Integration of TB-HIV services at an ANC facility in Frances Baard District, Northern Cape, South Africa

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Background: Integrated tuberculosis-human immunodeficiency virus (TB-HIV) service delivery as part of maternal health services, including antenatal care (ANC), is widely recommended. This study assessed the implementation of collaborative TB-HIV service delivery at a hospital-based ANC service unit.

Methods: A record review of a random sample of 308 pregnant women attending the ANC service between April 2011 and February 2012 was conducted. Data were extracted from registers and patient case notes. Outcomes included the proportion of women who underwent HIV counselling and testing (HCT), CD4 count testing, antiretroviral treatment (ART), cotrimoxazole preventive treatment (CPT), TB screening and isoniazid preventive treatment (IPT). Analysis measured variations in patient characteristics associated with service delivery.

Results: All women underwent HCT; 80% of those who tested HIV-positive were screened for TB. Most (85.9%) of the HIV-positive women received a CD4 count. However, only 12.9% of eligible women received ART prophylaxis onsite, only 35.7% were referred for initiation of ART, only 42.3% commenced IPT and none received CPT or further investigations for TB. HIV-negative women had 2.6 higher odds (95%CI 1.3–5.3) of receiving TB screening than their HIV-positive counterparts.

Conclusions: Although the identification of HIV-positive women and TB suspects was adequate, implementation of other TB-HIV collaborative activities was sub-optimal.

Tuberculosis (TB) is the primary cause of maternal mortality and morbidity among women in settings with high human immunodeficiency virus (HIV) prevalence.^{1,2} As HIV infection advances, the immune system weakens, increasing the individual's susceptibility to TB. HIV is the main driver of the TB epidemic among women.³ The proportion of women aged ≥ 15 years living with HIV has remained stable, at just below 50% of the global total. However, in sub-Saharan Africa, HIV prevalence is more than twice as high among young women than their male counterparts.⁴ Biological factors that contribute to women's particular vulnerability to HIV interact with social and political factors such as poverty and gendered power relationships to create an HIV risk profile among women.⁵ Prevention of TB among HIV-infected mothers should be a high priority for communities with significant TB-HIV burdens.⁶

Sub-Saharan Africa is the only region where more women than men are infected with HIV and dying of

the acquired immunodeficiency syndrome (AIDS).⁷ Females aged 15–24 years are in fact eight times more likely to contract HIV than men of the same age.⁸ Females also become HIV-positive on average 5–7 years earlier than males.⁹ HIV in South Africa disproportionately affects women, and has escalated the burden of TB among women, particularly those of reproductive age.^{3,10} The adverse impact of TB and HIV also extends beyond the women to their families, communities and the health care system.¹¹

In 2012, the World Health Organization (WHO) recommended including collaborative TB-HIV activities as part of maternal health services, including antenatal care (ANC).¹² In line with these recommendations, the South African National Strategic Plan for HIV, STI and TB 2012–2016 prescribe that all pregnant women should initially be offered HIV counselling and testing (HCT), and, if positive, undergo CD4 count measurement. HIV-infected pregnant women with a CD4 count < 350 cells/mm³ should immediately be referred for antiretroviral therapy (ART) initiation (ART initiation for the treatment of HIV/AIDS in the mother), while those with CD4 count > 350 cells/mm³ should immediately be started on ART prophylaxis onsite (ART prophylaxis for the prevention of HIV transmission from mother to child). Moreover, a simple TB symptom tool should be used to screen all HIV-infected pregnant women for TB. Those screening positive should be referred for further evaluation and treatment. Cotrimoxazole preventive therapy (CPT) should be initiated for opportunistic infection prophylaxis in HIV-positive pregnant women, and a 6-month course of isoniazid preventive therapy (IPT) should be initiated for HIV-positive women.

The implementation of these recommendations in South Africa has, however, been slow and threatens the country's progress towards Millennium Development Goals (MDGs) 5 and 6.¹³ South Africa is one of only 12 countries in the world where maternal mortality rates have actually increased since the MDG baselines were set.¹⁴ In the Northern Cape Province, ANC units have been adversely affected by the slow implementation of the policy. An assessment of the implementation of the National TB-HIV Integrated Services Programme revealed that only 75% of facilities providing ANC in the Frances Baard District offered routine TB screening to HIV-positive pregnant women in 2011.¹³ This rate was the lowest among all districts nationwide. While all of the facilities sampled provided TB diagnostic services, only 75% provided anti-tuberculosis treatment services, including CPT. Although

