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ASSESSMENT OF THE SERVICES AND MATERIALS AVAILABLE FOR THE PMTCT PROGRAMME IN BENIN CITY, EDO STATE, NIGERIA

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ABSTRACT
Prevention of Mother-to-Child transmission (PMTCT) of HIV is a global response to reduce the risk of mother-to-child transmission of HIV. The goal of this study was to assess the services and materials available for the PMTCT Programme in Benin City, Edo State, Nigeria. The study design was a descriptive cross-sectional survey of all the health facilities providing comprehensive services for PMTCT of HIV in Benin City. Data was collected using an observational checklist. All seven PMTCT facilities studied met the minimum service requirements for PMTCT sites. Majority (71.4%) of the sites had good availability of both services and materials for the PMTCT programme. Provision of information management technology, prevention of ART drug stock outs, with prompt dissemination of PMTCT Guidelines and appropriate registers, at the sites, will promote utilization and the sustainability of quality PMTCT services.

INTRODUCTION:

Globally, about 430,000 children are newly infected with HIV annually; over 90% are through mother-to-child transmission (MTCT). The HIV sero-prevalence among women attending antenatal clinic in Edo State was 4.1%, compared to the national average of 3.0%, in 2014. Without intervention, the risk of mother-to-child transmission ranges from 20% to 45%, and about half of these infected children will die before their second birthday. With specific intervention in non-breastfeeding populations, the risk of MTCT can be reduced to less than 2%, and to 5% or less in breastfeeding populations, such as Benin City. The programme for the Prevention of Mother-to-Child transmission (PMTCT) of HIV is a global response to reduce the risk of mother-to-child transmission of HIV.

PMTCT programme promotes a comprehensive approach, which includes: primary prevention of HIV among women of childbearing age; preventing unintended pregnancies among women living with HIV; preventing HIV transmission from a woman living with HIV to her infant; and providing appropriate treatment, care and support to mothers living with HIV and their infant and families.

The Nigerian National Programme for preventing mother-to-child transmission of HIV (PMTCT) commenced in 2002 at

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eleven tertiary health facilities spread across the six geo-political zones of the country.[1,2] Currently, the programme is being implemented in 684 sites across the country comprising primary, secondary and tertiary health facilities.[2] The National guidelines on PMTCT of HIV specify the minimum site requirements for health facilities providing comprehensive services for PMTCT in the country.[3] These include: having a reasonable flow of antenatal care patients; provision of antenatal care services supervised by a trained health care provider; and HIV counseling and testing services.[3] Other minimum PMTCT site criteria include provision of services: delivery services with capacity for caesarean section (or by referral), care for the newborn including antiretroviral prophylaxis and provision of infant counseling and support among others.[3]

Nigeria bears a heavy burden of paediatric HIV/AIDS and accounts for one-third of all new HIV infections in the 22 high burden countries for paediatric HIV/AIDS globally.[4] From 2009-2014, there has been a 15% decline in the number of new HIV infections among children in the country.[4] Factors contributing to the slow decline in the rate of mother-to-child transmission of HIV in the country include low uptake of PMTCT services by pregnant women, high levels of unmet need for family planning among married women, minimal male involvement in PMTCT and inadequate facilities for early infant diagnosis of HIV and follow-up of HIV-exposed infants.[4]

Disproportional high rates of mother-to-child transmission of HIV have been reported by health facilities implementing the PMTCT programme in Nigeria.[5,6] The capacity of health facilities to implement the programme of preventing mother-to-child transmission of HIV is premised on the availability of funding, trained personnel and materials for the programme. However, the national PMTCT guidelines do not specify the material resources required by health facilities providing PMTCT services in the country.

