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A Review to Identify the Gaps in Prevention of Mother to Child Transmission of HIV Services in Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. Author AFC designed the study and performed the statistical analysis, while the protocol and the first draft of the manuscript were written by author POUA. The literature searches were managed by author HNC. All authors read and approved the final manuscript.

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Review Article

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ABSTRACT

Background: Nigeria has the second largest burden of maternal to child transmission of HIV (MTCT) in the world at a rate of 30% and has the largest burden of paediatric HIV infection globally at the rate of 10%. Effective prevention of mother to child transmission of HIV (PMTCT) can drastically reduce the paediatric HIV infection to 2%. However, recent evidence reveals yawning gaps in the PMTCT services in Nigeria, where out of estimated 9.2 million pregnancies, only about 3 million received HIV counselling and testing (HCT). This review is to unravel the unmet needs for PMTCT of HIV services in Nigeria.
Methods: Keywords from objectives of review are MTCT and PMTCT which were used to search for related literatures through online libraries of national and international journals; Medline and PubMed including google. 62 related literatures/studies were initially generated and then narrowed down to 19 literatures were selected which met the inclusion criteria- less than 10 year and related to objective of review.

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Findings: There are unmet needs for PMTCT of HIV services in Nigeria due to challenges like low HCT/PMTCT service uptake (35.5%), low HCT/PMTCT service delivery facilities (27%), low ANC (58%) and low (35%) delivery in formal health setting.
Conclusion: PMTCT target in Nigeria has not been met. Regular training of existing health workforce including the TBAs and the adoption of the recommendations for an HIV-free generation will bridge the HCT / PMTCT of HIV services gap identified in this review.

Keywords: PMTCT; gaps; HIV; child transmission.

1. INTRODUCTION

Mother to child transmission of HIV accounts for over 90 percent of HIV infections in children [1,2,3] Prevention of mother to child transmission of HIV (PMTCT) remain a key in reducing paediatric HIV infection burden towards achieving the AIDS free generation.

Nigeria has HIV sero-prevalence of 3.4% [4] and is estimated to have the third largest number of People Living with HIV and AIDS globally [5]. The nation also bears the second largest burden of PMTCT globally and has 10% of global paediatric HIV burden [6]. This burden could be because the PMTCT goal is under achieved in Nigeria as the uptake of HIV Counselling and Testing (HCT) among pregnant women and PMTCT services is also very low [4,7]. For instance, National agency for the control of AIDs(NACA) reported that only 3.2 million of estimated 9 million pregnant women in 2014 got HCT [8].

Traditional birth attendant (TBA) as defined by World Health Organization (WHO) [9] is a person who assists the mother during childbirth and initially acquired her skills by delivering babies herself or through apprenticeship to other TBAs. TBAs when empowered through HCT/PMTCT training, involvement and supervision, stand the chance of forming a bridge to narrow the gap between the formal health centres and the culturally driven communities. Thus encourage grass root expansion mechanism through their reach out to the set of target (women) who culturally would not attend antenatal care (ANC) nor deliver in the facilities and to women who structurally/financially would not get access to PMTCT due to few number of service delivery facilities (SDFs) in Nigeria.

It is in the operational plan for elimination of mother to child transmission of HIV [EMTCT] in Nigeria to provide multiple testing points in every facility to reach pregnant women and women of reproductive age, [10] thereby demanding involvement of TBAs in PMTCT. There is therefore need to review the success stories, challenges and way forward of involvement of TBAs in PMTCT from around the world and particularly in Nigeria.

Objectives of this paper are to review Mother to child transmission of HIV (MTCT), delineate trend and discuss overview of and gaps in prevention of mother to child transmission of HIV (PMTCT) in Nigeria, and to identify the success stories, challenges and way forward of involvement of TBAs in PMTCT in Nigeria.

2. METHODOLOGY

Keywords from objectives of review are MTCT and PMTCT which were used to search for related literatures through online libraries like national and international journals example Medline and PubMed including google. 62 related literatures/studies were initially generated and then narrowed down to 19 literatures were selected which that met the inclusion criteria- less than 10 year and related to objective of review. All the literature reviewed are reflected and listed in the references section of the write up.

3. REVIEW RESULTS

PMTCT means Prevention of mother to child transmission of HIV. This involves strategies to prevent an HIV infected woman from transmitting HIV to her infant starting before pregnancy, during pregnancy and delivery, after delivery and breast feeding. Mother to child transmission of HIV (MTCT) can occur during; [11] pregnancy; which has 5-10% risk of infection, labor and delivery; which has 20% risk of infection and breastfeeding; which has 5-15% risk of infection.

Risk Factors for MTCT: Without intervention, the risk of MTCT is 25–40% in breastfeeding settings [11]. However, maternal triple ARV prophylaxis can reduce the MTCT rate to as low as 1- 2% even with exclusive breastfeeding up to 6 months [11].

