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The need for further integration of services to prevent mother-to-child transmission of HIV and syphilis in Mwanza City, Tanzania

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Abstract

Objective: To assess the operational integration of maternal HIV testing and syphilis screening in Mwanza, Tanzania. Methods: Interviews were conducted with 76 health workers (HW) from three antenatal clinics (ANC) and three maternity wards in 2008–2009 and 1137 consecutive women admitted for delivery. Nine ANC health education sessions and client flow observations were observed. Results: Only 25.0% of HWs reported they had received training in both prevention of mother-to-child transmission (PMTCT) and syphilis screening. HIV and syphilis tests were sometimes performed in different rooms and results recorded in separate registers with different formats and the results were not always given by the same person. At delivery, most women had been tested for both HIV (79.4%) and syphilis (88.1%) during pregnancy. Of those not tested antenatally for each infection, 70.1% were tested for HIV at delivery but none for syphilis. Conclusion: Integration of maternal HIV and syphilis screening was limited. Integrated care guidelines and related health worker training should address this gap.

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1. Background

Maternal HIV and syphilis infections are important public health problems. The WHO has called for the global elimination of mother-to-child transmission (MTCT) of both HIV and syphilis [1,2], which would help improve a broad range of maternal and child health outcomes. Interventions for the prevention of MTCT (PMTCT) of HIV include comprehensive antenatal and postnatal reproductive and child health services, HIV counseling and testing, provision of antiretroviral therapy, optimal obstetric care, and safer infant feeding practices [3,4]. Interventions for the prevention of congenital syphilis include screening of pregnant women and providing infected women, and their sexual partners, curative treatment with benzathine penicillin [5] along with prevention services.

Despite syphilis screening of pregnant women being a recommended policy in many low-resource countries [6], in reality, infants of HIV-infected mothers who receive antiretroviral therapy prophylaxis and successfully complete steps along the PMTCT cascade may still die from congenital syphilis due to lack of maternal syphilis services [6]. A 2013 global analysis of antenatal surveillance data estimated that, in Africa, annually, more than 535 000 women with active syphilis become pregnant [7]. Untreated syphilis in pregnancy is associated with adverse clinical outcomes for the infant, including stillbirth, fetal and neonatal death, prematurity, and low-birth weight. Further, over 50% of pregnant women with untreated syphilis experience adverse pregnancy outcomes [7–9].

Antenatal care (ANC) services are the entry point for PMTCT of HIV services through HIV counseling and testing of pregnant women. Additionally, WHO recommends the integration of PMTCT services with maternal and child health services [10,11]. The introduction of PMTCT in ANC offers an excellent opportunity to leverage the investment in HIV prevention services to strengthen other maternal health interventions, such as syphilis screening and treatment, family planning, and malaria prevention, and can lead to high uptake of these services. A study conducted in Zambia documented an increase in maternal syphilis screening from 62.5% to 80.8% following introduction of PMTCT services in ANC [12,13].

PMTCT of HIV and maternal syphilis services are potentially suited for integration since they target the same population (pregnant women). Further, the interventions necessary to diagnose HIV and syphilis in pregnancy (testing, ideally at first pregnancy visit) are similar.
and can be performed onsite in ANC clinics with limited equipment. The integration of PMTCT of HIV services with maternal syphilis screening services is cost-efficient, saving providers’ and clients’ time [14]. Thus, the integration of services has the potential to increase uptake of each individual intervention and to lead to improved maternal and reproductive health [6,11].

In Tanzania, HIV testing is recommended for pregnant women with an unknown HIV status when admitted for delivery and HIV-positive women are administered antiretroviral prophylaxis antenatally [4]. Similarly, maternal syphilis screening is national policy in Tanzania [5], recommending that women who missed a syphilis screening test during ANC are tested at delivery so that early treatment can be given to the infant and mother, as appropriate. Further, there is no policy for integration of PMTCT of HIV and maternal syphilis screening services. As part of a larger operational research study on PMTCT of HIV and maternal syphilis screening implementation, the present article reports the extent of integration of the two programs at the facility level in Tanzania.

