



Examining Cervical Cancer Screening Utilization Among African Immigrant Women: A Literature Review

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Abstract

Background: Globally, 530,000 women per year are diagnosed with cervical cancer, and approximately 275,000 die from the disease. Routine cervical cancer screening may reduce the burden of cervical cancer morbidity and mortality through early detection and improved treatment outcome. Immigrant women in the United States (U.S.) may be disproportionately affected by cervical cancer; however, there is scarce literature addressing cervical cancer screening in African immigrants (AIs) when compared to other immigrant groups. This systematic review evaluates the state of cervical cancer screening research in AIs and identifies current gaps.

Materials and methods: Through a comprehensive literature search, we identified 16 studies published between 2005 and 2015 that focused on cervical cancer screening among AIs.

Results: From this review, we found a low screening adherence rate among AIs. The common factors influencing cervical cancer screening practices among AIs included immigration status, health care interactions, knowledge deficiency, religiosity and certain personal characteristics.

Discussion: A multilevel approach to address the factors influencing screening practices among AIs is essential for improving adherence to screening guidelines. Implementation of grassroots enlightenment and screening programs are warranted in this population to decrease the screening disparity experienced by this burgeoning population.

Conclusions: Based on the findings from this review, African Immigrant (AI) women should be targeted for education about the importance of cervical cancer screening to bridge the knowledge gaps and multilevel initiatives could lead to improved access and utilization of screening services among this growing immigrant population.

Introduction

Every year 530,000 women worldwide are diagnosed with cervical cancer, and approximately 275,000 die from the disease [1]. Cervical cancer is the second most common cancer among women worldwide [1,2], is the most common cause of cancer in Africa [3], and is the leading cause of cancer-related deaths among women in developing countries [1,4]. Cervical cancer incidence rates are highest in sub-Saharan Africa, Latin America, Melanesia, and the Caribbean and are lowest in Western Asia, Australia, New Zealand, and North America. There is significant variation in cervical cancer rates by geographical region, which reflects differences in the availability and utilization of cervical cancer screening based upon geographical area [2]. Cervical cancer screening has successfully decreased cervical cancer incidence and mortality [5] in developed countries. However, screening in most African countries remains inaccessible and underutilized by African women [6]. In many sub-Saharan African countries, cervical cancer screening programs have not been effective due to multifactorial barriers that are client-based, provider-based, and system-based [7].

Human papillomavirus (HPV) infection is the primary cause of cervical cancer and HPV prevalence in women without cervical abnormalities is 24% in sub-Saharan Africa compared to a prevalence of 5% in North America [2,8]. Western and Eastern Africa are high risk areas for cervical cancer with women having a 3.4% cumulative risk of developing cervical cancer during their lifetime compared to a 0.5% lifetime risk of cervical cancer for women in North America risk of [9]. Decreases in HPV prevalence in North America have been linked to HPV vaccination [10]; however, the high cost of HPV

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vaccine may make it unaffordable or unavailable in many African countries [4]. The high HPV prevalence in African women translates to a high burden of cervical cancer in African women as well as an increased risk of cervical cancer for African women who immigrate to the United States (U.S.) [11].

Receiving Papanicolaou smear (Pap) screening according to recommended guidelines significantly reduces cervical cancer morbidity and mortality and is the most commonly used prevention strategy for cervical cancer worldwide [12]. Pap screening can find precancerous cervical abnormalities as well as detect cervical cancer at early and at treatable stages. Cervical cancer is rare in women less than 21 years of age, and screening in adolescent females has been shown to increase cost and anxiety without decreasing incidence of cervical cancer [13]. Hence, cervical cancer screening is not recommended for adolescent females [14]. The American Cancer Society, American Society of Colposcopy and Cervical Pathology, American Congress of Obstetricians and Gynecologists, and U.S. Preventive Services Task Force (2012) recommend Pap screening begin at age 21 years and be completed every 3 years until women are over 65 years. Women ages 30-65 years may alternatively choose co-testing with HPV and Pap screening every 5 years. Co-testing for HPV in combination with Pap screening can help to assess cervical cancer risk [15]. If there is no history of cervical cancer or precancerous abnormalities, women who have had a hysterectomy that includes removal of the cervix and women over age 65 do not need cervical cancer screening [15]. These recommendations are for women at average risk and do not apply to women at increased risk for cervical cancer such as women who have a history of cervical dysplasia or cervical cancer; women who have been exposed in utero to diethylstilbestrol, or women who are immunocompromised [11]. Recommended screening practices should not change based on HPV vaccination status [16].

Women receiving Pap screening based on guideline recommendations and intervals is critical to reducing cervical cancer related morbidity, mortality, and economic burden [17]. In the U.S mortality reduction would be 86%-93%, and lifetime cost would be approximately \$1200-\$1500, and 24 quality-adjusted life-years would be gained [10,18]. To improve the health and economic burden of cervical cancer, the Pap screening patterns of ethnic minorities and underserved populations must be understood since these populations are disproportionately affected by cervical cancer. Currently, there exists a limited understanding of the factors influencing cervical cancer screening among African immigrants (AIs) to the U.S.

