (ARV) regimens for the prevention of mother-to-child transmission (PMTCT), globally, 18% of pregnant and lactating women did not receive ARV for PMTCT resulting in an estimated 160,000 new infections in children in 2018.⁸ Nigeria is one of 21 priority countries in SSA that accounts for 90% of pregnant women infected with HIV.⁹ Identification of HIV-infected pregnant women through routine HIV screening remains a critical step for initiating PMTCT interventions. Concerned about the high rate of mother-to-child transmission of HIV, the Lagos state government put together, a renewed campaign to accelerate PMTCT service in the state.¹⁰ With support from the US President's Emergency Plan for AIDS Relief (PEPFAR), the Global Fund for HIV, TB, and Malaria, Nigeria offers free services for PMTCT of HIV.¹⁰ Yet, uptake of services remains abysmally low and efforts to prevent pediatric HIV transmission remain a major public health challenge.

While numerous studies have investigated barriers faced by individuals when accessing HIV/AIDS treatment and prevention services in Nigeria and similar settings in SSA, there is a paucity of studies on health system barriers, particularly challenges faced by health providers and their lived experiences of PMTCT service delivery.¹¹⁻¹⁴ Thus, the purpose of this study was to investigate the challenges of, and opportunities for effective delivery of PMTCT services from the perspectives of primary health care providers in Lagos, Nigeria. Specifically, we sought to describe the perceived barriers and solutions for optimal delivery of PMTCT services in primary health care facilities in the central and western districts of Lagos.

METHODS

Study Setting:

This study was conducted in Lagos State, southwest Nigeria. Although the prevalence of HIV (1.2%) is slightly lower than the national average (1.5%), Lagos is one of three states that account

for 44% of Nigeria's unmet need for HIV/AIDS intervention.¹⁰ Lagos has three districts (central, western and eastern), twenty Local Government Areas (LGAs), thirty-seven Local Council Development Areas (LCDAs),¹⁵ and over two thousand communities.¹⁶

Ethics and Data Collection:

Fifty-nine participants (49 women & 10 men) were purposively sampled from 38 primary health care facilities in the Central and Western districts of Lagos. Participants included female and male nurses, nursing assistants, community health workers (CHWs), laboratory workers, pharmacists, pharmacy technicians, and medical records personnel who participated in the delivery of PMTCT services at the primary level. This study was approved by the Nigeria Health Research Ethics Commission. Additional permission was granted by the Lagos State Ministry of Health, and the Lagos State Primary Health Care Board. Moreover, a relationship was established with Medical Officers of Health who introduced the study team to the nursing officers in charge of PMTCT services in primary care facilities. Meetings providing detailed information about the study and the role of participants were held with nursing officers and potential participants at PHC facilities where the focus group sessions were conducted.

All participants signed an informed consent form before participation. Nine focus group discussions (FGDs) lasting 45-60 minutes in duration were conducted between April and August 2017 in English with some phrases in one of the local languages (Yoruba). The FGDs were guided by a semi-structured guide and were facilitated by two authors, one male and one female, with advanced training and experience in qualitative data collection and conducting health research in Nigeria (JE, VY). The authors did not have established relationships with the participants before this study. Saturation was reached during data collection, FGD transcripts were produced verbatim from audio recordings and were de-identified prior to analysis. Interpretation of results is supported by observations and field notes collected by VY during data collection.

Data Analysis:

Data were thematically analyzed and independently reviewed by four authors (JE, NK, VY, BL) using the framework approach,¹⁷ a five-step process that involves: (i) familiarization, (ii) developing a theoretical framework, (iii) indexing, (iv) summarizing data in an analytical framework, and (v) data synthesis and interpretation.¹⁷ Following the framework approach, transcripts of the interviews were coded and classified. We generated category sequences and emerging themes. We then identified specific comments of respondents. The specific comments were arranged into larger categories and themes from which a final narrative was developed.¹⁷

RESULTS

Description of participants' demographic characteristics are presented in Table 1. FGD results indicate the challenges experienced by health providers in delivering PMTCT services fell into two broad themes: i) frustration with the healthcare system and ii) issues that arose during provider encounters with patients.

Table 1: Participant Demographic Characteristics

Gender	Number
Male	10
Female	49
Occupation	
Nurses	22
Counselors and Testers	15
Laboratory Scientists	7
Pharmacy Technicians	5
Community Health Workers (CHW)	4
Medical Records Personnel	1
Monitoring and Evaluation Officer	1

Frustration with the Health System

Lack of Resources and Referral Challenges:

Providers discussed shortage of material resources as a major challenge and gave detailed accounts of situations that represent sub-optimal working conditions. The discussed issues included the lack of electricity in newborn delivery rooms. A nurse narrated, *"We lack amenities such as gloves, face masks, and delivery apparatus, we sometimes use candles or battery-operated lamps for deliveries at night."* Participants agreed that the lack of electricity was a challenge for the effective delivery of safe PMTCT services. A pharmacy technician said, *"We have a power generator, but we do not have funds to buy gasoline to power the generator; we also do not have a regular supply of electricity for the refrigerator where we keep our drugs."* Providers reported contributing funds out of pocket to purchase battery operated lamps and gasoline.

According to participants, referrals were made when there was a shortage of medical supplies in the facility or when follow up procedures were necessary. They discussed the necessity of referrals and the lack of alternative options. A pharmacy technician said, *"We are making the most of our situation...we have centers where there are no drugs, so, we have to refer [patients] to the Nigerian Institute of Medical Research."* A nurse added, *"The General Outpatient Department is where counseling is done at some centers, but they don't have kits to do the test, so they refer and are not sure if the clients report to the designated center. Most of our clients will fail to go to where we refer them."*

Salary and compensation

Participants also discussed feeling demoralized due to months of delay in wages, lack of professional development opportunities, and limited upward mobility. They stated significant salary reductions after the transition of HIV programming from PEPFAR to LGAs. A nurse stated, “PEPFAR used to pay nurses ~US\$310 per month, but when the LGA took over, some nurses were not assimilated as LGA personnel, but were contractors with the salary reduced to ~US\$194, then further reduced to ~US\$65.” Participants were unhappy about the inability to negotiate salaries and delays in payments. Additionally, lower-ranking health providers spoke about the difficulty of getting promoted and lack of professional development opportunities. A CHW said, “Our bosses were sent for training which enabled them to enhance their careers, but we were left out.”

Challenges Related to Provider Encounter with Patients

“Loss to follow up”:

Issues that arose during provider encounters with patients include the inability to reach patients due to incorrect contact information, described as “lost on track or loss to follow up.” In discussing this challenge, a nurse commented: “We lost a patient to follow up because she gave our health center a fake phone number and address during her registration...” As narrated by health providers, the main reason patients provide false contact information is the fear of AIDS-related stigmatization.

Stigmatization, Disclosure, and Effects on Health Seeking Behaviors:

Health providers discussed the fear of stigmatization and its effects on patients’ ability to initiate PMTCT services, adhere to treatment, and remain in care. They provided examples of stigmatizing behaviors by partners, extended family, and community members. A nurse who shared a patient’s story noted, “there was this young lady who came in to register for her ANC... She explained that the man that got her pregnant later got to know her HIV status and arranged for a gang to beat her up.” Providers also shared examples of patient stigmatization experienced by extended family members. This was illustrated in the following narrative by a counselor/tester:

“There was this woman, who said her sister-in-law came to their house and saw condoms...since then, issues started in the lady’s home, the man no longer showed her love and care. She is still in the marriage, but no peace for her.”

Participants agreed that stigmatization and its resulting consequences are the main reasons for lack of patient disclosure. A counselor/tester said, “Some of the clients know their status before coming to this facility. The issue of stigma affects how clients seek HIV treatment.” Another provider added, “They prefer to keep the results to themselves until the person [partner] is infected so it

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3 *becomes a question of ‘who gave who [HIV].’* To encourage disclosure and empower patients,
4 providers reported discussing the importance of counseling, medication adherence, and emphasis
5 that one can live with HIV. A pharmacist said, *“I tell my clients that so far as there is treatment,*
6 *they should relax and adhere to instruction on their drugs. I used to tell them ‘It can be me and it*
7 *can be you.’”*
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11 Difficulty in getting patients to accept HIV positive test result:
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14 Another challenge discussed by health providers was patient HIV misinformation and difficulty in
15 getting them to accept an HIV positive test result. The most salient example of misinformation
16 was that of women believing that if they had one partner, they were protected from contracting
17 HIV. A CHW spoke about a woman who refused to accept her HIV positive test result. According
18 to the CHW, *“She believed there was no way she could have been infected with HIV given that she*
19 *had been monogamous in her sexual relationship with her husband.”* Health providers reported
20 that for married women especially, the news of having an HIV positive test result was unthinkable.
21 Thus, common responses to an HIV positive test result included the Yoruba phrases translating to
22 *“Olorun maje! (God forbid!)”* or *“Koni wa sinu ile mi! (It will not come to my home!).”* Other
23 phrases include *“Aye mi baje! (My life has ended!)”* or *“Nibo nimo magba?! (Where do I go from*
24 *here?!).”*
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30 Providers also spoke about misinformation and discordant health beliefs about the origin and
31 treatment of HIV. They shared stories of patients who invited spiritual leaders to the health facility
32 for guidance and support during visits. A counselor/tester said, *“Most clients belief in traditional*
33 *ways to solve their health issues rather than coming to the hospital; they believe in nature, they*
34 *have faith in the way their forefathers solved issues...”* Providers also expressed frustration with
35 patients who prefer traditional birth attendants (TBAs) or spiritual healers as opposed to, or in
36 combination with primary health facility services. This issue was described in the following story
37 told by a nurse. She noted:
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40 *“We had a lady who was due to deliver, we tried our best [to keep her in the facility], but*
41 *our efforts were fruitless. Her husband took her to a TBA. Later, she came for her baby’s*
42 *immunization. Some [patients] go to the two places, the health facility, and TBA, and this*
43 *presents a challenge for the health facility.”*
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47 **Health Providers Perspectives on Strategies for Improving PMTCT Services**

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50 Participant suggestions for improving the delivery of PMTCT services included strategies to
51 mitigate challenges within health facilities and in the community. Table 2 summarizes challenges
52 and provider suggested solutions for addressing barriers for PMTCT service delivery. Within
53 facilities, health providers suggested to first ensure the availability of necessary equipment, tools,
54 and medication. They also discussed reducing referrals by making the primary health care facility
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a one-stop facility for ANC, HIV counseling/testing, and treatment. Participants also suggested improvements to the health workforce by increasing the number of staff in primary healthcare facilities and the expansion of professional development and training opportunities to all staff. A CHW said, “*We all handle cases, we should all be trained.*”

At the community level, participants discussed the importance of continued efforts to promote

Table 2: Summary of Health Provider Reported Challenges and Strategies to Address Barriers to the Delivery of PMTCT Services

Theme	Challenges to PMTCT delivery	Strategies for addressing barriers
<i>Health Systems Challenges</i>	Lack of resources- medication shortage, supply shortage, lack of resources including gloves, delivery apparatus, gloves and electricity	Ensure the availability of necessary equipment, tools, and medication
	Workforce challenge-Delay in wages, lack of professional development opportunities, and limited upward mobility)	Increase in wages, expansion of professional development and training opportunities to all staff
<i>Patient related challenges</i>	“ <i>Loss to follow up</i> ”- Inability to reach patients/incorrect contact information	Improving medical records notation of those living with HIV
	Stigmatization experienced from extended family members and related violence, abandonment, and neglect.	Continued community education, efforts to promote couples counseling/testing, and home-based care and designation of HIV health educators from each neighborhood
	HIV misinformation and discordant health beliefs about the origin and treatment of HIV	Implementation of a peer to peer model paring health facility staff with spiritual leaders and TBAs

couples counseling/testing, efforts to provide home-based care to reduce stigmatization and discrimination at the community level. Moreover, participants discussed new strategies such a designating an HIV health educator from each neighborhood. A CHW said, “*this is because people tend to listen to who they know [rather] than a stranger.*” Some providers also suggested collaboration with religious institutions and TBAs by using a peer to peer model, which entails paring a health provider with TBA and/or spiritual leader to provide services to women.

DISCUSSION

We sought to understand the experiences of healthcare providers delivering PMTCT services in Lagos, Nigeria. Findings from this study demonstrate the convoluted factors impacting PMTCT service delivery, highlighting challenges at the health system, individual, and community level. The primary findings of this study are in alignment with studies investigating barriers and

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3 facilitators for effective delivery of PMTCT services in SSA.^{13 18} Previous studies in Africa and
4 elsewhere reported system challenges including shortage of resources such as ART, gloves, and
5 surgical equipment;¹⁹⁻²³ studies also reported operational challenges like inefficient workflow.^{11 12}
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7 ¹⁸ In a review of barriers and facilitators of ART uptake for PMTCT services in SSA, Gourla et.
8 al. not only reported resource shortages, but poor record-keeping^{18 21} and poor referral linkages
9 between departments and external facilities.^{18 19 24-26} In low-income countries often, the solution
10 to resource shortages is referrals; this presents a set of new challenges because of weak or non-
11 existent referral/follow-up procedures and practices.²⁴
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15 One of the root causes of the health system challenges in Nigeria is the lack of skilled health
16 workers to support the volume of patients seeking treatment.²⁷ Nigeria has an estimated 18.3
17 skilled health professionals per 10,000 individuals, a lower number than the estimated 44.5
18 health professionals per 10,000 needed to meet the sustainable development goals for health.²⁷
19 To increase the number of health professionals able to provide essential services including
20 PMTCT, Nigeria enacted the National Task Shifting/Task Sharing Policy in 2014 (“task-
21 shifting”).²⁷ Task-shifting allows CHWs to conduct HIV testing services, administer
22 medications, and provide provisional support services under the supervision of nurses, midwives,
23 or doctors.^{27 28} Task shifting is effective in addressing physician shortages to complete a host of
24 maternal and child health related tasks.^{27 29 30} Authors who compared physician, CHW, and other
25 lower-level health workers’ knowledge and ability to diagnose common illnesses in Nigeria
26 found no statistically significant difference between physician and non-physician understanding
27 of treatment guidelines and ability to accurately diagnose conditions.³⁰
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34 Although promising, utilizing lower-level health professionals to address health worker
35 shortages may bring about a different set of challenges. As illustrated by our findings, challenges
36 include low wages/delays in payment of salaries and lack of professional development
37 opportunities. Friction between various cadres of health workers has been reported, with shifting
38 of tasks from doctors and nurses to providers with less training sometimes seen as a threat to job
39 security or perceived quality of care.³¹ In some cases, frustrated health workers in Nigeria have
40 staged strikes at national and local levels resulting in the discontinuation of service delivery
41 including PMTCT services.^{27 32 33} Participant suggested solutions for workforce and other system
42 challenges echoed those presented in the literature primarily suggesting the provision of adequate
43 stocks of equipment (generators and fuel), necessary supplies (gloves, HIV testing kits) and
44 medication.^{11-14 18} Ensuring adequately supplied health facilities is likely to improve efficiency
45 and reduce the level of stress experienced by health providers resulting in a more productive
46 workforce.
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Besides health system challenges, participants reported barriers related to patient interaction, notably, loss to follow up. In Nigeria, a study investigating loss to follow up in the PMTCT care cascade indicates that a large proportion of women are lost to follow up prior to delivery.³⁴ Other studies investigating predictors of and factors associated with loss to follow up in PMTCT in Nigeria and SSA found correlations between age (young), lack of income, low education, and being unmarried.^{35 36} Qualitative factors for loss to follow up include lack of support from spouse and family members, distance to the health facility, poverty and community level stigma.³⁷ One way to reduce loss to follow up prior to delivery is to verify contact information of patient and next of kin and develop birth plans with women during antenatal care visits.