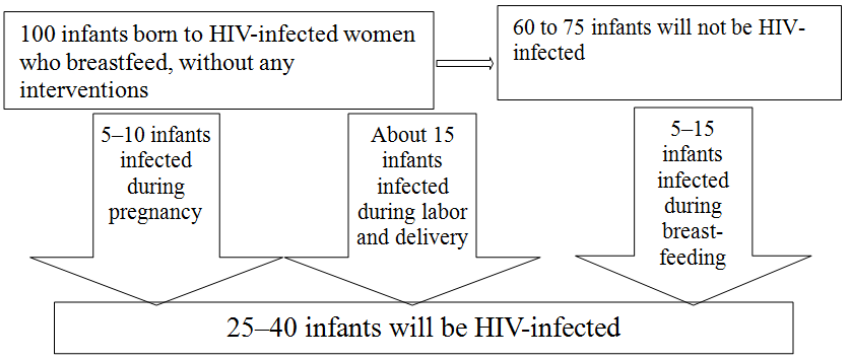

Fig. 1. Flow chart showing child transmission of HIV

Risk factors during Pregnancy include: high maternal viral load, infection, STIs, malnutrition and hemorrhage.

Risk factors during labour and delivery include: high maternal viral load, prolonged rupture of membranes, chorioamnionitis, prolonged labour, invasive delivery procedures, instrumental delivery, episiotomy and genital lacerations, first infant in multiple birth, preterm birth, fetal genetic characteristics.

Risk factors during Breast feeding are: high maternal viral load, duration, early mixed feeding, breast fissures, infections, poor maternal nutrition, oral disease in infant.

3.1 Elements for Comprehensive Approach to Prevent of Mother to Child Transmission of HIV (PMTCT) [11]

Element 1: Primary Prevention of HIV Infection: These are the measure taken to prevent HIV infection in both women and men as an attempt to prevent women of child bearing age from becoming infected with HIV. This in turn will combat the future risk of HIV transmission from mother to child. These measures include; safer and responsible sexual behaviour and practices, provision of early diagnosis and treatment of STIs, making HIV testing and counselling widely available, and provision of suitable counselling for women who are HIV-negative.

Element 2: Prevention of Unintended Pregnancies among Women Infected with HIV: This is the level two prevention. Thus, as women become infected, the element two involves measure taken to prevent unwanted pregnancy and thus plan pregnancy at such time when viral load is suppressed and the woman and family are ready to adopt strategies for PMTCT. This is where family planning is integrated with HIV management. The specific measures include; access to HIV testing & counselling and referral for family planning, safe, consistent, effective contraception, and integration of dual protection messages and methods into family planning counselling services.

Element 3: Prevention of HIV Transmission from Women Infected with HIV to Their Infants: If the woman becomes HIV infected and eventually becomes pregnant, element three involves interventions taken to prevent risk of transmission to infant. This element is based on the evidence that maternal triple ARV prophylaxis can reduce the MTCT rate to as low as 1-2% even with exclusive breastfeeding up to 6 months of age. These include the following core Interventions: HIV testing and counselling at ANC and in labour, anti-retroviral, safer delivery practices, and safer infant-feeding practices [12].

Element 4: Provision of Treatment, Care, and Support for Women Infected with HIV, their Infants and their Families: These are efforts made to provide holistic care to infected woman and/or her affected infant and families. These measures include; ART, Prevention and treatment of OIs, palliative care, nutritional support, reproductive health care, psychosocial and community support.

3.2 Overview of PMTCT in Nigeria

As at 2006, Nigeria had been on world watch list of countries with second largest people living with HIV with close to 60% being women- and also of childbearing age 15-45 years [4]. Unfortunately, the HIV burden among women in Nigeria has not changed as currently in 2016,

Nigeria still accounts for about 30% global burden of mother to child transmission (MTCT) of HIV [4]. The high burden of MTCT in Nigeria is due to a high rate of heterosexual transmission, a higher prevalence of HIV in women of reproductive age, high total fertility rates and poor access to PMTCT interventions. In 2011 it was estimated that about 6.7 million pregnant women (birth rate 41 per 1,000) [4]. Required HIV counselling and testing. Of the 2011 population of pregnant women, about 222,129 were estimated to be HIV-positive and would give birth to 58,495 HIV-infected babies [13]. In the same year only 17 percent of pregnant women received HCT, while only 16 percent of HIV-positive pregnant women received antiretroviral (ARV) prophylaxis to prevent HIV transmission to the infants [14]. Though experiences from programs in more technologically advanced countries and a number of African countries have shown that PMTCT programs can reduce the risk of MTCT of HIV to as low as 2 percent, Nigeria still battles with reaching, initiating and retaining the target population with PMTCT interventions which include the use of ARVs as either prophylaxis or therapy for HIV-positive women in pregnancy, labour and during breastfeeding [2].