Sub-Saharan Africa is historically a region of intense migration and population movement prompted by demographic, economic, ecological and political factors [19]. Hence, the African immigrant (AI) group is a rap-

idly growing population in the U.S. [20]. From 1980 to 2013, the African population in the U.S. increased from 130,000 to 1.5 million [21]. AIs differ by country of origin, reasons for migration, primary languages spoken, health practices and beliefs, human capital, education status, and cultural background [22]. Immigrants bring with them their health profiles and health-related knowledge, values, beliefs, and perceptions reflecting their cultural background [23]. Cervical cancer screening services have been poorly implemented in many developing countries because of the high cost of health services, poor health infrastructures, insufficient numbers of pathologists and technicians, lack of resources, and accessibility particularly by people living in the rural areas since many of the available services are based in secondary and tertiary health care facilities located in urban areas [4,24]. The awareness and utilization of Pap screening is increasing in Sub-Saharan Africa. However, the unavailability and inaccessibility of cervical cancer screening services continue to lead to only a small percentage of women being screened in sub-Saharan Africa [4]. Insufficient awareness of cervical cancer screening recommendations may deter AI women from completing Pap screening [7] after they migrate to the U.S. AIs may not have had any Pap screening prior to coming to the U.S. Consequently, cervical cancer screening appears to be underutilized among AI populations whose screening rates are much lower than the proposed Healthy People 2020 objective of 93% of women age 21 to 65 receiving screening based upon current guidelines [25].

AI women in the U.S. may be disproportionately affected by cervical cancer due to health care factors, culturally determined beliefs and attitudes, and cervical cancer screening barriers [26-28]. In the only identified systematic review of cancer control research focused on U.S. AIs, Hurtado-de Mendoz and colleagues (2014) [29] examined cancer related studies that included African-born immigrants to the U.S. This review was conducted in May 2013 and was not specific to cervical cancer screening. To date, scant research has examined the current state of cervical cancer screening in AIs or identified research gaps to inform future research and interventions. Therefore, the purpose of this review is to examine cervical cancer screening practices among AI women and to identify gaps in the literature to guide future research.

Methods

Search method

The literature review combined electronic searches from PubMed, Web of Science, Google Scholar, Ovid Medline and CINHALL and followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [30]. Search terms included a combination of key words such as “cervical cancer screening”, “African immigrants”, “cervical neoplasm screen-

ing”, “Pap test”, “African refugees”, and “immigrants”. First, abstracts and titles were screened for relevance. Subsequently, full text articles were evaluated to determine adherence to the predetermined inclusion criteria. The article selection was based on the following inclusion criteria: (a) studies were published in English between 2005 and 2015, (b) studies reported on cervical cancer screening in an AI population, (c) articles were peer reviewed, (d) and the article was either a qualitative or quantitative research study, (e) studies done in Europe, Australia, or North America. Studies reported only in abstracts without full manuscripts, conference abstracts, review papers, dissertations, and epidemiological studies were excluded from the review.

Search outcome

Figure 1 summarizes the article selection process. From the initial electronic database search, 45 articles were identified. The abstracts were appraised and the references were reviewed to identify relevant studies from the reference lists that might have been missed in the initial search. After deleting duplicates, the remaining 24 full-text articles were screened for eligibility. A total of 16 studies met inclusion criteria.

Quality appraisal

Due to the limited number of studies meeting inclusion criteria, all research methodologies were included in this review. A categorical quality appraisal of the studies was not undertaken due to the significant heterogeneity among studies and is a limitation of this review, however

the quality of studies was appraised via identifying designs, measures, strengths and weaknesses.

Data extraction and analysis

The abstract, manuscript, and the main findings of the studies meeting inclusion criteria were critically reviewed and synthesized. The authors used a data extraction sheet to examine study characteristics including subject characteristics, sampling methods, study location, and research design. Due to the changes in cervical cancer screening guidelines between 2005 and 2015, the authors referred to contemporary guidelines from the time the studies were conducted to ascertain if study participants met cervical cancer screening recommendations. The primary outcome variable of interest was if AIs had ever received Pap screening. Data also appraised and synthesized included cervical cancer screening adherence, and facilitators and/or barriers affecting cervical cancer screening practices. Given the heterogeneity of the included studies, meta-analysis or other statistical analysis could not be performed; therefore, data was summarized using qualitative synthesis. Extracted data was organized, integrated, and analyzed using qualitative content analysis methods [31]. Extracted data with common characteristics were then synthesized and grouped into major themes.

