Introduction: HIV testing among men remains low globally and in sub-Saharan Africa (SSA) in particular, when compared with their female counterparts. The aim of this study was to synthesise evidence on barriers to HIV testing among men in SSA using a scoping review method.

Methods: A scoping review was conducted, guided by Arksey and O’Malley’s framework. A search was made in PubMed, American Doctoral Dissertations via EBSCOhost, Union Catalogue of Theses and Dissertations and SA ePublications via SABINET Online and World Cat Dissertations, Theses via OCLC and Google Scholar. The PRISMA (preferred reporting items for systematic reviews and meta-analyses) chart was used to document the review process. The PRISMA extension for scoping reviews – PRISMA-ScR: checklist and explanation – was also used. The mixed method appraisal tool version 2018 was used to determine the methodological quality of the included studies. Thematic analyses were conducted using Nvivo version 11.

Results: Key barriers to HIV testing among men in SSA were knowledge of HIV, fear of testing positive for HIV, stigma associated with HIV, healthcare providers’ services, confidentiality, and clinic setting.

Conclusion: Structural and individual factors present barriers to HIV testing uptake among men in SSA. Community and home-based initiatives have the potential to improve the uptake of HIV testing among men in SSA, considering the confidentiality concerns posed by clinic settings.

Keywords: Africa, HIV testing, men, screening, sub-Saharan Africa
investigated and addressed, in order to decrease men’s morbidity and mortality, as well as reducing HIV incidence among their sexual partners (Auld et al., 2015). While a number of studies have been conducted on barriers to HIV testing among men in SSA (Ehrhardt et al., 2009; Shand et al., 2014; Auld et al., 2015), this information has hardly been collated and synthesised. Collating and synthesizing this information is important for broader understanding of structural and individual factors that pose as barriers to HIV testing uptake among men. This may guide implementers on the ground, reveal research gaps and shape policy developments aimed at improving HIV testing uptake among men in SSA. The main objective of this study was to map evidence on the barriers to HIV testing uptake among men in SSA over a period spanning from January 1990 to August 2018.

Methods

Design
We conducted a scoping review of published peer-reviewed literature on the barriers to HIV testing uptake among men in SSA. This study was guided by Arksey and O’Malley’s (2005) scoping review framework, and Levac et al’s (2010) methodological enhancement for scoping review projects. We also followed the PRISMA extension for scoping reviews (PRISMA-ScR): checklist and explanation (Tricco et al., 2018). The population–concept–context (PCC) framework (Peters et. al., 2017) was also employed in this study to determine the eligibility criteria for potential articles to address the research question (Table 1).

Identifying the research question
The overall research question was: What are the barriers to HIV testing uptake among men in SSA?

Eligibility of the research question
The PCC framework was employed in this study to determine the eligibility of the research question (Table 1).

Identifying relevant studies
This study utilised evidence that presented empirical research. We conducted a keyword search for relevant articles from the following databases: PubMed/MEDLINE, American Doctoral Dissertations via EBSCO host, Union Catalogue of Theses and Dissertations (UCTD) and SA ePublications via SABINET Online and World Cat Dissertations, Theses via OCLC and Google Scholar. Publications by the Medical Research Council and Human Sciences Research Council were also reviewed. We searched for policies and guidelines on HIV testing among men from the following websites: World Health Organization (WHO), the Joint United Nations Programme on HIV/AIDS (UNAIDS) and governmental websites and statistics institutions. We included the following keywords during the search: “HIV testing”, “Africa”, “SSA”, “men” (Appendix 1). Boolean terms such as “AND” and “OR” were also used. We included the medical subject headings (MeSH) terms during keyword searches. Following keyword search and title screening, eligible studies were exported to the Endnote version 7 library for abstract screening and full article screening. We included articles published from January 1990 to August 2018. This review focused on the period between 1990 and 2018 because studies published prior to 1990 were unlikely to reflect the key aspects and changes pertaining to HIV/AIDS. This is the period that saw a number of studies on HIV/AIDS being conducted, as well as interventions and guidelines being developed and implemented to address HIV/AIDS. The following filters were used during the PubMed search: publication date – 1 January 1990 to 31 August 2018; species – humans; sex – male; subject – AIDS.

