Patients’ self-reported factors influencing cervical cancer screening uptake among HIV-positive women in low- and middle-income countries: An integrative review

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ABSTRACT

Cervical cancer is among the most common causes of cancer-related deaths in low- and middle-income countries (LMICs). Despite the strong evidence regarding cervical cancer screening cost-effectiveness, its utilization remains low especially in high risk populations such as HIV-positive women. The aim of this review was to provide an overview on the patient-reported factors influencing cervical cancer screening uptake among HIV-positive women living in LMICs. We systematically searched EMBASE, PUBMED/MEDLINE and Web of Science databases to identify all quantitative and qualitative studies investigating the patient-reported barriers or facilitators to cervical cancer screening uptake among HIV-positive population from LMICs. A total of 32 studies met the inclusion criteria. A large number of barriers/facilitators were identified and then grouped into three categories of personal, social and structural variables. However, the most common influential factors include knowledge and attitude toward cervical cancer or its screening, embarrassment, fear of cervical cancer screening and test results, patient-healthcare provider relationship, social support, screening costs and time constraints. This review’s findings highlighted the need for multi-level participation of policy makers, health professionals, patients and their families in order to overcome the barriers to uptake of cervical cancer screening among HIV-positive women, who are of special concern in LMICs.

1. Introduction

Cervical cancer is the fourth most common neoplasm affecting women worldwide, with approximately 90% of cases occurring in developing countries (Ferlay et al., 2015). Cervical cancer is a leading contributor to the increased burden of diseases in less developed regions and it is acknowledged as the second most common cancer among women in developing areas (445 000 new cases each year) and the third leading cause of cancer-related mortality in developing countries (above 230 000 deaths each year) (Ferlay et al., 2015; Catarino et al., 2015).

Human immunodeficiency virus (HIV)-infection is known to be a well-elucidated risk factor of cervical cancer primarily through accelerating the development of pre-cancerous lesions in the cervix (Bonnet et al., 2004). HIV is also associated with higher rates of high-risk Human Papillomavirus (HR-HPV) acquisition, diminished clearance of HPV, more extensive pre-malignant lesions, and increased risk of cervical cancer when compared to HIV-negative women (Clifford et al., 2016; Massad et al., 2001). Furthermore, women with HIV have a more than two-fold risk of cervical cancer-related mortality compared to those who are HIV negative (Dryden-Peterson et al., 2016).

Cervical cancer is the only gynecological cancer for which screening tools are available, providing the opportunity for early detection of its precursor lesions. Several screening tests have been implemented for cervical cancer. Based on World Health Organization (WHO) reports (World Health Organization, 2006), the Pap test (cytology) is the only screening tool that has been studied in large populations and that has been shown to have been shown to effectively lower the risk of cervical cancer and cancer-related mortality. Other alternative screening tests such as visual inspection with acetic acid (VIA) or Lugol's iodine (VILI) are feasible options in resource-limited settings where cytology-based screening tools are not applicable; however, there is not enough
comparable evidence on their effectiveness (World Health Organization, 2006).

Despite introducing guidelines on cervical cancer screening for low- and middle-income countries (LMICs), cervical cancer screening practice is considerably low in LMICs. Studies of HIV-positive women across LMICs demonstrate relatively low utilization of cervical cancer screening services. In recent surveys carried out among HIV-positive women in Ethiopia (Solomon et al., 2019), Morocco (Belglaia et al., 2018), South Africa (Godfrey et al., 2019) and Laos (Sichanh et al., 2014) revealed a low cervical cancer screening uptake of 24.8%, 13%, 32.5% and 5.6%, which demonstrated a large gap with developed countries where uptake of cervical cancer screening among women with HIV is 78% to 85.7% in United States (Ogunwale et al., 2016; Tello et al., 2010) and 53% in United Kingdom (Shah et al., 2006). Therefore, the goal of WHO strategic planning in introducing the “comprehensive cervical cancer control” program is currently far from being achieved, since only small proportion of women have actually done cervical cancer screening in LMICs.

The lower rates of cervical cancer screening uptake have been previously attributed to numerous demographic and clinical characteristics of HIV patients (e.g., socio-demographics, clinical staging of HIV, CD4 cell count and duration on antiretroviral therapy) (Bailey et al., 2012; Ebu et al., 2015). However, up to this point, not enough attention has been paid to the personal, social, and structural factors, noted by patients themselves, that may influence their decision whether to undergo screening or not.

To our knowledge, no published systematic review has addressed the question of what are the women’s self-reported barriers/facilitators to cervical cancer screening in resource-limited settings in LMICs. The aim of this review was to assess the patient-reported personal, social, and structural factors influencing cervical cancer screening uptake among HIV-positive women, to notify future research, and to evaluate whether women living with HIV have different unmet needs.

