

Seroprevalence of hepatitis B and C among Cameroonians with cervical cancer diagnosed in 2020: a combined approach is needed to reduce the burden of disease.

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Article Info

Received: March 21, 2022

Accepted: March 31, 2022

Published: April 04, 2022

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Citation: Mathurin P Kowo, Corine Tsamo, Antonin Wilsonm, Ndjitoyap Ndam and Jan René Nkeck. (2022) "Seroprevalence of hepatitis B and C among Cameroonians with cervical cancer diagnosed in 2020: a combined approach is needed to reduce the burden of disease", *J of Gastroenterology and Hepatology Research*, 3(2); DOI: <http://doi.org/03.2022/2.10131>.

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Abstract:

Background:

This study aimed to provide data on the seroprevalence of hepatitis B virus (HBV) and of hepatitis C virus (HCV) in women newly diagnosed with cervical cancer in Cameroon.

Methods:

We conducted a cross sectional descriptive study including every consenting woman diagnosed with cervical cancer in the year 2020, in 4 urban hospitals of Cameroon. The diagnosis of HBV and of HCV was based on a rapid immuno-chromatographic test detecting HBsAg and anti-HCV antibodies. Seroprevalences are given with their 95% confidence interval.

Results:

Overall 114 participants were included. Their median aged was 50 [43.7;59] years; 22 (19.3%) had HIV, 108 (94.7%) had an epidermoid carcinoma, and half (51.7%) were at advanced stage of the disease (FIGO stage III and IV). The seroprevalence of HBV and HCV were respectively 6.1% [2.5; 11.2] and 7.01% [3.4; 13.3]. Among them, 2/7 and 2/8 participants had respectively coinfection with HIV-HBV and HIV-HCV.

Conclusion: In 2020, one in 15 patients diagnosed with cervical cancer was infected with HBV or HCV. In order to reduce their common burden, integrated strategy including a paired screening of these conditions is needed in our context.

Keywords: cameroon; cervical cancer; hepatitis B, hepatitis C

Background:

Cervical cancer is the second most common cancer of women in Cameroon, who has registered 2770 new cases in the year 2020 [1]. The pathophysiology of this disease strongly implies the participation of the Human Papilloma Virus (HPV), one of the most common sexually transmitted infections (STIs) in young women. Therefore, cervical cancer is practically considered as a STI in the same way as viral hepatitis and HIV (Human immunodeficiency virus), which are major public health problems in Africa [2]. The prevalence of hepatitis B, hepatitis C and HIV is elevated in Cameroon, which is one of the country of high endemicity in sub-Saharan Africa and in the world [3–5]. The association of HPV and other sexually transmitted infections (STIs) is frequent in patients diagnosed with cervical cancer, significantly resulting in greater morbidity, higher costs of management, and increased risk of death [6,7]. Also, cervical cancer treatments can sometimes induce immunosuppression that can modify the natural history of chronic viral hepatitis [8]. It is imperative to systematically screen women with cervical cancer for STIs, and to possibly combine screening campaigns for these two entities in our milieu in order to reduce this common burden. However, few data exist in the Cameroonian literature. In order to provide preliminary results to



guide public health strategies, we conducted the present study in 4 urban Hospitals in Cameroon to assess the frequency of viral hepatitis B and C in women newly diagnosed for cervical cancer in the year 2020.

Methods:

Study design and Setting:

We conducted a cross-sectional study lasting 7 months between January and July 2020. It took place in 04 hospitals in two urban cities in Cameroon: Yaoundé General Hospital (YGH), Douala General Hospital (DGH), Yaoundé Gynaeco-Obstetric and Pediatric Hospital (YGOPH), and Yaoundé University Hospital Centre (YUHC). These were four referral hospitals in Cameroon.

Participants:

We included all patients with a diagnosis of cervical cancer during the study period, confirmed by cytopathology, and who gave their consent to participate. Women vaccinated against hepatitis B virus were excluded.

Sample size estimation:

The sample size was estimated at 72 participants, using the sample size estimation formula contained in Withley and Ball's manual [9], a prevalence of 4.96% of viral hepatitis B in cervical cancer patients obtained in the study by Jihyun et al.[10], a power of 95%, and an error rate of 5%. The sampling was consecutive during the study period.