Several studies have assessed the availability of services and materials for the PMTCT programme within the African Continent. These studies were conducted in different countries including Nigeria, Cameroon, Tanzania and South Africa.[7-11] The findings from these studies were consistent across the different countries and included reports of weak infrastructure for the PMTCT programme, shortage of trained personnel and lack of essential materials for the PMTCT programme including HIV test kits, gloves and lancets.[7-10] A study conducted in Nigeria across the six geopolitical zones of the country assessed the availability of services, materials and manpower for the HIV/AIDS programme in Nigeria.[7] The study reported shortage of skilled manpower for the programme across the country; stock-outs of antiretroviral medications in several health facilities and irregular supply of rapid HIV test kits, etc.[7]

Without specific intervention, the relatively high prevalence of HIV infection in Benin City increases risk of MTCT of HIV infection, in Benin City. This creates an urgent need to review, strengthen and scale-up available PMTCT services in Benin City.

The goal of this study is to assess the PMTCT programme in Benin City. The specific objectives include the evaluation of the services and available material resources, and identification of any

constraints to the provision quality PMTCT services in Benin City. Findings would provide evidence-based information for relevant recommendations to the sponsors and providers of PMTCT, to strengthen the minimum infrastructure required for adequate standard PMTCT services, in Benin City, and Nigeria.

METHODOLOGY:

The study was conducted in Benin City, Edo State, Nigeria which has a population of 1, 085, 676 persons.[12] The HIV sero-prevalence among women attending antenatal clinic in Edo State was 4.1% in 2014 which was higher than the national average of 3.0%.[13] Twenty-one health facilities in Benin City provide HIV and sexual reproductive services.[14]

The study population comprised health facilities in Benin City which provide comprehensive services for preventing mother-to-child transmission of HIV including HIV counselling and testing (HCT), family planning, antenatal care, intra-partum care, postnatal care and provision of antiretroviral medications for HIV positive mothers and their infants. Only government-approved health facilities providing comprehensive PMTCT services were included in this study.

Sampling Methodology: The list of health facilities providing comprehensive PMTCT services in Benin City was obtained from the Edo State Agency for Control of AIDS (SACA). A total population survey of the health facilities providing comprehensive PMTCT services in Benin City, was conducted.

Method of data collection: Information on the PMTCT services available at the sites was collected using a service checklist, adapted from a tool used in a previous study and the minimum site criteria for PMTCT sites stated in the National PMTCT Guidelines.[3,9]

Similarly, data on materials available for the PMTCT programme at the different health facilities was collected using a facility observation checklist adapted from the Family Health International Baseline Assessment tool for PMTCT services; a validated tool used in previous studies.[9,15] The checklists were pre-tested for clarity and the estimated time required for data collection. Pre-testing of the study instruments took place at the General Hospital, Auchi, Edo State located about 120 kilometers from the study area. Data was collected from June 2011 to September 2011.

Data analysis: Data collected was entered into a spreadsheet and analyzed using the Statistical Programme for the Social Sciences (SPSS), version 16. A scoring system was used to grade the availability of services for the PMTCT programme at the sites. The scoring system, based on the minimum site requirement for PMTCT sites, included: two marks were awarded for each PMTCT service provided on-site at the health facility; one mark was awarded for PMTCT services available by referral to other sites. No mark was awarded for PMTCT services that were unavailable on-site or by referral. Total scores and percentage scores were computed for each health facility based on the availability of PMTCT services. The lowest possible score was zero while the maximum possible score was 22 marks. The health facilities were graded based on the PMTCT services available at the sites. Health facilities with percentage scores of 70% and above were classified as having good availability of PMTCT services. Health facilities with percentage scores between 40% and 69.9% were classified as

having fair availability of PMTCT services while those with percentage scores below 40% were classified as having poor availability of PMTCT services.

A similar scoring system was adapted from the Family Health International Baseline assessment tool for PMTCT.[15] This scoring system was used to grade the availability of materials for the PMTCT programme at the different sites. Two marks were awarded to each site for materials available for the PMTCT programme. No mark was awarded for materials unavailable at the sites. The lowest possible score for materials available at the health facilities was zero while the maximum possible score was 78 marks. Total scores and percentage scores were computed for each health facility based on the materials available for the PMTCT programme. Each health facility was classified as having good, fair or poor availability of materials for the programme based on the computed percentage scores. Health facilities with percentage scores of 70% and above were classified as having good availability of materials for the programme. Health facilities with percentage scores of between 40% and 69.9% were classified as having fair availability of materials for the programme while those with percentage scores below 40% were classified as having poor availability of materials for the PMTCT programme.

