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Cervical Cancer Screening in a Low–Resource Setting: Buea-Cameroon

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Authors' contributions

This work was carried out in collaboration among all authors. Author AT designed the study. Authors DN, FNC and PNF performed the statistical analysis, authors AT, FNC, TT and PNF wrote the protocol, and wrote the first draft of the manuscript. Authors AT and DN managed the analyses of the study and literature searches. Authors GEHE, TE, CEE, GE, LF, WN and GN contributed scientifically to the study. All authors read and approved the final manuscript.

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ABSTRACT

Background: Cervical cancer screening is not widely performed in developing countries like Cameroon. We conducted "one-day-screening" in Buea. Methods: The study was performed at the Buea Regional Hospital, Annex on the 2nd of November, 2019. A MobileODT colposcopic device was used to enhance visualization of the cervix and, if necessary, treatment as thermal coagulation or Loop electrical excision procedure (LEEP) was done at the same time. Before the screening, questionnaires were administered to participants.

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Results: of 140 women who agreed to participate, 124 (89%) completed the screening procedure: the mean age; 36.53 (±12.17) and reported negative HIV; 98%. Of the 124, 8 (6.5%) were screened positive, i.e., Low squamous intraepithelial lesion (LSIL) 7 (5.6%) and High squamous intraepithelial lesion (HSIL) 1 (0.8%).Out of the 8, 2 met treatment criteria. However, only one accepted treatment. The HSIL was excised and histopathology confirmed a CIN2 lesion. Although 111 (89.5%) participants believed that cervical cancer is preventable, only 37 (29.8%) had been previously screened and just one had previously been vaccinated against Human Papilloma Virus (HPV).
Conclusion: One-day cervical cancer screening may provide an opportunity to treat and educate women on the importance of cervical cancer screening. The "see and treat" effectiveness should be confirmed by larger studies.

Keywords: Cervical cancer; single-day screening and treatment; visual inspection with acetic acid and Lugol's iodine; thermal coagulation; thermocoagulation; LEEP; Buea.

1. INTRODUCTION

Cervical cancer is a global health burden, ranked as the second most common and deadliest gynecological cancer in low-income countries [1]. Its global incidence is approximately 529,409 new cases, and more than half of these new cases die annually [1]. In Cameroon, more than 6 million sexually active women are at risk of developing cervical cancer. There are 1993 newly diagnosed cases annually, and over 55% of these cases die annually although cervical cancer is a preventable disease [2].

HPV infection is by excellence a sexually transmissible disease, with about 75% of sexually active women at risk of contracting it during their active sexual lifespan [3]. 99.7 % of cervical cancers (CA) are caused by HPV (30) and types 16 and 18, are responsible for 2/3 of premalignant lesions and CA of the cervix [4,5].

Cervical dysplasia or pre-cancer lesions are the abnormal precursor cells which can later progress to frank cervical cancer [6]. The peak incidence of cervical dysplasia occurs between the ages of 25 to 35 years [7]. If diagnosed early, most of these dysplastic cells can be treated successfully, hence preventing further progression to invasive cervical cancer [8]. Despite the presence of a vaccine against Human Papilloma Virus HPV, its availability and affordability are still very low in Cameroon and most other low-income countries [9].

The first screening for cervical dysplasia is recommended to begin at the age of 21; however, less than 19% of women have been screened in low-income countries [10,11].

In Cameroon, cervical cancer screening is not routinely carried-out in most healthcare services, and no nationwide screening program has been implemented by the government. In 2007, the Cameroon Baptist Convention Health Services launched the Women Health Program which has ever since champion the screening of cervical cancer in most regions of the country using the visual inspection technique and enhanced by digital cervicography [12]. Beside insufficient screening programs, the cost of screening, the lack of information on screening programs, the notion that the screening process is painful, have been reported as some of the factors responsible for the low uptake of cervical cancer screening in Cameroon [13].

Visual inspection of the cervix with acetic acid (VIA)was reported as an effective and affordable screening test that can be combined with simple treatment methods for early cervical lesions eradication [14]. Pap smear is more expensive to run, needs a specialized laboratory and technicians, analyses are time-consuming, thus rendering "see and treat "lesions on the spot difficult to implement [14]. There is the need for the utilization of such a screening method, as screening a woman just once with VIA between the ages of 30 and 49 years have been reported to decrease her lifetime risk of developing invasive cervical cancer by 26% [15]. As a measure to increase the uptake of cervical cancer screening in the Buea health area, we organized a free cervical cancer screening campaign at the Buea Regional Hospital using the VIA/VILLI technique, and with the help of a MobileODT colposcopic device to enhance the visualization of positive lesions [16,17]. This program is an initiative of the Buea Regional Hospital and the Cameroon-Arizona Partnership, with a shared vision of decreasing maternal mortality via early screening and treatment of cervical dysplastic lesions by trained local healthcare personnel.

