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**Original Article**

# Factors Associated with Cervical Cancer Screening and Prevalence of Premalignant Cervical Lesions in a Rural Setting in Cameroon: a Cross-Sectional Analytical Study

## *Facteurs Associés au Dépistage du Cancer du Col Utérin et Prévalence des Lésions Précanceréuses en Milieu Rural au Cameroun : Une Étude Analytique Transversale*

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**Mots-clés :** cancer du col de l'utérus, lésions précancéreuses, dépistage, facteurs, connaissance, Cameroun rural

## ABSTRACT

**Introduction**. Despite being preventable through vaccination against Human Papilloma virus and screening, cervical cancer still presents with a high burden in low- and middle-income countries. The aim of this study was to determine factors associated with cervical cancer screening and prevalence of cervical premalignant lesions in a rural community in Cameroon. **Methods.** Community-based cross-sectional study using secondary data collected in a health campaign to create awareness and offer free screening to the population. Sociodemographic data, data on knowledge of prevention of cervical cancer, and past history of screening were collected. The R software version 4.2.2. was used for statistical analysis. **Results.** A total of 476 participants were enrolled. Over 32% of the population had heard of cervical cancer, 12.8% had heard of HPV infection, 7.1% knew a vaccine exists, 27.5% knew of screening, and 23.5% had heard of early treatment of lesions. Previous health education on cervical cancer *(aOR:230, 95% CI: 55-969, p<0.0001)*, attending a cervical cancer screening health campaign *(aOR: 23, 95% CI: 2.15-246, p= 0.009)*, were significantly associated with cervical cancer screening. **Conclusion.** Cervical cancer screening in the rural area relies largely on opportunistic screening provided during health campaigns. Free health campaigns could therefore be a very useful strategy to improve awareness and the rate of screening for cervical cancer in rural communities.

## RÉSUMÉ

**Introduction.** Le cancer du col de l'utérus (CCU) est évitable grâce à la vaccination contre l'HPV et au dépistage. Notre but était de déterminer les facteurs associés au dépistage et la prévalence des lésions précancéreuses dans une communauté rurale. **Matériels et méthodes.** Nous avons mené une étude transversale communautaire utilisant des données secondaires collectées lors d'une campagne de santé gratuite pour sensibilisation et dépistage. Des données sociodémographiques, sur les connaissances en matière de prévention du CCU, et des antécédents de dépistage ont été collectées. Le logiciel R a été utilisé pour l'analyse statistique. **Résultats.** Au total, 476 participants ont été inscrits. Plus de 32 % de la population avait entendu parler du CCU, 12,8 % avaient entendu parler de l'infection par l'HPV, 7,1 % savaient qu'un vaccin existe, 27,5 % connaissaient le dépistage et 23,5 % avaient entendu parler du traitement précoce des lésions. Une éducation sanitaire antérieure sur le CCU (aOR : 230, IC à 95 % : 55-969, p<0,0001), une participation à une campagne de dépistage du CCU (aOR : 23, IC à 95 % : 2,15-246, p= 0,009), étaient significativement associée au dépistage du CCU. **Conclusion.** Le dépistage du CCU dans la zone rurale repose en grande partie sur le dépistage opportuniste proposé lors des campagnes sanitaires. Des campagnes de santé gratuites pourraient donc constituer une stratégie utile pour améliorer la sensibilisation et le taux de dépistage dans les communautés rurales.

**HIGHLIGHTS OF THE STUDY**

**What is known**

Cervical cancer screening rate is low in low- and middle-income countries, especially among those with low education level, unemployed, lack of knowledge of cervical cancer, etc.

**What questions this study addressed**

The factors associated with cervical cancer screening in rural areas and the prevalence of cervical precancerous lesions?

**What this study brings**

1. Previous health education on cervical cancer and attending a cervical cancer screening health campaign were significantly associated with cervical cancer screening.
2. The prevalence of premalignant lesion was 3.57%.

**How this is relevant to practice, policy or further research.**

Districts could organize routine free health campaigns as part of their outreach programs to educate and screened the population for cervical cancer.