Results

Characteristics of selected studies

The selected articles were published between 2005 and

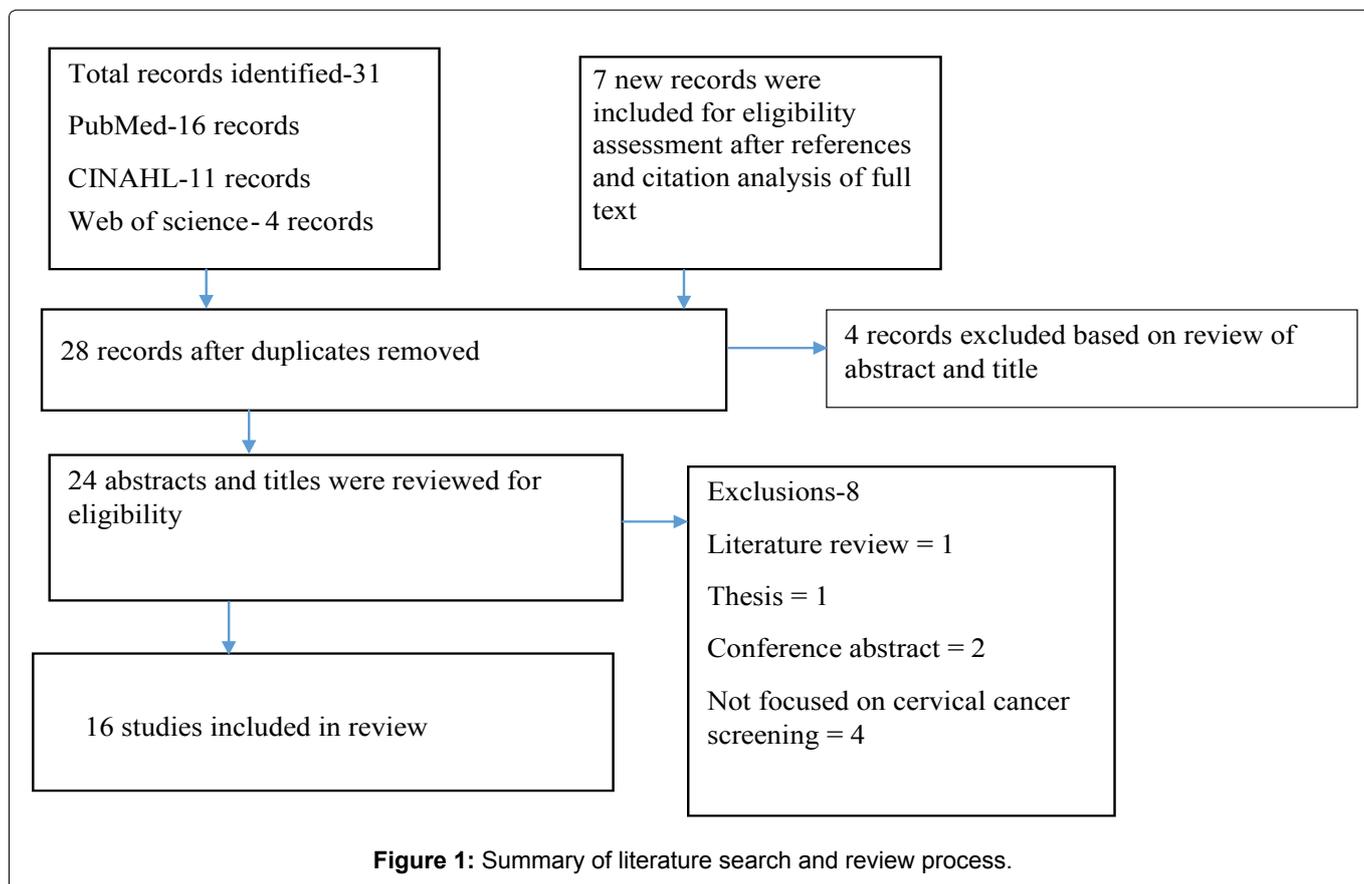


Figure 1: Summary of literature search and review process.

Table 1: Summary of cervical cancer related studies that include African immigrants (AI).

Author/year	Study design and population	Sample	Outcome	Pap screening time frame	Key findings
Forney-Gorman & Kozhimannil, 2015 [11]	Quantitative: secondary analysis of integrated health interview data African American and African immigrants	Total N = 656 AI N = 36	Distinguish between African Americans and AI screening patterns	Pap screening within the past three years	African Americans were over 3 times more likely to have reported pap smear compared to AI (OR-3.37, 95% CI-1.89-5.96). Higher education level is associated with higher odds of current Pap test. Every 1-unit increase in income was associated with decreased of having current pap screening.
Harcourt, et al. 2013 [38]	Cross-sectional design. African immigrants in Minnesota	AI N = 421	Factors associated with screening and screening rates	Ever had a Pap screening	52% have ever had pap screening. Recent immigrants ≤ 5 yrs stay were less likely to be screened. Somali have higher odds of being screened compared to other AI.
Ghebre, et al. 2014 [34]	Qualitative: informant interviews/ Somali immigrants	AI N = 23	Barriers and facilitators to cervical cancer	N/A	Barriers to screening include lack of knowledge, religious beliefs, fatalism, fear, embarrassment and lack of trust in interpreters. Other barriers are language and trust in healthcare.
Ndukwe, et al. 2013 [33]	Qualitative: focus groups. Key informants/ African women in Washington DC	AI N = 38	Knowledge and perception about breast/cervical cancer screening	Previously screened	Cervical cancer awareness is significantly lower among this population when compared to breast cancer. Barriers include fear, fatalism, lack of knowledge and cultural beliefs.
Piwowarczyk, et al. 2013 [44]	Quantitative: intervention Somali & Congolese in Boston	AI N = 120	Knowledge and intentions related to screening	Ever had pap screening. Pap smear in the past year	Tailored DVD-based intervention increased knowledge of screening and intention receive pap smear ($p < 0.01$). Somali women were less likely than Congolese women to have obtained a pap smear in the past year. 21.3.1% vs. 44.1%. About 75% have ever had a pap screening.
Samuel, et al. 2009 [42]	Quantitative analysis of chart review	N = 100 AI = 39	Screening rates and factors associated with screening	Year of most recent pap screening	Somali immigrants had lowest screening rates compared to other African immigrants. There was no significant relationship between odds of being screened and years in the US.
Morrison, et al. 2012 [39]	Quantitative analysis of medical records data	N = 91,557 AI = 810	Factors associated with preventive services use	Pap screening completion within the past 3years	Somali patients had lower pap smear screening use 48.79% compared to 69.1% in Non-Somali patients. Positive association between pap smear completion and the number of primary care visits ($p = 0.01$) and ED visits (67 vs. 51 %, $p = 0.005$).
Ogunsiji, et al. 2012 [47]	Qualitative inquiry/ West African women in Australia	AI N = 21	Knowledge, attitude, and usage of cancer screening	N/A	Low knowledge of screening, women who had at least a child after migration have better knowledge of cervical cancer screening, negative attitude towards screening.
Ekechi, et al. 2014 [41]	Quantitative design/ African or Caribbean women in London	N = 876 AI = 218 (24.7%)	Knowledge of cervical screening, screening attendance	Screened within the past 3 years Screened within 3-5 years	Being younger, single, African (compared to Caribbean) and attending religious services more frequently were associated with being overdue for screening.
Morrison, et al. 2013 [40]	Quantitative data Secondary analysis/ Somali	AI N = 310	Predictors of cervical cancer completion	One pap screening within the past 3 years	51% were adherent to cervical screening; adherence was associated with more overall health care system visits. Majority of participants, saw male providers 65.8% of the time; only 20.4% of pap tests were performed by male providers. No age difference in age between adherent and non-adherent women.