Another patient-related challenge discussed among study participants is patients' beliefs about treatment and transmission of HIV, and the use of TBAs. Although participants in this study were not in support of TBAs, in Nigeria, most births (60%) are performed by TBAs.^{38 39} TBAs are often preferred because they understand birthing rituals and provide culturally relevant advice about newborn care.^{38 39} For women living with HIV, TBAs not only offer culturally tailored birthing experiences but also cost less compared to health facilities.³⁹ Discussions about the use of TBAs in PMTCT efforts are ongoing, giving promising results from studies that integrated TBAs in mobilizing, testing, and treating women living with HIV.⁴⁰⁻⁴⁴

Health providers also talked about stigmatization and its disruption of PMTCT service delivery. As reported in this study and others, stigmatization has a profound effect on patients' HIV status disclosure, health-seeking behaviors, and medication adherence among other effects.^{13 18 36 39 45-49} In extreme cases as reported by our participants, persons living with HIV/AIDS experience violence as a direct effect of stigmatization. As suggested by participants, community education, and the involvement of male partners especially in couples counseling may be effective. Moreover, the implementation of culturally adapted, faith-based programs can increase HIV counseling, testing, and enrolment in care among pregnant women and their male partners in Nigeria.⁵⁰⁻⁵²

STRENGTHS AND LIMITATIONS

This study has several strengths. First, it is one of a few that focus on experiences of health providers as it relates to the provision of PMTCT services, thus enhancing our understanding of provider experiences. Second, findings not only describe challenges, but also, identify opportunities for intervention at the health system, community, and individual levels. Third, the findings support the quantitative findings reported by Ehiri et. al. regarding provider support of PLWHA and low levels of stigmatizing behaviors among providers.¹⁴ Lastly, this study had a large and diverse participant pool with representation from multiple cadres of the health workforce from facilities across Lagos. Study limitations include the inability to generalize findings as PMTCT challenges may be location and time-specific although some elements of study may be transferable to similar settings in Nigeria. It is also worthy to note that the findings in this study are from the

perspective of health providers. Thus, patient perceptions regarding challenges related to PMTCT service delivery may be different.

CONCLUSIONS

Findings from this study shed light on health systems challenges and challenges when providing direct patient care. Providers not only discussed these issues, but they also offered tangible context-specific solutions that can be implemented to remedy problems. For Nigeria to make progress in PMTCT, interventions to improve service delivery must consider factors at odds in the community, and health systems level. Understanding the compounded effect of these phenomena on PMTCT service delivery and utilization allows for better strategic planning and development of sustainable interventions.

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Contributors

JE designed the study. JE supervised and collected data. VY, JE collected data. JE, VY, NK, BL conducted or contributed to data analysis. NK, JE, VY interpreted the data. NK prepared the original manuscript. JE, KP, BL, MB contributed to subsequent revisions. All authors read and approved the final manuscript.

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Competing interests

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3 The authors declare they have no competing interests.
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6 **Patient and public involvement**

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8 Patients and/or the public were not involved in the design, or conduct, or reporting or dissemination
9 plans of this research.
10

11 **Patient consent for publication**

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13 Not required.
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15 **Ethics approval**

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17 This study was approved by the Nigeria Health Research Ethics Commission, ID number
18 ADM/DCST/HREC/APP/1237.
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21 **Data sharing statement**

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23 Data for this study were collected through focus group discussions with health workers who
24 provided the prevention of mother-to-child transmission services at primary health centers in the
25 western and eastern districts of Lagos. All relevant summary data are provided in this paper.
26 Interested readers may request data without restriction from the lead author, and Fulbright US
27 Scholar to the University of Lagos (2016-2017), Professor John E Ehiri (jehiri@email.arizona.
28 edu).
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REFERENCES:

1. UNAIDS. New survey results indicate that Nigeria has an HIV prevalence of 1.4%. 2019 https://www.unaids.org/en/resources/presscentre/pressreleaseandstatementarchive/2019/march/20190314_nigeria (Accessed 25 Jul 2019).
2. UNAIDS. UNAIDS Nigeria. 2019 <https://www.unaids.org/en/regionscountries/countries/nigeria> (Accessed 30 Jul 2019).
3. Joint United Nations Programme on HIV/AIDS. Countdown to Zero: Global Plan towards the Elimination of new HIV Infections among Children by 2015 and Keeping their Mothers Alive. 1st ed. Geneva, Switzerland: World Health Organization, 2011.
4. United Nations Children's Fund (UNICEF). Step Up the Pace: Towards an AIDS-free generation in West and Central Africa. Dakar Senegal, 2017 https://www.unicef.org/publications/index_101480.html (Accessed 20 Jul 2019).
5. Abiodun O, Sotunsa J, Ani F, *et al.* Elimination of mother-to-child transmission of HIV in Nigeria: the roles, preparedness and determinants of successful involvement of traditional birth attendants. *J AIDS Clin Res* 2015;6(7).
6. WHO. HIV initiative 'prevention of mother-to-child transmission' saves exposed infants in Nigeria. 2016 <https://www.afro.who.int/news/hiv-initiative-prevention-mother-child-transmission-saves-exposed-infants-nigeria> (Accessed 28 Oct 2019).
7. Nigeria U. UNAIDS 2016 Estimates. 2016.
8. UNAIDS Data 2019. 2019 <https://www.unaids.org/en/resources/documents/2019/2019-UNAIDS-data> (Accessed 20 Jul 2019).
9. Haroz D, von Zinkernagel D, Kiragu K. Development and impact of the global plan. *J. Acquir. Immune Defic.* 2017;75(Supplement1): S2-S6.
10. President's Emergency Plan For AIDS Relief. Nigeria Country Operational Plan (COP) 2019 Strategic Direction Summary. Washington, D.C.: U.S. Department of State, Global AIDS Coordinator; 2019.
11. Daigle GT, Jolly PE, Chamot EA, *et al.* System-level factors as predictors of adherence to clinical appointment schedules in antiretroviral therapy in Cambodia. *AIDS care.* 2015;27:836-43. 2015 Jul 3;27(7):836-43.
12. Uwimana J, Jackson D, Hausler H, *et al.* Health system barriers to implementation of collaborative TB and HIV activities including prevention of mother to child transmission in South Africa. *Trop Med Int Health.* 2012;17:658-65.

13. Aizire J, G Fowler M, M Coovadia H. Operational issues and barriers to implementation of prevention of mother-to-child transmission of HIV (PMTCT) interventions in Sub-Saharan Africa. *Curr HIV Res.* 2013;11:144-59.
14. Ehiri JE, Alaofè HS, Yesufu V, *et al.* AIDS-related stigmatisation in the healthcare setting: a study of primary healthcare centres that provide services for prevention of mother-to-child transmission of HIV in Lagos, Nigeria. *BMJ open.* 2019;9:e026322.
15. Lagos State Government: LASG Trains Local Government Staff on Effective Public Administration 2019 <https://lagosstate.gov.ng/blog/2019/07/19/lasg-trains-local-government-staff-on-effective-public-administration/> (Accessed 28 Jul 2019).
16. Lagos State Government: About Lagos. 2019 <https://lagosstate.gov.ng/about-lagos/> (Accessed 28 Oct 2019).
17. Smith J, Firth J. Qualitative data analysis: the framework approach. *Nurse researcher.* *Nurse Res.* 2011;18:52-62.
18. Gourlay A, Birdthistle I, Mburu G, *et al.* Barriers and facilitating factors to the uptake of antiretroviral drugs for prevention of mother-to-child transmission of HIV in sub-Saharan Africa: a systematic review. *J Int AIDS Soc.* 2013;16:18588.
19. Levy JM. Women's expectations of treatment and care after an antenatal HIV diagnosis in Lilongwe, Malawi. *Reprod Health Matters.* 2009;17:152-61.
20. Nkonki LL, Doherty TM, Hill Z, *et al.* Missed opportunities for participation in prevention of mother to child transmission programmes: simplicity of nevirapine does not necessarily lead to optimal uptake, a qualitative study. *AIDS Res Ther.* 2007;4:27.
21. Sprague C, Chersich MF, Black V. Health system weaknesses constrain access to PMTCT and maternal HIV services in South Africa: a qualitative enquiry. *AIDS Res Ther.* 2011;8:10.
22. Balcha TT, Lecerof SS, Jeppsson AR. Strategic challenges of PMTCT program implementation in Ethiopia. *J Int Assoc Physicians AIDS Care (Chic).* 2011;10:187-92.
23. Doherty T, Chopra M, Nsibandé D, *et al.* Improving the coverage of the PMTCT programme through a participatory quality improvement intervention in South Africa. *BMC public health.* 2009;9:406.
24. Watson-Jones D, Balira R, Ross DA, *et al.* Missed opportunities: poor linkage into ongoing care for HIV-positive pregnant women in Mwanza, Tanzania. *PloS one.* 2012;7:e40091.
25. Burke J. Infant HIV infection: acceptability of preventive strategies in central Tanzania. *AIDS Educ Prev.* 2004;16:415-25.

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55
56
57
58
59
60
26. Winestone LE, Bukusi EA, Cohen CR, *et al.* Acceptability and feasibility of integration of HIV care services into antenatal clinics in rural Kenya: a qualitative provider interview study. *Glob Public Health.* 2012;7:149-63.
 27. Olakunde BO, Adeyinka DA, Olawepo JO, *et al.* Towards the elimination of mother-to-child transmission of HIV in Nigeria: a health system perspective of the achievements and challenges. *Int Health.* 2019;11:240-249.
 28. Nigeria Federal Ministry of Health. Task-shifting and Task-sharing Policy for Essential Health Care Services in Nigeria. 2014
https://advancefamilyplanning.org/sites/default/files/resources/Nigeria%20taskshifting%20policy-Aug2014%20REVISEDLEAN%20_Approved%20October%202014.pdf (Accessed 20 May 2020).
 29. Charyeva Z, Oguntunde O, Orobato N, *et al.* Task shifting provision of contraceptive implants to community health extension workers: results of operations research in northern Nigeria. *Glob Health Sci Pract.* 2015;3:382-94.
 30. Uribe MV, Alonge OO, Bishai DM, *et al.* Can task-shifting work at scale?: Comparing clinical knowledge of non-physician clinicians to physicians in Nigeria. *BMC Health Serv Res.* 2018;18:308.
 31. Oku A. Facilitators and barriers to systematically scaling-up family planning task-shifting and task-sharing of contraceptive implants in Cross River State, Nigeria. 2019 <https://www.e2aproject.org/wp-content/uploads/CRS-FP-Scale-up-TSTS-Documentation-FINAL.pdf> (Accessed 26 Jul 2020).
 32. Adeloye D, David RA, Olaogun AA, *et al.* A. Health workforce and governance: the crisis in Nigeria. *Hum Resour Health.* 2017;15:32.
 33. Oleribe OO, Ezieme IP, Oladipo O, *et al.* Industrial action by healthcare workers in Nigeria in 2013–2015: an inquiry into causes, consequences and control—a cross-sectional descriptive study. *Hum Resour Health.* 2016;14:46.
 34. Rawizza HE, Chang CA, Chaplin B, *et al.* Loss to follow-up within the prevention of mother-to-child transmission care cascade in a large ART program in Nigeria. *Curr HIV Res.* 2015;13:201-9
 35. Meloni ST, Chang C, Chaplin B, *et al.* Time-dependent predictors of loss to follow-up in a large HIV treatment cohort in Nigeria. *Open Forum Infect Dis.* 2014;1(2):ofu055.
 36. Tweya H, Gugsu S, Hosseinipour M, *et al.* Understanding factors, outcomes and reasons for loss to follow-up among women in Option B+ PMTCT programme in Lilongwe, Malawi. *Trop Med Int Health.* 2014;19(11):1360-6.
 37. Mpinganjira S, Tchereni T, Gunda A, *et al.* Factors associated with loss-to-follow-up of HIV-positive mothers and their infants enrolled in HIV care clinic: A qualitative study. *BMC Public Health.* 2020;20:298.