2. Materials and methods

The present study was conducted at three reproductive and child health clinics, Nyamagana District Hospital (NDH), Makongoro Regional Reproductive and Child Health Clinic, and Igoma Health Center; and three maternity wards, Bugando Medical Center (BMC), Sekou-Toure Regional Hospital (STRH), and NDH—all located in Mwanza City, Tanzania. All study ANC facilities offered maternal services for PMTCT of HIV and syphilis daily.

The data were gathered from four research activities:

(1) A structured questionnaire was administered to 28 health workers (HWs) at the ANC facilities and 61 HWs at the maternity wards between September 2008 and July 2009. Information collected included their key work activities and training on PMTCT of HIV and syphilis management.

(2) A structured observation was undertaken assessing the flow of activities at the facility when women attended their first ANC visit during a new pregnancy. Two client flow observations were conducted at each ANC clinic, one during a day when the clinics were offering vaccination services to children (a very busy day) and one during a day when they were not (a less busy day). For each observation, the movements of one randomly selected woman attending her booking visit at the clinic in the morning were followed. The observation was used to determine the services that were offered to the women, the time spent at each station accessing different services, and the overall time spent in the ANC facility for that visit.

(3) To understand the content and delivery of the health education talk that is routinely offered to pregnant women at their ANC visits, three health education sessions were observed at each ANC facility. A tool adapted from the 2007 UNAIDS tools for evaluating quality and contents of counseling for HIV testing uptake [15] was used to document points covered during the health education talks and to assess the quality and content of the information that was provided.

(4) Finally, a cross-sectional study of all pregnant women who were admitted for delivery in the maternity wards at BMC and STRH

Table 1

<table>
<thead>
<tr>
<th>Facility type and name</th>
<th>ANC Makongoro</th>
<th>NDH</th>
<th>Igoma</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of staff interviewed</td>
<td>6</td>
<td>3</td>
<td>6</td>
<td>15</td>
</tr>
<tr>
<td>Percentage trained in</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIV testing</td>
<td>66.7</td>
<td>33.3</td>
<td>50.0</td>
<td>53.3</td>
</tr>
<tr>
<td>VCT for PMTCT</td>
<td>50.0</td>
<td>33.3</td>
<td>16.7</td>
<td>33.3</td>
</tr>
<tr>
<td>Provision of ARV for PMTCT</td>
<td>50.0</td>
<td>33.3</td>
<td>16.7</td>
<td>33.3</td>
</tr>
<tr>
<td>Infant feeding counseling</td>
<td>33.3</td>
<td>33.3</td>
<td>33.3</td>
<td>33.3</td>
</tr>
<tr>
<td>Optimal obstetric care</td>
<td>33.3</td>
<td>33.3</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>PMTCT record keeping</td>
<td>50.0</td>
<td>33.3</td>
<td>16.7</td>
<td>33.3</td>
</tr>
<tr>
<td>PMTCT guidelines (2007)</td>
<td>50.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Any of the PMTCT subjects above</td>
<td>100.0</td>
<td>66.7</td>
<td>83.3</td>
<td>86.7</td>
</tr>
<tr>
<td>Syphilis testing</td>
<td>33.3</td>
<td>33.3</td>
<td>66.7</td>
<td>46.7</td>
</tr>
<tr>
<td>Both syphilis testing and any of the PMTCT subject above</td>
<td>33.3</td>
<td>33.3</td>
<td>66.7</td>
<td>46.7</td>
</tr>
</tbody>
</table>

Abbreviations: ANC, antenatal care; ARV, antiretroviral; BMC, Bugando Medical Center; NDH, Nyamagana District Hospital; PMTCT, prevention of mother-to-child transmission; STRH, Sekou-Toure Regional Hospital; VCT, voluntary counseling and testing.

Table 2

<table>
<thead>
<tr>
<th>Day 1a</th>
<th>Day 2b</th>
<th>Day 1c</th>
<th>Day 2c</th>
<th>Day 1d</th>
<th>Day 2d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total time spent at the facility (min)</td>
<td>335</td>
<td>275</td>
<td>280</td>
<td>178</td>
<td>255</td>
</tr>
<tr>
<td>Waiting time before receiving any service (min)</td>
<td>180</td>
<td>135</td>
<td>20</td>
<td>30</td>
<td>45</td>
</tr>
<tr>
<td>Total waiting time from one stationc to another (min)</td>
<td>105</td>
<td>75</td>
<td>187</td>
<td>80</td>
<td>145</td>
</tr>
<tr>
<td>Range of waiting times between stations (min)</td>
<td>5–50</td>
<td>5–50</td>
<td>7–60</td>
<td>6–30</td>
<td>5–60</td>
</tr>
<tr>
<td>Total time spent accessing services at different stations (min)</td>
<td>50</td>
<td>65</td>
<td>73</td>
<td>68</td>
<td>65</td>
</tr>
<tr>
<td>Total distance covered within the clinic (km)</td>
<td>0.10</td>
<td>0.35</td>
<td>0.30</td>
<td>0.05</td>
<td>0.00</td>
</tr>
<tr>
<td>Total number of stations</td>
<td>5</td>
<td>6</td>
<td>6</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