Sewali, et al. 2015 [43]	Randomized control trial/Somali	AI N = 63	Screening with clinic based Pap test versus HPV self-sampling	Successful completion of Pap screening test within 3 months after enrollment	After 3 months participants in the HPV test group were more likely to complete screening test compared to those in the clinic based pap test group (65.6% vs. 19.4%) ($p = 0.0002$). Women who reported having friends/family members to talk about cancer screening were approximately three times more likely to complete any screening test than those who did not ($P = 0.127$). This was not statistically significant after multivariate adjustment. Participants who reported residing in the US longer were more likely to complete a screening test ($P = 0.011$).
Lofters, et al. 2011 [36]	Quantitative research: immigrant women living in Ontario's urban centers	N = 455864 AI = 26125	Screening adherence and Pap screening predictors	Screened within the past three years	49.2% of Sub Saharan African have been screened. Immigrant class was significant for Sub-Saharan African women and Western European women, with refugees being at higher risk of non-screening.
Tsui, et al. 2007 [37]	Foreign born women in the US	N = 70775 AI = 178	Receipt of pap screening and determinants of pap screening	Never receiving a pap screening	Significant determinants of screening rates were foreign born and time spent in the United States. Foreign born women were more than three times as likely as US born women to have never received a Pap screening.
Redwood-Campbell, et al. 2011 [32]	Immigrant and Canadian women	N = 77 AI = 15	Barriers and enablers associated with cervical cancer screening	N/A	Knowledge gaps, misconception about cervical cancer causes, positive attitudes about taking care of health and preference for female clinician.
Abdullahi, et al. 2009 [35]	Africa born Somali Women immigrant in Camden, London	AI = 50	Breast and cervical screening	Ever had Pap screening	Barriers to breast cancer screening included limited knowledge, lack of insurance, spiritual beliefs, and secrecy.
Brown, et al. 2011 [48]	Qualitative focus group/ethnic diverse women (Haitian, African, Caribbean, African American)	N = 54 AI = 5	Facilitators and barriers of cervical cancer	N/A	Patient-doctor relationship was the single most important facilitator for cervical cancer screening. Barriers to screening included cost, busy work schedule, fear of the unknown, lack of insurance or being unemployed, and fear of disclosing immigration status.

2015. The study characteristics are outlined in [table 1](#). The study designs included six qualitative [32-35], seven quantitative [11,36-41], and one mixed methods (using both qualitative and quantitative) approach [42]. The reviewed articles included only two intervention studies [43,44]. Of the selected studies, 11 were studies specific for cervical cancer while the remaining studies also included other types of cancer.

Subject characteristics

The sample sizes and sampling methods varied among the studies. Convenience sampling was used most frequently (25%, 4 articles). Three articles (18.8%) used stratified sampling, two articles (12.5%) used randomized sampling and purposeful sampling methods, one article (6.3%) used clustered sampling, and four articles (25%) did not specify the sampling method. All studies' participants were ages 18 and above. Seven articles examined AIs exclusively while 9 studies included other populations. Somalia was the most common country of

migration in all reviewed studies which may be related to large Somalian immigrant populations in the areas where most studies on AIs have been conducted. Somalia was the top country of origin of African-born refugees and asylees (11.6%) admitted to the US in 2007 [45]. Ten studies were conducted in the United States, two in United Kingdom, and one study each was conducted in Canada and Australia.

