

REVIEW ARTICLE

The control and prevention of sexually transmitted infections in primary healthcare facilities among key and priority population in sub-Saharan Africa: A systematic review

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Abstract

The syndromic management approach lacks diagnostic accuracy for asymptomatic infections, although it is the standard sexually transmitted infections (STI) treatment method. The study aimed to understand the status quo on STI control in primary healthcare (PHC) facilities among key and priority populations in sub-Saharan Africa (SSA). We registered the review on the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (ID: CRD42023439416). A systematic search of published articles was done using online databases and grey literature between 2016 and 2024. The search identified 2283 studies, and 1251 were excluded, remaining with 39 eligible studies for inclusion across 15 SSA countries. Of the 39 eligible studies, 11 were conducted on laboratory-diagnostic methods, and 28 were on treatment for STIs. Laboratory-diagnostic methods, including Gene Xpert assay, nucleic acid amplification transcriptase test, and multiplex reverse transcription polymerase chain reaction, have high diagnostic accuracy, sensitivity and specificity rates. However, they may result in delayed sampled results. Eighteen studies indicate that the STI syndromic management approach remains the standard care for treatment in PHC facilities, but its challenges include drug resistance, misdiagnosis, and low sensitivity. Integrating syndromic management with laboratory-diagnostic methods can improve diagnostic accuracy and allow early identification, diagnosis and treatment of STIs. These findings aim to inform policymakers and STI stakeholders to provide scientific evidence for targeted approaches to optimise and strengthen the STI response in SSA (*Afr J Reprod Health 2025; 29 [3]: 168-203*)

Keywords: key and priority populations; control; prevention; primary healthcare facilities; sexually transmitted infections; sub-Saharan Africa

Résumé

Français L'approche de gestion syndromique manque de précision diagnostique pour les infections asymptomatiques, bien qu'elle soit la méthode de traitement standard des IST. L'étude vise à comprendre le statu quo sur le contrôle des infections sexuellement transmissibles (IST) dans les établissements de soins de santé primaires (SSP) parmi les populations clés et prioritaires en Afrique subsaharienne (ASS). Nous avons enregistré la revue sur les éléments de rapport préférés pour les revues systématiques et les méta-analyses (ID : CRD42023439416). Une recherche systématique des articles publiés a été effectuée à l'aide de bases de données en ligne et de la littérature grise entre 2016 et 2024. La recherche a identifié 2283 études, et 1251 ont été exclues, restant avec 39 études éligibles à l'inclusion dans 15 pays d'ASS. Sur les 39 études éligibles, 11 ont été menées sur des méthodes de diagnostic en laboratoire et 28 sur le traitement des IST. Les méthodes de diagnostic en laboratoire, notamment le test Gene Xpert, le test d'amplification des acides nucléiques par transcriptase et la réaction en chaîne par polymérase à transcription inverse multiplexée, présentent des taux élevés de précision diagnostique, de sensibilité et de spécificité. Cependant, elles peuvent entraîner des résultats d'échantillonnage tardifs. Dix-huit études indiquent que l'approche de gestion syndromique des IST reste la norme de soins pour le traitement dans les établissements de soins de santé primaires, mais ses défis comprennent la résistance aux médicaments, les erreurs de diagnostic et la faible sensibilité. L'intégration de la gestion syndromique aux méthodes de diagnostic en laboratoire peut améliorer la précision du diagnostic et permettre l'identification, le diagnostic et le traitement précoces des IST. Ces résultats visent à informer les décideurs politiques et les parties prenantes des IST afin de fournir des preuves scientifiques pour des approches ciblées visant à optimiser et à renforcer la réponse aux IST en Afrique subsaharienne. (*Afr J Reprod Health 2025; 29 [3]: 168-203*).

Mots-clés: Populations clés et prioritaires; contrôle; prévention; établissements de soins de santé primaires; infections sexuellement transmissibles; Afrique subsaharienne

Introduction

Sexually transmitted infections (STIs) and their prevalence are on the rise, particularly in low and

middle-income countries.¹ Sub-Saharan African (SSA) countries are among the regions with the highest incidence of STIs, with an estimated 63 million cases per year, although most STIs are

treatable and preventable.² The daily acquisition of the STI rate is over a million new cases, with a projection of 374 million cases yearly.² Furthermore, many of these STIs are asymptomatic; some, such as Human Papillomavirus (HPV) and syphilis, may disappear or be cleared by the body's defence mechanism without the individuals' awareness.³ Moreover, other STIs share or overlap symptoms with other diseases or infections, making it even more challenging to identify and diagnose them using the patient's presented symptoms.⁴ Consequently, many STIs go unnoticed and thus remain undiagnosed and untreated, contributing to a higher prevalence rate.² Therefore, there is a need to generate new evidence and scale up efforts to improve the current STI diagnosis, prevention, and treatment measures.

As part of significant measures for STI prevention and control, SSA countries use a syndromic management approach. According to the South African National Strategic Plan for HIV, Tuberculosis, and STIs (NSP):2023-2028, this approach entails treating a group of infections with similar syndromes or signs instead of treating them individually.⁵ This approach relies on the presented STI symptoms in a patient, after which it prevents them from spreading further.⁵⁻⁶ What is not known is the impact of this treatment on the other asymptomatic STIs that the patient might be having during the treatment process.⁷ For this reason, asymptomatic STIs might be exposed to unnecessary or wrong antibiotics. This might result in overtreatment or undertreatment and later lead to drug resistance.⁷ On the other hand, the sixth South African National HIV Prevalence, Incidence, Behaviour and Communication Survey (SABSSM) showed a decline in condom use, particularly among teenagers and adolescents.⁸ A decline in condom use was also observed among men who have sex with men (MSM), with pre-exposure prophylaxis (PrEP) being regarded as the primary contributor.⁹ Therefore, integrating the syndromic management approach with aetiological testing or diagnostic methods should be a key priority in improving STI diagnosis and treatment among key and priority populations (KPP).³⁻¹⁰ In a study involving young women and their partners attending an STI clinic in South Africa, point of care (POC) STI testing and expedited

partner therapy (EPT) were found to be feasible and acceptable methods for reducing STI rates.¹¹ Test of care and partner notification (PN) were integrated into the HIV routine care programme among adults living with HIV in Botswana and were found to be highly feasible and acceptable in treating STIs.¹² Moreover, PN was integrated into antenatal care (ANC) services among pregnant women and with STI syndromic management as a form of treatment.¹³ The study found a reduction in STI burden at post-natal visits.¹³ However, Nakku-Joloba and colleagues reported that factors such as inadequate knowledge of how STIs are treated, fear of injections, conflicts or domestic violence from partners limit its feasibility and success.¹⁵ Nucleic acid amplification tests (NAAT) and rapid plasma regain (RPR) were also used to screen STIs among women taking PrEP in Kenya, and infected patients were given doxycycline post-exposure prophylaxis (Doxy-PEP) for treatment.¹⁶ The treatment reduced the incidence of STIs and was affordable and relevant, especially in resource-limited settings.¹⁶ The World Health Organization (WHO) has reported that several countries in SSA continue to struggle and lag behind with inadequate control of STIs, particularly among KPP.² On the other hand, the syndromic management approach, which is primarily used as the standard treatment regime in many PHC facilities of SSA, is linked to long term adverse health effects and high prevalence rates due to inability to diagnose asymptomatic STI. Moreover, the WHO indicated that the global target of preventing STIs was never met in 2020.⁷ Therefore, incorporating KPP in strategic control measures should be prioritised in contributing to the WHO's Vision 2030 and the global target of reducing the annual cases of STI transmissions. Therefore, this review aims to understand the status quo of the methods used for controlling and preventing STIs in PHC facilities among KPP in SSA.

Methods

Approach and databases

This review was conducted from November 2023 to October 2024 according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.¹⁷ It is registered on the

International Prospective Register of Reviews (PROSPERO) (ID: CRD42023439416). The Population, Intervention, Comparison Outcome (PICO), Medical Subject Heading (MeSH) terms and boolean operators (“AND” and ‘OR’), truncation (“*” and ‘()’) were utilised to guide the compilation of the search strategy based on the area of focus, time, exposure and outcome, region, and lastly the population. A literature search was done on electronic databases such as Medline, Scopus, Google Scholar, Web of Science, ScienceDirect, and PubMed. Further information search was done on multilateral organisations such as the Centre for Disease Control and Prevention (CDC) and the WHO website published from January 2016 to October 2024 that captures existing and available literature on STI prevention, screening, testing, diagnosis as well as linkage to treatment used in PHC facilities among KPP in SSA. Moreover, reference lists of eligible articles were also reviewed to ensure literature saturation.

Search strategy

The search terms were compiled using the PICO framework, MeSH terms, boolean operators (‘AND’ and ‘OR’), and truncation (“*” and ‘()’) to produce a combination of five key concepts., as presented in Table 1. The inclusion and exclusion criteria were informed by the PICO framework (Table 2), which looks at four constructs, namely population, intervention, comparison, and outcome¹⁷. In addition to PICO constructs, we added parameters such as study setting, article/ report type, language, and period (Table 1).

Eligibility criteria

The inclusion and exclusion criteria were informed by the PICO framework (Table 2), which looks at four constructs, namely population, intervention, comparison, and outcome¹⁷. In addition to PICO constructs, we added parameters such as study setting, article/ report type, language, and period (Table 2).

Data records and management

The search results were downloaded and stored in the reference management software, EndNote version 21. All eligible studies were uploaded to the

covidence tool for further screening and to remove duplicates. The researcher (MS) carried out a title, abstract and full-text screening, and all studies that did not align with the eligibility criteria of this review were excluded. Assistance was also sought from the UJ librarian for full-text articles from the inaccessible academic journals the university has subscribed to. For further information, each article's title, abstract, and full text were independently and extensively reviewed (MS) to exclude those that do not meet the inclusion criteria or are irrelevant to the review. The above-mentioned screening processes were supervised by RNP-M. Any differences were addressed by consensus of a third author (RNPM).

Data extraction and handling of missing data on articles

We contacted authors using the details found in the articles to get the missing information. Regarding non-respondents from the authors, the articles were removed from the selection criteria, and only those with full details or relevant information were added.

A summary of the systematic review process using the preferred reporting items for systematic reviews and meta-analyses flow chart

Figure 1. The studies' identification, screening, eligibility, and inclusion processes are summarised from electronic databases. The literature search yielded 2283 from an online database and seven studies identified through grey literature. A total of n=493 duplicates were removed by covidence. After that, 1799 articles went through thorough title and abstract screening, where 1251 studies were removed. Subsequently, 550 studies underwent full-text screening, 510 were further excluded, and only 39 were eligible for inclusion in the review after careful dual screening, data extraction, and risk and quality assessment using the Critical Appraisal Skills Programme.