2. METHODS

2.1 Study Design and Setting

This was a single day screen-and-treat cervical cancer clinic carried-out on the 2nd November 2019 at the Buea Regional Hospital in the South West Region of Cameroon.

The Buea Regional Hospital is a120-bed capacity intermediate level referral hospital located in Buea, at the foot of Mount Cameroon. It is a government-own hospital, which serves as a clinical rotation site for the University of Buea Medical School. It is the lone referral hospital for the Buea health area, which has an estimated population of over 200 000 inhabitants [18]. Under the patronage of the faculty of Health of the University of Buea in partnership with the University of Arizona School of Medicine-Phoenix, a "Cancer Screening and Early Diagnostic Center" is being created at the Buea Regional Hospital. This site is run by a handful of healthcare workers and overseen by a pathologist and a couple of gynecologists with ASCCP certification.

2.2 Study Population and Procedure

All women who were at least 21 years of age were invited for this screening via radio announcements, public banners, and social media campaigns. Our exclusion criteria were pregnancy, history of prior total hysterectomy, and women aged above 65 years. They were assured that they had the right to withdraw their consent at any stage of the screening process. Before the screening information on demography, gynae-obstetrical history, awareness, and previous exposure to the risk factors of cervical cancer was collected. We had three screening stations. An ASCCP trained colposcopist supervised these screening stations. The women lied in a lithotomy position on an examination bed, and the external genitalia examined before placing a sterile plastic speculum into the vagina to enable clear visualization of the cervix and the transformation zone. A freshly prepared 5% acetic acid was applied on the cervix, and after 1 minute, it was observed with the naked eyes and with the MobileODT colposcopic device. Findings were described as negative or positive based on the WHO/IARC practical manual on visual screening for cervical neoplasia [19]. Preliminary photos were taken for all VIA positive cases before the application of Lugol's iodine. All VIA positive cases were confirmed positive with VILI before treatment was initiated. Results were reported as a negative, low-grade squamous intraepithelial lesion (LSIL), high grade squamous intraepithelial lesion (HSIL), and suspicious for cancer. All patients with HSIL were treated with Loop Electrical Excision Procedure (LEEP), and samples sent for histopathology. All participants ≥ 25 years of age with an LSIL were eligible for thermal coagulation in accordance with the current WHO eligibility guidelines [20]. Participants with LSIL who were below 25 years old did not benefit from any treatment option but were to be re-evaluated in one year according to the WHO/IARC beginners manual [21]. An LSIL is described as a translucent, thin white lesion, with geographical borders, no fine punctuation, warts could be present. Characteristics of HSIL: opaque, thick white, straight borders, presence of punctuations, and mosaicism. Lesion suspicious of cancer: bleeding, or bleeds easily at contact, the borders with rolled-up edges, atypical vessels, and a fungating or ulcerated aspect [21].

All negative cases were offered a 3-year rendezvous for rescreening. A biopsy was to be provided to all cases with suspicion of cancer. At the end of the screening process, participants were all provided with their screening result, instructions on subsequent follow-up, and when next to go for screening.

2.3 Data Entry and Analysis

Data were entered into a Microsoft Excel spreadsheet and exported to Epi Info version 7 for analysis. Categorical variables were expressed as frequencies and percentages. Continuous variables were expressed as mean and standard deviation. A two-tailed Fisher exact test was used to determine the association between screening results and participants' characteristics. A p-value < 0.05 was considered to be statistically significant.

3. RESULTS

3.1 Participants' Characteristics

One hundred and forty (140) women opted to participate in this screening program. However, 16 women withdrew their consent in the course of the process and declined from undergoing the screening procedure. A total of 124 participants completed the screening procedure, given a screening uptake of 88.6%. Among those who initially opted to participate in the screening, the mean age was 35.81 (±12.37); forty-eight (34.3%) of them were married, and 91

(65.0%) had attained university level of education.