Study selection
Abstracts and full-article screening were conducted by the two independent reviewers, MH and SM, with guidance from the eligibility criteria for this study. The eligibility criteria were designed to focus the study only on the articles that address issues described in the research question. We worked closely with the University of KwaZulu-Natal library services during database searching and retrieval of articles. Studies that could not be retrieved from databases were obtained by contacting authors. The PRISMA (preferred reporting items for systematic reviews and meta-analysis) chart (Figure 1) (Moher et al., 2009) was employed to document the review process.

Eligibility criteria

Inclusion criteria
The following inclusion criteria were applied: (a) original research; (b) published in a peer-reviewed journal in English between January 1990 and August 2018; (c) research conducted in SSA; and (d) focused on HIV testing in men.

Exclusion criteria
Studies with the following characteristics were excluded: (a) not original research; (b) published before 1990; (c) languages other than English; (d) research conducted outside SSA; (e) not focused on HIV testing in men.

Quality of evidence
To determine the quality of the selected studies, a mixed method appraisal tool (MMAT, version 2018), was adopted and piloted by the two independent reviewers. The MMAT was utilised to scrutinise the relevance of study aim, adequacy and methodology, study design, data collection, study selection, data analysis, presentation of findings, author’s discussions and conclusions. An overall quality percentage score for each of the included studies was calculated and scores interpreted as low quality (<50%), average quality (51%–75%) and high-quality (76%–100%).

Table 1: The PCC framework

| Criteria   | Determinants                                                                 |
|------------|-----------------------------------------------------------------------------|
| Population | Men of all age groups in sub-Saharan Africa                                 |
| Concept    | HIV testing among men                                                       |
| Context    | 1990 to 2018. HIV/AIDS interventions and guidelines were implemented during this period |
**Charting the data**

We developed a data collection instrument (using Google forms) to confirm the study characteristics as well as relevance. The data charting form was updated continuously to ensure new information forms part of the analysis. While doing this, we were also highlighting the key concepts emerging from this exercise. This process was piloted prior to being fully implemented.

**Collating and summarising**

We used NVivo version 11 (QSR International, Daresbury, Cheshire, UK) to perform content analysis for all eligible articles.

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**Figure 1: PRISMA (preferred reporting items for systematic reviews and meta-analysis) flow diagram**
Results

Our electronic search strategy identified 2,061 references after database filters were applied, and 45 were retrieved from other sources (Figure 1). These were screened for titles and 2,059 articles were not selected at the database search stage because they did not meet our inclusion criteria: (a) original research; (b) published in a peer-reviewed journal in English between January 1990 and August 2018; (c) research conducted in SSA; and (d) focused on HIV testing in men. Twelve duplicates were removed, leaving us with 35 articles that were screened for abstracts; eight were removed at that stage. We further screened 27 full-text articles and excluded three because one was a study protocol, another was an opinion paper, and the last was a systematic review. Therefore, 24 articles met our inclusion criteria and were taken forward to data content analysis and quality assessment stages.

Characteristics of included studies

Ten studies were conducted using qualitative research methods (Johnston et al., 2010; Skovdal et al., 2011; Leichliter et al., 2011; Siu et al., 2013; DiCarlo et al., 2013; Matovu et al., 2014; Camlin et al., 2016; Fleming et al., 2016; Mambanga et al., 2016; Harichund et al., 2019), six were quantitative (Gage et al., 2005; Auld et al., 2015; Leta et al., 2012; Ngazi et al., 2012; Mhlongo et al., 2013; Stephenson et al., 2013), and five used mixed methods (Bwambale et al., 2008; Aarnio et al., 2009; Obermeyer et al., 2009; De Allegri et al., 2015; Leblanc & Andes, 2015). Two studies did not specify the research methods used (Remien et al., 2009; Sharma et al., 2017) and one was a randomized controlled trial (Ezeanolue et al., 2017). More than 10 SSA countries were represented in the included studies. The majority of included studies (76%) were published from 2010 onwards. The characteristics of included studies are given in Table 2.

Quality of evidence from included studies

All of the included studies that underwent methodological quality assessment achieved a high quality score between 80% and 100%. The overall evidence was considered to have minimal risk of bias.

Study findings

The following main themes emerged from the included studies: knowledge of HIV; fear of testing positive for HIV; stigma associated with HIV; healthcare providers and confidentiality; setting or location for HIV testing; masculinity; and sexual behaviour.

