

Implementation Barriers in the Management of Maternal Syphilis by Midwives at Two Primary Healthcare Clinics in the Free State Province, South Africa

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Abstract

This study aimed to identify barriers to managing pregnant women and their newborns exposed to or infected with syphilis and propose solutions based on existing treatment guidelines. Conducted at two primary healthcare clinics in the Free State province, the study used a quantitative design and purposive sampling to survey healthcare professionals involved in antenatal, childbirth and perinatal services across two health districts. A questionnaire captured the knowledge, views and practices of 14 midwives, two operational managers and one district clinical manager regarding maternal and congenital syphilis. All midwives were knowledgeable and experienced, with access to various treatment guidelines, though most relied on the *2016 Guidelines for Maternity Care in South Africa*. Barriers identified included inconsistent adherence to guidelines, irregular screening for syphilis and HIV, and a lack of serological testing in 64% of babies born to mothers with syphilis. Further challenges included inadequate training on new guidelines, lack of partner contact tracing, resource shortages and staffing inconsistencies. Despite their knowledge, midwives face implementation challenges that hinder effective practice.



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Regular training is recommended to support midwives and nurses in managing sexually transmitted diseases.

Keywords: guidelines; midwives; maternal syphilis; implementation barriers; management

Introduction

Syphilis is a major health concern globally, with eight million infections reported in 2022 (World Health Organization 2024). It is a sexually transmitted disease caused by the bacterium *Treponema pallidum* (World Health Organization 2011). The highest number of cases is reported from low-middle-income countries (LMICs), specifically from sub-Saharan Africa (SSA) and Asia (World Health Organization 2024). According to the 2022 sexually transmitted disease surveillance by the CDC (CDC 2024), syphilis rates increased following the COVID-19 pandemic. In the United States, 2.5 million cases of sexually transmitted diseases (syphilis, gonorrhoea and chlamydia) were documented (CDC 2024). In addition, syphilis predisposes the general population and women in particular to other sexually transmitted diseases such as Human Immunodeficiency Virus (HIV), gonorrhoea and chlamydia (Zinabie et al. 2018).

The most vulnerable populations to syphilis infections are pregnant women and children (Lynn and Lightman 2004). Pregnant women have the highest infection rates, with 2 million infections reported worldwide annually. LMICs account for 90% of these infections (Arnesen et al. 2015). In SSA, 2.7% of pregnant women are reported to have syphilis (National Department of Health 2010). However, in South Africa, the National Institute for Communicable Diseases reported that the prevalence of maternal syphilis was 2.6% at the national level in 2019, which was a 30% increase from 2015 (Kufa-Chakezha et al. 2024; Mabaso et al. 2023). Maternal syphilis resulted in 425 congenital infections per 100 000 live births globally. These rates are 8.5 times higher than the target rate of 50 per 100 000, indicated by the World Health Organisation (WHO) (Gilmour and Walls 2023; Stafford et al. 2024). The high rates of congenital syphilis are indicative of poor prenatal care despite the provision of testing kits at primary healthcare facilities (Amaral 2012).

South Africa faces a challenge in eradicating the rapid spread of HIV and syphilis. Recently, a considerable variation in the prevalence of HIV and syphilis in the different provinces of SA was reported. In 2022, KwaZulu-Natal had an HIV prevalence of 34.2%, followed by the Eastern Cape with 32% infections and the Free State with a prevalence of 28.8% (Kufa-Chakezha et al. 2022).

Pregnant women in South Africa attend antenatal clinics and receive healthcare services from midwives and professional nurses. These healthcare workers must be knowledgeable and capable of providing high-quality health care. Knowledge of sexually transmitted infections (STIs) is essential for all healthcare professionals who attend to pregnant women to effectively identify and treat infections to prevent adverse

maternal, foetal and neonatal outcomes. In Namibia, a study on nursing students' knowledge about STIs showed that 63% of the nurses had inadequate knowledge (Hamunyela et al. 2024). In Brazil, a similar study on the role of nurses in the management of pregnant women with syphilis was conducted. The study reported that follow-ups on patients with syphilis were not done regularly. Only one of the 16 nurses recruited in the study followed up on a syphilis case during pregnancy (Amaral 2012).

Studies have emphasised the need to improve the screening and treatment of syphilis at antenatal clinics (Azeze et al. 1995; Bam et al. 1994). Various guidelines used in local clinics for managing maternal and congenital syphilis include the *2016 Guidelines for Maternity Care in South Africa* and the new *Comprehensive STI Clinical Management Guidelines 2021–2025*, which were introduced in 2023. The knowledge of midwives on how to manage pregnant women with syphilis was assessed in this study based on these guidelines.

