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Knowledge and practice of health promotive lifestyle toward cervical cancer prevention among women in Africa: A scoping review

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ABSTRACT

Introduction: Cervical cancer remains a significant public health concern among women globally, with a high burden of morbidity and mortality. Despite the existence of empirical evidence about various preventive strategies, the burden of cancer continues to rise, particularly in developing countries like Nigeria. This scoping review aimed to examine the existing literature on the knowledge and practice of health-promotive lifestyle factors for the prevention of cervical cancer among women in Nigeria. This review is driven by the acknowledgment that early detection and prevention are crucial in mitigating the impact of cervical cancer.

Method: A systemic search of databases; PubMed, Embase, Google Scholar, Medline, Semantic Scholars was also conducted to identify relevant studies published between 2019 and 2023. Relevant articles were screened for eligibility, and 46 papers were selected. The Joanna Briggs Institute and Preferred Reporting Items for Systematic Review and Meta-analysis Scoping Review Extension (PRISMA-ScR) guidelines were used to analyze the quality of the articles.

Results: The study affirmed that various studies have been done concerning knowledge and practice of cervical cancer prevention among women in Africa. The knowledge, attitude and practice of cervical cancer prevention was poor among these women, which has had a direct influence in the poor uptake of cervical cancer screening among Africa women. However, nurse led interventions has been proven to increase knowledge level and screening uptake in experimental groups post intervention.

Conclusions: While some women have good knowledge of cervical prevention, the attitude and practice of prevention is poor in many of the studies reviewed. The uptake of screening was low, and some barriers identified encompasses socio-cultural concerns, cost, insufficient health education, limited availability of healthcare services, and consent from partners, while family history of cervical cancer is one of the reasons for uptake of screening in some women.

Introduction

Cervical cancer is the most prevalent form of gynaecological cancer, posing a significant challenge to global public health [1]. This is notwithstanding the evidence demonstrating the slow progression of cervical cancer and several preventable measures, such as screening, vaccination, and treatment, to prevent its occurrence [2,3]. Globally, cervical cancer ranks as the fourth most prevalent form of cancer among women. In 2022, estimated rate of 660,000 women were diagnosed with cervical cancer world-wide and about 350,000 women died from this disease with about 90 % occuring in developing countries [4]. The mortality rate associated with cervical cancer has been reported to be 18-fold higher in low-income countries compared to developed countries [5]. Cancer screening has been reported as an effective method for

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detecting the disease at various stages of development [6]. The Papanicolaou (Pap) test is highly effective screening method. American cancer society (ACS) recommended that screening should start at age 25 with an HPV test. HPV/Pap cotest be done every 5 years or Pap test every 3 years through age 65 [7]. However, access to HPV/Pap cotest may be limited in resource-constrained settings like Africa. To address this gap, alternative screening approaches have been explored by the World Health Organization (WHO, 2020). These methods, such as visual inspection with acetic acid (VIA) or visual inspection with Lugol's iodine (VILI), are simpler and more cost-effective to implement. These visual methods like VILI/ VIA, which has the highest sensitivity (100 %) to detect any grade of dysplasia, and a good specificity (93.3 %). Additionally, they promote a "screen and treat" approach, allowing for diagnosis and treatment during the same visit, making them particularly valuable in areas with limited healthcare resources.

However, the disparities in cancer burden between high and low-income countries have been linked with variations in the level of progress in the implementation of a structured population-based cervical cancer screening program [1,8].

Cervical cancer remains the second most common cancer and the second most frequent cause of cancer mortality in Nigeria among women between 15 and 44 years, despite being easily diagnosed in its premalignant stage [9]. Annually, approximately 12,000 new cases and 8000 deaths are attributed to cervical cancer in Nigeria, according to the 2020 estimation [10,11]. Cervical cancer-related morbidity and mortality made up 8240 (11.5 %) of all cancer morbidities in Nigeria [11]. Early detection of cervical cancer through screening is crucial for mitigating cervical cancer deaths, especially in Africa, where there is a high prevalence of the disease alongside low screening utilization [12] The implementation of cervical cancer screening has been identified as a significant factor contributing to the reduction of morbidity and mortality of cervical cancer [6,13]. However, the high burden of cervical cancer in Nigeria can be attributed to a high incidence of HPV infection, absence of efficient cervical cancer screening initiatives, limited knowledge of cancer, societal stigma, unfavourable health-seeking behaviors, and poor integration between screening and treatment services [12,14,15,16]. Studies in Nigeria and some regional studies within the west— African sub-regions have also revealed HPV prevalence with a wide range of 14.7 % - 44.9 % [17]

Despite the initial introduction of the HPV vaccine in Nigeria in 2009, there exists a significant gap in the knowledge and utilization of HPV vaccination as a preventive measure against cervical cancer within the target population of young people [18]. According to recent studies, less than 15 % of adolescent girls have received the HPV vaccine [19,20] and around 10 % of women have undergone cervical cancer screenings [21]. Another study found that a significant proportion of health workers, especially nurses, exhibited minimal participation in cervical cancer screening, with about 60 % never having undergone screening [22]. Furthermore, comprehensive cancer services in Nigeria are opportunistic, characterized by limited availability and wide disparities in the utilization rate of services due to variations in women's socio-economic status [8,23]. Insufficient knowledge about cancer screening and low utilization of screening services could potentially result in adverse consequences for the acceptance and adoption of the HPV vaccine.

The World Health Organization (WHO) initiated a comprehensive policy in 2020 for preventing and controlling cervical cancer by introducing a global strategy to accelerate the elimination of cervical cancer as a public health concern [1]. The proposed policy includes primary, secondary, and tertiary prevention strategies, highlighting the 90 to 70 to 90 targets for 2030, aiming to guide nations toward reducing age-standardized cervical cancer incidence from 13 per 100,000 to 4 per 100,000 globally, which comprise community education, vaccination, social mobilization, screening, treatment, and palliative care [1]. The impact of these targets by the WHO demonstrates significant advantages that can be achieved with the 90 to 70 to 90 targets, particularly in developing countries, by 2030.

Prevention strategies are crucial in mitigating the morbidity and mortality associated with cervical cancer in Nigeria. However, numerous barriers have accounted for the low rates of cervical screening, screening service uptake, knowledge, and attitude. These barriers include weak health systems, limited availability of adequately qualified clinical professionals, lack of community-level information regarding the preventability of cervical cancer, lack of national or regional data on cervical cancer screening and HPV vaccine uptake, and lack of cervical cancer control policy and public health programming that provides a strategic framework for addressing this issue [24,25]. Given this public health epidemic in Nigeria, a scoping assessment of the literature is critical. The goal of this scoping review is to [1] decide the result of studies on knowledge,attitudes and practice of cervical cancer prevention among women, [2] analyze cervical cancer screening uptake and preventive strategies, and [3] determine the impact of nurse-led interventions on cervical cancer safeguarding and health-motivating habits among women.

Methods

In carrying out the scoping review, a comprehensive literature search was done, two researchers in the team screened the titles and abstracts of all the identified literatures to determine their relevance to the meta-review's focus of interest, the data were presented in tables. Full papers and reports were retrieved, and the articles retrieved were sorted and analyzed. All relevant reports were appraised for eligibility for inclusion in the meta-review using an inclusion and exclusion checklist. The articles were analyzed using the Joanna Briggs Institute (JBI) scoping review guide (2020) and Preferred Reporting Items for Systematic Review and Meta-analysis Scoping Review Extension (PRISMA-ScR). The population, content, and context PCC framework was used along with its standard criteria.

Search strategies

A systematic search was conducted in electronic databases (e.g. PubMed, Embase, Google Scholars, Medline, and Semantic Scholars) using relevant keywords and Medical Subject Headings (MeSH) terms. The search strategy was documented and reported according to PRISMA-ScR guidelines.

Search queries, keywords and search items

To identify the knowledge, attitude, and practice of cervical cancer prevention. ("cervical cancer prevention" OR "cervical cancer screening" OR "cervical cancer awareness") AND ("knowledge" OR "attitude" OR "practice")

To examine practices, attitudes, uptake, and screening behaviors toward cervical cancer.

