

Cervical cancer screening in Doukoula- the far north region of Cameroon

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Abstract

With a morbidity of 600,000 cases and 375,000 lethal cases per year, cervical cancer (CC) is the second most prevalent gynecological cancer all over the world. Because of the absence of a widespread preventative campaign, CC has a significant impact in developing countries. An acceptable, efficient, and cost-effective screening technique in low-income nations is the visual inspection of the cervix with acetic acid and Lugol's iodine. By conducting a CC screening exercise in Doukoula, we hope to ignite the culture of CC screening campaigns in the Kar-Hay health district in the extreme north of Cameroon.

Methods: Doukoula District Hospital hosted a one-week CC screening and treatment exercise from the 3rd of November 2021 to the 9th of November 2021. Treatments for dysplastic lesions included thermal coagulation and LEEP. To improve cervix visibility, a MobileODT colposcopic gadget was used.

Results: 306 women in all agreed to take part in the study. A screening uptake of 82% was achieved, with 251 of them completing the process. 7 (2.8%) declared being HIV positive. The mean age of this study was 37.33. We had 31 cases of dysplasia (12.75%) and 1 case of cervical cancer (0.4%). Out of 251 participants, only 3 (1.2%) had undergone CC screening, and just one had received an HPV vaccination in the past. Five CIN-1 cases, aged 25 years and below, did not receive any treatment. The 11 cases of CIN 1 aged over 25 years and the 13 CIN 2 cases were eligible for thermotherapy. The two CIN-3 cases had a LEEP, and a sample was taken for pathology analysis. 20 presented themselves for treatment. The total uptake for treatment was 76.72%.

Conclusion: Despite growing recognition that cervical cancer is a disease that can be prevented, relatively little is being done to increase vaccine, screening, and treatment rates. While waiting for the development of efficient national screening systems, the use of a “see and treat” screening strategy is a reasonable method of approach for the prevention of CC in low-income countries.

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Keywords: Cervical Cancer; Screening; Visual Inspection with Acetic Acid and Lugol's Iodine; Thermal Coagulation; LEEP; Doukoula.

1. Introduction

In low-income nations, cervical cancer is the second most frequent and fatal gynecological cancer, placing it as a global health burden [1]. It is estimated that 375,000 cases of cervical cancer die each year, with the global incidence of the disease estimated to be 600,000 [1, 2]. Although cervical cancer is a disease that can be prevented, over 6 million sexually active women in Cameroon are at risk of having it. There are 2770 new instances of cervical cancer reported each year, and more than 55% of these cases result in death [3, 4].

Pre-cancer lesions, or cervical dysplasia, are aberrant precursor cells that can eventually develop into true cervical cancer [5]. Precancerous lesions mostly appear between the ages of 31 and 40, plateau between the ages of 41 and 50, and peak between 51 and 60 years [2, 6].

Early detection can successfully treat the majority of these dysplastic cells, preventing the development of invasive cervical cancer [7]. Cervical pre-cancer lesions are thought to be mostly caused by the Human Papilloma Virus (HPV) [7]. About 99.7% of cervical cancer (CC) cases are caused by the Human Papilloma Virus (HPV). There are about 100 species of HPV. Only types 6, 11, 16, 18, 31, 33, 45, 52, and 58 are responsible for malignant transformation of the cervix. The other types can cause genital warts [8, 9].

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Despite the existence of an HPV vaccine, Cameroon and the majority of other low-income nations still have very limited access to it, cannot afford it, or, lastly, vaccination hesitancy could manifest itself [9, 10].

The American College of Obstetricians and Gynecologists advises starting the first cervical dysplasia screening at age 21, regardless of the age at which sexual activity is initiated or other behavioral risk factors [11]. Nevertheless, in low-income nations, less than 19% of women have undergone screening [12]. Most healthcare facilities in Cameroon do not frequently perform cervical cancer screenings, and the government has not yet put in place a comprehensive screening program [13].

The cost of screening, the lack of information about screening options, and the perception that the screening procedure is uncomfortable have all been listed as contributing factors to the poor uptake of cervical cancer screening in Cameroon [14].