Quality assessment and appraisal

The quality of the studies was assessed using the Critical Appraisal Skills Programme Systematic Reviews (CASPSR) appraisal tool (**Appendix 1**).¹⁸ The process was done after the extraction phase to assess the quality of the selected articles and

investigate the research's validity, precision, and generalizability. The eligible studies were evaluated for completeness using exclusion and inclusion criteria, and this was done by two reviewers (MAS, EP). A third reviewer gave a final decision based on the two members' review and a consensus on any differences. The PRISMA-P checklist was used to ensure transparency of the selected studies (**Appendix 2**).¹⁹

Results

This review analysed and included 39 eligible studies published, including grey literature, from January 2016 to October 2024. The characteristics of the studies are visualised and interpreted as follows: The first part shows the visual presentation of the study's characteristics using figures, where the distribution of the study's population, setting, and publication period are shown. The second part consists of a tabular description of the results

The characteristics of the selected studies in sub-Saharan Africa

This review analysed and included 39 eligible studies published, including grey literature, from January 2016 to October 2024. The characteristics of the studies are visualised and interpreted as follows: The first part consists of a tabular description of the results.

The second part shows the visual presentation of the study's characteristics using figures, where the distribution of the study's population, setting, and publication period are shown.

Table 3 highlights the characteristics of the eligible studies on STI control among KPP in SSA. This includes the publication period between 2016 and 2024 across different PHC facilities, populations, settings, and study designs.

Distribution of studies in sub-Saharan Africa

Studies were spread across 15 SSA countries, and most were conducted in South Africa [n=13(33%)], followed by Kenya [n=6(15%)], Zimbabwe [n=4(10%)], Uganda [n=3(8%)], Botswana [n=2(5%)], and Rwanda [n=2(5%)]. For the rest of the nine SSA countries, only one study was reported in each country (Figure 2).

Key and priority populations reported across the 39 eligible studies

Figure 3 presents the population type included in the review. Most studies were conducted among adolescent girls and young women (AGYW) (n=12), FSW, MSM, AGYW, prisoners, pregnant women, LGBTQ (n=6), patients with STIs/STI-suspected cases/individuals visiting STI clinics (n=5), and pregnant women/attendees of ANC services (n=5). For the remaining populations, only one (n=1) individuals were reported

Studies setting

Figure 4 shows that most studies were carried out in urban areas (n=27) compared to mixed (urban and rural areas) (n=11) and rural areas (n=1).and qualitative studies (n=2). Other study designs were least reported (n=1).

Studies publication period

The selected 39 studies in this review were conducted between 2016 and 2024. The year 2018 recorded many publications (n=9), followed by 2021 (n=7), while the years 2019 and 2024 had only one study published (Figure 5).

Study design

The included studies highlighted a diversity of study designs, such as prospective studies (n=9), cross-sectional studies (n=8), pilot studies (n=2),

Diagnostic methods for sexually transmitted infections in sub-Saharan Africa

Eleven of the 39 eligible studies reported on diagnostic tests for STIs (Table 4). Four studies from Rwanda, Kenya, Zimbabwe, and South Africa used Gene Xpert to screen different STIs. In Kenya, point of care (POC) Gene Xpert screened HPV²¹, while in Zimbabwe and South Africa, it screened CT/NG.²⁶⁻³⁸⁻⁴² Furthermore, Gene Xpert was used to screen TV, BV, and VCA in Rwanda.³⁴ As for syphilis, in Nigeria, it was diagnosed using a dual SD Bioline HIV/syphilis test⁴³, while in Uganda and Zimbabwe, they used reactive rapid plasma regain (RPR) and confirmed with a reactive *treponemal pallidum* hemagglutination assay

(TPHA).⁴²⁻⁴⁹ Polymerase chain reaction (PCR) was used to screen NG, CT and MG in Morocco.²⁹ Moreover, in Zimbabwe⁴², Kenya⁴³, and Ghana⁵¹, multiplex-PCR and transcriptase-mediated amplification were used to test for NG, BV, CT, TV, MG and HSV, while careHPV analysis was used to diagnose HPV in Tanzania.³⁰

Gaps and successes in diagnostic methods for sexually transmitted infections in sub-Saharan Africa

Three studies in this review described the POC Gene Xpert drawbacks as a screening tool for STIs (HPV, CT/NG and TV) in PHC facilities (Table 4). It was stated that using the latter test led to delayed test results and a high loss of patient follow-up in a Kenyan study.²¹ A significant challenge in South African and Zimbabwean studies is a lack of laboratory expertise in operating the Gene Xpert molecular test.²⁶⁻³⁷ In South Africa, STI diagnostic tests were conducted in a laboratory environment, and an onsite test was performed outside the laboratory in Zimbabwe^{25; 37}. Moreover, Morikawa and colleagues also noted routine maintenance and sufficient human resources as potential barriers to diagnostic tests.³⁷ studies highlighted gaps in different laboratory diagnostic tests, such as RPR, TPHA, NAAT, multiplex-PCR, care human HPV analysis, and dual SD Bioline HIV/syphilis. Countries like Zimbabwe had to transport STI samples to South Africa for further laboratory analysis due to a lack of resources.⁴¹

Similarly, in Tanzanian, HPV samples were transported to Germany after being kept for 9-12 months.³⁰ Two studies reported that PCR, reactive RPR, and a reactive TPHA diagnostic test

were rarely employed in PHC facilities, especially among KKP.²⁹⁻⁴⁹ In addition, described that Sylverken and colleagues reported that RT-PCR was associated with high maintenance costs.⁵¹ In Nigeria, high costs were associated with syphilis screening, which contributed to low testing coverage.⁴⁶

Two studies from South Africa and Kenya reported that integrating screening POC Gene Xpert methods into primary, tertiary, and ANC routine care services improved screening.²¹⁻³⁸ These studies also added that integrating the methods was highly feasible and acceptable and did not extend visit duration or disrupt clinic visits flow.²¹⁻³⁸ A Zimbabwean study by Martin *et al.*²⁶ conducted STI screening outside the laboratory using onsite mobile Gene Xpert equipment.

The study found that this approach offered same-day test results, decreased the waiting period for treatment, and was highly feasible in processing STI samples outside the laboratory.²⁶ Five studies screened STIs using RPR, Gene Xpert, PCR, HC2 DNA, and multiplex RT-PCR diagnostic tests. A high prevalence of STIs was found due to having high diagnostic accuracy, sensitivity, and specificity.²⁹⁻³⁰⁻³⁴⁻⁴²⁻⁵¹ Subsequently, Karim *et al.* and Sylverken *et al.* indicated that multiplex RT-PCR and PCR diagnostic tests could detect asymptomatic and symptomatic STIs.²⁹⁻⁵¹ In a study by Katanga *et al.* careHPV was indicated as an excellent alternative test compared to conventional DNA HPV in detecting HPV and was suitable for use in low- and middle-income countries.³⁰ Microscopic wet mount preparation was also reported as an appropriate method to be used in SSA PHC facilities due to its cost-effectiveness and ability to manage STIs.³⁴

Table 1: The search terms and strategy

Search	Query
#1	(((((('Management'* OR 'Control'* OR 'treatment' OR 'cure' OR 'prevention' OR 'screening' OR 'diagnosis' OR 'partner notification' for STI' OR 'PN' for 'STD' OR 'point of care for STI' OR 'POC for STI' OR 'prevention' OR 'contract tracing' OR 'diagnostic testing'))))))
#2	('Sexually Transmitted Infection'* OR 'sexually transmitted infection' OR 'STI'* OR 'Sexually Transmitted Disease'* OR 'sexually transmitted disease' OR 'STD*') OR ('Asymptomatic sexually transmitted infections')) OR ('syphilis'* OR 'treponema pallidum' OR 'Treponema pallidum' OR 'chlamydia'* OR 'Chlamydia trachomatis' OR 'chlamydia trachomatis' OR 'C. trachomatis' OR 'CT') OR ('Neisseria'* OR 'gonorrhoea'* OR 'Neisseria gonorrhoeae' OR 'NG') AND ('Trichomona'* OR 'Trichomoniasis' OR 'Trichomonas vaginalis' OR 'trichomonas vaginalis' OR 'TV' OR 'Curable sexually transmitted infections')) OR ('Male Urethritis

-
- #2 Syndrome' OR 'MUS' OR 'Genetical Ulcer Syndrome' OR 'GUS' OR 'Vaginal discharge syndrome' OR 'VDS' OR 'Human Papillomavirus' OR 'HPV' OR 'Bacterial vaginosis' OR 'BV') ('FSW' OR 'female sex workers' OR 'SW' OR 'sex workers' OR 'prostitute'* OR 'commercial sex workers') OR ('men who have sex with men' OR 'men who have sex with men' OR 'gay' OR 'homosexual male' OR 'homosexual'* OR 'bisexual'* OR 'bisexual male' OR 'transsexual' OR 'transgender' OR 'TG' OR 'high-risk population'* OR 'high-risk group population'* OR 'key populations'* OR 'KP') OR 'male' OR 'transgender female' OR 'transgender population' OR 'transgender people' OR 'tg' OR ('people with injecting drug use' OR 'PWID' OR 'IDU' OR 'injecting drug users') OR 'adolescent girls' OR 'adolescent girls and young women' OR 'AGYW' OR 'young women'
- #3 'Primary healthcare facilities'* OR 'PHC' OR 'health care facilities' OR 'Clinics' OR 'hospitals' 'sexual health clinics' OR 'antenatal care' OR 'ANC' OR 'antenatal care clinics'
- #4 'sub-Saharan Africa' OR 'SSA'* OR 'Angola' OR 'Benin' OR 'Botswana' OR 'Burkina Faso' OR 'Burundi' OR 'Cabo Verde' (Cape Verde) OR 'Cameroon' OR 'Central African Republic' OR 'Chad' OR 'Comoros' OR 'Congo' (Brazzaville) OR 'Democratic Republic of the Congo' (Kinshasa) OR 'Djibouti' OR 'Equatorial Guinea' OR 'Eritrea' OR 'Eswatini' (formerly Swaziland) OR 'Ethiopia' OR 'Gabon' OR 'The Gambia' OR 'Ghana' OR 'Guinea' OR 'Guinea-Bissau' OR 'Ivory Coast' (Côte d'Ivoire) OR 'Kenya' OR 'Lesotho' OR 'Liberia' OR 'Madagascar' OR 'Malawi' OR 'Mali' OR 'Mauritania' OR 'Mauritius' OR 'Mozambique' OR 'Namibia' OR 'Niger' OR 'Nigeria' OR 'Rwanda' OR 'Sao Tome' and 'Principe' OR 'Senegal' OR 'Seychelles' OR 'Sierra Leone' OR 'Somalia' OR 'South Africa' OR 'South Sudan' OR 'Sudan' OR 'Tanzania' OR 'Togo' OR 'Uganda' OR 'Zambia' OR 'Zimbabwe'
- #5 (((('Management'* OR 'Control'* OR 'treatment' OR 'Cure' OR 'Prevention' OR 'screening' OR 'diagnosis' OR 'Partner notification for STI' OR 'PN' for 'STDs' OR 'Point of care for STI' OR 'POC for STI' OR 'Prevention' OR 'Contract Tracing' OR 'Diagnostic testing')))) AND 'Primary healthcare facilities' OR 'health care facilities' OR 'Clinics' OR 'hospitals' OR 'sexual health clinics' OR 'antenatal care' OR 'antenatal care clinics' AND ('FSW' OR 'female sex workers' OR 'SW' OR 'sex workers' OR 'prostitute'* OR 'commercial sex workers') OR ('men who have sex with men' OR 'men who have sex with men' OR 'gay' OR 'homosexual male' OR 'homosexual'* OR 'bisexual'* OR 'bisexual male' OR 'transsexual' OR 'transgender' OR 'TG' OR 'high-risk population'* OR 'high risk group population'* OR 'Key populations'* OR 'KP') OR 'male' OR 'transgender female' OR 'transgender population' OR 'transgender people' OR 'tg' OR ('people with injecting drug use' OR 'PWID' OR 'IDU' OR 'injecting drug users') OR 'adolescent girls' OR 'adolescent girls and young women' OR 'AGYW' OR 'young women' AND 'Sub-Saharan Africa'* OR 'sub-Saharan' OR 'sub-Sahara Africa' OR 'SSA'* OR 'Angola' OR 'Benin' OR 'Botswana' OR 'Burkina Faso' OR 'Burundi' OR 'Cabo Verde' (Cape Verde) OR 'Cameroon' OR 'Central African Republic' OR 'Chad' OR 'Comoros' OR 'Congo' (Brazzaville) OR 'Democratic Republic of the Congo' (Kinshasa) OR 'Djibouti' OR 'Equatorial Guinea' OR 'Eritrea', 'Eswatini' (formerly Swaziland) OR 'Ethiopia' OR 'Gabon' OR 'The Gambia' OR 'Ghana' OR 'Guinea' OR 'Guinea-Bissau' OR 'Ivory Coast' (Côte d'Ivoire) OR 'Kenya' OR 'Lesotho' OR 'Liberia' OR 'Madagascar' OR 'Malawi' OR 'Mali' OR 'Mauritania' OR 'Mauritius' OR 'Mozambique' OR 'Namibia' OR 'Niger' OR 'Nigeria' OR 'Rwanda' OR 'Sao Tome' and 'Principe' OR 'Senegal' OR 'Seychelles' OR 'Sierra Leone' OR 'Somalia' OR 'South Africa' OR 'South Sudan' OR 'Sudan' OR 'Tanzania' OR 'Togo' OR 'Uganda' OR 'Zambia' OR 'Zimbabwe'
- Add (#1); (#1 & #2); (#1 & #2 & #3); (#1 & #2 & #3 & #4); (#1 & #2 & #3 & #4 & #5)**
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Table 2: The inclusion and exclusion criteria used for the identification and selection of the eligible publications/literature