Data measurement:

Before starting the study, we obtained ethical clearance from the Institutional Ethics and Research Committee of the Faculty of Medicine and Biomedical Sciences of the University of Yaoundé I (Cameroon), as well as research authorization from the various study sites. Data collection was carried out through an interview using a data collection form that collected social demographic data (age, occupation, marital status, level of education), viral hepatitis risk factors (number of sexual partners, age at first coitus, presence of scarification and/or tattoos and piercings, history of blood transfusion, dental care, history of sexually transmitted infection, family history of chronic viral hepatitis), comorbidities, clinical signs, information on cervical cancer (histological type, stage according to the FIGO classification). At the end of the interview we proceeded to systematically screen for viral hepatitis B and C.

Viral hepatitis B and C screening:

Screening for viral hepatitis B and C was performed using the "Rapid onSite diagnostic test (CTK- BIOTECH®)". This is an immuno-chromatographic test for the qualitative screening and differentiation of hepatitis B surface antigen and hepatitis C virus antibodies (IgG, IgM) in a single blood sample. The sensitivity of this test evaluated by Kaur et al. was 87.5% for hepatitis C and 93.4% for hepatitis B, with a specificity of 100% for both [11]. The test was performed and read according to the manufacturer's recommendations.

Statistical analysis:

The data collected were analyzed using SPSS version 21.0 software. The qualitative variables are presented as effectives and their proportions. Quantitative variables are presented as median and the interquartile range [25th quartile; 75th quartile]. Seroprevalences were reported with their 95% confidence intervals.

Results:

Characteristics of the sample:

During the study period, 182 women were approached for the study among whom 162 were eligible with a histological diagnosis of cervical cancer, of which 114 were finally included and consented to participate, making the participation rate 70.3%. The median age of participants was 50.5 years [44.7; 59], with extremes of 33 and 89 years. The majority of the patients (48.2%) were employed in the private sector, 61.4% with a secondary education level, 41.2% were married at the time of the study (Table 1).

The most common histological type was squamous cell carcinoma in 94.7% of cases, followed by adenocarcinoma in 5.3% of cases. According to the FIGO classification, stages III and IV were the most common, affecting respectively 40 (35%) and 29 (25.4%) patients, so the diagnosis was most often made at the advanced stage.

Seroprevalence of hepatitis B and C:

As risk factors for viral hepatitis in the whole sample, we found: At least two sexual partners (72.8%), a history of surgery in 37.5% of cases, 9% of women had scarification or tattooing or piercing, and 26.3% had already been transfused. Personal history of sexually transmitted infection was found in 16.7% of patients, a family history of chronic viral hepatitis was reported in only 2 patients (1.8%). In the sample 22 (19.3%) patients were HIV positive and 9 (7.9%) were alcohol users (Table 1). The seroprevalence of viral hepatitis B and C was respectively 6.1% [2.5; 11.2] and 7.01% [3.4; 13.3]. Co-infection with HIV was found in 2/7 and 2/8 cases for hepatitis B and hepatitis C respectively. We did not find any cases of co-infection with hepatitis C and hepatitis B. two patients diagnosed with hepatitis B had received a transfusion, whereas no patient diagnosed with hepatitis C had ever received a transfusion.