According to reports, visual examination of the cervix with acetic acid (VIA) is a reliable and inexpensive screening technique that can be used in conjunction with easy cures for early cervical lesions [15]. Utilizing this screening method is necessary because it has been shown to reduce a woman's lifetime risk of acquiring invasive cervical cancer by 26% [16] after just one VIA screening between the ages of 30 and 49 years. The uptake and coverage of cervical cancer screening may also be increased by expanding the use of visual inspection with acetic acid and Lugol's iodine (VIA/VILI) with trained people [17]. To initiate cervical cancer screening in the Doukoula district hospital, we organized a free one-week cervical cancer screening campaign using the VIA/VILI technique and with the aid of a MobileODT colposcopic device to improve the visualization of positive lesions [18]. This screening program is one of several initiatives needed to launch a cervical cancer clinic at the Doukoula district hospital.

The goal of this program is to reduce mortality through early detection and treatment of cervical dysplastic lesions by trained local healthcare professionals.

2. Method, Setting, and Design of the Study

Doukola is the sub-divisional headquarters of the Kar-Hay subdivision, situated in the Mayo-Danay division in the extreme north of Cameroon. The population of Kar-Hay is 42,963 inhabitants, according to the 2005 census. Doukoula has a population of 26,624. The government-owned Kar-Hay district hospital is a first-level category hospital with a capacity of 50 beds. It is the referral hospital for that sub-division. The workforce is made up of 2 medical doctors, 5 state-registered nurses, 7 nurse-aides, 3 laboratory technicians, and 5 complementary workers [19].

This screening campaign was organized under the supervision of an accredited ASCCP obstetrician-gynecologist (OBGYN). Also, present were another OBGYN, one general practitioner, and six nurses. Our objective was to train local personnel to continue this activity.

During this cervical cancer screening clinic, this health facility served as the screening location. The director of the Kar-Hay Hospital and the Atlantic Medical Foundation gave, respectively, administrative and ethical permission for this screening campaign.

2.1. Study Population and Methodology

The campaign was carried out through social media, town criers, traditional chiefs, health unit heads, quarter heads, churches, and mosques. All women who were at least 21 years old were invited to this screening.

Pregnancy, a prior history of a total hysterectomy, menstruation, and women older than 65 were our exclusion criteria. Before being allowed to sign a consent form and sign up for the test, prospective participants were briefed about the screening process when they arrived. They were also informed that they could revoke their agreement at any time during the screening procedure. Data on demographics, gynecological and obstetrical history, and awareness of and prior exposure to cervical cancer risk factors were gathered using a data collection sheet before the screening. We had two screening stations, each headed by an obstetrician-gynecologist.

These screening stations were under the control of an ASCCP-trained colposcopist. Before inserting a sterile plastic speculum into the vagina to allow clear visualization of the cervix and the transformation zone, the ladies were placed in a lithotomy position on an examination bed, and the external genitalia were first examined. After one minute, both the cervix and the MobileODT colposcopic device were used to observe the effects of a freshly made 5% acetic acid that was applied to the cervix. The WHO/IARC practical manual on visual screening for cervical neoplasia was used to categorize the results as either negative or positive [20]. All VIA-positive cases had preliminary pictures taken before Lugol's iodine was applied. Before starting treatment, all VIA-positive subjects had their VILI results confirmed.

Negative, low, and high-grade squamous intraepithelial lesions (HSIL) and features suggestive of malignancy were the results that were given. All HSIL patients received Loop Electrical Excision Procedure (LEEP) treatment, and biopsy samples were sent for histopathology analysis. According to the most recent WHO eligibility recommendations, all individuals with an LSIL and an age under 25 were qualified for thermal coagulation [21]. According to the WHO/IARC beginning guideline [22], participants with LSIL who were younger than 25 years old were not eligible for any form of treatment but were required to undergo another evaluation after a year [23]. All negative cases were given the option of rescreening in three years. All cases where malignancy was suspected had to have a biopsy. After the screening procedure, each participant received their test results, directions for further follow-up, and the next screening date.

3. Results

3.1. Participants' Personalities

A total of 303 women agreed to take part in this screening program. 52 ladies, however, later withdrew their consent and decided not to go through the screening process. A screening uptake of 83% was achieved, with 251 participants in total who completed the process. Of the individuals who chose to participate in this screening exercise, 24.7% had no formal education, and 47.01% had primary education, giving a total of 71.71% of participants whose highest educational level is primary school.

