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Research Article

Risk Factors of Cervical Cancer in Yaounde: A Case-Control Study

Facteurs de Risque du Cancer du Col à Yaoundé : Une étude Cas - Témoins

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ABSTRACT

Introduction. In Cameroon, cervical cancer is a major public health problem with a high incidence and mortality rate. The aim of our study was to identify risk factors for cervical cancer in 3 hospitals in Yaoundé. **Methodology.** We conducted a case-control study over a period of 6 months in 3 hospitals of Yaoundé namely the Gynaeco-obstetric and paediatric hospital, General Hospital and University Teaching Hospital. Cases were made of files of women aged 18 and above with cervical cancer at any stage confirmed by histology prior to any treatment before the study. Controls included files of women within the same age range with normal Pap smear or VIA/VILI. The matched 1 case for 3 controls. **Results.** We included 244 files made up of 61 cases and 183 controls. The mean age of the cases was 52,52 ± 12,19 years, ranging from 32 to 81 years old; that of the controls was 46,98± 8,93 years, ranging from 30 to 70 years. After multivariate analysis, the risk factors for cervical cancer were: originating from the central region [OR :7.35 CI(1.58-34.48)], HIV infection [OR :100 CI (9.43-1000)], absence of prior screening by Pap test or VIA VILLI [OR : 7.14 CI (1.36-37.03)], history of a symptomatic partner with an STI [OR: 11.62 CI (1.92-71.42)], genital cleansing ≤ 1 time/day [OR: 16.39 CI (2.98-90.90)], history of an STI [OR: 11.62 CI (1.92-71.42)]. Genital cleansing ≤ 1 time/day [OR: 16.39 CI (2.98-90.90)], family history of cervical cancer [OR: 13.51 CI (2.21-83.33)] and vaginal insertion of traditional capsules [OR: 6.89 CI(1.23-38.46)] . **Conclusion.** Several risk factors for cervical cancer have been identified. A better prevention and screening policy could focus on these specific groups of women at higher risk of cancer.

RÉSUMÉ

Introduction. Au Cameroun, le cancer du col de l'utérus est un problème majeur de santé publique avec une incidence et un taux de mortalité élevés. L'objectif de notre étude était d'identifier les facteurs de risque du cancer du col de l'utérus dans 3 hôpitaux de Yaoundé. **Méthodologie.** Nous avons mené une étude cas-témoins sur une période de 6 mois dans 3 hôpitaux de Yaoundé, à savoir l'hôpital Gynéco-obstétrique et pédiatrique, l'hôpital général et l'hôpital universitaire. Les cas étaient composés de dossiers de femmes âgées de 18 ans et plus atteintes d'un cancer du col de l'utérus à tout stade confirmé par histologie avant tout traitement avant l'étude. Les témoins comprenaient des dossiers de femmes dans la même tranche d'âge avec un frottis de Pap normal ou un VIA / VILI. Nous avons apparié 1 cas pour 3 témoins. **Résultats.** Nous avons inclus 244 dossiers composés de 61 cas et 183 témoins. L'âge moyen des cas était de 52,52 ± 12,19 ans, variant de 32 à 81 ans; celui des témoins était de 46,98 ± 8,93 ans, variant de 30 à 70 ans. Après analyse multivariée, les facteurs de risque du cancer du col de l'utérus étaient : originaire de la région centrale [OR : 7,35 IC (1,58-34,48)], infection par le VIH [OR : 100 IC (9,43-1000)], absence de dépistage préalable par frottis de Pap ou VIA VILLI [OR : 7,14 IC (1,36-37,03)], antécédents d'un partenaire symptomatique atteint d'une IST [OR : 11,62 IC (1,92-71,42)], nettoyage génital ≤ 1 fois/jour [OR : 16,39 IC (2,98-90,90)], antécédents d'une IST [OR : 11,62 IC (1,92-71,42)]. Nettoyage génital ≤ 1 fois/jour [OR : 16,39 IC (2,98-90,90)], antécédents familiaux de cancer du col de l'utérus [OR : 13,51 IC (2,21-83,33)] et insertion vaginale de capsules traditionnelles [OR : 6,89 IC (1,23-38,46)]. **Conclusion.** Plusieurs facteurs de risque du cancer du col de l'utérus ont été identifiés. Une politique de prévention et de dépistage améliorée pourrait cibler ces groupes spécifiques de femmes à risque plus élevé de cancer.

