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Original Research Article

## Acceptability and feasibility of human papillomavirus vaccination for adolescents in school environments in Libreville

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### ABSTRACT

**Background:** High-risk oncogenic human papillomaviruses (HPV) are the cause of sexually transmitted viral infection. Its persistence is a risk factor for precancerous lesions of the cervix, which will constitute the base of cervical cancer. In the world, the prevalence of high-risk oncogenic HPV is 66.7%, which is higher among women starting their sexual activity.

**Methods:** An analytical cross-sectional study was conducted in high schools in Gabon regarding parents. The variables selected were the socio-cultural and demographic characteristics of the parents, their knowledge of human papillomavirus vaccination and their acceptability of HPV vaccination and finally the feasibility of HPV vaccination. The statistical test used was Pearson's Chi-square, and a difference was considered significant for  $p < 0.05$ .

**Results:** The majority of parents, 89%, were informed of the existence of cervical cancer. However, 73.4% of them were unaware of the existence of vaccination against cervical cancer. Only 2.4% of parents had vaccinated their daughters against cervical cancer at the time of the study. These parents only 53.4% expressed an interest in vaccinating their daughters in 53.4% of cases. The ability to vaccinate children is associated with the socio-professional status of parents ( $p < 0.000$ ).

**Conclusions:** The majority of parents approved school-based vaccination against human papillomavirus infections despite its reported cost and lack of information. The integration of anti-HPV vaccination into the expanded programme on immunization in Gabon will improve immunization coverage.

**Keywords:** Acceptability, Adolescents, Feasibility, Human papillomavirus, School environments

### INTRODUCTION

High-risk oncogenic human papillomaviruses (HPV) are the cause of sexually transmitted viral infection. Its

persistence is a risk factor for precancerous lesions of the cervix, which will constitute the base of cervical cancer (cc) but also, to a very lesser extent, of the vagina, anus, throat and penis.<sup>1-4</sup> The cc ranks second among women in

developing countries, with 570,000 incident cases in 2018.<sup>2,5</sup> Worldwide, the prevalence of high-risk oncogenic HPV is 66.7%, which is higher among women starting their sexual activity; cc represents 15% of women's cancers.<sup>6,7</sup> This prevalence is 24.0% in sub-Saharan Africa.<sup>8</sup> Since 2007, vaccines against these viruses have been available and recommended for virgin girls from the age of 9 to 14 years. In Gabon, the incidence of cc is 19.9 per 100,000 women and represents 36% of gynaecological and breast cancers.<sup>9</sup> Since 2013, this country has had a cancer prevention and control programme, and the holistic management of cervical cancer is one of the priority areas. The current challenge is to integrate HPV vaccination into the expanded programme on immunization (EPI) according to World Health Organization (WHO) recommendations because academic medicine is well integrated in Gabon and the school attendance rate is 94%.<sup>9</sup> The objective of this work was to study the acceptability and feasibility of HPV vaccination in schools by parents.

## METHODS

This was an analytical cross-sectional study that took place in Libreville in public and private high schools over a six-month period, from 1<sup>st</sup> December 2015 to 30<sup>th</sup> June 2016.

### *Study population*

The target population was parents or tutors of at least one child enrolled in 6<sup>th</sup> and/or 5<sup>th</sup> grade regardless of gender. All parents whose children were present at the investigator's visit and who signed the informed consent form were included.

The sample size was calculated according to Daniel Schwartz's formula:  $n = Z\alpha^2 pq / i^2$  which is 296 parents. The choice of institutions was simple random selection from a list of all institutions, with the verbal consent of the Academy Directors. The parents' choice was exhaustive.

### *Data collection and procedure*

The data were collected using a pretested and validated questionnaire. It was an anonymous questionnaire consisting of short answer questions and a briefing note on the CC, HPV and HPV vaccination. An investigator team was formed to conduct discussion conferences on the CC, the HPV and the HPV vaccine before distributing the questionnaires and consent form to parents; the head teachers in each class and supervisors were responsible for collecting them. A total of 3,000 questionnaires were distributed to parents who came to schools at the end of each month for their children's academic performance.

### *Variables of interest*

The variables selected were the socio-cultural and demographic characteristics of the parents, their

knowledge of human papillomavirus vaccination and their acceptability of HPV vaccination and finally the feasibility of HPV vaccination.