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KEY WORDS

HIV counselling and testing; CD4 count testing; antiretroviral treatment; cotrimoxazole preventive treatment; TB screening; isoniazid preventive treatment

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HIV-positive pregnant women received better services than the general HIV-positive population, the province still had the second worst anti-tuberculosis treatment service delivery among HIV-positive pregnant women countrywide. Furthermore, only 10% of all newly registered TB-HIV co-infected pregnant patients were started on prophylaxis for the prevention of mother-to-child transmission of HIV. However, data on the delivery of HCT, CD4 count testing and CPT were considered unreliable and were not reported. Integration of TB-HIV service delivery in the ANC context in South Africa appears insufficient.^{2,11,13} The status of the delivery of TB-HIV services in the ANC setting at the Frances Baard Hospital is not known.

The present study aimed to assess the extent of implementation of integrated TB-HIV service delivery at a hospital-based ANC service unit.

METHODS

Setting

The study was conducted at the ANC service unit at a day hospital in the Frances Baard District. With a population of 371 536, Frances Baard is the smallest of five districts in the Northern Cape Province.¹⁵ The district has high TB-HIV coinfection rates, as well as large distances between health facilities.¹⁶ According to the 2010 ANC survey, the Northern Cape had an HIV prevalence rate of 18.4%.³ The corresponding rate for Frances Baard District was 20.1%. The ANC unit studied serves as the first point of contact for pregnant women seeking primary health care (PHC) and ANC services.

Research design

A retrospective, cross-sectional record review was conducted among all pregnant women attending the ANC unit for the first time between 1 April 2011 and 29 February 2012.

Population and sample estimation

The study population included 526 pregnant women who visited the ANC unit for the first time between 1 April 2011 and 29 February 2012. Figure 1 shows the selection of cases/estimation of

FIGURE 1 Flow diagram of the selection of cases/estimation of sample size for women in the ANC. ANC = antenatal clinic; TB = tuberculosis; ART = antiretroviral therapy.

sample size. For inclusion in the sample, cases had to have at least two ANC clinic visits documented in the registers and/or case notes during this period. Where two or more types of services were not documented, cases were excluded. A total of 58 cases (11% of the total study population) did not satisfy the inclusion criteria and were excluded from further analysis. As these cases were not further analysed, it is not known how they compared with the cases included in the sample. The primary outcome variables were exposure to TB screening and/or HCT among pregnant women attending the ANC facility: the 'best guess' of expected percentage (proportion) for these outcomes was 80% (0.80), and the desired 95% confidence interval (CI) was 10% (±5%).

An assumption of 25% incomplete data was accepted; a surplus of 25% of cases therefore had to be included for quantitative data quality assurance. Thus, 308 cases needed to be randomly selected to satisfy this assumption and to obtain a 95%CI of ±5%.

Data collection

Routine data on HIV-TB service delivery were collected from the national ANC register (in use at the facility from April 2011) and, for purposes of verification, compared with the routine data as documented in the corresponding patient records and TB/HCT registers (kept at the ART and TB units of the day hospital) and case notes. A pre-formulated standard abstraction form was utilised. Data were extracted by two officials of the South Africa Medical Research Council (Cape Town, South Africa), who were blinded to the research question. They were both previously trained in data extraction, and had gained experience prior to the conduction of this study. Inter-rater reliability was assessed on a continuous basis by the principal investigator.

The main outcomes assessed were the proportion of eligible women who received 1) HCT (onsite), 2) CD4 measurement (onsite), 3) ART prophylaxis (onsite), 4) referral for ART initiation, 5) ART (offsite), 6) CPT (onsite), 7) TB screening (onsite), 8) IPT (onsite), 9) TB sputum testing (onsite), 10) TB culture testing (offsite) and 11) anti-tuberculosis treatment (offsite).

TB screening was performed using a simple four-part TB symptom screening tool. Patients were classified as TB suspects if they had one or more symptoms of cough, fever, night sweats or weight loss; and as non-TB suspects if none of these four symptoms were present. TB sputum testing was assessed on the basis of whether or not sputum had been collected for testing (onsite). TB culture was assessed on the basis of whether or not TB culture had been performed (offsite). Anti-tuberculosis treatment was assessed as anti-tuberculosis treatment initiated or not initiated (offsite).

All variables, except for ART initiation, TB culture testing and anti-tuberculosis treatment initiation were recorded onsite in the standardised national ANC register. ART initiation was recorded in the ART register of the Frances Baard primary health care facility, while TB culture and initiation of anti-tuberculosis treatment were recorded in the facility's TB register. All cases noted were available onsite for comparison, and the ANC, TB and ART clinic personnel had access to the case notes for documentation. Where referral for service delivery was indicated for patients, the case notes, ART and/or TB registers at the ART and TB clinics were assessed for corroboration.

