

# Maternal health service disparities across incomes and implications on prevention of mother-to-child transmission service coverage: current context in Sub-Saharan Africa

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## Abstract

About 69% of people living with HIV globally and over 90% of the children who acquired HIV infection are in Sub-Saharan Africa. Despite this, promising results have been observed, especially over the last decade – for example, a 25% decline in new HIV infections as compared to 2001 and a 38% decline in the number of children newly infected by HIV in 2012 as compared to 2009. However, the Global Plan and the Global Fast-Track Commitments of eliminating new HIV infections among children require addressing impediments to service expansion. In this regard, this paper attempts to draw attention to the extent to which disparities across income in using antenatal care (ANC) services may constrain the prevention of mother-to-child transmission (PMTCT) service expansion in Sub-Saharan Africa. The analysis is based on ANC service coverage data from Demographic and Health Surveys conducted between 2008 and 2015 in 31 Sub-Saharan African countries; and PMTCT coverage data from UNAIDS datasets released in 2016. Our analysis found that women in the highest wealth quintile are about three times more likely to frequently use ANC services (at least four visits) as compared to those in the lowest wealth quintile (95%CI: 1.7-5.7,  $P < 0.0001$ ). A regression analysis shows that one-quarter of the PMTCT service coverage can be explained by the disparity in ANC use associated with income; and the higher the disparity in ANC use, the lower the PMTCT service ( $P < 0.05$ ). The findings suggest that achieving the ambitious plan of zero new HIV infections among children while keeping their mothers alive will require on-going PMTCT/ANC service integration and ensuring that programs reach women who are most in need; specifically those in the poorest income categories.

## Introduction

Over the last decade, progress observed in Sub-Saharan African countries in increasing PMTCT service coverage and in reducing new HIV infections among children is promising. For example, in the 21 Global Plan priority countries in Sub-Saharan Africa, coverage of antiretroviral medicines for pregnant women living with HIV to prevent mother-to-child transmission has nearly doubled in 2012 as compared to the 2009 level, increasing from 34% in 2009 to 65% in 2012.<sup>1,2</sup> This increased coverage has contributed to reducing new HIV infections among children by 38% in 2012 as compared with 2009 levels. In this regard, Botswana, Ethiopia, Malawi, Namibia and Zambia have demonstrated a 50% or more decline on new HIV infections among children. On the other hand, Angola, Chad, Cote d'Ivoire, Democratic Republic of Congo, Lesotho and Nigeria showed slow declines in averting new HIV infections among children. Specifically, Nigeria, which accounts more than one-quarter of new HIV infections among children in the region, PMTCT coverage was very low (17% in 2012) and consequently, the decline in HIV infection aversion among children has been less effective.<sup>2</sup>

Such slow progress in high burden countries such as Nigeria also affects achievement of regional targets. The main purpose of this paper is to share the evidence on a major factor that may impede scale-up of PMTCT service coverage and thereby advocate for integration of PMTCT and maternal and child health services, fundamental for achieving the Global Plan and Global Fast-Track Commitments of zero transmission and to improve maternal and child health in general. The paper specifically analyses disparities across income in the use of antenatal care services in Sub-Saharan African countries. It also analyses the extent to which use of antenatal care services differentiated by women's wealth status explains variations in PMTCT service coverage in the region.

## Materials and Methods

All sub-Saharan African countries that conducted Demographic and Health Survey (DHS) between 2008 and 2015 have been selected for analysis. If countries conducted two or more DHS surveys, the most recent survey has been considered. The DHS are nationally-representative household surveys (with large sample sizes ranging between 5000 and 30,000) that provide a wide range of data in the areas of population, health, and nutrition. The DHS surveys are normally implemented approxi-

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mately every five years.<sup>3</sup> From the DHS survey results, UNICEF pooled data on ANC coverage and released the results in February 2016.<sup>4</sup> For this analysis, *ANC use* refers to least four antenatal care visits to a health facility or health personnel during the last pregnancy. On the other hand, the most recent PMTCT coverage data have been pooled from the UNAIDS dataset released in 2016.<sup>5</sup>

Using SPSS, linear regression analysis were conducted to assess the disparity in the use of ANC that are associated with income; and to understand how much the disparity in ANC use could explain PMTCT service coverage. Wealth quintiles, as measured by DHS, refer to household income classified into five categories using principal component analysis.

## Results

Thirty-one Sub-Saharan African countries with complete data on ANC use by wealth quintile and PMTCT service coverage. have been identified. The complete dataset extracted from UNICEF and UNAIDS 2016 online datasets are presented in Supplementary Table S1.

The ANC use (at least four visits) in the lowest and highest wealth quintiles, in their respect, average 42% and 69%. This implies that in the 31 Sub-Saharan African countries, women in the highest wealth quintile are about 3 times more likely to use ANC services (at least four visits) as compared to those in the lowest wealth quartile (95%CI: 1.7-5.7,  $P < 0.000$ ). The PMTCT service coverage in these countries ranges between 3% in

Madagascar and 95% in Mozambique, Namibia, Swaziland, Togo, and Uganda; while the average PMTCT coverage is about 71% (Table 1).