The PMTCT program in Nigeria was initiated before 2006 in six tertiary health facilities (one in each of the geopolitical zones of the country) by the Federal Ministry of Health (FMOH) with support from development partners [8]. It also important to note that majority of funding for PMTCT has been from international donors like United States president's emergency plan for AIDS relief (PEPFAR), global fund, Clinton foundation etc. With continued support, the number of facilities providing PMTCT has increased over the years, with services decentralized to secondary and primary health facilities and some involvement of private institutions. As at December 2012, a total of 1,320 health facilities [1,8]. offered PMTCT services. However, Nigeria has continued to commit to the elimination of Mother-To-Child Transmission (EMTCT) of HIV by 2015. Thus the Presidential Comprehensive Response Plan (PCRP) proposes to scale up PMTCT service coverage to 90.0% of national need (that is; 6 million pregnant women tested for HIV and received results, 244,000 positive pregnant women receive ART to prevent transmission of HIV to their unborn babies) towards achieving the EMTCT by 2015 in line with the global plan [7]. This has created renewed efforts towards the aggressive scale-up of PMTCT services nationwide. Currently, Antiretroviral Therapy (ART) through PMTCT services have been made available by the Government of Nigeria (GoN) and donor agencies. The services are now being rolled out at primary healthcare facilities nation-wide. However, this figure represents a small fraction of the total health facilities in the country and the public health care system in Nigeria is not without challenges. A 2011 baseline survey of primary health care services in Nigeria depicts challenges such as poor health infrastructure with inadequate buildings and equipment and inadequate human resource capacity and supervision [2]. There are also weak referral links between different levels of care and weak logistic systems for health care commodities [8].

In June 2011, at the United Nations (UN) High Level Meeting on AIDS, Nigeria and other member nations launched and committed to the Global Plan towards the Elimination of New HIV Infections in Children by 2015 and Helping Mothers Stay Healthy. Through the National Scale-up Plan Towards Elimination of Mother-to-Child Transmission (EMTCT) of HIV, the country is already aligned with the global targets of reducing new HIV infections in children by 90 percent and reducing AIDS-related maternal deaths by 50 percent by 2015 but sadly, by end of 2015, this goal is still far from being achieved as the data on PMTCT coming from Nigeria says otherwise. In order to achieve these ambitious targets, national and state governments; the organized private sector; public, private and traditional health care providers (such as Traditional Birth attendants (TBA)); civil society; networks of people living with HIV and AIDS (PLHIV); and community structures plan to work collaboratively to improve health care delivery systems, particularly at the primary health care levels where the majority of the people live and the need is greatest (for instance more than half of the population are rural dweller and have high fertility rate due to low family planning uptake from ignorance, illiteracy and cultural/religious factor).

Other achievements in the scale-up of PMTCT services in Nigeria include the development of key policy documents and plans—the National HIV/AIDS Policy, National HIV/AIDS Strategic Plan 2010-2015 and the National Scale-up Plan Towards EMTCT of HIV—all of which prioritize PMTCT as a major focus for the country. National PMTCT guidelines have been

developed to guide service provision. Though in the face of many challenges, the country and its partners have, through extensive analysis, are committed for accelerated scale-up of services through a strategy of decentralization and integration of services at primary health care levels.

With all the efforts channeled into PMTCT by national and international donor, federal ministry of health, National agency for control of AIDS (NACA) and most importantly, Non-Governmental Organization (NGO), the PMTCT burden is yet to be less in Nigeria, thus In 2014 it was estimated that about 9.2 million pregnant women (birth rate 41 per 1,000) and only about 3 million got tested [8]. Thus questions still arises in attempt to discover the causes of the gaps and how to fill them.

Fig. 2 is a trend showing the steady increase in number of health centres providing PMTCT services in Nigeria. This increase is expected to result in increase in number of women provided with PMTCT services to bridge the gaps.

From the above trend, since the increase in number of HIV/PMTCT service delivery services from 2006/2007, number of new infections among PMTCT target (women of child bearing age) has been increasing. Instead of the expected trend of going down, the number of new HIV infections trend has been relatively high (actual trend)

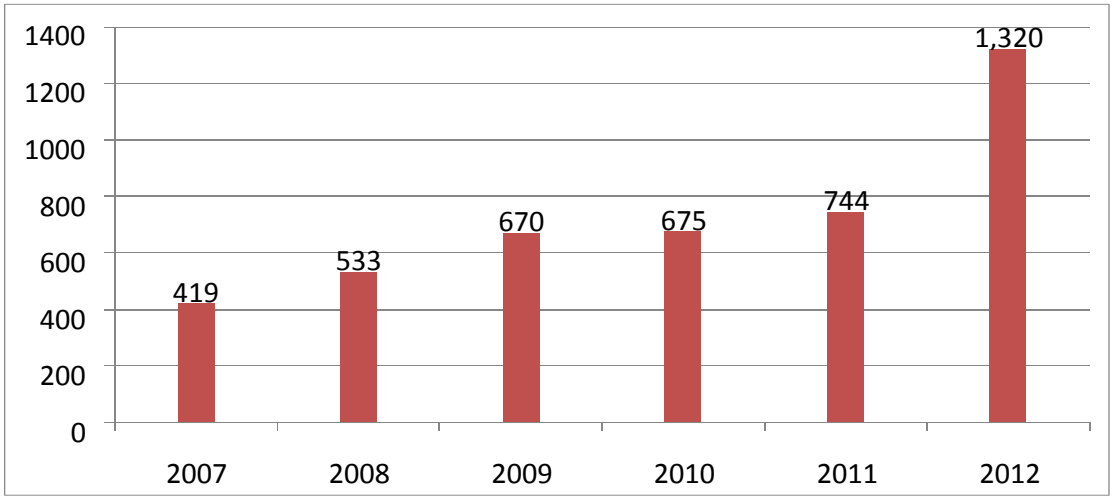

Fig. 2. Number of facilities offering PMTCT services nationally (adopted from National PMTCT communication Strategy, Nigeria, (2014) [6]