*'Onsite' refers to the Frances Baard ANC unit while 'offsite' refers to either the ART and/or TB unit, both located on the same hospital premises/primary health care facility premises as such.

FIGURE 2 Flow diagram of provision of HIV-related services for women in the antenatal care clinic. HCT = HIV counselling and testing; CPT = cotrimoxazole preventive treatment; HIV = human immunodeficiency virus; ART = antiretroviral treatment.

Analysis

Frequency counts and percentages were calculated for each outcome variable (i.e., HCT received, CD4 counts done, referrals for ART initiation, initiation of HIV preventive treatment, TB screening performed, IPT initiation, CPT initiation, referrals for further TB diagnostic testing/confirmation, initiation of anti-tuberculosis treatment). Differences and associations between variables were also calculated by the non-parametric χ^2 test (bivariate analysis).

Ethics considerations and study approval

As the record reviews were conducted retrospectively, with no direct contact with the pregnant women, the ethics committees of the Northern Cape Department of Health and the Medical Research Council granted a waiver for individual consent. Anonymity was maintained, as the records were only reviewed by means of patient numbers.

RESULTS

Figures 2 and 3 provide a graphic illustration of the results. Documentation of HIV service delivery was adequate: all of the data on HCT, CD4 count and ART delivery were recorded in either the registers or the case notes or both. However, this was not the case with the documentation on TB service delivery, where only 23% of services/variables were recorded in the registers and only 93% in the corresponding case notes. Figures 2 and 3 show the proportions of pregnant women with HIV and/or TB who received the various types of integrated TB-HIV services during the study period.

Figure 2 indicates that all 308 pregnant women underwent HCT, of whom 23.1% (71/308) tested HIV-positive; 54.9% (39/71) were newly diagnosed HIV-positive. A total of 85.9% (61/71) of

FIGURE 3 Flow diagram of provision of TB-related services for women in the antenatal clinic. TB = tuberculosis; HIV = human immunodeficiency virus; IPT = isoniazid preventive treatment.

these eligible HIV-infected women also had a CD4 count. Of the 60.7% (37/61) of HIV-infected women with a CD4 count of >350 cells/mm³, six had not reached 14 weeks' gestational age at the time of the study and were ineligible for onsite ART; 83.7% (31/37) were thus eligible for ART prophylaxis, but only 12.9% (4/31) of these received it. Of the 39.3% (24/61) women with a CD4 count of <350 cells/mm³, 58.3% (14/24) were eligible for ART initiation; however, only 35.7% (5/14) were referred for ART initiation; 41.7% (10/24) had already started on ART treatment on a previous occasion. Whether these women were in fact started on ART or whether they were lost to follow-up could not be ascertained. None of the HIV-positive women (0/71) received CPT. χ^2 test revealed that HIV-positive women were almost three times less likely to be screened for TB than HIV-negative women (odds ratio [OR] 2.63, 95%CI 1.3–5.3).

As shown in Figure 3, 71.4% (220/308) of all women who entered the ANC service were screened for TB; of these, 13.6% (30/220) screened positive (all HIV-positive pregnant women), but none (0/30) of these were referred for further TB diagnostic testing and/or treatment initiation. In total, 42.3% (30/71) of all HIV-positive patients underwent TB screening; of these, 13.3% (4/30) screened positive for TB and therefore did not qualify for IPT initiation; however, IPT was wrongly started in all four of these cases. It is therefore not surprising that none of the pregnant women were recorded as having active TB. Furthermore, of the 8.7% (26/30) of HIV-positive pregnant women who screened negative for TB and qualified for IPT initiation, only 42.3% (11/26) received IPT. All 30 women who screened positive for TB (i.e., TB suspects) were also found to be HIV-positive.

DISCUSSION

This study aimed to assess the extent of implementation of integrated TB-HIV service delivery at an ANC service unit at a primary

health care facility in the Frances Baard District, Northern Cape, South Africa. In line with previous research in the country,² we found very good HIV testing practices among pregnant women in this setting. More than 50% of all identified HIV-positive cases were newly diagnosed, underscoring the importance of ANC services for identifying most-at-risk populations (MARPs), i.e., pregnant women.