If a syphilis test is positive, the patient is treated with benzathine penicillin. According to the CDC guidelines, the standard procedure is to give all positive pregnant patients three doses. The first dose is given during the second trimester and the other two during the third trimester, one at 28 weeks of gestation and the other at least one month before childbirth (CDC 2021). In 2001, a study in KwaZulu-Natal investigated the screening and treatment of syphilis at antenatal clinics. The results showed 15.9% of positive pregnant women did not receive any treatment, 13.2% of those who were treated only received one dose of penicillin, 5.8% received two doses and 64.8% received three doses (Mullick et al. 2005).

A rapid HIV antibody test is used to test for HIV. When pregnant women test positive for HIV, they are offered counselling and HIV education, screened for TB, and further tests such as a CD4 count and viral load are done. They are then started on antiretroviral therapy immediately. If the test is negative, a repeat test is done at every antenatal visit, during labour, six weeks post-delivery and every three months during breastfeeding, according to the *Basic Antenatal Care Plus (BANC)* handbook from the National Department of Health (Hlongwane 2022).

There are no published studies on the knowledge and implementation practices of healthcare workers managing maternal and congenital syphilis from the Free State province. There is a knowledge gap regarding the cause of the recent resurgence of maternal and congenital syphilis. No study has been conducted on the feasibility, acceptability and adoption by midwives of the new guidelines and dual HIV and syphilis screening test kits introduced in South Africa in 2023. Therefore, this study investigated the knowledge and practices of professional nurses in the management of maternal and congenital syphilis at primary healthcare clinics.

Methods

A quantitative study design was implemented by surveying purposively selected healthcare professionals at two primary healthcare clinics providing antenatal, childbirth and perinatal services in two health districts in the Free State. A questionnaire designed by the researchers was used to survey the knowledge, views and implementation practices on the management of maternal and congenital syphilis. Fourteen midwives, including two operational managers and one district clinical manager, were purposively sampled for the study, and participants who agreed to participate provided written informed consent. All participants responded to the questionnaires independently. The study sites were selected based on the location, size and number of antenatal clinic attendees. Table 1 depicts all the questions posed to the nurses/midwives and their answers. Table 2 depicts the questions posed to the clinic managers and their answers.

Permission and ethical clearance to conduct the research were obtained from the Free State Department of Health and the UFS Health Sciences Research Ethics Committee before the initiation of the study (UFS-HSD2022/1399/2803-0001). Maternal demographic and clinical data, syphilis and HIV status and foetal outcomes were collected. All pregnant women who visited the antenatal clinic from 2020 to 2023 were included, regardless of their syphilis/HIV status.

In this study, the bedside Rapid Plasma Reagin (RPR) test was used. In 2023, the dual test kit for both HIV and syphilis was introduced for screening at antenatal clinics. The standard antenatal care procedure for testing syphilis in pregnant women begins with the RPR test at the first antenatal visit. While the RPR test measures disease activity, it does not specifically identify active syphilis. False positive results may occur, especially in patients with connective tissue disorders, requiring further testing for confirmation. Some patients may also retain a positive RPR test for life after treatment, although the titres are typically low ($\leq 1:8$) (National Department of Health 2019). To confirm active syphilis infections, a treponema pallidum haemagglutination assay (TPHA) test is carried out. It is important to note that once treponemal tests become positive, they will remain so for life even after treatment. According to the South African Sexually Transmitted Infections Management Guidelines 2018, all pregnant women are tested for syphilis and HIV at their first antenatal visit.

Data analysis

Statistical analysis was conducted by an institutional biostatistician. Data was descriptively analysed. Frequencies and percentages were used for categorical data, and percentiles were used for numerical data. Normally distributed data was presented by means and standard deviation, while data not normally distributed was presented by medians and interquartile ranges.

Results

Nurses' and midwives' results

Fourteen midwives working in two primary healthcare clinics were surveyed. All were well-informed about syphilis, and eight (57%) attended to two to five pregnant women with syphilis per month. One midwife (7.1%) was seeing more than six pregnant women with syphilis per month, while another (7.1%) was seeing one per month. About 28.6% were unsure how many pregnant women with syphilis they saw per month.

Training

Guidelines for screening patients for syphilis were available, accessed and used by all the nurses in the study. In terms of training, 35.7% stated that they received regular training on the guidelines, while 64.3% did not. Of those who received regular training, 28.6% had training annually, 7.1% received training every six months and 7.1% received training every three months. The provincial Department of Health provided training to 36% of the respondents.