Cervical cancer screening adherence

The cervical cancer screening adherence outcome for the purpose of this review was defined as the proportion of AI women, 21 years and older who had ever had a Pap screening. Women who had not received screening for 5 years after co-testing with HPV and Pap screening, women who had not received Pap screening within the past three years or had never had a Pap screening were categorized as overdue for screening. Pap screening rates among AIs were reported in five studies. According to Morrison and colleagues (2013) [40] 51% of the

310 women in their study had at least one cervical cancer screening within the past three years. In a sample of AIs in Minnesota, Harcourt and colleagues (2013) [38] found a 52% screening adherent rate. Somali women often completed cervical cancer screening at lower rates when compared to other AI women (37% versus 63%) [38]. Forney-Gorman and Kozhimannil (2015) [11] reported 26.4% of AI women were current on cervical cancer screening. Sewali and colleagues (2015) [43] reported a 19.4% and 65.9% completion rate for Pap screening and HPV home based kit, respectively, at 3-month follow-up. Lofters and colleagues (2010) reported that 49.2% of sub-Saharan African immigrants in their sample had not been screened for cervical cancer [46]. Ekechi and colleagues (2014) [41] reported that 26% (n = 216) of the AIs in their study were overdue for cervical cancer screening compared to 18% of Caribbean immigrant women. Piwowarczyk and colleagues (2013) reported among a group of Somali and Congolese women living in greater Boston area, 75% (n = 120) had ever completed a Pap screening. African American women were more than 3 times more likely to have reported having a Pap screening (OR = 3.37, 95% CI = 1.89, 5.96) compared to AI females [11].

Factors influencing cervical cancer screening

Immigration status: Four studies [37,38,41,43] demonstrated that length of stay in country of immigration may improve cervical cancer screening, with a longer period of stay being associated with likelihood of having completed cervical cancer screening. Harcourt and colleagues (2013) found that established immigrants (greater than 5 years) are more likely to be screened for cervical cancer compared to recent immigrants ($p < 0.001$, OR = 0.40, CI 0.24-0.65). However, Samuel and colleagues (2009) [42] did not observe a correlation between time living in the U.S. and odds of being screened for cervical cancer. In a Canadian study, Lofters and colleagues (2010) [46] found immigrant class (economic, family, and refugee class) to be a significant predictor of cervical cancer screening in sub-Saharan African and Western European women. In this study, refugees were less likely to have completed cervical cancer screening, even though length of stay in Canada was not consistently associated with lack of screening.

Health care interactions: The frequency of health care system interaction may increase screening. Emergency department visits were associated with an increased likelihood of cervical cancer screening completion [39,40]. Morrison and colleagues (2012, 2013) [39,40] reported that there was a significant positive association between the duration of established health care ($p = 0.001$), number of health care encounters ($p = 0.001$), and cervical cancer screening adherence. Three studies [35,40,47] reported that post-natal or obstetrics/gynecological visits increased the odds of cervical cancer screening completion. Ogunsiyi and colleagues (2013) found a majority of

women who had Pap screening participated after their first pregnancy and continued to receive follow-ups and reminders from their providers. In addition, health care provider recommendations [35,48], patient-health care provider relationship [48], and trained medical interpreter use [39] all were found to improve rates of cervical cancer screening.

A health care provider's gender may influence cervical cancer screening completion [32,35,40,42]. Morrison and colleagues (2012) [40] reported that patient-provider gender concordance may improve screening adherence among Somali women. Cervical cancer screening was significantly more likely to occur during a visit with a female health care provider compared to a male provider (6.9% versus 1.2%). Having a male health care provider perform Pap screening may be uncomfortable [42] and for Muslim Somali women this may be a barrier to screening completion [35]. Redwood-Campbell (2011) found in their study of cervical cancer screening barriers and facilitators, that participants preferred female clinicians, and that the health care provider be female gender was most important to Muslim women [32].

Other personal level factors related to health care interaction such as cost [33,48], communication [32,35], pain [34], embarrassment [32,34,35], fear [33,34,41,48] and accessibility difficulties are barriers to Pap screening among AI women. Fear of the Pap screening included fear of the procedure and fear of the result. Certain women perceived the process of undergoing pelvic examination as invasive. Some women believed that the use of speculum would damage reproductive organs or impact future pregnancies [34]. Some women considered the speculum a painful instrument and did not trust the instruments' sterilization [35]. Fear of receiving a cervical cancer diagnosis prevented women from undergoing Pap screening due to the belief that a cancer diagnosis would result in death [33]. Ghebre and colleagues (2014) reported that some AI women would rather die rather than know that they have cancer. Accessibility challenges affecting cervical cancer screening included lack of childcare, inconvenient appointment times, and transportation issues [33,35].

Some women anticipated embarrassment associated with reaction from health care providers based on having undergone female circumcision [35]. Also, women perceived undergoing Pap screening as a sign of problem or an indication that a woman is experiencing an infection. Other women were concerned regarding how their community might interpret undergoing a gynecologic exam [34]. Younger women expressed that due to the close knit nature of the AI community in the area, they had concerns related to privacy and confidentiality [33].

Another barrier affecting cervical cancer screening was communication and language difficulties experienced during health care interactions [32,34,35]. English is a second language for many AI women and the inability

ty to communicate effectively may be a barrier to cervical cancer screening. Communication issues may influence forming a trusting relationship with providers. Language difficulties can affect women's understanding of the cervical cancer screening and the perceived need for screening. Even though interpreter services were available, some women expressed dissatisfaction with the quality of interpreters provided, distrust of the interpreters provided, and embarrassment about disclosing private issues to interpreters [31].

