

A scoping review: Facilitators and barriers of cervical cancer screening and early diagnosis of breast cancer in Sub-Saharan African health settings

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ABSTRACT

To address gaps in access to cervical cancer screening and early diagnosis of breast cancer services in Sub-Saharan African (SSA), this scoping review was conducted to explore facilitators and barriers that exist on the patient-, provider-, and system-level. An extensive literature search was conducted in accordance with scoping review methodology and the Cochrane guidelines. Our search criteria were limited to original research studies conducted in community or clinical settings in SSA within the last 10 years (2010–2020). Themes found from this review included patient knowledge and provider education, access to screening services, trust, health-related behaviors, attitudes, values, and practices, community and social values, health infrastructure, resource allocation, and political will. Identified barriers included lack of knowledge about cervical and breast cancer among patients, gaps in education and training among providers, and lack of resources and health infrastructure at the facility level and within the overall health system. Facilitators included perceived risk of cancer, support and encouragement of the provider, and utilization of novel approaches in low-resource settings by health systems. To better address individual-, provider-, and health system and facility-based facilitators and barriers to care, there is a need for political and financial investment and further research on the health service delivery in specific national health systems, especially in the context of the global campaign to eliminate cervical cancer as a public health problem.

1. Introduction

Women living in low- and middle-income countries (LMICs) present with cancer at more advanced stages and suffer higher mortality and morbidity from cancers than women living in high-income countries (HICs). Approximately 85% of women diagnosed with cervical cancer and 88% of deaths from cervical cancer are in LMICs (Jemal et al., 2019). Although women in Sub-Saharan Africa (SSA) make up 14% of the world's female population, over one-third of all global cervical cancer deaths occur in this region (Morhason-Bello et al., 2013). Mortality due to cervical cancer varies from 27.6 per 100,000 in East Africa to less than 2 per 100,000 person years in Western Asia, Australia-New Zealand and Europe (Jemal et al., 2019). In the case of breast cancer,

incident rates are rapidly increasing in SSA and other LMICs. According to population-based registries, the pooled incidence rate of breast cancer in SSA increased from 19.7 per 100,000 to 36.9 per 100,000 from 2000 to 2015 (Adeloye et al., 2018). Despite lower incidence rates in LMICs than HICs, mortality due to breast cancer is disproportionately higher. Countries in SSA, with weak health infrastructure and limited screening and/or prevention programs, have been affected by high cervical cancer burdens and high mortality-to-incidence ratios for breast cancer (Denny and Anorlu, 2012).

Screening for both pre-invasive cervical abnormalities and early stage breast cancer has the potential to save lives as well as limit the costs and burdens on SSA health systems. Both breast cancer early detection and cervical cancer prevention are part of primary medical

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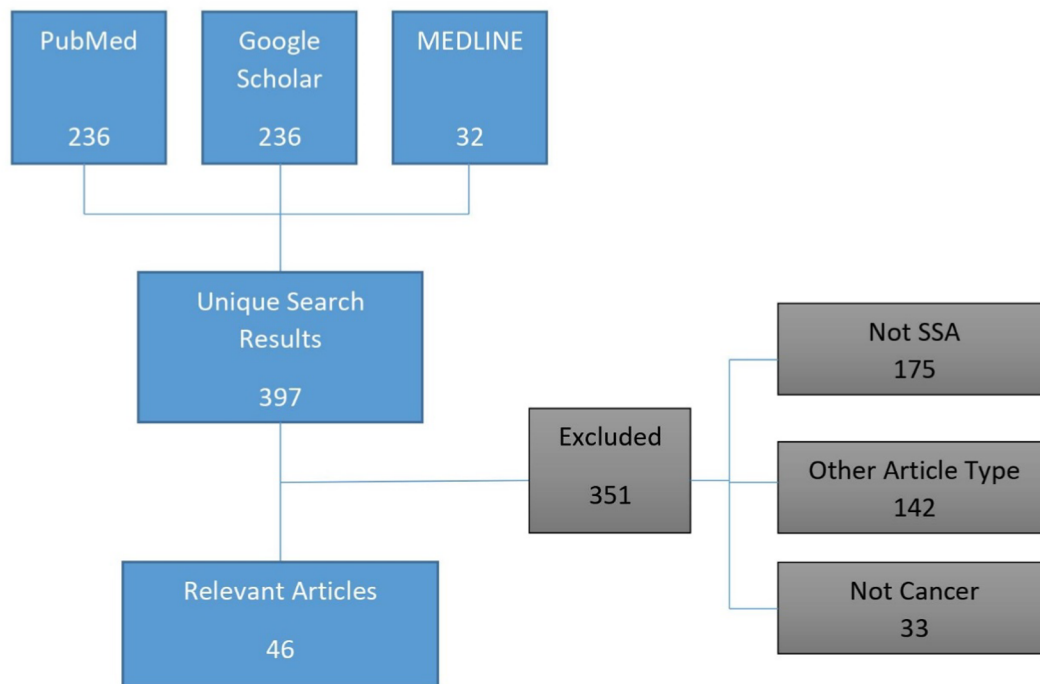


Fig. 1. Results of the literature search.

care in most HICs, and often these services are offered at the same medical visit. Furthermore, each service raises similar issues of privacy, dignity and women's empowerment that may either enhance or discourage their uptake in a given population.

Evidence-based global guidelines are available to support program planning, implementation and monitoring and evaluation efforts for cervical cancer screening and early detection of breast cancer programs, but uptake remains limited in the SSA. For example, in Kenya, only 13.8% and 13.5% of eligible women were screened for cervical and breast cancer, respectively (Kenya National Bureau of Statistics, 2014). It is important to assess the facilitators and barriers at the patient-, provider-, and system-level to address these gaps and improve women's access to cancer prevention services. In this literature review, we identify and describe patient-, provider-, and system-based 1) barriers that prevent the detection, diagnosis, and management of breast and cervical cancer in SSA, and 2) facilitators that can encourage women to seek education and care.

2. Methods

2.1. Identifying the research question

Our overall research question in this scoping review was: What are the barriers to cervical cancer screening and early diagnosis of breast cancer and/or facilitators that enable these programs at the patient-, provider-, and system-levels in SSA countries? We identified scientific knowledge gaps surrounding this research question in the indexed literature over a 10-year period (2010–2020). A scoping review aims to “map the existing literature in a field of interest in terms of the volume, nature and characteristics of the primary research” (Pham et al., 2014). The purpose of this review was not to appraise or synthesize the evidence base for effectiveness or feasibility of these programs in SSA, but rather to present a descriptive account of the facilitators and barriers that currently exist.