Data Presentation
Data was presented as texts, figure, percentages and statistical power of tests of significance.

Ethical Approval:
Approval for the study was obtained from the Ethical Committee of the University of Benin Teaching Hospital, Edo State. Similarly, ethical approval and permission to use health facilities belonging to the Edo State Government was obtained from the Ethical Clearance Committee of the Edo State Ministry of Health in Benin City. A summary of the research proposal was submitted to the head of each health facility for ethical consideration and to the ethical committees of the health facilities where applicable.

Institutional Assent:
Permission to use each health facility was sought and obtained from heads of the health facilities involved in this study. A code was assigned to each site to protect the privacy of the health facilities, and confidentiality regarding information on their workers and patients.

RESULTS: A total of seven health facilities in Benin City provided comprehensive services for preventing mother-to-child transmission of HIV. This comprised four publicly owned hospitals and three private faith-based health institutions.

A. Assessment of PMTCT services available at the health facilities:
The seven health facilities provided a wide range of PMTCT services. Three of the seven health facilities (42.9%) provided cervical cancer screening services on site. Four health facilities (57.1%) referred patients requiring cervical cancer screening to nearby centres. All the health facilities provided antiretroviral drugs for HIV positive mothers and their infants. Early infant diagnosis of babies born to HIV positive mothers and paediatric follow-up were available in all the sites. Table 1 lists the PMTCT services available on-site at each health facility.

Table 2 shows the composite scores for the different health facilities based on the PMTCT services available at the sites. The mean score for PMTCT services available

Table 1: On-site Availability of PMTCT Services at the Health Facilities

List of PMTCT services	**Availability of PMTCT services by health facility**					
	Service available on site		Service available by referral		Total	
	N	(%)	N	(%)	N	(%
1. ANC services provided by a trained provider	7	(100.0)	0	(0.0)	7	(100.0)
2. Reasonable flow of ANC attendees	7	(100.0)	0	(0.0)	7	(100.0)
3.HIV Counselling & Testing Services	7	(100.0)	0	(0.0)	7	(100.0)
4.Provision of ARV prophylaxis for HIV positive mothers	7	(100.0)	0	(0.0)	7	(100.0)
5. Delivery services with capacity for caesarean section or by referral	7	(100.0)	0	(0.0)	7	(100.0)
6. Provisions for care of the new born including ARV prophylaxis	7	(100.0)	0	(0.0)	7	(100.0)
7. Infant feeding counselling and support	7	(100.0)	0	(0.0)	7	(100.0)
8. Paediatric follow-up and early infant diagnosis	7	(100.0)	0	(0.0)	7	(100.0)
Provisions for postnatal services	7	(100.0)	0	(0.0)	7	(100.0)
10. Family Planning services	7	(100.0)	0	(0.0)	7	(100.0)
11. Cervical screening services	3	(42.9)	4	(57.1)	7	(100.0)

Table 2: Composite Scores for the PMTCT Sites Based on Available PMTCT Services

Health Facility Code	Scores for PMTCT services available	Percentage for PMTCT services	Availability of PMTCT services at the site
001	22	100.0	Good
002	22	100.0	Good
003	22	100.0	Good
004	21	95.5	Good
005	21	95.5	Good
006	21	95.5	Good
007	21	95.5	Good

[a] Poor availability of PMTCT services: Percentage scores <40.0
Fair availability of PMTCT services: Percentage scores from 40.0-69.9
Good availability of PMTCT services: Percentage scores ≥70.0