("cervical cancer" OR "cervical neoplasms") AND ("screening" OR "uptake" OR "practice" OR "behavior") AND ("attitude" OR "perception" OR "awareness") AND ("women" OR "population" OR "community").

Inclusion and exclusion criteria

The scope of the research focuses on cervical cancer prevention, specifically on nurse-led interventions promoting healthy lifestyles for this purpose. The target participants for these studies are women, including market women and rural women, within the regions of Nigeria and Africa. To ensure a comprehensive review, primary research studies in various designs, such as quantitative, qualitative, and mixed methods, are considered alongside relevant reviews, all of which must have been published in English. The time frame for the publication of eligible studies ranges from 2019 to 2023, ensuring the inclusion of recent and

up-to-date research. To maintain the relevance of the investigation, studies centered on cancer prevention other than cervical cancer were excluded from consideration. Additionally, any studies published in languages other than English and those published before 2019 were not included in the review.

Data extraction and data synthesis

The data search originally yielded over 15,300 from electronic databases (e.g. PubMed, Embase, Google Scholars, Medline, and Semantic Scholars) after removing irrelevant results. The abstracts and the full paper were examined based on the authors' work, study characteristics, the design of the study, the year the work was published, sample size, the findings of the study, and the outcomes of the interventions.

In the research process, two crucial stages involve the "Identification" and "Screening" of records. During the "Identification" phase, a comprehensive search is conducted in relevant electronic databases such as PubMed, Google Scholar, Embase, and CINAHL, utilizing appropriate keywords and Medical Subject Headings (MeSH) terms. The objective is to retrieve all potentially relevant records that match the research topic. The total number of records identified through this initial database search is recorded to establish the scope of the literature available. Subsequently, in the "Screening" stage, the titles and abstracts of the identified records are carefully reviewed to determine their relevance and eligibility based on predetermined inclusion criteria. This screening process helps to sift through the records and exclude those that clearly do not meet the specified inclusion criteria. The number of records screened for eligibility documents the initial pool of studies considered for further evaluation. These identification and screening stages form vital components of the systematic review process, ensuring that relevant and appropriate records are included in the subsequent stages of the research study.

Data extraction

A standardized data extraction form was developed to collect relevant information, including study characteristics (e.g., author, year, study design), sample characteristics, interventions, outcomes, and key findings. Data extraction involves retrieving relevant information from the selected studies, including study characteristics, sample size, intervention details, outcomes measured, and findings related to the outcomes of interventions on health lifestyles for cervical cancer prevention among market women. A template is a structured tool for extracting and organizing the data, making it easier to analyze and synthesize the findings during the scoping review.

The PRISMA-ScR flow diagram was developed and reported in accordance with the PRISMA-ScR guidelines to ensure clarity and transparency in the study selection process (See Fig. 1). It provided a visual representation of the screening and selection process, allowing readers to understand how studies were identified and included in the scoping review. Throughout the study selection process, it is recommended to have at least two independent reviewers or observers with differing opinions assess the records and full-text articles for eligibility. Any discrepancies or disagreements are resolved through discussion or consultation, or a review to ensure the accuracy and reliability of the selection process.

The results of the study selection process, including the number of records identified, screened, assessed for eligibility, and included, as well as the reasons for exclusion, should be presented in a PRISMA-ScR flow diagram. This diagram provides a visual representation of the study selection process and enhances the transparency and reproducibility of the scoping review.

Results

A total of 134 records were identified in these databases. Following the identification stage, duplicate records were removed, resulting in the elimination of 24 (17.9 %) duplicate studies. The remaining 110 records were then subjected to screening based on predetermined inclusion and exclusion criteria. During the screening stage, studies that were outside the scope of the research that are not related to cervical cancer preventions, such as those focusing on different health conditions like colorectal cancer or unrelated interventions which were not focusing on health promotion, were excluded. Also, studies that were carried out

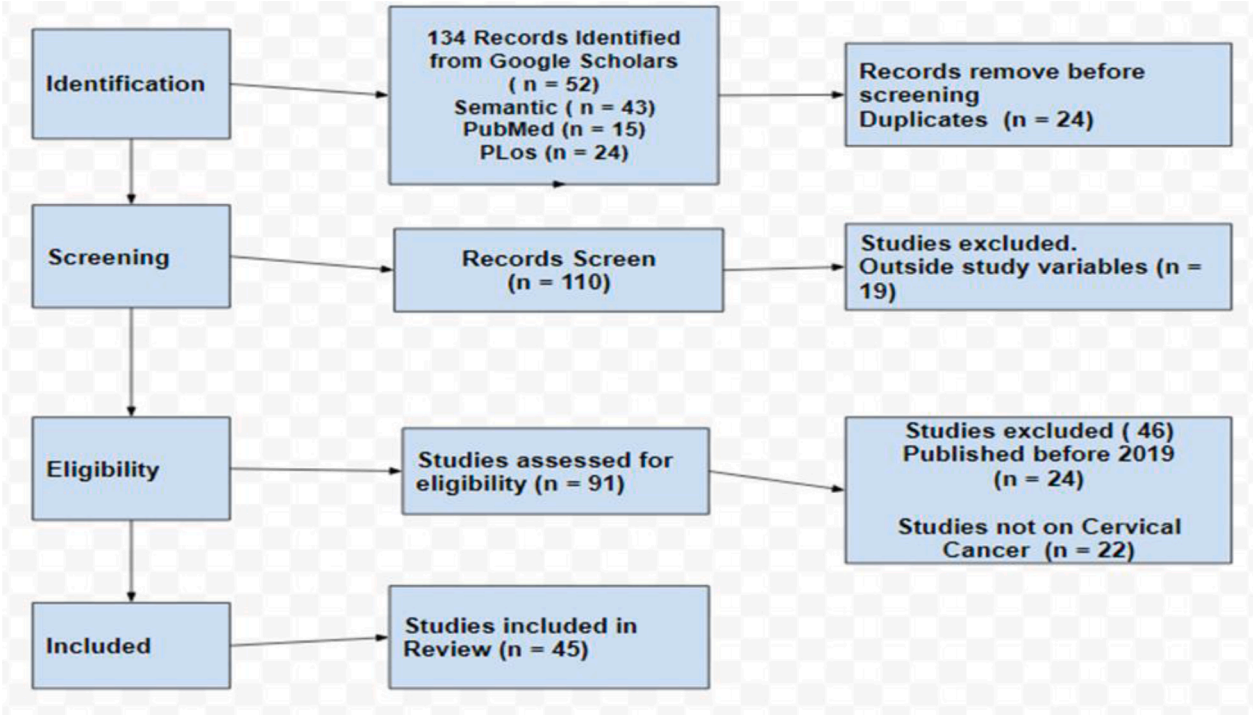

Fig. 1. Prisma flow diagram for literature selection.

outside Africa countries were also exempted as the focus of the study is on African women. This led to the exclusion of 19 studies. After the screening process, 91 records remained for eligibility assessment. A total of 91 studies were assessed for eligibility. Following the eligibility assessment, 46 (51.4 %) studies were further excluded based on various criteria, such as study design, sample size, or lack of relevant outcomes. These comprise studies published before 2019, resulting in the removal of 24 studies. Additionally, studies that did not specifically address cervical cancer prevention were excluded, leading to the exclusion of 22 studies, making the total number of studies under review to be 45 studies. These studies were carried out in Africa countries with the study populations been reproductive women whose age groups are not free from the diagnosis of cervical cancer, some scoping reviews previously done were also included. The study designs varies but the purpose of understanding the knowledge and practice of health promotive lifestyle for cervical cancer prevention among women was maintained. Table 1.

Discussion

Knowledge, attitude and practice

The findings from various studies indicate that women have low knowledge of cervical cancer, risk factors, symptoms and HPV virus [27,30,35,37]. In one study conducted in Kenya, it was found that a significant percentage of women knew nothing about cervical cancer or lack of screening as risk factors for cervical cancer [39]. In a comparable vein in Uganda, married women or those living with a partner knew better about breast cancer and cervical cancer indications than unmarried women [26], this was also supported by a study, who documented good knowledge of cervical cancer among women [34]. The survey also revealed several common misconceptions among women, such as the assumption that placing money in their bras is a risk factor for breast cancer [26].

