

Mapping of the High-Risk Human Papillomavirus in Clients Received for Voluntary Cervical Cancer Screening in Five Health Regions of Burkina Faso

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Abstract

Objective: This paper aims to study the mapping of high-risk oncogenic Human Papilloma Virus in clients who received voluntary cervical cancer screening in five health regions of Burkina Faso. **Patients and Methods:** This was a multicenter and cross-sectional study with a descriptive aim which took place over a period of 25 months from July 1, 2021 to July 30, 2023. **Results:** Our study population consisted of 8512 clients who had taken the HPV DNA test in the health regions named Center, Center-West, Center-East, Plateau Central and Cascades in Burkina Faso. The average age of the clients was 38.03 ± 9.69 years. The overall prevalence of HR-HPV was 22.99%. The “Other HPV” serotypes were the most frequent in a proportion of 54.27%, followed by serotypes 16 and 18 respectively in 14.46% and 13.95% of cases. The prevalence of HR-HPV was 42.75% among HIV + clients. The serotypes of the “Other HPV” group (HPV 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 66 and 68) were the most common among clients with a precancerous cervical lesion in 57.54% of cases. **Conclusion:** The health regions of Center, Center-East, Center-West, Plateau Central and Cascades in Burkina Faso have a high prevalence of HR-HPV. The “Other HPV” serotypes were the most dominant. A further study to identify by isolating the prevalence of the different serotypes of the “Other HPV”

group in these five health regions of Burkina Faso is essential to be able to choose the most appropriate type of HPV vaccine.

Keywords

PVH-HR, Prevalence, Screening, Cancer, Cervix, Burkina Faso

1. Introduction

Cervical cancer is a major public health problem worldwide. Indeed, cervical cancer is the fourth most common cancer of women in the world, with an estimated 604,000 new cases and 342,000 deaths in 2020. Approximately 90% of the new cases and deaths in the world for the year 2020 occurred in low- and middle-income countries [1] [2]. In Africa, cervical cancer is the second most common cancer with 117,316 new cases and it represents the second leading cause of cancer death with 76,745 cases in 2020 [2]. In Burkina Faso, cervical cancer is the second most common gynecological cancer with 1132 cases in 2020. It represents the second leading cause of cancer death in women with 839 deaths in 2020 [2] [3]. The major risk factor for the appearance of precancerous cervical lesions is a persistent infection with high-risk Human Papilloma Virus (HPV) in more than 95% [1] [4]. The main factors associated with HPV infection are sociodemographic characteristics, sexual behavior, history of sexually transmitted infections, gynecological parity, contraceptive methods and smoking [5]. The elimination of the factors linked to high risk of HPV transmission and the vaccination of teenager against HPV are the primary means of prevention against cervical cancer [6]. Considering this prevention, Burkina Faso has included the Gardasil 4 vaccine into its Expanded Program on Immunization (EPI). For this vaccination to be effective in Burkina Faso, it is necessary to know the HPV serotypes involved in cervical cancer. The objective of our study was to establish the mapping of the high-risk Human Papilloma Virus among clients who received voluntary cervical cancer screening in five health regions of Burkina Faso. These were the health regions of Center, Center-East, Center-West, Plateau Central and Cascades.

2. Patients and Methods

This was a multicenter, cross-sectional study with a descriptive aim that took place from July 1, 2021 to July 30, 2023. Data collection was spread over a period of fourteen (14) months from June 1, 2022 to July 31, 2023. The objective of our study was to establish the mapping of the Human Papilloma Virus with high oncogenic risk among clients who received voluntary screening for cervical cancer on the implementation sites of the project “SUCCESS” in the health regions of Center, Central Plateau, Center-West, Center-East and Cascades in Burkina Faso. The SUCCESS project (Scale Up Cervical Cancer Elimination with Secondary Prevention Strategy) was launched in August 2019 through Jhpiego and Expertise France. It was funded by: UNITAID. Its intervention area extended over four (04)

countries: Guatemala, the Philippines, Ivory Coast and Burkina Faso.

