



Knowledge and Practices Regarding Prevention of Mother-to-child Transmission of HIV among Health Workers in Primary Healthcare Centers in Sokoto, Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Authors SAA and KJA gave the study concept and design and drafted the manuscript. Authors HA, AHA, MBI and SM gave the study concept and design, and performed data collection, analysis and interpretation. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Evidence from studies has shown that transmission of HIV from mother-to-child during pregnancy, labor, delivery or breastfeeding can be reduced from 15 – 45% in the absence of any intervention to below 5% with effective interventions during these periods. This study aimed to assess the knowledge and practices regarding prevention of mother-to-child transmission of HIV among health workers in Primary Healthcare Centers in Sokoto, Nigeria.

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Methods: A cross-sectional descriptive study was conducted among 241 Primary Health Care (PHC) workers selected by universal sampling. Data were collected with a set of standardized, semi-structured, self-administered questionnaire, and analyzed using the IBM SPSS Version 20 statistical computer software package.

Results: All the 241 respondents were aware of mother-to-child transmission (MTCT) of HIV infection. About two-thirds (62.6%) of respondents have attended a training workshop on prevention of mother-to-child transmission (PMTCT) of HIV infection. Only about two-thirds (63.5%) of respondents had good knowledge of MTCT of HIV and its prevention; and it was significantly associated with cadre. The most commonly known methods of MTCT of HIV were through the placenta (71.4%), during vaginal delivery (70.5%) and through breast feeding (62.7%). Only about half to two-thirds of respondents knew the methods of preventing mother-to-child transmission of HIV infection. The methods most commonly known to the respondents were delivery by cesarean section (66.8%), avoiding procedures that increase risk of MTCT of HIV (66.4%), and HIV testing and counseling of pregnant women (63.5%). Barely two-thirds of respondents (58.9%) routinely provide HIV testing and counseling for all the pregnant women seen by them at their respective health facilities, and less than half of respondents (44.4%) routinely administer ARV prophylaxis to mother and child or refer them to where such services are available.

Conclusion: Although, awareness of PMTCT of HIV was high among the respondents in this study, on the job training, knowledge and practices were poor. These findings suggest the need to ensure universal coverage in training and access to information on PMTCT of HIV among healthcare workers. In addition, governments and other stakeholders involved in HIV/AIDS prevention and control should give PMTCT of HIV top priority.

Keywords: Knowledge; practices; PMTCT of HIV; PHC workers.

1. INTRODUCTION

Although, successes have been recorded in reducing the incidence and mortality from HIV/AIDS across the globe, the rates of new HIV infections remain disproportionately high across sub-Saharan Africa, particularly among young women, with concomitant high rates of mother to child transmission [1]. Mother-to-child transmission (MTCT) accounts for 90% of HIV infections in children under the age of 15 years [2].

Whereas sub-Saharan Africa is home to only 12% of the global population, it accounts for 71% of the global burden of HIV infection, and 74% of deaths from AIDs related illnesses. [1]. A peculiar feature of the epidemiology of HIV/AIDS in sub-Saharan Africa is heterosexual sex being its main mode of transmission [2]; and so in the face of abject poverty, poor female empowerment, and unfavorable socio-cultural practices, women are often at a disadvantage in making informed decisions on safe sex practices. Women are therefore disproportionately affected, and they account for 58% of the total number of people living with HIV [1]. Nigeria is ranked the second with the highest number of new HIV infections each year worldwide [2], and the country accounts for 30% of the global burden of mother-to-child transmission of HIV [3].

Evidence from studies has shown that transmission of HIV from mother-to-child during pregnancy, labor, delivery or breastfeeding can be reduced from 15 – 45% in the absence of any intervention to below 5% with effective interventions during these periods [4]. The annual number of HIV infections through perinatal transmission has declined by more than 90% in the United States since the 1990s. And between 1994 and 2010, an estimated 21,956 cases of perinatally acquired HIV infections were prevented, with the risk of MTCT of HIV reduced to less than 1% [5]. Similarly, in sub-Saharan Africa, integration of PMTCT of HIV into maternal, newborn and child health services resulted in over two-thirds of pregnant women with HIV being placed on anti-retroviral (ARV) drug treatment, and between 2009 and late 2014, many countries across the continent saw the number of new infections in children drop by over 60% [4].