2. Methods and materials

2.1. Search strategy and study selection

To identify the relevant studies, two independent authors (KH and MK) electronically conducted the searches in EMBASE, MEDLINE/ PUBMED and Web of Science through January 2020 based on PRISMA guidelines (Moher et al., 2009). The subject and text words search were performed separately in all relevant databases and then combined with ‘OR’ and ‘AND’ operators. The search included the following key words: ‘HIV’, ‘human immunodeficiency virus’, ‘AIDS’, ‘acquired immune deficiency syndrome’, ‘cervical cancer screening’, ‘pap test’, ‘pap smear’, ‘visual inspection with acetic acid’, ‘visual inspection with Lugol’s iodine’, ‘VIA’, ‘VILI’, ‘cervical cancer’, ‘cervical neoplasm’, ‘barriers’, ‘facilitators’, ‘utilization’, ‘uptake’, ‘perception’, ‘attitude’, ‘self-reported’, ‘patient-reported’. The reference lists of relevant studies were also reviewed in order to detect further studies that were not captured in the primary search.

2.2. Inclusion and exclusion criteria

Eligibility criteria included original quantitative, qualitative, and mixed methods (both quantitative and qualitative) research studies (i.e., not review articles, meta-analyses, conference papers, commentaries, or clinical trials) that (Ferlay et al., 2015) were written in English, (Catarino et al., 2015) have to be conducted in LMICs, defined as countries with a low- or middle-income status according to the World Bank’s classification, (Bonnet et al., 2004) must have assessed and reported patient-reported factors associated with uptake of cervical cancer screening in HIV-positive women in the quantitative literature or included factors women described as influencing their cervical cancer screening experience in the qualitative literature. Exclusion criteria were as follows: (Ferlay et al., 2015) not available in full text, (Catarino et al., 2015) those that did not specifically address barriers/facilitators to uptake of cervical cancer screening, (Bonnet et al., 2004) those did not clarify whether mentioned barriers/facilitators are reported by patients themselves or not (e.g., data regarding cervical cancer screening may extracted from medical charts or data registrations). It is important to note that during the reporting the results of included studies consisted of both HIV-positive and HIV-negative women, only data on HIV-positive subgroup was included and reported in the current review.

2.3. Data extraction and quality assessment

Data extraction and study quality assessment were performed independently by two researchers (HV and MK). In the case of disagreement among the 2 reviewers, it would be resolved by discussion with third author (NA). Regarding the study quality assessment, we used the Mixed Methods Appraisal Tool (MMAT), a tool designed for the quality appraisal of qualitative, quantitative and mixed-methods studies (Pace et al., 2012). No study was excluded due to a low-quality assessment score.

We used summary tables to extract study characteristics of selected articles (i.e., authors, year and setting of the study, sample size, study design, age and screening status of participants, and main outcomes) along with quality assessment results. After reviewing and identifying several patient-reported factors associated with uptake of cervical cancer screening across included studies, these factors were grouped into three categories including personal, social, and structural barriers/ facilitators based on “women’s autonomy in healthcare decision-making” (Sherwin, 1998), in order to organize a comprehensive overview of cervical cancer screening challenges among HIV-positive women living in LMICs. Briefly, personal factors include, but not limited to, knowledge and attitude, perceived susceptibility, embarrassment, fear of the cervical cancer screening procedure and test results, and experiencing cervical cancer-related symptoms. Social factors include the effectiveness of the patient–HCP relationship, stigma, information sources and social support from friends and family members. Structural factors include the screening costs, healthcare facility accessibility, time issues and resources/infrastructures.

3. Results

3.1. Search results and study characteristics

A total of 7896 articles were retrieved from the electronic databases search. After screening records, 32 articles were found to be eligible for inclusion in this review. The details of step by step study identification and selection are shown in Fig. 1. Among 32 included articles in the review, twenty-six studies were quantitative and mixed methods (21 quantitative and 5 mixed methods) and 6 studies were qualitative (Tables 1a–1d and 2). The design of all of the quantitative studies were cross-sectional. The majority of the qualitative studies were designed as in-depth interviews (n = 4), one of them as focus group discussions and the last one includes both in-depth interviews and focus group discussions. The proportion of HIV-positive women participating in cervical cancer screening, at least once in lifetime, ranged from 0.7% to 88%. Twelve studies focused on Pap test, three on visual inspection methods (VIA/VILI), three on visual inspection methods and Pap test, and 14 looked generally at cervical cancer screening without specifying a particular screening method. Forty-four percent of the studies were published in years 2018 or later, and twenty-nine studies were carried out in African, two in Asian and one in Southern American LMICs.
3.2. Patient-reported barriers and facilitators