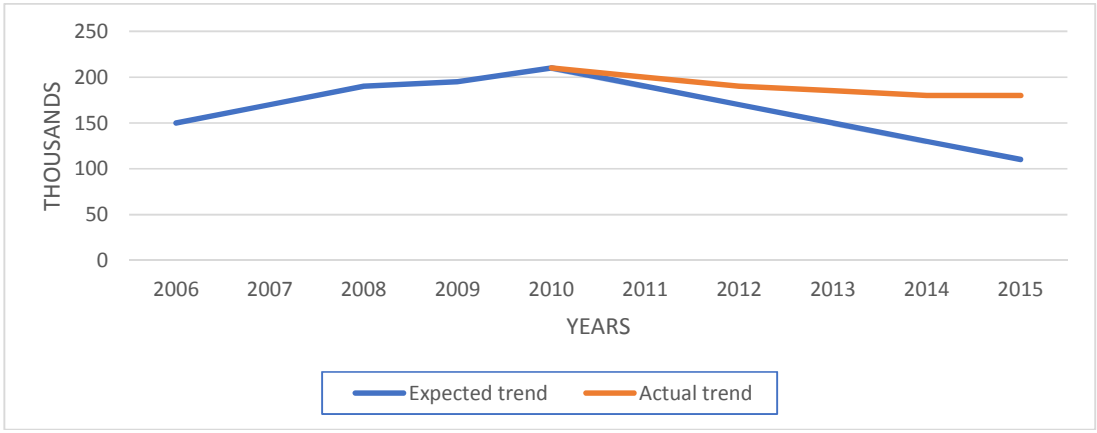

Fig. 3. Number of new HIV infections among reproductive age women, by scenario, Nigeria

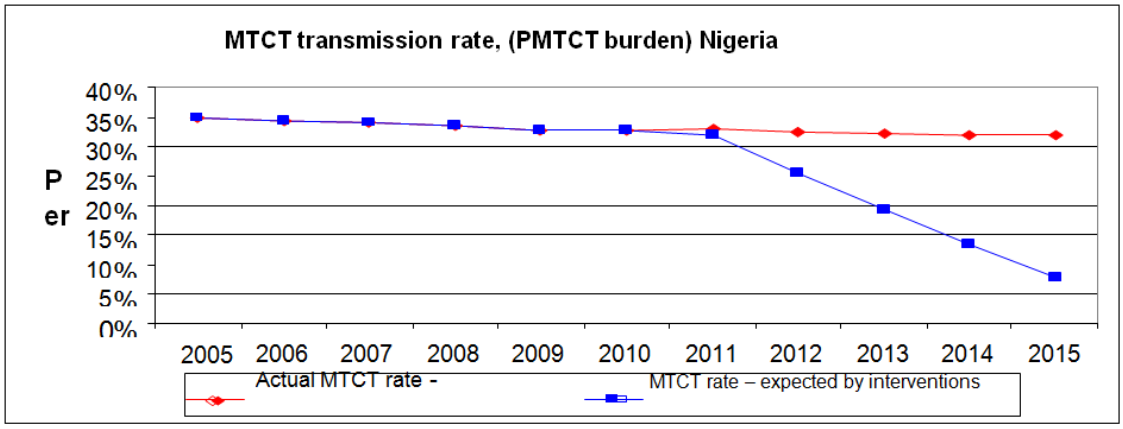

Fig. 4. Estimated mother to child transmission rate (including transmission during pregnancy, delivery and breastfeeding), {PMTCT burden} Nigeria

Similarly, Fig. 4 shows that in the past 10 years, MTCT which is expected to be going down with intervention, is actually going up despite the interventions done so far in PMTCT

3.3 Gaps in PMTCT and Challenges of Achieving the PMTCT Goal in Nigeria

As number of HIV positive persons remains at over 3 million and 270,000 new infections occur annually as at 2012 [15]. Infection among adults remain at about 210,000 comprising of less men (42%) and more women (58%) [11,15] who form the main PMTCT target population. Still, over 60,000 infection has been reported among children in same 2012, [11,15] of which over 90% were infected from mother to child. This has kept the HIV prevalence among Nigerians (ANC records) at 3.3% as at 2013 HIV sentinel survey (HSS) and specifically, annual HIV infection among pregnant women is at 229,480 new infections [10]. With increase in new infection among women comes the increase in need for antiretroviral coverage- a PMTCT intervention among this group to prevent mother to child transmission of HIV. Countries like Cuba and Kenya have recorded elimination of mother to child transmission with PMTCT intervention. However, Nigeria, unlike some other African countries has not made great improvement in ARV coverage among HIV infected women and in PMTCT.