Several supplementary topics were used as secondary research objectives to guide our review. These consisted of themes in individual and community perceptions of cervical cancer screening and early diagnosis of breast cancer services in SSA, and examination of the current

knowledge gaps that exist at the individual- and provider-levels that impact the ability of patients to seek and utilize screening and early diagnosis services. In addition, this review sought to highlight strategies that providers can implement to increase patient uptake of the current screening and early diagnosis programs as well as the resources and systematic changes that are needed to increase patient coverage and reduce cancer disparities in SSA.

2.2. Scoping review methodology and search strategy

The review methodology broadly followed the steps proposed by Levac et al. (Levac et al., 2010) with the development of research questions based on previous literature reviews on similar topics. Using the Cochrane guidelines (Higgins et al., 2019), we performed a literature search using Ovid MEDLINE, PubMed Central®, and Google Scholar to retrieve all studies published in English that contained information on facilitators and barriers to cervical cancer screening and early diagnosis of breast cancer within Sub-Saharan Africa. The subject search and text word search were done separately in each database and then combined using “OR” and “AND” operators. The MeSH (Medical Subject Headings) terms included “uptake,” “barriers,” “cancer,” “cancer control,” “culture,” “sociocultural barriers,” “enablers,” “detection,” “education,” “system,” “clinical,” “provider,” “breast,” “cervical,” “Africa,” and “sub-Saharan Africa.” We continued our search until we reached saturation, which was measured by citation of previously reviewed articles in new searches.

2.3. Selection criteria and quality assessment

Irrespective of study design, original research studies that were conducted in community or hospital/clinic settings in SSA within the last 10 years (2010–2020) were included. Additional inclusion criteria consisted of publications written in the English language and studies that took place in the 46 of Africa's 54 countries designated as “sub-Saharan” by UNDP (United Nations Development Program, 2003). We excluded studies that were undertaken in other LMIC. In addition, letters and personal views were excluded from this study.

From March to June 2019, the titles and abstracts were

Table 1Data extraction form adapted from [Udoh et al. \(2020\)](#).

Senior author
Date of publication
Study title
Type of study design
Study setting (country)
Geography setting (rural/urban)
Study population
Number of study participants
Study findings
Significant findings
Conclusions

independently screened in these searches, based on the inclusion and exclusion criteria. We selected a total of 397 publications, which were entered into a database and the full texts were downloaded. In an iterative process that involved removing publications that did not meet the inclusion criteria and adding relevant publications identified in a subset of review papers, the final list of publications for this review was determined ($n = 46$). In [Fig. 1](#), a flow chart illustrates this process of literature selection.

2.4. Data extraction

We extracted information from the selected publications that were relevant to our research questions. To aid our extraction process, we utilized a data extraction form developed by Udoh et al. ([Udoh et al., 2020](#)) as illustrated in [Table 1](#). To ensure accuracy and consistency in the data extracted, we reviewed all accepted papers and evaluated each by research design, research quality, study replicability, and generalizability and coherence of the results. Our search was evaluated by all members of the team as well as within our academic network for expert opinions based on their experiences in cervical cancer screening and early diagnosis of breast cancer implementation and evaluation.

2.5. Limitations

We acknowledge some important limitations for this review. First, in this review, we looked for general themes in studies conducted across SSA and therefore sacrificed specificity. The countries of SSA are very diverse culturally, socially, and politically, perhaps more so than any other continent, although they tend to be lumped together. Therefore, while we broadly identified common facilitators and barriers, the development of interventions to increase the uptake of these cancer screenings in any local setting will likely require research to understand the contextual influences of socio-cultural and structural factors that impact participation in and/or adaptation of interventions accordingly. Finally, we acknowledge an inherent bias because not all countries and regions are represented, which is likely influenced by resources i.e., the locales that are the least resourced are likely to be the least represented in this review or any review of this kind since it requires infrastructure, resources, and accessibility to conduct research in such settings. Yet, this scoping review found common themes that might be a useful starting point for future dissemination and implementation (D&I), or D & I research, and a handy reference for identifying relevant studies.

3. Results

The 46 articles included in this review are summarized in [Table 2](#). Thematic findings from our review have identified multiple facilitators and barriers of cervical cancer screening and early diagnosis of breast cancer for women living in SSA, which are presented in [Table 3](#). We distinguished various barriers and facilitators into individual-, provider-, and system-levels.

3.1. Individual-Level facilitators and barriers

3.1.1. Facilitators

The most salient individual factor that facilitated participation in cervical cancer screening was the patient's perceived risk ([Bayu et al., 2016](#); [Bukirwa et al., 2015](#); [De Abreu et al., 2013](#); [Ebu et al., 2014](#); [Hoque, 2010](#); [McFarland, 2013](#); [Mingo et al., 2012](#); [Mukama et al., 2017](#); [Ngugi et al., 2012](#)). One study reported that participants associated participation in cancer screening with the prevention of death or improvement in a patient's quality of life ([Ragan et al., 2018](#)). Additionally, the role of influential members of the community, such as religious and opinion leaders, led to increases in screening and vaccination participation ([Ngugi et al., 2012](#); [Nyanambe et al., 2019](#); [Teng et al., 2014](#)). The role of public health campaigns through local mass media were largely effective in not only an educational capacity, but also as a method to address community stigma against cancer screening methods ([De Abreu et al., 2013](#); [Hoque, 2010](#); [McFarland, 2013](#); [Ngugi et al., 2012](#); [Ragan et al., 2018](#); [Lunsford et al., 2017](#); [Ports et al., 2015](#); [Assoumou et al., 2015](#); [Almobarak et al., 2016](#); [Illaboya et al., 2018](#); [Kassam et al., 2017](#); [Ng'ida et al., 2019](#); [Sama et al., 2017](#); [Adedimeji et al., 2016](#); [Chaka et al., 2018](#)).