The health facilities in which this study took place are: the Yalgado Ouédraogo University Hospital, the Bogodogo University Hospital, the ALAVI Medical Center, the Pissy District Hospital, the Paul VI Hospital, the Bissighin Health and Social Promotion Center, the Kossodo District Hospital, the Schiphra Hospital, the Koudougou Regional Hospital, the Tenkodogo Regional Hospital, the Zorgho Medical Center with Surgical Unit and the Banfora Regional Hospital. Our study included 8512 clients who were received for voluntary cervical cancer screening and underwent the HPV DNA test, the VIA/VILI test or the Pap Smear. Three test procedures were used to detect HPV: Gene Xpert HPV, Cobas® 4800 HPV test, and Abbott RealTime High Risk HPV. The Gene Xpert HPV test specifically identifies HPV types 16 and 18/45 in two separate detection channels and flags 11 additional high-risk types (31, 33, 35, 39, 51, 52, 56, 58, 59, 66, and 68) in a group named “other HPV”. Gene Xpert analyzes these 11 additional high-risk HPV types and divides them into three subgroups as P3: HPV {31, 33, 35, 52, 58}; P4: HPV {51, 59} and P5: HPV {39, 56, 66, 68}. The Cobas® 4800 HPV test provides results for serotypes 16 and 18 separately, and the other 12 serotypes are grouped as “other HPVs”. The Abbott RealTime HPV test differentiates between HPV16, HPV18 and other HPV genotypes.

3. Results

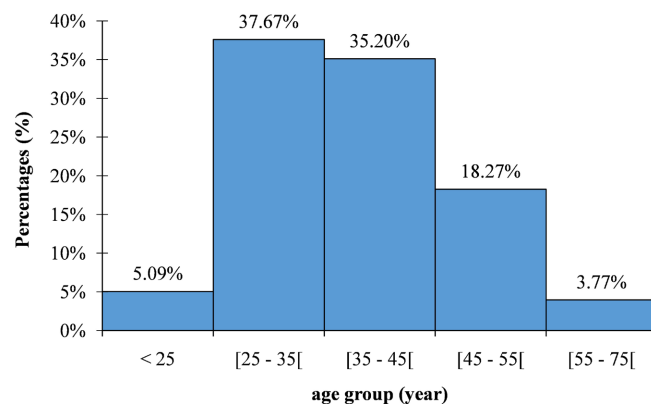


Figure 1. Distribution of clients by age group (n = 8512).

Our study population consisted of 8,512 clients who had completed the HPV DNA test at the SUCCESS project sites in the Center, Center-East, Center-West, Plateau Central and Cascades regions. The ages of the clients ranged from 17 to 74 years old. The average age was 38.03 ± 9.69 years. The 25 to 35 age group is the largest, representing 37.67%. **Figure 1** shows the distribution of clients by age group. The VIA was positive in 431 clients, representing 5.06% of the study population. In our study, 06 clients, representing 0.07%, had completed an Pap Smear. Thermocoagulation was performed on 2,106 clients, representing 24.74% of the study population, and 25 clients, representing 0.29%, were treated with RAD. The overall prevalence of HR-HPV was 22.99% (1957 clients out of 8512). **Table 1**

illustrates the distribution of clients according to the HR-HPV serotypes found. The prevalence of HR-HPV among HIV positive clients was 42.75% (481/1125). **Table 2** shows the prevalence of HR-HPV serotypes among HIV positive clients. The prevalence of precancerous cervical lesions was 22.02% among clients carrying HR-HPV. **Table 3** gives the distribution of HR-HPV serotypes among clients with precancerous cervical lesions.

Table 1. Distribution of clients according to the HR-HPV serotypes found (n = 1957).

HR-HPV serotypes	Number (n)	Percentages (%)
Others*	1062	54.27
16	283	14.46
18	273	13.95
P3	249	12.72
18/45	153	7.82
P5	108	5.52
P4	74	3.78

Others* = Serotypes PVH 31, 33, 35, 39, 45, 48, 51, 52, 56, 59, 66 and 68.