aEach column represents data on one woman.

bBusy day.

cLess busy day.

dRefer to Figs. 1–3 for the different stations visited by the woman at each visit.
Overall, 25.0% of HWs, working at either facility type, reported receiving facility (15/76; 19.7%) or in a maternity ward (61/76; 80.3%) (Table 1).

3.1. Health worker interviews

This analysis was restricted to HWs who reported working in an ANC facility (15/76; 19.7%) or in a maternity ward (61/76; 80.3%) (Table 1). Overall, 25.0% of HWs, working at either facility type, reported receiving training in both PMTCT of HIV and maternal syphilis screening (Table 1). There were differences by type of facility, with HWs in the ANC clinics more likely to report receiving training in both PMTCT of HIV and maternal syphilis screening than those in the maternity ward (46.7% vs 19.7%; P = 0.03). The proportion of HWs reporting training in PMTCT of HIV was similar among HWs working at ANC facilities or in maternity wards (86.7% vs 75.4%; P = 0.50). However, a somewhat higher proportion of HWs reported receiving training in syphilis testing in ANC facilities than in maternity wards (46.7% vs 24.6%; P = 0.07). Further, the proportion receiving training in both PMTCT of HIV and maternal syphilis screening differed between the maternity wards (39.1% (BMC) vs 9.1% (STRH) vs 0% (NDH); P = 0.02; Table 1).


differential attention of HWs reported receiving training in syphilis testing in ANC facilities than in maternity wards (46.7% vs 24.6%; P = 0.07). Further, the proportion receiving training in both PMTCT of HIV and maternal syphilis screening differed between the maternity wards (39.1% (BMC) vs 9.1% (STRH) vs 0% (NDH); P = 0.02; Table 1).

3.2. Client flow observation

On average, women attending ANC for the first time during their current pregnancy spent 3 hours and 35 minutes at the clinic. Much of this time was spent waiting after arrival before being able to access any services (ranging from 20 minutes in larger clinics to 3 hours at district hospitals). Following initial contact with the HW, total waiting time was longer on the busy days than the less busy days at the NDH and Makongoro clinics. At Igoma, the difference between busy and less busy days was 9 minutes (Table 2). In all three ANC facilities, the time a client waited for the services ranged from 42 minutes to almost 4 hours (235 minutes). At NDH, much of the waiting time was due to a long delay before receiving any services, but even excluding this initial waiting time, on average, women spent 10 — 114 minutes more time waiting between stations than actually receiving services (Box 1 and Fig. 1).

The extent to which activities were integrated in the study clinics varied by clinic (Table 3) and affected the time women spent in the health facilities (Boxes 1–3 and Figs. 1–3). Of the three ANCs observed, only NDH consistently integrated syphilis and HIV testing and management at some of the steps of the service visit. Further, the time women spent accessing the services (excluding the waiting times) was less at NDH compared with the other two facilities. The Igoma ANC facility integrated the different steps inconsistently, depending upon staff availability (Table 3). At Makongoro, the largest ANC facility, blood was tested in different rooms for the two infections and, in cases of a positive result, HIV and syphilis screening results and treatment were provided by different people in various areas of the clinic.

Generally, the total distance covered while accessing various services at all the clinics was short (Table 2). However, at Makongoro, the distance was relatively longer since vaccination services were offered outside the main ANC building (Fig. 2).
## 3.3. Health education sessions and general clinic observations

Little, if any, integration of HIV and syphilis information occurred at the health education sessions that women received at their booking visit. In two facilities, there were two separate sessions, one general education session including syphilis screening and one HIV education session.