Lack of trust in healthcare system [34], negative past experiences [35], and lack of health insurance [11,48] are system level barriers affecting cervical cancer screening. Cost of screening may affect cervical cancer screening for women without health insurance or underinsured. Lack of health insurance was associated with lower odds of Pap screening completion [11]. Lack of trust in the health care system and in health care providers was also identified by AI women as a health care system barrier to cervical cancer screening. Many women questioned recommendations by physicians and perceived that health care system or providers may not be focused upon the patient's best interest [34]. Furthermore, certain women delayed Pap screening due to their own past negative experience or other's reports of poor experiences related to Pap testing [35].

Knowledge of cervical cancer screening

Several studies reported that cervical cancer screening knowledge is low among AI women [32-35,47,48]. The women endorsed the need for more information on the necessity of cervical cancer screening, steps involved in procedure, and the implications of test results [32]. Because women's health issues were often not discussed openly in sub-Saharan African countries, it was difficult for AI women to initiate discussions on sexuality, cancer screening, or reproductive health [47]. In a multiethnic study by Brown and colleagues (2011), AI women knew the least among all the ethnic groups and commonly believed that cervical cancer was caused by having too many children. The women did not identify HPV as the cause of cervical cancer and were not aware HPV is a sexually transmitted infection [48]. Ndukwe and colleagues (2013) discussed that AI women often assume symptoms of cervical cancer are menstrual symptoms [33]. Ghebre and colleagues (2014) [34] found some Somali women might not know if they have undergone a cervical cancer screening because they did not know if they had undergone cervical cancer screening or another gynecological exam.

Religiosity, beliefs and attitudes

Certain religion and cultural belief can be barriers to cervical cancer screening completion. Ekechi and colleagues (2014) [41] found that women who attended religious services at least once a week were more likely to be overdue for screening than those who rarely or never

attended (27% vs. 17%, $p = 0.02$). Also, a common Muslim Somali belief is that everything that happens is 'under God's will' [34,35] and prevention has 'no impact on God's plan' for one's health [34]. Other beliefs that impact pap screening include that personal faith will serve as protection from cancer, that cancer is a curse [33], or that cancer is a form of punishment from God inflicted on an individual [34]. Some AI women have fatalistic beliefs; the women reported that prevention has no impact because if God plans for someone to get sick, they will despite screening. Individuals will die the day they were supposed to die and participating in health prevention would not change the outcome was another sentiment shared by AI women [34].

There is conflicting evidence about AIs attitudes related to cervical cancer screening. Ogunsiji and colleagues (2013) [47] reported the majority of West African immigrant women in their study had a negative attitude toward Pap screening due to unfamiliarity with the test. Conversely, Redwood-Campbell and colleagues (2011) [32] reported a positive attitude among female immigrant being proactive in managing their health by obtaining cervical cancer screening.

Demographic characteristics

Among the studies that assessed correlation between age and cervical cancer screening, one study reported no association between AIs age and cervical cancer screening completion [38] while another study reported that women 25-44 years old were less likely to be screened than women 45-64 years old [41]. Two studies indicated that single African women were less likely to be screened compared to married women [11,41]. Harcourt and colleagues (2013) [38] reported that there was no association between AIs' level of education and cervical cancer screening while Forney-Gorman and colleagues (2015) [11] found an association between higher level of education and screening but it did not reach statistical significance.

Discussion

This literature review describes the state of cervical cancer screening evidence related to AIs and highlights a paucity of research specific to AI women and cervical cancer screening despite growing numbers of this immigrant group in developed countries. The review included 16 articles published between 2005 and 2015. Through synthesis of the articles, the authors identified thematic factors influencing Pap screening among AIs. Factors influencing Pap screening were identified as immigration status; health care interactions; knowledge related to cervical cancer screening; religiosity, beliefs, and attitudes; and demographic characteristics.

Cervical cancer screening is underutilized in the AI population with screening rates lower than other U.S. women and well below the Healthy People 2020 goal of 93% of women ages 21 to 65 receiving screening [25].

The differing cervical cancer screening guidelines in place during 2005 to 2015 review period make direct comparisons of Pap screening adherence across studies difficult. Available national data do not reflect screening rates among AI due to data aggregation in which AI females are reported as part of African American female statistics. The 2010 National Health Interview Survey showed that the overall cervical cancer screening receipt in the U.S. within the past three years was 83.0%. African American women have a cervical cancer screening rate of 85%, and rates were significantly lower among Asians at 75.4% [49]. Lack of disaggregation of data makes it difficult to identify sub group differences between native-born blacks and foreign-born blacks. There is limited data about Pap screening among a nationally representative sample of AI. In this review, reported cervical cancer screening rates among AI varied greatly from 19.4% to 75%. Notably, even a cervical cancer screening rate of 75% is below the reported screening rates among other minorities indicating further intervention is still needed to increase cervical cancer screening rates and achieve the Healthy People 2020 goals in this population.