## INTRODUCTION

Cervical cancer is the second most common gynecological cancer after breast cancer worldwide. In 2020, 604,127 new cases and 341,831 deaths from cervical cancer with highest incidence and mortality rates found in sub-Saharan Africa (1). It is estimated that by 2030, there will be 700,000 new cases and 400,000 deaths (2) hence the World Health Organization (WHO) plans to eliminate cervical cancer by 2030 with targets of 90% of girls vaccinated at age 15, 70% of women screened at the age of 35 and again at 45, and 90% of women with pre-cancer lesion or invasive cancer managed (2).

Cervical cancer can be prevented through various strategies including the use of the HPV vaccine and early screening(3–6). These strategies are not readily distributed nor implemented in low- and medium-income countries (7)(8). Recommended screening methods for cervical cancer by WHO includes visual inspection with acetic acid in low-resource settings, a Papanicolaou test (cervical cytology) every 3 to 5 years, or HPV testing every 5 years (9,10).

In Cameroon, all 3 screening methods are available although distributed inequitably. Papanicolaou test (pap smear) is available only in centers that have a pathologist (mostly cities) and is not feasible in rural Cameroon due to high cost, poor quality, and need for technical expertise(11). HPV testing is done in very few hospitals and laboratories and is also relatively expensive. Visual inspection test is more distributed and done in many district hospitals. It is cheaper, requires less technical know-how and suitable for mass screening programs. However, screening for gynecological malignancies is still very low with only 17.5% of those with gynecological malignancies with prior screening (12). Most women are thus diagnosed with advanced stage cervical cancer for which radiotherapy is but it expensive and not accessible to the average Cameroonian (13).

Several factors hinder cervical cancer screening. In a Cameroonian study, over 68% of the study population did not do screening because of ignorance and only 39% had heard about cervical cancer (14). Low education level, unemployment, insufficient knowledge, and unfavorable attitude are reported barriers to screening (15). Women with low socioeconomic status rarely do screening and present with cancers at advanced stages (12). Women in rural areas could therefore lack motivation for screening. Our aim was thus to determine factors associated with cervical cancer screening and prevalence of premalignant lesions in a rural area through a cross sectional survey.

## METHODS

### Study design and Population

This was a community-based cross-sectional study using secondary data (retrospective) that was collected in August 2017, in the Bambalang Health area (BHA), a rural area in the North West region of Cameroon (16). This study made used of secondary data collected in a free cervical cancer screening health campaign which was provided by the Bambalang Subdivisional Hospital to create awareness, and offer screening to the Bambalang population. The BHA is found in the Ndop Health District with an estimated population of 20,863 in 2005(16). It is located between latitude 50°47' and 50°55'N and longitude 10°26' and 10°37'E and is found south-east of Ndop, the divisional capital of the Ngoketunjia Division, North West region. The Bambalang people are referred to as the Mbaw-Yakum and believed to have migrated from the Tikari tribe in Northern Nigeria passing through Ndobo in the Adamawa region of Cameroon(16). The Bambalang language is the main language but pidgin English is commonly spoken to non-natives. Corn-fufu and fish is the main food. Farming and fishing are the main activities. The construction of a dam, the Bamendjin dam, in 1974 saw most of the land of Bambalang occupied by water making it somehow partially surrounded and creating a very profitable fishing opportunity. The availability of data in the health facility on the health campaign with the fact that Bambalang is a rural population with little movements of its population at the time of data collection were the criteria of selection of the Bambalang health area for the study.

### Sampling method and population

A consecutive and exhaustive sampling was used. Our target population was rural women in Cameroon and parent population was women in Bambalang. Our study population was women in Bambalang aged at least 25years, and who had given their consent. See figure 1.

### Sample Size

Sample size was calculated using the Lorentz formula, $n = (Z^2pq)/e^2$ where Z=1.96, p = 50% (proportion of screened participants), e = 0.05 (desired significance); n = 384.