The factor that was most likely to serve as a facilitator or barrier on the individual-level was the patient's geographic setting with one study in particular indicating that participants from urban areas were more likely to be knowledgeable about risk factors and symptoms of cervical and breast cancer than those from rural areas ([Compaore et al., 2016](#)). In the case of cervical cancer, $57.64\% \pm 18.70\%$ (SD: 16.8) of study participants in urban and *peri*-urban settings had an understanding of the disease compared with $44.96\% \pm 43.46\%$ (SD: 24.4) of participants in rural areas. For breast cancer, $44.97\% \pm 6.80\%$ (SD: 2.7) of participants based in urban and *peri*-urban settings were knowledgeable about breast cancer and early detection programs while $36.2\% \pm 44.34\%$ (SD: 14.1) of participants from rural settings reported the same level of knowledge.

3.1.2. Barriers

Some of the major barriers for women seeking care were the lack of community and social support ([Ragan et al., 2018](#); [Adedimeji et al., 2016](#)), lack of support from spouse and spousal approval ([Ebu et al., 2014](#); [Hoque, 2010](#); [Ngugi et al., 2012](#); [Ragan et al., 2018](#); [Teng et al., 2014](#); [Lunsford et al., 2017](#); [Hasahya et al., 2016](#); [Sayed et al., 2019](#)) and stigma in their community in utilizing cervical and/or breast cancer screening services ([De Abreu et al., 2013](#); [Ragan et al., 2018](#); [Teng et al., 2014](#); [Lunsford et al., 2017](#); [Ports et al., 2015](#); [Adedimeji et al., 2016](#); [Sayed et al., 2019](#); [Rosser et al., 2015](#); [Meacham et al., 2016](#)). Several studies discussed the role of specific religious or cultural beliefs that may explain the causes of cancer ([Ebu et al., 2014](#); [Mingo et al., 2012](#); [Ng'ida et al., 2019](#); [Sama et al., 2017](#); [Binka et al., 2019](#)) or beliefs that keep people from seeking health services ([Hoque, 2010](#); [Lunsford et al., 2017](#); [Sayed et al., 2019](#)). Several studies revealed major misconceptions in patients' beliefs including that they would know that they have cervical cancer from obvious symptoms ([Mukama et al., 2017](#); [Bayu et al., 2016](#); [Bukirwa et al., 2015](#); [De Abreu et al., 2013](#)), as well as myths and misconceptions about Pap smears ([Bukirwa et al., 2015](#); [Mingo et al., 2012](#); [Mupepi et al., 2010](#)).

Many of these barriers highlighted the overall lack of critical knowledge and education surrounding cervical and breast cancer ([Nyanambe et al., 2019](#); [Assoumou et al., 2015](#); [Illaboya et al., 2018](#); [Ng'ida et al., 2019](#); [Sama et al., 2017](#); [Chaka et al., 2018](#); [Compaore et al., 2016](#); [Sayed et al., 2019](#); [Bukirwa et al., 2015](#); [De Abreu et al., 2013](#); [Ebu et al., 2014](#); [Hoque, 2010](#); [Mupepi et al., 2010](#); [Eze et al., 2012](#); [Utoo et al., 2013](#); [Olasehinde et al., 2019](#); [Grosse-Frie et al., 2018](#); [Koon et al., 2013](#); [Makurirofa et al., 2019](#)). As a result of limited cervical and breast cancer education, poor individual screening behaviors and practices persist throughout SSA. These included not having a breast exam, mammogram, or breast ultrasound within the last year

Table 2
Summary of the articles reviewed.