- 1
2
3 38. Balogun M, Odeyemi K. Knowledge and practice of prevention of mother-to-child transmission of
4 HIV among traditional birth attendants in Lagos State, Nigeria. *Pan Afr Med J.* 2010;5:7.
5
6
7 39. Iwelunmor J, Ezeanolue EE, Airhihenbuwa CO, *et al.* Socio-cultural factors influencing the
8 prevention of mother-to-child transmission of HIV in Nigeria: a synthesis of the literature. *BMC*
9 *Public Health.* 2014;14:771.
10
11 40. O Olakunde B, Wakdok S, Olaifa Y, *et al.* Improving the coverage of prevention of mother-to-child
12 transmission of HIV services in Nigeria: should traditional birth attendants be engaged? *Int J STD*
13 *AIDS.* 2018;29:687-690.
14
15 41. Chizoba AF, Pharr JR, Oodo G, *et al.* Increasing HIV testing among pregnant women in Nigeria:
16 evaluating the traditional birth attendant and primary health center integration (TAP-In) model. *AIDS*
17 *Care.* 2017;29:1094-1098.
18
19 42. Nsirim RO, Iyongo JA, Adekugbe O, *et al.* Integration of traditional birth attendants into prevention
20 of mother-to-child transmission at primary health facilities in Kaduna, North-West Nigeria. *J Public*
21 *Health Afr.* 2015;6:455.
22
23 43. Brennan AT, Thea DM, Semrau K, *et al.* In-home HIV testing and nevirapine dosing by traditional
24 birth attendants in rural Zambia: A feasibility study. *J Midwifery Womens Health.* 2014;59:198-204.
25
26 44. Hamela G, Kabondo C, Tembo T, *et al.* Evaluating the benefits of incorporating traditional birth
27 attendants in HIV Prevention of Mother to Child Transmission service delivery in Lilongwe, Malawi.
28 *Afr J Reprod Health.* 2014;18:27-34.
29
30 45. Anígilájé EA, Ageda BR, Nweke NO. Barriers to uptake of prevention of mother-to-child
31 transmission of HIV services among mothers of vertically infected HIV-seropositive infants in
32 Makurdi, Nigeria. *Patient Prefer Adherence.* 2016;10:57-72.
33
34 46. Sekoni OO, Owoaje ET. HIV/AIDS stigma among primary health care workers in Ilorin, Nigeria. *Afr*
35 *J Med Med Sci.* 2013;42:47-57.
36
37 47. Oke OO, Akinboro AO, Olanrewaju FO, *et al.* Assessment of HIV-related stigma and determinants
38 among people living with HIV/AIDS in Abeokuta, Nigeria: A cross-sectional study. *SAGE Open*
39 *Med.* 2019;7:2050312119869109.
40
41 48. Ndinda C, Chimbwete C, Mcgrath N, *et al.* Community attitudes towards individuals living with HIV
42 in rural KwaZulu-Natal, South Africa. *AIDS Care.* 2007;19:92-101.
43
44 49. Olowookere SA, Adeleke NA, Fatiregun AA, *et al.* Pattern of condom use among clients at a
45 Nigerian HIV Counseling and Testing Centre. *BMC Res Notes.* 2013;6:289.
46
47 50. Ezeanolue EE, Obiefune MC, Ezeanolue CO, *et al.* Effect of a congregation-based intervention on
48 uptake of HIV testing and linkage to care in pregnant women in Nigeria (Baby Shower): a cluster
49 randomised trial. *Lancet Glob Health.* 2015;3:e692-700.
50
51
52
53
54
55
56
57
58
59
60

- 1
2
3 51. Ezeanolue EE, Obiefune MC, Yang W, *et al.* What do you need to get male partners of pregnant
4 women tested for HIV in resource limited settings? The baby shower cluster randomized trial. *AIDS*
5 *Behav.* 2017;21:587-596.
6
7
8 52. Ehiri JE, Iwelunmor J, Iheanacho T, *et al.* Using a cultural framework to understand factors
9 influencing HIV testing in Nigeria. *International quarterly of community health education. Int Q*
10 *Community Health Educ.* 2016;37:33-42.
11
12
13
14
15
16
17
18
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COREQ (CONsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
<i>Personal characteristics</i>			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
<i>Relationship with participants</i>			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
<i>Theoretical framework</i>			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
<i>Participant selection</i>			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
<i>Setting</i>			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
<i>Data collection</i>			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat interviews carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the interview or focus group?	
Duration	21	What was the duration of the interviews or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
<i>Data analysis</i>			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
<i>Reporting</i>			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

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BMJ Open

“Making the most of our situation”: A qualitative study reporting health providers’ perspectives on the challenges of implementing the prevention of mother-to-child transmission of HIV services in Lagos, Nigeria

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3 **“Making the most of our situation”: A qualitative study reporting health providers’**
4 **perspectives on the challenges of implementing the prevention of mother-to-child**
5 **transmission of HIV services in Lagos, Nigeria**
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50 **Keywords:** *HIV/AIDS, Health Systems Challenges, Prevention of Mother-to-Child Transmission,*
51 *PMTCT, Low-and Middle-income countries, sub-Saharan Africa, Global Maternal and Child*
52 *Health*
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ABSTRACT

Objectives: To investigate the challenges of, and opportunities for, effective delivery of PMTCT services from the perspectives of primary health care providers in Lagos, Nigeria.

Design: This qualitative study consisted of nine focus groups with 59 health providers, analyzed thematically.

Setting: Thirty-eight primary health facilities in central and western districts of Lagos, Nigeria.

Participants: Participants included nurses, nursing assistants, community health workers (CHWs), laboratory workers, pharmacists, pharmacy technicians, monitoring and evaluation staff, and medical records personnel.

Results: Health providers' challenges included frustration with the healthcare system where unmet training needs, lack of basic amenities for effective and safe treatment practices, low wages, and inefficient workflow were discussed. Providers discussed patient-level challenges, which included the practice of giving fake contact information for fear of HIV-related stigmatization, and refusal to accept HIV-positive results and to enroll in care. Providers' suggestions for addressing PMTCT service delivery challenges included the provision of adequate supplies and training of healthcare workers. To mitigate stigmatization, participants suggested home-based care, working with traditional birth attendants and religious institutions, and designating a second level of CHWs for each neighborhood.

Conclusions: Findings illustrate the complex nature of PMTCT service delivery and illuminate issues at the patient and health system levels. These results may be used to inform strategies for addressing identified barriers and to improve the provision of PMTCT services, thus ensuring better outcomes for women and families.

Strengths and Limitations:

- This study adds to the few studies reporting the experiences of health providers involved in PMTCT service delivery in sub-Saharan Africa.
- Findings describe challenges and opportunities for intervention at the health system, community, and individual levels.
- Participant pool represents multiple cadres of the health workforce from facilities across a large city.
- PMTCT challenges may be location and time-specific.
- Findings are based on provider perspectives.

INTRODUCTION

Nearly 2 million adult Nigerians live with HIV/AIDS, accounting for a significant portion of all people living with HIV/AIDS in sub-Saharan Africa (SSA).¹ According to the 2019 results of the Nigeria HIV/AIDS Indicator and Impact Survey, the prevalence of HIV in the country is 1.5% among adults aged 15-64 years,¹ with women of reproductive age at an increased risk.² Although the country has made significant progress in addressing HIV/AIDS, it still records the largest number of HIV infections among children each year globally, with only 18% of infants under eight weeks tested for HIV.³ Nigeria accounted for over 23% of global pediatric HIV infections in 2016;⁴⁻⁷ in 2018, only 35% of HIV-positive children 0-14 years of age were receiving treatment.³ While many countries in SSA have made significant strides in reducing the burden of pediatric HIV infection, major challenges remain. Despite some successes, Nigeria failed to meet the 2015 Global Plan target of eliminating new HIV infections among children by 90%.⁸

While the availability of inexpensive, effective antiretroviral therapy (ART) for the prevention of mother-to-child transmission (PMTCT) has increased globally, delivery of PMTCT services is complex and uptake in Nigeria remains less than optimal. The Nigerian National Agency for the Control of AIDS estimates that only 53,677 out of 177,993 HIV-Positive pregnant received ART in 2015.⁹ Low uptake of PMTCT resulted in an estimated 160,000 new HIV infections in children in 2018.¹⁰ Nigeria is one of 21 priority countries in SSA that accounts for 90% of pregnant women infected with HIV.¹¹ Identification of HIV-infected pregnant women through routine HIV screening remains a critical step for initiating PMTCT interventions. Concerned about the high rate of mother-to-child transmission of HIV, the Lagos state government initiated a renewed campaign to accelerate PMTCT service delivery in the state.¹² With support from the US President's Emergency Plan for AIDS Relief (PEPFAR), the Global Fund for HIV, TB, and Malaria, Nigeria offers free services for PMTCT of HIV.¹² Yet, prevention of pediatric HIV transmission remains a major public health challenge.

Numerous studies have investigated barriers faced by individuals when accessing HIV/AIDS treatment and prevention services in Nigeria and similar settings in SSA. However, there is a paucity of studies on health system barriers, and in particular, challenges faced by health providers and their lived experiences of PMTCT service delivery.¹³⁻¹⁶ Thus, the purpose of this study was to investigate the challenges of, and opportunities for, effective delivery of PMTCT services from the perspectives of primary health care providers in Lagos, Nigeria.

METHODS

Study Setting:

This study was conducted in Lagos, southwest Nigeria. Based on the UN-Habitat and international development agencies' estimates, Lagos had ~24.6 million inhabitants in 2015.¹⁷ Thus, Lagos is

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3 the commercial center of both Nigeria and the West African subregion. The large population and
4 the fluid movement of people in and out of the state have significant implications for the spread
5 and control of HIV/AIDS. Although the prevalence of HIV (1.2%) is slightly lower than the
6 national average (1.5%), Lagos is one of three states that account for 44% of Nigeria's unmet need
7 for HIV/AIDS intervention.¹² Lagos has three districts (central, western and eastern), twenty Local
8 Government Areas (LGAs), thirty-seven Local Council Development Areas (LCDAs),¹⁸ and over
9 two thousand communities.¹⁷ This study was set in primary care facilities in the central and western
10 districts of Lagos.
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15 **Ethics and Data Collection:**

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18 This study was embedded within a larger quantitative study, which methodology had previously
19 been published.¹⁶ Using a geopolitical map, we purposively selected central and western districts
20 of the state for the study. These districts were chosen because they covered the largest areas of
21 Lagos, including areas with populations with income levels that are most representative of the
22 state. With approvals from the Lagos State Ministry of Health, the Lagos State AIDS Control
23 Agency, and the Lagos State Primary Healthcare Board, Medical Officers of Health in the LGAs
24 within the two study districts were contacted with study information and an invitation to
25 participate. Of the 10 LGAs in the western district, 8 responded and agreed to participate; 2 of the
26 5 LGAs in the central district responded and volunteered to participate.
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31 This study was approved by the Nigeria Health Research Ethics Commission, the Lagos State
32 Ministry of Health, and the Lagos State Primary Health Care Board. To ensure standard protocol
33 was followed, the Primary Health Care Board introduced the study team to the Medical Officer in
34 charge of each study district. The Medical Officer, in turn, introduced the study team to the Nursing
35 Officer in charge of each Primary Health Care Center under their jurisdiction. Each Nursing
36 Officer introduced the study team to eligible participants at their facility during a face-to-face
37 meeting. At each meeting, the study team provided detailed information about the study and the
38 role of participants. At the end of each meeting, the location, date, and time of each focus group
39 discussion (FGD) session were confirmed. Of 75 health workers who indicated initial interest, 59
40 (49 women and 10 men) participated in the FGDs. Study participants were purposively sampled
41 to include only health workers involved in direct patient care (nurses and nursing assistants,
42 community health workers) or who had access to information on clients' HIV serostatus
43 (laboratory workers, pharmacists, pharmacy technicians, and medical records personnel).
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49 Following standard methods for Focus Group Discussions (FGDs),¹⁹ a topic guide for the FGD
50 sessions was drafted at the University of Arizona, informed by analysis of results of the larger
51 quantitative study previously reported¹⁶ and a review of related literature^{20,21} It was later finalized
52 in Lagos following pre-testing and discussions with local collaborators. The FGD guide consisted
53 of open-ended questions and statements designed to allow the respondents to structure their
54 perceptions in their own words. Specifically, participants were asked to freely discuss the major
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3 challenges they faced in their delivery of PMTCT services in their health facilities and to share
4 their perspectives regarding potential strategies for improving service delivery. The FGD sessions
5 were conducted in large meeting rooms at nine health facilities. All participants signed an informed
6 consent form prior to data collection. Nine focus group discussion (FGD) sessions lasting 45-60
7 minutes in duration were conducted between April and August 2017 in English with some phrases
8 in Yoruba, a local language. The semi-structured FGD sessions were facilitated by two authors
9 with advanced training and experience in qualitative data collection and conducting health research
10 in Nigeria (JE, VY). Pre-determined questions from the FGD guide were asked, followed by
11 probing questions as deemed necessary by the facilitators to elicit rich data.²² The authors did not
12 have established relationships with the participants before this study. Saturation was reached
13 during data collection. FGD transcripts were produced verbatim from audio recordings and were
14 de-identified prior to analysis. Transcripts were not returned to participants for comment or
15 correction given that data were anonymized to ensure confidentiality.

22 **Data Analysis**

25 Data were independently reviewed by four authors (JE, NK, VY, BL) and thematically analyzed
26 using the framework approach.²³ Our multi-cultural, team-based approach to data analysis,
27 including the involvement of two co-authors that were present during the FGDs (JE, VY) and two
28 that were not (NK, BL), was used to enhance the transferability of findings while maintaining
29 cultural integrity and credibility.²⁴

33 The framework analysis approach utilized during this analysis has five steps that involve (i)
34 familiarization, a process during which the team members are immersed in the details of transcripts
35 to gain a sense of each FGD before dividing them into sections and identifying recurrent themes;
36 (ii) developing a theoretical framework where we identified recurrent and important themes in the
37 transcripts; (iii) indexing during which the team became further immersed in the data to refine
38 identified themes and sub-themes; (iv) data summarization during which we reduced material into
39 understandable, summaries of what was said by participants; and finally, (v) data synthesis and
40 interpretation which allowed for the comparison of themes and sub-themes against the original
41 transcripts, field notes, and audio recordings to ensure appropriate context.²³

46 Transcripts were manually coded and classified without the use of coding software. Team meetings
47 were held to discuss each step during analysis to ensure a collective understanding of the data and
48 methodological approach. Discrepancies in coding and selected quotes were resolved in three
49 rounds of discussions until an agreement was reached. The agreed-upon set of respondent quotes
50 were then arranged into larger categories and themes from which a final narrative was developed.
51 ²³ We did not seek participant feedback on the codes and final themes and sub-themes identified.

55 **Patient and public involvement:**

The study instrument was piloted locally using a purposive sample of 10 PMTCT workers in two PHCs in Lagos. Participants in the pilot study were not included in the main study. Their feedback was used to modify and adapt the instrument as appropriate.

RESULTS

Participants were mostly female (83.1%), and worked as nurses (37.3%) and counselors/and testers (25.4%). Participants' demographic characteristics are presented in Table 1.

Table 1: Participant Demographic Characteristics

<i>Gender</i>	<i>Number</i>
Male	10
Female	49
<i>Professional cadre</i>	
Nurses	22
Counselors and Testers	15
Laboratory Scientists	7
Pharmacy Technicians	5
Monitoring and Evaluation Officer	1
Nursing Assistants	3
Community Health Workers (CHW)	4
Medical Records Personnel	1
Monitoring and Evaluation Officer	1

FGD results indicate the challenges experienced by health providers in delivering PMTCT services fell into two broad themes: i) frustration with the healthcare system and ii) issues that arose during provider encounters with patients.

