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Barriers for Cervical Cancer Screening in Women Living with HIV: A Systematic Review

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Abstract:

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living with HIV (WLWH). A systematic review was conducted to identify and summarize these barriers among WLWH nationwide. There is a need to increase awareness and education among WLWH about the barriers to cervical cancer screening. Interventions should target women of low SES and minority status while assessing the barriers among this population to improve cervical cancer screening rates.

Keywords:

Cervical cancer, Cancer screening, Women living with HIV, HPV positive women

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ABSTRACT

Cervical cancer is a prominent cancer in U.S. women caused primarily by the human papilloma virus and its incidence and mortality rates have decreased through screening programs. Certain barriers are perceived to be affecting the rates of cervical cancer screening among women living with HIV (WLWH). A systematic review was conducted to identify and summarize these barriers among WLWH nationwide. There is a need to increase awareness and education among WLWH. Public health programs and community-based interventions should target women of low SES and minority status while assessing the barriers among this population to improve cervical cancer screening rates.

Keywords: Cervical cancer; Cancer Screening; Women living with HIV; HPV positive women

INTRODUCTION

Cervical cancer is one of the most prominent gynecological cancers ranking 14th in frequency in the USA (National Institutes of Health, 2010). In 2014, 12,578 women were diagnosed with cervical cancer and 4,115 women died from cervical cancer in the USA (U.S. Cancer Statistics, 2014). The age-adjusted incidence rates, per 100,000 women, for HPV-associated cervical cancer in the USA during the years 1998-2012, was highest among Hispanics (9.7) compared to Non-Hispanics (7.1), The rates were higher in African-Americans (9.2) followed by Whites (7.1), American Indians/Alaskan Natives (6.3), and Asian/Pacific Islanders (6.1) (Viens et al., 2016).

Of the gynecologic cancers (cervical, ovarian, uterine, vaginal, and vulvar), only cervical cancer has a screening test. The screening tests include the Pap (Papanicolaou) test and human papillomavirus (HPV) test, as most cases are caused by HPV (Baseman & Koutsky, 2005). In a

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Pap test, the sample is examined to see if the cells are atypical presenting with low-grade squamous intra-epithelial neoplasia [LGSIL], high-grade squamous intra-epithelial neoplasia [HGSIL] or atypical squamous cells of undetermined significance (ASCUS). The HPV sample is tested for the presence of 13–14 of the most common high-risk HPV types because cervical cancers associated with certain HPV types were considered to be of high risk (Musa et al., 2005). The screening tests can detect the cancer during early stages where the treatment can be most effective. Current American College of Obstetricians and Gynecologists (ACOG) guidelines recommend women ages 21–29 years should have a Pap test every 3 years. Women ages 30–65 years should have a Pap test and an HPV test (co-testing) once every 5 years, or only the Pap test once every 3 years (Practice Bulletin, ACOG, 2016). However, in WLWH and those with prior history of cervical cancer, the ACOG states that they may require more frequent cervical cancer screening and recommends they do not follow the routine guidelines (ACOG, n.d.).

Cervical Cancer in WLWH

Women living with HIV (WLWH) are at increased risk of getting HPV infection compared with the general adult female population (Clifford et al., 2005; Grulich et al., 2007; Bratcher and Sahasrabudde, 2010). The Canadian Women's HIV Study shows that the crude prevalence rates of HPV infection among WLWH was 73.6% as compared to 52.5% among WLWH (Hankins et al., 2000). Another study showed that women with AIDS-defining illness or with low level of immunity (with CD4+ T cell count <200 cells/mm³) have a six-fold increase of abnormal cytology of the cervix (Maiman et al., 1998). WLWH show a seven-fold increase of HPV infection compared to women without HIV infection (Womack et al., 2000). HPV types 16 and 18 are of higher oncogenic risk than the other types. WLWH are more likely to be infected with these high-risk HPV types and are also infected with multiple HPV types than the women without HIV infection (Sun et al., 1997). Highly Active Anti-Retroviral Therapy (HAART) has increased the lifespan of WLWH; yet there is a prolonged risk of exposure to HPV putting them at higher risk for cervical cancer.