### Data collection and study variables

Data was extracted from the health campaign register of the Bambalang Hospital into preestablished excel data entry sheets. Data was extracted for the following variables; outcome variable: previous screening for

cervical; explanatory variables: age, marital status, level of education, age of coitarche, use of contraceptives, previous health education on cervical cancer, source of health education, knowledge on cervical cancer prevention, number of previous screening tests and type of test, and result of visual inspection test. The health campaign for which we used the data was done in August 2017 at the Bambalang Public Hospital. Administrative authorization had been obtained from the Divisional Officer of Ndop central subdivision through the District Chief of service of Public Health for Ndop Health District. The health campaign was offered freely to the population. Prior to the campaign, community members were informed of the importance and period during which the campaign will run through local radio station and interpersonal communication by community social mobilizers. Community social mobilizers were taken from each quarter of Bambalang, and they went around their respective quarters, and to farms with a megaphone for three consecutive days to sensitize the public. Participants were invited to the Bambalang public hospital to meet the health team which consisted of health personnel who had been trained on Visual Inspection techniques and senior Gynecological and obstetrical residents of the faculty of Biomedical sciences of the university of Yaoundé 1. The health team provided a health talk and conducted the screening while using a register to document all participants who were screened. To reduce bias and increase validity, results were read by two team members and where there was discrepancy, a third opinion was sought. Participants with positive visual inspection tests were then offered a cervical biopsy which was sent for pathological interpretation and the results communicated with the hospital team for further management. Those who had positive pathological results were all referred to a gynecologist and followed up for appropriate management.

### Statistical analysis

All data collected data was entered into a Microsoft excel spreadsheet and checked for obvious inconsistencies. The data was then imported into R software version 4.2.2 for analysis. Frequency tables were used to described the socio-demographic and Gyneco-obstetrical characteristics, and knowledge on cervical cancer of the study population. Bivariate analysis was done to determine association between independent variables and screening for cervical cancer using Chi square or Fischer Exact tests. A multivariate analysis was then done to control for confounding. Statistical significance was set at $p < 0.05$ and 95% confidence interval.

### Ethical consideration

Ethical approval was obtained from the North West Regional institutional review board. Consent was not sort since our study was on secondary data. However, Confidentiality was ensured by using codes to replace names and omitting phone numbers in the data entry sheet.

## RESULTS

### Description of study population

The mean age of our study population was 42.0±11.9 and the age range of participants was 25-65 years. The age groups of 25-34 and 35-44 were the most represented in descending order (36.3% and 23.7% respectively). Over 90% of the population were married and close to 60% had at least primary education. Most participants had informal jobs, and only a third of the population had once heard of cervical cancer. The most common medium of hearing about cervical cancer was through a health campaign. Majority of the participants had coitarche before 18 years (80.2%), and only 19.7% had ever been screened for cervical cancer. (Table 1)

**Table 1: Socio-demographic and Gyneco-obstetric characteristics of study population**

| Variable (n=476) | | Frequency | Percentage (%) |
|---|---|---|---|
| **Age** | | | |
| | 25-34 | 173 | 36.3 |
| | 35-44 | 113 | 23.7 |
| | 45-54 | 101 | 21.2 |
| | ≥55 | 89 | 18.7 |
| **Marital status** | | | |
| | Married | 431 | 90.5 |
| | single | 45 | 9.5 |
| **Level of education** | | | |
| | No formal | 199 | 41.8 |
| | Primary | 157 | 33 |
| | Secondary | 111 | 23.3 |
| | University | 9 | 1.9 |
| **Occupation** | | | |
| | Informal | 463 | 97.3 |
| | Employed | 13 | 2.7 |
| **Heard of cervical cancer** | | | |
| | Yes | 155 | 32.6 |
| | No | 321 | 67.4 |
| **Medium of health education on cervical cancer** | | | |
| | None | 321 | 67.4 |
| | Meetings | 8 | 1.7 |
| | Friend | 13 | 2.7 |
| | Family member with cancer | 4 | 0.8 |
| | Health champagne | 92 | 19.3 |
| | Hospital | 38 | 8.0 |
| **Parity** | | | |
| | 0 | 18 | 3.8 |
| | 1-2 | 73 | 15.3 |
| | ≥3 | 385 | 80.9 |
| **Coitarche** | | | |
| | <18 | 382 | 80.2 |
| | >18 | 94 | 19.8 |
| **Contraceptive usage** | | | |
| | Yes | 75 | 15.8 |
| | No | 401 | 84.2 |
| **Cumulative sexual Partners** | | | |
| | 0-2 | 272 | 57.1 |
| | ≥3 | 204 | 42.9 |
| **Previous screening for cervical cancer** | | | |
| | Yes | 94 | 19.7 |
| | No | 382 | 80.3 |