3.2.1. Personal factors

Knowledge and attitude toward cervical cancer and screening

HIV-positive women with low knowledge of cervical cancer (Belglaiaa et al., 2018; Chipfuwa and Gundani, 2013; Dim et al., 2009; Koneru et al., 2017; Matenge and Mash, 2018; Rabiu et al., 2011; Tchounga et al., 2019) and cervical cancer screening (Dim et al., 2009; Matenge and Mash, 2018; Rabiu et al., 2011; Belglaiaa et al., 2018; Godfrey et al., 2019; Sichanh et al., 2014; Adibe and Aluh, 2018; Bateman et al., 2019; Rositch et al., 2012; Shiferaw et al., 2018; Wake et al., 2009; Wanyenze et al., 2017) were less likely to undergo screening. Conversely, adequate knowledge of cervical cancer (Tchounga et al., 2019; Adibe and Aluh, 2018; Assefa et al., 2019; Belete et al., 2015; Erku et al., 2017; Ezechi et al., 2013; Mingo et al., 2012) and cervical cancer screening (Rositch et al., 2012; Wanyenze et al., 2017; Erku et al., 2017; Delgado et al., 2017; Ebu and Ogah, 2018; Lieber et al., 2019; Njuguna et al., 2017) was associated with higher rates of cervical cancer screening uptake by patients. Two studies evaluated HPV-positive women’s attitudes toward cervical cancer screening and reported that positive attitude (Assefa et al., 2019), despite negative one (Adibe and Aluh, 2018), is associated with increased rate of cervical cancer screening uptake.

Perceived susceptibility of cervical cancer

The majority of studies showed a low perceived susceptibility of cervical cancer among HIV-positive women (Chipfuwa and Gundani, 2013; Dim et al., 2009; Rabiu et al., 2011; Wanyenze et al., 2017; Delgado et al., 2017). This low perceived susceptibility was associated with a decreased uptake of cervical cancer screening in most of studies, except for one study that showed low perceived susceptibility was significantly associated with higher uptake of cervical cancer screening (Wanyenze et al., 2017). On the other hand, a number of previous studies found that greater perceived susceptibility of cervical cancer was associated with increased uptake of cervical cancer screening by study subjects (Solomon et al., 2019; Erku et al., 2017; Bukirwa et al., 2015).

3.2.2. Social factors

Patient–HCP relationship

The effectiveness of the patient–HCP relationship was acknowledged as having a significant effect on cervical cancer screening uptake.
## Table 1a
Quantitative and mixed-method studies conducted in Western Africa.

| First author, Year | Country | Study design | Study setting | Population | Age | Screening status | Type of screening | Patient-reported factors influencing women’s cervical cancer screening experience. The (+) signs indicate how these factors influenced their screening experience. |
|--------------------|---------|--------------|---------------|------------|-----|------------------|------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Dim et al. (2009)   | Nigeria | Cross-sectional study | Voluntary Counseling and Testing (VCT) clinic of the University of Nigeria Teaching Hospital in Enugu, Nigeria | 150 HIV-positive women and 150 HIV-negative women | 21-54 yrs, mean age 34.9 y | 0% screened at least once | Pap test | Personal: low awareness of cervical cancer (78%) (-), low perception about being at risk of cervical cancer among HIV-positive women (12.1%) (-), low awareness of HPV vaccine (68.8%) (-), fear of screening procedure (12.6%) (-). Social: had a previous Pap test (56.2%) (-), had a previous gynecological visit (48.1%) (-). Structural: had a previous cervical cancer diagnosis (38.3%) (-). |
| Adibe and Aluh (2018) | Nigeria | Descriptive cross-sectional study | ART clinic at the Nnamdi Azikiwe University Teaching Hospital, tertiary health care in Nnewi, south-eastern Nigeria | 447 HIV-positive women | NR | 10% screened at least once | Pap test | Personal: not heard of cervical cancer screening (61.8%) (-), not heard of HPV (86.4%) (-), not heard of HPV vaccine (88.8%) (-), fear of screening procedure (1.8%) (-), screening not necessary (21%) (-), negative attitude toward screening (56.5%) (-), had a previous Pap test (56.2%) (-), had a previous gynecological visit (48.1%) (-). Social: had a previous cervical cancer diagnosis (38.3%) (-). Structural: had a previous cervical cancer diagnosis (38.3%) (-). |
| Ezechi et al. (2013) | Nigeria | Cross-sectional study | HIV treatment center, Nigerian Institute of Medical Research (NIMR), Lagos | 1517 HIV-positive women | 18-57 yrs, mean age 31 y | 9.4% screened at least once | NR | Personal: awareness of cervical cancer (OR: 1.53) (+), fear of test outcome (4.2%) (-), pregnant/recently delivered (10.7%) (-), not aware of cervical cancer (12.1%) (-). Social: need to obtain partner’s approval (12.4%) (-). Structural: expensive cervical cancer screening (35.2%) (-). |
| Rabiu et al. (2011) | Nigeria | Descriptive cross-sectional study | ART clinic of the Lagos State University Teaching Hospital, Ikeja, Lagos State, Nigeria | 300 HIV-positive women | 17-60 yrs, mean age 34 y | 31.3% screened at least once | Pap test | Personal: never heard of cervical cancer (74.7%) (-), never heard of the Pap test (84%) (-), fear of the result (9.1%), does not feel susceptible to cervical cancer (12.1%). Social: information sources (media electronic and printed (33.3%), friends and relatives (20.8%), medical personnel (16.7%). Structural: expensive cervical cancer screening (9.1%) (-). |
| Tchounga et al. (2019) | Ivory Coast (Côted’Ivoire) | Cross-sectional study | Outpatient setting in the four highest volume urban HIV-clinic of government or non-governmental organisation in Côte d’Ivoire | 1991 HIV-positive women | Inter Quartile Range of 37-47 yrs, median age 42 | 59.7% screened at least once | Pap test and VIA | Personal: being informed on cervical cancer at the HIV-clinic (OR: 1.5) (+), being informed of cervical cancer screening at the HIV-clinic (OR: 1.4) (+), being informed of cervical cancer screening as part of a research project (15.4%) (+), fear of the result of screening (10.1%) (-), had a previous Pap test (84%) (-), fear of cervical cancer (1.3%) (-). Social: information sources (media electronic and printed (33.3%), friends and relatives (20.8%), medical personnel (16.7%). Structural: fear of cervical cancer screening cost (1.3%) (-). |
Table 1a (continued)