The average age of individuals who participated in the screening was 37.33, with up to 106 (42%) of them falling within the 21–30 age range. 174 (69.32%) were married, and 244 (97.21%) of these subjects reported having negative HIV serology results. Only 3 (1.2%) candidates had previously undergone cervical cancer screening in the past, and 1 (0.4%) had received the HPV vaccine.

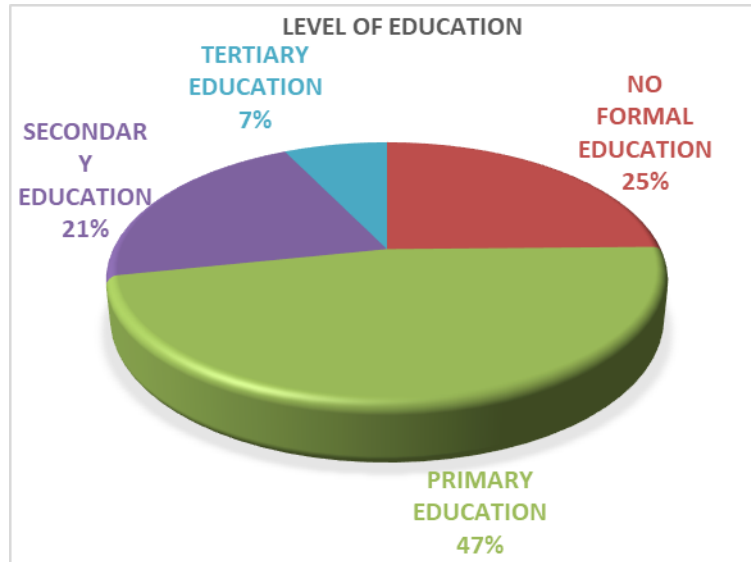


Figure 1 Level of education

25% of participants had never been to school, and 47% ended their education at the primary school level. Just 7% had attended the tertiary level.

3.2. screening outcomes and therapeutic approaches.

Table 1 Distribution of warts, precancerous, and cancerous lesions according to age group

AGE GROUP	WARTS	CIN 1	CIN 2	CIN 3	CC
<20 YRS					
21-30	9	4			
31-40	8	6	4		
41-50		3	5	1	
51-60	1	2	4	1	
61-70	1	1			1

The majority of cases of precancerous lesions occurred in the 31–40 age group. The lone CC case occurred in the age group of 61–70 years.

32 subjects (12.75%) tested positive for cervical squamous intraepithelial lesions, as seen in Figure 1. Only two (0.80%) participants of those who tested positive had a high grade, while 30 (12%) had low-grade lesions. Of those with low-grade lesions, five were inferior or equal to 25 years. They received no treatment and were asked to report a year later for control. The rest of the low-grade lesions that met the treatment criteria (24 in total) received thermal coagulation therapy. The two HSIL cases were qualified for LEEP, and the sample was sent for histology analysis.

The three cases that had had a previous CC screening were still reported as negative.

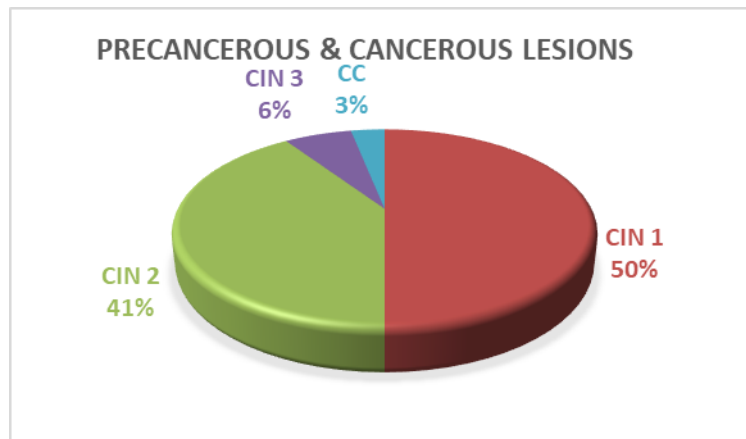


Figure 2 Precancerous and cancerous lesions

3.3. Preventive and screening attitudes

Table 2 The traits of the participants who completed the screening process

Question	Answer	Number	Percentage
Is CC preventable?	No idea	175	69.72
	true	69	27.50
	false	4	1.60
Does HPV increase the chances of CC?	No idea	199	79.28
	true	38	15.13
	false	13	5.17
HPV vaccine exists?	No idea	185	73.70
	true	59	23.50
	false	6	2.40
HPV's main cause of CC?	No idea	186	74.10
	true	56	22.31
	false	6	2.40

Those who had no idea if CC was preventable and those who thought CC was not preventable represented, respectively, 69.72% for 175 persons and 1.6% for 4 persons. This gave a total of 71.32%, representing people who did not know that CC is preventable.