Aspect	Inclusion Criteria	Exclusion Criteria
P (Population)	Key populations: sex workers (female sex workers and clients), gay men and other men who have sex with men, transgender people (transgender females/males), people who inject drugs, people in prison, and other enclosed settings. Priority population: people living with HIV, pregnant women, adolescent girls and young women, orphans, homeless children, people with disabilities, and mobile workers. Individuals 18 years and above All races/ ethnicity	Studies reporting on the following: Individuals younger than 18 years old Focusing outside SSA Reporting on non-KPP
I (Intervention)	We defined STIs-related interventions as any intervention conducted in a primary healthcare facility for KPP to create awareness and prevent transmission and acquisition of STIs, such as educational programmes, counselling, and PN	Any intervention not related to STIs
C (Comparison)	Different STI diagnosis methods Different STI prevention methods Different SSA countries Different population group type	Not relevant to this study
O (Outcomes)	STI screening/testing/diagnosis, STI prevention, and treatment services availability, accessibility, coverage, efficiency, effectiveness, efficacy, quality services, timeliness; and people-centredness Number/percentage of STI screening/testing, STI diagnosis Linkage to care STI treatment Partner tracing STI incidence Condom distribution/utilisation	Not describing STI screening/testing/diagnosis services Not describing STI prevention and treatment methods Not describing or measuring STI outcomes
Other parameters		
S (Study design)	Cohort studies Observational studies Cross-sectional studies Prospective studies Qualitative studies Exploratory studies Case-control studies Randomized controlled trials Non- randomised controlled trials	Reviews (literature reviews) Commentaries Editorials Modelling studies Case reports Publication which did not report primary data.
Study setting	Sub-Saharan Africa This review will include all the studies conducted in Sub-Saharan Africa (Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde (Cape Verde), Cameroon OR Central African Republic, Chad, Comoros, Congo (Brazzaville), Democratic Republic of the Congo (Kinshasa), Djibouti, Equatorial Guinea, Eritrea, Eswatini (formerly Swaziland), Ethiopia, Gabon, The Gambia, Ghana, Guinea, Guinea-Bissau, Ivory Coast (Côte d'Ivoire), Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome	Non SSA

Article/ Report type	and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, South Sudan, Sudan, Tanzania, Togo, Uganda, Zambia, and Zimbabwe Full-text peer-reviewed studies Policies, technical reports, grey literature Unpublished studies	Animal studies, Opinion pieces
Language	English written language studies Studies with English translation	Non-English languages or without English translation
Period	2016 and onwards	Prior 2016

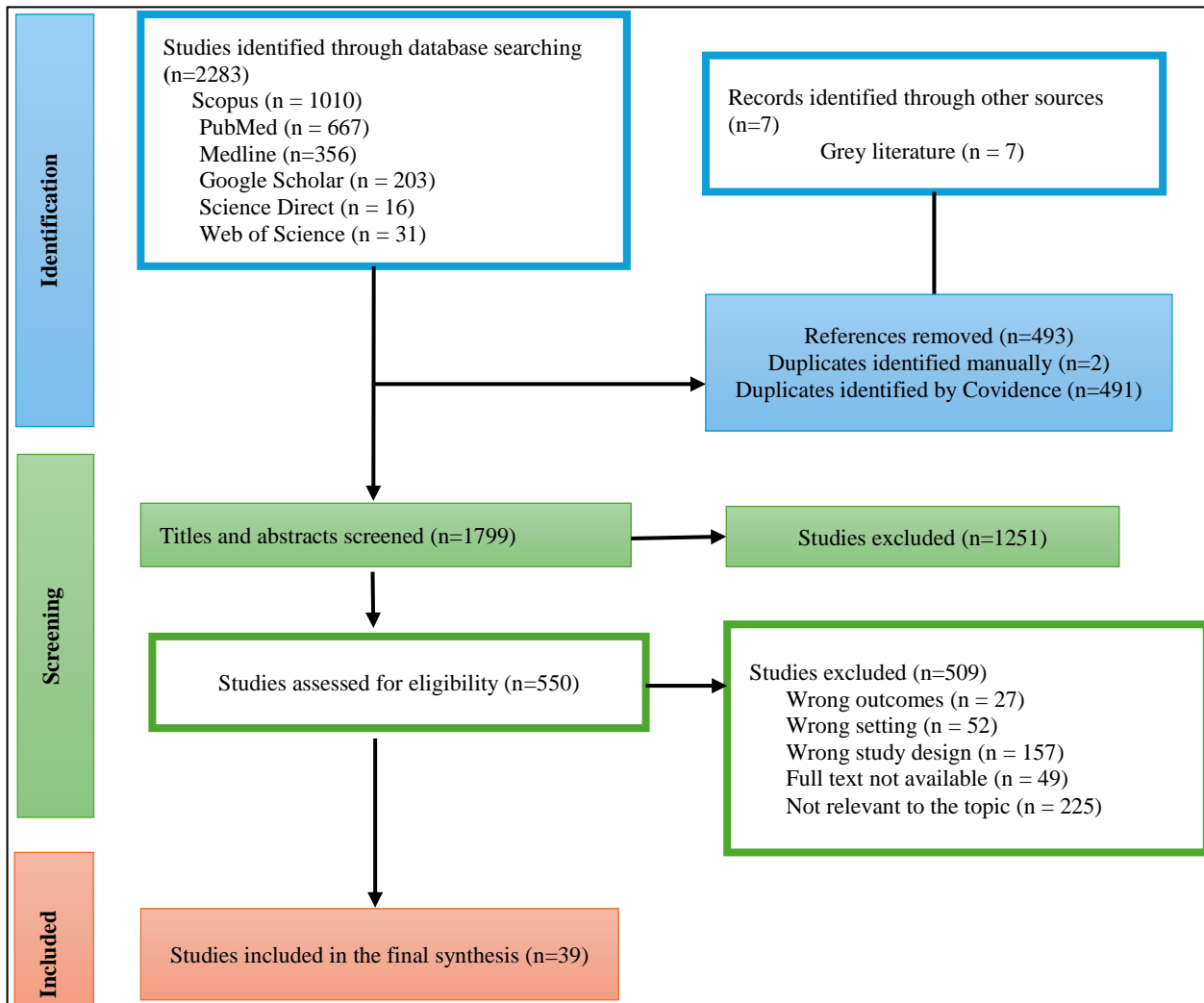


Figure 1: PRISMA flow chart represents the review selection process and eligibility
A Summary of the systematic review process using the preferred reporting items for systematic reviews and meta-analyses flow chart