Variables n (%)	HBV+7 (6.1%)	HCV+8 (7.01%)	HBV and HCV negative 99 (86.8%)	Overall (114)
Median age, years	47 [38;82]	60[54;65.5]	50 [42;59.5]	50.5 [44.7;59]
Profession, n (%)				
Private sector	2 (28.6)	5 (62.5)	48 (48.5)	55 (48.2)
Housewife	4 (57.1)	3 (37.5)	36 (36.4)	43 (37.7)
Public sector	1 (14.3)	0 (0)	15 (15.1)	16 (14.1)
Education al level, n (%)				
No formal education	1 (14.3)	0 (0)	7 (7.1)	8 (7.0)
Primary school	2 (28.6)	1 (12.5)	17 (17.2)	19 (16.7)
Secondary/higher	4 (57.1)	7 (87.5)	75 (75.7)	87 (76.3)
Marital status, n (%)				
Married	1 (14.3)	1 (12.5)	45 (45.5)	47 (41.2)
Single	4 (57.1)	2 (25.0)	35 (35.3)	41 (36.0)
Widow	2 (28.6)	5 (62.5)	19 (19.2)	26 (22.8)
≥ 2 cumulated sexual partners, n (%)	7 (100)	6 (75.0)	87 (87.9)	100 (87.7)
Past history of surgery, n (%)	0 (0)	1 (12.5)	37 (37.4)	38 (33.3)
Scarring / tattoo / piercing, n (%)	3 (42.8)	1 (12.5)	29 (29.3)	33 (28.9)
First coitus < 20 years, n (%)	4 (57.1)	8(100.0)	88 (88.9)	100(87.7)
Past blood transfusion, n (%)	1 (14.3)	1 (12.5)	29 (29.3)	31 (27.2)
Past history of STIs, n (%)	1 (14.3)	1 (12.5)	17 (17.2)	19 (16.7)
Dental care, n (%)	0 (0)	0 (0)	22 (22.2)	22 (19.3)
Family history of viral hepatitis, n (%)	1 (14.3)	4 (50.0)	25 (25.3)	30 (26.3)
HIV infection, n (%)	2 (28.3)	2 (25.0)	19 (19.2)	23(20.2)
Alcohol consumption, n (%)	1 (14.3)	0 (0)	8 (8.1)	9 (7.9)
Tobacco consumption, n (%)	0 (0)	0 (0)	3 (3.0)	3 (2.7)
Histological type of CC, n (%)				
Squamous cell carcinoma	7 (100.0)	8 (100.0)	93 (93.9)	108 (94.7)
Adenocarcinoma	0 (0.0)	0 (0.0)	5 (5.1)	6 (5.3)
Stage of cervical cancer (FIGO), n (%)				
I	0 (0.0)	0 (0.0)	14 (14.1)	14 (18.4)
II	2 (28.5)	2 (25.0)	20 (20.2)	24 (21.0)
III	3 (42.8)	2 (25.0)	35 (35.3)	40 (35)
IV	2 (28.5)	4 (50.0)	30 (30.3)	36 (25.4)

HBV+: Hepatitis B virus positive; HCV+: Hepatitis C virus positive; STIs: Sexual Transmitted Infections; CC: cervical cancer ; FIGO: *Fédération Internationale des Gynécologues Obstétriciens*.

Table 1: Characteristics of the sample.



Discussion:

Chronic viral hepatitis and cervical cancer are public health problems in Cameroon and should be tackled as well. The purpose of this study was to determine the seroprevalence of viral hepatitis B and C among women diagnosed with cervical cancer in the year 2020. We observed prevalence rates of 6.1% and 7.01% for viral hepatitis B and C, respectively, revealing that one in 15 women diagnosed with cervical cancer is a carrier of one of these viruses. This calls for clinicians and public health authorities dealing with chronic viral hepatitis and those dealing with women's cancers to join efforts in the fight against these conditions that most often share the same transmission route and combine to increase the burden of the populations suffering from them.

The prevalences found could be explained by the fact that Cameroon is an area of high endemicity of viral hepatitis B and C with prevalences in the general population in 2016 of 11.2% and 6.5% respectively [3,4]. In addition, it has been described in the literature that HPV carriage is associated with co-infection with other viruses such as HBV, HCV and HIV [12]. Some authors who have worked on the same subject as us have found HBsAg carriage to vary from 0.8% to 12.1% [13–16]. However, their results vary. Jihyun et al. in Korea in 2018, found a prevalence of hepatitis B of 4.96% in patients with cervical cancer [14]. Though, Korea is a country classified as an intermediate endemic area of viral hepatitis B with prevalence between 2–7% [17]. Alvaro Henrique et al found a low HBsAg carriage (0.8%) in women with cervical cancer [13]. Similarly, having worked in an area of Brazil where the endemicity of hepatitis B virus is less than 1.8% [18]. Moreover, the vaccination coverage in this same area of Brazil is 50%, even lower than in Cameroon [19]. As a result, the different segments of the population are less susceptible to hepatitis B infection. Higher prevalences (12.1%) of HBsAg were found by Tigna Lu et al. in China in an area of high endemicity [16]. In fact, HBsAg carriage in the Guangdong province where the study by Tigna et al. was carried out is 14.82% [20]. Several authors have worked on HCV in oncology and found seroprevalence that varied from 0.7% to 5.8% [13,15,21]. These prevalences, all lower than ours, were obtained in areas of low endemicity of viral hepatitis. The age distribution of our population shows a median age of 50 [43.7; 59] years. This age is close to that found by other authors who have worked on the same subject. These are Alvaro et al in Brazil and Jihyun in Korea who found in their series median ages of 50.3 [40.7; 60.6] years and 56 [47; 66] years respectively [13,14]. In fact, the natural history of cervical cancer implies the development of precancerous lesions in up to 10–20 years [22,23]. Thus the diagnosis of cervical cancer is made later at an advanced age of 40–50 years [24]. In addition, age over 50 years has been described as a factor associated with the high prevalence of hepatitis B in patients diagnosed with cervical cancer [13]. It is therefore important to provide targeted education to this age group about cervical cancer and viral hepatitis B and combined screening campaigns.