Author	Year	Primary Cancer Site	Country	Geographic Setting	Study Population	Study Design
Adedimeji et al (Adedimeji et al., 2016)	2017	Breast	Nigeria	Urban/peri-urban	Men, women, and young adults in Ibadan	Focus group discussions (FGD)
Almobarak et al (Almobarak et al., 2016)	2016	Cervix	Sudan	Urban/peri-urban	Women aged between 14 and 58 that were recruited from obstetric clinics, governmental and private hospitals, and universities in Khartoum, Sudan	Cross-sectional survey
Assoumou et al (Assoumou et al., 2015)	2015	Cervix	Gabon	Urban/peri-urban	Women aged 16 years and older in Libreville, Gabon	Structured questionnaire interviews
Balekouzou et al (Balekouzou et al., 2016)	2016	Breast	Central African Republic	Urban/peri-urban	Health professionals working in hospitals in Bangui	Individual questionnaires
Bayu et al (Bayu et al., 2016)	2015	Cervix	Ethiopia	Urban/peri-urban	Women (age ≥ 21 years) who have been living in Mekelle zone at least for six month	Semi-structured questionnaire interviews
Binka et al (Binka et al., 2019)	2019	Cervix	Ghana	Rural	Women aged between 30 and 65 who were registered at the Battor Catholic Hospital but not yet screened	In-depth interviews
Bukirwa et al (Bukirwa et al., 2015)	2015	Cervix	Uganda	Urban/peri-urban	Health care providers and adult women, aged 25+ years at the Mildmay HIV clinic	Key informant interviews (KII) and in-depth interviews
Chaka et al (Chaka et al., 2018)	2018	Cervix; Breast	Ethiopia	Rural	Women aged 18+ years	Semi-structured questionnaire interviews
Compaore et al (Compaore et al., 2016)	2016	Cervix	Burkina Faso	Urban/peri-urban	Women referred from primary or secondary level public and private hospitals, community healthcare facilities, or Non-Governmental Organizations (NGO) for suspected dysplastic or cancer lesions	Cross-sectional survey
De Abreu et al (De Abreu et al., 2013)	2013	Cervix	South Africa	Urban/peri-urban	Black women from Red Hill and Masiphumelele neighborhoods in Cape Town, aged 21–53 years old	FGD
Ebu et al (Ebu et al., 2014)	2014	Cervix	Ghana	Rural	Women who are 10–74 years and are sexually active in Elmina	Structured questionnaire interview
Eze et al (Eze et al., 2012)	2012	Cervix	Nigeria	Rural	Female patients seeking care at the General Hospital at Enuohia	Structured questionnaires
Grosse-Frie et al (Grosse-Frie et al., 2018)	2018	Breast	Mali	Urban/peri-urban	Breast cancer survivors and women from Bamako	FGD
Hasahya et al (Hasahya et al., 2016)	2016	Cervix	Uganda	Rural	Women aged 25–49 years with daughters who received their HPV vaccination	FGD
Hoque (Hoque, 2010)	2010	Cervix	South Africa	Urban/peri-urban	Female first year students at Mangosuthu University of Technology	Structured questionnaire
Illaboya et al (Illaboya et al., 2018)	2018	Breast	Uganda	Rural	Women and community health workers in Ssisa sub-county in Wakiso district	Semi-structured interviews
Iliyasu et al (Iliyasu et al., 2010)	2010	Cervix	Nigeria	Urban/peri-urban	Female university students in northern Nigeria	Structured questionnaire interviews
Joffe et al (Joffe et al., 2018)	2018	Breast	South Africa	Urban/peri-urban	Women diagnosed at the Chris Hani Baragwanath Academic Hospital in 2015–2016	Structured questionnaire interviews
Kahesa et al (Kahesa et al., 2012)	2012	Cervix	Tanzania	Urban/peri-urban	Women living in three wards from three municipalities in Dar es Salaam	Structured questionnaire interviews
Kangmenaa et al (Kangmenaa et al., 2018)	2018	Cervix	Kenya	Rural and urban/peri-urban districts	Women identified through cluster sampling from the 2014 Kenya Demographic and Health Survey	Structured questionnaire interviews
Kassam et al (Kassam et al., 2017)	2015	Breast	Tanzania	Urban/peri-urban	Senior personnel involved in the 2010 “Check It, Beat It” campaign (CIBI2020)	Semi-structured questionnaire interviews
Koneru et al (Koneru et al., 2017)	2017	Cervix	Tanzania	Urban/peri-urban	Women with HIV infection aged 19+ years attending HIV clinics in Dar es Salaam	Structured questionnaire
Koon et al (Koon et al., 2013)	2013	Breast	Uganda	Urban/peri-urban	Members of Uganda Women’s Cancer Support Organization (UWOCASO) aged 25–59 years and were breast cancer survivors at least one year from their time of diagnosis	FGD
Lunsford et al (Lunsford et al., 2017)	2017	Cervix	Kenya	Rural and urban/peri-urban districts	Women aged 25–49 years and male partners from urban Nairobi and rural Nyanza	FGD
Meacham et al (Meacham et al., 2016)	2016	Breast	Uganda	Urban/peri-urban	Breast cancer survivors from Uganda that received treatment in Uganda or East Africa	Structured questionnaire interviews
Makurirofa et al (Makurirofa et al., 2019)	2019	Cervix; Breast	Zimbabwe	Rural	Women aged 15–49 years old in Mudzi district	Community-based questionnaire survey
McFarland (McFarland, 2013)	2013	Cervix	Botswana	Urban/peri-urban	Black women aged 30+ years living in Gaborone	Structured questionnaires
Mingo et al (Mingo et al., 2012)	2012	Cervix	Botswana	Urban/peri-urban	Women attending general medicine or HIV clinics where Pap testing was available	Structured questionnaires
Mukama et al (Mukama et al., 2017)	2017	Cervix	Uganda	Rural	Women from Bugiri and Mayuge districts	Community-based questionnaire survey
Mupepi et al (Mupepi et al., 2010)	2010	Cervix	Zimbabwe	Rural	Women from Shamva district	Descriptive survey
Ng’ida et al (Ng’ida et al., 2019)	2019	Breast	Tanzania	Rural	Women aged 35+ years in Morogoro district	Standardized questionnaire
Ngugi et al (Ngugi et al., 2012)	2012	Cervix	Kenya	Rural and urban/peri-urban districts	Women living in Thika district	In-depth interviews
Nyanmbe et al (Nyanmbe et al., 2019)	2019	Cervix	Zambia	Rural	Women and men from the general public resided in either Chilenje Township or Kanyama Compound of Lusaka City	Semi-structured questionnaire interview
Obrist et al (Obrist et al., 2014)	2014	Breast	Ghana	Urban/peri-urban	Breast cancer patients attending Komfo Anokye Teaching Hospital and their next of kin	Structured questionnaire

(continued on next page)

Table 2 (continued)

Author	Year	Primary Cancer Site	Country	Geographic Setting	Study Population	Study Design
Olasehinde et al. (Olasehinde et al., 2019)	2019	Breast	Nigeria	Rural and urban/peri-urban districts	Women aged 40 years and older in life central and two local district	Semi-structured questionnaire interviews
Ports et al. (Ports et al., 2015)	2015	Cervix	South Africa	Urban/peri-urban	Key informants from Senzokuhle Home Based Care Workers, staff, and advocates as well as women from the community	In-depth interviews
Pruitt et al. (Pruitt et al., 2015)	2014	Breast	Nigeria	Rural and urban/peri-urban districts	Women diagnosed with breast cancer and were seeking care at University College Hospital in Ibadan	Semi-structured interviews
Ragan et al. (Ragan et al., 2018)	2018	Cervix	Kenya	Rural and urban/peri-urban districts	Women aged 25–49 years or a man aged ≥ 18 years and married to a woman aged 25–49 years, a resident of Nairobi or Nyanza	FGD
Rosser et al. (Rosser et al., 2015)	2015	Cervix	Kenya	Rural	Staff members at FACES/Ministry of Health (MoH)-supported cervical cancer screening and prevention sites in Suba and Mbita districts	Structured provider surveys
Sama et al. (Sama et al., 2017)	2017	Breast	Cameroon	Rural	Female undergraduate students in the Higher Teachers Training College	Structured questionnaire
Sayed et al. (Sayed et al., 2016)	2016	Breast	Kenya	Rural and urban/peri-urban districts	Women aged 15+ years	Knowledge, attitudes, and practices (KAP) tool
Sayed et al. (Sayed et al., 2019)	2019	Breast	Kenya	Rural and urban/peri-urban districts	Women aged 15–49 years from the Integrated Primary Health Care (IPHC) database and male heads of household	FGD and KII
Teng et al. (Teng et al., 2014)	2014	Cervix	Uganda	Urban/peri-urban	Women attending the ASPIRE project and women unfamiliar with the Advances in Screening and Prevention in Reproductive Cancers (ASPIRE) project	Semi-structured interviews and FGD
Utoo et al. (Utoo et al., 2013)	2013	Cervix	Nigeria	Urban/peri-urban	Women attending outpatient gynecological clinic at the Benue State University Teaching Hospital in Makurdi	Semi-structured questionnaire interviews
Wachira et al. (Wachira et al., 2017)	2017	Breast	Kenya	Rural	Adult women aged 18+ years in western Kenya	Cognitive FGD using a breast cancer awareness measure (BCAM)

(Sayed et al., 2019; Meacham et al., 2016; Olasehinde et al., 2019; Koon et al., 2013; Wachira et al., 2017), dismissal of symptoms of early stage breast cancer (Pruitt et al., 2015; Grosse-Frie et al., 2018), limited awareness of the availability of programs in their area (Binka et al., 2019), and having never been screened for cervical cancer (Almobarak et al., 2016; Mupepi et al., 2010; Eze et al., 2012; Kahesa et al., 2012; Koneru et al., 2017).