Additionally, the United States Food and Drug Administration has approved three vaccines for prevention of HPV infections (Gardasil, Gardasil 9 and Cervarix) for girls aged 11-12 years and can be given up to the age of 26 years (Gillison et al., 2008). The current vaccines provide strong protection against new HPV infections for certain types of viral strains, but they are not effective at treating established HPV infections or disease caused by HPV (Hildesheim et al., 2007). However, in WLWH, these vaccines are less robust in increasing an immune response (Levin et al., 2010). The HPV infection in individuals living with HIV is caused by certain strains of the HIV virus which are not covered by the vaccine (Heard, 2009). Therefore, it is highly recommended that WLWH adhere to a regular screening schedule for the early detection of cervical cancer.

New guidelines were effective from 2012 as recommended by U.S. Preventive Services Task Force (USPSTF) for cervical cancer screening. As per the new guidelines, WLWH are recommended to have screening every 6 months in the first year of HIV diagnosis and annually thereafter (Moyer and U.S. Preventive Services Task Force, 2012). There are several barriers and factors influencing cervical cancer screening rates among general population such as older age, lower income, education level, lack of health insurance, unmarried status etc. (Datta et al., 2006). Several other risk factors influence cervical cancer screening rates in WLWH such as age, race/ethnicity, lower income, lack of health insurance, not having a regular source of primary health care, high viral loads, low CD4+ T cell counts, cigarette smoking and injection drug use.

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(Baranoski et al., 2011; Chen et al., 2012; Lambert et al., 2015). The objective of this study is to assess and summarize the barriers and/or risk factors influencing cervical cancer screening rates among WLWH of the USA through a systematic review since the implementation of new guidelines in 2012. To our knowledge, there has been no systematic review conducted specifically among this sub-group.

METHODS

Search Strategy

A systematic literature review was conducted to summarize the barriers and/or risk factors of cervical cancer screening rates among WLWH in the USA and therefore IRB approval was unnecessary for this study. The databases PubMed and Cochrane Library were searched for peer-reviewed journal articles published between January 1, 2012 and October 31, 2017.

Inclusion Criteria

Qualitative and quantitative studies that identify the barriers or factors influencing cervical cancer screening rates at the health service level or at a community level in WLWH are included in the systematic review. The literature search was restricted to peer-reviewed articles that are published in the English language that demonstrated the risk factors for receiving cervical cancer screening rates in WLWH. This review considered the studies limited to the USA where there are standard guidelines for cervical cancer screening.

Exclusion Criteria

Conference abstracts and unpublished manuscripts were excluded from this review due to difficulty in obtaining these documents or unclear demonstration of the barriers discussed above. Studies conducted outside of the USA, which may follow different guidelines, and articles published in a language other than English were excluded from this review. Finally, any previous systematic reviews identifying the barriers were also excluded from this review.

Search Terms

The search terms or key words chosen for searching the databases are (“HIV-positive women” or “HIV-positive females” or “HIV-infected women” or “HIV-infected females”) and (“cervical cancer screening” or “Pap smear test” or “Pap test” or “human papilloma virus test” or “HPV test”) and (“barriers” or “risk factors”).

Retrieval of Studies

The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines were followed in selection of the eligible articles, appraisal and during the synthesis of the results (Boland et al., 2014). An initial search across the PubMed and Cochrane databases was conducted and these citations were exported into Mendeley software and assessed for duplicates. The imported citations were then title screened and abstract screened considering the inclusion criteria. Full text articles of the included studies were reviewed for final eligibility of the studies. Two independent researchers completed the title screening, abstract assessment, full texts, and for assessment of eligibility.