| First author, year | Country | Study design          | Study setting                                                                 | Population              | Age          | Screening status | Type of screening                  | Patient-reported factors influencing women’s cervical cancer screening experience. The (+/−) signs indicate women’s perception of how these factors influenced their screening experience. | MMAT score |
|-------------------|---------|-----------------------|-------------------------------------------------------------------------------|-------------------------|--------------|-----------------|-------------------------------|---------------------------------------------------------------------------------|-------------|
| Ebu and Ogah (2018) | Ghana   | Descriptive cross-sectional study | HIV health facilities in the Central Region of Ghana | 660 HIV-positive women | 20–65 years | NR              | NR                           | **Personal** perceived benefits of cervical cancer screening (OR: 1.68) (+), perceived seriousness of cervical cancer (OR: 2.02) (+), cues about cervical cancer screening (OR :3.48) (+) | 100%        |
| Stuart et al. (2019) | Ghana   | Mixed methods         | Cape Coast Teaching Hospital in Cape Coast, Ghana                              | 55 HIV-positive women and 76 HIV-negative women | Mean age 42.9 year | NR              | NR                           | **Personal** embarrassing (35.6%) (−), not painful examination based on previous experience with cervical cancer screening (85.0%) (+), worried about the results of screening (43.3%) (−), **Social** given enough information about HPV, cervical cancer, and screening before the screening (88.3%) (+), **Structural** would have cervical cancer screening again if it was free (91.4%) (+) | 50%         |

ART anti-retroviral therapy, HCP healthcare provider, HIV human immunodeficiency virus, MMAT mixed methods appraisal tool, NR not reported, OR odds ratio, VIA visual inspection with acetic acid.
| First author, year | Country       | Study design       | Study setting                                                                 | Population | Age                  | Screening status         | Type of screening | Patient-reported factors influencing women’s cervical cancer screening experience. The (+/−) signs indicate women’s perception of how these factors influenced their screening experience. | MMAT score |
|-------------------|---------------|--------------------|--------------------------------------------------------------------------------|------------|----------------------|-------------------------|-------------------|---------------------------------------------------------------------------------|-----------|
| Godfrey et al. (2019) | South Africa | Cross-sectional study | Secondary referral obstetrics and gynecology hospital, Lower Umfolozi District War Memorial Hospital, in rural KwaZulu-Natal | 79 HIV-positive women and 155 HIV-negative women | 18-70 years, mean age 29 years | 32.5% screened at least once | Pap test | Personal: never heard of a Pap test (27.1%) (−), too scared/too painful (19.4%) (−), never offered cervical cancer screening (12.9%) (−), feel well so do not need cervical cancer screening (being asymptomatic) (5.8%) (−), do not want to know the result (1.9%) (−), old enough for cervical cancer screening (1.9%) (−), being symptomatic 57.9% (+). Social: offered to them by HCP (42.1%) (+). Structural: did not know where or when to have cervical cancer screening (6.9%) (−), longer waiting time to get screened (5.8%) (−). | 75% |
| Lieber et al. (2019) | South Africa | Mixed-methods* | Rural HIV clinic in Limpopo Province, South Africa | 403 HIV-positive women for quantitative and 12 HIV-positive women for qualitative study | NR | NR | VIA and Pap test | Personal: discomfort with the position required for undergoing cervical cancer screening (−), knowledgeable about the purpose of VIA and pap test (−), left behind in follow-up care (−). Social: understaffing (−), long waiting time (−). | 25% |
| Maree and Moitse (2014) | South Africa | Descriptive cross-sectional study | Adult HIV unit at a public hospital in Johannesburg, South Africa | 315 HIV-positive women | 27-54 years, mean age 38.9 years | NR | Pap test | Personal: fear of the procedure (39.3%) (−), not ill so screening not necessary (7.4%) (−). Social: information sources [nurse or doctor (61%), community health worker (50.8%), classmates (9.8%) and relative and parents (7.6%)] (+), bad attitude of nurses and doctors (8.1%) (−). | 50% |
| Wake et al. (2009) | South Africa | Cross-sectional study | ART clinic at GF Jooste Hospital, Cape Town, South Africa | 100 HIV-positive women | 21-64 years, mean age 32.8 years | 59% screened at least once | Pap test | Personal: had never been asked to get cervical cancer screening (35.7%) (−), had never heard of the Pap test (28.6%) (−), fear and misunderstanding of cervical cancer screening (−). Social: unable to attend cervical cancer screening due to inappropriate time and place (19.6%) (−). | 50% |
| Mingo et al. (2012) | Botswana | Cross-sectional study | Two public health clinics in Gaborone, Botswana | 163 HIV-positive women and 117 HIV-negative women | 20-84 years | 72% screened at least once | Pap test | Personal: ever heard of cervical cancer (OR: 3.28) (−), to know if cervix is healthy (56%) (−), to get early treatment (34%) (−), improve overall health (33%) (−), being symptomatic (10%) (−), protecting future fertility/pregnancy (8%) (−). | 50% |