Other individual barriers involve accessibility and individual health-related behaviors, attitudes, values, and practices that prevent women from seeking cervical cancer screening and early diagnosis of breast cancer programs. These included embarrassment (De Abreu et al., 2013; Ebu et al., 2014; Teng et al., 2014; Lunsford et al., 2017; Assoumou et al., 2015; Kassam et al., 2017; Adedimeji et al., 2016; Binka et al., 2019), poor health status taking precedence over screening (Bukirwa et al., 2015), fatalism (Ebu et al., 2014; Mukama et al., 2017; Ngugi et al., 2012; Teng et al., 2014; Ports et al., 2015; Kassam et al., 2017; Pruitt et al., 2015; Mupepi et al., 2010; Sayed et al., 2016), socioeconomic status and financial barriers (Ebu et al., 2014; McFarland, 2013; Mingo et al., 2012; Ragan et al., 2018; Lunsford et al., 2017; Binka et al., 2019; Grosse-Frie et al., 2018) and inability to take time off from work or family responsibilities to seek care (De Abreu et al., 2013; Mingo et al., 2012; Joffe et al., 2018). Another major individual barrier was fear, particularly fear of pain during the screening procedure (Bayu et al., 2016; Bukirwa et al., 2015; Ebu et al., 2014; Hoque, 2010; Ports et al., 2015; Binka et al., 2019; Kahesa et al., 2012; Koneru et al., 2017), positive test results (Bukirwa et al., 2015; Hoque, 2010; Lunsford et al., 2017; Sayed et al., 2019; Kahesa et al., 2012; Joffe et al., 2018), losing a breast (Illaboya et al., 2018; Pruitt et al., 2015), and being infected in a health service setting (Hasahya et al., 2016).

3.2. Provider-Level facilitators and barriers

3.2.1. Facilitators

It was evident that the provider’s role in providing health education to patients can serve as either a facilitator or a barrier. Women were most likely to seek care and follow up when they trusted their physician to be responsible for their disease management. Some ways to garner the trust and respect of patients included providing education to patients with respect to their cultural or religious values (Kassam et al., 2017), clear explanation of follow-up procedures (Koneru et al., 2017), and providing educational materials to their patients (Ports et al., 2015; Kassam et al., 2017; Ng’ida et al., 2019; Mupepi et al., 2010). The majority of women in one particular study indicated that they were screened for cancer at the insistence of their provider (Assoumou et al., 2015).

These studies in our review indicated a high level of dependency on the role of nurses to facilitate cervical cancer screening and early detection of breast cancer programs. Their roles included but were not limited to assisting or administering the questionnaires in these studies, serving as educators and patient navigators, granting interviews as key informants, performing screening (VIA, clinical breast examination, etc.) and registry activities (Bukirwa et al., 2015; Ebu et al., 2014; Mingo et al., 2012; Nyanmbe et al., 2019; Kangmennaang et al., 2018; Balekouzou et al., 2016; Obrist et al., 2014). Additionally, women in these studies generally reported a preference of a female physician or provider when asked (Bukirwa et al., 2015; Ebu et al., 2014; Mingo et al., 2012; Nyanmbe et al., 2019; Chaka et al., 2018; Sayed et al., 2016; Koneru et al., 2017; Kangmennaang et al., 2018; Balekouzou et al., 2016; Obrist et al., 2014).

3.2.2. Barriers

Many provider characteristics and behaviors constituted barriers for patients in a clinical setting. Patients indicated that poor provider-patient interactions including hostile or unfriendly attitudes from health workers (Bukirwa et al., 2015; Ngugi et al., 2012; Binka et al., 2019), a lack of explanation of procedures (Bukirwa et al., 2015), feeling

Table 3
Facilitators, barriers, and possible solutions for individual, provider, and system-level factors that impact cervical cancer screening and early diagnosis of breast cancer.