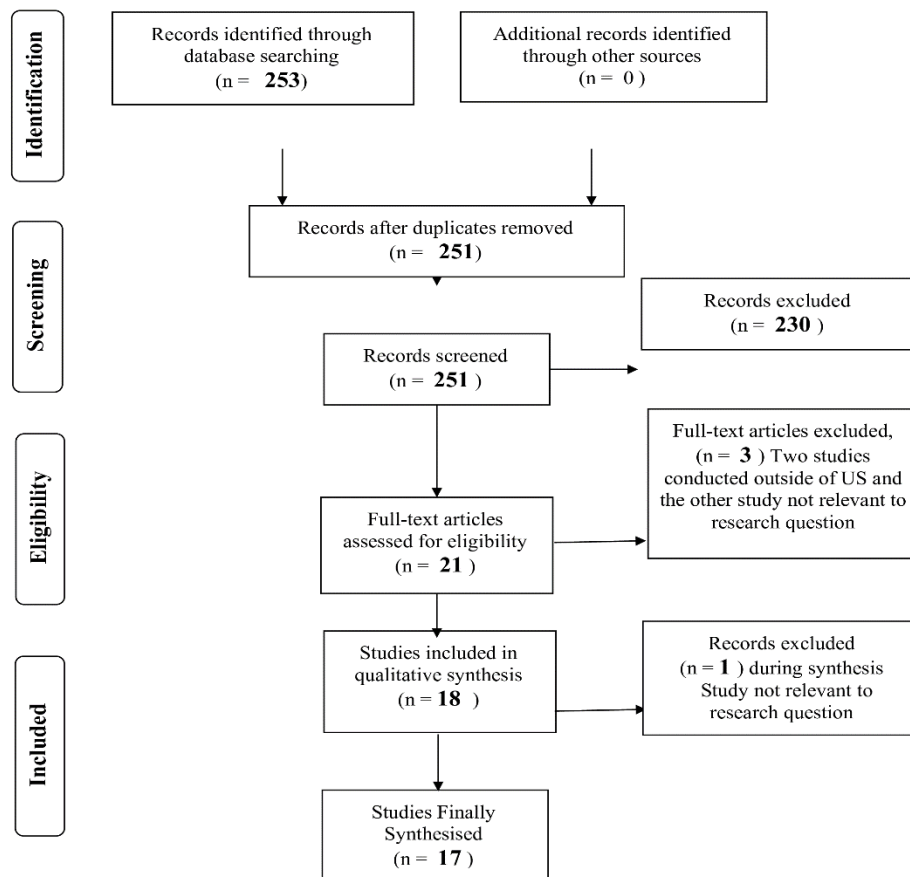
The Critical Appraisal Skills Programme (CASP) (2017a, 2017b) checklist was used for methodological assessment of the studies. The risk of bias for each included study was assessed using the Newcastle-Ottawa Scale (NOS) for non-randomized studies (Wells et al., 2013). Finally, a narrative synthesis of the eligible studies which have significant quality was done to know the effective barriers for cervical cancer screening in WLWH.

RESULTS

Literature Search

An initial search across the databases using the search terms yielded a total of 253 citations. After assessing for duplications, there were a total of 251 studies for title screening and abstract screening. Twenty-one articles were extracted after applying the inclusion and exclusion criteria defined above. Full text articles for the 21 studies were assessed again with the selection criteria for eligibility. Three articles were excluded at this point: two studies were conducted outside of the USA and the third one was not relevant to the aims/objectives of the systematic review. Eighteen articles were included in the qualitative synthesis, where one article was excluded because of non-relevancy to the aims of the systematic review. Seventeen articles were eligible and included in this systematic review for synthesis (Table 1). The entire process was represented in Figure 1 using the PRISMA flow diagram (Moher et al., 2009).

Figure 1. PRISMA Flow Diagram



The objectives, study design, study setting, outcomes, and results were examined in all eligible articles. Thirteen of the eligible studies are either retrospective or prospective cohort studies (Castle et al., 2012; Curry et al., 2012; Setse et al., 2012; Alade et al., 2017; Kim et al.,

2013; Fletcher et al., 2014a, 2014b; Simonsen et al., 2014; Lofgren, 2015; Ogunwale et al., 2016; Aserlind et al., 2017; Lakshmi et al., 2017; Levinson et al., 2017). Cross et al (2014) is an interventional study; Frazier et al Hessol et al & Lambert et al are cross-sectional studies (Hessol et al., 2013; Lamert et al., 2015; Frazier et al., 2016). All of these studies were conducted either in a hospital or clinical setting which provides comprehensive clinical care for WLWH (Table 1).

Table 1: Characteristics of the Included Studies:

Study	Objective	Study Design/ Setting	Sample size / Participants	Outcomes	Results
Alade, 2017	WLWH with concurrent normal cervical cytology and undetectable cervical HPV has low risk of developing CIN	Retrospective cohort, chart review/ Clinical setting	325 / WLWH aged 30 years and above	20% has detectable HPV, cumulative CIN+2 diagnosis for HPV-negative cohort was 1.4%, vs 14.5% for HPV-positive cohort	WLWH with concurrent normal cervical cytology has low 3- year risk of developing CIN+2 lesions, with adequate HIV treatment and low levels of CD4
Aserlind, 2017	Cervical cancer screening practices before the new guidelines in WLWH, description of comorbidities and risk factors	Retrospective cohort, chart review/ Clinical setting	75 / WLWH aged 65 years and above	85% of the tested women has ASCUS out of which 14% progressed to LSIL and only one progressed to HSIL. 69% are African-Americans and 80% below the federal poverty line Comorbidities, STIs, risk factors evaluated	Utility of cervical cancer screening in WLWH over the age of 65 is described, with 48% of them who required colposcopies based on Pap tests didn't have it.
Castle, 2012	Assessing the risk of cervical precancer	Retrospective cohort, Electronic	245 / WLWH aged 30 years and above	Repeated co-testing was carried in 12-month intervals. After	Those WLWH with negative contesting