*Quantitative data of this mix-methods study is not presented since it was not patient-reported factors and it only reported patients’ medical records data.

ART anti-retroviral therapy, HCP healthcare provider, HIV human immunodeficiency virus, MMAT mixed methods appraisal tool, NR not reported, OR odds ratio, VIA visual inspection with acetic acid
| First author, year | Country | Study design | Study setting | Population | Age | Screening status | Type of screening | Patient-reported factors influencing women’s cervical cancer screening experience. The (+/-) signs indicate women’s perception of how these factors influenced their screening experience. | MMAT score |
|------------------|---------|--------------|--------------|------------|-----|-----------------|------------------|-------------------------------------------------|-------------|
| Asefa et al. (2019) | Ethiopia | Cross-sectional study | Three public health facilities providing both cervical cancer screening and assisted reproductive technology services in Hawassa, Ethiopia | 342 HIV-positive women | Mean age 33.4 year | 40.1% screened within previous five years | NR | **Personal** no need for cervical cancer screening due to no symptoms (34.1%) (−), fear of test results (16.1%) (−), fear of painful examination (11.2%) (−), positive attitude towards cervical cancer and screening (+), knowledge about cervical cancer risk factors (+) | 75% |
| Belete et al. (2015) | Ethiopia | Mixed methods | Public health institutions of HIV care in Addis Ababa, Ethiopia | 322 HIV-positive women | Mean age 35.7 years | 11.5% screened at least once | NR | **Personal** being pregnant or in peripartum period (13.3%) (−), fear of test result (30.8%) (−), knowledge about risk factors and prevention of cervical cancer (+) Social information sources [media, (58.2%) and HCP (53.6%)] (+), partner acceptance (10%) (+), religious denial (10%) (−) Structural expensive cervical cancer screening (30%) (−), lack of female screeners (13.3%) (−), time consuming (35.8%) (−) | 75% |
| Erku et al. (2017) | Ethiopia | Cross-sectional study | ART clinic at University of Gondar Referral and Teaching Hospital, Ethiopia | 302 HIV-positive women | Mean age 33.7 year | 23.5% screened at least once | NR | **Personal** comprehensive knowledge about cervical cancer screening (OR: 3.02) (+), perceived susceptibility of cervical cancer (OR: 2.85) (+), absence of symptoms (88.7%) (−), embarrassment (68.8%) (−), fear of test result (71%) (−), not prescribed by the doctor (32.9%) (−) Social partner negative attitude toward cervical cancer screening (27.7%) (−), Screening center too far (37.7%) (−), time consuming (19%) (−) | 75% |
| Shiferaw et al. (2018) | Ethiopia | Mixed methods | Public (community) health centers in Addis Ababa, the capital city of Ethiopia | 581 HIV-positive women | 21-64 years, mean age 34.9 year | 10.8% screened at least once | NR | **Personal** feeling healthy (36.5%) (−), never think of cervical cancer (23.9%) (−), lack of awareness about cervical cancer screening (9.6%) (−), embarrassment (5.3%) (−), fear of positive results (5.2%) (−), painful screening procedure (1.2%) (−) Social partner negative attitude toward cervical cancer screening (1.4%) (−), religion factors (0.9%) (−), HCP negative attitude (0.7%) (−), no appropriate care at health care facilities (6.2%) (−), HCP do not have good knowledge (1.4%) (−) Structural expensive cervical cancer screening (5.7%) (−), no health facility in the catchment area (4.3%) (−) | 75% |
| Solomon et al. (2019) | Ethiopia | Cross-sectional study | Hospital based setting In Bishoftu town, East Shoa, Ethiopia | 475 HIV-positive women | 18-67 years, mean age 36.2 year | 24.8% screened at least once | VIA | **Personal** fear of positive result (28%) (−), being symptomatic (33.1%) (+), perceived perceived fear of positive result (28%) (−), being symptomatic (33.1%) (+), perceived fear of positive result (28%) (−), being symptomatic (33.1%) (+) | 100% |