### *Patient and public involvement*

Parents of students were educated about human papillomavirus as part of STIs in adolescents and also responsible for gynecological cancers. Primary prevention remains HPV vaccination available in health facilities. Parents were therefore involved in the recruitment and implementation of the study. A session to disseminate the results of the survey is organized in collaboration with school principals and parents who come to collect their children's academic results.

### *Statistical analysis*

The simple text entry was performed with Word 2013 software; the tables and graphs were created with Excel 2013 software. The statistical analysis was performed using CS Pro software version 6.0. The statistical test used was Pearson's Chi-square, and a difference was considered significant for  $p < 0.05$ .

### *Ethical considerations*

The study was conducted in accordance with the good clinical practice guidelines and the regulations of the Ministry of health and population. Written consent included elements of informed consent as described in the legislation of the Ministry of Public Health and population. The information was given in French in writing. It was written in such a way as to be understandable so that the children's parents or tutors could sign it after they had agreed to participate in the study.

## RESULTS

Authors distributed 3000 questionnaires in the selected institutions; 820 were returned, for a response rate of 28.2%. We excluded 26 questionnaires for non-response. A total of 820 questionnaires could be analysed, representing 27.3% of interpretable responses.

### *Sociodemographic and professional characteristics of participants*

The students' mothers had replied to the questionnaires in 51% of cases. Fathers responded in 37.3% of cases. The best represented socio-professional category is that of middle managers in 39.0% of cases. A parent had an average of  $4.3 \pm 2.9$  children. There was a high frequency of 41.6% in the 1 to 3 children group, followed by 39.4% in the 4 to 6 children group (Table 1). Parents with a female child were the most represented, with a total of 499 or 60.9%. The average number of girls per parent was  $2.23 \pm 1.8$ . The extremes of 0 and 12 girls. Parents with 0 to 3 daughters were the most represented, with a

total of 667 or 81.3%. Parents of sixth-grade students were the most represented, with a total of 601 or 73.3%.

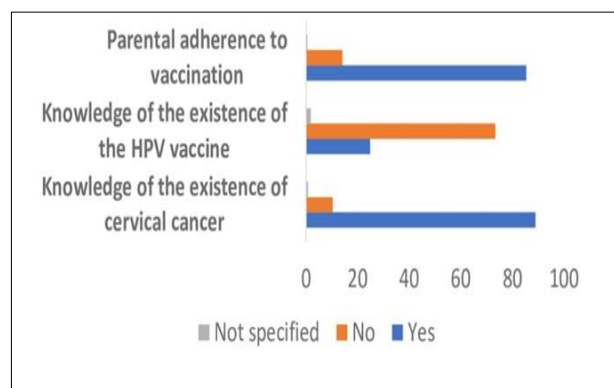
**Table 1: Socio-demographic characteristics of participants (N=820).**

Variables	Number	%
<b>Age</b>		
20-29	54	6.6
30-49	626	76.4
50-70	140	17.0
<b>Family relationship</b>		
Father	306	37.3
Mother	418	51.0
Other	96	11.7
<b>Socio-professional category</b>		
Senior managers	279	34.0
Middle managers	320	39.0
Working class	58	7.1
Unemployed, retired	156	19.0
Not specified	7	0.9
<b>Number of children</b>		
1-3	341	41.6
4-6	323	39.4
7 et +	156	19.0

**Parents' knowledge of cervical cancer, HPV infection and HPV vaccine**

The majority of parents, 89%, were informed of the existence of cervical cancer. However, 73.4% of them were unaware of the existence of vaccination against cervical cancer, and only 24.8% had heard of this vaccine (Figure 1). In general, the majority of parents adhere to vaccination because it protects against serious diseases (n=745) or 90.9%, is effective (n=684) or 83.4% and has few or no side effects (n=505) or 61.6%. The majority of parents interviewed consider that vaccination is too expensive (n=432) or 52.7%, ignores the existence of the

vaccine (n=423) or 51.6% and is especially afraid of adverse effects (n=495) or 60.4%.



**Figure 1: Knowledge about cervical cancer, the existence of the vaccine and adherence to vaccination.**

**Acceptability et feasibility of HPV vaccination**

Only 2.4% of parents had vaccinated their daughters against cervical cancer at the time of the study. These parents only 53.4% expressed an interest in vaccinating their daughters in 53.4% of cases. The non-motivation arguments for HPV vaccination are illustrated in Table 2. Parents who were able to vaccinate their daughters despite the high cost were 47.8%.