Knowledge deficits related to cervical cancer risk factors and screening procedures influence cervical cancer screening among AIs. Limited knowledge in the AI population may be related to lack of cervical cancer screening emphasis or utilization prior to migration. Numerous studies conducted in Africa have shown that there is poor knowledge related to HPV, cervical cancer, and cervical cancer screening among African women. In a study conducted among women in Burkina Faso, the researchers reported low biomedical knowledge about cervical cancer [50]. In an integrated review of barriers to cervical cancer screening in sub-Saharan Africa, McFarland and colleagues (2016) cited lack of knowledge and awareness of cervical screening as the most common client-based barrier. Lack of information about cervical cancer screening programs and illiteracy likely are components affecting this knowledge gap [7]. Similarly, research among other immigrant population in the U.S. have found knowledge of cervical cancer causes and prevention to be lower as compared to the general U.S. population. For example, Corcoran and colleagues (2014) reported that Latina women have inaccurate and inadequate knowledge of cervical cancer and its prevention [51].

The knowledge gaps related to cervical cancer which exist in the burgeoning AI population must be addressed. Limited knowledge related to cervical cancer can fuel misconceptions about cervical cancer and cervical cancer screening. Alarming, more than half of cervical cancer deaths in the U.S. are among immigrant women [37], and AI women also suffer a disproportionate cervical cancer burden. Screening campaigns must target AIs and emphasize the causative role of HPV in cervical cancer and cervical cancer risk factors. Such campaigns will help eliminate anecdotal beliefs and combined with tar-

geted cervical cancer screening programs can reduce the risk of cervical cancer. Regular cervical cancer screening based upon current guidelines is highly effective in identifying cervical cancer precursors and interrupting progression to invasive disease [52].

In this review, health care interactions also influenced cervical cancer screening among AI. In this review, AI women at post-natal or obstetrics/gynecological visits were screened as part of their visit; however, depending solely on this service may preclude women above childbearing ages. In native African women, screening for cervical cancer is similarly opportunistic and is more often completed by women who attend antenatal and family planning clinics. However, women who use these services are generally young and from a relatively low-risk group. This type of service does not reach women many at higher risk such as those aged 35-60 years and those who live in rural areas [4]. Morrison and colleagues (2012) noted that more frequent exposure to the health care system may increase comfort with the system and procedures, enhancing opportunities for preventive health services [40]. However, women who anticipate or experience unpleasant health care interactions may have fewer encounters with the health care system decreasing the likelihood of preventive care including cervical cancer screening.

In addition, certain health care interaction factors affecting Pap screening that are reported by U.S. ethnic minorities include embarrassment, fear of pain, fear of diagnosis, and trust in provider [51,53]. In a systematic review of barriers to cervical cancer utilization in sub-Saharan Africa, Lim and Ojo (2016) reported similar barriers among Sub-Saharan Africans [54]. Nigerian women indicated that fear of a positive result, modesty concerns, gender of health care providers, and beliefs that it is better to be ignorant of disease than to go in search of it were factors affecting cervical cancer screening practices, but these factors were not uniform across religions and geographical regions [55]. Furthermore, anticipated embarrassment related to health care providers unfamiliar with female circumcision practices have been reported among AIs [29]. Health care providers that encounter immigrant women should be aware that AIs may have specific needs related to female circumcision, which is practiced in more than 28 countries in Africa [56].

Religiosity has been shown to predict engagement in preventive services [57]. Generally, individuals who attend religious services are more likely to report the use of female preventive services compared to those who never attend [57]. However, in this review, we found that AI women who attended religious services were not up to date on screening. Religiosity may influence perceptions about cervical cancer causes and outcome. Some AI women endorse fatalistic beliefs about cancer that may be intertwined with religious beliefs. The belief that a higher power controls health is a component of fatalism [58]. Studies conducted among native African women

have reported fatalistic views of cervical cancer screening, viewing positive results as a death sentence negating the need for screening. Other African women have reported solace in ignorance about their cervical cancer status [54].

Based on the heterogeneity and cultural diversity among Africans, factors related to cervical cancer screening uptake may vary among different ethnicities, within countries, and across the continent. In this review, most of the factors identified as influencing cervical cancer screening among AIs are similar to those identified among native Africans. However, some factors influencing cervical cancer screening differ between native Africans and AIs. For instance, immigration status is an important determinant of cervical cancer screening uptake among immigrants with recent immigrants at greater risk for non-compliance with screening recommendations. In addition, immigrants may be disproportionately affected by unique factors that may deter from cervical cancer screening. For example, undocumented immigrants cannot receive health insurance via the Patient Protection and Affordable Care Act (ACA) and legal immigrants who have been in the country less than five years are also excluded from participation in the Medicaid expansion program. Therefore, undocumented immigrants and recent immigrants are less likely to receive cervical cancer screening, and more likely to delay seeking necessary care [59]. U.S. immigrants consistently have lower rates of health insurance coverage than native U.S. populations, yet there are differences among immigrants based on immigration status, time in the U.S., and country of origin [60]. Having health insurance and cost likely play a significant role in access to preventive services such as Pap screening for AIs.

Despite migration to developed countries where organized cancer screening services and programs are normalized, there remains low cervical cancer screening rates among AIs. In part, this may be associated with lack of successful integration into the health care system of the host country. As acculturation and assimilation occur for AIs over time, this may lead to changes in beliefs or norms related to health practices such as cervical cancer screening [61]. Culturally congruent care may facilitate awareness of and access to health care services, including cervical cancer screening.

