Assessing the Prevention of Mother-to-Child Transmission of HIV in Mozambique

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Abstract

Background: Prevention of mother-to-child transmission (PMTCT) of HIV is essential for controlling the HIV/AIDs epidemic in poor, resource-limited countries. Women in Mozambique disproportionately experience health inequalities, which impacts HIV transmission to children. Access to antenatal care (ANC), HIV testing, and antiretroviral therapy (ART) are critical for positive health outcomes among women and children. **Methods:** Mozambique's Population-based HIV Impact Assessment (PHIA) from 2021 was utilized to perform descriptive statistics among 2,065 mother-infant pairs. The primary focus of this analysis was to identify the target indicators for the elimination of MTCT (EMTCT) of HIV. **Results:** Among the population of women who gave birth to their last child, 92% attended ANC, 73.5% knew their HIV status, and 94.3% of HIV-positive women received ART. Among the population of infants born, 23.% knew their HIV status, of whom 0.4% were HIV-positive. **Conclusion:** Observed gaps in care or "leaks" in the PMTCT cascade highlight weaknesses in the country's HIV response. Findings indicate that further research is needed to explore contextual factors associated with the prevention of HIV and the significance of association.

Introduction

Approximately 65% of the global population living with HIV reside in Sub-Saharan Africa (SSA). Mozambique accounts for 9% of people living with HIV in SSA, of whom 62.5% were women (aged 15 and older) (UNAIDS, 2023). Without ART, "approximately 15-30% of infants born to HIV-positive women will acquire HIV during gestation and delivery, with a further 5-15% of infants acquiring HIV through breastfeeding" (WHO, 2022). PMTCT programs are essential to the prevention of pediatric HIV infection, and health outcomes among women and children. Women face socio-ecological inequalities (e.g. poverty, harmful gender norms, sexual violence, stigma and discrimination) that make risk reduction efforts challenging. Recent disruptions in HIV care during the COVID-19 pandemic highlighted the importance of strengthening health care services.

Despite recent progress toward reducing the national HIV/AIDS health burden, the identification of children living with HIV continues to lag farther behind (PEPFAR, 2023). Utilization of ANC during pregnancy serves as a critical point of entry to comprehensive health services which include HIV testing, treatment and supportive care. Target goals to achieve the EMTCT of HIV include: 95% of pregnant women attend ANC (at least one), 95% of pregnant women tested for HIV, and 95% of HIV-positive pregnant women initiate ART. (WHO, 2022). Monitoring progress is an integral function of tracking HIV infections; addressing barriers that intersect with the utilization of ANC, HIV testing, and ART usage; and providing evidence for cost-effective prevention strategies and ethically guided responses.

Aim

The primary purpose of this study was to examine the 95-95-95 elimination targets of HIV among women (aged 15-49 years) who had given birth to their last infant. Infant HIV status was examined to gain insight into the overall effectiveness of PMTCT efforts in Mozambique.

Methodology

Mozambique's Population-based HIV Impact Assessment (PHIA) from 2021 was conducted as a nationally representative, multi-stage household-based survey to measure the impact of the country's HIV response. Eligibility criteria included individuals aged 15 and older with informed consent. Home-based HIV testing, counseling, and referral to care was provided by trained staff during the survey. Additional consent was required to collect blood samples for laboratory-based quality control testing. Those who provided consent for lab testing had associated biomarker data. Among the adult population surveyed, 13.1% were women who gave birth to their last child during the three years prior to survey. Women who were older than 49, reported giving birth prior to January 1, 2018, or reported no live births were not included in this study. The primary outcome measure assessed was infant HIV status. The population of women were assessed by three key variables: ANC visit (at least one), HIV status during pregnancy, and ART coverage during pregnancy and characterized by age, education, marital, wealth quintile, and residence during their pregnancy. The Population of infants were assessed by their HIV status and characterized by maternal behaviors: ANC visit, HIV status, ART coverage, breastfeeding status, viral load suppression, and early infant testing. Missing values for known ART coverage, viral load suppression, early infant testing, and infant HIV status were included to capture the frequency of mothers without a known status. After exclusion of missing values, the sample size of mother-infant pairs were 2,065.

Results

ANC coverage- first 95 target: Among the population of mothers 92% (n = 1898) attended ANC. Of whom, the greatest proportion of women were those aged 20-24 (30.1%), attained primary education (48.3%), were married or living together (76.9%), were in the Q4 wealth quintile (24.9%), and were from a rural residence (61.6%). Conversely, the lowest proportion of women were those aged 45-49 (1.2%), attained more than secondary education (2.8%), were widowed (1.5%), were in the Q1 wealth quintile (15.8%), and were from an urban residence (38.4%)