It is very disturbing that despite the high burden of HIV/AIDS in Nigeria, implementation of PMTC programmes remains poor in the country. In 2011, it was estimated that only 17.1% of HIV infected pregnant women in Nigeria received anti-retroviral (ARV) drug treatment [6], and it was far below the 80% universal access that was recommended for the elimination of mother-to-child transmission of HIV [7]. In addition, reports

show poor utilization of PMTC services among pregnant women in Nigeria, even where they are available [7].

Reports from studies across Nigeria showed poor knowledge and practices regarding PMTCT of HIV among healthcare workers. In a study among health workers in Benin City, Nigeria, even though all of them were aware of PMTC of HIV, less than two-thirds (58.1%) had received training on it, about a third (33.8%) possessed a copy of the national guideline on PMTC of HIV, and only about two-thirds (61.1%) had good knowledge of it [8]. Similarly, studies conducted among health care workers in rural PMTCT clinics in Oyo State, Nigeria [9] and among general medical practitioners in Port Harcourt, Nigeria [10], also reported poor knowledge of PMTCT of HIV. In the Port Harcourt study, only 50% of respondents had read the national guideline on PMTCT of HIV, and most of them (89.3%) agreed that their knowledge and practice of PMTCT of HIV were deficient.

Reports from studies conducted among healthcare workers in several sub-Saharan African countries including Ghana [11], Malawi [12], South Africa [13], Congo [14], and Ethiopia [15], generally showed poor knowledge of PMTCT of HIV, poor compliance with PMTCT protocol, poor quality of PMTCT services, dissatisfaction with PMTCT services and poor utilization by pregnant women. Noticeably, poor knowledge of PMTCT for HIV, lack of training, poor access to information (including the national guideline on PMTCT for HIV), and irregular supply of HIV testing kits / anti-retroviral drugs were the major hindrances to good quality PMTCT services identified in these studies.

Primary Health Care (PHC) facilities account for the majority (85.5%) of the estimated 23,640 health facilities in Nigeria in 2010 [16]; PHC workers therefore constitute the bulk of the healthcare providers in the country, particularly in the rural areas where the majority of Nigerian reside. Adequate knowledge of PMTCT of HIV among healthcare workers would enable them educate their patients and clients (particularly antenatal care clinic attendees) on it, improve the quality of PMTCT services, and facilitate their utilization by pregnant women. This is supported by the findings in a study among pregnant women in Ethiopia [17], in which the strongest predictors of good knowledge of PMTCT of HIV were attending antenatal care (AOR: 5.80; 95% CI: 2.63 – 12.77), and obtaining information from

healthcare providers (AOR: 3.24, 95% CI: 1.53 – 6.83). This study aimed to assess the knowledge and practices regarding prevention of mother-to-child transmission of HIV among health workers in Primary Healthcare Centers in Sokoto, Nigeria.

2. MATERIALS AND METHODS

This cross-sectional descriptive study was carried out among health workers in the Primary Healthcare Centers (PHCs) in Sokoto metropolis, Nigeria, in October and November 2015. All health workers directly involved in patients' management, who have been in employment for at least six months, and consented to participate, were considered eligible and enrolled into the study. A sample size of 242 was determined using the statistical formula for calculating the sample size for descriptive studies [18], a 61.1% prevalence of knowledge of prevention of mother-to-child transmission of HIV infection among health workers in a previous study [8], a precision level of 5%, a finite population of 620 health workers in the PHCs in Sokoto, Nigeria (obtained from institution records), and an anticipated response rate of 95%. All the 245 eligible health workers who were on duty in the respective PHC facilities in the metropolis during the survey, and gave informed consent to participate in the study were enrolled.

A semi-structured, interviewer administered questionnaire was used to obtain information on respondent's socio-demographic characteristics, and their knowledge and practices on prevention of mother-to-child transmission of HIV infection. The questionnaire was adapted from the National Guideline on PMTCT [19]. The questionnaire was pretested among 20 health care workers at PHC Achida (a PHC facility located outside Sokoto metropolis). The questions were well understood by the respondents and no modification was necessary after the pretesting. Four resident doctors assisted in questionnaire administration after pre-training on conduct of survey research, the objectives, and questionnaire administration. Ethical clearance was obtained from the Ethical committee of Sokoto State Ministry of Health, Sokoto, Nigeria. Permission to conduct the study was obtained from the Sokoto State Ministry for Local Government and Community Development, Sokoto, Nigeria, and from the respective LGA authorities. Informed written consent was also obtained from the participants before data collection.