The main risk factors of transmission of viral hepatitis B and C found in our cohort were multiple sexual partners (83%), blood transfusion (30%), tattooing and piercing (33%) and early age of first intercourse. The cumulative number of sexual partners per woman during her lifetime was greater than two for 83% of the population. This result is close to that of the DHS (demographic

health survey in Cameroon) 2018, which indicates that the average number of partners per sexually active Cameroonian woman is 4 during her lifetime [25]. This multiplicity of sexual partners has been described and known in the literature to be a risk factor for viral hepatitis B and HPV [26,27]. Alvaro et al. in Brazil in 2018 found no association between multiple sexual partners and HBsAg carriage in cervical cancer patients [13]. However, multiple sexual partners are associated with low educational level, low economic level and marital status single, widowed, divorced reflecting the need to sensitize these different groups about the dangers of multiple sexual partners. A percentage of 52.8% of the women in our study had had their first intercourse before the age of 17. This can be explained by the fact that almost half of Cameroonian adolescents are sexually active before the age of 19 and are therefore at risk of developing cervical cancer and viral hepatitis later on [28]. Alvaro et al. found no association between multiple sexual partners and HBsAg carriage in cervical cancer patients. A percentage of 52.8% of the women in our study had had their first intercourse before the age of 17. This can be explained by the fact that almost half of Cameroonian adolescents are sexually active before the age of 19 and are therefore at risk of developing cervical cancer and viral hepatitis later on [28].

Education of the girl should be emphasized to decrease the risk of carrying cervical cancer and hepatitis B during her lifetime.

The interpretation of the data from our study must, however, take into account certain limitations: the small sample size obtained does not allow statistical analyses to be carried out with ease in order to evaluate the participation of the various risk factors; the cross-sectional nature of the study does not indicate the time of infection by viral hepatitis viruses; the serological test used which do not represent the gold standard, although they are widely used for their cost-benefit ratio in screening strategies.

Conclusion:

About one in fifteen women diagnosed with cervical cancer in 2020 was infected with viral hepatitis B or C. Public health policies have to combine their efforts and strategies to fight against chronic viral hepatitis and cervical cancer in order to reduce their common burden in Cameroon.

Abbreviations: HBV: hepatitis B virus; HCV: Hepatitis C virus; STIs: sexual transmitted infections; FIGO: *Fédération Internationale des Gynécologues Obstétriciens*.

Declaration:

Acknowledgement:

The authors would like to thank the personnel of Yaoundé General Hospital (YGH), Douala General Hospital (DGH), Yaoundé Gynaeco-Obstetric and Pediatric Hospital (YGOPH), and Yaoundé University Hospital Centre (YUHC) for their support in the data collection.

Author's contribution:

MPK and PMT conceived and designed the study and supervised data collection; MPK, ANN, CT, and WTBN collected the data.



CT, JRN and AJSS analyzed data and drafted the manuscript; MPK, ON and PMT substantively revised the manuscript. All authors read and approved the final manuscript.

Funding

This research did not receive fund from any organization.

Availability of data and materials

The datasets used for this study are available from the corresponding author on reasonable request.

Ethical approval and consent to participate

The study was approved by the Institutional Ethical Review Board of the Faculty of Medicine and Biomedical Sciences of the University of Yaoundé I (Cameroon). All the participants read and signed an informed consent before their inclusion in the study.

Consent for publication

Not applicable.

Competing interest

The authors declare that they have no competing interests.

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