	Attended ANC N = 1898 or 92.0%		Did Not Attended ANC N = 167 or 8.0%	
Characteristics	n	%	n	%
Age Group (years)				
15-19	225	11.9	15	9.0
20-24	571	30.1	40	24.0
25-29	466	24.6	52	31.0
30-34	343	18.0	30	18.0
35-39	192	10.1	18	11.0
40-44	78	4.1	9	5.3
45-49	23	1.2	3	1.7
Education				
No education	348	18.3	85	51.0
Primary education	917	48.3	63	37.7
Secondary education	580	30.6	19	11.3
More than secondary	53	2.8	0	0.0
Marital Status				
Never married	179	9.43	17	10.2
Married or living together	1460	76.9	126	75.4
Divorced or separated	239	12.1	24	14.4
Widowed	29	1.5	0	0.0
Wealth Quintile				
Q1 (poorest)	299	15.8	49	29.3
Q2	350	18.4	49	29.3
Q3	352	18.6	40	24.0
Q4	473	24.9	24	14.4
Q5 (richest)	424	22.3	5	3.0
Residence				
Rural	1168	61.6	135	81.0
Urban	730	38.4	32	19.0

HIV testing coverage- second 95 target: Among the population of mothers 73.5% (n = 1518) knew their HIV status, of whom 8.1% already knew they were HIV-positive before pregnancy, 3.6% tested positive during pregnancy, and 88.3% tested negative during pregnancy. The greatest proportion of women with a known HIV status were those aged 20-24 (28.9%), had attained primary education (46.6%), were married or living together (77%), were in the Q4 wealth quintile (26.9%), and were from a rural residence (58.6%). Conversely, the lowest proportion of women with a known HIV status were those aged 45-49 (1.1%), attained more than secondary education (3.1%), were widowed (1.4%), were in the Q1 wealth quintile (14%), and were from an urban residence (41.4%).

Results (cont.)

	Tested for HIV During ANC						Total Known HIV Status	Total Unknown HIV Status
	Knew HIV Positive Before Pregnancy		Tested Positive During Pregnancy		Tested Negative During Pregnancy			
	(n = 123 or 8.1%)		(n = 54 or 3.6%)		(n = 1341 or 88.3%)		N= 1518 or 73.5%	N= 547 or 26.5%
Characteristics	n	%	n	%	n	%	%	n
Age Group (years)								
15-19	3	2.4	0	0.0	162	12.1	10.8	75
20-24	20	16.3	15	27.7	403	30.0	28.9	173
25-29	32	26.0	11	20.4	347	25.9	25.7	128
30-34	34	28.0	12	22.2	242	18.0	19.0	85
35-39	25	20.0	13	24.1	123	9.2	10.6	49
40-44	9	7.3	2	3.7	48	3.6	3.9	28
45-49	0	0.0	1	1.9	16	1.2	1.1	9
Education								
No education	22	17.9	12	22.2	227	16.9	17.2	172
Primary education	58	47.2	27	50.0	622	46.4	46.6	273
Secondary education	42	34.1	15	27.8	446	33.3	33.1	96
More than secondary	1	0.8	0	0.0	46	3.4	3.1	6
Marital Status								
Never married	6	4.9	1	1.9	137	10.2	9.5	52
Married or living together	87	70.7	42	77.7	1039	77.5	77.0	418
Divorced or separated	23	18.7	7	13.0	154	11.5	12.1	70
Widowed	7	5.7	4	7.4	11	0.8	1.4	7
Wealth Quintile								
Q1 (poorest)	13	10.7	6	11.1	194	14.5	14.0	135
Q2	14	11.4	3	5.6	220	16.4	15.6	162
Q3	21	17.0	14	25.9	252	18.8	18.9	105
Q4	37	30.0	16	29.6	355	26.5	26.9	89
Q5 (richest)	38	30.9	15	27.8	320	23.8	24.6	56
Residence								
Rural	66	53.7	30	55.6	794	59.2	58.6	413
Urban	57	46.3	24	44.4	547	40.8	41.4	134

ART coverage- third 95 target: Among the population of HIV-positive mothers,94.3% (n = 167) received ART, of whom 67.7% were already on ART at their first ANC visit and 32.3% were newly initiated during pregnancy. The greatest proportion of HIV-positive women receiving ART were those aged 30-34 (25.%), had attained primary education (48.5%), were married or living together (73.1%), were in the Q4 wealth quintile (31.1%), and were from a rural residence (54.5%). Conversely, the lowest proportion of HIV-positive women receiving ART were those aged 45-49 (0.6%), attained more than secondary education (0.6%), were never married (4.2%), were in the Q1 wealth quintile (9%), and were from an urban residence (45.5%).