Level	Theme	Facilitators	Barriers	Possible Solutions
Individual	Knowledge and education	Perceived risk of developing cervical and/or breast cancer (Bayu et al., 2016; Bukirwa et al., 2015; De Abreu et al., 2013; Ebu et al., 2014; Hoque, 2010; McFarland, 2013; Mingo et al., 2012; Mukama et al., 2017; Ngugi et al., 2012)	Lack of significant knowledge and education surrounding cervical and breast cancer (Nyanambe et al., 2019; Assoumou et al., 2015; Illaboya et al., 2018; Ng'ida et al., 2019; Sama et al., 2017; Chaka et al., 2018; Compaore et al., 2016; Sayed et al., 2019; Bukirwa et al., 2015; De Abreu et al., 2013; Ebu et al., 2014; Hoque, 2010; Mupepi et al., 2010; Eze et al., 2012; Utoo et al., 2013; Olasehinde et al., 2019; Grosse-Frie et al., 2018; Koon et al., 2013; Makurirofa et al., 2019)	Community and social support from members of their community such as religious and opinion leaders (Ngugi et al., 2012; Nyanambe et al., 2019; Teng et al., 2014)
Provider	Knowledge and education	Education tailored with respect to their cultural or religious values (Kassam et al., 2017)	Religious or cultural beliefs that explain causes of cancer (Ebu et al., 2014; Mingo et al., 2012; Ng'ida et al., 2019; Sama et al., 2017; Binka et al., 2019)	Local radio, television and multi-media public health campaigns (De Abreu et al., 2013; Hoque, 2010; McFarland, 2013; Ngugi et al., 2012; Ragan et al., 2018; Lunsford et al., 2017; Ports et al., 2015; Assoumou et al., 2015; Almobarak et al., 2016; Illaboya et al., 2018; Kassam et al., 2017; Ng'ida et al., 2019; Sama et al., 2017; Adedimeji et al., 2016; Chaka et al., 2018)
Individual	Accessibility	Providing educational materials to patients (Ports et al., 2015; Kassam et al., 2017; Ng'ida et al., 2019; Mupepi et al., 2010)	Beliefs that keep people from seeking health services (Hoque, 2010; Lunsford et al., 2017; Sayed et al., 2019) Misconceptions in patients' beliefs about cervical and breast cancer (Mingo et al., 2012; Mukama et al., 2017; Mupepi et al., 2010; Bayu et al., 2016; Bukirwa et al., 2015; De Abreu et al., 2013)	Increased training on specific screening and early detection techniques (Rosser et al., 2015)
Individual	Health-related behaviors, attitudes, values, and practices	Education tailored with respect to their cultural or religious values (Kassam et al., 2017)	Poor physician-patient interactions (Bukirwa et al., 2015; Ebu et al., 2014; Ngugi et al., 2012; Almobarak et al., 2016; Meacham et al., 2016; Pruitt et al., 2015; Balekouzou et al., 2016; Challinor et al., 2016) Providers did not offer sufficient education or advocacy (Bukirwa et al., 2015; De Abreu et al., 2013; Grosse-Frie et al., 2018; Koneru et al., 2017) Providers' perceptions of patient acceptability (Rosser et al., 2015) Gaps in education and knowledge amongst providers (Ports et al., 2015; Illaboya et al., 2018; Chaka et al., 2018; Grosse-Frie et al., 2018; Makurirofa et al., 2019; Balekouzou et al., 2016) Poor health status taking precedence over screening (Bukirwa et al., 2015) Socioeconomic status and financial barriers (Ebu et al., 2014; McFarland, 2013; Mingo et al., 2012; Ragan et al., 2018; Lunsford et al., 2017; Binka et al., 2019; Grosse-Frie et al., 2018) Inability to take time off from work or family responsibilities to seek care (De Abreu et al., 2013; Mingo et al., 2012; Joffe et al., 2018) Poor individual screening behaviors and practices (Almobarak et al., 2016; Sayed et al., 2019; Meacham et al., 2016; Binka et al., 2019; Pruitt et al., 2015; Mupepi et al., 2010; Eze et al., 2012; Olasehinde et al., 2019; Grosse-Frie et al., 2018; Koon et al., 2013; Wachira et al., 2017; Kahesa et al., 2012; Koneru et al., 2017) Embarrassment (De Abreu et al., 2013; Ebu et al., 2014; Teng et al., 2014; Lunsford et al., 2017; Assoumou et al., 2015; Kassam et al., 2017; Adedimeji et al., 2016; Binka et al., 2019)	

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Table 3 (continued)

Level	Theme	Facilitators	Barriers	Possible Solutions
Individual	Community and social values		<p>Fatalism (Ebu et al., 2014; Mukama et al., 2017; Nguigi et al., 2012; Teng et al., 2014; Ports et al., 2015; Kassam et al., 2017; Pruitt et al., 2015; Mupepi et al., 2010; Sayed et al., 2016)</p> <p>Fear (Bayu et al., 2016; Bukirwa et al., 2015; Ebu et al., 2014; Hoque, 2010; Lunsford et al., 2017; Ports et al., 2015; Illaboya et al., 2018; Hasahya et al., 2016; Sayed et al., 2019; Binka et al., 2019; Pruitt et al., 2015; Kahesa et al., 2012; Koneru et al., 2017; Joffe et al., 2018)</p> <p>Lack of social support (Ragan et al., 2018; Adedimeji et al., 2016)</p> <p>Lack of support from spouse and spousal approval (Ebu et al., 2014; Hoque, 2010; Nguigi et al., 2012; Ragan et al., 2018; Teng et al., 2014; Lunsford et al., 2017; Hasahya et al., 2016; Sayed et al., 2019)</p> <p>Stigma in their community on utilizing cervical and/or breast cancer screening services (De Abreu et al., 2013; Ragan et al., 2018; Teng et al., 2014; Lunsford et al., 2017; Ports et al., 2015; Adedimeji et al., 2016; Sayed et al., 2019; Rosser et al., 2015; Meacham et al., 2016)</p>	
Provider	Trust	Earn the respect and trust of patient (Ports et al., 2015; Kassam et al., 2017; Ng'ida et al., 2019; Mupepi et al., 2010; Koneru et al., 2017)	Poor physician-patient interactions (Bukirwa et al., 2015; Nguigi et al., 2012; Sayed et al., 2019; Binka et al., 2019; Grosse-Frite et al., 2018; Kahesa et al., 2012)	Use of nurses to facilitate cervical cancer screening and early detection of breast cancer programs (Bukirwa et al., 2015; Ebu et al., 2014; Mingo et al., 2012; Nyammbé et al., 2019; Kangmennaang et al., 2018; Balekrouzou et al., 2016; Obrist et al., 2014)
System	Personal and community support	<p>Motivating patients to engage in screening and/or early diagnosis programs (Assoumou et al., 2015)</p> <p>Female provider (Bukirwa et al., 2015; Ebu et al., 2014; Mingo et al., 2012; Nyammbé et al., 2019; Chaka et al., 2018; Sayed et al., 2016; Koneru et al., 2017; Kangmennaang et al., 2018; Balekrouzou et al., 2016; Obrist et al., 2014)</p> <p>Peer-to-peer education and recruitment (Teng et al., 2014; Meacham et al., 2016; Koneru et al., 2017)</p> <p>Offering screening in more convenient places in their community (Teng et al., 2014; Kassam et al., 2017; Sayed et al., 2016)</p>	<p>Limited awareness of the availability of programs (Joffe et al., 2018; Balekrouzou et al., 2016)</p> <p>Time and accessibility issues with health facilities (Nguigi et al., 2012; Ragan et al., 2018; Lunsford et al., 2017; Illaboya et al., 2018; Adedimeji et al., 2016; Binka et al., 2019; Mupepi et al., 2010; Kahesa et al., 2012; Koneru et al., 2017; Bukirwa et al., 2015; De Abreu et al., 2013; Ebu et al., 2014; Hasahya et al., 2016; Sayed et al., 2019; Rosser et al., 2015)</p> <p>Problems with equipment procurement and costs (Bukirwa et al., 2015; Adedimeji et al., 2016; Sayed et al., 2019)</p> <p>Staffing issues and hospital strikes (Rosser et al., 2015; Pruitt et al., 2015)</p> <p>Lack of defined referral system (Pruitt et al., 2015)</p> <p>Problems with clinical pathways and insufficient patient tracking (Bukirwa et al., 2015)</p> <p>Problems with supplies and equipment procurement (Bukirwa et al., 2015; Adedimeji et al., 2016; Sayed et al., 2019)</p> <p>Cost of the screening procedure (Ebu et al., 2014; Binka et al., 2019; Pruitt et al., 2015; Eze et al., 2012; Utoo et al., 2013; Kahesa et al., 2012; Joffe et al., 2018; Iijyasu et al., 2010)</p> <p>Lack of equipment, resources and trained personnel to support cancer screening (Illaboya et al., 2018; Adedimeji et al., 2016; Rosser et al., 2015)</p>	Increased role of patient navigation programs to prevent loss to follow-up (Koneru et al., 2017)
System	Health infrastructure	Incorporating survivorship in education programs (Meacham et al., 2016; Pruitt et al., 2015; Koon et al., 2013)		
System	Resource allocation			Integration of cancer screening within national HIV programs and other existing health programs (Ports et al., 2015)