Screening tests

The majority (64.3%) of the midwives used the RPR mono test to screen for syphilis, while 28.6% used the dual test kit, and 7.1% used the laboratory TPHA test. The survey found that 28.5% of midwives used the *2016 Guidelines for Maternity Care in South Africa*, while 14.2% used the *Comprehensive STI Clinical Management Guidelines 2021–2025* for syphilis testing. Other tests were also done on the patients, and 64.3% of the midwives conducted tests for HIV and STI screening. Another 21% tested for HIV, 14.2% did STI screening, and 7.1% did RPR titre, hepatitis B and urine microscopy, culture and sensitivity (UMC and S) testing. If the pregnant women presented with any external vulval lesions or vaginal discharge, 92.9% of midwives reported doing additional tests such as a cervical smear for cytology for premalignant cells and a vaginal swab for sexually transmitted infections. The most common findings (21.4%) showed chlamydia, 21.4% reported vaginal vaginosis, and 42.9% were normal. Gonorrhoea was not a common finding from this study's results.

Contact tracing

Most (71.4%) of the midwives indicated that they advised the women's partners to visit STI clinics, while 28.6% did not. Regarding partners treated at the study sites, 7.1% received Bicillin, and 7.1% received Ceftriaxone, Azithromycin and Metronidazole. Reported reasons for no contact tracing included refusal of treatment by partners (21.4%), patient and partner separation (35.7%), refusal to accept partner diagnosis (14.3%) and patients having more than one partner (7.1%). Half of the midwives promoted condom use and health education to prevent further STI infection, 35.7% promoted condom use only and 14% used health education only.

Treatment for syphilis-infected antenatal attendees

Most (85.7%) midwives reported that pregnant women completed their treatment before delivery. All the midwives reported that they had treated their patients postpartum. Most (92.9%) of the midwives were able to cope with the management of syphilis. Many (78.6%) reported their clinics being understaffed, and 57% reported having a shortage of supplies and equipment. Almost half (42.9%) of the midwives reported that the pharmacy was responsible for supplying medical supplies, while 7.1% said it was a function of the management team of the facility.

Testing of babies

A total of 35.7% of the midwives conducted syphilis testing on babies born to women who tested positive for syphilis during pregnancy, while 64.3% did not conduct tests. For the tests, 14.3% conducted the RPR test, 7.1% tested in cases where the babies were symptomatic, and 7.1% performed a TORCH screen (toxoplasmosis, rubella, cytomegalovirus, herpes simplex and HIV). A few midwives (14.3%) screened the babies' cord blood at delivery. The screening of cord blood was reported by 21% of the midwives, who stated that it was included in the guidelines, while another 42.9% said it was not documented in the guidelines. A few (21%) said they were unsure.

Treatment for babies born to mothers with syphilis

The babies received prophylactic benzathine penicillin (Bicillin) if the mother tested positive for syphilis, which was reported by 78.6% of the midwives, while 21.4% did not. If the baby was symptomatic, 35.7% of the midwives treated the baby with a Bicillin injection. In the case of symptomatic babies, only 14% of midwives reported peeling skin and skin pustules, while 7.1% reported snuffles, low birth weight and a rash. X-rays of babies' long bones were requested by 14.3% of the midwives, while 85.7% did not request it. In 14% of cases, the midwives did not record the condition of the babies.

Referrals

The referral patterns of 71.4% of the midwives adhered to the guidelines, while 35.7% referred their patients to a tertiary hospital, and 28.6% referred them to a regional hospital. Referral to the next level of care for symptomatic babies was done by half the midwives. Thirty-five percent of the midwives reported that the management of symptomatic babies is done by a paediatrician, 21% by medical officers and 28.6% by senior nurses.

Follow-up

Half the midwives reported that they did follow-ups on syphilis-infected babies, while 28.8% were unsure. The follow-up of babies at one week was reported by 21.4% of midwives, 7.1% reported a follow-up at six weeks, 35.7% reported follow-up at six

months, and 35.7 % did not record any follow-ups. Only 21.4% reported long-term follow-up, and half did not record any long-term follow-up.

Guidelines

The availability of clinical guidelines for newborn care was reported by 78.6% of the midwives. Regarding the guidelines followed, 14.3% used the *Comprehensive STI Clinical Management, Guidelines 2021–2025*, 7.1% used the *2016 Guidelines for Maternity Care in South Africa* for managing newborns, and 7.1% used the *Integrated Management of Childhood Illnesses (IMCI)* guidelines. A total of 42.9% did not record the use of any guidelines.