	Already on ART at First ANC Visit		Newly Initiated on ART During Pregnancy		Total Received ART	Total Without ART
	(n = 113 or 67.7%)		(n = 54 or 32.3%)		N = 167 or 94.3%	N = 1898 or 91.9%
Characteristics	n	%	n	%	%	n	%
Age Group (years)							
15-19	3	2.7	0	0.0	2.3	237	12.5
20-24	18	15.9	15	27.8	19.8	578	30.5
25-29	30	26.5	10	18.4	23.9	478	25.2
30-34	29	25.7	13	24.1	25.0	331	17.4
35-39	24	21.2	13	24.1	22.0	173	9.1
40-44	9	8.0	2	3.7	6.4	76	4.0
45-49	0	0.0	1	1.9	0.6	25	1.3
Education							
No education	17	15.0	13	24.1	18.0	403	21.2
Primary education	54	47.8	27	50.0	48.5	899	47.4
Secondary education	41	36.3	14	25.9	32.9	544	28.7
More than secondary	1	0.9	0	0.0	0.6	52	2.7
Marital Status							
Never married	6	5.3	1	1.9	4.2	189	9.9
Married or living together	79	69.9	43	79.6	73.1	1464	77.1
Divorced or separated	21	18.6	7	1.4	16.8	226	12.0
Widowed	7	6.2	3	5.6	5.9	19	1.0
Wealth							
Q1 (poorest)	10	8.8	5	9.25	9.0	333	17.5
Q2	13	11.5	3	5.6	9.6	383	20.2
Q3	18	15.9	15	27.8	19.8	359	18.9
Q4	36	31.9	16	29.6	31.1	445	23.4
Q5 (richest)	36	31.9	15	27.8	30.5	378	20.0
Residence							
Rural	60	53.1	31	57.4	54.5	1212	63.9
Urban	53	46.9	23	42.6	45.5	686	36.1

Infant HIV status- Outcome Target. Among the population of infants born, 0.4% (n = 9) were HIV positive and 22.7% (n = 468) were HIV negative.

	HIV Positive N = 9 or 0.4%		HIV Negative N = 468 or 22.7%		Unknown Status N = 1588 or 76.9%	
Maternal Characteristics	n	%	n	%	n	%
Attended ANC						
Yes	9	100.0	462	98.7	1427	89.9
No	0	0.0	6	1.3	161	10.1
HIV Status						
Already knew HIV positive before pregnancy	2	22.2	105	22.4	16	1.0
Tested HIV positive during pregnancy	7	77.8	20	8.6	7	0.4
Tested HIV negative during pregnancy	0	0.0	293	62.6	1069	68.0
Results not known or not tested	0	0.0	30	6.4	517	32.6
Received ART						
Already taking ART at first ANC	2	22.2	100	21.4	11	0.7
Newly initiated on ART during pregnancy	5	55.6	41	8.7	8	0.5
No ART received	2	22.2	327	69.9	1569	98.8
Breastfeeding Status						
Never breastfed	1	11.1	8	1.7	18	1.1
Ever breastfed, but not currently	1	11.1	263	54.1	602	37.9
Currently breastfeeding	7	77.8	207	44.2	968	61.0
Viral Load Suppression *						
Suppressed	6	66.7	130	27.8	32	2.0
Not Suppressed	2	22.2	22	4.7	34	2.1
Results not determined	1	11.1	214	45.7	1365	79.7
Not tested ^	(0)	(0.0)	(102)	(21.8)	(267)	(16.2)
Early Infant Testing						
HIV test done within 2 months	4	44.5	235	50.2	5	0.3
HIV test done between 2 and 11 months	4	44.5	108	23.1	2	0.1
HIV test done more than 12 months	1	11.0	99	21.1	1	0.1
Had an HIV test, but date or test is unknown	0	0.0	26	5.6	2	0.1
Did not have an HIV test	0	0.0	0	0.0	1569	98.7
Unknown Posted	0	0.0	0	0.0	180	9.7

* Time frame on achieved viral suppression correlated to intrauterine or postpartum characteristics not indicated.
^ Data for infant HIV status associated with non-consent for maternal HIV virological testing.

Discussion

Health disparities are exacerbated by low-income status, sociocultural characteristics, inadequate health infrastructure, lack of trained health providers. This study found that Mozambique's EMTCT target indicators were approximately 92-74-94, with 0.4% of infants HIV positive. A prior study reported that "75% of women to not fully utilize maternity health services during at least one ANC" (Reis-Muleva, Duarte, Silva, Gouveia, & Borges, 2021). Another study indicated "only 15.3% of women made their first ANC visit within the first trimester, 60.1% had an adequate number of ANC visits, and 75.4% took an HIV test during pregnant" (Yaya, Oladimeji, Oladimeji, & Bishwajit, 2019). The data highlights important gaps in care or "leaks" in the PMTCT cascade. Additionally, only 23.1% of infants had a known HIV status, of whom 0.4% were HIV positive. PEPFAR (2023) reported that the national vertical transmission rate was estimated at 10% in 2022. The complex, multifaceted interactions of maternal health behaviors and existing social inequalities warrants further, in-depth research to improve access and retention in care for women and children.

Conclusions

Non-responses to the survey or non-consent to blood testing associated with HIV status may potentially skew data. The PHIA was designed to measure achievements and to identify unmet needs in the population. However, the data in this study does not provide for analysis of factors such as timing of first ANC or HIV test, ART adherence, or when the mother achieved viral suppression that impacts infant HIV outcomes. Overall, the findings in this study indicate further research is needed to explore contextual factors associated with the PMTCT of HIV and the significance of association. Improving access to HIV care and retention in care for long-term treatment is critical for maternal and child health outcomes.

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Laura Iannopollo has no financial disclosures that would be a potential conflict of interest with this presentation.