Some other studies conducted in Nigeria and Uganda provide further insights into the awareness and knowledge levels related to cervical cancer. In Nigeria, it was found that religious organizations had high awareness of both cervical cancer (70.8 %) and its screening (68.1 %) (14). in their study also supported this high level of awareness (67.7 %). However, the overall level of knowledge regarding different aspects of cervical cancer was poor (65.3 %) among the women surveyed [38]. Another study in Nigeria reported that while respondents had a positive attitude toward cervical cancer screening, their knowledge about cervical cancer was poor, with only 18.1 % having good knowledge [68]. These findings suggest that although there may be some awareness of cervical cancer and its screening, there is still a need for improving knowledge among women in Nigeria. Additionally, the findings indicate a low level of cervical cancer screening and a lack of awareness among women regarding HPV, cervical cancer symptoms, and associated risk factors. These results highlight the need for increased education and awareness campaigns to improve knowledge and promote regular cervical cancer screening practices among women [27].

It was deduced that women had good attitude about cervical cancer (81 %)[34], this was supported by recording a majority of respondents (75.6 %) exhibiting positive attitude also[34].

In addition to knowledge improvement, studies have also focused on understanding the factors contributing to the low uptake of the HPV vaccine. Moodley et al., in their study, found that only 35.1 % of parents were aware of the HPV vaccine, and a significant proportion (58.7 %) had never heard of it [26]. Various factors influence the knowledge levels related to cervical cancer, such as the impact and attribution of bodily changes, the influence of social networks and health messaging in help-seeking, and the management of symptoms and help-seeking barriers. Women often attribute breast changes to manual activities or possible cancer, while vaginal symptoms are commonly attributed to HIV, hormonal contraceptives, or partner infidelity. Social networks, radio, or primary care providers are sources of information that raise concerns about cancer. Seeking care promptly is triggered by the impact of symptoms on personal lives [69].

Furthermore, educational status was found to be associated with higher rates of Pap smear testing. Women with higher educational levels had a significantly higher proportion of Pap smear tests compared to those with lower educational attainment [40]. This highlights the influence of education in promoting participation in cervical cancer screening and suggests that educational interventions could be beneficial in increasing knowledge, awareness and practice of preventive measures.

Effect of nurse led educational intervention

The study findings indicate that the awareness of cancer in the general population before educational intervention done by Nurse was poor. Several studies reported significant increases in knowledge scores among participants after Nurse led educational interventions. For example, it was found that women's knowledge scores significantly improved after a nursing educational program in Egypt, 84 % of the women had an average and good knowledge post intervention [58]. Also, it was affirmed that the experimental group women had knowledge scores of cervical cancer significantly increased when compared with control group [28,61]. Mohamed et al. [59] when evaluating the effect of Tele-Nursing on experimental group deduced there was statistically significant difference regarding level of knowledge of cervical cancer in experimental group women after the Tele- nursing.

Similarly, Nisak et al. [63], also reported that the intervention group had increase in knowledge and their participation in the cervical screening (VIA) increased when compared to the control group women in Kenya.

There was poor knowledge of HPV vaccination and cervical screening pre intervention but increased in knowledge of HPV vaccination and cervical screening by 70 % was seen in experimental group after nurse led education post intervention [60]. There are studies finding which highlighted the initial poor awareness of cancer among the general population. However, interventions aimed at improving knowledge have shown promising results. One study found a significant difference in women's knowledge levels before the intervention, indicating an increase in knowledge over time [15]. Furthermore, a study revealed that a great percentage of participants were aware of cervical cancer, with community health workers and healthcare professionals being common sources of information. Participants were also able to identify various symptoms associated with cervical cancer [34]. After the interventions, there was a significant increase in the patients' overall mean knowledge and practice by 17.6 % and 6.7 %, respectively. Age and educational levels were significantly associated with post-intervention knowledge and practice scores. Pharmacist-led educational interventions were found to improve cervical cancer patients' knowledge and practice of self-care management of adverse events [62]. Baseline knowledge levels about human papillomavirus (HPV), which is strongly linked to cervical cancer, were found to be poor in a study [70]. A lack of knowledge about HPV and its association with cervical cancer can deter individuals from seeking screening. However, post-intervention, there was a significant increase in knowledge and intention to take and/or encourage HPV vaccination and cervical screening.

Practice and uptake of cervical screening

The findings of the preceding analysis demonstrate the low adoption of cervical cancer screening among women in various locations. In South Africa, it was discovered that the incidence of cervical cancer screening uptake among women is significantly low, with differences reported among provinces [40]. Similarly, urban women in Lagos, Nigeria, reported low cervical cancer screening uptake, owing mostly to a lack of knowledge and accurate data on cervical cancer and its diagnostic

Table 1
Facts extractions from selected literature.

KNOWLEDGE, ATTITUDE AND PRACTICE OF CERVICAL CANCER PREVENTION							
SN	Authors	Aim	Population	Concept	Country	Study Design	Key Findings
1	Yahya & Mande (2019) [14]	assess awareness of cervical cancer and its screening methods among women	98	Awareness of cervical cancer and screening methods.	Nigeria	Qualitative (cross-sectional study)	67.7 % of participants were aware of cervical cancer, only 13.6 % of them knew about any form of cervical cancer screening methods
2	Uchendu et al, (2021). [6]	A review to evaluated knowledge attitudes and perception towards CC and uptake of screening	10	Knowledge, attitude and screening uptake.	Nigeria	Integrative review	Knowledge and uptake of CCSS were found to be poor, only few of them had ever been screened.
3	Moodley et al., (2020) [26]	Mapping awareness of breast and cervical cancer risk factors, symptoms and lay beliefs in Uganda and South Africa	1758	Awareness knowledge	Uganda	Quantitative (cross-sectional Survey)	In Uganda, married women/ living with a partner had higher awareness of breast cancer risk factors and cervical cancer symptoms compared to women not living with a partner.
4	Tiiti et al., (2022) [27]	Knowledge of human papillomavirus and cervical cancer among women attending GyneacologyClinics in Pretoria, South Africa	527 women	Knowledge Awareness	South Africa	Quantitative (Clinic-based analytic cross-sectional study)	cervical cancer screening is very low, and women lack knowledge of HPV and cervical cancer disease symptoms and its risk factors.
5	Chukwuka et al .,(2021) [28]	determine the effects of information, education, and communication (IEC) as a strategy for enhancing CC knowledge among women	200	Knowledge On cervical cancer	Nigeria, Ondo	Quantitative (quasi-experimental study)	knowledge scores increased significantly in the experimental group when compared with control group.
6	Onyenwenyi & Mchunu (2019) [29]	knowledge and service of primary health care (PHC) workers to conduct cervical cancer screening	10	Knowledge On screening	Nigeria	Qualitative (Exploratory research design)	poor knowledge and skills about cervical cancer screening using VIA or VILLI.
7	Weng et al., (2020) [30]	describe women's knowledge of cervical cancer and explore the attitudes toward, acceptability of cervical cancer screening (CCS)	1483	Knowledge Attitude	Zambia	Quantitative (cross-sectional study)	knowledge of cervical cancer was poor. Educational level, family income and awareness of previous disease history were significant factors influencing screening uptake.
8	Getaneh et al. (2021). [31]	assess the KAP of undergraduate female students towards cervical cancer screening.	403	Knowledge, attitude and practice towards cervical screening	Ethiopia	Quantitative (cross-sectional study)	undergraduate female students had apparently good knowledge and favorable attitude, their practices on cervical cancer screening was quite low.
9	Agboola et al., (2021) [32]	Determinants of knowledge, attitude towards cervical cancer screening (CCS) and practice	287	Knowledge, Attitude and practice of 7cervical screening	Nigeria	Quantitative (Descriptive study)	Majority (75.6 %) were willing to undergo CCS thereby exhibiting positive attitude towards screening. The practice of cervical screening was poor
10	Dozie et al., (2021) [33]	To assess the knowledge, attitude and perception on cervical cancer screening among women	231	Knowledge, attitude and perception of cervical screening	Nigeria	Quantitative (Cross-sectional study)	There was a high level of awareness (68.8 %) of cervical cancer screening Expensive cost of screening and invasion of privacy by male doctors were strong reasons for avoiding screening.
11	Omoyeni, & Tsoka-Gwegweni, (2022) [34]	To assess the knowledge, attitudes and practices of cervical cancer screening among women	283	Knowledge, attitude and practice	South Africa	Quantitative (Cross-sectional study)	Good awareness and attitude of cervical cancer screening (93 %, 81 %) There is significant high level of practice (66.8 %) But poor knowledge on treatment and screening method (28 %).
12	Surakatu et al., (2022). [35]	assess the knowledge, attitude and practices of cervical cancer screening among female secondary school teachers	273	Awareness Knowledge practice	Nigeria	Quantitative (descriptive cross-sectional study)	There is overall poor knowledge of cervical cancer, majority of female teachers had poor knowledge and poor cervical cancer screening practices.
13	Ogundipe et al., (2023) [36]	assess the knowledge, awareness, and attitude of female staff of Afe Babalola University towards cervical cancer screening and vaccinations.	200	Knowledge, awareness of cervical screening and vaccination	Nigeria	Qualitative (Cross-sectional study)	participants showed good knowledge while only 46 % had a positive attitude towards cervical cancer screening and vaccination.

