Mapping Evidence of Self-Sampling to Diagnose Sexually Transmitted Infections in Women: A Scoping Review

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INTRODUCTION

Sexually transmitted infections (STIs) are a global health challenge, with one million new cases diagnosed every day [1]. Although STIs affect both genders, women are at a higher risk due to the anatomy of their reproductive tract [2]. STIs are commonly diagnosed and treated based on the presentation of symptoms, particularly in low- and middle-income countries (LIMC) where access to technologically advanced diagnostic procedures are limited [3]. Often, STIs are treated using a syndromic management approach, where the patient is treated for a group of conditions that cause similar symptoms and often occur concomitantly. Although treating symptomatic STIs is effective, many asymptomatic infections are missed [4]. Not diagnosing or treating asymptomatic STIs may result in infections persisting or spreading. Diagnosing STIs mostly requires physically examining people who present to healthcare facilities [3], which may be challenging in remote areas where access to healthcare is limited [5,6]. Physical exams are unattractive to many people, due to the invasive nature of physical exam procedures and the social stigma associated with STIs [5,6]. Delayed diagnosis and treatment of STIs often increase the risk of STI related long-term health complications, including chronic pelvic pain, fertility issues, and cervical cancer development [7]. Self-sampling to diagnose STIs is widely used in high-income countries (HIC) as an alternative to having healthcare workers collect samples [8]. Through self-sampling, people can collect their specimens, either at healthcare facilities or at home, in relative privacy [7,8]. Allowing people to self-sample at their convenience eliminates various barriers often associated with STIs, such as lack of privacy and stigmatization [7,9]. Self-sampling may also promote the diagnosis and management of STIs in remote areas and allow people who are skeptical and uncomfortable with conventional clinic-based practices to access treatment [5]. Self-sampling is also effective in screening for asymptomatic infections [6,7]. As a means of scaling up global STI services, the World Health Organization (WHO) recommends the expansion of self-sampling [10]. Despite this recommendation, self-sampling interventions to diagnose STIs in women are not very well documented. The long-term effects of undiagnosed and untreated STIs, together with the difficulties associated with clinic-based management of STIs, contributes to the global challenges associated with STI management [11,12]. Self-sampling has the potential to facilitate STI management and expand STI service

AAIM OF STUDY

The aim of this scoping review was to map evidence on the use of self-sampling interventions to diagnose STIs among women

MATERIALS AND METHODS

The scoping review was guided by recommendations from Arksey and O'Malley [13], Colquhoun Levac [14], and Godfrey Peters [15]. Methods and findings were presented using the preferred reporting items for systematic reviews and meta-analyses extension for scoping reviews (PRISMA-ScR) guideline [16].

Identifying the Research Question

We asked the research question: What is the evidence on self-sampling interventions to diagnose STIs among women? We adopted the population, concept, and context (PCC) framework to effectively address the research question (see Table 1).

Identifying relevant studies

A comprehensive literature search was conducted in PubMed, Scopus, Web of Science, Medline (EBSCO), ProQuest, and Cochrane. For grey literature, a search was conducted in Open Grey, World Health Organization, Google, and conference proceedings and dissertations. All search results were screened and assessed for eligibility.

Table 1: PCC framework for defining eligibility of studies to address the research question

Criteria	Determinants	Description
Population	Women	Women of sexual reproductive age
Concept	Self-sampling interventions	• Women collecting their own specimens for STI diagnosis, either at home or at a healthcare facility without the aid of a healthcare professional (7, 17). • The self-sampling specimen collection kit. • Submission of self-collected specimens for diagnosis to a healthcare facility or directly to the laboratory. • Feedback on patient results. • Laboratory diagnostic techniques used for different specimen collection kits.
Context	Sexually transmitted infections	Sexually transmitted infections in women excluding Human Immunodeficiency Virus (HIV).

Study selection

Studies were selected in three screening stages. Screening of title, abstract, and full-text.

Data charting

We developed a data charting tool with variables relevant to the research question

Quality Appraisal of Included Articles

Included articles were critically appraised using the Mixed Method Appraisal Tool (MMAT), version 2018 [17].

Collating, Summarising, and Reporting Results

The included articles were thematically analysed to demonstrate how they related to the research question.

RESULTS

Screening results

Our search and screening strategy is outlined in the PRISMA flow diagram (Figure 1). We retrieved and screened 770 articles during title screening, of which 681 were from databases, nine were from Google, and 80 were from the WHO website. After abstract and full-text screening 44 studies were left for data extraction.