Knowledge of HIV

Eleven of the studies included in this review reported evidence on knowledge of HIV among men in SSA (Gage & Ali, 2005; Bwambale et al., 2008; Aarnio et al., 2009; Obermeyer et al., 2009; Leichliter et al., 2011; DiCarlo et al., 2014; De Allegri et al., 2015; Leblanc & Andes, 2015; Mambanga et al., 2016; Ezeanolue et al., 2017; Harichund et al., 2019), suggesting a generally high level of HIV knowledge among men in SSA (Gage & Ali, 2005; DiCarlo et al., 2014; De Allegri et al., 2015; Sharma et al., 2017). Two studies revealed that as many as 80% of sampled men were aware of the existing voluntary counselling and testing (VCT) programme in their area (Gage & Ali, 2005; Bwambale et al., 2008). Overall, high knowledge of HIV was evident in studies conducted in Burkina Faso (Obermeyer et al., 2009; De Allegri et al., 2015). In support of HIV knowledge, more than 90% of men indicated that VCT was important for the good of the individual and the family (Bwambale et al., 2008), despite not using that knowledge to improve its uptake. Men also generally understood the process followed when a client is tested for HIV (that is, pre-HIV counselling, drawing of blood for HIV testing and counselling on the prevention and control of HIV/AIDS) (Bwambale et al., 2008). Although men were aware of HIV, their understanding of risks involved with HIV transmission was flawed (Aarnio et al., 2009; Leblanc & Andes, 2015). Up to 39% of men in Malawi never discussed HIV with their wives (Aarnio et al., 2009), while some perceived themselves to be at high risk of contracting the virus (De Allegri et al., 2015). As many as three studies conducted in Burkina Faso, Uganda and Lesotho indicated that men do not test for HIV because they use their wife’s or partners’ HIV status as proxy indicators of their own HIV status (Bwambale et al., 2008; DiCarlo et al., 2014; De Allegri et al., 2015).

Fear of testing positive for HIV

Nine of the included studies reported evidence on fear of testing positive for HIV as a barrier to men’s uptake of HIV testing services in SSA (Bwambale et al., 2008; Aarnio et al., 2009; Obermeyer et al., 2009; Leichliter et al., 2011; Skovdal et al., 2011; DiCarlo et al., 2014; Matovu et al., 2014; Leblanc & Andes, 2015; Camlin et al., 2016; Mambanga et al., 2016; Sharma et al., 2017). Some of these studies indicated that men feared taking the HIV test due to the possibility of getting an HIV-positive result (Leichliter et al., 2011; Skovdal et al., 2011; Matovu et al., 2014; Leblanc & Andes, 2015; Mambanga et al., 2016). However, contradictory findings were observed in a study conducted in Burkina Faso, where men who had never tested for HIV perceived themselves to be at low risk of contracting this virus (De Allegri et al., 2015). As many as three studies conducted in Burkina Faso, Uganda and Lesotho indicated that men do not test for HIV because they use their wife’s or partners’ HIV status as proxy indicators of their own HIV status (Bwambale et al., 2008; DiCarlo et al., 2014; De Allegri et al., 2015).
| Table 2: Characteristics of included studies |
|-----------------------------------------------|
| Study aim | Country | Population | Sample | Age group | Research method |
| Aarnio et al., 2009 | Malawi | To explore married men’s perceptions of HIV in pregnancy and male involvement in antenatal HIV testing and counselling in Southern Malawi | Men 388 | 15 years & older | Quantitative & qualitative (cross-sectional survey & FGD) |
| Auld et al., 2015 | Multiple (East & West Africa) | To evaluate gender equity in ART access among adults | Men & women 765 877 | 15 years & older | Qualitative (Patent records) |
| Bwambale et al., 2008 | Uganda | To determine the prevalence and factors associated with VCT use among men in Bukoma West health sub-district, Kampala district | Men 780 | 15 years & older | Quantitative & qualitative (FGD, KI interviews) |
| Camlin et al., 2016 | Kenya & Uganda | To explore gender, cultural factors, and community-level processes that influence men’s HIV testing uptake | Men 230 | 15 years & older | Qualitative (Observations, FGD, in-depth interviews) |
| De Allegri et al., 2015 | Burkina Faso | To explore factors shaping the decision to undergo human immunodeficiency virus (HIV) testing among men in rural Burkina Faso | Men 937 | 15 years & older | Quantitative & qualitative (Survey & interviews) |
| DiCarlo et al., 2014 | Lesotho | To explore gender norms, sexual decision-making, and perceptions of HIV among a sample of Basotho men and women in order to understand how these factors influence HIV testing and prevention | Men & women 30 men; 200 women | 18 years & older | Qualitative (interviews) |
| Fleming et al., 2016 | South Africa | To explore masculinity-related barriers to men’s HIV testing, care and treatment | Men 60 | 18 years & older | Qualitative (interviews) |
| Gage et al., 2005 | Uganda | To examine rates and predictors of self-reported HIV testing among married men aged 15-54 in Uganda | Men 2439 | 15-54 years | Quantitative & qualitative (FGD interviews) |
| Harichund et al., 2019 | South Africa | To assess whether men or women in KwaZulu-Natal displayed a higher level of acceptability among married men aged 15-59 in South Africa | Men & women 12 females; 28 males | 18-62 years | Quantitative (interviews) |
| Leblanc et al., 2015 | Ghana | To explore men’s HIV knowledge, perceptions of HIV risk, and willingness to test for HIV in preparation for the initiation of voluntary counseling and testing (VCT) services at Frere Hospital in Durban, South Africa | Men 129 | 18 years & older | Qualitative (FGD) |
| Leichliter et al., 2011 | Lesotho | To explore sexual health care-access and -seeking behaviors in men, including sexual partners in a South African township outside Cape Town | Men 6778 | 15-59 years | Quantitative (semi-structured interviews, surveys, FGDs, interviews) |
| Leta et al., 2012 | Ethiopia | Men are less likely than women to be offered and accept routine HIV testing | Men 58 | Adult (age not specified) | Qualitative (FGD, KI interviews) |
| Matovu et al., 2014 | Uganda | To explore the motivations for and barriers to couples’ HCT among married men & women in Rakai, Uganda | Men 157 | 15 years & older | Qualitative (FGD, KI interviews) |