A regression analysis shows that the disparity in ANC use associated with income (*i.e.*, between women in the highest and lowest wealth quintiles) is a statistically significant predictor of PMTCT service coverage ( $P < 0.05$ ). Also, the analysis shows that disparity in ANC use associated with income can explain nearly a quarter of the variation on PMTCT service coverage in Sub-Saharan African countries ( $P < 0.05$ ). The analysis and graph below show that the higher the disparity in ANC use associated with income, the lower the PMTCT service coverage (Figure 1; see also Supplementary Table S2 for more details on the output of the regression analysis).

## Discussion

Sub-Saharan Africa accounts the highest burden of HIV/AIDS World Wide. In this regard, by the end of 2012, about 69% of people living with HIV globally were in this region, where nearly 1 in every 20 adults (4.9%) were living with HIV.<sup>1</sup> Similarly, over 90% of the children who acquired HIV infection in 2011 lived in sub-Saharan Africa.<sup>1</sup> However, there are also encouraging results that are being observed, specifically over the last decade. In this regard, for example, new HIV infection in the region has declined by one-quarter; *i.e.*, from 2.4 million in 2001 to 1.8 million in 2011. Also, in the Global Plan's 21 priority countries in Sub-Saharan Africa, the number of children newly infected fell by 38%; *i.e.*, from 340,000 new infections in 2009 to 210,000 in 2012.<sup>1,2</sup>

But, achieving the global target of eliminating new HIV infections among children and keeping their mothers alive requires taking the full advantages of the advancements in the biomedical field on PMTCT.<sup>2,3</sup> Advancements in biomedical interventions have created huge opportunities by reducing the risk of mother-to-child transmission (MTCT) of HIV from 35% to 2%. However, translating such advance-

ments into practice is faced with programmatic barriers specifically in Sub-Saharan Africa; one of such challenges being lack of integration of PMTCT with other maternal and child health services.<sup>6</sup> The World Health Organization strategic directions for scaling-up quality and effective PMTCT calls for integration of HIV prevention, care and treatment services with maternal, new-born and child health and reproductive health programs as one of the critical approaches for reaching zero new infections among children.<sup>7,8</sup> In most of the Sub-Saharan African countries, ANC use (at least four visits) is higher than PMTCT coverage. Therefore, reaching women who are already using ANC service is a low hanging fruit for expanding PMTCT services.

While maternal health and PMTCT service coverage are generally low and at varying levels in Sub-Saharan Africa, access to services by the poorest women is worse, which has major impact on national and regional level achievements. In this regard, for example, the relatively wealthiest women are three times more likely to use ANC services as compared to the poorest women in the region ( $P < 0.05$ )

(Table 1). Also, the higher the disparity across income in using ANC services, the lower the PMTCT service coverage at the national level ( $P < 0.05$ ). The impact of health inequality in the region is beyond PMTCT and ANC. In this regard, in Sub-Saharan African countries, while there is no association between national poverty rate and HIV prevalence, a systematic review of studies shows existence of clear and significant association between income inequality (measured with Gini coefficient) and HIV prevalence across countries; *i.e.*, countries with greater income inequality have higher HIV prevalence.<sup>9</sup>

The specific factors as to why women in the lower wealth quintile have lower access to health services might require further in-depth research. However, available studies on the general population might also enlighten some of the potential factors that need to be considered when designing maternal and PMTCT programs. It is also important to note that the ANC use disparity across income only explains about a quarter of the variation on PMTCT service coverage (Supplementary Table S2).<sup>10</sup> In this respect, there remain many other fac-

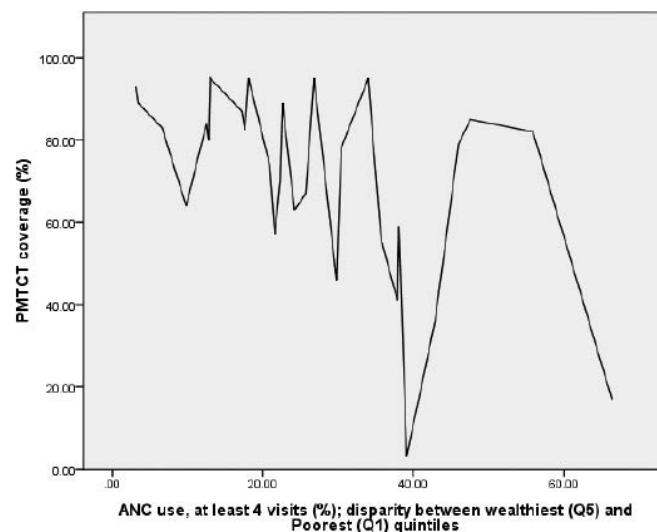


Figure 1. Prevention of mother-to-child transmission service coverage vis-à-vis disparity in antenatal care use by income.