199 (79.28%) people had no idea if contact with HPV increased the chances of developing CC. 13 (5.18%) outright refused that HPV increased the chances of developing CC. The total of these two groups was 212 (84.46%) who did not know HPV was the pathogen in CC.

185 people (73.70%) had no idea of a vaccine against HPV. 6 (2.4%) denied the existence of a vaccine. So, 76.1% of participants were ignorant of the fact that vaccination can prevent CC.

186 (74.1%) participants had no idea about HPV being the main cause of CC. 6 (2.4%) denied HPV being the main cause of the disease. A total of 76.5% of participants did not know HPV was the main cause of CC.

4. Discussion

The average age of the individuals that were screened was 36.53. Horo et al. in Ivory Coast showed a similar mean age for participants, 37.33 [23]. In contrast, Tebeu et al. observed a higher mean age of 41.59 years in a Cameroonian study conducted in six districts [24]. The fact that they only included women who were at least 25 years old may be the cause of this discrepancy. In their study on Ivory Cost, Horo et al. had an uptake of 88.6% [23]. The screening uptake in this study was 82%. The fact that we were in a rural environment where CC screening was being conducted for the first time and some degree of shyness among the participants could explain this difference.

In this study, the prevalence of cervical intra-epithelial neoplasia (CIN) was 12.5%. This figure is twice as high compared to what this same author usually finds in Buea, 6.5%, in the southwest region of Cameroon [25]. This remarkable discrepancy could be explained by the fact that yearly screening campaigns have been organized in Buea for close to a decade now. However, the incidence rate of CC in Doukola is similar to that reported by Globocan, as the national incidence in Cameroon is 13.4%, and this figure is almost similar to those reported in a sister community across the border in Nigeria, 14% by Abdul et al. Kafuruki et al. report a higher incidence of 26.8% in Tanzania [1]. It is worth noting that the Kafuruki study was conducted on patients with HIV and chronic pelvic inflammatory disease. The total incidence of dysplastic lesions was 12.75%. CIN 1, CIN 2, and CIN 3 represented, respectively, 6.4% (n = 16), 5.2% (n = 13), and 0.8% (n = 2). A case of cervical cancer (a clinical diagnosis) was found. Genital warts had an incidence of 7.6% (n = 19).

For the positive cases identified in this study, 24 had thermocoagulation, and 2 had LEEP. Five people aged 25 years or younger had no treatment. They were asked to report a year later for control.

Abnormal results were classified as CIN 1, 16 (6.37%), CIN 2, 13 (5.17%), and CIN 3, 2 (0.79%). According to Eakin et al., the prevalence of dysplastic lesions among the university-based population was 6.09%, with CIN 1 at 5.2% [26].

For those who were eligible for treatment after excluding the 5 cases aged from 25 downward, 21 showed up for treatment, which gave an uptake of 80.76%. The two cases eligible for LEEP presented themselves.

69 (27.5%) of the participants in our study believed that cervical cancer could be avoided, yet only 3 (1.2%) had undergone a cervical cancer screening. Despite more awareness that cervical cancer is a preventable disease, other low-income nations observed similar trends of low screening uptake [27]. More than 23.5% of the participants thought there was an HPV vaccine, but only one individual had received it. In the neighboring nation of Nigeria, there was also reported to be a very low HPV vaccination rate [28]. One of the following can account for this: lack of sensitization, accessibility, acceptability, affordability, and hesitancy. Therefore, to enhance the uptake of HPV vaccines, there is a need for sensitization, free vaccination campaigns, and preventative programs.

Cervical dysplasia spikes between 31 and 40 years and plateaus at 41–50 years. This is in agreement with the research by Tebeu et al. and Avidime et al., who found that people beyond the age of 30 had a higher incidence of dysplasia [24, 29]. Neh Fru and Tassang Andrew, DeGregorio et al. noted that participants with lower educational levels were more likely to test positive for precancerous lesions [13, 30]. This is consistent with other research, which claims that having a low level of education makes the person ignorant of protective measures and, as a result, increases their risk of contracting HPV. It was also found that having several sexual partners during the previous five years increased the likelihood of screening positively. Another study in East Africa revealed similar results [1].