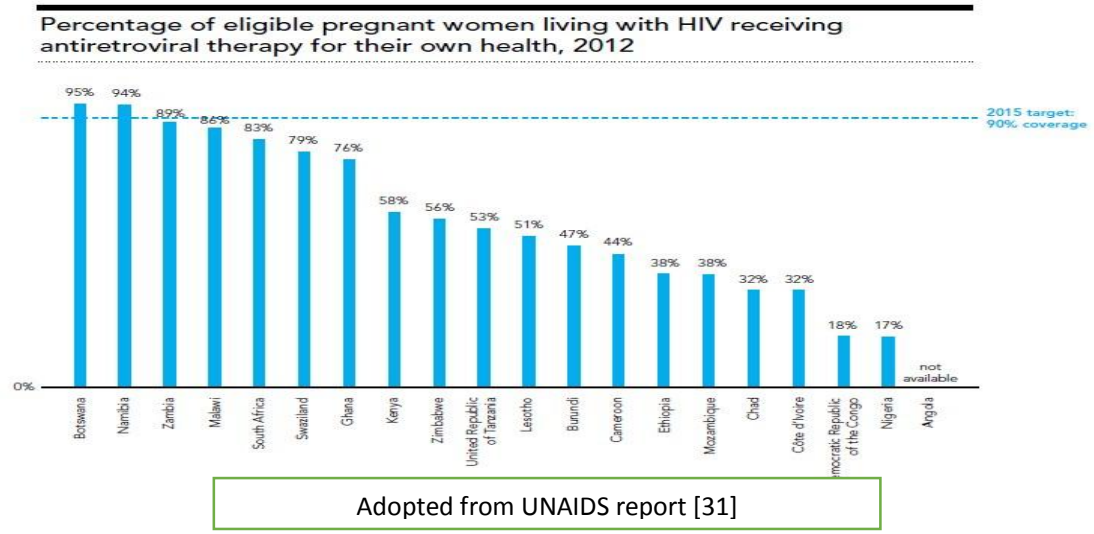

Fig. 5. Percentage of eligible pregnant women living with HIV receiving antiretroviral therapy for their own health

Fig. 5 above shows that Nigeria has about the worst report (17%) on number of positive women receiving ARV for PMTCT compared to 20 countries analysed. The gaps in reaching the target population with the lifesaving PMTCT services are thus evident in Nigeria.

Moreover, a score card presented by UNAIDs comparing the two countries (South Africa and Nigeria) with highest number of infected people shows a tremendous coverage of PMTCT gap in south Africa but a relatively wide gap in that of Nigeria.

A 2011 baseline survey of health care services in Nigeria, [2] depicts challenges which also form the gaps in PMTCT which include; inadequate human resource capacity; inadequate training/re-training and supervision; poor health infrastructure with inadequate buildings and equipment; weak referral links between different levels of care and weak logistic systems for health care commodities. Included to the list is insufficient number of health centres to serve the population and poor community mobilization for participation in health care and particularly in PMTCT.

PMTCT gap can form at any points along the four elements of comprehensive approach for PMTCT. Though the first and second element of PMTCT demands that intervention starts before pregnancy, the third and fourth elements which start after pregnancy is usually the true picture of PMTCT intervention in Nigeria. However, irrespective of point of starting the intervention, the gaps in PMTCT need to be bridged for the goal to be achieved.

The 4 main factors identified to cause the PMTCT gaps in Nigeria include:

Provider factor: Insufficient trained health work force, insufficient PMTCT trained staff, high staff turnover, high workload, poor documentation, lack of commitment

Patients factor: Transportation cost to health centre, distance/poverty, transportation cost to health centre, illiteracy and ignorance, poor health care seeking behavior, cultural/religious belief, illiteracy and ignorance

Resources factor: Insufficient PMTCT service delivery points, insufficient funds to drive PMTCT activities especially from government

Community factor: Cultural/religious issues, poor community participation/ownership, poor community mobilization

3.4 The Gaps

Gap in HIV/PMTCT knowledge and awareness: Though there has been increased effort to create awareness in HIV, knowledge of PMTCT is still barely sufficient with higher knowledge among men than women who the majority of PMTCT target group. And on the other hand, knowledge of HIV has been more in urban dwellers than rural dwellers where impact of HIV/PMTCT is greater.

Gap in HCT/PMTCT services coverage/ decentralization including ARV coverage: The proportion of health centres in Nigeria that provides HCT/PMTCT is still low. Though PMTCT services started in 11 pilot tertiary institutions in 2002 with less than 1% coverage, the number of PMTCT sites has only increased to quarter- 25% (5,622 out of the 22,726) of public sector health facilities available in the country in December 2013 [8]. Women living with HIV can only be reached with PMTCT interventions if they come into contact with health centres providing the services.