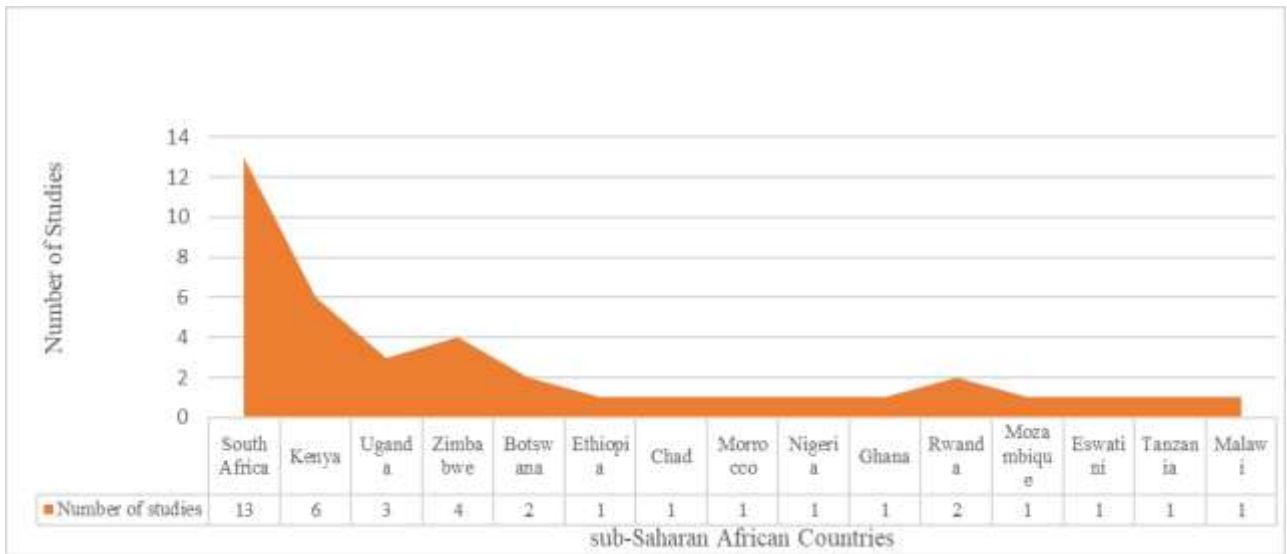


Figure 2: The distribution of studies within sub-Saharan Africa

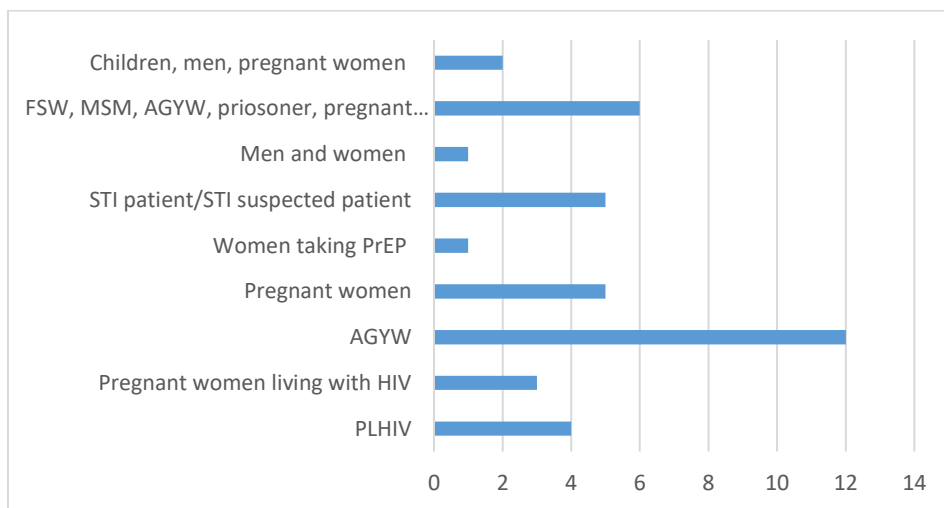


Figure 3: Key and priority populations in the review

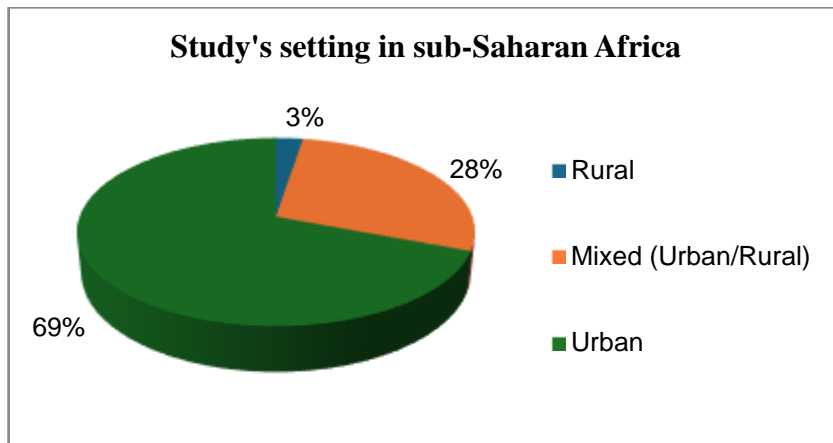


Figure 4: The setting of the studies in sub-Saharan Africa

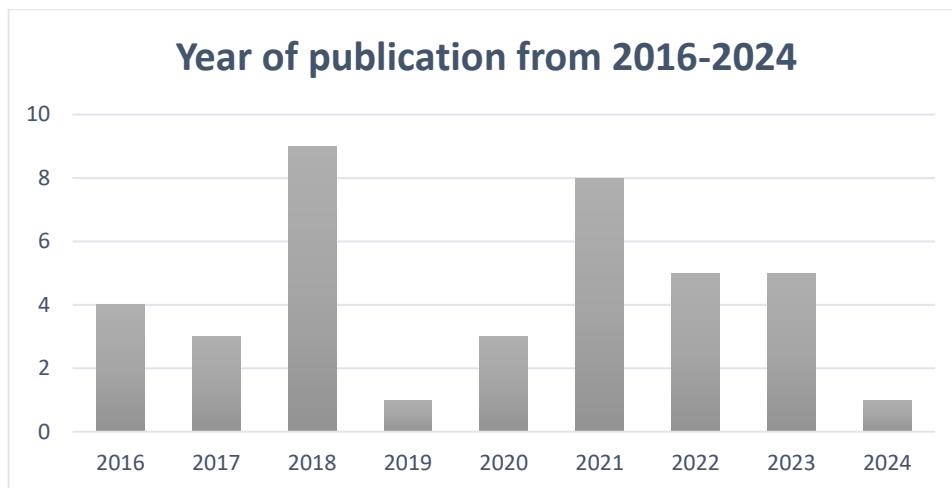


Figure 5: Studies publication period from 2016-2024

Table 3: The characteristics of the eligible studies reporting on STI control among key and priority populations in sub-Saharan Africa

First author, year	Country Setting	Sample size	Study period	Study design	Population and age	Primary healthcare facilities
Manjate <i>et al.</i> , 2024 (20)	Mozambique: Mavalane, mixed	n= 924	February 2018 to January 2019	Cross-sectional	Women aged 18-35 and above	PHC units, General Hospitals, primary health centres
Mwenda <i>et al.</i> , 2023 (21)	Kenya: Meru, Kitui, Kilifi, Kajiado, Mombasa, mixed	n=4500	October 2019 to December 2020	Pilot	Women aged 30–49 years old	Nine healthcare facilities
Chikwari <i>et al.</i> , 2023 (22)	Zimbabwe: Harare, Bulawayo, Mashonaland East, mixed	n= 10691	October 2020, and December, 2021	Cluster randomised trial	Youth aged 16-24 years old	CHIEDZA STI community health centre
Smith <i>et al.</i> , 2023 (23)	South Africa: Cape Town, urban	Not specified	January 2014 to January 2015	Decision analysis model	Women of reproductive-aged 15–49 years old	PHC
Mukwevh0 (5)	South Africa	Not specified	March 2023	Report	Key and priority populations	Not specified
Cleopatra Makura (24)	Zimbabwe	Not specified	November, 2023	Report	Pregnant and lactating women, SW, PWID, AGYW, artisanal miners, women in informal trading, LGBTIQ	Not specified
Wynn <i>et al.</i> , 2022 (25)	Botswana: Gaborone, urban	n=400	July 2015 and May 2016	Pilot	Pregnant women aged 18 years and older	Hospital and regional volumes for lower-level health facilities (e.g., clinics)
Martin <i>et al.</i> , 2022 (26)	Zimbabwe: Harare, Bulawayo and Mashonaland East, mixed	n= 3426	November 2019- March 2020	Cluster-randomised trial	Youth aged 16 to 24 years old	CHIEDZA Community Healthcare Centre
Stewart <i>et al.</i> , 2022 (16)	Kenya: Kisumu, urban	n=446	February 2020 to November 2021	Cluster randomised trial	Women aged ≥ 18 and ≤ 30 years old women taking PrEP	Research clinic
Nyemba <i>et al.</i> , 2022 (13)	South Africa: Tshwane District and Cape Town, urban	n=669	June 2016 and October 2017	Observational prospective	Pregnant women aged 25–34 years old	Public sector ANC clinics

Kularatne <i>et al.</i> , 2022 (27)	South Africa: Gauteng, Kwa-Zulu Natal, Western Cape Province, urban	n=769	January 2019 to December 2020	Cross-sectional	Men aged 25–36 years old	Alexandra Health Centre, Spencer road clinic, and Prince Cyril Zulu communicable disease centre
Adaway <i>et al.</i> , 2021 (28)	Chad: N'Djamena, urban	n=207	December 2017 to December 2018	Cross-sectional observational	Patients living with HIV aged 18 to 65 years old	Outpatient HIV clinic
Carveth-Johnson <i>et al.</i> , 2021 (12)	Botswana: Gaborone, urban	n=806	February and October 2019	Prospective cohort	Adults living with HIV aged 18-73 years old	Outpatient clinic
Karim <i>et al.</i> , 2021 (29)	Morocco: Fez City, urban	n=809	February 2015 and March 2017	Prospective cohort	Women aged 19 to 85 years old	University Hospital Centre Hassan II of Fez
Katanga <i>et al.</i> , 2021 (30)	Tanzania: Dar es Salaam and the Kilimanjaro Christian Medical Centre, urban	n=4080	December 2018 to October 2020	Cohort	Women aged 25-60 years old	ORCI in Dar es Salaam, the KCMC, and Mawenzi Regional Hospital
Maina <i>et al.</i> , 2021 (31)	Kenya: Nairobi, urban	n=297	April and June 2019	Case-control	Individuals aged 18 to 49 years old seeking treatment for STIs	STC Casino Health Centre
Mathews <i>et al.</i> , 2021 (32)	South Africa: Cape Town, urban	n=1050	June 2014 and August 2017	Randomised controlled trial	Men and women aged 18 years old and older diagnosed with an STI	Public clinic
Peters <i>et al.</i> , 2021 (33)	South Africa: Tshwane District, urban	n=841	June 2016 and September 2017	Non-randomized prospective cohort	HIV-infected pregnant women aged 26–34 years old	PHC facilities
Wall <i>et al.</i> , 2021 (34)	Rwanda: Kigali, urban	n=1592	January 2016 and August 201	Prospective cohort	Men and women aged 18 and above	Centre for Family Health Research
Chitneni <i>et al.</i> , 2020 (35)	South Africa: Soweto, urban	n=216	September 2015 to April 2016	Prospective cohort	Adolescent girls and young adults aged 16–24 years old	MatCH Research Unit, Chris Hani Baragwanath Hospital
Medina-Marino <i>et al.</i> , 2020 (36)	South Africa: Tshwane urban	n = 28	May and October 2017	Qualitative	Pregnant women living with HIV, aged 22–39 years old	PHC facilities
Thivalapill <i>et al.</i> , 2020 (37)	Eswatini: Mbabane, Manzini, and Hlathikulu, mixed	n=415	October 2017 to May 2019	Cross-sectional	HIV-positive adolescents and young adults aged 15–24 years old	Three outpatient HIV clinics
Nakku-Joloba <i>et al.</i> , 2019 (14)	Uganda: Mulago, Nakuru, Kampala, urban	n=54	May to November 2016	Exploratory	Antenatal women and their partners aged 25–44 years old	IDI, SRH Clinic, Mulago National Referral Hospital; antenatal and the STD Clinics and the Kasangati Health Center IV antenatal clinic