Table 3. Availability of Relevant Document and Guidelines at the Sites

Name of document	Available	Not Available
	No. of health facilities (%)	No. of health facilities (%)
Protocol for post exposure prophylaxis	7 (100.)	0 (0.0)
General ANC Register	6 (85.7)	1 (14.3)*
ANC HCT Register	6 (85.7)	1 (14.3)*
ANC HCT Monthly Summary Form	6 (85.7)	1 (14.3)*
Maternal Follow-up Register	6 (85.7)	1 (14.3)
PMTCT Antiretroviral Register	5 (71.4)	2 (28.6)*
Partner Register	5 (71.4)	2 (28.6)
Child Follow-up Register	4 (57.1)	3 (42.9)
2007 National PMTCT Guidelines	4 (57.1)	3 (42.9)
2010 National PMTCT Guidelines	1 (14.3)	6 (85.7)
National Guidelines on HCT	3 (42.9)	4 (57.1)
National Guidelines on Adult ART	3 (42.9)	4 (57.1)
Standard Operating Procedures on PMTCT	2 (28.6)	5 (71.4)
National Guidelines on Paediatric ART	2 (28.6)	5 (71.4)
Written policy on confidentiality	1 (14.3)	6 (85.7)

* National PMTCT registers not available but improvised registers available

Table 4. Material Resources Available for the PMTCT Programme at the Sites

Material Resources	Available	Not Available
	No. of health facilities (%)	No. of health facilities (%)
Materials for venepuncture*	7 (100.0)	0 (0.0)
Equipment for PCV	7 (100.0)	0 (0.0)
Equipment for Rapid HIV testing	7 (100.0)	0 (0.0)
Equipment for ELISA	1 (14.6)	6 (85.7)
Equipment for Western Blot	0 (0.0)	7 (100.0)
Equipment for Full Blood Count	7 (100.0)	0 (0.0)
Equipment for Electrolytes & Urea	6 (85.7)	1 (14.3)
Equipment for Liver Function Test	6 (85.7)	1 (14.3)
Equipment for CD4 Count	6 (85.7)	1 (14.3)
Equipment for viral load	1 (14.6)	6 (85.7)
Equipment for DNA PCR	1 (14.3)	6 (85.7)
Material for collecting dried blood spots	6 (85.7)	1 (14.3)
Materials for testing for Acid fast bacilli	5 (71.4)	2 (28.6)
Materials for Blood film for 'MP'[1]	7 (100.0)	0 (0.0)

*Includes lancets, needles, syringes, cotton swabs, etc. [1]Malaria Parasites

Table 5: Antiretroviral Medications Available at the Sites

Antiretroviral Medications	No. of Heath Facilities	(%)
a) Antiretroviral medications for Adults		
Zidovudine tablets	7	(100.0)
Lamivudine tablets	7	(100.0)
Triple drug combination: Zidovudine, Lamivudine & Nevirapine	7	(100.0)
Zidovudine, Lamivudine dual fixed dose Combination	4	(57.1)
Tenofovir tablets	3	(42.9)
Efavirenz tablets	2	(28.6)
b) Antiretroviral medications for children		
Zidovudine suspension	7	(100.0)
Nevirapine suspension	7	(100.0)
Lamivudine suspension	5	(71.4)

Table 6: Measures for Infection Control Available at the Sites

*Measures for infection control	No. of Heath Facilities	(%)
a) Materials for infection control available		
Sharp boxes	7	(100.0)
Bin Liners	7	(100.0)
Hand washing materials e.g. soap and water	7	(100.0)
Disposable gloves	7	(100.0)
b) Methods of handling non-infectious hospital wastes		
Collection & disposal by waste managers	5	(71.4)
Burning	2	(28.6)
Low temperature incineration	1	(14.3)
High temperature incineration	1	(14.3)
Disposal into a sanitary land fill	1	(14.3)
c) Method of handling infectious hospital wastes		
Collection & disposal by waste managers	5	(71.4)
Burning	4	(57.1)
Burial	4	(57.1)
Low temperature incineration	1	(14.3)
High temperature incineration	1	(14.3)

* Multiple responses

Table 7. Composite scores for Materials Available for the PMTCT Programme at the Sites