Table 1. Score board after nearly one decade of implementation

	Nigeria	South Africa
HIV+ pregnant women:	210,000	210,000
Coverage of ARV/ART for PMTCT:	22%	88%
Estimated HIV incidence (modelled):	0.39%	1.68%
Contraceptive prevalence:	20%	62%
Unmet need for FP:	20%	14%
ANC at least 1 visit:	58%	92%
Median duration of BF:	19 m	16 m
MTCT rate in 2009:	32%	19%
New child infections 2009:	64,700	40,500

Sources: WHO Universal access report 2010, Nigeria DHS 2008, South Africa DHS 2003, UNAIDS analysis

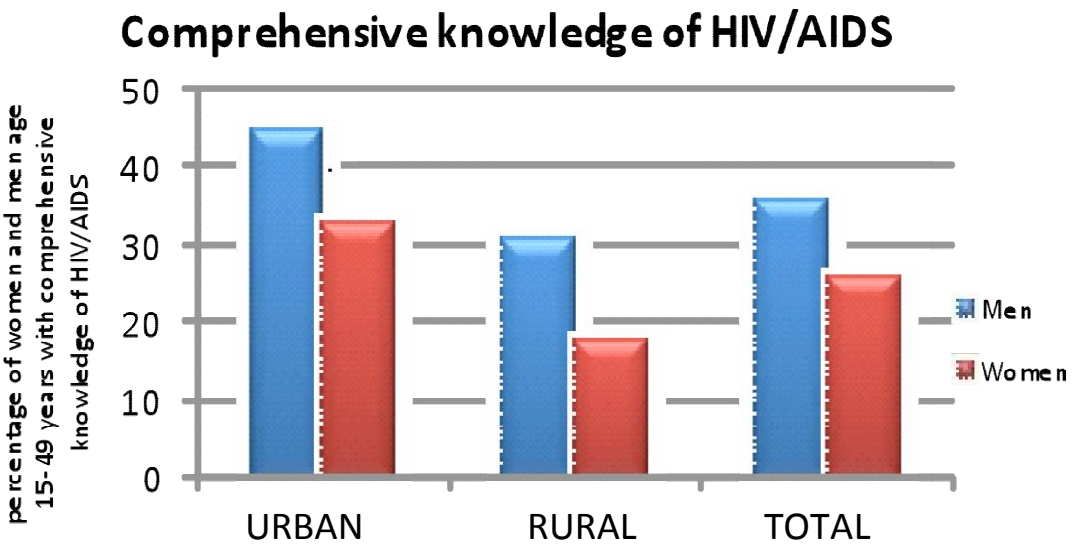

Fig. 6. NSHDP 2010-2015 showed the following gap in HIV knowledge between urban and rural dwellers. (Fig. 7) [16]

Adopted from National strategic health development plan 2010-2015, November 2010

. Understanding Mother-to-Child Transmission of HIV

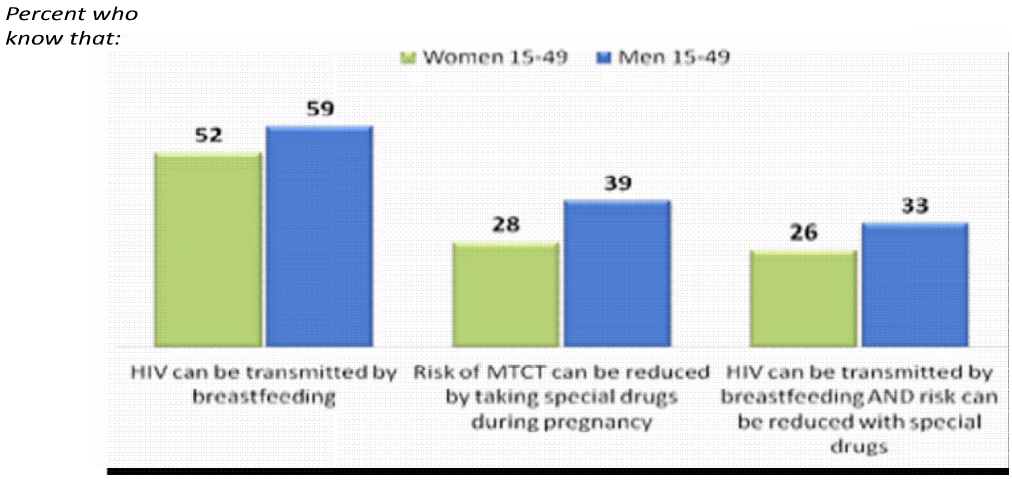

Fig. 7. NSHDP 2010-2015 showed the following gap in PMTCT knowledge between men and women [16]

Adopted from National strategic health development plan 2010-2015, November 2010

Gap in number and proportion of health workforce and trained PMTCT health care providers: Number of health workforce compared to Nigeria population is disproportionately low and also having disproportionate distribution between urban and rural health centres. While the average health workforce is about 39,210 doctors, 124,629 nurses and 88, 796 midwives registered in Nigeria (though it is difficult to judge with these numbers alone due to attrition), most doctors and nurses work in higher level and private practices. 88% of 26,361 doctors practicing in the country work in hospitals, most of them (74%) in private hospitals. Only about 12% of practicing doctors work in private or public sector PHC services that service majority of the population including pregnant women [16,17]. Moreover, the trained PMTCT health

care providers, an extract from the insufficient workforce, is even lower.