TB screening practices, however, were not on par with those of HIV testing. For example, at 71.4%, almost 30% fewer women who underwent HIV testing were screened for TB. This appears to be a global problem, with more than half of global estimated female TB cases found to be undetected in 2012.¹⁷ Even more alarming was the fact that with less than half of all the HIV-positive patients receiving TB screening, HIV-positive women were almost three times less likely to be screened for TB than their HIV-negative counterparts. The reason for this is unclear, but is possibly related to underlying ethical and psychological issues, such as consent, confidentiality and fear.¹⁸ In a qualitative study conducted in Bangladesh, some pregnant women felt their TB screening results may not remain confidential, and were therefore more likely to refuse symptom screening.¹⁸ It was also found that some Malawian women did not want to undergo TB screening for fear of a possible positive outcome, as that would mean that they had to pay for transport to and from the facility for further testing and diagnosis, causing further economic burden upon their families; and second that they had to receive anti-tuberculosis treatment while breastfeeding and feared becoming more ill, or that the treatment would affect their unborn infants.¹⁸ Logistical constraints, such as unavailable symptom screening tools, or even a lack of awareness of the importance of TB screening among health care workers may also be an issue.¹⁹ The reasons why HIV-positive women were less likely to be screened for TB should be further investigated in other settings to determine the reasons for this selective practice.

Although the TB screening tool used among women in this setting did not differ from those used elsewhere, it was found to have lower sensitivity and specificity among pregnant women than in the general population.²⁰ It has been recommended that health care workers be made aware of the subtle signs of TB among pregnant women, and especially among those with HIV.²¹ It is therefore of the utmost importance that greater effort be made to identify possible TB suspects, especially among those with HIV coinfection.²¹ Furthermore, after the identification of HIV-positive pregnant women with suspected TB, integrated TB-HIV service delivery was found to be poor: none of the women who had signs and symptoms indicative of TB were referred for further TB investigation.

The underlying causes for this are not known, but may be related to inadequate coordination and referral systems at the ANC unit between the TB and the HIV/ART services, or due to the inability of patients to make multiple visits to the health care facility due to financial or other logistical constraints.²²

The poor delivery of HIV preventive treatment among pregnant women may have resulted in exposure of their babies to HIV, a risk factor for neonatal infection.²³ In addition, only a small proportion of eligible women received IPT, and a small proportion of patients were prescribed IPT inappropriately. Pregnant women with latent tuberculous infection are at increased risk of progression to active TB, which in turn increases their vulnerability to HIV and/or HIV and TB-related maternal and fatal complications. According to the literature, active, untreated TB during pregnancy contributes to perinatal female mortality, exposes their close con-

tacts to TB, can lead to in utero infection of the foetus/baby, and may eventually translate into foetal and newborn mortality.²⁴

According to Lester et al., inadequate experience, knowledge and clarity about the benefits of IPT and existing guidelines among health workers are important barriers to the delivery of IPT.²⁵ It is not known why IPT was mistakenly prescribed to women with active TB, but this may also be due to inadequate experience and/or knowledge about isoniazid. This also highlights the importance of improving education and awareness among health care providers if better outcomes are to be achieved.

In addition, none of the eligible women in our cohort received CPT treatment. This could lead to higher than normal rates of opportunistic bacterial and parasitic infections during pregnancy,²¹ which may affect the health of the mother and baby or be detrimental to the development of the foetus, and may even result in death. Barriers commonly cited as being detrimental to the provision of CPT have been pharmacy stock-outs and unreliable drug supply chains.^{26,27} Given the geographical location of the health facility assessed, it is likely that erratic drug supplies and pharmacy stock-outs were some of the reasons behind the unsatisfactory delivery of this treatment modality. The independently sub-standard TB and HIV services in our ANC setting, and the inadequate integration of these services, turned out to counter-productive in controlling and preventing these twin epidemics, while further burdening an already struggling health care system²⁸ in South Africa. Our study was not designed to determine the reasons behind the imperfect implementation of TB-HIV integrated services, but as discussed, possible health system factors that may have impeded the delivery of these TB-HIV integrated services may include a lack of awareness about policy and practice guidelines among health care workers, poor coordination and referral systems, and logistical and supply chain constraints. Person factors may have included ethical issues such as consent and confidentiality, and psychological constraints such as fear and a lack of education and awareness among patients.

Certain limitations of the study need to be noted. First, as the ANC unit is located in a high TB-HIV prevalence area, the results may not be representative of ANC units/facilities in areas with lower TB-HIV prevalence, or even of settings with similar burden that have fewer resource problems, potentially leading to selection bias. Second, charts without at least two services were determined incomplete and were excluded from the study sample, potentially biasing the results towards better performance. However, we do not believe this substantially affected our overall conclusions.