HIV-exposed babies

In cases where the mothers were HIV positive, all the midwives reported to have done the HIV-polymerase chain reaction (PCR) test for the babies. About 85.7% of the midwives reported starting the babies on antiretrovirals for prophylaxis. For the prophylactic treatment, 78.6% reported giving Zidovudine (AZT) and Nevirapine (NVP), and, depending on the viral load, 7.1% of them gave NVP on its own. Regarding HIV-positive babies, 85.7% of the midwives stated that they initiated antiretroviral treatment. Of those HIV-positive babies, 42.9% were referred to the HIV clinic for the commencement of treatment by a medical officer. Blood was drawn from HIV-positive babies for CD4 count by 71.4% of the midwives and for viral load by 28.6% of the midwives. Follow-up on HIV-positive babies was reported by 92.9% of the midwives.

Clinic managers' results

Training

Three clinic managers participated. All three said nurses and midwives managing pregnant women at their clinics receive in-service training. Topics included are hypertension in pregnancy, postpartum haemorrhage, neonatal resuscitation, and maternal emergencies (ESMOE). One of the managers said training was conducted annually at their clinic. Another said training was offered twice a year, while the third said they offered quarterly training opportunities. Two of the clinic managers reported that their trainees received continuous monitoring by midwife supervisors from the University of the Free State and the district clinical specialist teams (DCSTs).

Equipment

All three managers said checks on equipment were done regularly. Two managers knew of the new *Comprehensive STI Clinical Management Guidelines 2021–2025*, and another one knew of the *National Integrated Maternal Care Guidelines for South Africa*. Two (66.7%) of the managers were aware of the referral guidelines.

Screening tests

Two of the clinic managers reported that the RPR rapid test and the RPR laboratory test were used to check for titres.

Management of patients

Two of the clinic managers confirmed antenatal ultrasounds are done at 20–22 weeks to determine gestational age and for foetal assessment. Both confirmed they were knowledgeable about the treatment given to pregnant women and babies infected with syphilis. They were also aware of the referral pathways.

Table 1: Nurses and midwives

Meetings (n=14)	Frequencies	Percentages (%)
How many syphilis patients do you see per month?		
1	1	7.1
2–5	8	57.1
>6	1	7.1
Not sure	4	28.6
Are syphilis screening guidelines available at the clinics?		
Yes	14	100
No	0	0
If yes, do you receive regular training on the guidelines?		
Yes	5	35.7
No	9	64.3
If yes, how often do you receive training?		
Once a month	0	0
Every three months	1	7.1
Every six months	1	7.1
Annually	4	28.6
n/a	8	57.1
Who provides the training?		
Department of Health	5	36
Maluti-A-Phofung District	1	7.1
Not receiving training	7	50
Not recorded	1	7.1
Do you have access to guidelines?		
Yes	14	100
No	0	0
What forms of testing are done?		
RPR mono test	9	64.3
Dual testing kit	3	21.4
Laboratory test and TPHA	1	7.1

RPR mono test and laboratory test	1	7.1
Are there guidelines regarding the forms of testing?		
Yes	10	71.4
No	4	28.6
If yes, what are the guidelines?		
<i>Maternal Guidelines 2016</i>	7	49.7
<i>Comprehensive STI Clinical Management, Guidelines 2021–2025, routine testing of ANC, screening</i>	3	21.3
Laboratory guidelines	1	7.1
n/a	4	28.6
Are you informed about syphilis?		
Yes	14	100
No	0	0
Do you do contact tracing?		
Yes	14	100
No	0	
Do patients agree to contact tracing		
Yes	13	92.9
No	0	0
Sometimes	1	7.1
What tests are done?		
HIV	3	21.4
STI screening	2	14.2
HIV and STI screening	9	64.3
Syphilis	0	0
If tests are positive, do you refer partners to an STI clinic?		
Yes	10	71.4
No	4	28.6
If yes, what treatment is given?		
Bicillin	2	14.2
Ceftriaxone, Azithromycin, Metronidazole	1	7.1
Not recorded	6	42.9
n/a	4	28.6
Reasons that contact tracing is not done		
Treatment refusal	3	21.4
Partner and patient separated	5	35.7
No response	5	35.7
Refusal to accept partner diagnosis	2	14.3
Patient has more than one partner	1	7.1
Not doing contact tracing	8	57.1
Not recorded	2	14.3
Which preventive measures do you communicate to patients?		
Condom use	5	35.7
Health education (prevent transmission/re-infection)	2	14.3
Condom use as well as health education (prevent transmission/re-infection)	7	50