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Morikawa <i>et al.</i> , 2018 (38)	South Africa: Tshwane District, urban	n=430	June 2016 and October 2017	Prospective cohort	HIV-infected pregnant women aged ≥ 18 years old	Three PHC clinics
Huchko <i>et al.</i> , 2018 (39)	Western Kenya: Migori County, rural	n=5898	February and December 2016	Qualitative	Women who tested HPV-positive aged 33-51 years old	Community health campaigns Health care facilities
Garrett <i>et al.</i> , 2018 (11)	South Africa: Durban, KwaZulu-Natal, urban	n=267	May 2016 and January 2017	Prospective cohort	Young women aged 18–40 years old	Clinic for STIs
Kaida <i>et al.</i> , 2018 (40)	South Africa: Durban and Soweto, urban	n=352	November 2014 to April 2015 and September 2015 to April 2016	Prospective cohort	Adolescents and young adults aged 16–24 years old	Clinic at Commercial City and Chris Hani Baragwanath Hospital
Mbulawa <i>et al.</i> , 2018 (41)	South Africa: Soweto and Cape Town, urban	n=298	November 2013 and December 2014	Cross-sectional	Sexually active, HIV-negative women, AGYW aged 16±22 years old	Community outreach programs and adolescent-friendly sexual reproductive health services centre
Kilmarx <i>et al.</i> , 2018 (42)	Zimbabwe: Harare, urban	n= 600	June 2014 to April 2015	Cluster-randomised trial	STI patients (women and men) aged 15-35+ years old	Chiedza community intervention centre (Research centre)
Olugbenga <i>et al.</i> , 2018 (43)	Nigeria: Oyo, Imo and the Federal Capitol Territory mixed	n=4500	Not specified	Prospective cohort	Pregnant women aged 27–33 years old	Antenatal clinic
South African National Department of Health (44)	South Africa	Not specified	Not specified	Report	Children, men, pregnant women	Not specified
Kenya Ministry of Health (45)	Kenya	Not specified	October 2018	Report	Pregnant women. FSW/MSWs, MSM PWID, AGYW, STI-exposed infants, children	Not specified
Masese <i>et al.</i> , 2017 (46)	Kenya: Mombasa, urban	n=628	August 2014 and March 2015	Cross-sectional	Adolescent girls and young women aged 15–24-year-old	Clinic for STI
Malawi Ministry of Health (47)	Malawi	Not specified	October 2015 to February 2016	Report	Men, women and neonatal	Not specified
Republic of Rwanda Ministry of Health (48)	Rwanda	Not specified	November 2018	Report	FSW, MSM, and persons in correctional facilities. aggression of children, pregnant women, AGYW	Not specified

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Katusiime <i>et al.</i> , 2016 (49)	Uganda: Kampala, urban	n=355	July 2011 and April 2012	Cohort	FSW, long-distance drivers, barmaids, taxi drivers, commercial motorcycle riders, soldiers, police officers, prison officers, security guards, prisoners, and fishermen aged 20≥50 years old	Urban clinic
Mayanja <i>et al.</i> , 2016 (50)	Uganda: Kampala, urban	n=241	April 2010 to May 2011	Cross-sectional	FSWs aged 18 years and older	Urban community centre
Sylverken <i>et al.</i> , 2016 (51)	Ghana: Kumasi, urban	n=200	February and April 2014	Cross-sectional	Women visiting an STI clinic aged 21-30 years old	STI clinic
Ali <i>et al.</i> , 2016 (52)	Ethiopia: Gambela, mixed	n=186	March to July 2015	Cross-sectional	STI suspected patients, aged 15-35 years old	OPD of Gambella Hospital

Table 4: Laboratory-based diagnostic methods for screening and diagnosing sexually transmitted infections and their gaps and successes among key and priority populations in sub-Saharan Africa

First Author, Year	Country	Type/s of STIs	Type/s of STI Methods	Population Type	Gaps	Successes
Mwenda <i>et al.</i> , 2023 (21)	Kenya	HPV	POC GeneXpert	Women aged 30–49 years old	-A delay in results and high loss to follow-up	HPV testing was integrated into routine GeneXpert at Kenya's primary care and tertiary facilities
Martin <i>et al.</i> , 2022 (26)	Zimbabwe	CT/NG	On-site mobile Gene Xpert	Youth aged 16 to 24 years old	-There were inadequate laboratory skills to operate the onsite mobile Gene Xpert -Consistent intermittent electricity supply due to screening being conducted outside the laboratory Not specified	- Processing STI samples outside the laboratory environment was feasible. -Onsite mobile Gene Xpert platform offered same-day results and reduced waiting treatment period
Wall <i>et al.</i> , 2021 (34)	Rwanda	TV, BV, VCA, NG	RPR serologies and vaginal pool swabs for microscopy of wet preparation of TV, BV, and VCA samples- Endocervical swabs and urethral swabs sample extracts were tested using GeneXpert testing for NG and CT (Cepheid, Sunnyvale, USA)	Men and women aged 18 and above		-Wet mount results for BV and VCA helped diagnose NG -Microscopic wet mount preparation is inexpensive and could manage STIs in women. -A high prevalence of NG and CT among study participants was found
Karim <i>et al.</i> , 2021 (29)	Morocco	NG, CT, and MG	PCR was done to detect bacterial infectious agents (NG, CT, and MG)	Women aged 19 to 85 years old	-The diagnosis of STIs using PCR is rarely prescribed at PHC facilities since STI cases are clinically diagnosed based on clinical symptoms	-The PCR method detected MG, NG, and CT in asymptomatic women more than in symptomatic women. -There was a high prevalence of bacterial STIs, especially NG, in asymptomatic patients
Katanga <i>et al.</i> , 2021 (30)	Tanzania	HPV	careBrush. HC2 testing and liquid-based cytology using ThinPrep® Pap Test Plastic Spatula (Innogenetics). HPV	Women aged 25-60 years old	-The period between the analyses of the care HPV and HC2 samples was longer. -The HC2 samples were kept in PreServCyt solution for 9-	-CareHPV indicated a good concordance with HC2 in detecting HPV independent of age, HIV status, and testing setting.

			DNA testing was done using the HC2 DNA test. Cervical specimens were obtained for careHPV analysis.		12 months before being shipped to Germany for further analyses	-careHPV testing is a good alternative to conventional DNA HPV testing and can be used in low- and middle-income countries with outstanding performance
Morikawa <i>et al.</i> , 2018 (38)	South Africa	STIs (CT, NG, TV)	POC diagnostic screening for CT, NG, and TV using the Cepheid Xpert CT/NG assay and the Xpert TV assay	HIV-infected pregnant women \geq 18 years old	-POC diagnostic screening requires skilled nurses/personnel to operate them, routine maintenance, and sufficient human resources	-Integration of POC diagnostic STI screening into first-visit antenatal care services was feasible and highly acceptable. -Integrating STI testing in ANC routine care did not disrupt clinic flow and extend the overall visit duration
Kilmarx <i>et al.</i> , 2018 (42)	Zimbabwe	NG, CT, TV, TP, MG, HSV, Syphilis	Venipuncture was done to withdraw blood samples for HIV and syphilis serologic testing. Non-treponemal testing by RPR, and treponemal testing by TPHA, nucleic acid amplification testing, GeneXpert, and multiplex PCR test procedure were used to test ulcer specimens for TP, NG, CT, TV, MG, and HSV through collected urethral, vaginal, urine, and/or genital ulcer specimens	STI patients (women and men) aged 15-35+ years old	-Samples are transported/ shipped to the lab (NICD) in Johannesburg, South Africa, for analysis, and results are unavailable on the same day	-HIV/STI prevalence in this STI study population was 2.8 times than the overall adult population
Olugbenga <i>et al.</i> , 2018 (43)	Nigeria	HIV/Syphilis	Dual RDT, the SD Bioline HIV/Syphilis Duo Test	Pregnant women aged 27–33 years old	-There is low syphilis testing coverage in pregnant women. This is due to the high cost of syphilis. Furthermore, treatment is delayed due to syphilis results not being available on the same day.	The SD Bioline HIV/Syphilis Duo Test showed a high overall diagnostic accuracy for HIV and a high specificity for syphilis diagnosis in the ANC clinic. -Patient acceptability of the dual RDT was positive.
Masese, <i>et al.</i> , 2017 (46)	Kenya	CT, NG, TV	Testing was performed using transcription-mediated amplification for CT, NG, and TV withdrawn from urine samples using the Hologic Aptima Detection System	Adolescent girls and young women aged 15–24-year-old	-Not specified	-STI prevalences in this study were relatively low due to attending school -The uptake of STI testing in this study provides evidence that school-based recruitment linked to facility-based testing

Sylverken <i>et al.</i> , 2016 (51)	Ghana	BV/ STIs	Multiplex RT-PCR was used to detect seven bacterial STI pathogens	Women visiting an STI clinic aged 21-30 years old	-Multiplex real-time PCR is expensive and requires highly skilled personnel to operate it	is feasible and acceptable when conducted in collaboration with students, parents, and teachers -Multiplex RT-PCR methodology revealed high detection rates for MH and the two <i>Ureaplasma</i> spp (UU and UP) in symptomatic and asymptomatic women. The multiplex real-time PCR methodology identified seven STI pathogens
Katusiime <i>et al.</i> , 2016 (49)	Uganda	Syphilis, hepatitis B, genital herpes, HPV infection, NGU, and NG	Syphilis infection was tested with a positive reactive RPR and confirmed with a reactive TPHA. Hepatitis B infection was based on a positive hepatitis B surface antigen result	Female sex workers, long-distance drivers, barmaids, taxi drivers, commercial, prison officers, security guards, prisoners, and fishermen aged 20≥50 years old	-This is the first Ugandan study to screen STIs among high-risk populations within an HIV care program.	-A high prevalence of STIs was found among certain HIV-positive high-risk groups with a quarter of high-risk cohort diagnosed with an STI

Table 5: Prevention and treatment methods for sexually transmitted infections, their gaps and successes among key and priority populations in sub-Saharan Africa