Health Facility Code	Composite scores for available equipment	Percentage scores available equipment	Quality of equipment available
001	74	94.9	Good
002	62	79.5	Good
003	60	76.9	Good
004	54	69.2	Fair
005	60	76.9	Good
006	60	76.9	Good
007	48	61.5	Fair

[a] Availability of equipment for the PMTCT programme:
Poor: Percentage scores < 40.0%
Fair: Percentage scores 40.0-69.9%
Good: Percentage scores ≥ 70.0%.

across the sites was 21.4 marks (SD = 0.53) with a range of 21-22 marks. The median and modal scores for PMTCT services provided at the sites were 21.0 marks each. All the seven health facilities had percentage scores for PMTCT services above 70% and were graded as having good availability of PMTCT services.

B. Assessment of Materials Available for the PMTCT Programme

i. Availability of Relevant Document and Guidelines at the Sites:

All the health facilities had written protocols for HIV post-exposure prophylaxis displayed within their premises. Registers for monitoring and evaluation of the PMTCT programme were available in six of the seven health facilities (85.7%). These included the general antenatal clinic (ANC) register, the ANC HCT register as well as the ANC HCT monthly summary forms. The 2010 National PMTCT Guidelines was available in only one of the sites (14.3%). However, three sites (42.9%) had posters on display highlighting some of the recent changes to the National PMTCT Guidelines. Table 3 shows the availability of relevant documents at the sites.

ii. Availability of Laboratory Equipment and Consumables for the PMTCT programme

All the seven sites (100.0%) had materials for venepuncture and rapid HIV testing. Equipment for viral load estimation and Deoxyribonucleic acid (DNA) Polymerase Chain Reaction was available at only one site (14.3%). Equipment for the enzyme linked immunosorbent assay (ELISA) antibody testing was available at one site only (14.6%); none of the sites had materials for the Western Blot Test. The laboratory equipment and consumables available for the PMTCT programme across the seven health facilities are shown in Table 4.

iii. Antiretroviral medications for HIV positive mothers and their infants:

Antiretroviral medications for HIV positive mothers were available at the seven PMTCT sites. Six sites (85.7%) had three months' supply of antiretroviral medications in their pharmacies. The

triple drug combination of Zidovudine, Lamivudine and Nevirapine tablets for HIV positive mothers was available at all health facilities. Similarly, medications for antiretroviral prophylaxis for infants born to HIV positive mothers were available at all the sites. Zidovudine suspension and Nevirapine suspension were the most commonly available antiretroviral medications for babies at the sites. The antiretroviral medications available for HIV positive mothers and their infants are listed in Table 5.

All the sites studied had in stock drugs for the treatment of opportunistic infections. The most commonly available drugs for the treatment of opportunistic infections were Co-trimoxazole tablets, antimalarials and metronidazole tablets.

C. Antiretroviral Medications and Stock outs

Four of the seven health facilities (57.1%) had experienced stock-outs of antiretroviral medications within six months of the survey. The antiretroviral medications for which stock-outs were reported included Zidovudine suspension; Nevirapine suspension and some second-line antiretroviral medications. Similarly, stock-outs of drugs for treatment of opportunistic infections were also reported at five of the seven sites (71.4%). Such drugs included Loratidine tablets, Acyclovir tablets, Fluconazole tablets and Cloxacillin suspension.

All the health facilities had antiretroviral medications that had expired in their pharmacies within six months of the survey. The antiretroviral medications affected included Zidovudine tablets, Nevirapine suspension, Lamivudine tablets, fixed-dose combination of Zidovudine and Lamivudine tablets and Stavudine tablets. Other medications reported to have expired at the sites/ within the same period, included: Co-trimoxazole suspension, Ceftriaxone injections, Ergotamine injections and Action meal food supplement.

D. Measures for Infection Control Available at The Sites

Materials for infection control, such as sharp boxes, bin liners, hand washing materials (e.g. soap and water), as well as disposable gloves, were available in all the health facilities. Although bin liners were observed in all the health facilities, none of the health facilities practiced appropriate colour-coding of hospital waste management.