Frustration with the Health System

Lack of Resources and Referral Challenges:

Providers discussed the shortage of material resources as a major challenge and gave detailed accounts of situations that represent sub-optimal working conditions. The discussed issues included the lack of electricity in newborn delivery rooms. A nurse narrated, "*We lack amenities such as gloves, face masks, and delivery apparatus. We sometimes use candles or battery-operated lamps for deliveries at night.*" Participants agreed that the lack of electricity was a challenge for the effective delivery of safe PMTCT services. A pharmacy technician said, "*We have a power*

generator, but we do not have funds to buy gasoline to power the generator. We also do not have a regular supply of electricity for the refrigerator where we keep our drugs.” Providers reported contributing funds out of pocket to purchase battery operated lamps and gasoline.

According to participants, referrals were made when there was a shortage of medical supplies in the facility or when follow-up procedures were necessary. They discussed the necessity of referrals and the lack of alternative options. A pharmacy technician said, “*We are making the most of our situation... we have centers where there are no drugs, so, we have to refer [patients] to the Nigerian Institute of Medical Research.*” A nurse added, “*The General Outpatient Department is where counseling is done at some centers, but they don’t have kits to do the test, so they refer and are not sure if the clients report to the designated center. Most of our clients will fail to go to where we refer them.*”

Salary and compensation

Participants also discussed feeling demoralized due to low wages or months of delay in wages, lack of professional development opportunities, and limited upward mobility. They stated significant salary reductions as a challenge after the transition of HIV programming from PEPFAR to LGAs. A nurse stated, “*PEPFAR used to pay nurses ~US\$310 per month, but when the LGA took over, some nurses were not assimilated as LGA personnel, but were contractors with the salary reduced to ~US\$194, then further reduced to ~US\$65.*” Participants were unhappy about the inability to negotiate salaries and delays in payments. Additionally, lower-ranking health providers spoke about the difficulty of getting promoted and the lack of professional development opportunities. A CHW said, “*Our bosses were sent for training which enabled them to enhance their careers, but we were left out.*”

Challenges Related to Provider Encounter with Patients

Loss to follow-up:

Issues that arose during provider encounters with patients included the inability to reach patients for follow-up due to incorrect contact information, described as “*lost on track.*” In discussing this challenge, a nurse commented: “*We lost a patient to follow-up because she gave our health center a fake phone number and address during her registration...*” As narrated by health providers, the main reason patients provide false contact information is the fear of AIDS-related stigmatization.

Stigmatization, Disclosure, and Effects on Health Seeking Behaviors:

Health providers discussed the fear of stigmatization and its effects on patients’ ability to initiate PMTCT services, adhere to treatment, and remain in care. They provided examples of stigmatizing

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3 behaviors by partners, extended family, and community members. Pregnant women may be
4 especially vulnerable to stigmatization and discrimination when compared with people living with
5 HIV at other points in the life cycle. A nurse who shared a patient's story noted, *“there was this*
6 *young lady who came in to register for her antenatal care... She explained that the man that got*
7 *her pregnant later got to know her HIV status and arranged for a gang to beat her up.”* Providers
8 also shared examples of patient stigmatization by extended family members. This was illustrated
9 in the following narrative by a counselor/tester:

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12 *“There was this woman, who said her sister-in-law came to their house and saw*
13 *condoms...since then, issues started in the lady’s home, the man no longer showed her love*
14 *and care. She is still in the marriage, but no peace for her.”*
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18 Participants agreed that stigmatization and its resulting consequences are the main reasons for the
19 lack of patient disclosure. A counselor/tester said, *“Some of the clients know their status before*
20 *coming to this facility. The issue of stigma affects how clients seek HIV treatment.”* Another
21 provider added, *“They prefer to keep the results to themselves until the person [partner] is infected*
22 *so it becomes a question of ‘who gave who [HIV].’* To encourage disclosure and empower patients,
23 providers reported discussing the importance of counseling, medication adherence, and emphasis
24 that one can live with HIV. A pharmacist said, *“I tell my clients that so far as there is treatment,*
25 *they should relax and adhere to instruction on their drugs. I used to tell them ‘It can be me and it*
26 *can be you.”*
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31 Difficulty in getting patients to accept HIV-Positive test result:

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34 Another challenge discussed by health providers was patient HIV misinformation and difficulty in
35 getting patients to accept an HIV-Positive test result. The most salient example of misinformation
36 was that of women believing that if they had one partner, they were protected from contracting
37 HIV. A CHW spoke about a woman who refused to accept her HIV-Positive test result. According
38 to the CHW, *“She believed there was no way she could have been infected with HIV given that she*
39 *had been monogamous in her sexual relationship with her husband.”* Health providers reported
40 that for married women especially, the news of having an HIV-Positive test result was unthinkable.
41 Thus, common responses to an HIV-positive test result included such Yoruba phrases as *“Olorun*
42 *maje! (God forbid!)”* or *“Koni wa sinu ile mi! (It will not come to my home!)”*. Other phrases
43 include *“Aye mi baje! (My life has ended!)”* or *“Nibo nimo magba?! (Where do I go from here?!).”*
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49 Providers also spoke about misinformation and discordant health beliefs related to the origin and
50 treatment of HIV. They shared stories of patients who invited spiritual leaders to the health facility
51 for guidance and support during visits. A counselor/tester said, *“Most clients believe in traditional*
52 *ways to solve their health issues rather than coming to the hospital. They believe in nature, they*
53 *have faith in the way their forefathers solved issues...”* Providers also expressed frustration with
54 patients who prefer traditional birth attendants (TBAs) or spiritual healers as opposed to, or in
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Table 2: Summary of Health Provider Reported Challenges and Strategies to Address Barriers to the Delivery of PMTCT Services

Theme	Challenges to PMTCT delivery	Strategies for addressing barriers
Health systems challenges	Lack of resources- medication shortage, supply shortage, lack of resources including gloves, delivery apparatus, gloves and electricity	Ensure the availability of necessary equipment, tools, and medication
	Workforce challenge-Delay in wages, lack of professional development opportunities, and limited upward mobility)	Increase in wages, expansion of professional development and training opportunities to all staff

combination with primary health facility services. This issue was described in the following story told by a nurse. She noted:

“We had a lady who was due to deliver, we tried our best [to keep her in the facility], but our efforts were fruitless. Her husband took her to a TBA. Later, she came for her baby’s immunization. Some [patients] go to the two places, the health facility, and TBA, and this presents a challenge for the health facility.”

Health Providers Perspectives on Strategies for Improving PMTCT Services

Participant suggestions for improving the delivery of PMTCT services included strategies to mitigate challenges within health facilities and in the community. Table 2 summarizes the two major themes in the coding tree (systems and patient-related challenges) along with codes related to provider-suggested solutions for addressing those barriers to PMTCT service delivery. Within facilities, health providers suggested first ensuring the availability of necessary equipment, tools, and medication. They also discussed reducing referrals by making the primary health care facility a one-stop facility for antenatal care (ANC), HIV counseling/testing, and treatment. Participants also suggested improvements to the health workforce by increasing the number of staff in primary healthcare facilities and the expansion of professional development and training opportunities to all staff. In addition to the number of staff trained, there was concern about equity with some health workers perceiving that higher-ranking professionals were gate-keeping training opportunities. A CHW said, *“We all handle cases, we should all be trained.”* At the community level, participants discussed the importance of continued efforts to promote couples counseling/testing, efforts to provide home-based care to reduce stigmatization, and discrimination at the community level. Moreover, participants discussed new strategies such as designating an HIV health educator from each neighborhood. A CHW said, *“this is because people tend to listen to who they know [rather] than a stranger.”* Some providers also suggested collaboration with religious institutions and TBAs by using a peer-to-peer model, which entails pairing a health provider with a TBA and/or spiritual healer to provide tandem services to women.

Patient related challenges	<p>“Loss to follow-up”- Inability to reach patients/incorrect contact information</p> <p>Stigmatization experienced from extended family members and related violence, abandonment, and neglect.</p> <p>HIV misinformation and discordant health beliefs about the origin and treatment of HIV</p>	<p>Improving medical records notation of those living with HIV</p> <p>Continued community education, efforts to promote couples counseling/testing, and home-based care and designation of HIV health educators from each neighborhood</p> <p>Implementation of a peer to peer model paring health facility staff with spiritual leaders and TBAs</p>
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DISCUSSION

We sought to understand the experiences of healthcare providers delivering PMTCT services in Lagos, Nigeria. Findings from this study demonstrate the convoluted factors impacting PMTCT service delivery, highlighting challenges at the health system, individual, and community level. Challenges included lack of resources and compensation, stigma and discrimination, loss to follow-up, and HIV misinformation. The primary findings of this study are in alignment with studies investigating barriers and facilitators for effective delivery of PMTCT services in SSA.¹⁵ Previous studies in Africa and elsewhere reported system challenges including shortage of resources such as ART, gloves, and surgical equipment;²⁵⁻³⁰ studies also reported operational challenges like inefficient workflow.^{13 14 25} In a review of barriers and facilitators of ART uptake for PMTCT services in SSA, Gourla et. al. not only reported resource shortages but also, poor record-keeping^{25 28} and poor referral linkages between departments and external facilities.^{25 26 30-32} In low-income countries, the solution to resource shortages is often referrals which presents a whole new set of challenges since weak or non-existent referral or follow-up procedures and practices may lead to increased patient burden and inaccessibility of care.³⁰

One of the root causes of the health system challenges in Nigeria is the lack of skilled health workers to support the volume of patients seeking treatment.²¹ Nigeria has an estimated 18.3 skilled health professionals per 10,000 individuals, a lower number than the estimated 44.5 health professionals per 10,000 needed to meet the sustainable development goals for health.²¹ To increase the number of health professionals able to provide essential services including PMTCT, Nigeria enacted a National Task Shifting Task Sharing Policy in 2014.²¹ Task-shifting allows CHWs to conduct HIV testing services, administer medications, and provide provisional support services under the supervision of nurses, midwives, or doctors.^{21 33} Task shifting is effective in addressing physician shortages to complete a host of maternal and child health-related tasks.^{21 34 35} Authors who compared physician, CHW, and other lower-level health

workers' knowledge and ability to diagnose common illnesses in Nigeria found no statistically significant difference between a physician and a non-physician understanding of treatment guidelines and ability to accurately diagnose conditions.³⁵

As illustrated by our findings, additional challenges included low wages/delays in payment of salaries and lack of professional development opportunities. Friction between various cadres of health workers has been reported, with the shifting of tasks from doctors and nurses to providers with less training sometimes seen as a threat to job security or perceived quality of care.³⁶ In some cases, frustrated health workers in Nigeria have staged strikes at national and local levels resulting in the discontinuation of service delivery, including PMTCT services.^{21 37 38} Participant-suggested solutions for workforce and other system challenges echoed those presented in the literature, primarily suggesting the provision of adequate stocks of equipment (generators and fuel), necessary supplies (gloves, HIV testing kits) and medication.^{13-16 25} Ensuring adequately supplied health facilities is likely to improve efficiency and reduce the level of stress experienced by health providers resulting in a more productive workforce.

Aside from health system challenges, participants reported barriers related to patient interaction, notably, loss to follow-up. In Nigeria, a study investigating loss to follow-up in the PMTCT care cascade indicated that a large proportion of women are lost to follow-up before delivery.³⁹ Other studies investigating predictors of, and factors associated with, loss to follow-up in PMTCT in Nigeria and SSA found correlations between age (young), lack of income, low education, and being unmarried and losses to follow-up.^{40 41} Other factors for loss to follow-up include lack of support from spouse and family members, distance to the health facility, poverty, and community level stigma.⁴² One practice that may be important for reducing loss to follow-up before delivery, as we saw in this study, is to carefully verify contact information of patients and next of kin and develop birth plans with women during antenatal care visits.

Another patient-related challenge discussed among study participants are patients' beliefs about treatment and transmission of HIV, and the use of TBAs. Although participants in this study were not in support of TBAs, in Nigeria, most births (60%) are performed by TBAs.^{43 44} TBAs are often preferred because they understand birthing rituals and provide culturally relevant advice about newborn care.^{43 44} For women living with HIV, TBAs not only offer culturally tailored birthing experiences but also cost less compared to health facilities.⁴⁴ Social support from a TBA may be important for combatting stigmatization. Discussions about the use of TBAs in PMTCT efforts are ongoing, with promising results from studies that integrated TBAs in mobilizing, testing, and treating women living with HIV.⁴⁵⁻⁴⁹ Future studies on the integration of TBAs in PMTCT service delivery are warranted.

Stigmatization was viewed as disruptive to PMTCT service delivery. As reported in this study and others, stigmatization has a profound effect on patients' HIV status disclosure, health-seeking

behaviors, and medication adherence among other effects.^{15 25 41 44 50-54} In extreme cases as reported by our participants, persons living with HIV/AIDS experience violence as a direct effect of stigmatization. Providers in this sample primarily described stigmatization and discrimination as challenges that existed in the community and interpersonal interactions of women with their partners, extended family, and other community members but did not describe any effects of discrimination that may occur within the health facility. A recent study suggests that training of health providers can reduce fear of infection and therefore make them less likely to engage in discriminatory health care practices such as double gloving.¹⁶ As suggested by participants, community education, and the involvement of male partners especially in couples counseling may be effective. Moreover, the implementation of culturally adapted, faith-based programs can increase HIV counseling, testing, and enrolment in care among pregnant women and their male partners in Nigeria.⁵⁵⁻⁵⁷

STRENGTHS AND LIMITATIONS

This study has several strengths. First, it is one of a few that focused on the experiences of health providers as it relates to the provision of PMTCT services, thus enhancing our understanding of provider experiences. Second, findings not only describe challenges, but also, identify opportunities for intervention at the health system, community, and individual levels. Third, the findings support the quantitative findings reported by Ehiri et. al. regarding provider support of PLWHA and low levels of stigmatizing behaviors among providers.¹⁶ Lastly, this study had a large and diverse participant pool with representation from multiple cadres of the health workforce from facilities across Lagos. Study limitations include limited transferability of findings as PMTCT challenges may be location and time-specific. It is also worthy to note that the findings in this study are from the perspective of health providers. Thus, patient perceptions regarding challenges related to PMTCT service delivery may be different.

CONCLUSIONS

Findings from this study shed light on PMTCT service delivery challenges including those at the health system and direct patient care levels. Providers not only discussed these issues but also offered tangible context-specific solutions that can be implemented to remedy problems. For Nigeria to make progress in PMTCT, interventions to improve service delivery must consider factors at odds in the community and health system levels. Understanding the compounded effect of these phenomena on PMTCT service delivery and utilization allows for better strategic planning and the development of sustainable interventions.