	and cancer after negative co-testing (Pap test and HPV test) in WLWH	Medical Records/ Clinical setting		second co-test, 236 WLWH showed no cases of CIN2+ and after third co-test with remained 78 women, no cases of CIN2+ were reported.	conferred safety against cervical precancer and cancer progression, provided CD4 cell counts and HIV-viral loads are checked at regular intervals.
Cross, 2014	Identify factors for inadequate screening and analyze the interventions for increasing screening rates	Pre-Post Interventional study design/ Clinical setting	422 / WLWH	WLWH has a mean of 4.2 visits who received screening vs 3.4 visits who did not receive screening tests, in one-year time-period ($p < 0.01$).	WLWH with more clinical visits per year and Prior atypical cervical cytology were more likely to receive cervical cancer screening tests.
Curry, 2012	Assess the rates of CIN2+ with minimally abnormal Pap tests in WLWH and disease-free women	Retrospective cohort/ Clinical setting	655 / WLWH and disease-free women	WLWH were twice as likely to be diagnosed with CIN2 + after a minimally abnormal Pap test than HIV-uninfected women	WLWH have higher rates of underlying CIN2 + for minimally abnormal Pap tests compared with disease-free women
Fletcher & Buchberg, 2014	Describe the barriers and facilitators for screening services in WLWH	Prospective Qualitative approach using focus groups/ Integrated HIV clinic	33 / WLWH aged 18 years and older	Barriers and facilitators for screening services were evaluated from focus group questionnaire	Barriers include pain and discomfort associated with testing, lack of awareness, lack of

					transportation, scheduling appointments
Fletcher & Vidrine, 2014	Identify the factors for non-adherence to screening in WLWH smokers	Retrospective cohort, data collected from electronic medical records and secondary data/ HIV clinic	138 / WLWH smokers	African American women were four times more likely than white women to be non-adherent to Pap screening	Factors for non-adherence to screening among HPW smokers are younger age, African-American race, rigorous drinking, and smoking habits
Frazier, 2016	To know the prevalence of cervical cancer and factors associated with Pap tests in WLWH	Cross-sectional study, using interview and medical records data / HIV clinic with Medical Monitoring Project(MMP)	2270 / WLWH	Factors which made less likely to report Pap tests are older age groups, income above FPL and those with no sexual activity in the last 12 months	Suggests integration of HIV-care services with OBGYN services to improve screening rates in HPW
Hessol, 2013	Assess the factors associated with HPV infections in WLWH and high-risk women	Cross-Sectional Study, nested from Women's Interagency HIV Study (WIHS) / Women's Interagency HIV Study (WIHS) from six centers in the US	655 / 470 WLWH and 185 disease free women	42% of HPW had detectable cervical HPV infection vs 8% on disease free women, WLWH were more likely to have concomitant HPV infection with more than one HPV type compared with disease free women	Factors are higher mean years of smoking cigarettes, WLWH, especially with low CD4 counts should be screened for cervical cancer
Kim, 2013	Assess the long-term effect of HAART and menopause on SILs in WLWH	Retrospective cohort, databases reviewed / Hospital bases AIDS center	313 / Only 245 WLWH were eligible	Menopausal women had a 70% higher risk of progression to SILs than premenopausal women, HAART	Increased CD4 increases risk of lesions; younger and menopausal increases risk