continued on next page...
Table 2 (continued): Characteristics of included studies

| Author & year             | Study aim                                                                 | Population          | Sample | Age group | Research method                      |
|---------------------------|---------------------------------------------------------------------------|---------------------|--------|-----------|--------------------------------------|
| Mhlongo et al., 2013       | To assess the effectiveness of incentivized mobile HCT in reaching unemployed men in Cape Town, South Africa | Men & women         | Not specified | 21–51 years | Qualitative (FGD, interviews)        |
| Obermeyer et al., 2009     | To investigate community influences on HIV testing among men ages 15–54, using Demographic and Health Survey (DHS) data from Chad, Ghana, Malawi, Nigeria, South Africa, and Zimbabwe | Men & women | Not specified | Not specified | Quantitative (DHS)                   |
| Nglazi et al., 2012        | To investigate community influences on HIV testing among men ages 15–54, using Demographic and Health Survey (DHS) data from Chad, Ghana, Malawi, Nigeria, South Africa, and Zimbabwe | Men & women | Not specified | Not specified | Qualitative (FGD, interviews)        |
| Remien et al., 2009        | To examine community-based strategies to strengthen men’s engagement in HIV care cascade in Sub-Saharan Africa | Men & women         | Not specified | Not specified | Qualitative (interviews)             |
| Sharma et al., 2017        | To examine community-based strategies to strengthen men’s engagement in HIV care cascade in Sub-Saharan Africa | Men & women         | Not specified | Not specified | Qualitative (interviews)             |
| Stephenson et al., 2013    | To investigate community influences on HIV testing among men ages 15–54, using Demographic and Health Survey (DHS) data from Chad, Ghana, Malawi, Nigeria, South Africa, and Zimbabwe | Men & women | Not specified | Not specified | Quantitative (interviews)            |

Stigma associated with HIV

Fourteen articles reported evidence on stigma and HIV testing uptake among men (Bwambale et al., 2008; Aarnio et al., 2009; Obermeyer et al., 2009; Remien et al., 2009; Leichliter et al., 2011; Leta et al., 2012; Nglazi et al., 2012; Siu et al., 2013; De Allegri et al., 2015; Camlin et al., 2016; Fleming et al., 2016; Mambanga et al., 2016; Sharma et al., 2017; Harichund et al., 2019). Studies conducted in Malawi, Kenya and Uganda, two from South Africa, and one each from Ethiopia, North Africa and SSA found that the stigma associated with testing HIV-positive persists in many communities and negatively affects men's engagement with HIV testing services (Aarnio et al., 2009; Remien et al., 2009; Leta et al., 2012; Camlin et al., 2016; Mambanga et al., 2016; Sharma et al., 2017) – especially given reported incidences of health care facilities’ failure to protect confidentiality (Nglazi et al., 2012; De Allegri et al., 2015; Harichund et al., 2019). These findings were supported by other studies conducted in Uganda and Burkina Faso, which concluded that if men tested seropositive, their families as well as communities would easily tell that they were HIV-positive (Bwambale et al., 2008; De Allegri et al., 2015), which would unintentionally expose them to rejection (Obermeyer et al., 2009), gossip and shame, and even lead to men committing suicide (Aarnio et al., 2009; Fleming et al., 2016). As such, men were even scared to attend local clinics because they were worried that they might meet people from their neighbourhoods (Bwambale et al., 2008; Harichund et al., 2019).