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Contributors

JE designed the study. JE supervised and collected data. VY, JE collected data. JE, VY, NK, BL conducted or contributed to data analysis. NK, JE, VY interpreted the data. NK prepared the original manuscript. JE, KP, BL, MB contributed to subsequent revisions. All authors read and approved the final manuscript.

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Competing interests

The authors declare they have no competing interests.

Patient consent for publication

Not required.

Ethics approval

This study was approved by the Nigeria Health Research Ethics Commission, ID number ADM/DCST/HREC/APP/1237.

Data sharing statement

Data for this study were collected through focus group discussions with health workers who provided the prevention of mother-to-child transmission services at primary health centers in the western and eastern districts of Lagos. All relevant summary data are provided in this paper. Interested readers may request data without restriction from the lead author, and Fulbright US Scholar to the University of Lagos (2016-2017), Professor John E Ehiri (jehiri@email.arizona.edu).

References:

1. UNAIDS. New survey results indicate that Nigeria has an HIV prevalence of 1.4%. 2019
https://www.unaids.org/en/resources/presscentre/pressreleaseandstatementarchive/2019/march/20190314_nigeria (Accessed 25 Jul 2019).
2. Women, girls, gender equality and HIV in Nigeria. 2021 <https://naca.gov.ng/wp-content/uploads/2019/10/Fact-Sheet-Women-Girls-Gender-Equality-and-HIV-in-Nigeria.pdf> (Accessed 15 Apr 2021)
3. UNAIDS. UNAIDS Nigeria. 2019
<https://www.unaids.org/en/regionscountries/countries/nigeria> (Accessed 30 Jul 2019).
4. Joint United Nations Programme on HIV/AIDS. Countdown to Zero: Global Plan towards the Elimination of new HIV Infections among Children by 2015 and Keeping their Mothers Alive. 1st ed. Geneva, Switzerland: World Health Organization, 2011.
5. United Nations Children's Fund (UNICEF). Step Up the Pace: Towards an AIDS-free generation in West and Central Africa. Dakar Senegal, 2017
https://www.unicef.org/publications/index_101480.html (Accessed 20 Jul 2019).
6. Abiodun O, Sotunsa J, Ani F, *et al.* Elimination of mother-to-child transmission of HIV in Nigeria: the roles, preparedness and determinants of successful involvement of traditional birth attendants. *J AIDS Clin Res* 2015;6(7).
7. WHO. HIV initiative 'prevention of mother-to-child transmission' saves exposed infants in Nigeria. 2016 <https://www.afro.who.int/news/hiv-initiative-prevention-mother-child-transmission-saves-exposed-infants-nigeria> (Accessed 28 Oct 2019).
8. Nigeria U. UNAIDS 2016 Estimates. 2016.
9. Fact sheet: prevention of mother to child transmission (PMTCT), 2016. 2021 (Accessed 15 Apr 2021).
10. UNAIDS Data 2019. 2019 <https://www.unaids.org/en/resources/documents/2019/2019-UNAIDS-data> (Accessed 20 Jul 2019).
11. Haroz D, von Zinkernagel D, Kiragu K. Development and impact of the global plan. *J. Acquir. Immune Defic.* 2017;75(Supplement1): S2-S6.
12. President's Emergency Plan For AIDS Relief. Nigeria Country Operational Plan (COP) 2019 Strategic Direction Summary. Washington, D.C.: U.S. Department of State, Global AIDS Coordinato; 2019.
13. Daigle GT, Jolly PE, Chamot EA, *et al.* System-level factors as predictors of adherence to clinical appointment schedules in antiretroviral therapy in Cambodia. *AIDS care.* 2015;27:836-43.
14. Uwimana J, Jackson D, Hausler H, *et al.* Health system barriers to implementation of collaborative TB and HIV activities including prevention of mother to child transmission in South Africa. *Trop Med Int Health.* 2012;17:658-65.

15. Aizire J, G Fowler M, M Coovadia H. Operational issues and barriers to implementation of prevention of mother-to-child transmission of HIV (PMTCT) interventions in Sub-Saharan Africa. *Curr HIV Res.* 2013;11:144-59.
16. Ehiri JE, Alaofè HS, Yesufu V, et al. AIDS-related stigmatisation in the healthcare setting: a study of primary healthcare centres that provide services for prevention of mother-to-child transmission of HIV in Lagos, Nigeria. *BMJ open.* 2019;9:e026322.
17. Lagos State Government: About Lagos. 2019 <https://lagosstate.gov.ng/about-lagos/> (Accessed 28 Oct 2019).
18. Lagos State Government: LASG Trains Local Government Staff on Effective Public Administration 2019 <https://lagosstate.gov.ng/blog/2019/07/19/lasg-trains-local-government-staff-on-effective-public-administration/> (Accessed 28 Jul 2019).
19. Then KL, Rankin JA, Ali E. Focus group research: what is it and how can it be used? *Can J Cardiovasc Nurs.* 2014;1:24.
20. du Plessis E, Shaw SY, Gichuhi M, Gelmon L, Estambale BB, Lester R, Kimani J, Avery LS. Prevention of mother-to-child transmission of HIV in Kenya: challenges to implementation. *BMC Health Serv Res.* 2014;14:1-9.
21. Olakunde BO, Adeyinka DA, Olawepo JO, *et al.* Towards the elimination of mother-to-child transmission of HIV in Nigeria: a health system perspective of the achievements and challenges. *Int Health.* 2019;11:240-249.
22. Longhurst R. Semi-structured interviews and focus groups. *Key methods in geography.* 2003;3(2):143-56.
23. Smith J, Firth J. Qualitative data analysis: the framework approach. *Nurse researcher.* *Nurse Res.* 2011;18:52-62.
24. Pelzang R, Hutchinson AM. Establishing cultural integrity in qualitative research: Reflections from a cross-cultural study. *International journal of qualitative methods.* *Int. J. Qual. Methods* 2017; 27;17:1609406917749702.
25. Gourlay A, Birdthistle I, Mburu G, *et al.* Barriers and facilitating factors to the uptake of antiretroviral drugs for prevention of mother-to-child transmission of HIV in sub-Saharan Africa: a systematic review. *J Int AIDS Soc.* 2013;16:18588.
26. Levy JM. Women's expectations of treatment and care after an antenatal HIV diagnosis in Lilongwe, Malawi. *Reprod Health Matters.* 2009;17:152-61.
27. Nkonki LL, Doherty TM, Hill Z, et al. Missed opportunities for participation in prevention of mother to child transmission programmes: simplicity of nevirapine does not necessarily lead to optimal uptake, a qualitative study. *AIDS Res Ther.* 2007;4:27.
28. Sprague C, Chersich MF, Black V. Health system weaknesses constrain access to PMTCT and maternal HIV services in South Africa: a qualitative enquiry. *AIDS Res Ther.* 2011;8:10.
29. Balcha TT, Lecerof SS, Jeppsson AR. Strategic challenges of PMTCT program implementation in Ethiopia. *J Int Assoc Physicians AIDS Care (Chic).* 2011;10:187-92.

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30. Watson-Jones D, Balira R, Ross DA, *et al.* Missed opportunities: poor linkage into ongoing care for HIV-positive pregnant women in Mwanza, Tanzania. *PloS one.* 2012;7:e40091.
 31. Burke J. Infant HIV infection: acceptability of preventive strategies in central Tanzania. *AIDS Educ Prev.* 2004;16:415-25.
 32. Winestone LE, Bukusi EA, Cohen CR, *et al.* Acceptability and feasibility of integration of HIV care services into antenatal clinics in rural Kenya: a qualitative provider interview study. *Glob Public Health.* 2012;7:149-63.
 33. Nigeria Federal Ministry of Health. Task-shifting and Task-sharing Policy for Essential Health Care Services in Nigeria. 2014
https://advancefamilyplanning.org/sites/default/files/resources/Nigeria%20taskshifting%20policy-Aug2014%20REVISED%20CLEAN%20_Approved%20October%202014.pdf (Accessed 20 May 2020).
 34. Charyeva Z, Oguntunde O, Orobato N, *et al.* Task shifting provision of contraceptive implants to community health extension workers: results of operations research in northern Nigeria. *Glob Health Sci Pract.* 2015;3:382-94.
 35. Uribe MV, Alonge OO, Bishai DM, *et al.* Can task-shifting work at scale?: Comparing clinical knowledge of non-physician clinicians to physicians in Nigeria. *BMC Health Serv Res.* 2018;18:308.
 36. Oku A. Facilitators and barriers to systematically scaling-up family planning task-shifting and task-sharing of contraceptive implants in Cross River State, Nigeria. 2019
<https://www.e2aproject.org/wp-content/uploads/CRS-FP-Scale-up-TSTS-Documentation-FINAL.pdf> (Accessed 26 Jul 2020).
 37. Adeloye D, David RA, Olaogun AA, *et al.* A. Health workforce and governance: the crisis in Nigeria. *Hum Resour Health.* 2017;15:32.
 38. Oleribe OO, Ezieme IP, Oladipo O, *et al.* Industrial action by healthcare workers in Nigeria in 2013–2015: an inquiry into causes, consequences and control—a cross-sectional descriptive study. *Hum Resour Health.* 2016;14:46.
 39. Rawizza HE, Chang CA, Chaplin B, *et al.* Loss to follow-up within the prevention of mother-to-child transmission care cascade in a large ART program in Nigeria. *Curr HIV Res.* 2015;13:201-9.
 40. Meloni ST, Chang C, Chaplin B, *et al.* Time-dependent predictors of loss to follow-up in a large HIV treatment cohort in Nigeria. *Open Forum Infect Dis.* 2014;1(2):ofu055.
 41. Tweya H, Gugsa S, Hosseinipour M, *et al.* Understanding factors, outcomes and reasons for loss to follow-up among women in Option B+ PMTCT programme in Lilongwe, Malawi. *Trop Med Int Health.* 2014;19(11):1360-6.
 42. Mpinganjira S, Tchereni T, Gunda A, *et al.* Factors associated with loss-to-follow-up of HIV-positive mothers and their infants enrolled in HIV care clinic: A qualitative study. *BMC Public Health.* 2020;20:298.

43. Balogun M, Odeyemi K. Knowledge and practice of prevention of mother-to-child transmission of HIV among traditional birth attendants in Lagos State, Nigeria. *Pan Afr Med J.* 2010;5:7.
44. Iwelunmor J, Ezeanolue EE, Airhihenbuwa CO, *et al.* Socio-cultural factors influencing the prevention of mother-to-child transmission of HIV in Nigeria: a synthesis of the literature. *BMC Public Health.* 2014;14:771.
45. O Olakunde B, Wakdok S, Olaifa Y, *et al.* Improving the coverage of prevention of mother-to-child transmission of HIV services in Nigeria: should traditional birth attendants be engaged? *Int J STD AIDS.* 2018;29:687-690.
46. Chizoba AF, Pharr JR, Oodo G, *et al.* Increasing HIV testing among pregnant women in Nigeria: evaluating the traditional birth attendant and primary health center integration (TAP-In) model. *AIDS Care.* 2017;29:1094-1098.
47. Nsirim RO, Iyongo JA, Adekugbe O, *et al.* Integration of traditional birth attendants into prevention of mother-to-child transmission at primary health facilities in Kaduna, North-West Nigeria. *J Public Health Afr.* 2015;6:455.
48. Brennan AT, Thea DM, Semrau K, *et al.* In-home HIV testing and nevirapine dosing by traditional birth attendants in rural Zambia: A feasibility study. *J Midwifery Womens Health.* 2014;59:198-204.
49. Hamela G, Kabondo C, Tembo T, *et al.* Evaluating the benefits of incorporating traditional birth attendants in HIV Prevention of Mother to Child Transmission service delivery in Lilongwe, Malawi. *Afr J Reprod Health.* 2014;18:27-34.
50. Anígilájé EA, Ageda BR, Nweke NO. Barriers to uptake of prevention of mother-to-child transmission of HIV services among mothers of vertically infected HIV-seropositive infants in Makurdi, Nigeria. *Patient Prefer Adherence.* 2016;10:57-72.
51. Sekoni OO, Owoaje ET. HIV/AIDS stigma among primary health care workers in Ilorin, Nigeria. *Afr J Med Med Sci.* 2013;42:47-57.
52. Oke OO, Akinboro AO, Olanrewaju FO, *et al.* Assessment of HIV-related stigma and determinants among people living with HIV/AIDS in Abeokuta, Nigeria: A cross-sectional study. *SAGE Open Med.* 2019;7:2050312119869109.
53. Ndinda C, Chimbwete C, Mcgrath N, *et al.* Community attitudes towards individuals living with HIV in rural KwaZulu-Natal, South Africa. *AIDS Care.* 2007;19:92-101.
54. Olowookere SA, Adeleke NA, Fatiregun AA, *et al.* Pattern of condom use among clients at a Nigerian HIV Counseling and Testing Centre. *BMC Res Notes.* 2013;6:289.
55. Ezeanolue EE, Obiefune MC, Ezeanolue CO, *et al.* Effect of a congregation-based intervention on uptake of HIV testing and linkage to care in pregnant women in Nigeria (Baby Shower): a cluster randomised trial. *Lancet Glob Health.* 2015;3:e692-700.
56. Ezeanolue EE, Obiefune MC, Yang W, *et al.* What do you need to get male partners of pregnant women tested for HIV in resource limited settings? The baby shower cluster randomized trial. *AIDS Behav.* 2017;21:587-596.

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57. Ehiri JE, Iwelunmor J, Iheanacho T, et al. Using a cultural framework to understand factors influencing HIV testing in Nigeria. *International quarterly of community health education*. Int Q Community Health Educ. 2016;37:33-42.

For peer review only

COREQ (CONsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
<i>Personal characteristics</i>			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
<i>Relationship with participants</i>			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
<i>Theoretical framework</i>			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
<i>Participant selection</i>			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
<i>Setting</i>			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
<i>Data collection</i>			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat interviews carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the interview or focus group?	
Duration	21	What was the duration of the interviews or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
<i>Data analysis</i>			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
<i>Reporting</i>			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

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BMJ Open

“Making the most of our situation”: A qualitative study reporting health providers’ perspectives on the challenges of implementing the prevention of mother-to-child transmission of HIV services in Lagos, Nigeria

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3 **“Making the most of our situation”: A qualitative study reporting health providers’ perspectives**
4 **on the challenges of implementing the prevention of mother-to-child transmission of HIV services**
5 **in Lagos, Nigeria**
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ABSTRACT

Objectives: To investigate the challenges of, and opportunities for, effective delivery of PMTCT services from the perspectives of primary health care providers in Lagos, Nigeria.

Design: This qualitative study consisted of nine focus groups with 59 health providers, analyzed thematically.