**Knowledge on cervical cancer**

Knowledge on cervical cancer risk factors and preventive measures was low among the study population as only 29.8% knew multiple sex partners was a risk factor, 12.8% knew of HPV infection, 7.1% knew a vaccine exists, 29.8% knew using condoms will prevent cancer, 27.5% know of screening, and 23.5% had heard of early treatment of lesions. (Table 2)

**Table 2: knowledge on cervical cancer**

| Variable | Yes n (%) | No n (%) |
|---|---|---|
| Multiple sex partners as risk factor | 142 (29.8) | 334(70.2) |
| HPV viral infection | 61 (12.8) | 415(87.2) |
| HPV vaccination | 34 (7.1) | 442(92.9) |
| Using Condoms for prevention | 142 (29.8) | 334(70.2) |
| Cervical cancer screening | 131 (27.5) | 345(72.5) |
| Early treatment of lesions | 112 (23.5) | 364(76.5) |

*HPV: Human Papilloma Virus*

**Factors associated with cervical cancer screening**

Previous health education on cervical cancer *(OR:233, 95% CI: 65-1437, p<0.001)*, attending a cervical cancer screening health campaign *(OR: 21, 95% CI: 2.3-651, p= 0.007)*, and contraceptive use *(OR:2.06, 95% CI: 1.16-3.56, p<0.01)* were positively associated with cervical cancer screening. Not having had a health education on cervical cancer *(OR:0.02, 95% CI: 0.001-0.7, p= 0.037)* was negatively associated with cervical cancer screening. Of the 155 participants who previously had health education on cervical cancer, 92 (59.3%) had done a screening test. Table 3 summarizes association between independent variables and screening of cervical cancer.

**Table 3: Association between exposure variables and screening of cervical cancer**

| Variable (n= 476) | Screening | | OR | 95% CI | P-value |
|---|---|---|---|---|---|
| | **Yes n (%)** | **No n (%)** | | | |
| Age | | | | | |
| 25-34 | 41 (23.7) | 132 (76.3) | Ref | NA | NA |
| 35-44 | 20 (17.7) | 93 (82.3) | 0.7 | 0.38-1.25 | 0.23 |
| 45-54 | 16 (15.8) | 85 (84.2) | 0.6 | 0.31-1.14 | 0.12 |
| ≥55 | 17 (19.1) | 72 (80.9) | 0.7 | 0.39-1.43 | 0.40 |
| **Marital status** | | | | | |
| Married | 343 (79.6) | 88 (20.4) | Ref | NA | NA |
| single | 6 (13.3) | 39 (86.7) | 0.50 | 0.22-1.40 | 0.26 |
| **Level of education** | | | | | |
| No formal | 28 (13.7) | 176 (86.3) | Ref | NA | NA |
| Primary | 30 (19.1) | 127 (80.9) | 1.80 | 1.00-3.28 | 0.052 |
| Secondary | 40 (36.0) | 71 (64.0) | 4.28 | 2.4-7.77 | <0.001 |
| University | 1 (11.1) | 8 (88.9) | 1.07 | 0.04-6.38 | 0.09 |
| **Parity** | | | | | |
| 0 | 4 (22.2) | 14 (77.8) | Ref | NA | NA |
| 1-2 | 14 (19.2) | 59 (80.2) | 0.82 | 0.24-3.33 | 0.75 |
| ≥3 | 76 (19.7) | 309 (80.3) | 0.83 | 0.29-3.12 | 0.77 |
| **Coitarche** | | | | | |
| <18 | 66 (17.3) | 316 (82.7) | Ref | NA | NA |
| ≥18 | 28 (29.8) | 66 (70.2) | 2.03 | 1.20-3.39 | 0.006 |
| **Occupation** | | | | | |
| Informal | 89 (19.2) | 374 (80.8) | 0.38 | 0.12-1.31 | 0.15 |
| Employed | 5 (38.5) | 8 (61.5) | Ref | NA | NA |
| **Health education on cervical cancer** | | | | | |
| Yes | 92 (59.4) | 63 (40.6) | 233 | 65-1437 | **<0.000** |
| No | 2 (0.6) | 319 (99.4) | Ref | NA | NA |
| **Medium of health education** | | | | | |
| Family with cancer | 1 (25) | 3 (75) | Ref | NA | NA |
| Friend | 2 (15.4) | 11 (84.6) | 0.55 | 0.03-21 | 1 |
| Health campaign | 82 (81.2) | 10 (18.8) | 21 | 2.3-651 | **0.007** |
| Hospital | 6 (15.8) | 32 (84.2) | 0.53 | 0.05-17 | 0.53 |
| Social gatherings | 1 (12.5) | 7 (87.5) | 0.46 | 0.01-22 | 1 |
| None | 2 (0.6) | 319 (99.4) | 0.02 | 0.001-0.7 | **0.037** |
| **Contraceptive usage** | | | | | |
| Yes | 23 (30.7) | 52 (69.3) | 2.06 | 1.16-3.56 | **<0.01** |
| No | 71 (17.7) | 330 (82.3) | Ref | NA | NA |
| **Cumulative sexual Partners** | | | | | |
| 0-2 | 54 (19.9) | 218 (80.1) | Ref | NA | NA |
| ≥3 | 40 (19.6) | 164 (80.4) | 0.98 | 0.62-1.55 | 0.95 |