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Table 1 (*continued*)

KNOWLEDGE, ATTITUDE AND PRACTICE OF CERVICAL CANCER PREVENTION							
SN	Authors	Aim	Population	Concept	Country	Study Design	Key Findings
14	John-Akinola et al., (2021) [37]	study investigated knowledge and screening practices for cervical cancer among two urban poor community settings in Ibadan,	500	Knowledge And screening practice	Nigeria	Quantitative (cross sectional design)	majority of respondents (77.2 %) had low knowledge of cervical cancer and were not aware (91.2 %) of cervical screening 10 % were aware of HPV for prevention of CC, 4 % had been screened with PAP test, and one woman (0.3 %) with VIA. Four (1.1 %) women had taken HPV before.
15	Abugu & Nwagu (2021) [38]	determined the awareness, knowledge and screening for cervical cancer among women of a faith-based organization in Nigeria.	200	Knowledge on screening	Nigeria	Quantitative (descriptive survey research design)	Majority of the women studied had never been screened for cervical cancer (91.7 %) and the reasons for not screening ranged from lack of knowledge of where to go for screening
16	Ngune et al., (2022) [39]	Explores knowledge of cervical cancer among women.	5398	Knowledge of CC	Kenya	Quantitative (cross-sectional study)	A considerable proportion of young women in Kenya one third of the participants are unaware of cervical cancer
17	Amu et al., (2019) [63]	Determined the knowledge and attitude of cervical cancer screening among women	260	Knowledge and attitude	Nigeria	Quantitative (Descriptive design)	One hundred and fifteen were aware of cervical cancer and only 47 (18.1 %) had good knowledge.
18	Akokuwebe et al. (2021) [40]	assessed the level of cervical cancer screening uptake among women	5903	Screening	South Africa	Demographic Health Survey	The prevalence of cervical cancer uptake is substantially low among women. 35.5 % of women indicated that they have had a Pap smear test, and 64.5 % of them reported they have not.
19	Olubodun et al., (2019) [41]	assessed the knowledge, attitude and preventive practices towards cervical cancer among women	305	Knowledge Attitude and Practice	Nigeria Lagos	Quantitative (descriptive cross-sectional study)	Most respondents (64.3 %) did not consider themselves at risk for cervical cancer. However, majority (88.9 %) were willing to undergo screening and 93.8 % were willing to take HPV immunization or recommend the vaccine to a friend/ relative.
SCREENING UPTAKE AND PREVENTIVE STRATEGIES							
SN	Authors	Aim	Population	Concept	Country	Study Design	Key Findings
20	Mafiana et al., (2022) [42]	aims at offering a comprehensive synthesis of studies that assessed the barriers preventing women from utilizing cervical cancer screening services in Nigeria.	9995	Cervical Screening	Nigeria	Systematic review.	Frequently reported barriers to cervical screening include a lack of knowledge of cervical cancer and screening
21	Ilevbare et al., (2020) [43]	Investigates the determinants of cervical cancer screening utilization among both working class women	62	Determinant of cervical Screening	Nigeria	Quantitative (Descriptive study)	Family history of cervical cancer is a strong driver for utilization of cervical cancer screening.
22	Odenusi et al., (2020) [44]	This compared the uptake of cervical cancer screening services as well as its determinants between health and other non-health workers	602	Cervical screening uptake.	Nigeria	Quantitative (comparative cross-sectional design)	Doctors utilize cervical cancer screening services compared to other female health workers While non health workers have poor utilization of cervical screening
23	Fapohunda et al., (2020) [45]	To examine the current trends and cancer in Nigeria cancer center record.	548	Prevalence	Nigeria	Retrospective and descriptive cross-sectional study.	Highest prevalence of cancer in women with Breast and cervical cancer as leading cause.
24	Lawal et al., (2023) [46]	Find out the cost effective way of combining cervical screening with Clinical breast examination	2446	Action research model	Nigeria	Quantitative (Descriptive study).	No additional funding is required to leverage clinical breast examination with budgeted cervical cancer screening.
25	Okyere et al., (2022). [47]	To investigated the association between women's healthcare decision making and cervical cancer screening uptake	22,564 Across Africa	Screening practice	Sub Sahara Africa	Demographic and Health Surveys of six countries in sub-Saharan Africa.	The overall prevalence of cervical cancer screening across the six sub-Saharan African countries was 13.4 %. women who are able to make autonomous healthcare decisions and those who practice shared decision making are more likely to uptake cervical cancer screening
26	Adegboyega et al., (2022) [48]	To understand women's values and beliefs of CC screening and explore willingness, acceptability.	121	Screening Acceptability	Sub-Sahara	Qualitative (cross-sectional survey)	disproportionately low utilization of CC prevention services among women.

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Table 1 (*continued*)