First Author, Year	Study setting	Type of STI/Syndromes	Treatment/Prevention	Population Type	Gaps	Successes
Manjate <i>et al.</i> , 2024 (20)	Mozambique	NG, CT, MG, and TV	Syndromic management	Women aged 18-35 years and above	-Syndromic management of vaginal discharge had low accuracy in detecting STIs. - under-treatment of STI-positive cases and incorrect or over-treatment of women with urogenital complaints	A high prevalence of non-viral STIs and HIV-1/2 infection was observed, with chlamydia being the most common non-viral STI.
Cleopatra Makura 2023 (24)	Zimbabwe	Not specified	Use of Traditional herbs to treat STIs and syndromic management	Pregnant and lactating women, sex workers, PWD, AGYW, Artisanal Miners, Women in informal trading, LGBTIQ+	-Stockouts of medicines -High cost of STI diagnostic and treatment -Parents/guardians act as barriers to accessing STI services among young people	-Not specified
Mukwevho <i>et al.</i> (5)	South Africa	NG, CT, syphilis, Viral hepatitis, trichomoniasis, VDS, MUS	Prevention: Condoms, lubricants, VMMC, Counselling, HPV vaccination, cervical cancer screening	Key and priority populations	Stigma, discrimination, and rights violations	Not specified
Chikwari <i>et al.</i> , 2023 (22)	Zimbabwe	CT, NG, TV	-Syndromic management -PN for STI-positive patients	Youth aged 16-24 years	stockout of test kits for STIs	STI prevalence was high among youth living with HIV
Smith <i>et al.</i> , 2023 (23)	South Africa	STIs and BV	Syndromic management	Women of reproductive	-Additional costs for system improvement to ensure adequate record-keeping for	-Integrating syndromic management with rapid GIFT-Expect Microscopy

				aged 15–49 years	screening history or identifying high-risk individuals. -The vaginal discharge algorithms of syndromic management resulted in untreated STIs/BV due to their asymptomatic nature	device and GeneXpert NG/CT and GeneXpert TV assays was cost-effective and improved STIs and BV care in women
Mwenda <i>et al.</i> , 2023 (21)	Kenya	HPV	Treatment services were done using visual inspection with acetic acid (VIA), cryotherapy and LEEP	Women aged 30–49 years	HPV testing is not widely available in Kenya's public healthcare system.	73% of those who tested positive on VIA received treatment with cryotherapy
Kularatne <i>et al.</i> , 2022 (27)	South Africa	NG, CT, TV, and MG, Syphilis, HSV-2:	Syndromic treatment. NG (ceftriaxone-azithromycin)	Men aged 25–36 years	Continued gonococcal antimicrobial resistance to ceftriaxone is due to having diverse sexual networks/multiple partners selection pressure and reinfection from used recent antibiotics Treatment (Kenyon & Schwartz, 2018)	The dual treatment of ceftriaxone-azithromycin was able to treat NG among men
Stewart <i>et al.</i> , 2022 (16)	Kenya	STIs (NG, CT, syphilis)	Doxycycline post-exposure prophylaxis	Women aged ≥ 18 and ≤ 30 years old women taking PrEP	Doxy-PEP is associated with antibiotic resistance, tolerability, and low adherence	-Doxy-PEP reduced the incidence of STIs and was found to be an inexpensive intervention, especially in settings where testing is unavailable or unaffordable - Doxy-PEP is woman-controlled and does not rely on partner participation

Wynn <i>et al.</i> , 2022 (25)	Botswana	STI (NG, CT, TV)	Syndromic management	Pregnant women aged 18 years and older	-Syndromic management missed some infections and overtreated many uninfected women and their partners adverse birth outcomes, low-birth-weight infants	-Not specified
Nyemba <i>et al.</i> , 2022 (13)	South Africa	CT, NG, TV	PN and syndromic management Prevention: Counselling and condoms	Pregnant women aged 25–34 years attending public sector ANC clinics	Association between adverse pregnancy outcomes and STI diagnosis (CT and NG)	Integration of PN and syndromic management resulted in a reduction in 78 % of the STI burden at post-natal visits
Carveth-Johnson <i>et al.</i> , 2021 (12)	Botswana	CT/NG	PN and Test of Care. CT-positive individuals were treated with 1 g of oral azithromycin. while NG or both CT and NG patients were given 250 mg intramuscular ceftriaxone plus 1 g of oral azithromycin	Adults living with HIV aged 18-73 years	Asymptomatic STIs were missed in PLHIV	Integrating STI testing into routine HIV care was feasible, and self-collecting specimens was highly acceptable
Peters <i>et al.</i> , 2021 (33)	South Africa	STIs (CT, NG, TV)	Aetiological testing and syndromic management: CT was treated with a 1 g oral dose of azithromycin. NG was treated with ceftriaxone (250 mg intramuscular injection) and metronidazole, 2 g oral dose for TV for seven days	HIV-infected pregnant women aged 26–34 years old	-Not specified	-Syndromic management is highly acceptable, feasible, and reliable in primary care settings when implemented with aetiological testing within ANC clinics. -Same-day STI detection and antimicrobial treatment -The syndromic management used during ANC resulted in a higher prevalence of STI around

						the time of delivery than when aetiological testing was used
Adaway <i>et al.</i> , 2021 (28)	Chad	Syphilis	Syndromic management: Treatment with a single dose of BPG	Patients living with HIV aged 18 to 65 years	- lack of routine syphilis screening. -Limited data on STIs, particularly syphilis -Syphilis infection was found to be regular among PLHIV	BPG 2.4 MU remains the best treatment for all syphilis stages with no resistance reported, and it achieved serologic response within six months of treatment
Mathews <i>et al.</i> , 2021 (32)	South Africa	STIs	STI PN, counselling and provider-assisted partner services on partner referral and syndromic approach	Men and Women aged 18 years and older diagnosed with an STI	PN (provider-assisted partner services) was not widely valued and has resulted in a very low uptake among people with STIs	accurate knowledge about STIs and high levels of PN self-efficacy
Maina <i>et al.</i> , 2021 (31)	Kenya	NG, CT, TV, and MG	Syndromic treatment	Individuals aged 18 to 49 years old seeking treatment for STIs	-A high rate of overtreatment -A poor diagnostic accuracy of the vaginal discharge syndrome for the diagnosis of cervical infections	-Urethral discharge syndrome in men screened for four STIs -Vaginal infections were able to screen TV among women
Thivalapil <i>et al.</i> , 2021 (37)	Eswatini	CT, NG, TV	Syndromic management	Adolescents and young adults living with HIV aged 15–24 years	-Syndromic management poorly screened asymptomatic STIs -A high rate of overtreatment -Low rates of correct treatment	high prevalence of CT, NG, and TV among AGYW living with HIV
Chitneni <i>et al.</i> , 2020 (35)	South Africa	CT, NG, and MG	PN	Adolescent girls and young adults aged 16–24 years old	PN was associated with stigma, dissolution of the relationship, and patient confusion.	A smaller proportion of youth reported notifying partners of their STI results

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Medina-Marino <i>et al.</i> , 2020 (36)	South Africa	CT, NG, and TV	Syndromic management, TOC	Pregnant women living with HIV aged 22–39 years	With a poor understanding of what STI they are diagnosed with and what treatment they are taking, individuals may struggle to explain to their partners the urgency of seeking care -Fear of conflict and domestic violence, living separately from partners -The return to the clinic for treatment of male partners after PN by infected pregnant women was low	STI test and treatment intervention assisted women in reducing feelings of shame and guilt and allowed some of them to disclose their STI status to their partners -Not specified
Nakku-Jaloba <i>et al.</i> , 2019 (14)	Uganda	Syphilis	PN	Antenatal women and their partners aged 25–44 years	-A high rate of overtreatment -Poor diagnostic accuracy when using vaginal discharge to diagnose cervical infections -Poorly screened for PID when using lower abdominal pain syndrome	Not specified
Mbulawa <i>et al.</i> , 2018 (41)	South Africa	HPV, CT, NG, MG, TV, HSV, TP	Syndromic management	Individuals aged 18 to 49 years old seeking treatment for STIs	Immediate treatment, EPT and test of cure are rarely prescribed, particularly in the LMIC setting	-reduced the prevalence of STI at 6 weeks of follow-up - EPT pack to be a more useful tool to treat and engage their sexual partners - acceptable to young South African women and partners
Garrett <i>et al.</i> , 2018 (11)	South Africa,	CT, NG, TV, and NG	PN: immediate treatment and EPT.	Young women aged 18–40 years old		

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Kaida <i>et al.</i> , 2018 (40)	South Africa	CT, NG, MG, TV, and BV, herpes simplex virus, CA	Syndromic management	Adolescents and young adults aged 16–24 years	-It had a low sensitivity and offered no value in identifying the highly prevalent asymptomatic GTI infections (BV and CA) in females. -There was a high and frequent asymptomatic burden of GTI infection among South African youth	Not specified
Huchko <i>et al.</i> , 2018 (39)	Kenya	HPV	Cryotherapy treatment	Women who tested HPV- positive aged 33-51 years old	Linkage to treatment in women with a positive HPV test was low	Cervical cancer screening using HPV testing of self- collected samples and treatment with cryotherapy reached a larger proportion of women when offered through periodic CHCs compared to when it is done at healthcare facilities.
Republic of South Africa, National Department of Health (44)	South Africa	AVD, LAP, MUS, SS, GUS, BU, GW, PL, GM, contagiosum, Balanitis	Prevention: Counselling, education, condoms, contact treatment/ partner management, circumcision and cervical cancer screening. Treatment: Syndromic management: NG: ceftriaxone + azithromycin CT: GUS, Bubo azithromycin BV: metronidazole, CA:	Children, pregnant women and men	Not specified	Not specified

Kenya Ministry of Health (45)	Kenya	UD, AVD, Cervicitis, GUD, SS, PID, Anorectal Syndromes, Proctitis, Proctocolitis, Anal/Genital Lesions/growth	<p>Clotrimazole, Herpes simplex: acyclovir, Syphilis: Benzathine benzylpenicillin (M, 250 mg)</p> <p>Azithromycin, oral (1 g)</p> <p>Prevention: Education, counselling, vaccination, condom, and contact tracing</p> <p>Treatment: The aetiological approach using a good laboratory setting. Urethral discharge in men (Cefixime 400 mg, and Azithromycin 1 gm), Vaginitis (Clotrimazole pessaries 100 mg intravaginally OD for 6 days and Metronidazole 2 gm), Cervicitis (Cefixime 400 mg, Azithromycin 1gm), Lower abdominal pain in women (Cefixime 400 and doxycycline 100 mg) Genital ulcer syndrome, Benzathine penicillin 2.4 MU Azithromycin 2 gm, Syphilis (Benzathine penicillin G 2.4 MU)</p> <p>Syndromic management GUD: Benzathine penicillin 2.4 mega units</p>	Pregnant Women. FSW/MSWs, MSM PWID, AGYW, STI-exposed infants, children	<p>-Lack of laboratory services, -Limited referral healthcare facilities for treatment of STIs</p> <p>-Delayed treatment</p> <p>-Expensive laboratory equipment, reagents and training personnel</p>	Not specified
Malawi Ministry of Health (47)	Malawi	GUD, UD, AVD, LAP in women,	Syndromic management GUD: Benzathine penicillin 2.4 mega units	Men, women, and Neonatal	Not specified	Not specified