Was treatment completed before delivery?		
Yes	12	85.7
No	2	14.3
If patients complain about external lesions or vaginal discharge, are any tests done?		
Yes	13	92.9
No	1	7.1
Is a pap smear done?		
Yes	12	85.7
No	2	14.3
Are any other investigations done?		
Yes	7	50
No	7	50
If yes, please mention them.		
HIV viral load (VL), cluster differentiation 4 (CD4)	4	28.4
Hepatitis B	2	14.2
RPR titre	1	7.1
Urine microscopy, culture and sensitivity (UMC and S) test	1	7.1
RH blood tests	1	7.1
Not recorded	7	50
Are vaginal speculum examinations done?		
Yes	11	78.5
No	3	21.1
What other tests are done?		
Discharge swab	3	21.2
Urine specimen for MC and S	2	14.3
Blood specimen	7	50
n/a	2	14.3
What are the most common findings from swabs?		
Bacterial vaginosis	3	21.4
Chlamydia	3	21.4
Gonorrhoea	0	0
Bacterial vaginosis and chlamydia	1	7.1
No abnormalities detected	6	42.9
Is treatment provided postpartum?		
Yes	14	100
No	0	0
Are you able to cope with the management of women with syphilis?		
Yes	13	92.9
No	1	7.1
Do you feel that you are understaffed?		
Yes	11	78.6
No	3	21.4
Do you feel that you have a lack of equipment/supplies?		

Yes	8	57.1
No	5	35
Not recorded	1	7.1
If yes, who is responsible for supplying medical equipment?		
I don't know	1	7.1
Pharmacy	6	42.9
Management and HR personnel	1	7.1
Depot	1	7.1
Resources department	1	7.1
n/a	4	28.6
Regarding the baby: Were syphilis tests done on the baby?		
Yes	5	35.7
No	9	64.3
If yes, please state the types of tests		
RPR	3	21.4
If symptomatic, blood was taken for a syphilis test	1	7.1
TORCH screen	1	7.1
No tests were done	9	64.3
Was a screening blood test for the patient and baby (cord blood) done at delivery?		
Yes	2	14.3
No	12	85.7
If yes, is that included in the guidelines?		
Yes	3	21.4
No	2	14.3
Unsure	3	21.4
Not recorded	6	42.9
Did the baby receive prophylactic penicillin if the mother tested positive?		
Yes	11	78.6
No	3	21.4
If the baby showed signs of syphilis or had a positive cord test, what treatment was given?		
Bicillin	5	35.7
Was an X-ray examination done of the baby's long bones?		
Yes	2	14.3
No	12	85.7
Who managed the baby?		
Pediatrician	5	35.3
Medical officer	3	21.4
Senior nurse	4	28.6
Visiting doctor	2	14.3
Was the baby referred to the next level of health care?		
Yes	7	50
No	7	50

If yes, is the referral pattern in the guidelines?		
Yes	10	71.4
No	3	21.4
n/a	1	7.1
If yes, to what level of care are the babies referred?		
District	1	7.1
Regional	4	28.6
Tertiary	5	35.7
n/a	4	28.6
Baby's syphilis status		
Asymptomatic	3	21.4
Symptomatic	5	35.7
Not recorded	6	42.9
If symptomatic, what symptoms did the baby have?		
Pustules on skin	2	14.3
Skin rash	1	7.1
Snuff/sniffles, rash, low birth weight	1	7.1
Not recorded	2	14.3
n/a	8	57.1
What clinical features did the babies present with?		
Enlarged liver	0	0
Cardiac complications	0	0
Peeling skin	2	14.3
None	3	21.4
n/a	9	64.3
Were syphilis-infected babies followed up?		
Yes	7	50
No	1	7.1
Unsure	4	28.6
n/a	2	14.3
If yes, after how many weeks?		
1 week	3	21.4
6 weeks	1	7.1
Unsure	2	14.3
Not recorded	2	14.3
n/a	6	42.9
Were follow-ups done on babies within six months?		
Yes	5	35.7
No	1	7.1
Not recorded	5	35.7
n/a	3	21.4
Is a long-term follow-up programme in place for babies with congenital syphilis?		
Yes	3	21.4
No	0	0
Not recorded	7	50
n/a	4	28.6