KNOWLEDGE, ATTITUDE AND PRACTICE OF CERVICAL CANCER PREVENTION							
SN	Authors	Aim	Population	Concept	Country	Study Design	Key Findings
27	Plaisy et al., (2023). [49]	Finding barriers to Cervical cancer screening and diagnosis	95	Barriers to screening and diagnosis	West Africa	Mixed (cross-sectional study)	access to health insurance or integrated healthcare program appear to be key determinants of early diagnosis of cervical cancer.
28	Godfrey et al., (2019) [50]	Understanding of rural Zulu women's knowledge and attitudes towards Pap smear tests, and their reasons for participation or non-compliance with cervical screening	234	Knowledge, attitude and screening uptake	Nigeria	Quantitative (cross-sectional study)	32.5 % of women had previously had a Pap smear. Only 19.2 % of women understood that a Pap smear was related to screening for cervical cancer
29	Stewart et al., (2020). [51]	To identify and evaluate spatial barriers to cervical cancer prevention services in Ondo State, Nigeria,	70	Screening Policies	Nigeria	Multi-Mode Enhanced Two-Step Floating Catchment Area model	Variations in spatial access were revealed healthcare providers need to effectively plan for more accessible and equitable access to cancer screening services, especially for the vulnerable areas with low spatial accessibility
30	John-Akinola et al., (2022) [52]	evaluated the knowledge and utilisation of HPV vaccine in cervical cancer prevention.	110	Knowledge of CC and screening uptake	Nigeria	Scoping review	Knowledge and uptake of cervical cancer preventive services across diverse groups in Nigeria remain poor. Those in urban areas demonstrated a slightly higher level of awareness of HPV vaccine, vaccination uptake and utilization of cervical cancer preventive services than the rural studies
31	Okunade et al., (2021). [53]	assessed the impact of mHealth on Pap test screening uptake and also determined the factors that affect screening uptake among women in Lagos,	15	Screening Intervention	Nigeria	Experimental randomized controlled trial	significantly higher rate of uptake of Pap smear screening among women in the mHealth arm compared with those in the usual care arm
32	Appiah, (2022). [54]	Explore the cues to cervical cancer screening among women.	178	Barriers to Screening uptake	Ghana	Qualitative approach (exploratory descriptive design)	Health workers, peer influence, spousal influence, creation of awareness and reducing cervical cancer screening cost emerged as major determinants (cues) that influence women's decision to get screened or not.
33	Binka et al., (2019) [55]	Explore the barriers to the uptake of cervical cancer screening and treatment	45	Barriers to Screening	Ghana	Qualitative (in-depth interview and focus group discussion)	Barriers includes low level of knowledge, personal or psychological convictions, cost of screening
34	Ago et al., (2022) [56]	Factors that influence uptake of cervical cancer screening.	180	Screening	Nigeria	Quantitative (Descriptive design)	Factors that influence uptake of CCS include knowledge, multiple sexual partner and offensive watery vaginal discharge. 30.56 % of the women had knowledge of cervical cancer, however, only 28 women (15.56 %) have ever been screened for cervical cancer
35	Okunowo & Smith-Okonu, (2020) [57]	assess the knowledge and uptake of cervical cancer screening	274	Knowledge and Screening uptake.	Nigeria	Quantitative (descriptive cross-sectional study)	knowledge of women study about risk factors of cervical cancer was very poor (15.6 %), with awareness rate of 78.5 %. The uptake of screening was very low (22.9 %)
IMPACT OF INTERVENTION							
SN	Authors	Aim	Population	Concept	Country	Study Design	Key Findings
36	Ahmed et al. (2022). [58]	examine the effect of nursing educational program on women knowledge and beliefs about cervical cancer prevention	150 Married women	Nursing Intervention Educational Program	Egypt	Quantitative (Quasi-experimental study)	All the women had poor knowledge score regarding cervical cancer prevention before the program after the program, 84 % of the women had an average and good knowledge
37	Mohamed et al. (2021) [59]	assess the level of women's knowledge and beliefs regarding cervical cancer prevention using tele-nursing instructions on women	75 women	Intervention using tele-Nursing instructions	Tunisia	Quantitative (quasi-experimental study)	There was a statistically significant difference regarding level of knowledge after the Tele- nursing
38	Nkwonta (2020) [60]	Efficacy of community-based education interventions on HPV and cervical cancer Screening	266	Educational Intervention study	Nigeria	Quantitative (Community-based educational interventions)	Poor knowledge of HPV vaccination and cervical screening pre intervention (80 %), increase in knowledge post with (70 %)
39	Agbana et al. (2021) [61]	Assessed the impact of interventional on knowledge of cervical cancer risk factors among women	522	Educational intervention	Nigeria	Quasi-experimental design	There was knowledge increase about cervical risk factors post intervention in the study than the control group

(*continued on next page*)

Table 1 (*continued*)

KNOWLEDGE, ATTITUDE AND PRACTICE OF CERVICAL CANCER PREVENTION							
SN	Authors	Aim	Population	Concept	Country	Study Design	Key Findings
40	Samaila et al., (2021). [62]	Assessed the impact of pharmacist-led interventions on self-care management of adverse event in cancer patient	56	Educational Intervention	Nigeria	Prospective longitudinal design	There was significant increase in knowledge post-intervention knowledge as well as practice scores.
41	Nisak et al., (2019) [63]	To determine the effectiveness of health promotion on the early detection of cervical cancer and to increase the participation of women's in VIA	66	Education Interventional on cervical screening.	Kenya	Quantitative (quasi-experimental)	In the intervention group it was found that there was an increase in knowledge and participation in the cervical screening (VIA) compared to the control group.
42	Makadzange et al., (2022) [64]	systematic review of literature published between 2005 and 2020 aimed at identifying effectiveness of educational interventions on increase in cervical cancer awareness, knowledge, and screening or vaccination uptake	19	Effect of educational intervention of cervical screening knowledge and uptake.	Nigeria	Systematic review	Educational interventions increased knowledge and awareness in African women, some boosted uptake of cervical cancer screening, especially when using peer health educators and culturally tailored methods.
43	Lott et al., (2020). [65]	identifies studies on interventions to increase uptake of cervical screening among women	19	Education Intervention on screening uptake	Africa	Scoping review	Willingness to screen was high after intervention Screening coverage ranged from 1.7 to 99.2 % post-intervention, with six studies (31.6 %) reporting a significant improvement in screening that achieved ≥60 % coverage.
44	Rahman et al., (2019) [66]	describing the implementation of decentralized cervical cancer prevention services in Africa,	19	Cervical Cancer screening Usage.	Africa	Systematic Review	Disparity of access to cervical cancer services between urban and rural settings is a major setback for CC prevention
45	Moodley et al., (2019) [67]	determine the feasibility of mobile health (mHealth) phone technology to improve management and follow-up of clients with cervical cancer precursor lesions.	364	Intervention through Technology	Africa	Mixed Method (Quantitative: Cross-sectional survey, Qualitative: In-depth interviews)	Technology has potential for mHealth interventions in improving follow-up and management of clients

procedures [57]. The study conducted [49] reported that a majority (71.5 %) of the diagnosed cases were already at an advanced stage of cervical cancer. This emphasizes the importance of early detection through regular screening, as late-stage diagnoses often lead to poorer treatment outcomes.

Okyere discovered that the general level of cervical cancer screening was 13.4 % in six Sub-Saharan African nations, the total frequency of cervical cancer screening was 13.4 % in six Sub-Saharan African nations [47]. Factors such as knowledge and occupation were found to influence screening uptake. It was noted that non-health workers at higher grade levels and those with good knowledge of cervical cancer were more likely to utilize screening services [44].

Knowledge and awareness also influence screening uptake, as evidenced by the finding that a majority of women studied had never been screened for cervical cancer due to a lack of knowledge about screening venues, the importance of being screened, and a feeling of not being susceptible to cervical cancer [38]. These findings emphasize the need for targeted educational interventions to improve knowledge and awareness of cervical cancer and its importance for screening among women. Demographic factors such as age, ethnicity, education, employment, and marital status also play a role in cervical cancer screening uptake. Studies have found that Pap smear testing is more prevalent among women aged 45+, those in the white population group, those with higher education, divorced individuals, and those with health insurance coverage [40]. Furthermore, recommendations from healthcare providers, advice from friends and relatives, and media enlightenment have been identified as motivating factors for women to undergo cervical cancer screening [57]. Also, multiple sexual partner and offensive watery vaginal discharge are also precipitating factors for uptake of cervical screening [56]. Despite the 30.56 % of the women having knowledge of cervical cancer, only 28 women (15.56 %) have ever been screened for cervical cancer [56]. It was recorded that despite the good awareness rate of 78.5 % among women of their study, the uptake of screening was very low (22.9 %) in comparison with the awareness level [57].

Implication for nursing education, practice and research

It is obvious that there is a need to integrate screening of women into the practical sessions of student Nurses and all the Nurses as women feel more comfortable having female Nurses screening them.

Training and retraining of nurses on all methods of screening should be encouraged, this implies that nurses should be trained properly on cervical cancer detection and control.

Risk factors, signs and symptoms of cervical cancer should be properly explained to women particularly those who have attained menopausal ages and in child-bearing mothers. Flyers and pictorial explanation can be used for them especially in clinics, religious home and public places like market, as this will enhance proper understanding.

HPV vaccination and screening should be free or subsidize as cost is one of the major reason for neglecting this. Also, nurses should broaden their horizon by taking up research roles, advocate screening and increase education about screening.

Nurse-led educational interventions and other interventional package were found to have a positive impact on promoting knowledge of cervical cancer among women and screening uptake. Hence, an increase in nurse-led interventions will boost cervical cancer screening rates and adherence to screening intervals which will ultimately reduce the incidence of cervical cancer.

Nurses can also broaden the knowledge and awareness of women by conducting educational talks on social media like Twitter, Instagram, Facebook, and others, this will go more viral, as traffic tends to be high on these platforms.

Conclusion

The study affirmed that various studies has been done concerning knowledge, attitude and practice of cervical cancer prevention among women in Africa. The knowledge of cervical cancer was poor among these women, which had a direct influence in the poor uptake of cervical cancer screening. There are some barriers identified which encompass socio-cultural concerns, insufficient health education, limited availability of healthcare services, and consent from partners. But nurse led interventions has been proven to increase knowledge level and screening uptake in experimental groups post intervention.