**Table 2: Arguments for not motivating HPV vaccination among parents.**

Justifications for the rejection	Number	%
<b>Ignorance</b>	248	30.2
<b>Fear of adverse reactions</b>	84	10.2
<b>Personal willingness</b>	39	4.8
<b>No medical recommendation</b>	28	3.4
<b>Costs</b>	17	2.1
<b>Others</b>	26	3.2

**Table 3: Distribution of parents by capacity to vaccinate their daughters and socio-professional category.**

Socio-professional category	SPC1	SPC2	SPC3	SPC4	Total (%)	P value
Ability of parents to carry out vaccination	Number (%)	Number (%)	Number (%)	Number (%)		
<b>Yes</b>	175 (45.0)	147 (37.8)	22 (5.7)	45 (11.6)	389 (100)	0.000
<b>No</b>	83 (23.9)	136 (39.1)	30 (8.6)	99 (28.4)	348 (100)	
<b>Total</b>	258 (35.0)	283 (38.4)	52 (7.1)	144 (19.5)	737 (100)	

There is a significant association between parents' ability to vaccinate and the socio-professional category (SPC) of parents at the 5% threshold (p=0.000). Parents who were able to vaccinate their children according to the WHO schema were from SPC1 and 2 (Table 3). However,

parents' ability to immunize is not significantly associated with the number of children (p=0.809) or the number of girls in the household (p=0.603). Parents were able to immunize their children in 61% of cases if the vaccine was recommended by the medical doctor. They were able

to immunize at 53.3% if it was included in the EPI, at 52.1% if it was covered by health insurance, in particular the Gabon insurance.

## DISCUSSION

The study was limited by the coincidence of institutional appointments with end-of-term or end-of-year assessment periods for examination classes; the presence of the target population was not mandatory. It was necessary to comply with the requirements of the schools, taking into account the upcoming school holidays. Nevertheless, the large sample size obtained made it possible to obtain large-scale results that we hope are close to reality.

### *Sociodemographic and professional characteristics of participants*

The study found an average age of parents of 40.6 years with extremes ranging from 25 to 70 years, the age group of 30-39 years was the majority or 40.5%. This distribution is consistent and represents the share of the labour force that has increased since 1993.<sup>9</sup> This could be explained by the fact that the age of the first parity is lower in Gabon. The study recorded 51% of mothers' responses. Guehot reported more than 90% of the mothers' responses.<sup>10</sup> There are two arguments in favour of the representativeness of mothers' responses. First, in Gabon, single-parent families dominate with mothers as the head of the family.<sup>9</sup> Then the theme of the study related to gynecology made that mothers were the most likely to respond. Raising awareness among men is important, especially since HPV infection affects boys less frequently but causes cancers of the penis, throat and anus.<sup>2</sup> The intermediate socio-professional category SPC2 (middle manager) dominated with 39% of responses followed by categories 1, 4, 3 and 5. These results are similar to those of Guehot, which found 41.9% of respondents in the same category. The consent to participate in the study of heads of public schools justifies this trend because the good quality of education and free schooling encourage the parents of any SPC to enroll their children despite the overcrowding. The promotion of STI/HIV control and vaccination concerns all adolescents regardless of the type of facility. The majority of parents had between 1 and 3 children; parents of female children were the most numerous, with 60.9%, the average number of girls per parent was  $2 \pm 1$ . Parents of pupils in 6<sup>th</sup> grade classes were the most represented 73.3% because the 6<sup>th</sup> grade classes were the most numerous with overcrowding.

### *Parents' knowledge on cervical cancer, HPV infection and HPV vaccine*

This study revealed that 74.4% of parents were ignorant of the existence of vaccination against cervical cancer, while 89% of them were aware of the existence of this disease. These results have also been obtained by some authors in a similar way.<sup>11-14</sup> However, these results differ

for some authors who showed that between 14.9 and 35.5% of parents were aware of this disease; they revealed, for example, in China that 28.85% of women had heard of the HPV vaccine, of which 54.44% knew that HPV can cause cancer.<sup>15,16</sup> Despite this difference, it should be noted that the population is not intensively sensitized to STI/HPV and its vaccine in Gabon.