Are clinical guidelines followed for the management of newborns?		
Yes	11	78.6
No	1	7.1
Unsure	1	7.1
n/a	1	7.1
Which guidelines are followed?		7.1
<i>Maternity Guidelines for the Management of the Newborn</i>	1	7.1
<i>IMCI</i>	1	7.1
<i>Comprehensive STI Clinical Management Guidelines 2021–2025</i>	2	14.3
Not recorded	6	42.9
n/a	4	28.6
HIV: If the mother was HIV positive, was a birth HIV PCR done on the baby?		
Yes	14	100
No	0	0
n/a	0	0
Are HIV-positive babies started on antiretrovirals?		
Yes	12	85.7
No	0	0
n/a	2	14.7
Are HIV-positive babies referred to an HIV clinic?		
Yes	6	42.9
No	1	7.1
n/a	7	50
If no HIV treatment was given, why was this the case?		
Prophylaxis	1	7.1
n/a	11	78.6
Not recorded	2	14.6
Was blood drawn for a CD4 count?		
Yes	10	71.4
No	0	0
Not recorded	4	28.6
Were viral loads tested?		
Yes	4	28.6
No	0	0
Not recorded	10	71.4
Was HIV prophylaxis treatment given to HIV-exposed babies?		
Yes	12	85.7
No	0	0
n/a	2	14.3
If yes, what was the treatment given?		
n/a	1	7.1
Nevirapine (NVP) and Zidovudine (AZT)	11	78.6
Mothers VL-NVP	1	7.1

Was a follow-up done on HIV-positive babies who were tested?		
Yes	13	92.9
No	0	0
Not recorded	1	7.1

Table 2: Clinic managers

Meetings (n=3)	Frequencies	Percentages (%)
Present at meeting		
District managers	2	66.7
Pharmacist/pharmacy at clinic	1	33.3
Is in-service training presented to nurses/midwives at the clinic?		
Yes	3	100
No	0	
If yes, what topics are discussed?		
Hypertension in pregnancy, postpartum haemorrhage, neonatal resuscitation, and ESMOE* training for midwives	1	33.3
Maternal emergency (ESMOE), neonatal (HBB, KMS) and PMTCT	1	33.3
Essential steps in the management of obstetric emergencies, basic antenatal care	1	33.3
If yes, how frequently is training presented?		
Annually	1	33.3
Twice a year	1	33.3
Quarterly	1	33.3
Who participates in the training?		
Nurses	1	33.3
Midwives	2	66.7
Doctors		
All of the above	1	33.3
Target audience		
Nurses and doctors	3	100
Counsellors		
Training attendance	3	100
Yes	0	
No		
Are checks done on equipment?		
Yes	3	100
No	0	
What are the latest guidelines on the management of maternal and neonatal syphilis?		
RPR positive patients with titre receive 2.4 Mu of Penitent LA weekly X3, repeated to follow-up whether the titre is reduced or not, babies are given 50mg/kg of Bicillin after delivery even if mothers are now negative	1	33.3
<i>2021–2025 Guidelines</i>	1	33.3
<i>National Integrated Maternal and Perinatal Care Guidelines for SA</i>	1	33.3
Do you adhere to referral guidelines?		
Yes	2	66.7

No	1	33.3
If yes, what are they?		
Using the latest guidelines, consult neonatology if the baby has clinical signs or the mother did not receive the full dose of Bicillin and is still positive	1	33.3
If the patient is positive, relevant treatment is given, and if the titre is increasing, the patient will be referred for obstetric evaluation at a tertiary hospital	1	33.3
n/a	1	33.3
What are the standard operating procedures for maternal and neonatal syphilis?		
Positive RPR is treated at the local clinic. If the titre does not decrease during treatment, the patient will be referred to a tertiary institution	1	33.3
Following the National Guidelines	1	33.3
n/a	1	33.3
Type of RPR (choice = rapid test (treponemal test))		
Rapid test (treponemal test) only	1	33.3
Laboratory test only	0	
Both of the above only	2	66.7
If RPR is positive, at what ratio should treatment be initiated?		
1:4	2	66.7
≥ 1:128	1	33.3
If the rapid test is positive, is treatment initiated immediately?		
No	0	
Yes	3	100
Are antenatal ultrasounds done?		
Yes	1	33.3
No	1	33.3
Sometimes	1	33.3
If yes, state the reason. Is it only a gestational age scan or is it done specifically to assess whether the foetus is affected by maternal syphilis?		
Sonar done between 20–22 weeks	1	33.3
Both gestational age and foetal assessment	1	33.3
n/a	1	33.3
What is the referral pathway for patients with a penicillin allergy?		
Patient given macrolides i.e. erythromycin	1	33.3
Alternative treatment	1	33.3
n/a	1	33.3
Are items discussed at meetings?		
Yes	3	100
No	0	
Is the learning environment monitored?		