Despite the low level of knowledge of women about cervical cancer screening and uptake in these areas, Nurse-led intervention have been proven to increase African women knowledge, attitude and practice of cervical cancer prevention. This has shown some benefits and beneficial changes that encourage health promotion habits. The positive outcomes observed from this intervention highlight the importance of implementing comprehensive cervical cancer prevention programs. These programs should incorporate educational initiatives and promote the accessibility and affordability of screening services. It will also be crucial for this educational package to address social and cultural factors that may hinder women's participation in screenings.

Consent for publication

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Availability of data and materials

All the data used and generated are included in the manuscript.

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Mary Opeyemi Adigun: Writing – original draft, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Deborah Tolulope Esan:** Writing – review & editing, Visualization, Validation, Supervision, Methodology, Formal analysis, Data curation, Conceptualization. **Babatunji Emmanuel Oyinloye:** Writing – review & editing, Visualization, Validation, Supervision. **Benedict Tolulope Adeyanju:** Writing – review & editing, Methodology, Formal analysis, Conceptualization. **Kikelomo Sabainah Olowoyo:** Writing – review & editing, Validation. **David Bamidele Olawade:** Writing – review & editing, Visualization, Validation, Formal analysis, Data curation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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References

[1] World Health Organization. Global strategy to accelerate the elimination of cervical cancer as a public health problem (2020). [online] www.who.int. Available at: https://www.who.int/publications/i/item/9789240014107 Accessed 7 Nov. 2023.

[2] S. Finocchario-Kessler, C. Wexler, M. Maloba, N. Mabachi, F. Ndikum-Moffor, E. Bukusi, Cervical cancer prevention and treatment research in Africa: a systematic review from a public health perspective, BMC Women's Health 16 (2016) 29, https://doi.org/10.1186/s12905-016-0306-6.

[3] E.A. Okolie, D. Aluga, S. Anjorin, F.N. Ike, E.M. Ani, B.I. Nwadike, Addressing missed opportunities for cervical cancer screening in Nigeria: a nursing workforce approach, Ecancermedicalscience 16 (2022), https://doi.org/10.3332/ecancer.2022.1373.

[4] World Health Organization Cervical Cancer, World Health Organization, 2023 onlineAvailable at: https://www.who.int/news-room/fact-sheets/detail/cervical-cancer. Accessed 22 Nov. 2024.

[5] I. Uchendu, J. Hewitt-Taylor, A. Turner-Wilson, C. Nwakasi, Knowledge, attitudes, and perceptions about cervical cancer, and the uptake of cervical cancer screening in Nigeria: an integrative review, Sci. Afr. 14 (2021) e01013, https://doi.org/10.1016/j.sciaf.2021.e01013.

[6] H.I. Anyasi, A.M. Foss, A comparative analysis of cervical cancer prevention between Nigeria and Nordic countries that have experienced a decline in cervical cancer incidence, Int. Health 13 (4) (2020) 307–317, https://doi.org/10.1093/inthealth/ihaa062.

[7] https://www.cancer.gov/types/cervical/screening:~Updatedcervicalcancerscreeningguidelines *National cancer institute* (NCI), (2024).

[8] L. Bruni, G. Albero, B. Serrano, M. Mena, J.J. Collado, D. Gómez, J. Muñoz, F. X. Bosch, S. de Sanjosé, Human Papillomavirus and Related Diseases in Nigeria, ICO/IARC Information Centre on HPV and Cancer (HPV Information Centre), 2023 [online]Available at: https://hpvcentre.net/statistics/reports/NGA_FS.pdf. Accessed 8 Nov. 2023.

[9] World Health Organization. Nigeria to vaccinate 7.7 million girls against leading cause of cervical cancer. [online] Africa Renewal. Available at: https://www.un.org/africarenewal/magazine/october-2023/nigeria-vaccinate-77-million-girls-against-leading-cause-cervical-cancer Accessed 8 Nov. 2023.

[10] S.G. Morounke, A.B. James, B.O. Adu, A.F. Faduyile, A.O. Fadaka, O. Iyapo, S. S. Soyemi, B. Adekunle, Epidemiology and incidence of common cancers in Nigeria, J. Cancer Biol. Res. 5 (3) (2017) 1105.

[11] M. Mulongo, C.J. Chibwesha, Prevention of cervical cancer in low-resource African settings, Obstet. Gynecol. Clin. North Am. 49 (4) (2022) 771–781, https://doi.org/10.1016/j.ogc.2022.08.008.

[12] R. Landy, F. Pesola, A. Castañón, P. Sasieni, Impact of cervical screening on cervical cancer mortality: estimation using stage-specific results from a nested case–control study, Br. J. Cancer 115 (9) (2016) 1140–1146, https://doi.org/10.1038/bjc.2016.290.

[13] C.C. Ifemelumma, C.C. Anikwe, B.C. Okorochukwu, F.A. Onu, J.A. Obuna, B. N. Ejikeme, O.P. Ezeonu, Cervical cancer screening: assessment of perception and utilization of services among health workers in low resource setting, Int. J. Reprod. Med. (2019) 6505482, https://doi.org/10.1155/2019/6505482.

[14] A. Yahya, A.T. Mande, Awareness and knowledge of cervical cancer and its screening methods among women attending primary healthcare centers in Zaria, North-Western, Nigeria, Trop. J. Obst. Gynecol. 36 (2) (2019) 271–276, https://doi.org/10.4103/tjog.tjog_26_19.

[15] K. Adewumi, H. Nishimura, S.Y. Oketch, P. Adsul, M. Huchko, Barriers and facilitators to cervical cancer screening in western Kenya: a qualitative study, J. Cancer Edu. 37 (4) (2021) 1122–1128, https://doi.org/10.1007/s13187-020-01928-6.

[16] A.R. Isara, N. Osayi, Knowledge of Human papillomavirus and uptake of its vaccine among female undergraduate students of Ambrose Alli University, Ekpoma, Nigeria, J. Commun. Med. Prim. Health Care 33 (1) (2021) 64–75, https://doi.org/10.4314/jcmphc.v33i1.6.

[17] A. Ohihoin, P. Okwuraiwe, A. Musa, G. Olorunfemi, C. Onwuamah, F. Ige, O. Amoo, R. Audu, F. Okogbo, B. Daniyan, T. Swende, G. Onyemelukwe, H. Daru, H. Usman, O. Shittu, J. Musa, O. Ezechi, I. Ujah, Prevalence and predictors of high-risk HPV in Nigeria, Adv. Infect. Dis. 12 (2022) 745–757, https://doi.org/10.4236/aid.2022.124052.

[18] C.M. Ndikom, P.I. Oboh, Perception, acceptance and uptake of Human papillomavirus vaccine among female adolescents in selected secondary schools in Ibadan, Nigeria. Afr. J. Biomed. Res. 20 (3) (2017) 237–244.

[19] T.N. Ogochukwu, J. Akabueze, I.V. Ezeome, U.U. Aniebue, E.O. Oranu, Vaccination against Human papilloma virus in adolescent girls: mother's knowledge, attitude, desire and practice in Nigeria, J. Ancient Dis. Prevent. Remed. 5 (1) (2017) 151, https://doi.org/10.4172/2329-8731.1000151.

[20] World Health Organisation, author. Cancer country profile 2020: Nigeria burden of cancer [Internet] World Health Organisation; 2020. Available from: https://www.who.int/cancer/country-profiles/NGA_2020.pdf?ua=1.

[21] A. Idowu, S.A. Olowookere, A.T. Fagbemi, O.A. Ogunlaja, Determinants of cervical cancer screening uptake among women in Ilorin, North Central Nigeria: A community-based study, J. Cancer Epidemiol. (2016) 1–8, https://doi.org/10.1155/2016/6469240.

[22] O. Awodele, A.A.A. Adeyomoye, D.F. Awodele, V. Kwashi, I.O. Awodele, D. C. Dolapo, A study on cervical cancer screening amongst nurses in Lagos University Teaching Hospital, Lagos, Nigeria, J. Cancer Edu. 26 (3) (2011) 497–504, https://doi.org/10.1007/s13187-010-0187-6.