Table 2. Prevalence of HR-HPV serotypes among HIV positive clients (n=481).

HR-HPV serotypes	Number (n)	Percentages (%)
Others*	257	53.43
18	67	13.93
16	63	13.10
18/45	29	6.03
P3	27	5.61
P5	20	4.16
P4	13	2.70

Others* = Serotypes PVH 31, 33, 35, 39, 45, 48, 51, 52, 56, 59, 66 and 68.

Table 3. Distribution of HR-HPV serotypes among clients with precancerous cervical lesions (n = 431).

HR-HPV serotypes	Number (n)	Percentages (%)
Others *	248	57.54
18	70	16.24
16	60	13.92
P4	34	7.88
18/45	20	4.64
P3	18	4.18
P5	12	2.78

Others* = Serotypes PVH 31, 33, 35, 39, 45, 48, 51, 52, 56, 59, 66 and 68.

4. Discussion

The average age of our clients was 38.03 ± 9.69 years with extremes of 17 years and 74 years old. The age group 25 to 35 years was the most representative with 3206 clients or 37.67%. Our results are like those of Zohoncon T. M *et al.* [7] who in their study on the prevalence of HR-HPV in sexually active women in West Africa, found an average age of 35.06 ± 10 years and a predominance of the age group 25 to 34 years. Our results are lower from those of Horo A *et al.* [8] in Ivory Coast who reported an average age of 43.44 ± 10.80 years. This difference could be explained by the fact that in our study, clients were included before the age required for cervical cancer screening, which is 25 years.

VIA was positive in 431 clients (5.06%) in our study population. Our rate is lower than Horo A *et al.* [8] in Ivory Coast who noted 18.40% of positive VIA. Six (06) clients (0.07%) were able to perform the Pap Smear examination and the results were normal. The availability of Pap Smear is not constant in our public health facilities. In private health facilities where it is available, the cost remains high. This would explain the reduced rate of performing this examination. Thermocoagulation was performed on 2016 clients (24.74%) of the study population and 25 clients (0.29%) were treated by RAD. Thermocoagulation is the most available therapeutic method in health facilities in Burkina Faso. During our study, 1957 clients were carrying HR-HPV, which gives an overall prevalence of HR-HPV at 22.99%. Our prevalence is higher than those of Bruni L *et al.* [9] in Paris, France and Yan X *et al.* [10] in Xinjiang province, China, who found a respective prevalence of 12.60% and 7.41%.

On the contrary, it is lower than those of Faye B *et al.* [11] in Senegal and Horo A *et al.* [8] in Ivory Coast, who noted a respective prevalence of 57.07% and 34%. Our results could be explained by the previous absence of a national HPV vaccination program in our context.

The serotypes “Other group” (HPV 31, 33, 35, 39, 45, 48, 51, 52, 56, 59, 66 and 68) were the most frequent with 54.27%. However, the detection procedures used (COBAS 4800 and XPERT) did not allow us to determine the proportion of each serotype. In our series, HPV-18 and HPV-16 had a respective prevalence of 13.95% and 14.46%. Our prevalences are higher than those in the literature in Burkina Faso and in the West African sub-region. Indeed, in Burkina Faso, for HPV-18, Hatzipanagiotou M *et al.* [12] in 2018; Ouédraogo R A *et al.* [13] in 2020 found a prevalence respectively of 5.5% and 4.1%. For HPV-16, they noted a respective prevalence of 1.4% and 6.5%. In the West African sub-region, Zohoncon T M *et al.* [7], found, in Burkina Faso, Benin, Ivory Coast, Togo and Niger for HPV-18 a prevalence respectively of 6.43%; 6.25%; 5.21%; 3.37% and 0.8%. For HPV-16, they found in Togo, Ivory Coast, Benin, Burkina Faso and Niger a prevalence respectively of 4.81%; 2.60%; 1.88%; 1.17% and 0.4%. Also, our prevalence of HPV-18 is higher than those studies conducted in Germany, Morocco, South Africa, Thailand and the USA where Bruni L *et al.* noted a prevalence of 1%, 0.7%, 1.3%, 1.1% and 1.2% respectively [14]-[18].