Yes	3	100
No	0	
How often is training presented?		
Once a month	2	66.7
Continuously	1	33.3
Are the trainees monitored?		
Yes	1	33.3
No	1	33.3
If yes, who monitors them?		
Midwives and supervisors from the university	1	33.3
Professional nurses, midwives, MOs, consultants	1	
Advanced midwives, advanced antenatal nurses		
Is any evaluation done after a training session?		
Yes	1	33.3
No	1	33.3
n/a	1	
Are the DCSTs actively involved in supporting continuous learning and mentoring clinicians who manage syphilis?		
Yes	2	66.7
No	1	33.3

* essential steps in the management of obstetric emergencies

Discussion

All 14 participating midwives self-reported to be well-informed about syphilis. They were experienced in managing syphilis because most were seeing two to five syphilis-infected antenatal women per month. Most of the midwives used the *2016 Guidelines for Maternity Care in South Africa* for screening and managing pregnant women and babies infected with syphilis. In most cases, regular training was not done on the correct guidelines. As a result, when the new *Comprehensive STI Clinical Management Guidelines 2021–2025* were introduced, the midwives were reluctant to use them and continued using the guidelines with which they were familiar. For the implementation of any new intervention or guideline to be successful, it must be accepted and adopted by its users. The findings of this study indicate that the implementation of new guidelines in the studied primary healthcare settings was not accepted or adopted by the midwives. Training by experts on new guidelines at regular intervals would probably ensure the use of and adherence to new guidelines. The results of this study differ from a study by Abdrazakova on the attitudes and expectations of nurses to new clinical guidelines in primary healthcare clinics. That qualitative study found nurses in Kazakhstan and Russia had a positive attitude regarding the adoption of new guidelines (Abdrazakova 2019).

The reasons for midwives' reluctance to implement the new guidelines are unclear, but previous studies show most nurses and midwives rely on experience not scientifically

based guidelines when managing patients (Rolfe et al. 2008; White and Spruce 2015). A study by Kalies et al. (2017) found nurses do not follow guidelines because they believe the guidelines limit patient care and are not flexible enough to meet patient needs.

The standard antenatal care (ANC) procedure for screening syphilis in pregnant women using the RPR mono test was used by most midwives, as recommended by the *2016 Guidelines for Maternity Care in South Africa*. A few used the dual test kit, which was introduced in 2023. Very few midwives reported testing pregnant women with other syphilis tests like drawing blood for RPR titre and TPHA. However, the guidelines stipulate that follow-up tests should be done on those who test RPR positive, because RPR may yield false positives, and some patients might even have a positive RPR for life (Bam et al. 1994). The guidelines also indicate screening of the cord blood for syphilis, and many of the midwives did not follow this practice. Rodrigues and Domingues (2018) investigated the knowledge and practices of Brazilian healthcare professionals in the management of syphilis in pregnant women. That study evaluated 20 knowledge and practice criteria related to the diagnosis and treatment of syphilis at a 95% compliance standard. Knowledge of mother-to-child transmission and counselling mothers about infection, were the only criteria that had a 95% compliance standard. The nurses scored less than 50% on their knowledge about serological testing, epidemiology of congenital syphilis and elimination of congenital syphilis. They scored 60% on post-test counselling, treatment control and the treatment of partners (Rodrigues and Domingues 2018).

Due to the dual epidemic of HIV and syphilis, tests done for pregnant women include HIV and screening for other STIs as per the guidelines. The dual test kit was introduced to test both conditions at the same time. According to the *BANC Plus National Guidelines*, testing should be done at every monthly antenatal visit. According to the results of this study, the midwives did not follow these guidelines and instead continued with the *2016 Guidelines for Maternity Care in South Africa*. The guidelines indicate testing for syphilis and HIV should be done at booking. Only a few of the midwives did follow-up testing. In terms of treatment practices, 35% of health professionals in Brazil did not know when to perform a repeat test for syphilis during pregnancy (Domingues et al. 2013). Treatment of pregnant women with syphilis or HIV was correctly managed with Bicillin for syphilis or ART for HIV, according to the guidelines. Even though the treatment of syphilis and HIV was managed correctly in this study, a study in KwaZulu-Natal found contrasting results. An audit of antenatal care was performed in 2023 in an obstetric unit, and the results showed only 72.7% of nurses initiated syphilis treatment, while 43.4% performed a syphilis repeat test. Alarming, only 46.3% of the nurses completed the basic ANC checklist (Hoque et al. 2023).

