PriMera Scientific
Medicine and Public Health
Volume 3 Issue 5 November 2023
DOI: 10.56831/PSMPH-03-099
ISSN: 2833-5627

PriMera Scientific Publications

Factors Associated with Non-Adherence to the HPV Vaccine by Parents of Girls Aged of 9 to 14 in the MIFI Health District, Cameroon

Type: Community-Based Study
Received: October 19, 2023
Published: October 27, 2023

Citation:
Armand Tiotsia Tsapi., et al. "Factors Associated with Non-Adherence to the HPV Vaccine by Parents of Girls Aged of 9 to 14 in the MIFI Health District, Cameroon". PriMera Scientific Medicine and Public Health 3.5 (2023): 35-46.

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Abstract

Introduction: HPV infection is the leading cause of cervical cancer and cancer deaths among women in Cameroon. It constitutes a real public health problem. The aim of this research was to study the factors associated with non-adherence to the HPV vaccine by the parents of young girls aged 9 to 14 in the MIFI Health District.

Methodology: This was a descriptive cross-sectional study with an analytical aim. This study was carried out among the parents of young girls aged 9 to 14 living in the Mifi Health District. The data was collected over the period of May to July 2023; using a face to face administered questionnaire. Questionnaires were administered after obtaining an informed consent from each participant. The data were subsequently compiled using Excel software, then analyzed using SPSS version 25 software. Descriptive and inferential statistics were used to present the

results; with a significance threshold set at 0.05.

Results: A total of 430 parents were accessed, of which 83.5% (359/430) of them were female. 34 parents declared to have vaccinated their children against HPV, for a vaccination coverage of 7.9%. 81.6% (351/430) of parents admitted to know about cervical cancer. 55.1% (237/430) of them had never heard of HPV and only 48.6% (209/430) of parents knew that this virus constitutes a risk for their health and that of their daughters. Regression analyzes showed a significant association between vaccination status and knowledge of the disease by parents/guardians [aOR=4.30(3.18-6.76); pvalue =0.001], the fact of not have received information on vaccination [aOR=3.02(1.51-5.65); pvalue =0.003], not having confidence in the vaccine [ORa =5.21(4.33-6.12); pvalue ≤0.001], having never heard of HPV [ORa =5.85 (4.43-6.88); pvalue ≤0.001], fear of side effects [ORa =5.79 (3.17-6.91); pvalue≤0.001], and parent's profession [ORa =4.98(3.35-6.77)); pvalue =0.004)].

Conclusion: Strengthening communication around the importance of vaccination against HPV becomes essential to reduce the incidence of cases of cervical cancer.

Introduction

Cervical cancer is the fourth most common cancer in women worldwide. There were an estimated 604,000 new cases and 342,000 deaths in 2020. Around 90% of new cases and deaths globally in 2020 occurred in low- and middle-income countries [1]. A large majority of cervical cancers (more than 95%) are caused by human papillomavirus (HPV) [1]. HPV types 16 and 18 are responsible for 70% of all cases worldwide. In 2009, the World Health Organization (WHO) recommended that routine vaccination against HPV should be included in national immunization programs. Especially since prevention of cervical or other HPV-related cancer diseases, or both, are a public health priority. The main target age group recommended for anti-HPV vaccination being 09-14 years representing the sexually inactive age group [2]. In low- and middle-income countries, access to these preventive measures is limited and cervical cancer is often not identified until it has reached an advanced stage and symptoms appear. Additionally, access to treatment for cancerous lesions (e.g. cancer surgery, radiotherapy and chemotherapy) may be limited, leading to a higher rate of cervical cancer deaths in these countries [1]. According to a case - series study conducted at the Douala General Hospital in Cameroon, cervical cancer ranked second among cancers in terms of incidence and mortality for both sexes combined, with 2770 new cases and 1787 deaths in 2021 [3]. The lack of knowledge about HPV and the cancers it causes, insufficient awareness of the HPV vaccine, hesitancy to get vaccinated, and non-disproportionate access to health care and services may be factors of this low vaccination coverage [4].