Health care providers and confidentiality

Evidence on confidentiality and the level of trust towards health care workers was reported in 10 articles (Bwambale et al., 2008; Aarnio et al., 2009; Leichliter et al., 2011; Skovdal et al., 2011; Nglazi et al., 2012; Siu et al., 2013; Le Blanc et al., 2015; Fleming et al., 2016; Sharma et al., 2017; Harichund et al., 2019). These articles revealed that men do not trust that their HIV-positive test results will, at all times, be kept confidential by the nurses at the clinics. Other studies indicated that men’s expectation of professionalism from health care workers was often undermined (Le Blanc et al., 2015) by health workers’ unsupportive and unfriendly reactions towards them (Leichliter et al., 2011). This included poor quality of care (Leichliter et al., 2011; Le Blanc et al., 2015; Harichund et al., 2019), breaches of trust and concerns that health care workers would gossip about HIV test outcomes to community members (Fleming et al., 2016). Some men displayed serious mistrust, even suspecting that health care workers were bribed by individuals to give incorrect HIV results (Bwambale et al., 2008). Men also refrained from HIV testing in local clinics, citing concerns that testing was conducted by counsellors from local communities, which threatened confidentiality (Leichliter et al., 2011). Therefore, more people preferred self-testing as a possible alternative (Harichund et al., 2019). Long queues and waiting periods of four to five hours at public clinics have also been cited as barriers to men’s health-seeking behaviour and retention to ARV treatment (Leichliter et al., 2011, Skovdal et al., 2011).
Setting or location for HIV testing
Evidence on the testing setting was discussed in 13 articles (Aarnio et al., 2009; Obermeyer et al., 2009; Remien et al., 2009; Leichliter et al., 2011; Skovdal et al., 2011; Stephenson et al., 2013; Matovu et al., 2014; Leblanc & Andes, 2015; Fleming et al., 2016; Mambanga et al., 2016; Ezeanolue et al., 2017; Sharma et al., 2017; Harichund et al., 2019). Studies conducted in South Africa, Ghana and SSA revealed that men generally felt that a public clinic setting made them feel uncomfortable to either test for HIV or collect ARV treatment (Leichliter et al., 2011; Leblanc & Andes, 2015; Fleming et al., 2016; Sharma et al., 2017) especially where there are local people known to them (Mambanga et al., 2016). One of the reasons cited was that public clinic waiting rooms were full of female patients and female health care workers (Leichliter et al., 2011; Skovdal et al., 2011), and that men therefore avoided such “women-centred” facilities (Stephenson et al., 2013). Hence, many of them do not support their pregnant partners during antenatal visits (Ezeanolue et al., 2017). Further studies revealed that unsuitable operating hours in public clinics served as a barrier to many men accessing HIV testing services because they were at work during these times (Remien et al., 2009; Matovu et al., 2014; Ezeanolue et al., 2017; Harichund et al., 2019) and cited the importance of extended service hours at weekends and having testing services and ARV collection sites closer to where they worked or lived (Ezeanolue et al., 2017). This may be particularly beneficial to men who avoided services at clinics that are located within their communities (Harichund et al., 2019).