HIGHLIGHTS

What is known of the subject

In Cameroon, cervical cancer is a major public health problem with a high incidence and mortality rate.

The aim of our study

Risk factors of cervical cancer in Yaoundé.

Key Results

1. The mean age of the cases was 52,52 ± 12,19 years, ranging from 32 to 81 years old; that of the controls was 46,98± 8,93 years, ranging from 30 to 70 years.
2. After multivariate analysis, the risk factors for cervical cancer were: originating from the centre region [OR :7.35 CI(1.58-34.48)], HIV infection [OR :100 CI (9.43-1000)], absence of prior screening by Pap test or VIA VILLI [OR : 7.14 CI (1.36-37.03)], history of a symptomatic partner with an STI [OR: 11.62 CI (1.92-71.42)], genital cleansing ≤ 1 time/day [OR: 16.39 CI (2.98-90.90)], history of an STI [OR: 11.62 CI (1.92-71.42)]. Genital cleansing ≤ 1 time/day [OR: 16.39 CI (2.98-90.90)], family history of cervical cancer [OR: 13.51 CI (2.21-83.33)] and vaginal insertion of traditional capsules [OR: 6.89 CI(1.23-38.46)] .

Implications for future practices and policies

A better prevention and screening policy could focus on these specific groups of women at higher risk of cancer.

INTRODUCTION

Cervical cancer is a public health problem worldwide, especially in developing countries where more than half of the cases of cervical cancer occur **[1].** In developed countries like France, it is the 11th cancer with an incidence of 6/100 000 women **[2]** but in Sub-saharan Africa the incidence is 31/100 000 women with 22,5 per 100 000 /year death rate [3,5] .This difference is due to the high screening rate in developed countries **[6].** Sub-saharan Africa and Cameroon are indeed high prevalence zone ,making the second gynaecological cancer in our country **[4]**. Oncogenic strains of Human papilloma virus (HPV) are the principal cause of cervical cancer. This virus is usually transmitted during the first sexual intercourse. Cervical cancer is characterised by a long pre-invasive phase that enables preventive measures through screening and management of precancerous lesions. The prevalence of HPV infection varies from one area to another. Most women infected with oncogenic strains of HPV do not develop cervical cancer suggesting the action of other associated factors **[2].** Identifying risk factors related to our milieu might enable to shape our strategies in the fight this public health problem **[7].** This is why we conducted this case-control study to identify the risk factors of cervical cancer in three hospitals of Yaoundé.

PATIENTS AND METHODS

We conducted a case-control study over a period of 6 months in 3 hospitals of Yaoundé namely the Gynaeco-obstetric and paediatric hospital, General Hospital and University Teaching Hospital. Cases were made of files of women aged 18 and above with cervical cancer at any stage confirmed by histology prior to any treatment before the study. Controls included files of women within the same age range with normal Pap smear or VIA/VILI. The matched 1 case for 3 controls. Data collection was done using a questionnaire administered by the principal investigator after calling them back with their due consent. Study variables were socio demographic, clinical Characteristics, lifestyle: and family history of cervical and other malignancies. They were called upon for clinical assessment and pap smear and/ VIA/VILI result or biopsies of post-surgical sample

Data were analyzed using the software IBM SPSS (Statistical Package for Social Sciences) version 23. Association between the different variables and cervical cancer was done using the Odd's and its 95% confidence interval. . Statistical tests used to compare qualitative variables were Chi square test and fisher's exact test. Risk factors of cervical cancer were identified by assessment of odd's ratio with its 95% confidence interval. Logistic regression identified independent risk factors. This study received the approval of the ethical committee of the University of Yaoundé I.