Data were analyzed using the IBM Statistical Package for Social Sciences (SPSS) version 20. Respondents' knowledge of mother-to-child transmission of HIV-infection and its prevention was scored and graded on a 9-point scale. One point was awarded for a correct response, while a wrong response or a non-response received no points. This gives a minimum score of '0' and a maximum score of '9' points. Those that scored ≥ 6 of 9 points were considered as having 'good' knowledge, while those that scored < 6 of 9 points were graded as having 'poor' knowledge. Frequency runs were done for further editing and cleansing of the e-data. Frequency distribution tables were constructed; and cross tabulations were done to examine relationship between categorical variables. Chi-square test of independent association was used to test for relationship between categorical variables. All levels of significance were set at $p < 0.05$.

3. RESULTS

3.1 Socio-demographic Characteristics of Respondents

Two hundred and forty-one of the 245 questionnaires administered were completely filled, retrieved and analyzed, giving a response rate of 98.4%. The ages of the 241 respondents ranged from 22 to 53 years (mean = 31.44 ± 6.27), and a larger proportion 102 (42.3%) were aged 30 – 39 years. Majority of the respondents 138 (57.3%) were female, married 174 (72.2%), and most of them practiced Islam as religion 226 (93.8%). A larger proportion of respondents 113 (46.9%) were community health extension workers (CHEWs) and have been in practice for 10 years and below 158 (65.6%) as shown in Table 1.

3.2 Respondents' Knowledge of Mother-to-child Transmission of HIV Infection and Its Prevention

All the 241 respondents were aware of mother-to-child transmission (MTCT) of HIV infection, and about two-thirds 151 (62.6%) have attended a training workshop on prevention of mother-to-child transmission of HIV infection. Most of the respondents knew that mother to child transmission of HIV infection could occur through the placenta 172 (71.4%), and during vaginal delivery 170 (70.5%). Also, about two-thirds of respondents 151 (62.7%) knew that MTCT of HIV could occur through breastfeeding. However, about a third of respondents 76 (31.5%) believed

that MTCT of HIV infection could occur during cesarean section, while a few respondents 36 (14.9%) misconceived HIV infection to be transmissible from mother to baby through contact.

Table 1. Socio-demographic characteristics of respondents

Variables	Frequency (%) n = 241
Age group (in years)	
20-29	76 (31.5)
30-39	102 (42.3)
40-49	48 (19.9)
50-59	15 (6.2)
Sex	
Male	103 (42.7)
Female	138 (57.3)
Marital status	
Single	58 (24.1)
Married	174 (72.2)
Divorced	7 (2.9)
Widowed	2 (0.8)
Religion	
Islam	226 (93.8)
Christianity	15 (6.2)
Cadre	
Doctor	5 (2.1)
CHO	18 (7.5)
Nurse/midwife	35 (14.5)
CHEW	113 (46.9)
Lab technicians	43 (17.8)
EHA	27 (11.2)
Length of practice (in years)	
1-10	158 (65.6)
11-20	65 (27.0)
21 and above	18 (7.4)

Key: CHO: Community Health Officer
CHEW: Community Health Extension Worker
EHA: Environmental Health Assistant

Only about half to two-thirds of respondents knew the methods of preventing mother-to-child transmission of HIV infection. The methods most commonly known to the respondents were delivery by cesarean section 161 (66.8%), avoiding procedures that increase risk of MTCT of HIV 160 (66.4%), and HIV testing and counseling of pregnant women 153 (63.5%). The other methods of preventing MTCT of HIV known to the respondents are as shown in Table 2.

About two-thirds 153 (63.5%) of the 241 respondents had good knowledge of MTCT of HIV and its prevention. The proportion of respondents with good knowledge of MTCT of

HIV and its prevention was significantly higher among doctors (100%), CHOs (77.8%) and Nurses/midwives (77.1%) as compared to CHEWs (62.8%), Laboratory technicians (53.5%) and EHAs (48.1%), $\chi^2 = 11.893$, $p = 0.036$ (Table 3).

3.3 Respondents' Knowledge of Feeding Options for Infants of HIV-positive Mothers

Exclusive breastfeeding was the feeding option for infants of HIV-positive mothers most commonly known to the respondents 155 (64.3%). About two-thirds of respondents 145 (60.2%) also knew breast milk substitutes (formula feeding) as a feeding option, while only a few respondents knew the other feeding options such as expressed and heat treated breast milk 75 (31.1%) and breastfeeding by an HIV-negative wet nurse 71 (29.5%) as shown in Fig. 1.