Gap in ANC attendance by pregnant women: Low uptake of ANC and delivery care, due to financial, geographical and socio-cultural barriers, is a challenge to PMTCT scale-up [18]. In some African countries, ANC attendance is quite high but such is not the case in Nigeria were attendance is barely above half (58%) of the estimated pregnant women [15]. In Zambia, over 92% of women attend ANC at least once and in Uganda, also 92% make at least one visit to an ANC facility [18]. Since PMTCT services in Nigeria typically starts at ANC, efforts to get majority of the pregnant women to ANC clinics supported with PMTCT services is of a high priority. This is because only 58% of pregnant women attend ANC at least once throughout pregnancy and not all ANC clinics offer HCT nor PMTCT services making the number of pregnant women who could receive the intervention far less than the 58% ANC attendance [15].

Gap in access to skilled delivery by pregnant women: Beyond ANC attendance of 58%, national health and demographic survey of 2013 showed that only 35% of pregnant women in Nigeria deliver in the health facilities with the rest 65% delivering at non formal settings like Traditional birth attendants (TBA), churches and homes [15]. Such is also the case in some other African countries, like in Zambia, though 92% of women attend ANC at least once but 60% deliver at home and post-natal care services are limited. Also in Uganda, 92% of pregnant women make at least one visit to an ANC facility but only 40% make more visits up to delivery. Yet, not all 35% that deliver at Health facility are provided with HCT/PMTCT interventions [8,19].

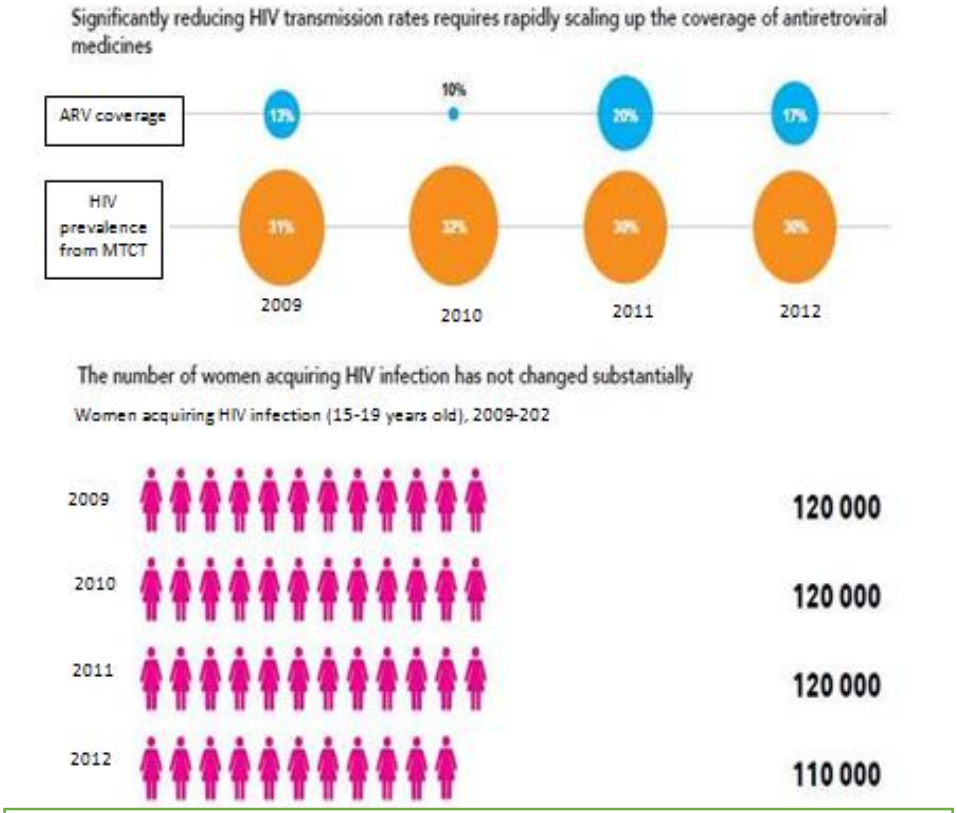

Fig. 8. Reduction of HIV transmission including PMTCT, requires rapid scaling up of ART

Gap in integration of PMTCT into MCH: In Malawi, links between MCH, including ANC, and ART services are weak. While MCH facilities offer HIV CT, they refer women for ARV prophylaxis and ART, resulting in high drop-out rates. Nigeria has also not been able to fully integrate HCT and PMTCT services into the routine MCH clinics in all health centres in the country. Health care providers need to see PMTCT as one of the services in MCH package and not done in isolation, then will the true picture of PMTCT intervention in health centres be seen.

Gap in HCT/PMTCT service uptake by pregnant women: To achieve the goal of eliminating MTCT, at least 90% of HIV-infected women should have access to comprehensive PMTCT services including ARV prophylaxis during pregnancy and the breastfeeding period. However, available data from 2011 showed that only 17%of pregnant women received HCT, while only 16% of HIV-positive pregnant women received antiretroviral (ARV) for PMTCT [12]. In 2013 the number of HIV positive pregnant women who received ARVs to reduce the risk of MTCT increased to 58,000 in 201 but still only 27% of the 244,000 HIV-infected women who were estimated to have been pregnant in 2013. [17] Moreover, NACA also reported that out of the 9.2 million pregnancies estimated to have occurred in 2014 only about 3 million pregnant women received HCT [7]. Blame for low service uptake could either go to health care delivery system in Nigeria which has low service delivery points and insufficient service provider or go to the patients who make a choose not to attend and accept ANC and PMTCT services respectively.