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| First author, year | Country | Study design | Study setting | Population | Age | Screening status | Type of screening | Patient-reported factors influencing women’s cervical cancer screening experience. The (+) signs indicate women’s perception of how these factors influenced their screening experience. | MMAT score |
|-------------------|---------|--------------|---------------|------------|-----|-----------------|-----------------|-------------------------------------------------|-----------|
| Njuguna et al. (2017) | Kenya | Mixed methods | Kenyatta National Hospital, Nairobi, Kenya | 387 HIV-positive women for quantitative study and 4 focus group discussions (each group = 6–8 HIV-positive women) | Inter Quartile Range of 35–44 years, median age 40 | 46.3% screened at least once | NR | Informed consent for cervical cancer screening (OR: 1.24) (+), perceived threat of cervical cancer (OR: 1.08) (+), perceived net benefit (OR: 1.18) (+) | 50% |
| Rositch et al. (2012) | Kenya | Descriptive cross-sectional study | Voluntary counseling and testing centers in Nairobi, Kenya | 268 HIV-positive women and 141 HIV-negative women | Inter Quartile Range of 24–34 years, median age 28 | 14% screened at least once | Pap test | Informed consent for cervical cancer screening (OR: 1.24) (+), perceived threat of cervical cancer (OR: 1.08) (+), perceived net benefit (OR: 1.18) (+) | 75% |
| Rosser et al. (2015) | Kenya | Cross-sectional study | Integrated HIV clinic in the Nyanza Province of Kenya | 106 HIV-positive women | 23–64 years, mean age 34.9 year | 15% screened at least once | NR | Informed consent for cervical cancer screening (OR: 1.24) (+), perceived threat of cervical cancer (OR: 1.08) (+), perceived net benefit (OR: 1.18) (+) | 75% |
| Chipfuwa and Gundani (2013) | Zimbabwe | Descriptive cross-sectional study | Bindura Provincial Hospital, Zimbabwe | 70 HIV-positive women | 19–49 years, mean age 35.7 year | NR | NR | Informed consent for cervical cancer screening (OR: 1.24) (+), perceived threat of cervical cancer (OR: 1.08) (+), perceived net benefit (OR: 1.18) (+) | 25% |
| Tanzania | 399 HIV-positive women | ≥19 years | NR | NR | NR | NR | NR | Informed consent for cervical cancer screening (OR: 1.24) (+), perceived threat of cervical cancer (OR: 1.08) (+), perceived net benefit (OR: 1.18) (+) | 100% |

(continued on next page)
| First author, year | Country | Study design | Study setting | Population | Age | Screening status | Type of screening | MMAT score | Patient-reported factors influencing women’s cervical cancer screening experience. The (+/−) signs indicate women’s perception of how these factors influenced their screening experience. |
|-------------------|---------|--------------|---------------|------------|-----|-----------------|------------------|------------|--------------------------------------------------|
| Koneru et al. (2017) | Cross-sectional study | HIV clinics in Dar es Salaam, Tanzania | 9% screened at least once | Personal | had not been informed about care and treatment of cervical cancer at clinic (65.7%) (−), Social | information sources (media (47.4%), hospital staff (39.3%), friends and families (4.4%)) (+), Structural | free cervical cancer screening (83.3%) (+), free cervical cancer treatment (77.8%) (+), time to travel to clinic > 120 min (18.8%) (−) |
| Wanyenze et al. (2017) | Uganda | Nationwide cross-sectional study | 5198 HIV-positive women | 15–49 years | 30.3% screened at least once | Personal: lack of information on cervical cancer screening (29.6%) (−), had been told that procedure is painful (10.5%) (−), fear of receiving a cancer diagnosis (40.6%) (−), embarrassing (22.3%) (−), knowledgeable of cervical cancer screening (PR: 2.19) (+), low risk perception (PR: 1.52) (+), Structural: lack of screening facilities 14% (−), know any place where cervical cancer screening is offered (PR: 6.47) (+), did not have time (25.9%) (−) |