Among those who completed the screening, the mean age was 36.53 (±12.17), with up to 50 (40.3%) of them in the 21- 30 years' age group. Forty-five (36.3%) were married, and 79 (63.7%) had attained a university level of education. The majority, 121 (97.6%) of these participants reported a negative HIV serology result. Although 37 (29.8%) of these participants had previously been screened for cervical cancer, only 1 (0.8%) of them admitted to having been vaccinated against HPV. Among those who were screened before, only one person reported a prior positive result, and the lesion treated by excision.

Table 1 summarizes the characteristics of participants who completed the screening procedure.

As shown in Fig. 1, eight (6.5%) participants screened positive for the cervical squamous intraepithelial lesion. Seven (5.6%) of those screened positive had a low-grade lesion, and only 1 (0.8%) case was diagnosed as a high-grade lesion. Of those with a low-grade lesion, six were within 21 to 24 years of age. Of the 8 participants who screened positive, two were eligible for treatment. The first was a 38 years old with LSIL who met eligibility criteria for thermal coagulation, and the second was the lone HSIL case at 40 years of age who met eligibility criteria for LEEP. The case of HSIL underwent LEEP, and the sample sent for histopathology, which confirmed CIN 2. However, the LSIL case who was eligible for thermal coagulation did not consent for treatment. The only participant who previously screened positive and benefitted from excision therapy had a negative test result during this screening program. All cases screened positive were to be reviewed in 1 year.

Table 2 displays participants' results according to age group.

Table 1. Characteristics of participants who completed the screening (N=124)

Variables	Responses	Frequency (n)	Percentages (%)
Age group	21-30	50	40.3
	31-40	25	20.2
	41-50	29	23.4
	51-60	17	13.7
	61-65	3	2.4
Marital status	Married	45	36.3
	Single	72	58.1
	Divorced	3	2.4
	Widow	4	3.2
Educational level	Primary	14	11.3
	Secondary	31	25.0
	University	79	63.7
Parity	Multipara	46	37.1
	Nulliparara/Primipara	78	62.9
Age of first intercourse	<21 years	83	76.2
	>21 years	26	23.9
Multiple sexual partners in the last 5 years	Yes	61	49.2
	No	63	50.8
History of genital warts	Yes	25	20.2
	No	99	79.8
Reported HIV status	Negative	121	97.6
	Positive	3	2.4
Use of contraceptives	Yes	9	7.3
	No	115	92.7
Previous screening for cervical cancer	Yes	37	29.8
	No	87	70.2
Previously vaccinated for HPV	Yes	1	0.8
	No	123	99.2

Screening results and treatment modalities

Table 2. Screening results of participants

Age group, (Years)	VIA/VILI Results (N=124)			
	Negative (n=116)	Positive (n=8)		Total
		LSIL	HSIL	Frequency (%)
21-30	44	6	0	50 (40.3)
31-40	23	1	1	25 (20.2)
41-50	29	0	0	29 (23.4)
51-60	17	0	0	17 (13.7)
61-65	3	0	0	3 (2.4)

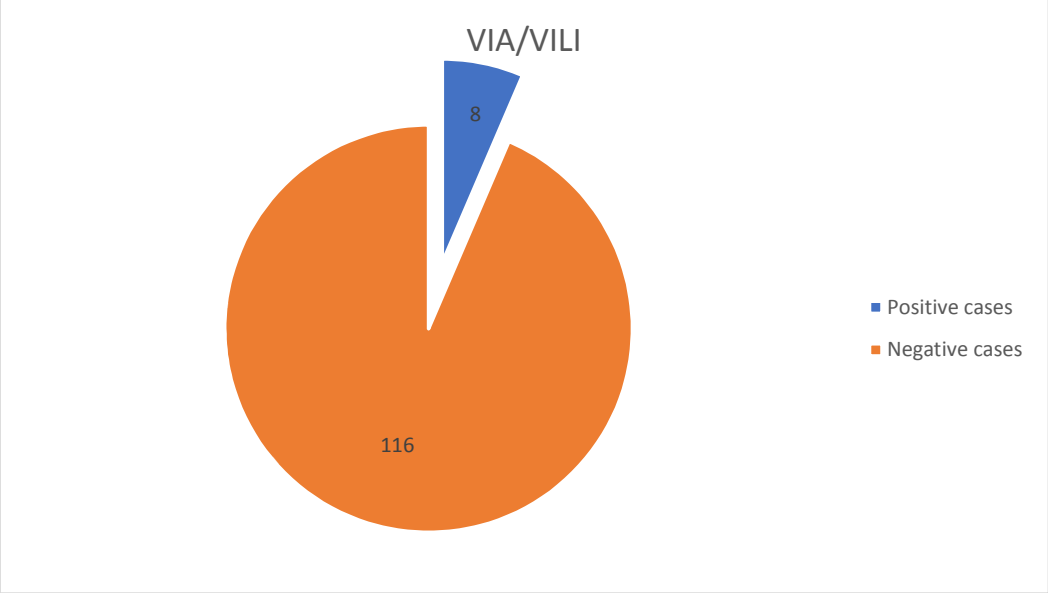

Fig. 1. Graphical display of the proportion of positive and negative cases

Table 3. Correlation between participants' characteristics and results of screening (N=124)