Masculinity
Evidence on masculinity and HIV testing uptake was reported in eight articles (Bwambale et al., 2008; Aarnio et al., 2009; Skovdal et al., 2011; Siu et al., 2013; Auld et al., 2015; Camlin et al., 2016; Fleming et al., 2016; Sharma et al., 2017). Studies conducted in Zimbabwe, Kenya and Uganda found that health-seeking behaviour among men was an issue about masculinity (Skovdal et al., 2011; Camlin et al., 2016), which justified their reluctance to test for HIV (Fleming et al., 2016), or admit to ill-health (Auld et al., 2015). A high number of men who died in 2011 did so as a result of poor health-seeking behaviour, with 33% of men being lost to treatment between testing positive and initiating ART (Sharma et al., 2017). Studies conducted in South Africa and Zimbabwe revealed that some men believed that an HIV-positive test result meant that they had to adopt a new lifestyle and that this diminished their masculinity (Fleming et al., 2016) and negatively impacted their manhood (Skovdal et al., 2011). This was supported by other studies from Uganda and Kenya which established that men were reluctant to test for HIV because they feared being considered “weak” (Siu et al., 2013; Camlin et al., 2016), or losing dignity and respect if they tested HIV-positive (Siu et al., 2013). Even attending clinic with a spouse for HIV testing was uncommon and considered strange by some men (Bwambale et al., 2008), or ridiculed by other men (Aarnio et al., 2009).

Sexual behaviour and HIV
The extent to which men’s sexual behaviour affected HIV testing uptake was reported in seven articles (Gage & Ali, 2005; Bwambale et al., 2008; Johnston et al., 2010; Skovdal et al., 2011; Leta et al., 2012; Mhlongo et al., 2013; DiCarlo et al., 2014). Studies conducted in Lesotho, Uganda, Ethiopia, Zimbabwe and South Africa revealed that having multiple sexual partners was common among men in SSA (Bwambale et al., 2008; Skovdal et al., 2011; Leta et al., 2012; Mhlongo et al., 2013; DiCarlo et al., 2014). As many as 27%, 35% and 38% of men in Lesotho, Uganda and Ethiopia, respectively, reported having had more than one sexual partner in their lifetime (Bwambale et al., 2008; Leta et al., 2012; DiCarlo et al., 2014), with 77% having used a condom during their last sexual encounter (Bwambale et al., 2008). Although a high number of men engaged in risky sexual behaviours, only 9% of men perceived themselves to be at high risk of contracting HIV (Bwambale et al., 2008). Some men, however, cited that engaging in risky sexual behaviour made them fear that they might test HIV-positive (AOR 1.749, CI 1.196–2.557) and, as such, would rather avoid testing (Mhlongo et al., 2013; DiCarlo et al., 2014). Contradictory findings were observed in studies in Uganda, South Africa and Ethiopia, where an HIV test was more accepted among men involved in transactional sex (Gage & Ali, 2005) and those who engaged in risky sexual behaviours (Johnston et al., 2010; Leta et al., 2012).

Discussion
This review was aimed at synthesising evidence on barriers to HIV testing uptake among men in SSA. The results of our study indicated that several factors – knowledge of HIV, fear of testing positive for HIV, stigma attached to HIV-positive status, confidentiality, clinic setting, masculinity and risky sexual behaviour – were central to whether or not men in SSA would participate in HIV testing services.

In this article, masculinity refers to a social construction which defines a set of behaviours, attributes, and roles that characterise “men”, while risky sexual behaviours include unprotected sexual encounters and/or having multiple sexual partners, which may expose one to sexually transmitted infections or diseases such as HIV.

Despite HIV testing services being widely and freely available in SSA, men generally remain scared to test despite robust evidence of the benefits thereof. UNAIDS highlights the importance of people living with HIV knowing their status and noting the gaps in HIV knowledge, particularly among men (UNAIDS, 2017). The results of our study showed that while there was generally high knowledge of HIV, this knowledge rarely translates into HIV testing, and improved sexual behaviour remains controversial. UNAIDS further stresses the importance of innovations to engage with men differently in order to improve their participation in HIV testing services (UNAIDS, 2017).

Barriers to HIV testing uptake were demonstrated in the following countries: South Africa, Zimbabwe, Uganda, Lesotho, Ethiopia, Malawi, Kenya, Burkina Faso and Nigeria, as well as in studies conducted in sub-Saharan Africa, the Middle East and the North Africa region. Our findings show that, due to confidentiality concerns, HIVST was perceived as a feasible alternative to a clinic-level HIV test. Similar findings have also been shown in other studies (Hlongwa et al., 2019; Kakuhikire et al., 2016). Our
study also revealed the importance of attracting men using different strategies to improve testing uptake because clinic setting, working hours and stigma deter men's engagement with such services (Hlongwa et al., 2019). Our study findings further showed that masculinity remained a major barrier to men's HIV testing in SSA and UNAIDS stresses that addressing the entire 90–90–90 HIV cascade requires intensive efforts to address issues of masculinity to improve men's involvement in the programme (UNAIDS, 2017).