3.4 Respondents' Practices on Prevention of Mother-to-child Transmission of HIV Infection

Barely two-thirds of respondents 142 (58.9%) routinely provide HIV testing and counseling for all the pregnant women seen by them at their respective health facilities, and about half of respondents 127 (52.7%) avoid obstetric procedures that increase the risk of MTCT of HIV. Less than half of respondents 107 (44.4%) routinely administer ARV prophylaxis to mother

and child or refer them to where such services are available; whereas 101 (41.7%) of the 241 respondents routinely counsel HIV-positive mothers on infant feeding (Fig. 2). There was no association ($p > 0.05$) between respondents' knowledge of PMTCT of HIV and their practices. There was also no association ($p > 0.05$) between respondents' practices on PMTCT of HIV and any of their socio-demographic variables.

4. DISCUSSION

The high awareness (100%) of mother-to-child transmission (MTCT) of HIV infection among the respondents in this study is similar to the finding in a study among health workers in Benin City, Nigeria [8], that also reported 100 percent awareness of MTCT of HIV; likewise about two-thirds (62.6%) of the respondents in this study had received training on prevention of mother-to-child transmission (PMTCT) of HIV, and this is on a par with the 58.1% prevalence of previous training in the other study. This could be due to the re-invigorated and sustained sensitization of the populace (in addition to training of health care workers, and development / implementation of the national guideline on PMTCT of HIV) by the Federal Government of Nigeria, in conjunction with other non-government, bilateral and international organizations, as a result of the high prevalence of HIV infection among women of child bearing age and children in Nigeria. [1,19,20].

Table 2. Respondents' knowledge of mother-to-child transmission of HIV infection and its prevention

Variables	Correct response Frequency (%) n = 241
Routes of MTCT of HIV infection	
Through the placenta	172 (71.4)
During vaginal delivery	170 (70.5)
Through breast feeding	151 (62.7)
Prevention of MTCT of HIV infection	
HIV testing and counseling of pregnant women	153 (63.5)
ART in pregnancy and during breastfeeding	140 (58.3)
Modification of obstetric practices (avoid procedures that increase risk of MTCT of HIV)	160 (66.4)
Delivery by cesarean section	161 (66.8)
ARV prophylaxis for the newborn	135 (56.0)
Avoid breastfeeding	143 (59.3)
Knowledge grade	
Good	153 (63.5)
Poor	88 (36.5)

Table 3. Distribution of knowledge of PMTCT of HIV by respondents' socio-demographic variables

Variables	Knowledge of PMTCT of HIV (n = 241)		Test of significance
	Good Frequency (%)	Poor Frequency (%)	
Age group (in years)			
20-29	51 (67.1)	25 (32.9)	$\chi^2 = 2.038$
30-39	60 (58.8)	42 (41.2)	p = 0.564
40-49	31 (64.6)	17 (35.4)	
50-59	11 (73.3)	4 (26.7)	
Sex			
Male	66 (64.1)	37 (35.9)	$\chi^2 = 0.027$
Female	87 (63.0)	51 (37.0)	p = 0.869
Marital status			
Single	36 (62.1)	22 (37.9)	$\chi^2 = 1.396$
Married	110 (63.2)	64 (36.8)	p = 0.706
Divorced	5 (71.4)	2 (28.6)	
Widowed	2 (100)	0 (0)	
Religion			
Islam	143 (63.3)	83 (36.7)	$\chi^2 = 0.070$
Christianity	10 (66.7)	5 (33.3)	p = 0.792
Cadre			
Doctor	5 (100)	0 (0)	$\chi^2 = 11.893$
CHO	14 (77.8)	4 (22.2)	p = 0.036
Nurse/midwife	27 (77.1)	8 (22.9)	
CHEW	71 (62.8)	42 (37.2)	
Lab technicians	23 (53.5)	20 (46.5)	
EHAs	13 (48.1)	14 (51.9)	
Length of practice (in years)			
1-10	99 (62.7)	59 (37.3)	$\chi^2 = 0.161$
11-20	42 (64.6)	23 (35.4)	p = 0.923
21 and above	12 (66.7)	6 (33.3)	

Key: CHO: Community Health Officer
CHEW: Community Health Extension Worker
EHA: Environmental Health Assistants