### *Acceptability and feasibility of HPV vaccine*

Protection against a serious disease and the effectiveness of the vaccine were cited by 90.9% and 83.4% of parents as reasons for their massive acceptability to vaccination, or 85.4%. Several authors have reported results similar to ours.<sup>11-13,17</sup> The seriousness of the disease had been sufficiently mentioned during the campaigns through the media and patients' testimonies; and the effectiveness of the HPV vaccine preceded by that of the vaccines included in the EPI, and therefore vaccination in general. However, these results differ from those of Palmeri, Cheruvu, Restivo and Blaisdell.<sup>18-21</sup> In our study case, the minority of parents who did not accept the HPV vaccine, 14.6%, were mostly afraid of side effects, feared high costs and were unaware of the existence of the HPV and its vaccine. Partial or total coverage of the vaccine and the possible mandatory nature of the vaccine are two elements that could contribute to increasing adolescent girls' immunization coverage compared to HPV in Gabon. Only 2.4% of parents had vaccinated their daughters; 53.4% of parents interviewed understood the importance of vaccinating their daughters against 43.3%. Worldwide, vaccination coverage against HPV varies between 25 and 80%, and several reasons have been given for refusing the vaccine, including lack of information, fear of side effects, and vaccine ineffectiveness.<sup>8,21</sup> This low immunization coverage in Gabon was mainly due to ignorance of the vaccine's existence, fear of side effects and the perceived high cost of the vaccine. Although parents have understood that cervical cancer is a serious public health phenomenon, communication strategies around HPV will have to increase if primary prevention is to be effectively addressed in Gabon. Adolescent girls' knowledge of this vaccination is essential and must be complete. The absence of vaccination may be linked to the refusal of the adolescent herself, probably due to a lack of information, as the catch-up of the vaccine can go up to the age of 19, an age when parental authority is no longer required. The natural science teacher would be in a better position to stimulate collective and interactive reflection by intervening in the classroom, and to provide objective scientific information about HPV vaccination. Obviously, if this vaccine were to become mandatory, the decision-making role of parents for this vaccination would be limited. In addition, improved communication strategies could change the opinion of some parents and teenage girls about this vaccine and create the opportunity to vaccinate girls in schools to increase vaccination coverage in Gabon.

### **Analysis of acceptability and impassibility according to socio-demographic factors and level of knowledge**

Parents aged 30-39 are the most likely to agree to have their daughters vaccinated than others. However, the acceptability of vaccination is not significantly associated with the age of the parents ( $p=0.07$ ). The same is true for the number of children, the number of girls in a household. Some authors have found similar results to ours.<sup>22</sup> For other authors, however, parents believed that HPV vaccination should be mandatory because of HPV-related history, understanding of their children's sensitivity, the value of HPV vaccination to their children and their knowledge that the vaccine reduces the risk of cervical cancer.<sup>23-25</sup> There is a significant association between parents' ability to vaccinate and their socio-professional category ( $p=0.000$ ). Parents who were able to vaccinate their children according to the WHO scheme belonged to the SPC1. However, this ability of parents to immunize their children is not associated with the number of children and the number of girls in households.

### **Possibilities to carry out vaccination according to the WHO scheme despite the cost**

Before the awareness sessions, the proportion of parents who were able to vaccinate their daughters despite the cost was estimated at 47.8%. After the sensitization, the parents were ready to vaccinate their children left as follows: if vaccination was recommended by the doctor at 61%, if it was registered in the EPI at 53.3% and if it was covered by the Gabonese health insurance, in particular the National health insurance and social guarantee fund at 52.1%. But for the time being, the priority for immunization management is rotavirus in children in the country. It would therefore be important to promote safe sexual behaviour and systematic screening.

### **CONCLUSION**

One effective way to control cervical cancer is to vaccinate teenage girls against HPV. The study of the acceptability and feasibility of the parents was necessary. Almost half of the parents were from the intermediate socio-professional class. The majority of parents approved school-based vaccination against Human Papillomavirus infections despite its reported cost and lack of information. Very few adolescent girls had received at least one dose of the vaccine. In any case, school-based HPV vaccination is socially, technically and programmatically feasible in Gabon. Ultimately, integrating HPV vaccination into routine expanded programme of immunization will improve immunization coverage in Gabon.

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