Regarding patient education about STIs, this study identified that half of midwives promoted condom use and health education, 35.7% promoted condom use only, and 14% focused only on health education. These numbers are higher than those of a study

in Brazil, which reported that a mere 15.4% of healthcare professionals found it difficult to offer patients guidance on STIs, including ways to prevent transmission, the anticipated outcomes of STIs, treatment and condom use. Patient education should also include the importance of contact tracing. In this study, contact tracing was limited to partner referrals to STI clinics, and follow-ups were not done to check if the partners did in fact receive treatment. Poor contact tracing and treatment could impact the spread of syphilis, which has shown a resurgence in recent studies (Lewis 2023; Schmidt et al. 2019; Xiong et al. 2023).

Testing and treatment for syphilis of babies born from syphilis-infected mothers were not done by most of the midwives. According to the *2016 Guidelines for Maternity Care in South Africa*, if the mother is fully treated for syphilis, the baby does not need testing and treatment (National Department of Health 2016). This is concerning because it allows many infected babies to be missed and not treated. Most of the midwives in the study reported conducting HIV-PCR testing and Vertical Transmission Prevention (VTP) treatment for all HIV-exposed babies. Most midwives use the *2016 Guidelines for Maternity Care in South Africa*; one used the *IMCI* guidelines because she usually worked at the IMCI clinic and was familiar with them. There are inconsistencies in the management of babies due to the adherence to multiple guidelines. Regular training on the management and transmission of HIV in pregnant women is required. Another contributing factor is the rotation of staff from one section to another, which contributes to inconsistencies in the management of patients as nurses and midwives usually practise what they are familiar with rather than the latest guidelines.

A South African study conducted in Pretoria yielded similar findings in final-year nursing students. The study was on their knowledge of HIV and AIDS. A total of 140 participants from three universities were recruited between 2018 and 2019. The study found that the nursing students had a high knowledge of HIV, with a mean of 91.02 ± 5.00 , but lacked knowledge about how it was transmitted and its management (Dlamini et al. 2022).

Another study in Malawi found similar results in 81 nurses assessed on their knowledge, attitudes and practices on PMTCT. The study reported average knowledge with favourable attitudes, but limited practice. Limited practice was attributed to limited access to resources and research articles. The study anticipated that with additional mentorship, training and access to research articles, nurses' practice would improve (Naidoo and Mulenga 2017).

The clinic managers seem to know about the new *Comprehensive STI Clinical Management Guidelines 2021–2025* and the *National Integrated Maternal Care Guidelines*. They reported that in-service training on the guidelines was offered to nurses and midwives, and their trainees were continuously monitored by the midwives' supervisors and DCSTs, which could not be confirmed by the 14 midwives surveyed in the study. In this study, the midwives reported a lack of regular training. All three

managers reported that checks on equipment were done regularly, and they did not report a shortage of equipment, which was something the midwives did report. The managers were familiar with the referral pathways, including the referral of pregnant women for antenatal ultrasounds at 20–22 weeks for gestational and foetal assessment.

Conclusion

While midwives possess knowledge about maternal syphilis and associated treatment guidelines, this understanding often fails to translate into effective practice due to various implementation barriers including incomplete adherence to guidelines, inadequate training, insufficient resources and inconsistent staff practices. Consequently, the management of maternal and congenital syphilis remains inconsistent, highlighting the need for improved training, resource allocation and a unified approach to guideline implementation.

Recommendations

The *2016 Guidelines for Maternity Care in South Africa* should be updated to include additional treatments and screening from the *Comprehensive STI Clinical Management Guidelines 2021–2025*, *BANC Plus National Guidelines* and *Viral Load Testing and Prevention of Mother-to-Child Transmission guidelines*. Only one comprehensive guideline should be used to manage pregnant women and newborns. Midwives rely on and mostly use the *2016 Guidelines for Maternity Care in South Africa*; consequently, other existing guidelines are not used.

Rotating staff should not be common practice. Staff from other healthcare sections like IMCI implement what they know and apply the newborn care guidelines with which they are familiar. One of the respondents used the laboratory guidelines for testing, as they were not familiar with the available clinical guidelines.

Regular and frequent training on relevant guidelines and tests, especially new ones, must be presented more than once a year to improve their acceptance and adoption by midwives.

In addition, patient education must be strengthened, and the importance of proper contact tracing to ensure partner treatment to prevent the spread of syphilis and HIV infections must be emphasised.

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Disclaimer

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