The poor knowledge of MTCT of HIV and its prevention (63.5%) among the respondents in this study essentially mirror the situation across Nigeria and other sub-Saharan African countries. Similar to the finding in this study, a study among health care workers in rural areas of Oyo State, Nigeria [9], reported poor knowledge of PMTCT of HIV; but whereas, religion, cadre, and length of service were predictors of good knowledge of PMTCT of HIV in the study conducted in Oyo State, the only predictor of good knowledge of PMTCT of HIV in this study was cadre. Whereas studies conducted in other cities in Nigeria [8,10], and other countries in sub-Saharan Africa [12,21] generally reported poor knowledge of PMTCT of HIV, and it was majorly attributed to lack of training, and poor access to information (particularly the national guidelines on PMTCT of

HIV in the respective countries), a study conducted among healthcare providers in Togo [22] reported fairly good knowledge of PMTCT of HIV, and most of the respondents (76%) had received training on PMTCT of HIV. These findings suggest the need to ensure universal coverage in training and access to information on PMTCT of HIV among healthcare workers.

Reports from studies conducted among healthcare workers in several sub-Saharan African countries including Ghana [11], Malawi [12], South Africa [13], Congo [14], and Ethiopia [15], generally showed poor knowledge of PMTCT of HIV, poor compliance with PMTCT protocol, poor quality of PMTCT services, dissatisfaction with PMTCT services and poor utilization by pregnant women. Noticeably, poor

knowledge of PMTCT for HIV, lack of training, poor access to information (including the national guideline on PMTCT for HIV), and irregular supply of HIV testing kits / anti-retroviral drugs were the major hindrances to good quality PMTCT services identified in these studies.

This study showed poor compliance with the national guideline on PMTCT of HIV among the respondents, barely two-thirds (58.9%) routinely provide HIV testing and counseling for all the pregnant women seen by them at their respective health facilities, and less than half of respondents (44.4%) routinely administer ARV prophylaxis to mother and child or refer them to where such services are available. This finding is in consonance with the poor compliance with PMTCT of HIV protocol reported in studies

conducted among health workers in other places including Mpumalanga province, South Africa [13], Delhi, India [23], and Hanoi, Viet Nam [24]. In these studies, provision of good quality PMTCT of HIV services was principally hampered by lack of knowledge, poor on the job training and lack of operational guidelines, high workload and shortage of manpower, unavailability of HIV testing kits, and shortage of anti-retroviral drugs. The absence of an association between knowledge and practice of PMTCT of HIV among the respondents in this study could be related to the fact that both were poor among them. It is inconceivable that despite the enormous resources committed to halting the HIV/AIDS epidemic in sub-Saharan Africa and other resource-poor settings across the world [25], these problems seem to linger on,

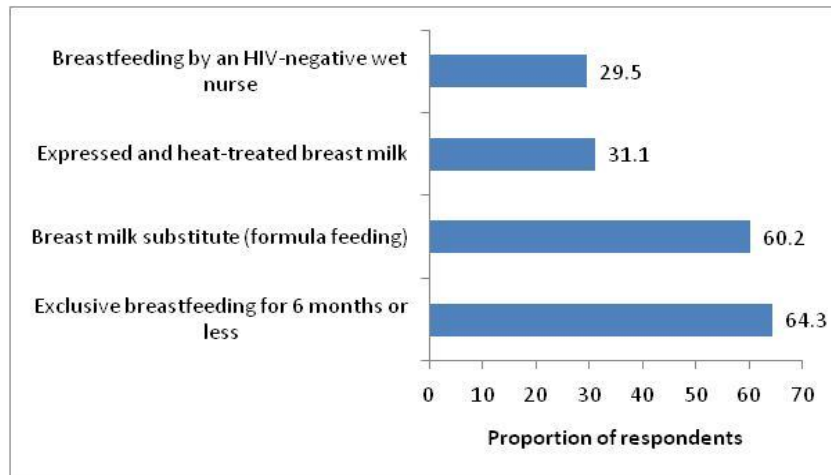


Fig. 1. Respondents' knowledge of feeding options for infants of HIV-positive mothers