		SS, BU, BA and NC. genital warts and cervical cancer, syphilis.	via intramuscular injection; Syphilis: Ciprofloxacin 500 mg orally twice a day for three days or acyclovir 800 mg Chancroids: Primary genital herpes: Acyclovir 400 mg orally 3 times a day for 10 days, Genital herpes & BV: (Metronidazole 2grams orally, as a single dose), Candida albicans (yeast infection) (Clotrimazole vaginal pessary, 500 mg as a single intravaginal application), Azithromycin 1 gram orally as a single dose, Cefuroxime 1 gram orally as a single dose, metronidazole 2 grams orally, single dose NG, CT and/or TV: Gentamicin 240 mg IM single dose Prevention: Education, counselling, condom			
Ali et al.,2016 (52)	Ethiopia	NG	Syndromic management: NG ciprofloxacin 500 mg tablet by mouth stat (commonly), or spectinomycin, 2 g intramuscular (IM) stat (occasionally) or ceftriaxone 250 mg IM as a single dose (for recurrent	STI-suspected patients aged 15-35 years	An alarming percentage of resistance against ciprofloxacin was a challenge	It was found that ceftriaxone and cefoxitin antibiotics were excellent first-line treatment options for NG

Mayanja <i>et al.</i> , 2016 (50)	Uganda	STIs	infection) in combination with other antibiotics PN and condom use whenever they were diagnosed with STIs	FSWs 18 years and older	-Little has been reported on the acceptance of PN STI treatment for stable sexual partners of FSWs, sex work is still illegal, and, as a result, FSWs encounter police brutality, stigmatisation and poor attitudes from health workers -Low acceptance of partner treatment among FSWs diagnosed with STIs	Not specified
Republic of Rwanda Ministry of Health (48)	Rwanda	UD in men; AVG; GUS; IBU; SS; PP in women; Venereal (Condylomas); Purulent conjunctivitis of the newborn baby.	Prevention: Education and counselling, vaccination Treatment: Syndromic approach, Etiologic approach	FSW, MSM, persons in correctional facilities, children, pregnant women, AGYW	Not specified	Not specified

Prevention and treatment methods for sexually transmitted infections in sub-Saharan Africa

Table 5 outlines STI prevention and treatment methods in 29 published articles, including grey literature. The treatment methods that were assessed in the studies were syndromic management, PN, cryotherapy, and Doxy-PEP. Eleven studies considered syndromic management as a treatment for various STIs without specifying the antibiotics used.²⁰⁻⁴¹ One of these studies also indicated using traditional herbs as an additional treatment for syndromic management.²⁴ These studies were undertaken in varied populations, such as AGYW, FSW, children, MSM, individuals in prisons, children, adults, and pregnant women living with HIV.

These were done in Mozambique, South Africa, Botswana, Kenya, Rwanda, and Eswatini. On the other hand, seven other studies specifically stated using antibiotics in syndromic management treatment.

For instance, in Ethiopia⁵¹, NG was treated with 500 mg of ciprofloxacin, whereas in South Africa²⁷⁻³³, NG was treated with 250 mg of ceftriaxone or ceftriaxone-azithromycin. Syphilis was treated with benzathine penicillin in Chad²⁸, Kenya⁴⁵ and South Africa⁴⁴, while in Malawi, it is treated with ciprofloxacin or acyclovir. Other authors integrated syndromic management and prevention intervention with PN¹³⁻³²⁻¹²⁻²², while¹⁴⁻⁵⁰⁻¹¹⁻³³ assessed PN without integrating it with other treatment or prevention methods. Two studies conducted in Kenya used cryotherapy to treat HPV among women living with and without HIV.²¹⁻³⁹ Moreover, Doxy-PEP was used to treat NG, CT, and syphilis in Kenya.¹⁶ Several authors also highlighted prevention methods such as education, condom provision, counselling, HPV vaccination, and cancer screening, which are given alongside treatment intervention in Malawi⁴⁸, Rwanda⁴⁷, Kenya⁴⁵, and South Africa⁴⁴. South Africa also included VMMC in addition to other prevention strategies mentioned.

Gaps and success in the treatment and prevention of sexually transmitted infections

Syndromic management without specific antibiotics

Poor diagnostic accuracy in STI identification using vaginal discharge assessment was a barrier to syndromic STI management in seven studies conducted in South Africa, Botswana, Zimbabwe, Mozambique, Eswatini, and Kenya.^{20,23,25,31,37,40-41} Under-treatment and over-treatment of STI-positive cases were also syndromic management disadvantages in the same studies. Furthermore, syndromic management was associated with missing asymptomatic STIs, low sensitivity, and adverse birth outcomes.²⁵⁻⁴⁰ Nonetheless, syndromic management screened and treated four STIs using urethral discharge in men and TV using vaginal infections in women.³² In a study conducted by Thivalapil et al., a high prevalence of STIs (CT, NG, and TV) were found using syndromic management.³⁷ Similar results were found in a study conducted in Mozambique, although the study observed the prevalence of HIV and non-viral STIs.²⁰ Smith et al. indicated that the syndromic management approach performs more efficiently and effectively when integrated with diagnostic testing techniques such as rapid GIFT-Expect microscopy device, GeneXpert NG/CT, and GeneXpert TV assays.²³

Syndromic management with specific antibiotics

Neisseria gonorrhoea was found to be highly resistant to ciprofloxacin antibiotics in Ethiopian PHC facilities.⁵² The use of BPG as a treatment for syphilis resulted in more cases of the infection²⁸ However, in a Chad's study, it was indicated that BPG remained the appropriate treatment for all syphilis stages and was not associated with antibiotic resistance.²⁸ In Botswana, syndromic management treatment resulted in missed asymptomatic STIs among PLHIV.¹² Additionally,

other authors reported challenges with the issue of medicine stockout in PHC facilities.⁴⁴ South African study stated stigma, discrimination, and human rights violations as barriers experienced by KPP in accessing STI treatment services.⁵ Nonetheless, dual ceftriaxone-azithromycin was reported to be the best treatment for NG among South African men.²⁷ In Ethiopia, ceftriaxone/cefotaxime antibiotics were also noted to be the first-line treatment for NG.⁵² Two other studies carried out in South Africa and Botswana indicated that integrating syndromic management treatment with aetiological testing and other programs, such as routine HIV care programs, was highly acceptable, feasible and reliable in PHC settings.¹²⁻³³ Peters et al. further showed that syndromic management can allow same-day STI identification and treatment, enabling simultaneous detection of multiple pathogens in a short period.³³ Furthermore, STI identification via multiplex PCR also proved to be an effective method.

Partner notification

Eight studies were conducted on PN; two did not specify the type of PN strategy used, and three specified the use of expedited partner therapy (EPT) or partner referral and provider-assisted partner therapy. In addition, the three remaining studies integrated PN with treatment methods such as syndromic management and test of cure. Additionally, prevention methods such as condom use, and counselling were provided. In South Africa, PN is not widely prescribed and valued in PHC facilities, and this has resulted in its low uptake.¹¹⁻³² In addition, Mayanja et al. found a low acceptance of PN among sex workers.⁴⁵ Also, a lack of a clear understanding of the diagnosis and the treatment, dissolution of the relationship, fear of domestic violence or conflict and stigma were factors that contributed to the failure of PN intervention.¹⁴⁻³⁵⁻³⁶ Success linked with PN intervention includes a reduction in the prevalence of STIs at a 6-week follow-up among young women who had notified their sexual partners.¹¹⁻³⁵

A high level of PN efficacy and knowledge of STIs³² and disclosing STI status³⁶ improved the uptake of PN. Additionally, when PN is integrated with syndromic management, it results in a 78% reduction in the burden of STIs at post-natal visits¹³.

Doxycycline post-exposure prophylaxis

A Kenyan study conducted on Doxy-PEP among women aged 18 years and above discovered a strong probability of antibiotic resistance, tolerability, and low adherence.¹⁶ Stewart et al. further found that Doxy-PEP reduced the incidence of STIs and was an appropriate, inexpensive intervention to use in areas where testing is very expensive or unavailable.¹⁶

Cryotherapy treatment

Only two studies from Kenya reported the use of cryotherapy treatment for HPV. The uptake of this treatment was lower due to a lack of awareness in the community.²¹⁻³⁹

Additionally, treatment with cryotherapy reached a more significant proportion of women when offered through periodic CHCs than when given within PHC facilities treatment.²¹⁻³⁹

Discussion

This systematic review aims to understand the status quo on the management of STIs in PHC facilities among KPP in SSA. Thirty-nine (39) published studies and grey literature across 15 SSA countries were included. Of 39 studies, 11 reported on diagnostic methods, and 29 focused on treatment and prevention methods used in PHC facilities. Most studies (13/44) emanated from South Africa, highlighting advancement in diagnostic methods or laboratory systems within the country. Our review found that (i) STI syndromic case management remains the preferred /standard care for STI treatment; (ii) 11 studies were carried out on laboratory tests, with four assessing POC Gene Xpert, which were the most preferred methods (iii) seven studies reported on other types of diagnostics methods such as SD Bioline HIV/syphilis, PCR, RPR and TPHA, and (iv) 29 studies reported on treatment/prevention methods. Barriers such as high loss of patient follow-up and lack of expertise to conduct laboratory tests were associated with using laboratory diagnostic methods. Stockout of antibiotics, high rate of antibiotic resistance, low sensitivity and accuracy of syndromic management were among the barriers associated with the STI treatment approaches.

Sexually transmitted infections screening and diagnostic methods

This systematic review has discovered that SSA countries use similar diagnostic tests or methods to screen different STIs comprising NG, CT, TV, MG, BV, and VCA POC.^{26,29,34,37,42,43,49} For example, in a study carried out among pregnant women, syphilis screening was done using dual SD Biolone HIV/syphilis in Nigeria⁴³, while, among the KP, men and women, syphilis was screened using non-treponemal testing by reactive RPR and confirmed by treponemal testing with TPHA in Zimbabwe.⁴²⁻⁴⁹ Similar diagnostic methods were recommended by WHO³, and a systematic review by⁵³ which was conducted in the United States of America (USA). However, as compared to non-treponemal testing with RPR and treponemal testing using TPHA, a dual SD Biolone HIV/syphilis can provide results within 5-30 minutes and provides simultaneous results for syphilis and HIV from a single finger prick.⁵³ This offers a promising opportunity to expand STI and HIV screening and coverage, allowing early diagnosis and treatment.