				had a 52% reduced risk in the progression to SILs compared to women receiving any other antiretroviral regimen	and being on HAART decreases risk of progression of lesions.
Lakshmi, 2017	Assess how frequent infectious disease (ID) physicians provide primary care for HPW and assess their barriers for providing primary care.	Prospective Cohort / Survey based from Emerging Infections Network	644 / Survey from only 326 Primary care Physicians treating WLWH was assessed	Barriers reported include: refusal by patient (72%), non-adherence to HIV medications (43%), other health priorities (44%), time constraints during clinic visit (43%) and financial/insurance limitations (40%).	Most ID physicians act as primary care providers for their HIV infected patients, but screening rates were suboptimal
Lambert, 2015	Assess relationships between Pap test adherence and constructs of the Health Belief Model (HBM)	cross-sectional, quantitative correlational design / Two ambulatory care clinics	300 / WLWH aged 18 years and above	WLWH perceived lower personal risk for cervical cancer, those with higher perceived self-efficacy and lower perceived barrier scores received better Pap test adherence.	WLWH were not aware of the risk for cervical cancer And the preventive actions
Levinson, 2017	Evaluating gynecologic cancer treatments in HPW for adherence to guidelines and compare the survival	Retrospective cohort study, Chart reviews / Two Comprehensive care centers	57 / WLWH	48-month survival was higher in HPW who received adherent care (60%) than those who did not (28%).	Those who did not receive adherent care had worse survival compared to those who did, 69% were due to patient-related barriers.

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Lofgren, 2015	Evaluate the progression and regression of cervical dysplasia in HPW and associated factors for pap tests	Retrospective Cohort / Clinical setting	309 / WLWH	31% reported regression of lesions and 24% reported progression of lesions. Those on anti-retroviral therapy (ART) regressed by 12.5% than those who are not on ART (0%)	Initial CD4 counts above 200 cells/mL was associated with regression or remaining normal.
Ogunwale, 2016	To evaluate factors impacting the prevalence of cervical cancer screening among HPW	Prospective cohort, self-administered questionnaire / HIV integrated clinic	179 / WLWH aged between 21 and 64 years	Knowledge of cervical cancer risk factors, such as multiple sexual partners or sex with a man with multiple partners, was low	Unscreened women were younger and more likely to be single with multiple current sexual partners, knowledge of cervical cancer risk factors among low-income groups influence screening rates
Setse, 2012	To evaluate factors impacting the prevalence of cervical cancer screening among adolescent HPW	Prospective Cohort, chart review / Longitudinal Epidemiologic Study to Gain Insight into HIV/AIDS in Children and Youth (LEGACY) cohort participants from 22 clinics in US	231 / WLWH aged 13-24 years of age	Prevalence of cervical cancer screening was low there is abnormal cytology in about 50% and associated risk factors	Decreased screening was seen among perinatal HIV infection and African-American race. Increased rates in HPW diagnosed with STIs, previous STIs, CD4 counts <200 cells/ul

Simonsen, 2014	To evaluate preventive health care services (cervical cancer screening included) in HPW and its associated factors	Retrospective Cohort Study, Medical record reviews / Infectious Disease Clinic	192 / WLWH	Documentation of cervical cancer screening is low, 57% only	HPW with private insurance were less likely to have cervical cancer screening (P=0.025)
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*Note: Abbreviations: Women living with HIV (WLWH), atypical squamous cells of undetermined significance (ASCUS), low-grade squamous intraepithelial neoplasia (LSIL), high-grade squamous intraepithelial neoplasia (HSIL), cervical biopsies read as grades 1, 2, or 3 Cervical Intraepithelial Neoplasia (CIN), Highly Active Anti-Retroviral Therapy (HAART), Squamous Intraepithelial Lesions (SIL), Sexually Transmitted Infections (STI)
** The terms, “women living with HIV” or “WLWH” were not used at the time of the initial search query as this preferred verbiage was more widely established subsequent to the search.

Barriers or Factors that affect Cervical Cancer Screening Rates among WLWH from Eligible Studies

Several barriers were identified in multiple studies which included: low income, lack of insurance, lower screening rates in specific populations, age groups, higher HIV viral loads, lower CD4+ T cell counts, lack of adherence, lack of awareness, limited transportation, pain and discomfort associated with pap smear testing, number of health visits, issues related to making an appointment, provider specific barriers, and other factors.

Lower Income

It was stated that forty eight percent of the WLWH did not attend follow up visits or the subsequent screening visits because the majority of those women (~ 80%) were below the federal poverty line (Aserlind et al., 2017). However, the underlying factors surrounding poverty as a barrier were not addressed; for example, lack of either transportation or a sliding fee scaled based on income.

Lack of Insurance

WLWH with financial and insurance limitations had low cervical cancer screening rates (Simonsen et al., 2014; Lakshmi et al., 2018).