Sociocultural and socioeconomic factors influencing health seeking behaviours among pregnant women: Illiteracy and ignorance of HIV/PMTCT among Nigerian women (shown in Fig. 2 above) has widened the PMTCT gap resulting from lack of sense of need to access services at health facilities. One could have imagined that since 70% of health centres in Nigeria are Primary health centres [16], mainly located in rural areas and of which ANC services is a core deliverable that pregnant women would endeavour to use the services. However, such is not the case as close to half (42%) pregnant women never attends ANC once while 65% would deliver outside the health centres. A pry into factors influencing these health seeking behaviour would reveal the influence of sociocultural and socioeconomic factors especially in rural areas where cultural/religious beliefs and poverty, illiteracy/ignorance abound. Among such factors are; beliefs that women should deliver at home especially among the northern Nigerian, beliefs that TBAs are more culturally acceptable than formal health service providers, belief of non-usage of condom for family planning among catholic religion, unaffordability of transports cost to health centres and delivery cost due to poverty, stigma and discrimination of HIV, influence of men over women acceptance of PMTCT interventions like ARV, breastfeeding options and contraceptives, belief of giving infant certain herbs, food or water before 6 months- thus mix feeding, among others.

Questionable data: Recently, there has been anecdotal discussions in the corridors of PMTCT program implementers in Nigeria, querying the accuracy of PMTCT data coming to and from Nigeria. Questions has been raised recently on viability of indicators and data which form the targets and outcomes which forms the PMTCT report cards in Nigeria. Such questions include- but not limited to-; are the projections/estimations of number of pregnant women exuberant? Are health centres reporting all pregnant women provided with HCT? Are there loss of data coming from health centres along the PMTCT cascade? Are monitoring and evaluation system in Nigeria unanimous and efficient? These questions though complex and anecdotal needs further review and answers

These bottle necks in providing HCT/PMTCT service interventions to target population have led to occurrence of annual HIV positive babies of 84,200 in 2013 making Nigeria the highest burden bearer of PMTCT and pediatric HIV at 30% and 10% respectively [4]. It is in an attempt to bridge these gaps that Nigeria EMTCT plan emphasized that strategies to involve non formal settings like TBAs be incorporated in the plan towards achieving PMTCT/EMTCT [10].

4. CONCLUSION

A number of unmet needs for PMTCT have been identified and highlighted to include; Gaps in HIV/PMTCT knowledge and awareness; HCT/PMTCT service coverage/decentralization; number and proportion of health workforce and trained PMTCT health care providers; ANC attendance by pregnant women; access to skilled delivery by pregnant women; integration of

PMTCT into MCH; HCT/PMTCT service uptake by pregnant women; Sociocultural and socioeconomic factors influencing health seeking behaviours among pregnant women; and Questionable data.

5. RECOMMENDATION

1. It may be necessary to think outside the box in a bid to meet the many challenges of unmet needs for PMTCT of HIV services in Nigeria. Regular training and retraining of all cadres of health workers may help. Cascading of such skills to some unskilled health workforce such as the TBAs will go a long way to fill the unmet needs gap for PMTCT in Nigeria.
   Furthermore, the following steps to bridge the PMTCT gaps towards the AIDS free generation may be adopted:
2. Community mobilization for participation and action- this is where Traditional birth attendants and other non-formal community groups are involved in PMTCT to improve acceptance and sustainability.
3. Task shifting from higher cadre of health service provider to lower cadre in order to provide services to increasing number of infected women with PMTCT.
4. Decentralization; this comes with tasks shifting thus service delivery centres are no longer few and centralized.
5. Private sector engagement; entails involvement of the private sector such as patent medicine vendor, TBA etc. this is because Nigerians still patronize this sector.
6. Combination prevention; involves combining biomedical, behavioural and structural means for prevention of HIV and MTCT.
7. Male involvement in which men who are opinion leaders of the infected women are reached with message of PMTCT so they can influence their wives to use PMTCT services. Also, increase in HIV risk knowledge reduces behavioural risks among men and thus reducing risk of transmission among women.
8. Family planning which is the second element of PMTCT entails making family planning methods acceptable and accessible b women as a means of dual protection; preventing HIV transmission and unplanned pregnancy.
9. Treatment as prevention (TasP); treating the infected person reduces risk of transmission of HIV to the discordant partner.
10. Option B+; which allows women who have completed a PMTCT cascade to continue on ARV though no longer pregnant. This continuously reduces viral load, risk of transmission to partner of baby in next pregnancy and risk of developing resistance to ARV.
11. Early infant diagnosis (EID) identifies HIV infected babies early for them to be placed on treatment early to reduce mortality and morbidity among infected children.
12. With early initiation of paediatric ARV, babies are kept alive; reducing morbidity and mortality.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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