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Table 3 (continued)

Level	Theme	Facilitators	Barriers	Possible Solutions
System	Political will		Limited or flawed screening and patient management policies across SSA (Illaboya et al., 2018; Adedimeji et al., 2016; Hasahya et al., 2016; Sayed et al., 2019) Limited health insurance coverage (Ebu et al., 2014; McFarland, 2013; Mupepi et al., 2010)	Decentralizing health services (Makurifofa et al., 2019)

unformed (Kahesa et al., 2012), and a lack of trust that providers will give patients the proper diagnosis (Sayed et al., 2019; Binka et al., 2019; Grosse-Frie et al., 2018) prevented women from seeking screening services. Women indicated that they sought care through local practitioners such as pharmacists, nurses, and herbalists, rather than seeing a physician (Sayed et al., 2019). It was frequently highlighted that patients did not feel that their providers offered sufficient education or advocacy, which could be a major barrier to care (Bukirwa et al., 2015; De Abreu et al., 2013; Grosse-Frie et al., 2018; Koneru et al., 2017).

Gaps in relevant education and knowledge amongst providers was another barrier (Ports et al., 2015; illaboya et al., 2018; Chaka et al., 2018; Grosse-Frie et al., 2018; Makurifofa et al., 2019; Balekouzou et al., 2016). Providers in rural settings self-reported that they needed formal training on performing visual inspection after acetic acid (VIA) / visual inspection after Lugol's iodine (VILI) (Rosser et al., 2015). Furthermore, providers' perceptions regarding the acceptability of cancer prevention and screening amongst patients constituted as a barrier when providers believed patients were not likely to accept these services and were therefore less likely to offer them in the first place (Rosser et al., 2015).

3.3. System-level facilitators and barriers

3.3.1. Facilitators

Several interventions in SSA were implemented to increase screening and early diagnosis programs with varying results. The most successful intervention strategies were focused on community and social support such as peer-to-peer education, navigation and recruitment (Teng et al., 2014; Meacham et al., 2016; Koneru et al., 2017), offering screening in more convenient places in their community-based screening services and early diagnosis programs (Teng et al., 2014; Kassam et al., 2017; Sayed et al., 2016), incorporating survivorship in education programs (Meacham et al., 2016; Pruitt et al., 2015; Koon et al., 2013) and leveraging the infrastructure and funding of existing HIV programs to integrate cancer screening services (Ports et al., 2015). To counter the challenge of increasing uptake of screening and early diagnosis programs – particularly among hard to reach populations, different strategies were proposed and implemented including decentralization of health services for cancer prevention strategies to facilitate scale up (Makurifofa et al., 2019) and an increased role of patient navigation programs to prevent loss to follow-up (Koneru et al., 2017) based on the needs and capacities in local settings.

3.3.2. Barriers

Overall, these studies highlighted a lack of health infrastructure, allocation of resources, and political will for cervical cancer screening and early breast cancer diagnosis as major barriers. This was seen in the limited or flawed screening and patient management policies across SSA (Illaboya et al., 2018; Adedimeji et al., 2016; Hasahya et al., 2016; Sayed et al., 2019) and limited health insurance coverage (Ebu et al., 2014; McFarland, 2013; Mupepi et al., 2010). A dearth of equipment, resources, and personnel for screenings and interventions was often noted (Illaboya et al., 2018; Adedimeji et al., 2016; Rosser et al., 2015). Features of health systems that served as barriers to patients included lack of defined referral or follow-up system (Pruitt et al., 2015), cost of the screening procedure (Ebu et al., 2014; Binka et al., 2019; Pruitt et al., 2015; Eze et al., 2012; Utoo et al., 2013; Kahesa et al., 2012; Joffe et al., 2018; Iliyasu et al., 2010) and time burdens and accessibility issues (Ngugi et al., 2012; Ragan et al., 2018; Lunsford et al., 2017; Illaboya et al., 2018; Adedimeji et al., 2016; Binka et al., 2019; Mupepi et al., 2010; Kahesa et al., 2012; Koneru et al., 2017; Bukirwa et al., 2015; De Abreu et al., 2013; Ebu et al., 2014; Hasahya et al., 2016; Sayed et al., 2019; Rosser et al., 2015). This last factor included: hours of operation for clinics, issues of transportation to health facilities, location and accessibility of facilities, lack of privacy, long waiting times,

unavailability of services in some locations, and lack of space in facilities for screening services. Potential causes of sub-optimal uptake included staffing issues and hospital strikes (Rosser et al., 2015; Pruitt et al., 2015), problems with supplies and equipment procurement (Bukirwa et al., 2015; Adedimeji et al., 2016; Sayed et al., 2019) and delays with clinical pathways and insufficient patient tracking (Bukirwa et al., 2015).