We further sought to study the association of cervical cancer screening and exposure variables that were significantly associated in the bivariate analysis by controlling for potential confounders in a multivariate logistic regression analysis. Health education on cervical cancer *(aOR:230, 95% CI: 55-969, p<0.0001)*, attending a cervical cancer screening health campaign *(aOR: 23, 95% CI: 2.15-246, p= 0.009)*, and not having had a health education on cervical cancer *(aOR:0.02, 95% CI: 0.00-0.26, p= 0.003)* remained significantly associated with cervical cancer screening. (Table 4)

**Table 4: Factors independently associated with cervical cancer screening (Multivariate analysis)**

| Variable (n= 476) | aOR | 95% CI | P-value |
|---|---|---|---|
| **Health education on cervical cancer** | | | |
| Yes | 230 | 55-969 | **<0.0001** |
| No | Ref | NA | NA |
| **Medium of health education** | | | |
| Family with cancer | Ref | NA | NA |
| Friend | 0.55 | 0.04-8.27 | 0.66 |
| Health campaign | 23 | 2.15-246 | **0.009** |
| Hospital | 0.52 | 0.05-6.03 | 0.602 |
| Social gatherings | 0.43 | 0.02-9.36 | 1 |
| None | 0.02 | 0.00-0.26 | **0.003** |
| **Contraceptive usage** | | | |
| Yes | 1.34 | 0.41-4.36 | 0.629 |
| No | Ref | NA | NA |

### Prevalence of premalignant lesions

Of the 476 participants that were screened, 19 had positive tests on visual inspection with acetic acid and Lugol's iodine. Of the 19, pathological results confirmed 17 cases of which 11 cases were LSIL, 5 were HSIL, and a case of carcinoma in situ. Using pathological results, the prevalence of premalignant lesion was 3.57%.

## DISCUSSION

Our study was aimed at identifying factors associated with cervical cancer screening in a rural area in Cameroon and to determine the prevalence of cervical premalignant lesions. We found a low level of knowledge on cervical cancer in this rural area. Previous Health education on cervical cancer, attending a cervical cancer health campaign, and use of contraceptive were positively associated with cervical cancer screening while never hearing about cervical cancer was negatively associated with cervical cancer screening.