Characteristics		VIA/VILI positive	VIA/VILI negative	Odds ratio	Relative risk	P-value
Age	≤ 35 years	6	53	3.5660	3.3051	0.15
	≥ 36 years	2	63			
Age of first intercourse	< 21 years	4	79	0.4684	0.4940	0.44
	≥ 21 years	4	37			
Parity	Multipara	1	45			
	Nullipara/ primipara	7	71	0.2254	0.2422	0.26
Level of education	Primary/ secondary	4	41			
	University	4	75	1.8293	1.7556	0.46
History of genital warts	Yes	1	24	0.5476	0.5657	1.00
	No	7	92			
Multiple sexual partners < 5 years.	Yes	5	56	1.7857	1.7213	0.49
	No	3	60			
History of screening	Yes	2	35	0.7714	0.7838	1.00
		6	81			

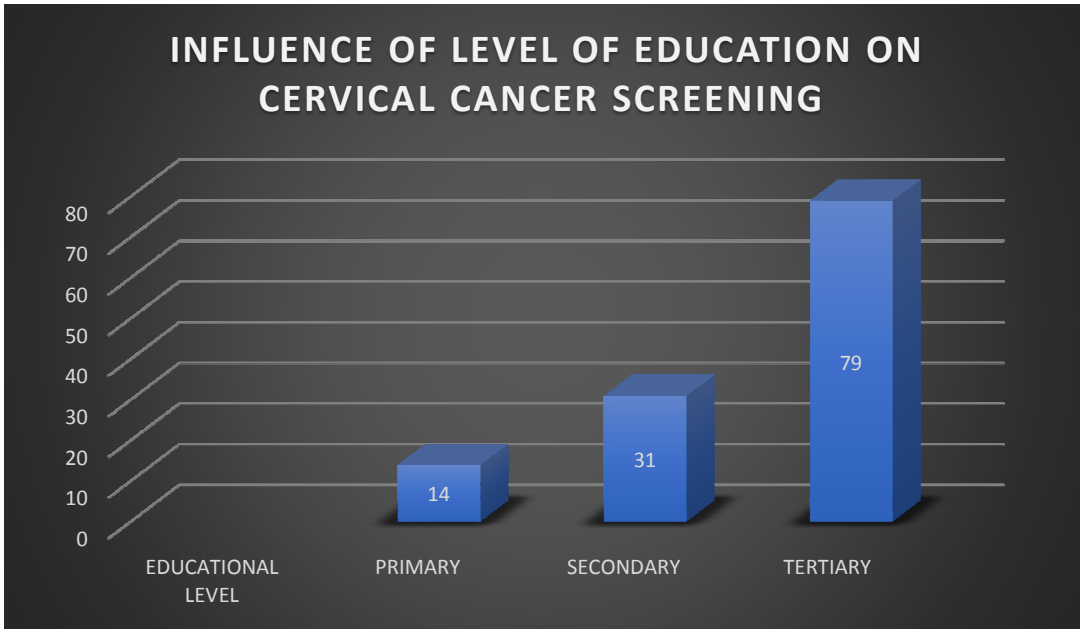

Fig. 2. Bar chart representing correlation between level of education and presentation for screening

3.2 Screening and Prevention Beliefs

Among those screened, 111 (89.5%) believed that cervical cancer is a preventable disease. The majority of 101 (81.5%) also believed that infection with HPV increases one's lifetime chance of developing cervical cancer. Also, 82 (66.1%) of these participants believed that there is a vaccine against HPV, which serves as the primary preventive method for cervical cancer.