Table 1. Descriptive summary statistics on antenatal care (ANC) use and prevention of mother-to-child transmission (PMTCT) service coverage in 31 Sub-Saharan African Countries.

	ANC coverage in the lowest wealth quintile (Q1)	ANC coverage in the highest wealth quintile (Q5)	Range in ANC coverage between highest and lowest wealth quintiles (Q5-Q1)	PMTCT coverage
Mean	42.4%	68.8%	26.5	70.5%
Range	67.5%	62.7%	63.3%	92.0%
Minimum	6.8%	35.8%	3.1%	3.0%
Maximum	74.3%	98.5%	66.4%	95.0%
N. of countries	31	31	31	31

tors that determine access/utilization of PMTCT and other maternal health services. For example, a study in Holeta town of Ethiopia shows that ANC attendance is significantly associated with demographic, socio-economic and health related factors including age at last birth, literacy status of women, average monthly family income, media exposure, attitude towards pregnancy, knowledge on danger signs of pregnancy and presence of husband approval on ANC.<sup>11</sup> Hardon *et al.*<sup>12</sup> studied women's practice of disclosing their HIV status to their partners in four Sub-Saharan Africa countries - Burkina Faso, Kenya, Malawi and Uganda. Disclosure has important effect for HIV positive women's desires to access PMTCT services. According to Hardon *et al.*,<sup>12</sup> rates of disclosure to partners in the four countries varied between 32.7% and 92.7%; the lowest being in Malawi. Main reasons for not disclosing are fear of stigma and negative reactions from partners. A similar study in Tanzania showed that six in ten HIV positive pregnant women had not disclosed their results of the HIV test to their partners. An important reason for not disclosing was women's economic dependency on their partners and hence fear of being expelled from house.<sup>13</sup> Such findings suggest the importance of also targeting male patterns in PMTCT and maternal health programs.

A cross-sectional study conducted in Southeast Nigeria shows limitations of women's knowledge/awareness about available maternal and child health services at the different service delivery points in their areas,<sup>14</sup> which potentially leads to lack of trust and wastage of their time and other resources by unknowingly traveling to facilities where services are not available. In these regards, PMTCT and maternal health program planning processes need to further look into the factors, validate those that deem most important and earmark resources on how to break the barriers for women (especially to those in the poorest wealth category) for accessing the services.

Ameur *et al.*<sup>15</sup> emphasized on the importance of eliminating user fees for maternal health services, specifically at the time of delivery, in order to address issue of maternal health inequity. In this regards, while the study by Ameur *et al.*<sup>12</sup> focused on Burkina Faso, they also cited the positive outcomes in Ghana after the country introduced exception policy making delivery care free. In this respect, 18 months after user fees were abolished in Ghana, the greatest increase in health facility use was by the poorest segment of the population.<sup>15</sup> Analysis of data from 269 sites in 20 PMTCT programs and 15 sub-Saharan countries from 2002 to 2005 showed two important factors that can increase PMTCT coverage – higher knowledge about PMTCT and higher Government investment on health.<sup>16</sup>

In order to address the maternal health disparities across income through integrated service delivery, other potential areas to be considered are: introducing routine HIV testing for women and their partners (*e.g.*, through provider initiated testing and counselling - PICT); supporting alternate models of care delivery (such as shifting basic tasks from physicians to nurses); and providing incentives for service providers as well as clients (*e.g.*, incentive for health workers for agreeing to relocate to rural areas if necessary; or outreach pregnant women in neighboring villages; and reimbursing pregnant women for the cost of transportation to the clinic).<sup>6</sup>

## Conclusions

The goal of the Global Plan was to move towards eliminating new HIV infections among children by 2015 and keeping their mothers alive.<sup>2</sup> The plan focused on reaching pregnant women living with HIV and their children, from the time of pregnancy until the mother stops breastfeeding. The Global Fast-Track Commitments to end AIDS by 2030 also aims to eliminate HIV infections among children by 2020.<sup>3</sup> In this regards, one of the principles for reaching these goals is leveraging synergies, linkages and integration for improved sustainability, *i.e.*, national plans leverage opportunities to strengthen synergies with existing programmes for HIV, maternal health, new-borns and child health, family planning, orphans and vulnerable children, and treatment literacy. This integration must fit the national and community contexts. PMTCT is more than the simple administration of ARVs; and the full set of its intervention components should be implemented as an integral component of essential maternal, neonatal and child health services.<sup>5</sup> On the other hand, funding is critical, there is never enough money for global health; never enough for any one intervention; and this creates a double rationale for support.

While the HIV/AIDS and maternal health challenges in Sub-Saharan Africa are immense, the gains (especially over that last decade) are also promising. In these regards, achieving the Global Plan target and Global Fast-Track Commitments of eliminating new HIV infections among children and keeping their mothers alive would definitely require strategic approaches by building on existing health-care delivery systems/structures and specifically integrating the service deliveries with other maternal and child health services; and with deliberate effort to reach women who are most disadvantaged.

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