Lower screening rates in African Americans

The African-American group of WLWH were four times non-adherent to cervical cancer screening than Caucasian women (Fletcher et al., 2014b). The factors reported which contribute to such low screening are caregiving responsibilities, lack of housing stabilities, lack of financial stabilities, stigma associated with the cervical cancer screening procedures and non-disclosure.

Older Age Group

WLWH who are of older age groups, were less likely to report to the screening services (Kim et al., 2013; Frazier et al., 2016).

Higher HIV Viral Loads

WLWH who had higher viral loads had fewer follow up visits to regular and gynecological care services, thereby having lower screening rates than those with lower or undetectable HIV viral loads (Castle et al., 2012).

Lower CD4+ T Cell Counts

WLWH with lower CD4+ T cell counts (< 200 cells/ μ L) had lower screening rates than those who had higher CD4+ T cell counts (Castle et al., 2012; Setse et al., 2012; Kim et al., 2013).

Lack of Adherence

Those who engage in rigorous smoking and drinking habits lacked adherence to cervical cancer screening among WLWH (Hessol et al., 2013; Fletcher et al., 2014b). Smokers who are of younger age less likely to adhere to screening tests (Fletcher et al., 2014b). It was very striking to note that WLWH who engaged in higher amounts of alcohol consumption were five times more likely to fall into the non-adherence group (Fletcher et al., 2014b).

Studies of urban clinics have demonstrated that non-adherence to the screening tests and follow-up care was due to low CD4+ T cell counts leading to the progression of lesions, delay in therapy, and insufficient treatment doses (Lofgren et al., 2015; Levinson et al., 2018). Poor compliance for attending the screening tests and the follow-up visits was also observed (Curry et al., 2012; Alade et al., 2017). WLWH without documentation of three or more CD4+ T cell counts and HIV viral loads along with no evidence of testing for sexually transmitted diseases in the past year, were less likely to report to have screening tests (Frazier et al., 2016).

Lack of Awareness

Studies demonstrated that there is lack of awareness about cervical cancer as a preventable disease among WLWH (Cross et al., 2014; Fletcher et al., 2014a). These women reported low knowledge about the preventive methods such as perceived susceptibility, seriousness about cervical cancer, barriers to screening methods, benefits, and self-efficacy (Lambert et al., 2015). Those who had prior atypical cervical cytology were more aware of the Pap tests or HPV tests than those who had no prior atypical cervical cytology (Cross et al., 2014; Ogunwale et al., 2016).

Limited Transportation Access

Transportation was one of the most persistent barriers for attending appointments to cervical cancer screening. This is especially relevant for WLWH with longer commutes to the clinics (Fletcher et al., 2014a).

Pain & Discomfort Associated with Screening Tests

Pain and discomfort caused while receiving the screening tests and with the following procedures act as barriers for cervical cancer screening in WLWH (Fletcher et al., 2014a). These women even expressed anxiety associated with undergoing follow-up procedures such as colposcopies, biopsies, and loop electrosurgical excision procedures (Fletcher et al., 2014a).

Lesser Number of Health Visits

WLWH who had lesser number of health visits were less likely to receive screening tests than those who had more health visits (Cross et al., 2014; Ogunwale et al., 2016). Cross et al (2014) demonstrates that WLWH who had a mean of 3.4 visits in a one year of time-period did not receive screening tests in comparison to those who had a mean of 4.2 visits ($p < .01$).

Issues related to Gynecological Appointment

Various issues related to gynecological appointments have been described (Fletcher et al., 2014a). Some WLWH needed a referral from their primary health care provider to see a gynecologist or a nurse practitioner for receiving the Pap smear screening. These women reported dissatisfaction for having to make multiple appointments, one for regular health care, one for

scheduling screening tests, and one for follow-up. Some women reported excessive wait times associated with making and/or attending additional appointments as a barrier for adherence to screening tests.

Provider-Specific Barriers

Cross et al. (2014) has listed provider-specific barriers in addition to patient-specific barriers that affect the cervical cancer screening rates in WLWH at an urban clinic, including that providers lack training of Pap testing, lack of comfort when performing the test, and were unaware when patients were due for the Pap tests. It was reported that the procedures are lengthy and time-consuming, making providers behind schedule, hence, increasing patient wait times.