Due to the total lack of any recorded data on TB investigations, diagnoses or treatment, we could not examine any possible associations between TB and HIV. The quality and completeness of our data were also determined by the completeness and accuracy of information in the available records and registers, which could not be improved as this was a retrospective review.

CONCLUSIONS

This study describes the poor provision of integrated TB-HIV services to pregnant women. Despite the initial satisfactory identification of HIV-positive women and TB suspects, implementation of other TB-HIV collaborative activities was suboptimal. Both HIV and TB services were more thorough among HIV-negative women than among HIV-positive women. Further research is needed to uncover the barriers to the delivery of integrated services to pregnant women.

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Contexte : Une offre de services intégrée de tuberculose et du virus de l'immunodéficience humaine (TB-VIH)—en tant qu'élément des services de santé maternelle, notamment des consultations prénatales (ANC)—est largement recommandée. Cette étude a évalué la mise en œuvre d'une offre de services intégrée TB-VIH dans une unité hospitalière de CPN.

Méthodes : Les dossiers d'un échantillon aléatoire de 308 femmes enceintes qui ont fréquenté le service ANC entre avril 2011 et février 2012 ont été revus. Les données ont été extraites à partir des registres ainsi que des dossiers des patients. Les résultats attendus comprenaient la proportion de femmes bénéficiant d'un conseil et test VIH (HCT), d'un comptage des CD4, d'un traitement antirétroviral (ART), d'un traitement préventif par cotrimoxazole (CPT), d'un dépistage de TB et d'un traitement préventif par

isoniazide (IPT). L'analyse a mesuré les variations des caractéristiques des patients associées à l'offre de services.

Résultats : Toutes les femmes ont bénéficié du HCT et 80% de celles ayant eu un test VIH positif ont eu un dépistage de TB. La majorité (85,9%) des femmes VIH-positives ont eu un comptage des CD4. Cependant, seulement 12,9% des femmes éligibles ont reçu une prophylaxie ART sur place ; seulement 35,7% ont été référées pour une mise en route de l'ART ; seulement 42,3% ont commencé l'IPT ; et aucune n'a reçu de CPT ni d'autres investigations relatives à la TB. Les femmes VIH négatives avaient 2,6 fois (IC95% 1,3–5,3) plus de chances de bénéficier d'un dépistage de TB que leurs homologues VIH positives.

Conclusions : L'identification des femmes VIH positives et de celles suspectes de TB a été satisfaisante, mais la mise en œuvre des autres activités de collaboration TB-VIH a été insuffisante.

Marco de referencia: La prestación integrada de servicios de atención de la tuberculosis (TB) y la infección por el virus de la inmunodeficiencia humana (VIH) se recomienda ampliamente como parte de los servicios que se ofrecen a las madres durante la atención prenatal (ANC). En el presente estudio se evaluó la introducción de los servicios integrados de TB y VIH en una unidad hospitalaria de ANC.

Método: Se examinaron las historias clínicas de una muestra aleatoria de 308 embarazadas que acudieron al servicio de ANC entre abril del 2011 y febrero del 2012. Se extrajeron datos de los registros y las historias clínicas de las pacientes. Los criterios de evaluación fueron la proporción de mujeres en quienes se practicó la orientación y las pruebas diagnósticas del VIH (HCT), el recuento de linfocitos CD4, el tratamiento antirretrovírico (ART), el tratamiento preventivo con cotrimoxazol (CPT), la detección sistemática de la TB y el tratamiento preventivo con isoniazida (IPT). En el análisis se midieron las variaciones en las características de las pacientes asociadas con la prestación de los servicios.

Resultados: Todas las mujeres recibieron HCT y en 80% que obtuvieron un resultado positivo, se practicó la detección sistemática de la TB. En la mayoría de las pacientes positivas frente al VIH se practicó el recuento de linfocitos CD4 (85,9%). Sin embargo, solo 12,9% de las mujeres aptas recibieron la profilaxis ART en el lugar de la consulta; solo 35,7% se remitieron con el fin de comenzar el ART; apenas 42,3% de las pacientes comenzaron el IPT; y ninguna recibió CPT ni tuvo investigaciones complementarias por TB. Las mujeres con resultados negativos frente al VIH exhibieron un cociente de posibilidades 2,6 veces inferior de beneficiar de la detección sistemática de la TB, en comparación con las mujeres VIH positivas.

Conclusión: Se constató una detección adecuada de las mujeres positivas frente al VIH y de casos con presunción clínica de TB, pero una prestación deficiente de las demás actividades de los servicios integrados del VIH y la TB.