From 2019 to 2021, global vaccination coverage with the first dose of HPV vaccine saw a significant decline, from 25% in 2019 to 15% in 2021. This means that in 2021; 3.5 million more girls than in 2019 did not have sufficient access the vaccines [5]. In 2016, Marie Ecollan et al., in their study carried out among parents of students in two Parisian middle schools, obtained vaccination coverage of 13% [6]. In Uganda, a study conducted by Esther Kisaakye et al., in 2018 showed HPV vaccination coverage of 17.61% [7]. In Morocco, the survey conducted among parents, on the acceptability of the human papillomavirus vaccine revealed vaccination coverage of 0% [8]. In 2021, HPV1 vaccination coverage in Cameroon was 18.2% for a minimum target of 25%. Only the regions of Adamaoua, the Far North, North, North West and South West have achieved vaccination coverage of 25%. The regions with the lowest coverage are: the Littoral (0.7%), the Center (1.6%) and the West (4.1%) [9].

Although the pilot phase of HPV vaccine introduction went well, vaccination coverage still remains low due to multiple obstacles such as [1, 10]:

- The cost of HPV vaccines poses an obstacle for some countries to provide enough doses to their populations.
- Countries' attempts to increase their HPV vaccination coverage have also been affected by a shortage of doses. Although manufacturers are finding ways to ease supply constraints, the need for just one dose could significantly ease that pressure.

Increased efforts must also be made to counter the lack of knowledge about HPV and the cancers it causes, which is the case worldwide. For example, a U.S. study published last year in JAMA Pediatrics found that 60% of American men and 32% of American women aged 18 to 26 did not know that HPV causes cervical cancer. uterus. In addition to a lack of awareness of the HPV vaccine, vaccination hesitancy is also a factor for refusing vaccination [11].

Materials and Methods

This was a cross-sectional descriptive study with an analytical aim on a community-base, carried out over the period of May to October 2023 in the three sub-divisions covered by the Mifi Health District, namely Bafoussam, Baleng and Bamougoum. After obtaining their informed consent, a semi-open questionnaire was administered to the parents or guardians of young girls aged 9 to 14 living in the target districts of the study.

The minimum sample size (n) was determined using the Cochrane formula below:

$$n = \frac{tp2 \times P\,(1 - P) \times N}{tp\,2 \times P(1 - P) + (N-1) \times y2}$$

With:

- n: Sample size.
- N: Size of the target population (number of households, users, etc.), real or estimated. N= 95,998 household numbers from the Mifi Health District.
- P: Expected proportion of a population response or actual proportion. P=0.041 HPV vaccination coverage in the West region.
- Tp: Sampling confidence interval. Table 1 gives the tp values associated with the confidence intervals. tp =1.96
- Y: margin of sampling error. y =5%

After applying the formula with the basic parameters, we obtained a minimum sample size of n=388. An increase of 10% was made to cover the cases of refusal; Thus, a final sample size of n: 427 parents or guardians of children aged 09 - 14 years old to be surveyed.

We carried out exhaustive sampling, consisting of including in our sample all the parents/guardians of children encountered in the homes during our investigation.

The main information collected when administering the questionnaire were, the sociodemographic characteristics of the participants, their general knowledge about HPV and the cancers it causes, the vaccination status of their children as well as the factors associated with this vaccination status.

Data collection was preceded by obtaining various administrative authorizations, as well as ethical clearance from the Regional Ethics Committee for Research in the Human Sciences of the West Region. This was followed by the training of the investigators who immediately began collecting data using the door-to-door strategy. Only households containing the target children were visited.

The review of the raw data was systematically and continuously done at the end of each day by the investigators and the supervisor to ensure the completeness, consistency and accuracy of the data. These data were subsequently compiled in Microsoft Office Excel 2016 software, then exported to SPSS 25 software for statistical analyses.

At the end, to determine the factors associated with non-adherence to the HPV vaccine and the vaccination status of young girls, univariate and multivariate regression tests were used to test the association between studied independent variables and vaccination status. The test was considered significant if $p < 0.05$.