**Box 2**

Case Study 3: Client movement first observation at Makongoro antenatal clinic.

Mwasi arrived at the ANC on a Monday morning at 08:10 am for a first visit during that pregnancy. The general health education stared at 08:30 am and lasted 23 minutes. After this talk, Mwasi waited 30 minutes before being called to the registration table, where she was given an ANC card, was interviewed, and had her details documented on the card. After registration, Mwasi was sent to the examination room. Both registration and examination took 7 minutes. Mwasi was then sent to the laboratory waiting area, where she waited for 40 minutes before a blood sample was taken (5-minute process). From the laboratory, she went directly to the PMTCT room for a group counseling session on HIV. Mwasi sat in the room for 1 hour waiting for the 25 minute session to start at 11:15 am. Mwasi continued to wait in the PMTCT waiting area for an additional 50 minutes before being called into the PMTCT room to receive her results and individual HIV post-test counseling (10 minutes), after which Mwasi went to the vaccination room located outside the main building, where she waited for 7 minutes. The tetanus toxoid vaccination took 2 minutes and Mwasi left the ANC facility at 12:50 pm. In total, Mwasi spent 4 hours and 40 minutes at the clinic, including 3 hours and 27 minutes (74%) waiting for services and 1 hour and 13 minutes (26%) receiving these.

**Box 3**

Case Study 5: Client movement first observation at Igoma antenatal clinic.

Nyanjige arrived at the ANC clinic at 09:30 am for a first visit during that pregnancy. The general health education started at 10:15 am and lasted 15 minutes. After this, Nyanjige waited 60 minutes before being called to the registration table where she was given an ANC card, interviewed, and had her details documented on the card. Immediately after registration (11:35 am), Nyanjige entered the examination room and received a full examination, as well as the tetanus toxoid vaccination. The process took 15 minutes. Nyanjige exited the examination room at 11:50 am, and was instructed to gather with other women waiting for the ANC HIV education session. Her ANC card was taken to the laboratory. The ANC HIV education session started at 11:55 am and took 20 minutes. Nyanjige waited until 13:00 pm, then entered the laboratory at 13:03 am. After 30 minutes, Nyanjige was called back to receive her HIV results, post-test counseling, and syphilis results. She completed this session at 13:40 pm. Overall, Nyanjige was at the clinic for 4 hours and 5 minutes, including 3 hours and 10 minutes (75%) waiting for services and 1 hour and 5 minutes (25%) receiving these.
and treatment services was recorded in simple, handwritten register books, and was recorded differently at each facility; for example, information on partner treatment was only recorded at the Makongoro clinic. Additionally, linking of individuals tested for HIV in PMTCT services with those who underwent syphilis screening and treatment was not possible through the register books because the identification numbering system for PMTCT registers was different from that used in other ANC records.

3.4. Cross-sectional study in the maternity wards

Overall, 1137 of the 1435 (79.2%) pregnant women admitted for delivery at BMC and STRH were interviewed and their ANC cards were reviewed. In total, 903 (79.4%) and 1002 (88.1%) women had been tested for HIV and syphilis, respectively, during pregnancy. Of the 234 women who had not been tested for HIV antenatally, 164 (70.1%) were tested for HIV in the maternity ward before or after delivery. On the contrary, none of the 135 women who had not been screened for syphilis antenatally were offered syphilis screening at delivery (Table 4).

4. Discussion

Despite clinics having few staff trained in PMTCT of HIV and syphilis screening, there was some evidence of integration at some steps of the two prevention cascades in the smaller ANC facilities. However, scale-up to larger clinics and maternity wards will require joint policy
guidelines and training of staff alongside a relatively minor reorganization of services within the facilities.

At the policy level, integration of PMTCT of HIV and syphilis screening may be achieved through policies formulated to guide the delivery of services, such as policies and guidelines on how to provide both maternal syphilis screening and HIV testing and treatment services in the ANC facility or maternity ward settings. At the health facility level, integration may take various forms and may require training of HWs in both syphilis and HIV counseling, testing, and treatment; thus, both services could be delivered using a “supermarket approach,” whereby services are offered by the same provider in the same unit or in different units but within the same building [16].