This review underscores the need for culturally-appropriate, targeted prevention efforts aimed at recent immigrants to improve their cervical cancer-screening uptake. In an intervention study identified in this review, Piwowarczyk and colleagues (2013) [44] found that a culturally and linguistically tailored DVD intervention increased knowledge and intention to screen among women. The intervention was a series of one-session group workshops with Congolese and Somali in the US built around a DVD using AI women's stories which provided basic information about mammography, pap smears and mental health services for trauma.

Connecting recent immigrant with community resources, local advocacy, and resettlement organizations may help link and integrate them into the health care system in their host countries and reduce the cervical cancer screening and cervical cancer disease disparities experienced by this group.

Although, considerable progress is being made toward understanding the facilitators and barriers to cervical cancer screening among AIs, this review highlights the need for culturally-targeted and linguistically appropriate interventions to address knowledge gaps, health promotion, all levels of prevention, and culturally sensitive health care interactions.

This review indicates that health care providers influence cervical cancer screening utilization via their recommendations, patient-provider relationships, and communication. Hence, interventions and educational initiatives should address health care providers' cultural sensitivity and cultural congruence and facilitate incorporation of these concepts into patient-centered care to enhance health care interactions and improve health care barriers for AIs.

Self-Pap screening and HPV testing may play a vital role in the future in increasing the number of women globally who are able to receive cervical cancer screening [62]. Sewali and colleagues (2015) study [43] among Somali immigrants demonstrated the potential for using self-sampling home-based kits to increase cervical cancer screening in AIs. Community health workers (CHWs) might serve as patient navigators to participants with positive cervical cancer or HPV self-screening results to ensure timely follow-up [62]. As frontline lay public health workers, CHWs serve as a bridge between communities and health care providers [63]. CHWs address the challenge of delivering health care services to underserved populations through education, outreach, and counseling [64,65] CHWs have been successfully used in cancer screening promotions among underserved populations and thus should be considered as a component of intervention strategies aimed at increasing cervical cancer screening in AI women [65].

Limitations

There are several limitations of this review including the number and types of studies that were reviewed and the time span of publication. Although 16 studies were identified, the study designs and samples varied greatly and studies utilized unique research purposes and questions, different types of research participants, dissimilar research measures, multiple variables, and widely varied immigrant population foci. Although the authors sought to identify all AI cervical cancer screening studies meeting inclusion criteria, the search methodology employed for the literature review may have limited the number of studies identified for inclusion. Searches of additional databases, grey literature, abstract-only writings, and unpublished data may have led to the identification of

additional research studies. The limitation of using keywords and Mesh terms may have impacted the search results; however, in an effort to minimize this effect multiple databases were searched. The diversity of the articles reviewed and AIs as a population, limits the ability to generalize the review findings. The results should be interpreted with caution due to the numerical variation of AI study participants. Also, study participants included AI women born in various countries across the African continent which are likely influenced by factors such as geographical region, religion, legislation, socio-political factors, sociocultural norms, and a myriad of other factors. Data classification and thematic identification and classification were based on subjective inferences; consequently, this is a limitation that may affect the results.

Conclusions

The findings from the review highlight gaps in research among AI population related to cervical cancer screening. The need for more research to test interventions among this growing population cannot be overemphasized. Such research studies should target AIs within their socioeconomic cultural context to identify effective interventions to improve cervical cancer screening participation in this group. Such investigation should also evaluate the cost effectiveness and feasibility of such interventions for dissemination to a larger AI audience.

In addition, much of the research done in this group has not been among national representative samples of AI and has been conducted with broad classification of immigrants with small representation of AIs; thus limiting the interpretation and generalization of such research to larger AI populations. Future AI research should consider the heterogeneity of the AI population and identify and study population subgroups and subcultures to determine the similarities and differences in cervical cancer screening influences and practices. AI groups such as uninsured, recently-arrived, and non-English speakers may be best reached through community-based participatory research with community-based organizations [29]. Engagement with community-based organizations that serve these communities provide a platform for exploring meaningful health promotion interventions in this underrepresented population [66]. Achieving inclusive, meaningful research in this population may best be accomplished through multi-institutional collaborations to ensure diversity among African-born populations while further stratification may delineate risks, behaviors, and associations unique to specific subgroups within these populations [66].

Sample Search Terms used in PubMed

(africa*) OR "Africa" [Mesh])) AND (((("Emigrants and Immigrants" [Mesh])) OR immigrant*)) AND "last 10 years" [Pdat] AND Humans [Mesh] AND English [lang])) AND (((cancer screen* AND "last 10 years" [Pdat] AND Humans [Mesh] AND English [lang])) OR

("Early Detection of Cancer" [Mesh] AND "last 10 years" [Pdat] AND Humans [Mesh] AND English [lang])) AND "last 10 years" [Pdat] AND Humans [Mesh] AND English [lang])) AND "last 10 years" [Pdat] AND Humans [Mesh] AND English [lang])) AND (((("Uterine Cervical Neoplasms" [Mesh] AND "last 10 years" [Pdat] AND Humans [Mesh] AND English [lang])) OR (cervi* AND "last 10 years" [Pdat] AND Humans [Mesh] AND English [lang])) AND "last 10 years" [Pdat] AND Humans [Mesh] AND English [lang])).

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