The findings of our study were consistent with the findings of other studies conducted elsewhere in resource-limited settings. Some studies found that HIV transmission knowledge remains inadequate (Campbell et al.; 2007; Fauk et al., 2018), despite the many educational efforts that had already been implemented in many countries. This suggests the importance of having a targeted approach when educating men. Fear and stigma have also been found to be serious barriers to HIV testing (Fauk et al., 2018). Confidentiality remains a barrier to men engaging on HIV testing services (Fauk et al., 2018), as men would usually prefer testing outside the clinic setting due to their fears of being seen by community members or of HIV-positive results being leaked to others. This study further showed that masculinity remained a barrier to men's health-seeking behaviour as well as HIV testing uptake among men; this is supported by other studies (Bila & Egrot, 2009; Siu et al., 2012; Nyamhanga et al., 2013; Mburu et al., 2014).

**Strengths and limitations**

All included studies underwent quality appraisal using an approved tool, the MMAT. Our full-article screening tool was piloted to ensure reliability of included studies. Although our title screening included a wide range of databases, the overall search strategy may have been biased towards public health and social sciences. Searching other bibliographic databases might have yielded additional published articles. Our search terms included keywords such as “HIV testing”; however, adding "HIV test" as a search term might have yielded additional relevant articles. Given that we applied filters during our database search, we acknowledge that this may have led to the exclusion of other relevant studies. We acknowledge that some of the included studies may be older and that changes may have occurred over time. Despite these limitations, we believe that our search strategy was comprehensive in reviewing public health and social sciences literature on the barriers to HIV testing uptake among men in SSA. We also acknowledge that men are diverse in terms of masculinity, sexual identity, sexual behaviour, ethnicity, culture and income; therefore, the structural and/or individual barriers to HIV testing uptake among men in SSA discussed in this review does not imply that all men face similar barriers to HIV testing uptake.

**Recommendations for future research**

Our study findings show that there are limited published scoping reviews specific to HIV testing, especially among men in SSA. Therefore, we hope that these results will add to the limited body of literature on scoping review studies. The introduction of HIV self-testing has proved to be an attractive alternative testing model for men (Kakuhihire et al., 2016; Hlongwa et al., 2020) and it has been shown to result in more men testing for HIV in similar settings (Choko et al., 2011; Henley et al., 2013; MacPherson et al., 2014; Kurth et al., 2015). However, more research is still needed to establish the accuracy of test kits (given the confirmatory test required after using HIVST), monitoring of test kits, and linkages of clients to care after testing HIV-positive.

**Implications for practice**

We concur with other studies in recommending that HIV testing services at the clinic level should be decentralised and also incorporated into home- and community-based programmes (Bwambale et al., 2008; Skovdal et al., 2011). Integrating HIV testing services with the delivery of other general services within a clinic setting may play a positive role in reducing the perceived stigma and confidentiality issues expressed by men in clinics. Targeting men at home, in communities, taxi ranks and the working environment should be strengthened to improve HIV testing for men who prefer settings outside of clinics (Leblanc & Andes, 2015) including mobile clinics (Lugada et al., 2010; Chami et al., 2014; Hensen et al., 2014). With the universal test and treat programme having been rolled out, we recommend that direct linkage to care should be implemented, strengthened and monitored at community testing campaigns.

**Conclusion**

The findings of this study indicate that HIV knowledge, fear of testing positive for HIV, stigma, confidentiality and masculinity remain key barriers to HIV testing uptake among men in SSA. Therefore, we conclude that strategies aimed at improving men's HIV testing uptake should be designed to address these issues. This study also concludes that community- and home-based initiatives may potentially yield better results among men testing for HIV with confidentiality concerns. The introduction of self-testing could potentially provide an effective and feasible alternative in this regard but further studies are still required to explore issues of quality and linkage to care.

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Appendix 1: Search filter for sub-Saharan Africa

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((("hiv"[MeSH Terms] OR "hiv"[All Fields]) AND testing[All Fields]) AND ("men"[MeSH Terms] OR "men"[All Fields])) AND ("africa"[MeSH Terms] OR "africa"[All Fields]) ((("1990/01/01"[PDAT] : "2019/08/31"[PDAT]) AND "male"[MeSH Terms] AND AIDS[sb] H Terms))