Our study findings support the idea that knowledge on cervical cancer is low in rural areas with only about 1 out of three participants has ever heard of cervical cancer, less than one third of the population knowing about multiple sex partners as risk factors, slightly above one tenth knowing of HPV infection, less that one tenth knowing of the existence of a vaccine, less than one third knowing of using condoms for prevention, and slightly above one quarter knowing about screening. This low knowledge is consistent with results of other studies done in Cameroon (14,17,18). However, in the study by Simo et al.(14), a higher proportion of women who have heard of cervical cancer (39%) was reported compared to 32.6% in our study. This could be explained by the fact that, their study was done in an urban area.

Having previous had health education on cervical cancer was found to be highly significantly associated with cervical cancer screening in our study. Unlike results by Tebeu et al. (17) that showed that only 8.3% of women who were aware of cervical cancer had actually been screened, our results showed that over 59% of participants who had previous health education had been screened. This huge difference could be explained in part by the fact that their study was done as far back in 2008 and also by the fact that, the main means of health education in our study population was through health campaigns during which free cervical cancer screening tests are offered. This increase in the proportion of women who have had screening could be an indication of a changing attitude on cervical cancer screening which beckons for continuous effort to continuously improve on the knowledge and attitude of women especially those in rural areas.

Health campaign was the most common medium of health education in this rural population of our study. Other media included medical staff in hospital, social gatherings, friends, and family member with cancer. Our findings are contradictory to those of the aforementioned Cameroonian studies in which the broadcasting media such as radio and Television was the main source of health education. This could be explained by the fact that our study was done in a rural area where access to electricity is low and therefore broadcasting media were not readily available. This implies that efforts on increasing knowledge on cervical cancer in rural areas through broadcasting media could not be an appropriate means. More so, it has been argued that even though broadcasting mediatic campaigns raise awareness on cervical cancer, it did not provide good knowledge and attitude on cervical cancer (14). As shown by our study, in order to improve cervical cancer awareness and screening in rural areas, cervical cancer health campaigns are therefore a suitable means of achieving this goal.

Use of contraceptive was found to be associated with cervical cancer screening in bivariate analysis although the association did not reach statistical significance in the multivariate analysis. One study reported an association between medically provided contraceptives and screening for cervical cancer (19). Women seeking contraceptives are women in reproductive age and are therefore in need for cervical cancer screening. Family planning services thus provides a window where these women could be educated and cervical cancer screening provided on the spot without referrals. Using family planning services could therefore be another useful method of addressing the gap in cervical cancer awareness and screening.

We obtained a prevalence of 3.57% of premalignant lesions among our study population. This was similar to the 3.3% reported by Nkfusai et al. in Bamenda, North West region of Cameroon (20). Our prevalence was however lower than values reported in previous studies in other parts of Cameroon; 7.14% by Simo et al. in the West region in 2021 (14) and 12.7% by Kalgong et al. in Northern Cameroon in 2017 (21). In our study pathological testing was done on biopsy samples which

could provide better results than the usual conventional cytology tests. Also, in this locality, a previous health campaign had taken place which could have identified those with positive premalignant lesions and referred for management. However, the prevalence of 3.57% is still huge and requires that continuous efforts be made.

**Limitations and strengths of our study**

***Limitations***

Our data was collected in retrospective thus reported bias could not be completely controlled and the list of variables could only be those found in the register.

***Strengths***

Our sample size was large enough and participants were drawn from all over the community thus reducing selection bias and increasing the internal validity of our study. More so, our study was carried out in a rural setting where the burden of cervical cancer is higher and addresses particularly cervical cancer screening unlike most previous studies.

## CONCLUSION

Cervical cancer screening in the rural area of our study relies largely on opportunistic screening provided during health campaigns for cervical cancer screening. Having had health education on cervical cancer and having attended a cervical cancer health campaign are significantly associated with screening for cervical cancers. Free health campaigns could therefore be a very useful strategy to improve awareness and rate of screening for cervical cancer in rural communities.

**Competing interests**

The authors declare that they have no competing interests.

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None

**Authors' contributions**

Conception and design of the study: AAAM, GMA, BAAT and REM; data collection: AAAM, CTE and BAAT; data analysis and results interpretation: AAAM, TT, DWP, MB, WAT and SJD; manuscript drafting: AAAM; revision of the manuscript: all authors. Critical revision: AAAM and REM. All the authors have read and approved the final manuscript.

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