All the health facilities had arrangements in place for the management of non-infectious wastes. Methods used for handling non-infectious hospital wastes at the sites included collection and disposal by waste managers, (71.4%); burning (28.6%); and low-temperature incineration (14.3%). All the health facilities had modalities in place for the management of infectious hospital wastes. Methods used for handling infectious wastes at the sites included: collection and disposal by waste managers (71.4%); burning (57.1%); burial (57.1%); and incineration (28.6%). The measures for infection control available at the sites are shown in Table 6.

E. Composite Scores for the Different Health Facilities Based on Materials Available for the PMTCT Programme.

The mean score for the seven health facilities, based on materials available for the PMTCT programme was 59.4 marks (SD = 7.4). The median and modal scores for materials available for the PMTCT programme was 60.0 marks with a range of 48.0 marks to 74.0 marks (Table 7.) There was a positive co-relation between the composite scores for available PMTCT services and composite scores for materials available for the PMTCT

programme. Health facilities that provided a wider range of PMTCT services had more materials for the programme. However, the observed relationship was not statistically significant (Spearman's rho co-relation co-efficient = 0.60, p = 0.18). Percentage scores were computed for each site based on the availability of materials for the PMTCT programme. The health facilities were graded based on the availability of the materials for the PMTCT programme. The availability of materials for the PMTCT programme was graded as good in five health facilities (71.4%) and fair in two health facilities (28.6%).

DISCUSSION

All the health facilities assessed in this study met the minimum service requirements for PMTCT sites as specified in the 2010 National PMTCT Guidelines.[3] Similar findings have been reported in other studies.[9] Access to PMTCT services is crucial if the goal of reducing mother-to-child transmission of HIV is to be achieved. An update of the National PMTCT Guidelines was published in November 2010.[3] However, the dissemination of these guidelines and appropriate registers to health facilities providing PMTCT services has been rather slow. This may explain the poor availability of the 2010 National PMTCT Guidelines across the health facilities providing comprehensive services for PMTCT in Benin City. Non-availability of the national guidelines at health facilities providing PMTCT services may adversely affect the quality of care provided by health workers at these sites, with negative impact on the on the efforts to prevent vertical transmission of HIV.

Only one of the seven PMTCT sites in Benin City (14.3%) had the capacity to determine viral load and perform early infant diagnosis of HIV. The implications of these observations are long waiting times for patients accessing these services and delayed diagnosis of HIV status infants exposed to HIV infection. Long waiting time for PMTCT services and the lengthy turn-around time for investigations may discourage patients from utilizing these services. It may cause mothers to drop-out of the PMTCT programme thus contributing to missed opportunities for PMTCT of HIV.[7,9]

Over half of the health facilities studied reported stock-outs of antiretroviral medications as well as antiretroviral medications that had expired in their pharmacies. This observation suggests sub-optimal drug management practices at the PMTCT sites in Benin City. Stock-out of antiretroviral medications may result in non-adherence to antiretroviral therapy and contribute to failure of antiretroviral therapy (ART), with risk of drug resistance to ART, in people living with HIV. Drug wastage, arising from the expired antiretroviral medications also constitute 'leakages' from the drug management cycle, and has the potential to contribute to the stock out of antiretroviral medications, reported at all the health facilities.

With regards to programme monitoring and evaluation, data capture and management was manually done at most of the sites visited, as have been reported in the literature.[7, 11] Poor Management Information Systems (PMIS) may impact negatively on the monitoring and evaluation of the PMTCT programme, with the consequences of lost opportunity to improve upon the quality of care and performance of the PMTCT programme.

CONCLUSIONS

All the health facilities had good availability of PMTCT services and met the minimum service requirements, as specified in the national guidelines. Majority (71.4%) of the health facilities

had good availability of services and materials for the PMTCT programme. Observed PMTCT service challenges included: poor availability of information management technology, ART drug stock outs, and delayed access to PMTCT Guidelines and appropriate registers. Sustained availability of the services and materials for the PMTCT programme is essential for the achievement of the PMTCT programme goal, to reduce the risk of MTCT to less than 5%.

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