The levels of integration of PMTCT of HIV and syphilis services were examined at the ANC facility and maternity ward level. Considering the definition of integration of services at facility level [16,17], although both PMTCT of HIV and syphilis services were available and offered at the ANC facilities, there was evidence of missed opportunities for integration within these facilities.

Women attending ANC at the observed facilities spent several hours waiting for services. A number of steps were noted where integrating HIV and syphilis services could help to reduce the time spent at the facilities. For example, PMTCT health education and ANC general education, including syphilis, could be provided as one session by one HW. One blood sample could be collected, with rapid point-of-care testing performed by the same HW. Issuing results, counseling, and documentation could be carried out by the same HWs without extra resources.

True service integration is missing at the policy level. In Tanzania, both PMTCT of HIV and maternal syphilis screening and treatment services are documented policies [4,5]. However, the absence of integrated guidelines and protocols may facilitate vertical systems and hinder the successful implementation of integration of these services. At the service delivery level, although opportunities existed to integrate PMTCT of HIV and maternal syphilis screening and provide swifter, more efficient services, these were seldom taken. Relatively few staff had received training in the provision of both services. In data reporting, records were not integrated and priority was given to collection of PMTCT data. At delivery, priority was given to HIV testing for women who had not been tested antenatally, despite policies recommending both HIV and syphilis testing at delivery for such women. The reasons for this remain unclear, but may be related to the absence of HW training in the importance of testing for both HIV and syphilis, a lack of understanding of the guidelines, or logistic issues such as shortage of testing kits and reagents.

Availability of trained and motivated HWs remains crucial for service integration. The present study found that a very small proportion of HWs in maternity wards (12.5%) and around half of those working in ANC facilities (46.7%) reported receiving some training in syphilis screening and PMTCT. Adequacy of trained staff has been documented as an obstacle for integrated services [12,16,18]. For the successful integration of these two important reproductive and maternal health programs, training gaps must be addressed, ideally by the use of phased onsite training to avoid service delivery interruptions.

Although some aspects of integration of PMTCT of HIV and syphilis screening and treatment services were observed at the ANC level, implementation of maternal syphilis screening at the maternity wards in Mwanza city failed despite PMTCT of HIV services being frequently offered. The study did not explore the causes of these failures. However, future studies could help elucidate why pregnant women admitted to hospital for delivery and who were not screened for syphilis antenatally were not screened at admission.

The study has several limitations. First, only data from three ANC facilities and three maternity wards in one district in Tanzania were included, and may thus not be representative of rural clinics in other settings. The number of HWs whose training was assessed was small; therefore, the findings may not be applicable to all HWs providing services for pregnant women in Mwanza. Finally, only two visits for each of the ANC facilities were observed, although these days may not have provided a typical representation of services. Nevertheless, this study may provide insight into the delivery of HIV and syphilis services in other parts of Africa.

A previous study in Mwanza, Tanzania, published in 2002, showed that 51% of stillbirths and 24% of pre-term live births could be attributed to syphilis [19,20]. These adverse outcomes can be prevented with a single dose of penicillin given before 28 weeks of pregnancy [19], with this being one of the most cost-effective healthcare interventions available [21]. Screening of pregnant women for syphilis is national policy in most countries; yet, in 2001, it was estimated that less than 40% of pregnant women were screened for syphilis in Sub-Saharan Africa [22]. Since that time, point-of-care tests for syphilis, which can be performed anywhere and provide a result in 15 minutes, have been developed [6]. Moreover, considerable resources have been made available for the PMTCT of HIV in many African countries. Unfortunately, these have been usually provided through vertical programs, which have not been integrated with other maternal and child health activities, and have not included syphilis screening. We have previously drawn attention to the tragedy of infants in whom HIV infection was prevented through PMTCT programs in Haiti, only for them to die of congenital syphilis [23].

5. Conclusions

The present study highlights the importance of ensuring that syphilis and HIV screening are performed simultaneously on all pregnant women through an integrated program. Dual point-of-care tests for HIV and syphilis, which meet the WHO ASSURED criteria of being Affordable, Sensitive, Specific, User-friendly, Rapid and robust, Equipment free, and Deliverable to those who need them, are now available [24]. Replacement of individual HIV and syphilis tests with these dual tests has occurred in some countries in South America [25] and will facilitate the integration of programs for PMTCT of HIV and syphilis, ensuring that all women screened for HIV are also screened for syphilis.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

References