RESULTS

During the study period, we included 244 women with 61(25%) cases. The mean age of the cases was 52,52 ± 12,19 years, ranging from 32 to 81 years old; that of the controls was 46,98± 8,93 years, ranging from 30 to 70 years **(Table I).** After a multivariate analysis , independent risk factors of cervical cancer were **(Table II, III):**

- Absence of previous screening with pap smear or VIA/VILI [P:0,020 OR:7,14(1,36 - 37,03)] ,
- Cleansing of the genitalia once daily[P:0,001 OR:16,39 (2,98- 90,90)),
- past history of traditional vaginal capsules[P:0,028 ;OR:6,89(1,23-38,46)],
- symptomatic sexual partner with STI [P:0,008OR: 11,62(1,92-71,42)],
- family history of cervical cancer[P:0,005 OR:13,51 (2,21-83,33)] and
- HIV infection[P:<0,001 OR:(100-9,43 1000)].

Table I. Socio demographic risk factors

Variables	Cases N= 61 n (%)	Controls N=183 n (%)	OR	CI (95%)	p value
Age (in years)					
[30-40[	9(14,8)	43 (23,5)	0,56	0,26-1,24	0,149
[40-50[	17 (27,9)	70 (38,3)	0,62	0,33-1,18	0,143
≥50	35 (57,4)	70(38,3)	2,17	1,20-3,91	0,009
Marital status					
Single	13 (21,3)	27 (14,8)	1,56	0,74-3,26	0,231
cohabitation	1 (1.6)	2 (1,1)	1,50	0,13-16,93	0,999
Married	27 (44,3)	120 (65,6)	0,41	0,23-0,75	0,003
Divorced	4 (6,6)	6 (3,3)	2,07	0,56-7,79	0,273
Widow	16 (26,2)	28 (15,3)	1,96	0,97-3,95	0,055
Profession					
student	1 (1,6)	2 (1,1)	1,50	0,13-16,93	0,999
housewife	28 (45,9)	66 (36,1)	1,50	0,83-2,70	0,172
Shop keeper	12 (19,7)	27 (14,8)	1,41	0,66-3,00	0,364
Health personnel	2 (3,3)	10 (5,5)	0,58	0,12-2,75	0,735
Civil servant	3 (4,9)	50 (27,3)	0,13	0,04-0,45	0,001
Farmer	7 (11,5)	3 (1,6)	7,77	1,94-31,11	0,003
others	8 (13,1)	25 (13,7)	0,95	0,40-2,24	0,914
Education level					
None or primary	30 (49,2)	35 (19,1)	4,22	1,59-11,11	0,002
Secondary	26 (42,6)	98 (53,6)	0,64	0,35-1,55	0,139
University	5 (8,2)	44 (24)	0,23	0,09-0,62	0,002
Residence					
urban	49 (80,3)	182 (99,5)			
Rural	12 (19,7)	1 (0,5)	44,57	5,65-351,19	<0,001

Table II. Gyneaco -obstetric factors

Variables	Cases N = 61 n (%)	Controls N=183 n (%)	OR	CI (95%)	p value
Age at menarche					
≤15 years old	45 (73,8)	149 (81,4)	0,64	0,32-1,26	0,200
>15 years old	16 (26,2)	34 (18,6)			
Age at coitarche					
≤16 years old	27 (44,3)	38 (20,8)	3,03	1,63-5,62	<0,001
>16 years old	34 (55,7)	145 (79,2)			
Uncircumcised partner	4 (6,6)	1 (0,5)	12,92	1,41-118,05	0,014
past history of sexual partner with symptomatic STI	19 (38)	20 (12,1)	4,44	2,12-9,29	<0,001
Past history of STI*	23 (56,1)	52 (31,7)	2,75	1,36-5,53	0,004
Oral contraceptive pills	4 (16,7)	26 (27,4)	0,53	0,16-1,70	0,281
Injectable contraceptive	9 (37,5)	13 (13,7)	3,78	1,37-10,41	0,007
Utilisation of condoms	13 (54,2)	52 (54,7)	0,97	0,39-2,40	0,960
Cumulated number of sexual partners					
≤3	37 (60,7)	75 (41,0)			
>3	24 (39,3)	108 (59,0)	2,22	1,22-4,01	0,008
Previous screening for cervical cancer*					
Yes	16 (26,2)	94 (51,4)	0,33	0,17-0,63	0,001
No	45 (73,8)	89 (48,6)	2,97	1,56-5,63	
Mean inter pregnancy interval					
≤2 years	41 (67,2)	76 (41,5)	2,88	1,56-5,31	0,001
>2 years	20 (32,8)	107 (58,5)			
Age at first delivery					
≤20 years	39 (63,9)	78 (42,6)	2,38	1,31-4,34	0,004
>20 years	22 (36,1)	105 (57,4)			