However, our HPV-16 rate is lower than the studies conducted in Nigeria by Kabuga I. A *et al.* [19], who found 27%. In our study, the prevalence of HPV-45 was 7.82%. Our prevalence is higher than those of Bruni L *et al.* [20] in the Republic of Guinea, Kabuga I. A *et al.* [19] in Nigeria, Horo *et al.* [8] in Ivory Coast and Ouédraogo C *et al.* [21] in Burkina Faso who noted a respective prevalence for HPV-45 at 4.70%, 6%, 7% and 5.80%. Our study did not allow us to assess the exact prevalence of other serotypes due to the analysis techniques used. However, However, this is consistent with other studies conducted in Burkina Faso which reported that HPV-16 and HPV-18 are not the most represented among HR-HPVs.

Our study shows that 481/1125 HIV + clients were carrying HR-HPV, which corresponds to a prevalence of 42.75% in this social class. The “Other” serotype group was the most represented with 53.43%. HPV-18 represented 13.93%, HPV-16 represented 13.10% and HPV 45 represented 6.03% among HIV+ clients. Our rate is higher than those of Nyasenu Y. T *et al.* [22] in Togo who found an overall HPV prevalence of 16.7% among HIV+ clients, serotypes 18 and 16 represented 8.6% and 1.3% respectively. On the contrary, it is lower than Nworie O *et al.* [23] in Nigeria who reported an HPV prevalence of 85.40% among HIV+ clients, and a predominance of serotypes 18 with 18.4%. This difference could be explained by the size of our sample which was thirty times larger than Nyasenu Y. T *et al.* [22] in Togo on the one hand and on the other hand our sample which was random while the study of Nworie O *et al.* [23] in Nigeria was carried out in an HIV positive population.

The prevalence of precancerous cervical lesions in clients with HR-HPV was 22.02%. HPV-16 and 18 represented 13.92% and 16.24% respectively, the serotypes “Other” and HPV-45 each represented 57.54% and 4.64%. Our prevalence is close to that of Ouédraogo C *et al.* [21] in Burkina Faso who noted 22.70%. It is significantly lower than those of Ouédraogo A. R *et al.* [24] in Burkina Faso, Horo A *et al.* [8] in Ivory Coast and Dufit V *et al.* [25] in French Guiana who found respectively 30.36%, 47.80% and 86.90% of precancerous cervical lesions in clients with HR-HPV. In French Guiana, serotypes 16, 18 and 45 were respectively encountered in abnormal FCU with 14.80%, 8.20% and 4.90% [25]. In Guinea, Bruni L *et al.* [20] reported that serotypes 16 and 45 were identified respectively with 18.80% and 6.30% in low-grade squamous intraepithelial lesions and serotype 18 was identified in 6.70% of high-grade squamous intraepithelial lesions. Our results could be explained by the fact that IVA was the only technique used to identify precancerous lesions of the cervix and it was only performed in clients carrying HR-HPV. Given the high prevalence of serotypes in the “other HPV” group, it could be deduced that HPV-16 and HPV-18 are not the most frequent in clients with lesions.

5. Conclusion

From our study, it appears that all the sites of the study have a prevalence of HR-

HPV infection of 22.99% with a predominance of serotypes from the “Other” group (31, 33, 35, 39, 45, 51, 52, 56, 58, 59, 66 and 68). The latter were also the most common providers of precancerous lesions of the cervix. The prevalence of HR-HPV was higher among HIV-positive clients and the “Other” serotypes were the most common in this segment of the population. Thermocoagulation was the therapeutic method of choice. A more in-depth study to identify the prevalence of the different serotypes constituting the “Other” group is essential in order to choose the most appropriate type of HPV vaccine for Burkina Faso. It would also be relevant to plan in a few years, a study on the mapping of HR-HPV in the vaccinated population, to evaluate the vaccine efficacy and strengthen the related policy.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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