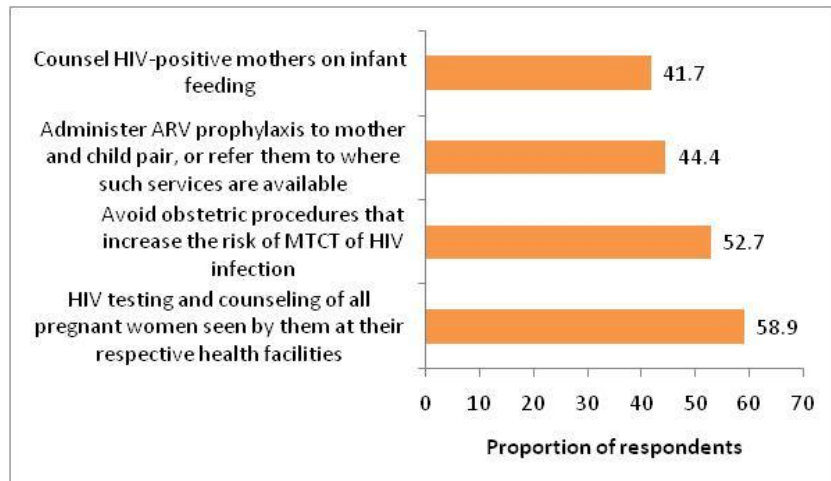


Fig. 2. Respondents' practices on prevention of MTCT of HIV infection

and they pose serious threats to HIV/AIDS control across the continent, as the PMCTC of HIV services in many sub-Saharan Africa and other resource-poor countries have become enmeshed in the triad of poor quality of service, dissatisfaction and poor utilization [13,15,26]. It therefore didn't come as a surprise that even though substantial decline has been observed in new HIV infections in sub-Saharan Africa, HIV incidence rates remain unacceptably high with the largest number of new infections coming from South Africa (23%), Nigeria (15%), Uganda (10%), Mozambique (8%) and Kenya (7%) [27]. These findings underscore the need for governments and other stakeholders involved in HIV/AIDS prevention and control to give PMTCT of HIV top priority.

5. CONCLUSION

Although, awareness of PMTCT of HIV was high among the respondents in this study, on the job training, knowledge and practices were poor. These findings suggest the need to ensure universal coverage in training and access to information on PMTCT of HIV among healthcare workers. In addition, governments and other stakeholders involved in HIV/AIDS prevention and control should give PMTCT of HIV top priority.

CONSENT

As per international standard or university standard, patient's written consent has been collected and preserved by the authors.

ETHICAL APPROVAL

As per international standard or university standard, written approval of Ethics committee has been collected and preserved by the authors.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Joint United Nations Programme on HIV/AIDS (UNAIDS). Global Plan towards the elimination of new HIV infections among children by 2015 and keeping their mothers alive. Countdown to zero. Geneva, Switzerland, UNAIDS; 2011. Available:https://www.unaids.org/sites/default/files/media_asset/20110609_JC2137_Global-Plan-Elimination-HIV-Children_en_1.pdf
2. Joint United Nations Programme on HIV/AIDS (UNAIDS). Global AIDS Response Progress Reporting. Geneva, Switzerland: UNAIDS; 2011. Available:https://www.unaids.org/en/media/unaids/contentassets/documents/document/2011/JC2215_Global_AIDS_Response_Progress_Reporting_en.pdf
3. Federal Ministry of Health (FMOH) Nigeria. National Integrated Management of Pregnancy and Childbirth curriculum. Abuja, Nigeria: FMOH; 2013.
4. World Health Organization (WHO). Mother-to-child transmission of HIV. Geneva, Switzerland: WHO; 2017. Available at: <https://www.who.int/hiv/topics/mtct/about/en/>
5. Centers for Disease Control and Prevention (CDC). HIV among pregnant women, infants and children. Atlanta, USA: CDC; 2017. Available:<https://www.cdc.gov/hiv/group/gender/pregnantwomen/>
6. National Agency for the Control of AIDS (NACA), Federal Republic of Nigeria. Global AIDS Response: Country progress report-Nigeria. GARPR; 2012. Available:<files.unaids.org/en/dataanalysis/knowyourresponse/countryprogressreport/2012countries/Nigeria>
7. World Health Organization (WHO). Towards Universal Access: scaling up priority HIV/AIDS interventions in the health sector: progress report 2010. Available:whqlibdoc.who.int/publications/2010/9789241500395_eng.pdf
8. Ashipa T, Ofili AN, Onakewhor JUE, Adejumo AO. Health workers' knowledge of preventing mother-to-child transmission of HIV in Benin City, Edo State, Nigeria. J Comm Med Prim Health Care. 2017;29(1): 1-10.
9. Usman A, Ayinde O. Prevention of mother to child transmission of HIV/AIDS: perception of health care workers in rural areas of Oyo State. Scientifica (Cairo) 2016; 4257180.
10. Okike O, Jeremiah I, Akanni C. Knowledge, attitude and practice of General Medical Practitioners in Port Harcourt towards the prevention of mother-