Setting: Thirty-eight primary health facilities in central and western districts of Lagos, Nigeria.

Participants: Participants included nurses, nursing assistants, community health workers (CHWs), laboratory workers, pharmacists, pharmacy technicians, monitoring and evaluation staff, and medical records personnel.

Results: Health providers' challenges included frustration with the healthcare system where unmet training needs, lack of basic amenities for effective and safe treatment practices, low wages, and inefficient workflow were discussed. Providers discussed patient-level challenges, which included the practice of giving fake contact information for fear of HIV-related stigmatization, and refusal to accept HIV-positive results and to enroll in care. Providers' suggestions for addressing PMTCT service delivery challenges included the provision of adequate supplies and training of healthcare workers. To mitigate stigmatization, participants suggested home-based care, working with traditional birth attendants and religious institutions, and designating a HIV health educator for each neighborhood.

Conclusions: Findings illustrate the complex nature of PMTCT service delivery and illuminate issues at the patient and health system levels. These results may be used to inform strategies for addressing identified barriers and to improve the provision of PMTCT services, thus ensuring better outcomes for women and families.

Strengths and Limitations:

- This study adds to the few studies that report PMTCT service delivery experience in sub-Saharan Africa.
- Findings described challenges and opportunities for intervention at the health system, community, and individual levels.
- Participant pool represents multiple cadres of the health workforce from facilities across a large city.
- PMTCT challenges may be location and time-specific.
- Findings are based on provider perspectives.

INTRODUCTION

Nearly 2 million adult Nigerians live with HIV/AIDS, accounting for a significant portion of all people living with HIV/AIDS in sub-Saharan Africa (SSA).¹ According to the 2019 results of the Nigeria HIV/AIDS Indicator and Impact Survey, the prevalence of HIV in the country is 1.5% among adults aged 15-64 years,¹ with women of reproductive age at an increased risk.² Although the country has made significant progress in addressing HIV/AIDS, it still records the largest number of HIV infections among children each year globally, with only 18% of infants under eight weeks tested for HIV.³ Nigeria accounted for over 23% of global pediatric HIV infections in 2016;⁴⁻⁷ in 2018, only 35% of HIV-positive children 0-14 years of age were receiving treatment.³ While many countries in SSA have made significant strides in reducing the burden of pediatric HIV infection, major challenges remain. Despite some successes, Nigeria failed to meet the 2015 Global Plan target of eliminating new HIV infections among children by 90%.⁸

While the availability of inexpensive, effective antiretroviral therapy (ART) for the prevention of mother-to-child transmission (PMTCT) has increased globally, delivery of PMTCT services is complex and uptake in Nigeria remains less than optimal. The Nigerian National Agency for the Control of AIDS estimates that only 53,677 out of 177,993 HIV-Positive pregnant received ART in 2015.⁹ Low uptake of PMTCT resulted in an estimated 160,000 new HIV infections in children in 2018.¹⁰ Nigeria is one of 21 priority countries in SSA that accounts for 90% of pregnant women infected with HIV.¹¹ The 2016 revision of Nigeria's National Guidelines for HIV Prevention, Treatment and Care¹² contains key recommendations for PMTCT implementation, including initiation of ART for all persons testing positive for HIV. Other recommendations cover the retesting of patients prior to initiation of ART, adoption of pre-exposure prophylaxis for individuals at high risk for acquiring the infection and addition of Dolutegravir, Efavirenz 400 mg and Darunavir/ritonavir to the pool of approved antiretroviral drugs).¹² The Guidelines emphasize the identification of HIV-infected pregnant women through routine HIV screening as a critical step for initiating PMTCT interventions. Concerned about the high rate of mother-to-child transmission of HIV, the Lagos state government initiated a renewed campaign to accelerate PMTCT service delivery in the state.¹³ With support from the US President's Emergency Plan for AIDS Relief (PEPFAR), the Global Fund for HIV, TB, and Malaria, Nigeria offers free services for PMTCT of HIV.¹³ Yet, prevention of pediatric HIV transmission remains a major public health challenge.

Numerous studies have investigated barriers faced by individuals when accessing HIV/AIDS treatment and prevention services in Nigeria and similar settings in SSA. However, there is a paucity of studies on health system barriers, and in particular, challenges faced by health providers and their lived experiences of PMTCT service delivery.¹⁴⁻¹⁷ Thus, the purpose of this study was to investigate the challenges of, and opportunities for, effective delivery of PMTCT services from the perspectives of primary health care providers in Lagos, Nigeria.

METHODS

Study Setting:

This study was conducted in Lagos, southwest Nigeria. Based on the UN-Habitat and international development agencies' estimates, Lagos had ~24.6 million inhabitants in 2015.¹⁸ Thus, Lagos is the commercial center of both Nigeria and the West African subregion. The large population and the fluid movement of people in and out of the state have significant implications for the spread and control of HIV/AIDS. Although the prevalence of HIV (1.2%) is slightly lower than the national average (1.5%), Lagos is one of three states that account for 44% of Nigeria's unmet need for HIV/AIDS intervention.¹³ Lagos has three districts (central, western and eastern), twenty Local Government Areas (LGAs), thirty-seven Local Council Development Areas (LCDAs),¹⁹ and over two thousand communities.¹⁸ This study was set in primary care facilities in the central and western districts of Lagos.

Ethics and Data Collection:

This study was embedded within a larger quantitative study, which methodology had previously been published.¹⁷ Using a geopolitical map, we purposively selected central and western districts of the state for the study. These districts were chosen because they covered the largest areas of Lagos, including areas with populations with income levels that are most representative of the state. With approvals from the Lagos State Ministry of Health, the Lagos State AIDS Control Agency, and the Lagos State Primary Healthcare Board, Medical Officers of Health in the LGAs within the two study districts were contacted with study information and an invitation to participate. Of the 10 LGAs in the western district, 8 responded and agreed to participate; 2 of the 5 LGAs in the central district responded and volunteered to participate. This study was approved by the Nigeria Health Research Ethics Commission, the Lagos State Ministry of Health, and the Lagos State Primary Health Care Board. To ensure standard protocol was followed, the Primary Health Care Board introduced the study team to the Medical Officer in charge of each study district. The Medical Officer, in turn, introduced the study team to the Nursing Officer in charge of each Primary Health Care Center under their jurisdiction. Each Nursing Officer introduced the study team to eligible participants at their facility during a face-to-face meeting. At each meeting, the study team provided detailed information about the study and the role of participants. At the end of each meeting, the location, date, and time of each focus group discussion (FGD) session were confirmed. Of 75 health workers who indicated initial interest, 59 (49 women and 10 men) participated in the FGDs. The 16 that did not participate were absent (on leave or off-duty) during the time of the data collection. Study participants were purposively sampled to include only health workers involved in direct patient care (nurses and nursing assistants, community health workers) or who had access to information on clients' HIV serostatus (laboratory workers, pharmacists, pharmacy technicians, and medical records personnel). Following standard methods for Focus Group Discussions (FGDs),²⁰ a topic guide for the FGD sessions was drafted at the University of Arizona, informed by analysis of results of the larger quantitative study previously reported¹⁷ and a review of related literature^{21,22} It was later finalized in Lagos following pre-testing and discussions with local collaborators. The FGD guide consisted of open-ended questions and

statements designed to allow the respondents to structure their perceptions in their own words. Specifically, participants were asked to freely discuss the major challenges they faced in their delivery of PMTCT services in their health facilities and to share their perspectives regarding potential strategies for improving service delivery. The FGD sessions were conducted in large meeting rooms at nine health facilities. All participants signed an informed consent form prior to data collection. Nine focus group discussion (FGD) sessions lasting 45-60 minutes in duration were conducted between April and August 2017. The FGD sessions were conducted in English with some phrases in Yoruba, the local language of the study setting. All participants had post-secondary school education and were proficient in English Language, the medium of instruction in schools in Nigeria. By the 9th FGD, we believed that data saturation had been reached, given that little additional new information could emerge at that point. The semi-structured FGD sessions were facilitated by two authors with advanced training and experience in qualitative data collection and conducting health research in Nigeria (JE, VY). Pre-determined questions from the FGD guide were asked, followed by probing questions as deemed necessary by the facilitators to elicit rich data.²³ The authors did not have established relationships with the participants before this study. FGD transcripts were produced verbatim from audio recordings and were de-identified prior to analysis. Transcripts were not returned to participants for comment or correction given that data were anonymized to ensure confidentiality.

Data Analysis

Data were independently reviewed by four authors (JE, NK, VY, BL) and thematically analyzed using the Framework approach to qualitative data analysis.²⁴ As Gale et al.²⁵ observe, the Framework method is a systematic and flexible approach to analyzing qualitative data and is appropriate for use by research teams, even where not all members have previous experience of conducting qualitative research. Our multi-cultural, team-based approach to data analysis, including the involvement of two co-authors that were present during the FGDs (JE, VY) and two that were not (NK, BL), was used to enhance the transferability of findings while maintaining cultural integrity and credibility.²⁶ The framework approach to qualitative data analysis has five steps that involve (i) familiarization, a process during which the team members are immersed in the details of transcripts to gain a sense of each FGD before dividing them into sections and identifying recurrent themes; (ii) developing a theoretical framework where we identified recurrent and important themes in the transcripts; (iii) indexing during which the team became further immersed in the data to refine identified themes and sub-themes; (iv) data summarization during which we reduced material into understandable, summaries of what was said by participants; and finally, (v) data synthesis and interpretation which allowed for the comparison of themes and sub-themes against the original transcripts, field notes, and audio recordings to ensure appropriate context.²⁴

Transcripts were manually coded and classified without the use of coding software. Team meetings were held to discuss each step during analysis to ensure a collective understanding of the data and methodological approach. Discrepancies in coding and selected quotes were resolved in three rounds of discussions until an agreement was reached. The agreed-upon set of respondent quotes were then arranged

into larger categories and themes from which a final narrative was developed.²⁴ We did not seek participant feedback on the codes and final themes and sub-themes identified.

Patient and public involvement:

The study instrument was piloted locally using a purposive sample of 10 PMTCT workers in two PHCs in Lagos. Participants in the pilot study were not included in the main study. Their feedback was used to modify and adapt the instrument as appropriate.

RESULTS

Participants were mostly female (83.1%), and worked as nurses (37.3%) and counselors/and testers (25.4%). Participants' demographic characteristics are presented in Table 1.

Table 1: Participant Demographic Characteristics

<i>Gender</i>	<i>Number</i>
Male	10
Female	49
<i>Professional cadre</i>	
Nurses	22
Counselors and Testers	15
Laboratory Scientists	7
Pharmacy Technicians	5
Monitoring and Evaluation Officer	1
Nursing Assistants	3
Community Health Workers (CHW)	4
Medical Records Personnel	1
Monitoring and Evaluation Officer	1

FGD results indicate the challenges experienced by health providers in delivering PMTCT services fell into two broad themes: i) frustration with the healthcare system and ii) issues that arose during provider encounters with patients.

Frustration with the Health System

Lack of Resources and Referral Challenges:

Providers discussed the shortage of material resources as a major challenge and gave detailed accounts of situations that represent sub-optimal working conditions. The discussed issues included the lack of

1
2
3 electricity in newborn delivery rooms. A nurse narrated, *“We lack amenities such as gloves, face masks, and delivery apparatus. We sometimes use candles or battery-operated lamps for deliveries at night.”*
4
5
6 Participants agreed that the lack of electricity was a challenge for the effective delivery of safe PMTCT
7
8 services. A pharmacy technician said, *“We have a power generator, but we do not have funds to buy*
9
10 *gasoline to power the generator. We also do not have a regular supply of electricity for the refrigerator*
11 *where we keep our drugs.”* Providers reported contributing funds out of pocket to purchase battery
12
13 operated lamps and gasoline.

14
15 According to participants, referrals were made when there was a shortage of medical supplies in the
16
17 facility or when follow-up procedures were necessary. They discussed the necessity of referrals and the
18
19 lack of alternative options. A pharmacy technician said, *“We are making the most of our situation...we*
20
21 *have centers where there are no drugs, so, we have to refer [patients] to the Nigerian Institute of Medical*
22
23 *Research.”* A nurse added, *“The General Outpatient Department is where counseling is done at some*
24
25 *centers, but they don’t have kits to do the test, so they refer and are not sure if the clients report to the*
26
27 *designated center. Most of our clients will fail to go to where we refer them.”*

28 Salary and compensation

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30 Participants also discussed feeling demoralized due to low wages or months of delay in wages, lack of
31
32 professional development opportunities, and limited upward mobility. They stated significant salary
33
34 reductions as a challenge after the transition of HIV programming from PEPFAR to LGAs. A nurse stated,
35
36 *“PEPFAR used to pay nurses ~US\$310 per month, but when the LGA took over, some nurses were not*
37
38 *assimilated as LGA personnel, but were contractors with the salary reduced to ~US\$194, then further*
39
40 *reduced to ~US\$65.”* Participants were unhappy about the inability to negotiate salaries and delays in
41
42 payments. Additionally, lower-ranking health providers spoke about the difficulty of getting promoted
43
44 and the lack of professional development opportunities. A CHW said, *“Our bosses were sent for training*
45
46 *which enabled them to enhance their careers, but we were left out.”*

47 Challenges Related to Provider Encounter with Patients

48 Loss to follow-up:

49
50 Issues that arose during provider encounters with patients included the inability to reach patients for
51
52 follow-up due to incorrect contact information, described as *“lost on track.”* In discussing this challenge,
53
54 a nurse commented: *“We lost a patient to follow-up because she gave our health center a fake phone*
55
56 *number and address during her registration...”* As narrated by health providers, the main reason patients
57
58 provide false contact information is the fear of AIDS-related stigmatization.
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60

Stigmatization, Disclosure, and Effects on Health Seeking Behaviors:

Health providers discussed the fear of stigmatization and its effects on patients' ability to initiate PMTCT services, adhere to treatment, and remain in care. They provided examples of stigmatizing behaviors by partners, extended family, and community members. Pregnant women may be especially vulnerable to stigmatization and discrimination when compared with people living with HIV at other points in the life cycle. A nurse who shared a patient's story noted, "*there was this young lady who came in to register for her antenatal care... She explained that the man that got her pregnant later got to know her HIV status and arranged for a gang to beat her up.*" Providers also shared examples of patient stigmatization by extended family members. This was illustrated in the following narrative by a counselor/tester:

"There was this woman, who said her sister-in-law came to their house and saw condoms...since then, issues started in the lady's home, the man no longer showed her love and care. She is still in the marriage, but no peace for her."