According to DeGregorio GA et al., those who had previously undergone screening showed lower odds of testing VIA/VILI positive after repeated screens, reinforcing the necessity of routine cervical cancer screenings following established standards (13).

5. Conclusion

In this study, cervical dysplastic lesions have an incidence of 12.75%. The majority of people who tested positive belong to the age group of 31–40 years. Despite increasing awareness that cervical cancer is avoidable, vaccination, screening, and treatment techniques are still not widely used.

Before a successful national screening program is put into place, "see and treat" screening and treatment clinics could play a significant role in enhancing cervical cancer prevention and screening in the majority of low-income nations.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest is to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

Reference

- [1] Kafuruki L, Rambau PF, Massinde A, and Masalu N. Prevalence and predictors of Cervical Intraepithelial Neoplasia among HIV-infected women at Bugando Medical Centre, Mwanza, Tanzania. *Infect Agent Cancer*. 2013;8:45.
- [2] Tassang Andrew et al., A Kaleidoscope of Pap Smear Results for Cervical Cancer Screening at the Buea Regional Hospital- Cameroon. *IQRJ*: Volume 002, Issue 3, March 2023
- [3] Cameroon: Human Papillomavirus and Related Diseases, Summary Report 2015 - CMR.pdf. [cited 2020 Feb 10]. Available from: <http://www.hpvcentre.net/statistics/reports/CMR.pdf>
- [4] Globocan 2020. Cameroon-fact-sheets. <https://gco.iarc.fr/today/data/factsheets/populations/900-world-fact-sheets.pdf>
- [5] Enow-Orock G, Mbu R, Ngowe NM, Tabung FK, Mboudou E, Ndom P, et al. Gynecological cancer profile in the Yaounde population, Cameroon. *Clin Mother Child Health*. 2006;3(1):437–44.
- [6] Dunn TS, Bajaj JE, Stamm CA, and Beaty B. Management of the Minimally Abnormal Papanicolaou Smear in Pregnancy. *J Low Genit Tract Dis*. 2001;5(3):133–7.
- [7] Cervical dysplasia. University of Maryland Medical Center. 2015. Available from: <https://umm.edu/health/medical/altmed/condition/cervical-dysplasia> Cervical dysplasia. University of Maryland Medical Center. 2015. Available from: <https://umm.edu/health/medical/altmed/condition/cervical-dysplasia>
- [8] Finocchiaro Kessler S, Wexler C, Maloba M, Mabachi N, Ndikum Mofor F, Bukusi E. "Cervical cancer prevention and treatment research in Africa: A systematic review from a public health perspective." *BMC Women's Health*, 2016.
- [9] Celestina Neh Fru and Andrew Tassang. Vaccination Hesitancy: The Case of Cervical Cancer Vaccination in Fako Division, Cameroon. *International Journal of Tropical Diseases and Health* .15 June 2021.
- [10] Ogembo J, Manga S, Nulah K, Foglabenchi L, Perlman S, Wamai R, et al. Achieving high uptake of human papillomavirus vaccine in Cameroon: Lessons learned in overcoming challenges - ScienceDirect. [cited 2020 Feb 14]. Available from: <https://www.sciencedirect.com/science/article/pii/S0264410X14008652>
- [11] Randel A. ACOG Releases Guidelines on Cervical Cancer Screening. *Am Fam Physician*. 2013;88(11):776–7.
- [12] Gakidou E, Nordhagen S, Obermeyer Z. Coverage of Cervical Cancer Screening in 57 Countries: Low Average Levels and Large Inequalities. *PLOS Med*. 2008;5(6):e132.
- [13] DeGregorio GA, Bradford LS, Manga S, Tih PM, Wamai R, Ogembo R, et al. Prevalence, Predictors, and Same Day Treatment of Positive VIA Enhanced by Digital Cervicography and Histopathology Results in a Cervical Cancer Prevention Program in Cameroon. *PLOS ONE*. 2016;11(6):e0157319.