- to-child transmission of HIV. The Nigerian Health Journal. 2011;11(3):79-82.
11. Laar AK, Amankwa B, Asiedu C. Prevention of mother-to-child transmission of HIV services in sub-Saharan Africa: A qualitative analysis of healthcare providers and clients challenges in Ghana. Int J MCH AIDS. 2014;2(2):244-49.
 12. Mulenga C, Naidoo JR. Nurses' knowledge, attitudes and practices regarding evidence-based practice in the prevention of mother-to-child transmission of HIV programme in Malawi. Curationist. 2017;40(1):e1-e8.
 13. Peltzer K, Prado G, Horigian V, Weiss S, Cook R, Sifunda G, et al. Prevention of mother-to-child transmission (PMTCT) implementation in rural community health centres in Mpumalanga province, South Africa. J Psychol Afr. 2016;26(5):415-418.
 14. Amboko AR, Beyslewicz P. Nurses' compliance with prevention of mother-to-child transmission national guidelines in selected sites in Kinshasa, Democratic Republic of Congo. Afr J Prim health Care Fam Med. 2015;7(1):e1-e7.
 15. Asefa A, Mitike G. Prevention of mother-to-child transmission (PMTCT) of HIV services in Adama town, Ethiopia: clients' satisfaction and challenges experienced by service providers. BMC Pregnancy Childbirth. 2014;14:57.
 16. Federal Ministry of Health (FMOH), Nigeria. National Strategic Health Development Plan (NSHDP) 2010-2015. Abuja, Nigeria: FMOH; 2010.
 17. Birhane T, Assefa Tessema G, Addis Alene K, Dadi AF. Knowledge of pregnant women on mother-to-child transmission of HIV in Meket District, Northeast Ethiopia. J Pregnancy. 2015;2015:960830.
 18. Araoye M. Research methodology with statistics for health and social sciences. Ilorin: Nathadex; 2004.
 19. Federal Ministry of Health (FMOH). National Guidelines for Prevention of Mother-To-Child Transmission of HIV (PMTCT). Abuja, Nigeria: FMOH; 2010.
 20. Federal Ministry of Health (FMOH). National scale up plan towards elimination of mother-to-child transmission of HIV in Nigeria 2010 – 2015. Abuja, Nigeria: FMOH; 2010.
 21. Ogbonna K, Govender T, Tumbi J. Knowledge and practice of prevention of mother-to-child transmission of HIV guidelines amongst doctors and nurses at Odi Hospital, Tshwane District, South African Family Practice. 2016;58(5):167-171.
 22. Diadou KE, Koffi KS, Saka B, Tepe EM, Vinyad K, Tatagan-Agbi K. Knowledge, attitudes and practices of healthcare providers in Togo regarding prevention of mother-to-child transmission of HIV in 2010. Med Trop (Mars). 2011;71(6):608-12.
 23. Gupta AK, Garq CR, Joshi BC, Rawat N, Dabla V, Gupta A. Implementation of prevention of mother-to-child transmission of HIV programme through private hospitals of Delhi—policy implications. AIDS Care. 2015;27(12):1487-92.
 24. Nguyen TA, Oosterhoff P, Pharm YN, Hardou A, Wright P. Health workers' views on quality of prevention of mother-to-child transmission and postnatal care for HIV-infected women and their children. Human Res Health. 2009;7:39.
 25. Algir P, Summers T, Kates J. Global spending on HIV/AIDS in resource poor settings. Available:<https://www.umich.edu/~spp638/coursepack/fin-globalspending.pdf>
 26. Deressa W, Seme A, Asefa A, Teshome G, Enqusellassie F. Utilization of PMTCT services and associated factors among pregnant women attending antenatal clinics in Addis Ababa, Ethiopia. BMC Pregnancy Childbirth. 2014;14:328.
 27. Joint United Nations Programme on HIV/AIDS (UNAIDS). The Gap Report. Geneva, Switzerland: UNAIDS; 2013. Available:https://www.unaids.org/sites/default/files/media-asset/UNAIDS_Gap_report_en.pdf

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