4. Discussion

The screening and surveillance of breast and cervical cancer have been conducted together in demonstration projects from as early as the 1980s by the American Center for Disease Control (CDC) with Congress passing the Breast and Cervical Cancer Mortality Prevention Act of 1990 (Lee et al., 2014). The high burden of both breast and cervical cancer mortality in LMICs, inequity in access to resources and services when compared to HIC, and the opportunity to reduce morbidity and mortality at early detection amongst both forms of cancer make for a natural synergy of research and implementation (Davis Tsu et al., 2013).

While cervical cancer screening and early detection of breast cancer are separate clinical activities that may raise different issues in access and utilization, we chose to review them together given that each of these interventions are priorities for the World Health Organization and for Health Ministries within SSA. There is growing consensus that cancer prevention will need to be integrated into publicly available healthcare at the community level. Successful integration of these services will need to leverage facilitators and overcome the barriers identified in our review.

Based on this review, there are several priorities to be considered in development, implementation and evaluation of cervical cancer screening and early detection of breast cancer programs in SSA. These include financial investment and resource allocation to (1) community education programs to facilitate screening uptake tailored specifically to the setting; (2) enhanced education programs for providers and health workers with special consideration to those in rural areas; (3) task shifting screening and early detection activities from physicians to nurses and other health care workers; and (4) decentralized policy adaptations to meet the needs of rural populations. Many of the facilitators and barriers identified in this review are consistent with other, non-SSA LMIC.

On the individual-level, cultural and religious beliefs, concern for social and community support, and individual financial circumstances serve as the primary motivator of health behavior surrounding cancer screening and treatment utilization (Islam et al., 2017). However, sufficient gaps in knowledge and education still exist across regional settings that inform individual perceptions and attitudes. In other LMIC countries, studies similarly indicate low levels of awareness of cancer risk factors and availability of screening services with no increase in cancer literacy over time, even amongst sub-populations with high educational and socioeconomic status (Gupta et al., 2015; Ventosa-Santaulària et al., 2018). Alternatively, The Union for International Cancer Control indicate that when regions invest financial and educational resources to improve cancer literacy in LMIC settings, patients in these regions are more likely to utilize screening and early detection programs (The Breast Health Global Initiative, 2017).

The results from this scoping review indicate that providers, especially those from rural areas, require more rigorous training programs to keep up to date with the current early diagnosis and screening methods and guidelines. Other studies and action plans also highlight the need for educating providers, including on patient-provider interactions (Ngugi et al., 2017; Chidyaonga-Maseko et al., 2015). Additionally, our review highlights the vast role that nurses play in the facilitation of screening and early detection programs, and the high level of trust that is placed in nurses in SSA context. Consideration should be taken to tailoring programs and interventions to utilize this

goodwill through task shifting aspects of cervical cancer screening and early detection of breast cancer from physicians to nurses and other health care workers. Other similar studies highlight the importance of this strategy to broaden coverage and increase uptake in LMIC (Joshi et al., 2014; Challinor et al., 2016).

A consistent theme in these barriers is the need for resource allocation and facilitation of educational programs at the patient- and provider-levels and increased accessibility of cancer screening by leadership at the national level. A major component of this is that health facilities are less accessible in rural settings than in populous urban and peri-urban settings, and information about screening and early detection is dispensed through social and community networks. Rahman et al., (Rahman et al., 2019) calls for decentralized policy adaptations to be tailored to a SSA rural context (Rahman et al., 2019). These include but are not limited to recruiting peer educators for health talks that are more personable and available than physicians to answer follow-up questions in order to increase knowledge, use of mobile clinics for areas with limited health infrastructure, and subsidized or free screening and early detection services. Several studies selected for this review highlight similar interventions to increase screening uptake and support decentralized models for screening implementation to adapt to the rural-specific context of patients in SSA.

Global health leadership indicate that regional and national commitment is required through Global Action Plan on Non-Communicable Diseases (2013–2023) and the global call to action to eliminate cervical cancer by WHO Director-General Dr. Tedros Adhanom (2018) (World Health Organization, 2013; Ghebreyesus, 2018). Strategic investments in cancer control and implementation to ensure universal access to cancer care are required to achieve these objectives as well as the targets in the Sustainable Development Goals (United Nations, 2015). The WHO highlighted financing, partnership, legislative frameworks, policy integration, leadership and advocacy, development and allocation of human resources as key aspects to facilitating effective policy development (World Health Organization, 2002).

In conclusion, there is a need to strengthen political will related to these core policy features in order to develop robust national cervical cancer screening and early breast cancer diagnosis programs. Increased financial, human and political investments and research efforts are needed to sufficiently address the existing and increasing need for cancer prevention and treatment services. To ensure proper development of screening services and better clinical management of screening services and cancer prevention, it is necessary to enhance political and resource commitment and the development of public health interventions targeted at educating providers and their community about the risks of cervical and breast cancer and the benefits of screening as well as implementation of strategies to overcome barriers to cancer screening. In the absence of such commitments, it seems unlikely that the WHO goals to achieve cervical cancer elimination will be met and burden of breast cancer in SSA will continue to rise unchecked.

CRediT authorship contribution statement

Amanda J. Pierz: Conceptualization, Methodology, Investigation, Formal analysis, Writing - original draft, Project administration. **Thomas C. Randall:** Conceptualization, Supervision, Methodology, Writing - original draft. **Philip E. Castle:** Conceptualization, Supervision, Project administration, Funding acquisition, Resources. **Adebola Adedimeji:** Supervision, Methodology. **Charles Ingabire:** Data curation, Methodology. **Gallican Kubwimana:** Project administration. **Francois Uwinkindi:** Project administration. **Marc Hagenimana:** Data curation. **Lydia Businge:** Data curation, Methodology. **Francoise Musabyimana:** Data curation, Methodology. **Athanase Munyaneza:** Data curation, Methodology. **Gad Murenzi:** Conceptualization, Supervision, Project administration, Funding acquisition, Resources.

Declaration of Competing Interest

Ms. Pierz, Dr. Randall, Dr. Castle, Mr. Kubwimana, Dr. Uwinkindi, Mr. Hagenimana, Ms. Businge, Ms. Musabyimana, Mr. Munyaneza and Dr. Murenzi report grant funding (NCI/NIH (USA) - 5P20CA210284) from National Cancer Institute during the conduct of the study; Dr. Uwinkindi and Mr. Hagenimana personal fees from Ministry of Health and Rwanda Biomedical Centre; Dr. Adedimeji and Mr. Ingabire have nothing to disclose.

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