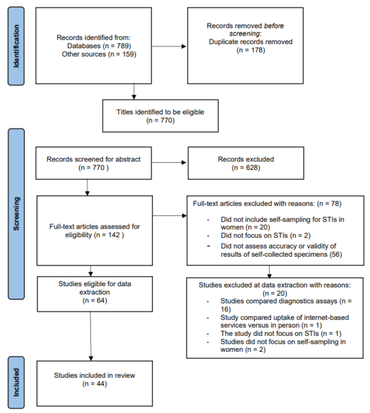


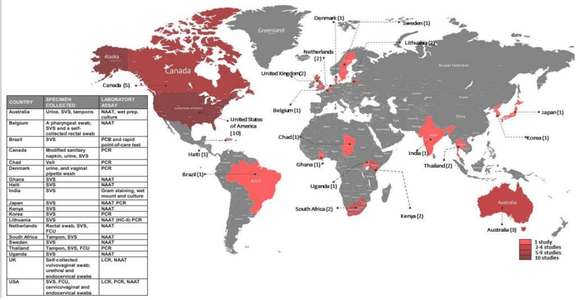
Figure 1*:* Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram of the study selection process

Quality Appraisal

Of the 44 studies included in the review, 36 studies were primary studies. The quality of these studies was appraised using the MMAT 2018 version [17]. The overall score of the studies ranged between 65% and 100%.

Characteristics of Studies

Out of forty-four studies, eleven (24%) studies were conducted in the United States of America (USA), five (11%) in Canada, three (7%) in Australia, two (5%) in the United Kingdom (UK), and two (4%) in The Netherlands. Two studies (4%) were conducted in South Africa, two (4%) in Lithuania, and two (4%) in Kenya. Only one (2%) study was conducted in each of the following countries: Brazil, Sweden, Korea, Ghana, Japan, Uganda, Haiti, Thailand, Belgium, Denmark, India, and Chad. In addition, four (8%) studies were systematic reviews and meta-analyses and were not assigned any specific study location. See Figure 2.



COUNTRY	SPECIMEN COLLECTED	LABORATORY ASSAY
Australia	Urine, SVS, tampons	NAAT, wet prep, culture
Belgium	A pharyngeal swab, SVS and a self-collected rectal swab	NAAT
Brazil	SVS	PCR and rapid point-of-care test
Canada	Modified sanitary napkin, urine, SVS	PCR
Chad	Veil	PCR
Denmark	urine, and vaginal specific swab	PCR
Ghana	SVS	NAAT
Haiti	SVS	NAAT
India	SVS	Gram staining, wet mount and culture
Japan	SVS	NAAT, PCR
Kenya	SVS	PCR
Korea	SVS	PCR
Lithuania	SVS	NAAT (HC-II) PCR
Netherlands	Rectal swab, SVS, PCH	NAAT
South Africa	Tampon, SVS	NAAT
Sweden	SVS	NAAT
Thailand	Tampon, SVS, FCU	PCR
Uganda	SVS	NAAT
UK	Self-collected vulvovaginal swab; urine; and endocervical swabs	LCR, NAAT
USA	SVS, FCU, cervicovaginal and endocervical swabs	LCR, PCR, NAAT

Figure 2: World map showing global evidence on self-sampling interventions for diagnosing STIs in women

Summary of findings

The following themes emerged from the included studies: feasibility, acceptance and ease of self-sampling interventions; types of self-sampling specimens; diagnostic accuracy of self-sampled specimens; agreement between physician-collected specimens and self-sampled specimens; pooled samples for STI diagnosis; and self-testing of STIs using self-collected specimens.

Feasibility, Acceptance, and Ease of Self-Sampling Interventions:

Nine studies reported on acceptance, ease of use, and feasibility of self-sampled specimens in settings where pelvic examinations were not routinely conducted and healthcare access was limited

Types of Self-Sampled Specimens:

Of the 33 studies that collected vaginal swabs, 18 studies used multiple types of self-sampled specimens including vaginal swabs, rectal swabs, pharyngeal swabs, tampons, and urine.

Diagnostic Accuracy in Self-Collected Specimens:

Irrespective of self-sample type, our findings highlight that diagnostic testing on self-collected specimens yields fairly accurate results when compared to clinician and physician collected specimens.

Agreement between Physician-Collected and Self-Sampled Specimens:

Strong agreement between vaginal swabs and cervical specimens suggests that self-sampled vaginal swabs could be used to improve access to STI healthcare services in high-risk populations.

Pooled Specimens for STI Diagnosis:

Two studies explored the use of pooled specimens to diagnose STIs. Our review reveals a large knowledge gap on the use of pooled patient specimens to diagnose STIs.

Self-Testing of Self-Collected Specimens:

Only one USA study reported on the use of self-testing assays on self-collected samples.

CONCLUSION

This scoping review presents global evidence on self-sampling interventions used to diagnose STIs in women. Our findings show that 23% of included studies were conducted in the USA. Despite receiving verbal and/or written instructions for specimen self-collection, studies found that self-sampling interventions to diagnose STIs in women were feasible. The lack of evidence on the use of pooled specimens for diagnosing STI is concerning in cases of anal and oral sex which may contribute to the spread of STI-causing pathogens to areas beyond the genital tract. The overall findings of the review highlighted that the diagnostic results on self-collected specimens were fairly accurate. Although STIs have been of great interest among the medical population, the level of public knowledge of such is not well known. It has been proven that sufficient knowledge about STIs has an effect on minimizing the spread of infection.

This scoping review shows that despite self-sampling interventions having the potential to improve STI management and treatment there is a need for self-sampling interventions tailored to the needs of users. Self-sampled vaginal swabs have the potential to increase access to healthcare. In LMIC settings, having women collect their own samples in private settings may save time and resources in primary care settings.

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