Lakshmi and colleagues (2018) outlined physician-related barriers such as lack of awareness of updates on screening guidelines by 21% (n=68). It was also reported that time allocated for the visits and procedures is not enough (reported by 43%, n=137) and the clinic lacks electronic system reminders regarding patient's yearly screening tests (reported by 18%, n=58). Physicians also reported a lack of availability of support services required for the screening tests.

Other Factors

WLWH sometimes would have to focus on other health priorities rather than getting the screening tests as reported among 44% (n=142) of the women (Lakshmi et al., 2018). The same study also reported that 72% (n=232) of study participants declined the screening services (Lakshmi et al., 2018). Substance use and depression were other factors for not receiving screening tests in WLWH (Fletcher et al., 2014b; Frazier et al., 2016). Those who had high-risk behaviors such as intravenous drug use, having unprotected sex or multiple sexual partners were also at risk of not receiving regular Pap smear tests (Fletcher et al., 2014a). It was also reported that perinatally infected HIV-adolescents and those who are sexually active had lower screening rates than those behaviorally infected HIV-adolescents (Setse et al., 2012).

DISCUSSION

Application of the inclusion criteria yielded 21 studies, out of which 17 studies were eligible for synthesis. This was an acceptable number of pooling considering the time-frame of 5 years (2012-2017) and limiting the studies to the USA population. All relevant research was included in this systematic review and conclusions were drawn based on the synthesis of available evidence from relevant studies based on the quality assessment criteria. Studies assessed the barriers that influence cervical cancer screening rates in WLWH, satisfying the aims and objectives of this systematic review.

There are several barriers and factors influencing cervical cancer screening rates among the general population such as older age, lower income, education level, lack of health insurance, and unmarried status (Datta et al., 2006). The identified perceived barriers for low cervical cancer screening rates among WLWH through this study include lower level of knowledge of cervical cancer, multiple sexual partners, HIV status, high viral loads, low CD4+ T cell counts, limited transportation access, lack of health insurance, lack of a primary health care, pain and discomfort associated with receiving Pap smears, and issues related to scheduling gynecological appointments. These women often have poor clinical adherence and challenging social and financial circumstances.

Facilitators should support to increase the knowledge and awareness regarding cervical cancer and maintain strong doctor-patient relationships for utilizing cervical cancer screening services (Fletcher et al., 2014a). One systematic review identified that one on one education was

useful to increase the awareness about cervical cancer and increase the screening rates by 8% (Sigrid et al., 2017). Some studies have shown that integration of gynecologic and general medical care for WLWH is important to patients and is likely to drastically improve screening rates (Oster et al., 2009; Sigfrid et al., 2017). The combination of automated text messaging and phone call reminders have been effective to improve the screening rates in the USA as well as in other parts of the world among WLWH (Mbuagbaw et al., 2015; Ganta et al., 2017). When provided incentives after undertaking screening tests, patients had positive reinforcement subsequently improving Pap rates, especially in groups of populations who are affected by poverty (Cross et al., 2014).

Most results were consistent across different studies and focused on factors that influence health care in WLWH. Few controversial findings were found between studies. One study reported lower screening rates when the WLWH were below the federal poverty line, but another study reported lower screening rates in those who are above the federal poverty line. (Frazier et al., 2016; Alade et al., 2017). However, the final results should be drawn from the studies based on the quality.

There are limitations in this systematic review. The methodological quality and risk of bias assessment was not completed for the cross-sectional studies in this systematic review and may not show the relevancy of those studies. The systematic review does not include studies from grey literature such as conference abstracts or unpublished studies, which may miss some relevant studies identifying the barriers and might have a risk of publication bias. Previous systematic reviews attempted to identify the barriers cervical cancer screening rates in WLWH, but this systematic review summarizes the barriers since the implementation of new guidelines in 2012. The critical appraisal helped to extract and synthesize the outcomes from relevant studies, which makes this systematic review of high quality. The results synthesized may be generalized to the WLWH based on the study settings of the studies included, most of the studies are either from a clinic or a comprehensive HIV-care clinic representing most of HIV care services.

This systematic review represents some of the major barriers for cervical cancer screening in WLWH. Future studies should address other barriers not discussed in these studies including trauma, mistrust of the medical community, adverse childhood experiences, intimate partner violence, and urban vs. rural access to care. Future research should aim at interventions and public health programs that can decrease these barriers and improve the cervical cancer screening rates in WLWH.

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