*ART* anti-retroviral therapy, *HCP* healthcare provider, *HIV* human immunodeficiency virus, *MMAT* mixed methods appraisal tool, *NR* not reported, *PR* prevalence ratio, *OR* odds ratio, *VIA* visual inspection with acetic acid.
### Table 1d

Quantitative and mixed-method studies conducted in other countries.

| First author, year | Country  | Study design    | Study setting                                                                 | Population | Age            | Screening status          | Type of screening | Patient-reported factors influencing women’s cervical cancer screening experience. The (+/−) signs indicate women’s perception of how these factors influenced their screening experience. | MMAT score |
|--------------------|----------|----------------|-------------------------------------------------------------------------------|------------|----------------|---------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| Belglaiaa et al. (2018) | Morocco | Cross-sectional study | HIV treatment center at the Hospital of Moulay Hassan Ben Elmehdi in Laâyoune city, Morocco | 115 HIV-positive women | Mean age 34.9 years | 13% screened at least once | Pap test | **Personal** lack of knowledge of cervical cancer risk factors (79.1%) (−), absence of symptoms (47%) (−), never heard of a Pap test (22%) (−), fear of abnormal results (13%) (−), fear of painful sampling (7%), shame or embarrassment (7%) (−), absence of sexual activity (3%) (−). **Social** information sources [media, (17.4%), friends/family (2.6%), HCP (0.9%)] (+) | 50% |
| Delgado et al. (2017) | Peru     | Cross-sectional study | Via Libre non-governmental organization (NGO) HIV center in Lima, Peru | 71 HIV-positive women | 19–60 years, mean age 40.4 year | 12.7% never had a Pap test, 77.5% had over 1 year ago, 9.8% within 1 year | Pap test | **Personal** good knowledge on cervical cancer screening interval and frequency (75%) (+), low perception about being at risk of cervical cancer among HIV-positive women (37.5%) (−), good knowledge on certain types of the HPV that can cause cervical cancer (75%) (+), **Social** perception about having cervical cancer screening services available (5.6%) (−) | 50% |
| Sichanh et al. (2014) | Laos     | Cross-sectional case-control study | HIV treatment centers of three provinces of Lao PDR, Vientiane, Luang Prabang and Savannakhet | 320 HIV-positive women (cases) and 320 HIV-negative women (controls) | 25–63 years, mean age 36.2 year | 5.6% screened at least once | Pap test | **Personal** no symptoms (46%) (−), never heard of cervical cancer screening (21.2%) (−), screening not necessary (10.9%) (−), not prescribed by the doctor (7.3%) (−), **Structural** not enough cervical cancer screening services available (5.6%) (−). | 100% |

*HCP* healthcare provider, *HIV* human immunodeficiency virus, *MMAT* mixed methods appraisal tool.
Table 2
Qualitative studies included.

| First author, year | Country | Study design | Studysetting | Population | Age | Screening status | Type of screening | Patient-reported factors influencing women's cervical cancer screening experience. | MMAT Score |
|-------------------|---------|--------------|--------------|------------|-----|-----------------|-------------------|--------------------------------------------------------------------------------|------------|
| Bateman et al. (2019) | Tanzania | Focus group discussions | Twelve Management and Development for Health (MDH) public HIV centers in Dar es Salaam, Tanzania | 19 HIV-positive women | 24–57 years | NR | NR | Personal lack of knowledge on cervical cancer screening (−), fear of examination (−) | 75% |
| Bukirwa et al. (2015) | Uganda | In-depth interview | HIV specialist care organization of Mildmay Uganda | 18 HIV-positive women | ≥25 years | 1/3 not screened, 1/3 screened once, 1/3 screened on a regular basis | VILI, VIA | Personal risk perception associated with HIV (+), misconceptions about the cervical cancer screening process (−), fear of painful examination and other screening-related side effects (−), current poor health status of the women (excessive weight loss, DM, HTN) (−), competing health priorities (tuberculosis and antiretroviral therapy) (−), embarrassment (−), poor hygiene (−) | 100% |
| Gordon et al. (2019) | India | Semi-structured in-depth interviews | New Civil Hospital ART Centrein Surat, India | 25 HIV-positive women | 30–54 years, mean age 37.2 year | 88% screened at least once | Pap test | Personal concerns about HIV status disclosure (−), Social HIV-related stigma at healthcare facilities (−), support from friends and/or family members (+), confidential communication with physician (+) | 75% |
| Matenge and Mash (2018) | Botswana | Semi-structured interviews | Oodi rural clinic in the Kgatleng district of Botswana | 14 HIV-positive women | 29–49 years, mean age 37.4 year | 71.4% screened at least once | Pap test and VIA | Personal delays in getting the test results (−), being employed (−), getting an appointment for the cervical cancer screening (−), lack of instruction by HCP (−), lack of knowledge Pap test and risk factors of cervical cancer (−), fear of painful examination (−), embarrassment (−), fear from positive results (−), lack of knowledge about treatment modalities for precursor lesions of cervical cancer (−), alcohol misuse (−) | 50% |
| Nyambe et al. (2018) | Zambia | In-depth interviews | Urban and rural health care facilities in Lusaka and Chongwe districts, Zambia | 19 HIV-positive women, 19 HIV-negative women and 2 women with unknown HIV status | 25–49 years | 52.5% screened at least once | NR | Personal importance of early detection of precancerous lesions (+), misconceptions about risk factors of cervical cancer (−), fear of painful examination (−), lack of time and reluctance (−) | 50% |