Participants agreed that stigmatization and its resulting consequences are the main reasons for the lack of patient disclosure. A counselor/tester said, "*Some of the clients know their status before coming to this facility. The issue of stigma affects how clients seek HIV treatment.*" Another provider added, "*They prefer to keep the results to themselves until the person [partner] is infected so it becomes a question of 'who gave who [HIV].'*" To encourage disclosure and empower patients, providers reported discussing the importance of counseling, medication adherence, and emphasis that one can live with HIV. A pharmacist said, "*I tell my clients that so far as there is treatment, they should relax and adhere to instruction on their drugs. I used to tell them 'It can be me and it can be you.'*"

Difficulty in getting patients to accept HIV-Positive test result:

Another challenge discussed by health providers was patient HIV misinformation and difficulty in getting patients to accept an HIV-Positive test result. The most salient example of misinformation was that of women believing that if they had one partner, they were protected from contracting HIV. A CHW spoke about a woman who refused to accept her HIV-Positive test result. According to the CHW, "*She believed there was no way she could have been infected with HIV given that she had been monogamous in her sexual relationship with her husband.*" Health providers reported that for married women especially, the news of having an HIV-Positive test result was unthinkable. Thus, common responses to an HIV-positive test result included such Yoruba phrases as "*Olorun maje! (God forbid!)*" or "*Koni wa sinu ile mi! (It will not come to my home!)*." Other phrases include "*Aye mi baje! (My life has ended!)*" or "*Nibo nimo magba?! (Where do I go from here?!)*."

Providers also spoke about misinformation and discordant health beliefs related to the origin and treatment of HIV. They shared stories of patients who invited spiritual leaders to the health facility for guidance and support during visits. A counselor/tester said, "*Most clients believe in traditional ways to solve their health issues rather than coming to the hospital. They believe in nature, they have faith in the way their*

Table 2: Summary of Health Provider Reported Challenges and Strategies to Address Barriers to the Delivery of PMTCT Services

Theme	Challenges to PMTCT delivery	Strategies for addressing barriers
Health systems challenges	Lack of resources- medication shortage, supply shortage, lack of resources including gloves, delivery apparatus, gloves and electricity	Ensure the availability of necessary equipment, tools, and medication
	Workforce challenge-Delay in wages, lack of professional	Increase in wages, expansion of professional development and training

forefathers solved issues... Providers also expressed frustration with patients who prefer traditional birth attendants (TBAs) or spiritual healers as opposed to, or in combination with primary health facility services. This issue was described in the following story told by a nurse. She noted:

“We had a lady who was due to deliver, we tried our best [to keep her in the facility], but our efforts were fruitless. Her husband took her to a TBA. Later, she came for her baby’s immunization. Some [patients] go to the two places, the health facility, and TBA, and this presents a challenge for the health facility.”

Health Providers Perspectives on Strategies for Improving PMTCT Services

Participant suggestions for improving the delivery of PMTCT services included strategies to mitigate challenges within health facilities and in the community. Table 2 summarizes the two major themes in the coding tree (systems and patient-related challenges) along with codes related to provider-suggested solutions for addressing those barriers to PMTCT service delivery. Within facilities, health providers suggested first ensuring the availability of necessary equipment, tools, and medication. They also discussed reducing referrals by making the primary health care facility a one-stop facility for antenatal care (ANC), HIV counseling/testing, and treatment. Participants also suggested improvements to the health workforce by increasing the number of staff in primary healthcare facilities and the expansion of professional development and training opportunities to all staff. In addition to the number of staff trained, there was concern about equity with some health workers perceiving that higher-ranking professionals were gate-keeping training opportunities. A

CHW said, *“We all handle cases, we should all be trained.”* At the community level, participants discussed the importance of continued efforts to promote couples counseling/testing, efforts to provide home-based care to reduce stigmatization, and discrimination at the community level. Moreover, participants discussed new strategies such as designating an HIV health educator from each neighborhood. A CHW said, *“this is because people tend to listen to who they know [rather] than a stranger.”* Some providers also suggested collaboration with religious institutions and TBAs by using a peer-to-peer model, which entails pairing a health provider with a TBA and/or spiritual healer to provide tandem services to women.

	development opportunities, and limited upward mobility)	opportunities to all staff
<i>Patient related challenges</i>	“Loss to follow-up”- Inability to reach patients/incorrect contact information	Improving medical records notation of those living with HIV
	Stigmatization experienced from extended family members and related violence, abandonment, and neglect.	Continued community education, efforts to promote couples counseling/testing, and home-based care and designation of HIV health educators from each neighborhood
	HIV misinformation and discordant health beliefs about the origin and treatment of HIV	Implementation of a peer to peer model, pairing health facility staff with spiritual leaders and TBAs

DISCUSSION

We sought to understand the experiences of healthcare providers delivering PMTCT services in Lagos, Nigeria. Findings from this study demonstrate the convoluted factors impacting PMTCT service delivery, highlighting challenges at the health system and patient levels that support evidence from earlier studies.^{16 27 28} Key health system challenges included lack of basic operational resources, medication shortage, clinic supplies (e.g., gloves and items for sanitation), delivery apparatus, electricity supply, delay in payment of salaries, lack of professional development opportunities, and limited upward mobility). Patient level barriers included fear of stigma/discrimination and associated physical and emotional violence that hinder uptake of services and retention in care, and HIV misinformation.

Study participants expressed frustration regarding the lack of basic equipment to implement safe and effective PMTCT service delivery. Provision of basic resources to implement antiretroviral treatment is essential for several reasons. Health workers may feel more empowered, less burdened and less resentful towards people living with HIV/AIDS when they have the means to provide treatment for them. Earlier studies have shown that lack of available resources and treatment for patients with HIV in healthcare settings was associated with an increased sense of despair among health workers, resentment towards patients with HIV and feelings of vulnerability to infection.²⁹⁻³¹ Frustrated health workers in Nigeria stage strikes at national and local levels several times a year, resulting in the discontinuation of service delivery, including PMTCT services.^{22 32 33} Participant-suggested solutions for workforce and other system challenges echoed those presented in the literature, primarily suggesting the provision of adequate stocks of equipment (power generators and fuel), necessary supplies (gloves, HIV testing kits) and medication.^{14 17 27} Ensuring adequately supplied health facilities is likely to improve efficiency and reduce the level of stress experienced by health providers resulting in a more productive workforce.

Reduction of health workers' salaries as responsibility for wages shifted from PEPFAR to LGAs was identified as an important health system challenge for PMTCT implementation. PEPFAR was paid

nurses ~US\$310/month. However, when the LGA took over, they failed to assimilate some nurses as LGA personnel in order to save cost. Instead, they were retained as contractors, with their salary initially reduced to ~US\$194/month, and later to ~US\$65/month. While foreign NGOs have played and continue to play a major role in population health improvement efforts in low- and middle-income countries, they are often in competition with the health sector for local qualified staff.³⁴⁻³⁶ This competition often leads to internal brain drain where health workers from the public sector migrate to other entities (e.g., foreign NGOs, the private sector, and multi-lateral and bilateral donor agencies) within the same country.³⁷ Internal brain drain and health worker wage distortion by foreign NGOs remain a topic of debate in global health.³⁸ NGOs may be obligated to abide by their internal wage policy on salary equity,³⁷ however, to plan for the unintended consequences of wage distortion as programs transition to government ownership, donor funded programs should include strategies for addressing wage distortions as part of their sustainability plan. Potential strategies may include but are not limited to: 1) supporting efforts to raise government salaries by a factor to arrive at a less distortionary gap, and 2) contributing financial resources proportionate to the size of the wage gap towards a stabilization fund, earmarked to support future wages and address current gaps.³⁹

In addition to health system challenges, participants reported barriers related to patient interaction, notably provision of false contact information resulting in inability to communicate with patients, and loss to follow-up. In Nigeria, a study investigating loss to follow-up in the PMTCT care cascade indicated that a large proportion of women are lost to follow-up before delivery.⁴⁰ Other studies investigating predictors of, and factors associated with, loss to follow-up in PMTCT in Nigeria and SSA found correlations between age (young), lack of income, low education, and being unmarried and losses to follow-up.^{41 42} Other factors for loss to follow-up include lack of support from spouse and family members, distance to the health facility, poverty, and community level stigma.⁴³ One practice that may be important for reducing loss to follow-up before delivery, as we saw in this study, is to carefully verify contact information of patients and their next of kin. Development of birth plans with women during antenatal care visits and maintenance of good communication throughout the entire period of pregnancy may help to build rapport and facilitate retention.

Another patient-related challenge raised by participants were patients' beliefs about transmission of HIV, and the use of TBAs. Although participants in this study were not in support of TBAs, in Nigeria, most deliveries (60%) are assisted by TBAs.^{44 45} TBAs are often preferred because they understand birthing rituals and provide culturally relevant advice about newborn care.^{44 45} For women living with HIV, TBAs not only offer culturally tailored birthing experiences but also cost less compared to health facilities.⁴⁵ Social support from a TBA may also be important for combatting stigmatization. The fact remains that in Nigeria and several other low- and middle-income countries, TBAs have delivered babies as part of a cultural practice that pre-date modern medicine. While health-facility delivery is often preferred because of the reduced risks for adverse maternal outcomes, we must recognize that there are women and families who would prefer to have their babies with a TBA. Thus, providing adequate training for example, in danger signs of obstetric risks, steps for effective referral, hygiene and aseptic

procedures, etc. can help to reduce adverse maternal outcomes for women who chose to have their babies with their TBAs. In a study in the Copperbelt Province of Zambia published in the British Medical Journal, Gill et al.⁴⁶ showed that training TBAs to manage common perinatal conditions significantly reduced neonatal mortality. Another study in Pakistan published in the New England Journal of Medicine, concluded that training traditional birth attendants and integrating them into an improved health care system were achievable and effective in reducing perinatal mortality.⁴⁷ In addition to training, promoting appropriate liaison with, and supervision by, health workers may help to strengthen the relation between TBAs and the public health sector, and thus facilitate communication and referral. Given that referral of at-risk women to the public health sector may mean a loss of revenue for TBAs, providing financial or other incentives to encourage such referrals may be beneficial.⁴⁸

This study supports existing literature regarding the relationship between fear of AIDS-related stigmatization, physical/emotional violence and women's ability to initiate PMTCT services and to remain in care.⁴⁹⁻⁵¹ Stigmatization was viewed as disruptive to PMTCT service delivery.^{52 53} As reported in this study and others, stigmatization has a profound effect on patients' HIV status disclosure, health-seeking behaviors, and medication adherence among other effects.^{16 27 42 45 52-56} In extreme cases as reported by our participants, persons living with HIV/AIDS experience violence as a direct effect of stigmatization. Participants narrated how fear of stigmatization and the associated violence impacts on patients' ability to initiate PMTCT services, adhere to treatment, and remain in care. They narrated incidences where HIV positive pregnant women were beaten after their partner learned of their HIV positive status. They described stigmatization and discrimination as challenges that existed in the community and interpersonal interactions of women with their partners, extended family, and other community members but did not describe any effects of discrimination that may occur within the health facility. A recent study suggests that training of health providers can reduce fear of infection and therefore make them less likely to engage in discriminatory health care practices such as double gloving.¹⁷ As suggested by participants, community education, and the involvement of male partners especially in couples counseling may be effective. It is important to recognize that influences on AIDS-related stigmatization and discrimination are rooted in the structure of communities and societies. Thus, effective interventions should be based on sound theoretical foundation and include attention to individual as well social and structural barriers.⁵⁷ Implementation of culturally adapted, faith-based programs has been demonstrated to reduce stigma, increase HIV counseling, testing, and enrolment in care among pregnant women and their male partners in Nigeria.⁵⁸⁻⁶⁰

STRENGTHS AND LIMITATIONS

This study has several strengths. First, it is one of a few that focused on the experiences of health providers as it relates to the provision of PMTCT services, thus enhancing our understanding of provider experiences. Second, findings not only describe challenges, but also, identify opportunities for intervention at the health system, community, and individual levels. Third, the findings support the quantitative findings reported by Ehiri et. al. regarding provider support of PLWHA and low levels of stigmatizing behaviors among providers.¹⁷ Lastly, this study had a large and diverse participant pool with representation from multiple cadres of the health workforce from facilities across Lagos. Study limitations include limited transferability of findings as PMTCT challenges may be location and time-specific. It is also worthy to note that the findings in this study are from the perspective of health providers. Thus, patient perceptions regarding challenges related to PMTCT service delivery may be different. The limited

gender diversity of our study population is representative of the proportion of males/females working in this area, and reflects the preponderance of nurses in our sample.

CONCLUSIONS

Findings from this study shed light on PMTCT service delivery challenges including those at the health system and direct patient care levels. Providers not only discussed these issues but also offered tangible context-specific solutions that can be implemented to remedy problems. For Nigeria to make progress in PMTCT, interventions to improve service delivery must consider factors at odds in the community and health system levels. Understanding the compounded effect of these phenomena on PMTCT service delivery and utilization allows for better strategic planning and the development of sustainable interventions.

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Contributors

JE conceptualized and designed the study.

JE, VY, & MB collected data.

JE, VY, NK & BL conducted or contributed to data analysis.

NK, JE & VY interpreted the data.

NK prepared the original manuscript.

JE, KP, BL & MB contributed to subsequent revisions.

All authors reviewed and approved the final manuscript.

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Competing interests

The authors declare they have no competing interests.

Patient consent for publication

Not required.

Ethics approval

This study was approved by the Nigeria Health Research Ethics Commission, ID number ADM/DCST/HREC/APP/1237.

Data sharing statement

Data for this study were collected through focus group discussions with health workers who provided the prevention of mother-to-child transmission services at primary health centers in the western and eastern districts of Lagos. All relevant summary data are provided in this paper. Interested readers may request data without restriction from the lead author, and Fulbright US Scholar to the University of Lagos (2016-2017), Professor John E Ehiri (jehiri@email.arizona.edu).