Table III. Clinical and lifestyle risk factors

Variables	Cases N = 61 n (%)	Controls N=183 n (%)	OR	CI (95%)	P value
HIV infection	17 (37)	6 (3,6)	15,53	5,65-42,70	<0,001
CD4 count					
<200 cells/mm3	4 (23,5)	0			0,539
>201 cells/mm3	13 (76,5)	6(100)			
Family history of cervical cancer	12 (21,4)	19 (10,9)	2,23	1,01-4,96	0,043
BMI*					
≤25 Kg/m²	27 (44,3)	34 (18,6)	3,48	1,85-6,51	<0,001
26-30 Kg/m²	21 (34,4)	76 (41,5)	0,73	0,40-1,35	0,326
30-35 Kg/m²	11 (18)	46 (25,1)	0,65	0,31-1,36	0,256
35-40 Kg/m²	1(1,6)	23 (12,6)	0,01	0,01-0,87	<0,013
>40 Kg/m²	1 (1,6)	4 (2,2)	0,74	0,08-6,80	0,999
Physical activity	49 (80,3)	103 (56,3)	3,17	1,58-6,35	0,001
Tobacco smoking	8 (13,1)	21 (11,5)	1,16	0,48-2,78	0,732
Passive	7 (87,5)	17 (81)	1,64	0,15-17,47	0,999
Active	1 (12,5)	2 (9,5)	1,35	0,10-17,41	0,999
Utilisation of traditional vaginal capsules					
Yes	16 (26,2)	19 (10,4)	3,06	1,46-16,44	0,002
No	45 (73,8)	164 (89,6)			
Genital cleaning					
1 time/day	33 (54,1)	27 (14,8)	6,76	3,53-12,94	<0,001
≥2 times/day	28 (45,9)	155 (85,2)			

DISCUSSION

Socio demographic factors associated with cervical cancer

The mean age among the cases was 52, 52+/-12,9 and an age above 50 increased the risk of cervical cancer in our study (p = 0.009 OR 2.17 (1.20 – 3.91). Teame et al in Addis-Abeba and Mesele et al in Ethiopia had similar results. this can be explained by an increased in the exposition to HPV with increasing age and the long period required for development of precancerous lesions **[8,9].** Being single was associated with cervical cancer in our study (OR: 2, 39). This finding is similar to that reported by Munwonge *et al* who found in 2016 an increased risk of cancer among widows and divorced women [OR: 2.0 CI (1.3–3.1)]. Makuza *et al* in Rwanda in 2015 also had similar results **[10–12].** Unmarried women tend to have multiple sexual partners therefore increasing their exposure to HPV and other STIs. Like El-Moselhy *et al.* in Egypt and Cooper *et al*. in South Africa, we found a significant association between being a farmer, having a low education level and residing in a rural area with cervical cancer. Indeed, in our country, this activity is mostly done in rural areas where access to quality care is difficult and people are generally of a low socio-economic status. Also these factors promote early onset of sexual activity, early marriages and multiparity **[13–15].**