(continued on next page)
Accordingly, women who were well informed by their HCPs regarding the cervical cancer and screening methods were more likely to get screened (Solomon et al., 2019; Godfrey et al., 2019; Njuguna et al., 2017; Stuart et al., 2019; White et al., 2012; Gordon et al., 2019). In contrast, poor patient-HCP relationship and negative attitude of HCPs toward HIV-positive women were considered a barrier toward cervical cancer screening uptake (Adibe and Aluh, 2018; Shiferaw et al., 2018; Maree and Moitse, 2014).

Stigma
Fear of cancer-related stigma lead to patients avoiding cervical cancer screening (Bateman et al., 2019; White et al., 2012). Also, HIV related stigma and concerns regarding HIV status disclosure were mentioned as barriers to cervical cancer screening (Gordon et al., 2019).

Information sources
There seems to be a variety of information sources for cervical cancer and its screening such as media, HCPs, family and friends, and etc. The majority of studies noted media as the main information source (Belglaiaa et al., 2018; Chipfuwa and Gundani, 2013; Koneru et al., 2017; Rabiù et al., 2011; Adibe and Aluh, 2018; Belete et al., 2015), while a lower number of studies noted HCPs as the main sources of information on cervical cancer (Solomon et al., 2019; Maree and Moitse, 2014).

Social support from friends and family members
Encouragement from family members to attend screening, particularly spousal encouragement, was an important motivator for women (Solomon et al., 2019; Assefa et al., 2019; Belete et al., 2015; White et al., 2012; Gordon et al., 2019). Women who reported negative attitude of their husband/partner toward cervical cancer screening were less likely to undergo screening (Adibe and Aluh, 2018; Shiferaw et al., 2018; Ezechi et al., 2013).

Other self-reported social factors influencing cervical cancer screening uptake
Religious beliefs and values seem to influence the uptake of cervical cancer screening across the ethnic and racial diversity of HIV-positive women (Belete et al., 2015; Ezechi et al., 2013). In the latter studies, some participants share concerns for maintaining modesty during cervical cancer screening.

3.2.3. Structural factors
Screening costs
HIV-positive women from ten studies specified that financial issues and screening costs were a barrier to cervical cancer screening (Rositch et al., 2012; Shiferaw et al., 2018; Rosser et al., 2015; Rabiu et al., 2011; Tchounga et al., 2019; Adibe and Aluh, 2018; Assefa et al., 2019; Belete et al., 2015; Erku et al., 2017; Ezechi et al., 2013), while a free screening opportunity was associated with an increased interest of women to get screened for cervical cancer (White et al., 2012). In another report by Stuart et al. (Stuart et al., 2019), 91.4% of HIV-positive women noted that if screening was free, they would do it again. Free cervical cancer screening and cancer-treatment was noted as a facilitator of screening uptake in one study (Koneru et al., 2017).

Healthcare facility accessibility and time issues
Not knowing a place where cervical cancer screening is done or being out of catchment of a healthcare facility providing screening services were among barriers to uptake of cervical cancer screening (Godfrey et al., 2019; Sichanh et al., 2014; Matenge and Mash, 2018; Assefa et al., 2019; Erku et al., 2017; Rositch et al., 2012; Shiferaw et al., 2018; Wake et al., 2009). Time limitations and long waiting time at clinics were noted as barriers by a majority of women (Godfrey et al., 2019; Koneru et al., 2017; Matenge and Mash, 2018; Wake et al., 2009; Wanyenze et al., 2017; Nyambe et al., 2018; Belete et al., 2015; Erku et al., 2017; Ezechi et al., 2013; Lieber et al., 2019; Njuguna et al., 2017; Bukirwa et al., 2015).

Resources/infrastructures
Lack of facilities needed for cervical cancer screening (Matenge and
ciocultural and religious barriers were among the most commonly re-
with cervical cancer screening uptake in LMICs. Lack of knowledge and
previous systematic review, which analyzed the barriers associated
screening uptake.
However, in contrast to our review, previous reviews did not ex-
women to get cervical cancer screening. Major system-related barriers
is not important unless being symptomatic and cultural or religious
et al. (McFarland et al., 2016) evaluating barriers to Pap test screening
screening (Ebu et al., 2015).
There seems to be considerable overlap between the HIV-positive and
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