References

1. UNAIDS. New survey results indicate that Nigeria has an HIV prevalence of 1.4%. 2019 https://www.unaids.org/en/resources/presscentre/pressreleaseandstatementarchive/2019/march/20190314_nigeria (Accessed 25 Jul 2019).
2. Women, girls, gender equality and HIV in Nigeria. 2021 <https://naca.gov.ng/wp-content/uploads/2019/10/Fact-Sheet-Women-Girls-Gender-Equality-and-HIV-in-Nigeria.pdf> (Accessed 15 Apr 2021)
3. UNAIDS. UNAIDS Nigeria. 2019 <https://www.unaids.org/en/regionscountries/countries/nigeria> (Accessed 30 Jul 2019).
4. Joint United Nations Programme on HIV/AIDS. Countdown to Zero: Global Plan towards the Elimination of new HIV Infections among Children by 2015 and Keeping their Mothers Alive. 1st ed. Geneva, Switzerland: World Health Organization, 2011.
5. United Nations Children's Fund (UNICEF). Step Up the Pace: Towards an AIDS-free generation in West and Central Africa. Dakar, Senegal. 2017. https://www.unicef.org/publications/index_101480.html (Accessed 20 Jul 2019).
6. Abiodun O, Sotunsa J, Ani F, *et al.* Elimination of mother-to-child transmission of HIV in Nigeria: the roles, preparedness and determinants of successful involvement of traditional birth attendants. *J AIDS Clin Res* 2015;6(7).
7. WHO. HIV initiative 'prevention of mother-to-child transmission' saves exposed infants in Nigeria. 2016 <https://www.afro.who.int/news/hiv-initiative-prevention-mother-child-transmission-saves-exposed-infants-nigeria> (Accessed 28 Oct 2019).
8. Nigeria U. UNAIDS 2016 Estimates. 2016.
9. Fact sheet: prevention of mother to child transmission (PMTCT), 2016. 2021 (Accessed 15 Apr 2021).
10. UNAIDS Data 2019. 2019 <https://www.unaids.org/en/resources/documents/2019/2019-UNAIDS-data> (Accessed 20 Jul 2019).
11. Haroz D, von Zinkernagel D, Kiragu K. Development and impact of the global plan. *J Acquir Immune Defic Syndr* 2017;75(Supplement1): S2-S6.
12. Federal Ministry of Health. National Guidelines for HIV Prevention, Treatment and Care. National AIDS and STI Control Programme. Abuja, Nigeria. 2016.
13. President's Emergency Plan For AIDS Relief. Nigeria Country Operational Plan (COP) 2019 Strategic Direction Summary. Washington, D.C.: U.S. Department of State, Global AIDS Coordinato; 2019.
14. Daigle GT, Jolly PE, Chamot EA, *et al.* System-level factors as predictors of adherence to clinical appointment schedules in antiretroviral therapy in Cambodia. *AIDS care* 2015;27:836-43.

15. Uwimana J, Jackson D, Hausler H, *et al.* Health system barriers to implementation of collaborative TB and HIV activities including prevention of mother to child transmission in South Africa. *Trop Med Int Health* 2012;17:658-65.
16. Aizire J, G Fowler M, M Coovadia H. Operational issues and barriers to implementation of prevention of mother-to-child transmission of HIV (PMTCT) interventions in Sub-Saharan Africa. *Cur HIV Res* 2013;11:144-59.
17. Ehiri JE, Alaofè HS, Yesufu V, *et al.* AIDS-related stigmatisation in the healthcare setting: a study of primary healthcare centres that provide services for prevention of mother-to-child transmission of HIV in Lagos, Nigeria. *BMJ Open* 2019;9:e026322.
18. Lagos State Government: About Lagos. 2019 <https://lagosstate.gov.ng/about-lagos/> (Accessed 28 Oct 2019).
19. Lagos State Government: LASG Trains Local Government Staff on Effective Public Administration 2019 <https://lagosstate.gov.ng/blog/2019/07/19/lasg-trains-local-government-staff-on-effective-public-administration/> (Accessed 28 Jul 2019).
20. Then KL, Rankin JA, Ali E. Focus group research: what is it and how can it be used? *Can J Cardiovasc Nurs* 2014;1:24.
21. du Plessis E, Shaw SY, Gichuhi M, Gelmon L, Estambale BB, Lester R, Kimani J, Avery LS. Prevention of mother-to-child transmission of HIV in Kenya: challenges to implementation. *BMC Health Serv Res* 2014;14:1-9.
22. Olakunde BO, Adeyinka DA, Olawepo JO, *et al.* Towards the elimination of mother-to-child transmission of HIV in Nigeria: a health system perspective of the achievements and challenges. *Int Health* 2019;11:240-249.
23. Longhurst R. Semi-structured interviews and focus groups. *Key methods in geography*. 2003;3(2):143-56.
24. Smith J, Firth J. Qualitative data analysis: the framework approach. *Nurse Res* 2011;18:52-62.
25. Gale N K, Heath G, Cameron E, *et at.* Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Med Res Methodol* 2013; 13:1-8.
26. Pelzang R, Hutchinson AM. Establishing cultural integrity in qualitative research: Reflections from a cross-cultural study. *Int J Qual Methods* 2017; 27;17:1609406917749702.
27. Gourlay A, Birdthistle I, Mburu G, *et al.* Barriers and facilitating factors to the uptake of antiretroviral drugs for prevention of mother-to-child transmission of HIV in sub-Saharan Africa: a systematic review. *J Int AIDS Soc* 2013;16:18588.
28. Watson-Jones D, Balira R, Ross DA, *et al.* Missed opportunities: poor linkage into ongoing care for HIV-positive pregnant women in Mwanza, Tanzania. *PloS One* 2012;7:e40091.
29. Aisien AO, Shobowale MO. Health care workers' knowledge on HIV and AIDS: universal precautions and attitude towards PLWHA in Benin-City, Nigeria. *Niger J Clin Pract* 2005;8:74-82.
30. Reis C, Heisler M, Amowitz LL, *et al.* Discriminatory attitudes and practices by health workers toward patients with HIV/AIDS in Nigeria. *PLoS Med* 2005;2:e246.

- 1
- 2
- 3
- 4 31. Koto MV, Maharaj P. Difficulties facing healthcare workers in the era of AIDS treatment in
- 5 Lesotho. *SAHARA J* 2016;13:53–9.
- 6 32. Adeloye D, David RA, Olaogun AA, *et al.* A. Health workforce and governance: the crisis in
- 7 Nigeria. *Hum Resour Health* 2017;15:32.
- 8 33. Oleribe OO, Ezieme IP, Oladipo O, *et al.* Industrial action by healthcare workers in Nigeria in
- 9 2013–2015: an inquiry into causes, consequences and control—a cross-sectional descriptive
- 10 study. *Hum Resour Health* 2016;14:46.
- 11 34. Biesma RG, Brugha R, Harmer A, *et al.* The effects of global health initiatives on country health
- 12 systems: a review of the evidence from HIV/AIDS control. *Health Policy Plan* 2009;24:239-52.
- 13 doi: 10.1093/heapol/czp025.
- 14 35. Furth R, Gass R, Kagubare J. Rwanda Human Resources Assessment for HIV/AIDS Scale-Up.
- 15 Phase 1 Report: National Human Resources Assessment. Operations Research Results. 2005.
- 16 36. Pfeiffer J. International NGOs and primary health care in Mozambique: the need for a new
- 17 model of collaboration. *Soc Sci Med* 2003;56:725-38.
- 18 37. Pfeiffer J, Johnson W, Fort M, *et al.* Strengthening health systems in poor countries: a code of
- 19 conduct for nongovernmental organizations. *Am J Public Health* 2008; 98:2134-40.
- 20 38. Sherr K, Mussa A, Chilundo B, *et al.* Brain Drain and Health Workforce Distortions in
- 21 Mozambique. *PLoS ONE* 2012; 7: e35840.
- 22 39. Dost AN, Khan H. Explaining NGO-State Wage Differentials in Afghanistan: Empirical
- 23 Findings and New Theoretical Models with Policy Implications in General Equilibrium. MPRA
- 24 Paper No. 66639. Denver Colorado: University of Denver. 2015 [https://mpra.ub.uni-](https://mpra.ub.uni-muenchen.de/66639/1/MPRA_paper_66639.pdf)
- 25 [muenchen.de/66639/1/MPRA_paper_66639.pdf](https://mpra.ub.uni-muenchen.de/66639/1/MPRA_paper_66639.pdf) (Accessed: September 6, 2021).
- 26 40. Rawizza HE, Chang CA, Chaplin B, *et al.* Loss to follow-up within the prevention of mother-to-
- 27 child transmission care cascade in a large ART program in Nigeria. *Curr HIV Res* 2015;13:201-
- 28 9.
- 29 41. Meloni ST, Chang C, Chaplin B, *et al.* Time-dependent predictors of loss to follow-up in a large
- 30 HIV treatment cohort in Nigeria. *Open Forum Infect Dis* 2014;1(2):ofu055.
- 31 42. Tweya H, Gugsu S, Hosseinipour M, *et al.* Understanding factors, outcomes and reasons for loss
- 32 to follow-up among women in Option B+ PMTCT programme in Lilongwe, Malawi. *Trop Med*
- 33 *Int Health* 2014;19(11):1360-6.
- 34 43. Mpinganjira S, Tchereni T, Gunda A, *et al.* Factors associated with loss-to-follow-up of HIV-
- 35 positive mothers and their infants enrolled in HIV care clinic: A qualitative study. *BMC Public*
- 36 *Health* 2020;20:298.
- 37 44. Balogun M, Odeyemi K. Knowledge and practice of prevention of mother-to-child transmission
- 38 of HIV among traditional birth attendants in Lagos State, Nigeria. *Pan Afr Med J* 2010;5:7.
- 39 45. Iwelunmor J, Ezeanolue EE, Airhihenbuwa CO, *et al.* Socio-cultural factors influencing the
- 40 prevention of mother-to-child transmission of HIV in Nigeria: a synthesis of the literature. *BMC*
- 41 *Public Health* 2014;14:771.
- 42
- 43
- 44
- 45
- 46
- 47
- 48
- 49
- 50
- 51
- 52
- 53
- 54
- 55
- 56
- 57
- 58
- 59
- 60

- 1
- 2
- 3
- 4 46. Gill CJ, Phiri-Mazala G, Guerina NG, *et al*. Effect of training traditional birth attendants on
- 5 neonatal mortality (Lufwanyama Neonatal Survival Project): randomised controlled study. *BMJ*
- 6 2011;3:342.
- 7
- 8 47. Jokhio AH, Winter HR, Cheng KK. An intervention involving traditional birth attendants and
- 9 perinatal and maternal mortality in Pakistan. *N Engl J Med* 2005;352:2091-9.
- 10
- 11 48. Chukwuma A, Mbachu C, McConnell M, *et al*. The impact of monetary incentives on referrals
- 12 by traditional birth attendants for postnatal care in Nigeria. *BMC Pregnancy Childbirth* 2019;19:
- 13 1-10
- 14
- 15 49. Li Y, Marshall CM, Rees HC, *et al*. Intimate partner violence and HIV infection among women:
- 16 a systematic review and meta-analysis. *J Int AIDS Soc* 2014;17:18845.
- 17
- 18 50. Shuaib FM, Ehiri JE, Jolly P, *et al*. Sexual violence and associated factors among women in HIV
- 19 discordant and concordant relationships in Uganda. *Int J Adolesc Med Health* 2012;24:125-33.
- 20
- 21 51. Emusu D, Ivankova N, Jolly P, *et al*. Experience of sexual violence among women in HIV
- 22 discordant unions after voluntary HIV counselling and testing: a qualitative critical incident
- 23 study in Uganda. *AIDS Care* 2009 Nov;21:1363-70.
- 24
- 25 52. Anígilájé EA, Ageda BR, Nweke NO. Barriers to uptake of prevention of mother-to-child
- 26 transmission of HIV services among mothers of vertically infected HIV-seropositive infants in
- 27 Makurdi, Nigeria. *Patient Prefer Adherence* 2016;10:57-72.
- 28
- 29 53. Sekoni OO, Owoaje ET. HIV/AIDS stigma among primary health care workers in Ilorin,
- 30 Nigeria. *Afr J Med Sci* 2013;42:47-57.
- 31
- 32 54. Oke OO, Akinboro AO, Olanrewaju FO, *et al*. Assessment of HIV-related stigma and
- 33 determinants among people living with HIV/AIDS in Abeokuta, Nigeria: A cross-sectional
- 34 study. *SAGE Open Med* 2019;7:2050312119869109.
- 35
- 36 55. Ndinda C, Chimbwete C, Mcgrath N, *et al* Community attitudes towards individuals living with
- 37 HIV in rural KwaZulu-Natal, South Africa. *AIDS Care* 2007;19:92-101.
- 38
- 39 56. Olowookere SA, Adeleke NA, Fatiregun AA, *et al*. Pattern of condom use among clients at a
- 40 Nigerian HIV Counseling and Testing Centre. *BMC Res Notes* 2013;6:289.
- 41
- 42 57. Ehiri, JE, Anyanwu EC, Emusu D, *et al*. AIDS-related stigma in sub-Saharan Africa: its contexts
- 43 and potential intervention strategies. *AIDS Public Policy J* 2005;20:25-39.
- 44
- 45 58. Ezeanolue EE, Obiefune MC, Ezeanolue CO, *et al*. Effect of a congregation-based intervention
- 46 on uptake of HIV testing and linkage to care in pregnant women in Nigeria (Baby Shower): a
- 47 cluster randomised trial. *Lancet Glob Health* 2015;3:e692-700.
- 48
- 49 59. Ezeanolue EE, Obiefune MC, Yang W, *et al*. What do you need to get male partners of pregnant
- 50 women tested for HIV in resource limited settings? The baby shower cluster randomized trial.
- 51 *AIDS Behav* 2017;21:587-596.
- 52
- 53 60. Ehiri JE, Iwelunmor J, Iheanacho T, *et al*. Using a cultural framework to understand factors
- 54 influencing HIV testing in Nigeria. *International quarterly of community health education. Int Q*
- 55 *Community Health Educ* 2016;37:33-42.
- 56
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COREQ (CONsolidated criteria for REporting Qualitative research) Checklist

A checklist of items that should be included in reports of qualitative research. You must report the page number in your manuscript where you consider each of the items listed in this checklist. If you have not included this information, either revise your manuscript accordingly before submitting or note N/A.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
<i>Personal characteristics</i>			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group?	
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have?	
<i>Relationship with participants</i>			
Relationship established	6	Was a relationship established prior to study commencement?	
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: Study design			
<i>Theoretical framework</i>			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	
<i>Participant selection</i>			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	
Non-participation	13	How many people refused to participate or dropped out? Reasons?	
<i>Setting</i>			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	
<i>Data collection</i>			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	
Repeat interviews	18	Were repeat interviews carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the interview or focus group?	
Duration	21	What was the duration of the interviews or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or	

Topic	Item No.	Guide Questions/Description	Reported on Page No.
		correction?	
Domain 3: analysis and findings			
<i>Data analysis</i>			
Number of data coders	24	How many data coders coded the data?	
Description of the coding tree	25	Did authors provide a description of the coding tree?	
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
<i>Reporting</i>			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357

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