3.3 Relationship between Participants' Characteristics and Screening Results

As shown in Table 3, bivariate analysis was used to assess the association between a positive screening result and participants' characteristics. Participants with age ≤ 35 years had the highest odds of being screened positive, with three times more risk than those above 35 years. However, this correlation was not statistically significant (P-value = 0.15). Higher odds of being screened positive was reported for those with multiple sexual partners in the last five years, and those who had only attained the primary or secondary level of education. Also, participants with a history of screening had a lesser chance of being screened positive (OR= 0.7714). Parity, history of genital warts, age of first intercourse < 21 years were not positively associated with a positive screening result in this study.

4. DISCUSSION

The mean age of those screened was 36.53 years. A similar mean age among participants was also reported by Horo et al. in Ivory Coast [22]. However, Tebeu et al. reported a higher mean age of 41.59 years in a study carried out in six regions in Cameroon [23]. This difference could be because they included only women who were at least 25 years of age. We had a screening uptake of 88.6% in this study, a similar level of screening uptake as also reported by Horo et al. in the Ivory Coast [22].

The prevalence of abnormal cervical lesion (dysplasia) was 6.5% in this study, and the majority of the positive cases were LSIL (5.6%). Eakin et al. reported a prevalence of 6.09%, with LSIL being 5.2% [24]. These similarities could be because these two studies were done in the same town. However, Abdul et al. in Nigeria and Kafuruki et al. in Tanzania reported a prevalence of abnormal cervical lesions of 14% and 26.8%, respectively [25,1]. This higher prevalence could be because these studies were carried-out among chronic pelvic inflammatory disease and HIV patients, respectively. In this study, one out of two showed up for treatment which was lower than the uptake of 100% obtained by Eakin et al. [24] This discrepancy could result from the fact that almost all of their participants had

attained university level of education, hence has a better understanding of the need for treatment if found positive.

Almost 90% of our participants believe that cervical cancer is a preventable disease, but only 29.8% had been screened for cervical cancer. Similar patterns of low screening uptake despite increased awareness that cervical cancer is a preventable disease was reported in other low-income countries [26]. Over 65% of these participants' belief that there is a vaccine against HPV, but just one person had been vaccinated. A meager rate of vaccination against HPV was also reported in neighboring Nigeria [27]. This could be due to the unavailability and affordability of this vaccine among this population. There is, therefore, the need for free vaccination campaigns and prevention programs in order to increase the uptake of HPV vaccines.

With regards to participants' characteristics which could predispose them to a positive result, age <35 years had a higher probability of being screened positive though this was not statistically significant. This confirms with current literature, which states that the peak incidence of cervical dysplasia is within 25 to 35 years. This was, however, contrary to findings by Tebeu et al., and Avidime et al. who reported a higher incidence of dysplasia among those with age > 30 years [23,28]. Also, participants who had only attained a primary or secondary level of education had a higher chance of being screened positive, though this difference was not statistically significant. DeGregorio et al. also reported that participants with a low educational status had a higher probability of being screened positive of precancerous lesions [9]. This aligns with previous literature, stating that low educational status increases vulnerability to poor sexual practices and consequently increases exposure to HPV infection. Having multiple sexual partners within the last five years was also found to increases the possibility of being screened positive. Similar findings were also reported in another study in East and Central Africa [1,29].

More so, the age of initiation of coitus < 21 years was not positively related to being screen positive for a precancerous lesion in this study. Similar findings were reported by Abdul et al. in 2009 in Nigeria [25]. On the contrary, DeGregorio et al. found out that, early age of sexual debut was associated with positive VIA results [12]. This discrepancy could be because they carried-out a retrospective study involving over forty-six thousand participants. Lastly, participants with a previous history of screening showed lesser chances of being screened VIA/VILI positive during subsequent screenings, hence, re-enforcing on the need for regular cervical cancer screenings following standard guidelines.

5. CONCLUSION

The prevalence of cervical dysplastic lesions in this study was 6.5%. Most of those who screened positive were less than 35 years of age. Uptake of vaccination, screening, and treatment practices are still low despite increased awareness that cervical cancer is preventable.

Participants with multiple sexual partners and those with a low level of education were more likely to be screened positive for dysplasia.

Single-day screening and treatment clinic could serve as an essential step in improving cervical cancer screening and enhance prevention in most low-income countries, before the implementation of an effective nationwide screening program.

We recommend larger-scale studies to confirm the tendencies observed in this study.

CONSENT AND ETHICAL APPROVAL

The ethical clearance was given by the Department of Obstetrics and Gynecology of the University of Buea. Administrative clearance was obtained from the regional delegation of public health Buea.

Upon arrival, potential participants were informed about the screening procedure before they were allowed to sign a consent form and enroll for the screening.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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