[23] O.I. Ekwunife, S.K. Lhachimi, Cost-effectiveness of Human Papilloma Virus (HPV) vaccination in Nigeria: a decision analysis using pragmatic parameter estimates for cost and programme coverage, BMC Health Serv. Res. 17 (1) (2017) 815, https://doi.org/10.1186/s12913-017-2758-2.

[24] F. Ishola, O. Omole, A vision for improved cancer screening in Nigeria, Lancet Glob. Health 4 (6) (2016) e359–e360, https://doi.org/10.1016/S2214-109X(16)30062-6.
[25] O.O. Sowemimo, O. Ojo, O. Fasubaa, Cervical cancer screening and practice in low resource countries: Nigeria as a case study, Trop. J. Obstet. Gynaecol. 34 (3) (2017) 170, https://doi.org/10.4103/tjog.tjog_66_17.
[26] J. Moodley, D. Constant, A.D. Mwaka, S.E. Scott, F.M. Walter, Mapping awareness of breast and cervical cancer risk factors, symptoms and lay beliefs in Uganda and South Africa, PLoS. One 15 (10) (2020) e0240788, https://doi.org/10.1371/journal.pone.0240788.
[27] T.A. Tiiti, J. Bogers, R.L. Lebelo, Knowledge of Human papillomavirus and cervical cancer among women attending gynecology clinics in Pretoria, South Africa, Int. J. Environ. Res. Public Health 19 (7) (2022) 4210, https://doi.org/10.3390/ijerph19074210.
[28] O. Olorunfemi, L. Chukwuka, F. Okanlawon, N. Osunde, A. Ogunniran, Information, education, and communication as a strategy for enhancing knowledge of cervical cancer among women in Benin city, Nigeria, J. Cancer Res. Pract. 8 (2) (2021) 54–67, https://doi.org/10.4103/jcrp.jcrp_31_20.
[29] A.O.C. Onyenwenyi, G.G. Mchunu, Primary health care workers' understanding, and skills related to cervical cancer prevention in Sango PHC centre in south-western Nigeria: a qualitative study, Prim. Health Care Res. Dev. 20 (2019) e93, https://doi.org/10.1017/s1463423619000215.
[30] Q. Weng, J. Jiang, F.M. Haji, L.H. Nondo, H. Zhou, Women's knowledge of and attitudes toward cervical cancer and cervical cancer screening in Zanzibar, Tanzania: a cross-sectional study, BMC Cancer 20 (63) (2020), https://doi.org/10.1186/s12885-020-6528-x.
[31] A. Getaneh, B. Tegene, T. Belachew, Knowledge, attitude and practices on cervical cancer screening among undergraduate female students in University of Gondar, Northwest Ethiopia: an institution based cross sectional study, BMC Public Health 21 (1) (2021) 775, https://doi.org/10.1186/s12889-021-10853-2.
[32] A.M. Agboola, O.O. Bello, The determinants of knowledge of cervical cancer, attitude towards screening and practice of cervical cancer prevention amongst antenatal attendees in Ibadan, Southwest Nigeria Ecancermedicalsci. 15 (2021) 1225, https://doi.org/10.3332/ecancer.2021.1225.
[33] U.W. Dozie, B.L. Elebari, C.J. Nwaokoro, G.N. Iwuoha, C.O. Emerole, A.J. Akawi, U.M. Chukwuocha, I.N.S.Knowledge Dozie, attitude and perception on cervical cancer screening among women attending ante-natal clinic in Owerri west L.G.A, South-Eastern Nigeria: A cross-sectional study, Cancer Treat. Res. Commun. 28 (2021) 100392, https://doi.org/10.1016/j.ctarc.2021.100392.
[34] O. Omoyeni, J. Tsoka-Gwegweni, Knowledge, attitudes and practices of cervical cancer screening among rural women in KwaZulu-Natal, South Africa. The Pan African, Med. J. 42 (188) (2022), https://doi.org/10.11604/pamj.2022.42.188.26172.
[35] O.K. Surakatu, I.A. Onyeodi, M.R.Knowledge Balogun, Attitude and practices of cervical cancer screening among female teachers in an urban community in Lagos, Nigeria.: knowledge, Attitude and practices of cervical cancer screening, Nigerian Med. J. 63 (3) (2022) 236–247, onlineAvailable at: https://nigerianmedjournal.org/index.php/nmj/article/view/112. Accessed 10 Nov. 2023.
[36] L. Ogundipe, T. Ojo, T. Oluwadare, E. Olayemi, F. Oluwafemi, O. Oni, O. Kukoyi, E. Orok, Cervical cancer screening and vaccination: knowledge, awareness, and attitude of female staff in a Nigerian University, BMC Women's Health 23 (218) (2023), https://doi.org/10.1186/s12905-023-02345-9.
[37] Y.O. John-Akinola, M.M. Oluwasanu, O. Oladepo, Urban poor community settings' Knowledge and screening practices for cervical cancer in Ibadan, Nigeria. JCO Glob. Oncol. 7 (7) (2021) 1024–1031, https://doi.org/10.1200/go.20.00619.
[38] L.I. Abugu, E. Nwagu, Awareness, knowledge and screening for cervical cancer among women of a faith-based organization in Nigeria, Pan Afr. Med. J. 39 (2021) 200, https://doi.org/10.11604/pamj.2021.39.200.23761.
[39] I. Ngune, F. Kalembo, B. Loessl, L.W. Kivuti-Bitok, Biopsychosocial risk factors and knowledge of cervical cancer among young women: A case study from Kenya to inform HPV prevention in Sub-Saharan Africa, PLoS. One 15 (8) (2020) e0237745, https://doi.org/10.1371/journal.pone.0237745.
[40] M.E. Akokuwebe, E.S. Idemudia, A.M. Lekulo, O.W. Motlogeloa, Determinants and levels of cervical cancer screening uptake among women of reproductive age in South Africa: evidence from South Africa demographic and health survey data, BMC Public Health 21 (2016), https://doi.org/10.1186/s12889-021-12020-z.
[41] T. Olubodun, O.O. Odukoya, M.R. Balogun, Knowledge, attitude and practice of cervical cancer prevention, among women residing in an urban slum in Lagos, Southwest, Nigeria, *Pan* Afr. Med. J. 32 (2019) 130, https://doi.org/10.11604/pamj.2019.32.130.14432.
[42] J. J Mafiana, S. Dhital, M. Halabia, X. Wang, Barriers to uptake of cervical cancer screening among women in Nigeria: a systematic review, Afr. Health Sci. 22 (2) (2022) 295–309, https://doi.org/10.4314/ahs.v22i2.33.
[43] O.E. Ilevbare, A.A. Adegoke, C.M. Adelowo, Drivers of cervical cancer screening uptake in Ibadan, Nigeria Heliyon 6 (3) (2020) e03505, https://doi.org/10.1016/j.heliyon.2020.e03505.
[44] A.O. Odenusi, V.O. Oladoyin, M.C. Asuzu, Uptake of cervical cancer screening services and its determinants between health and non-health workers in Ibadan, south-western Nigeria, Afr. J. Med. Med. Sci. 49 (4) (2020) 573–584.
[45] A. Fapohunda, A. Fakolade, J. Omiye, O. Afolaranmi, O. Arowojolu, T. Oyebamiji, C. Nwogu, A. Olawaiye, J. Mutiu, Cancer presentation patterns in Lagos, Nigeria: experience from a private cancer center, J. Public Health Afr. 11 (2) (2020) 1138, https://doi.org/10.4081/jphia.2020.1138.
[46] I. Lawal, Zainab Shinkafi-Bagudu, N. Koko, J. Mohammad, Abdullahi Bala Rano, Kabir Aliyu Suleiman, Integrated breast and cervical cancer prevention: what is the cost of cost reduction? Cancer Epidemiol., Biomark. Prevent. 32 (6_Supplement) (2023) 56, https://doi.org/10.1158/1538-7755.asgcr23-abstract-56.
[47] J. Okyere, R.G. Aboagye, A.-A. Seidu, B.Y.-A. Asare, B. Mwamba, B.O. Ahinkorah, Towards a cervical cancer-free future: women's healthcare decision making and cervical cancer screening uptake in sub-Saharan Africa, BMJ Open. 12 (7) (2022) e058026, https://doi.org/10.1136/bmjopen-2021-058026.
[48] A. Adegboyega, A.T. Desmennu, M. Dignan, Qualitative assessment of attitudes toward cervical cancer (CC) screening and HPV self-sampling among African American (AA) and Sub-Saharan African Immigrant (SAI) women, Ethn. Health 27 (8) (2022) 1769–1786, https://doi.org/10.1080/13557858.2021.1980771.
[49] M.K. Plaisy, S. Boni, P.A. Coffie, A. Tanon, I. Adoubi, A. Horo, F. Dabis, A. Bekelynck, A. Jaquet, Barriers to early diagnosis of cervical cancer: a mixed-method study in Côte d'Ivoire, West Africa, BMC Women's Health 23 (135) (2023), https://doi.org/10.1186/s12905-023-02264-9.
[50] M.A.L. Godfrey, S. Mathenjwa, N. Mayat, Rural Zulu women's knowledge of and attitudes towards pap smears and adherence to cervical screening, Afr. J. Prim. Health Care Fam. Med. 11 (1) (2019) e1–e6, https://doi.org/10.4102/phcfm.v11i1.1994.
[51] K. Stewart, M. Li, Z. Xia, S.A. Adewole, O. Adeyemo, C. Adebamowo, Modeling spatial access to cervical cancer screening services in Ondo State, Nigeria. Int. J. Health Geograph. 19 (28) (2020), https://doi.org/10.1186/s12942-020-00222-4.
[52] Y.O. John-Akinola, C.M. Ndikom, M.M. Oluwasanu, T. Adebisi, O. Odukoya, Cervical cancer and Human papillomavirus vaccine knowledge, utilisation, prevention educational interventions and policy response in Nigeria: A scoping review, Cancer Control 29 (2022) 107327482211301, https://doi.org/10.1177/10732748221130180.
[53] K.S. Okunade, A. Soibi-Harry, S. John-Olabode, A.A. Adejimi, M.J. Allsop, T. C. Onyeka, G.O. Akaba, Y.A. Oshodi, O. Salako, A.O. Ugwu, A. Adefemi, R. I. Anorlu, J.S. Berek, Impact of mobile technologies on cervical cancer screening practices in Lagos, Nigeria (mHealth-Cervix): A randomized controlled trial, JCo Glob. Oncol. 7 (2021) 1418–1425, https://doi.org/10.1200/go.21.00258.
[54] E.O. Appiah, Cues to cervical cancer screening and reaction to cervical cancer diagnosis during screening among women in Shai Osudoku District, Ghana Ecancermedicalsci. 16 (2022) 1392, https://doi.org/10.3332/ecancer.2022.1392.
[55] C. Binka, S.H. Nyarko, K. Awusabo-Asare, D.T. Doku, Barriers to the uptake of cervical cancer screening and treatment among rural women in Ghana, Biomed. Res. Int. (2019) 6320938, https://doi.org/10.1155/2019/6320938.
[56] B. U Ago, E. E Efiok, S. E Abeng, Sociodemographic and gynecological factors that influence uptake of cervical cancer screening. A cross-sectional study in Calabar, Nigeria, Afr. Health Sci. 22 (4) (2022) 96–103, https://doi.org/10.4314/ahs.v22i4.13.
[57] A. Okunowo, S. Smith-Okonu, Cervical cancer screening among urban women in Lagos, Nigeria: focus on barriers and motivators for screening, Nigerian J. Gen. Pract. 18 (1) (2020) 10, online.
[58] A.H. Ahmed, S.M. Yakou, M.M. Tosson, Health Belief model-based educational program about cervical cancer prevention on women knowledge and beliefs, Assiut Scient, Nurs. J. 10 (30) (2022) 51–60, https://doi.org/10.21608/asnj.2022.127397.1343.
[59] A. Mohamed, T. El-Sayed, R. Elsayed, R. Aboushady, Effect of tele-nursing instructions on women knowledge and beliefs about cervical cancer prevention, Assiut Scient. Nurs. J. 8 (23) (2021) 153–165, https://doi.org/10.21608/asnj.2021.56497.1096.
[60] C.A. Nkwonta, D.K. Hilfinger Messias, T. Felder, K. Luchok, Increasing Human papillomavirus vaccination and cervical cancer screening in Nigeria: an assessment of community-based educational interventions, Int. Q. Commun. Health Educ. 41 (1) (2020) 89–99, https://doi.org/10.1177/0272684x20916611.
[61] O.F. Agbana, N. Okoro, M.O. Ukonu, B.E. Agbana, Impact of interventional documentary on knowledge of cervical cancer risk factors among rural women in North-Central Nigeria, Afr. Popul. Stud. 35 (1) (2021), https://doi.org/10.11564/35-1-1525.
[62] A. Samaila, A. Isah, U.C. Michael, A. A. Biambo, N. Usman, M.O. Adibe, Therapy options received and impact of pharmacist-led interventions on self-care management of adverse events among cervical cancer patients in a Nigerian tertiary hospital, Int. J. Pharmaceut. Sci. Rev. Res. 71 (1) (2021), https://doi.org/10.47583/ijpsrr.2021.v71i01.011.
[63] A. Nisak, A. Wigati, Z. Fanani, N. Cholifah, The effectiveness of The use of cervical cancer prevention guideline book on women participation in visual inspection with acetic acid (VIA), in: Proceedings of the Third International Conference on Sustainable Innovation 2019 – Health Science and Nursing, Atlantis Press, 2019, pp. 80–84, https://doi.org/10.2991/icosihsn-19.2019.19. IcoSIHSNonline.
[64] E.E. Makadzange, A. Peeters, M.A. Joore, M.L. Kimman, The effectiveness of health education interventions on cervical cancer prevention in Africa: A systematic review, Prev. Med. 164 (2022) 107219, https://doi.org/10.1016/j.ypmed.2022.107219.
[65] B.E. Lott, M.J. Trejo, C. Baum, D.J. McClelland, P. Adsul, P. Madhivanan, S. Carvajal, K. Ernst, J. Ehiri, Interventions to increase uptake of cervical screening in sub-Saharan Africa: a scoping review using the integrated behavioral model, BMC Public Health 20 (654) (2020), https://doi.org/10.1186/s12889-020-08777-4.
[66] R. Rahman, M.D. Clark, Z. Collins, F. Traore, E.M. Dioukhane, H. Thiam, Y. Ndiaye, E.L. De Jesus, N. Danfakha, K.E. Peters, T. Komarek, A.M. Linn, P.E. Linn, K. E. Wallner, M. Charles, M. Hasnain, C.E. Peterson, J. Dykens, A cervical cancer screening decentralized policy adaptation: an African rural-context-specific systematic literature review, Glob. Health Action. 12 (1) (2019) 1587894, https://doi.org/10.1080/16549716.2019.1587894.