- [14] Halle-Ekane GE, Nembulefack DK, Orock GE, Fon PN, Tazinya AA, Tebeu PM. Knowledge of Cervical Cancer and Its Risk Factors, Attitudes, and Practices towards Pap Smear Screening among Students at the University of Buea, Cameroon. *J Cancer Tumor Int.* 2018;1–11.
- [15] ACCP_screening_factsheet_2009.pdf. [cited 2020 Feb 16]. Available from: https://www.paho.org/hq/dmdocuments/2011/ACCP_screening_factsheet_2009.pdf
- [16] Goldie SJ, Kuhn L, Denny L, Pollack A, Wright TC. Policy Analysis of Cervical Cancer Screening Strategies in Low-Resource Settings: Clinical Benefits and Cost-effectiveness. *JAMA.* 2001;285(24):3107–15.
- [17] Poli UR, Bidinger PD, Gowrishankar S. Visual Inspection with Acetic Acid (VIA) Screening Program: 7 Years Experience in Early Detection of Cervical Cancer and Pre-Cancers in Rural South India. *Indian J Community Med Off Publ Indian Assoc Prev Soc Med.* 2015;40(3):203–7.
- [18] MobileODT | The Smart Mobile Colposcope. MobileODT. [cited 2020 Feb 16]. Available from: <https://www.mobileodt.com>
- [19] <https://www.city-facts.com>>doukoula
- [20] Sankaranarayanan R, Wesley RS, International Agency for Research on Cancer. A practical manual on visual screening for cervical neoplasia. Lyon: International Agency for Research on Cancer, World Health Organization; 2003.
- [21] WHO | Comprehensive cervical cancer control. WHO. [cited 2020 Feb 14]. Available from: <http://www.who.int/reproductivehealth/publications/cancers/cervical-cancer-guide/en/>
- [22] Colposcopy and treatment of cervical intraepithelial neoplasia: a beginners' manual. [cited 2020 Feb 16]. Available from: <https://screening.iarc.fr/colpochap.php?lang=1&chap=11.php>
- [23] Horo AG, Didi-Kouko Coulibaly J, Koffi A, Tchounga B, Seni K, Aka KE, et al. Cervical Cancer Screening Program by Visual Inspection: Acceptability and Feasibility in Health Insurance Companies. *Obstet Gynecol Int.* 2015;2015:1–4.
- [24] Tebeu P, Sando Z, Ndoumba A, Sandjong I, Mawech-Fauceglia P, Doh AS. Prevalence and Geographical Distribution of Precancerous Lesions of the Uterine Cervix in Cameroon. *J Cytol Histol.* 2013 [cited 2020 Feb 16];2013. Available from: http://www.omicsonline.org/cytology-histology-abstract.php?abstract_id=19109
- [25] Tassang Andrew et al. Cervical Cancer Screening in a Low-Resource Setting: Buea-Cameroon. *International Research Journal of Oncology.* 28 September 2020
- [26] Eakin C, Ekollo R, Nembulefack D, Halle-Ekane G, Tangui G, Brady R, et al. Cervical Cancer Screening Beliefs and Prevalence of LSIL/HSIL Among a University-Based Population in Cameroon. *J Low Genit Tract Dis.* 2018;22(4):274–279.
- [27] Pengpid S, Peltzer K. Attitudes and Practice of Cervical Cancer Screening among Female University Students from 25 Low, Middle Income and Emerging Economy Countries. *Asian Pac J Cancer Prev APJCP.* 2014;15:7235–9.
- [28] Wright KO, Aiyedehin O, Akinyinka MR, Ilozumba O. Cervical Cancer: Community Perception and Preventive Practices in an Urban Neighborhood of Lagos (Nigeria). *Int Sch Res Not.* 2014;2014:e950534.
- [29] Avidime S, Ahmed S, Oguntayo A, Abu T, Ndako J. Pattern of cervical dysplasia among women of reproductive age in Zaria, Northern Nigeria. *ResearchGate.* 2014 [cited 2020 Feb 20]. Available from: https://www.researchgate.net/publication/265085786_Pattern_of_cervical_dysplasia_among_women_of_reproductive_age_in_Zaria_Northern_Nigeria
- [30] Neh Fru and Tassang Andrew. Determinants of Awareness and Knowledge on Cervical Cancer among Women in Buea- Cameroon. *International Journal of Research and Reports in Gynaecology.* 26th October 2020.