Gaps and success in laboratory-based diagnostic techniques or methods

A systematic review conducted in the USA revealed that the POC Gene Xpert platform required routine calibration and maintenance, controlled laboratory temperature conditions, and consistent laboratory personnel training.⁵⁴ Similar findings were noted in this review, where the use of POC Gene Xpert was associated with a shortage of individuals with laboratory-based expertise²⁵⁻²⁶⁻³⁸, routine maintenance²⁵⁻³⁷, availability of human resources³⁷ and loss of patient follow-up due to delays in getting laboratory test results²¹⁻³⁰⁻⁴². The WHO report¹ has indicated that the challenge with using laboratory-based or diagnostic tests was the unavailability of the suitable reagent needed to detect STI pathogens locally. Moreover, other associated challenges were late treatment due to delayed test results and high maintenance costs.¹ This review acknowledges the above-observed results. It also reported that transporting samples to other countries for further analysis was challenging.³⁰⁻⁴² Notably, a high cost is linked with screening for syphilis.⁴³

It is important to acknowledge the success linked with using diagnostic methods as they provide opportunities to guide future directions, plans and priority actions. This review has demonstrated that integrating diagnostic methods with existing programs in PHC facilities could reduce STI transmission cases and improve access to screening services.²¹⁻³⁸ Corroborating evidence was reported in a scoping review conducted in low- and middle-income countries, indicating that integrating POC services into routine care was highly feasible and acceptable.⁵⁵

The current review highlights a novel finding that mobile Gene Xpert equipment presents a significant advancement in technology because it can provide same-day test results, decrease the waiting period for treatment, and be used outside the laboratory environment.²⁶ Therefore, this equipment is suitable for use in resource-limited settings where STI screening is expensive or unavailable. Furthermore, this review also indicated that multiplex RT-PCR and PCR diagnostic tests can detect symptomatic and asymptomatic STIs.²⁹⁻⁵¹

Subsequently, other authors reported that these diagnostic tests have high accuracy, specificity, and sensitivity in detecting STIs.²⁹⁻³⁰⁻³⁴⁻⁴²⁻⁵¹ Comparable findings were noted in a systematic review and meta-analysis conducted by Xie et al. in China who indicated that Xpert CT/NG had high diagnostic accuracy for CT and NG as well as high sensitivity and specificity in the detecting anorectal, urethral, and vaginal samples.⁵⁶ In addition, Van Der Pol et al. also discovered that multiplex RT-PCR can exhibit excellent performance in detecting TV, NG, and CT.⁵⁷ These latter methods could simplify the diagnostic workflow, limit the turnaround time, and detect up to eighteen different organisms.⁵⁸ Moreover, this review suggested leveraging school-based recruitment intervention to increase STI screening, especially among AGYW, as it involves parents, teachers, and learners and was stated to be highly feasible and acceptable.⁴⁶

Gaps and successes of Sexually transmitted infections treatment and prevention methods

Doxycycline post-exposure prophylaxis presents a promising opportunity for STI treatment, especially

among KPP. In this review, it was reported to be inexpensive and can reduce the incidence of STIs.¹⁶ This was supported by Luetkemeyer et al. findings, which found that Doxy-PEP can be used as an alternative treatment strategy for STIs due to its ability to decrease the prevalence of STIs and that the female partner can regulate it.⁵⁹ Doxycycline post-exposure prophylaxis hindrances highlighted in the current review include low tolerability, antibiotic resistance, and low adherence.¹⁶ Further primary investigation is needed to develop reliable scientific evidence and to conclude the likelihood of Doxy-PEP antibiotic-resistant, particularly among KPP.

The WHO report utilised cone biopsy, cryotherapy, large loop excision of the transformation zone (LEETZ), and thermal ablation for precancer treatment.⁴ In this review, only cryotherapy was used as a treatment for HPV in two Kenyan studies conducted by different authors in different settings (rural and urban).²¹⁻³⁹ This treatment method was effective and acceptable, especially when utilised in the CHC rather than in PHC facilities. In a previously published qualitative study conducted in South Africa, it was indicated that factors such as male partners' violent reactions, unwillingness and stigma from healthcare service providers or society negatively affect PN effectiveness.⁶⁰ In addition, in a systematic review conducted in SSA on the acceptability and efficacy of PN of curable STIs, fear of adverse reactions, intimate partner violence, and stigma were possible barriers.⁶¹ This review's authors demonstrated similar PN limitations.¹¹⁻¹⁴⁻³¹⁻³²⁻³⁶ Moreover, poor attitudes from healthcare workers, brutality by police, and being a sex worker were other PN shortcomings which reduced its effectiveness and acceptability among users.²²

Prior studies have categorised PN into different types and based its success on that. For instance, an evidence review conducted in the United Kingdom indicated that both the patient-led referral and provider referral resulted in index partners notifying their partners about the potential exposure.⁶² The current review also noted different PN types, such as uncategorised or simple PN, EPT, partner referral, and provider-assisted partner therapy. However, it was primarily focused on finding the outcomes of PN rather than comparing

amongst the types. What this review found was never reported in prior studies⁶²⁻⁶³ and tended to close the knowledge gap in PN successes. In this review, it was found that PN can reduce the prevalence of STI when an index partner notifies their sexual partner/s¹¹ and can work more efficiently when integrated with other treatment as well as prevention interventions¹³. Furthermore, PN can allow women to disclose their STI status to their partners³⁶, reducing their feelings of shame and guilt.

On the other hand, emerging evidence indicates that the syndromic management approach is a poor predictor of asymptomatic STIs and cervical cancer.² Studies in this review reported that the approach is linked with overtreatment and drug resistance and long-term adverse sexual and reproductive health effects, confirming the above findings. Additionally, we found that syndromic management was associated with many inappropriately treated/untreated patients, missed infections, and poor diagnostic accuracy.²⁰⁻²³⁻³¹⁻³⁷⁻⁴⁰⁻⁴⁻⁴³ A few studies have also indicated an issue with the medicine stockout for STI treatment.²⁴ With regards to syndromic management successes, a review in India stated that it is easy to use, obtains treatment at the first visit, does not require laboratory or laboratory tests, has a high cure rate for most STIs, and can be integrated into PHC services/programmes.⁶⁴

In the current review, studies have found similar findings.¹²⁻²³⁻²⁷⁻³²⁻⁵² Other findings not included in the study by Gupta and colleagues⁶⁴ were that the syndromic management approach demonstrated a high detection ability.³⁷⁻²⁰ In India, the syndromic management flowcharts are recommended by the National AIDS Control Organization⁶⁴, while the WHO flowchart guidelines are utilised to guide the management of STIs in SSA.¹⁻¹⁵

The authors noted some similarities concerning syndromic management treatment methods; for instance, in both India and SSA countries, syndromes found after or noticed during the clinical assessment guide the type of treatment for a specific STI. This suggests that the syndromic management approach remains the standard treatment regime for STIs in low-resource settings. To effectively control for STI, cultural practices and norms need to be integrated into STI

preventive programs or campaigns because they play a significant role in the community's knowledge and awareness acquisition.⁶⁶⁻⁶⁷ Cultural practices in Nigeria, such as forced marriage and polygamous marriages, were stated to increase STIs.⁶⁶ Moreover, a study in the USA reported that older sexual partners and the culture of having to forgive cheating partners who engage in extra-marital affairs have the tendency to affect STI control and treatment.⁶⁷ This may lead to comorbidity of STIs, thus affecting treatment outcomes. It was further stated that the culture of normalising multiple sexual partnerships among males, even for those who are legally married, has grave consequences for STI control and prevention as well.⁶⁷

Religion, however, has played a protective role in reducing the acquisition of STIs by condemning adultery and fornication.⁶⁸ Subsequently, this review has indicated that traditional medicine or medicinal plants can be a valuable alternative treatment to the syndromic management approach. The WHO⁶⁹ revealed that roughly 80 % of African countries still rely more on medicinal plants to improve their health status and prevent STIs. Moreover, traditional medicine in African countries is preferred over seeking health care assistance from PHC facilities because they are readily accessible and affordable, clinics have insufficient staff, long distances travel to clinics, and do not need laboratory testing or processing.⁷⁰ Corroborating evidence was documented in a study conducted in Zambia, where it was reported that 52 medicinal plants completely treated different types of STIs.⁷⁰ Moreover, it was reported that these medicinal plants are rich in antioxidant compounds which have antimicrobial and antiviral effects and may inhibit infectious diseases such as STIs.⁷¹

Strength and limitations of the study

A significant strength of this review is that it provides essential information on sti control among kpp that would not otherwise be readily available through literature searches of published data. it covered many sti diagnostic, treatment and prevention methods. it was also conducted on various stis and kpps. to the author's knowledge, this was the first study conducted in ssa on

controlling and preventing stis among kpp in phc facilities. this review utilised casp and prisma p for quality assessment, ensuring the validity, transparency, and reliability of the reported findings. the review only focused on the studies conducted in ssa, which might have limited / missed some relevant studies carried out outside ssa. in addition, only the primary studies were the main focus of this review. studies published in english or with english translations were included. moreover, the review consisted of more studies conducted in urban areas than rural areas, which might have masked the representation of sti management in rural areas.

Conclusion

Syndromic case management remains the standard care for STI treatment in SSA countries. This review highlights the emergence or availability of advanced laboratory-based diagnostic methods. To achieve the WHO Vision 2030 of eliminating STIs as a global pandemic, integrating traditional syndromic case management with laboratory-based diagnostic methods in PHC facilities is essential to improve the diagnostic accuracy of STIs through early identification, diagnosis, and treatment. The gaps revealed in this review could be used to inform and guide policymakers or STI stakeholders by providing evidence-based data and insights for targeted interventions aimed at enhancing and improving the response to STIs. The review findings could bridge the knowledge gap and contribute to comprehensive insights into the control of STIs among KPPs in PHC facilities. Moreover, this can assist in allocating adequate funds and resources to areas needing enhancement in PHC facilities among KPP contributing to improved STI control. In addition, the success in laboratory-based diagnostics tests, particularly the mobile Gene Xpert equipment and treatment highlighted in this review, can be utilised or adopted to scale-up coverage, linkage to care to enhance the STI control measures in PHC facilities. Majority of the studies were conducted in urban areas due to advancements in diagnostic technologies for STI screening; future research should be conducted in rural areas to provide a comprehensive insight into the STI control

measures used in those settings. This would allow and aid in targeted approaches relevant to a specific setting.

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Ethics consideration

This systematic review forms part of a doctoral study by the first author, who has attained approval from the Research Ethics Committee (REC:2589-2024) at the University of Johannesburg (UJ). This work falls under an umbrella study funded by the South African Medical Research Council (SAMRC) within the SAMRC/UJ Pan African Centre for Epidemics Research (PACER) Extramural Unit funded research projects, namely harnessing big heterogeneous data to evaluate the potential impact of HIV responses among key populations in generalised epidemic settings in SSA (REC-1781-2022). This systematic review was registered with PROSPERO (ID: CRD42023439416). It used PICO and PRISMA frameworks to ensure it meets the appropriate reporting standards.

Two authors reviewed and approved the selected studies' eligibility with the third author's assistance to minimise reporting bias. Lastly, the PRISMA P checklist and CASP were used to ensure the transparency and quality of the reported results

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The control and prevention of sexually transmitted infections in primary healthcare facilities among key and priority populations in Sub-Saharan Africa: A systematic review.

This was presented during the virtual oral session

Competing interest

The authors declare no conflict of interest.

Authors' contributions

MAS., EP., and RNP-M conceived and established the study protocol. MAS. conducted the literature search., MAS., EP screened, extracted and assessed eligible studies. RNP-M confirmed the selected and eligible studies. MAS wrote and prepared—the first draft and final drafts. EP., RNP-M reviewed and edited the first and final drafts. All authors reviewed and agreed on the final manuscript before submission.

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