Clinical factors associated with onset of cervical cancer

One of the clinical factors associated with cervical cancer in our study was early coitarche. Having first sexual encounter before the age of 16 was significantly associated with cervical cancer. Green *et al* in England and Moodley *et al* in South Africa also found an association between cervical cancer and coitarche before 16 years **[16,17].** This is thought to be linked to steroid hormones and to the immunity against HPV infection. During adolescence, the cervix is exposed to high amounts of oestrogens leading to acidification of the vaginal cavity. This will favour metaplasia of the endocervix in case of eversion. If this metaplasia occurs with concomitant HPV infection, the risk of transformation to neoplasia increases **[18].** We noted an increased risk of cervical cancer in women who had a sexual partner with symptomatic STI and in women with a past history of STI. These results are similar to those of El-Moselhy *et al* and Castellsagué *et al* **[13,19].** Co infection with HPV and other STDs like chlamydia as known nowadays increases the risk of developing cervical cancer **[20].** Unlike many studies like that of Lacey *et al* in 1999 who found an association between usage of oral contraceptive pills (OCPs) and cervical cancer OR=12.6 (2.5–64.2) and that of Roura who had similar results in a cohort done in 10 European countries **[21,22],** we didn't find any significant association between OCP use and cervical cancer. This could be explained by the fact that few of our participants used contraception and even fewer used OCPs. Despite a higher proportion of usage of condoms among the controls, we found no significant reduction in the risk of cervical cancer. Green *et al* in England found a reduction in risk of cervical cancer in women using barrier methods of contraception **[17].** This difference might be due to the fact that the individuals were infected during their early sexual encounters. Having multiple sexual partners was among the factors linked to cervical cancer in our study. Having many sexual partners could be a cofactor of HPV infection by two mechanisms: it can cause cervical lesions and can also multiply the risk of acquiring the HPV infection. Sitakan *et al* in Thailand also had a significant association in women having more than one sexual partner **[23].** Less than half of the cases (45.08%) had done screening for cervical cancer at least once before while it was done by 85.45% of the controls. In our sample, absence of a

previous screening was a risk factor [OR : 2,97 CI(1,56-5,63)]. This result is similar to that of El-Moselhy *et al* who found in Egypt an OR of 2,63 and also Mesele *et al* in Ethiopia in 2010 **[13,24].** Lack of screening prevents the detection of precancerous lesions and if these are not detected and treated, they will eventually develop into a cancer; in our study, we found a significant association between HIV and cervical cancer ($p < 0.001$). 23,5% of HIV patients among the cases had a CD 4 count of less than < 200 cells/µl. These results are similar to those of Holmes *et al* in 2000 et Adjorlolo-Johnson *et al* in Ivory Coast in 2010 who had Odds ratios of 6,5 and 4,7. It is known that HIV positive women are more prone to be infected by high risk HPV and to develop precancerous lesions than HIV negative women of the same age **[25–27].**

Lifestyle factors associated with cervical cancer

Tobacco smoking was not associated with cervical cancer in our series. Carcinogenic substances like nicotine and cotinine found in cigarette smoke accumulate progressively in the cervical mucus. They cause cell proliferation, DNA damage and might also decrease local immunity. Our findings are contrary to those of Kjellberg *et al* and Castellsagué *et al* found a significant association with smoking **[28,29].** This difference can be explained by the fact that in our study, few women were smokers among them. Lack of physical activity was strongly associated with cervical cancer [OR 3, 17 CI(1,58-6,35)]. These results are similar to those of Szender *et al* who in a case-control study done in the United States in 2008 found an increase in the risk of cervical cancer in sedentary women [OR :2.43; 95% CI: 1.56-3.80]. Reasons are modification of sex hormone levels, insulin like growth factors and altered levels of free radicals **[30,31].** Other environmental risk factors identified in our study were: poor genital hygiene and usage of traditional ovarian capsules. Many studies confirm this relationship, for example Ali-Risasi *et al*, Shaw *et al* and Ramaiah *et al* had similar results **[32–34].** Also a positive family history was identified as a risk factor in our study **[13].** Similar results were obtained in Egypt. It should be noted that family history of cervical cancer increases the risk by 2 – 3 folds compared to the general population **[13].**

CONCLUSION

Independent risk factors to cervical cancer were absence of prior Pap smear or VIA/VILI screening, symptomatic STI sexual partner, genital cleansing at least once daily, family history of cervical cancer, HIV infection and traditional vaginal capsules habit. That group should be particularly focused for early screening of cervical cancer.

Conflict of interest

None

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None

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