[67] J. Moodley, D. Constant, M.H. Botha, F.H. van der Merwe, A. Edwards, M. Momberg, Exploring the feasibility of using mobile phones to improve the management of clients with cervical cancer precursor lesions, BMC Women's Health 19 (1) (2019) 2, https://doi.org/10.1186/s12905-018-0702-1.

[68] E.O. Amu, S.C. Ndugba, F.A. Olatona, Knowledge of cervical cancer and attitude to cervical cancer screening among women in Somolu Local Government Area, Lagos, Nigeria, J. Commun. Med. Prim. Health Care 31 (1) (2019) 76–85, onlineAvailable at: https://ir.unilag.edu.ng/handle/123456789/9239. Accessed 10 Nov. 2023.

[69] J. Harries, S.E. Scott, F.M. Walter, A.D. Mwaka, J. Moodley, Women's appraisal, interpretation and help-seeking for possible symptoms of breast and cervical cancer in South Africa: a qualitative study, BMC Women's Health 20 (251) (2020), https://doi.org/10.1186/s12905-020-01120-4.

[70] E Riza, A Karakosta, T Tsiampalis, D Lazarou, A Karachaliou, S Ntelis, V Karageorgiou, T. Psaltopoulou, Knowledge, attitudes and perceptions about cervical cancer risk, prevention and human papilloma virus (HPV) in vulnerable women in Greece, Int. J. Environ. Res. Public Health 17 (18) (2020 Sep) 6892.