Results

Sociodemographic characteristics of the study population

A total of 430 parents were accessed. The majority of them were aged 33±8 years. The maximum age of their daughters was 14 years, the average age was 11±1 years. Table IV below presents the sociodemographic characteristics of the parents we accessed. Women constituted 83.5% (359/430) of the parent's population. There was a predominance of married people (58.8% or 253/430) and the least represented marital status is that of widowers (1.9% or 8/430). The majority of parents worked as traders (41.6% or 179/430) followed by the unemployed (16.7% or 72/430). The secondary school level was the most represented (57.2% or 246/430). Most parents had an average monthly income (68.1% or 293/430). 44.7% (192/430) of our participants practiced Catholicism and the majority (46% or 198/430) of them resided in the district of Bafoussam.

	Age of parent	***Age of child***	
Average	33.48	11.12	
Standard deviation	8,634	1,653	
Variable	***Modality***	***Number (N=430)***	***Percentage (%)***
Parent's gender	Women	359	83.5
	Man	71	16.5
Marital status of parent	Married	253	58.8
	Bachelor	148	34.4
	Widower	8	1.9
	Divorcee	21	4.9
Parent's occupation	Official	62	14.4
	Trader	179	41.6
	Student	36	8.4
	Entrepreneur	62	14.4
	Financial manager	19	4.4
	Unemployed	72	16.7
Parent's educational level	Primary	38	8.8
	Secondary	246	57.2
	Superior	146	34.0
Parent's monthly income	Shabby	113	26.3
	AVERAGE	293	68.1
	Pupil	24	5.6
Parent's religion	Catholic	192	44.7
	Protestant	176	40.9
	Presbyterian	41	9.5
	Other religion	21	4.9
Sub-division	Bafoussam	198	46.0
	Baleng	130	30.2
	Bamoungoun	102	23.7

Table 1: Distribution of the population according to socio-demographic factors.

Vaccination coverage of the population studied

Of the 430 parents accessed, 34 declared to have vaccinated their daughters against HPV. Thus, a vaccination coverage of 7.9%. Verification of children's vaccination status was done by consulting children's vaccination records.

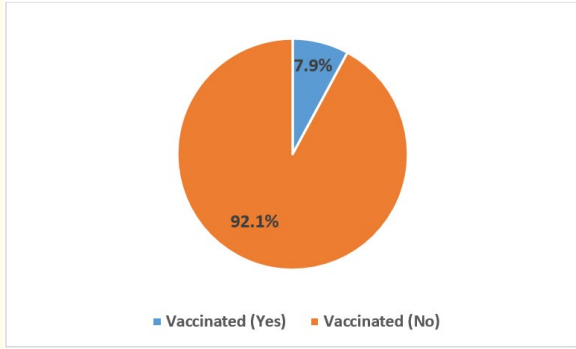

Figure 1: Vaccination status of children of parents/guardians surveyed.

Level of knowledge about cervical cancer, its prevention and HPV vaccination

Table II below presents parents' the level of knowledge about cervical cancer. We can notice that 81.6% (351/430) of participants said they knew about cervical cancer, 53.5% (230/430) did not know the cause of cervical cancer and 26.3% (113/430) claimed that it was caused by HPV. 55.1% (237/430) parents said they had never heard of HPV and 51.4 % (221/430) think that HPV was not a virus that posed a risk to their health.

Modality	*Number (n=430)*	*Percentage %*
Do you know about cervical cancer?		
Yes	351	81.6
No	79	18.4
What do you think causes cervical cancer?		
STI	57	13.3
HPV	113	26.3
Sexual intercourse	20	4.7
Family planning	10	2.3
I do not know	230	53.5
Have you ever heard of HPV?		
Yes	193	44.9
No	237	55.1
Is this virus a risk for your health?		
Yes	209	48.6
No	221	51.4

Table 2: Level of knowledge of parents about cervical cancer.

Table III below presents the level of knowledge on cervical cancer prevention and HPV vaccination. It appears that 29.1% (125/430) of parents did not know the means or methods of preventing cervical cancer. 10.9% (47/430) reported that they think vaccination constitutes a means of prevention, and 41.9% (180/430) of participants used condoms as a means of prevention. 60.7% (261/430) had never received information on vaccination; 58.6% (252/430) did not know where they could receive the vaccine and 81.2% (349/430) said they did not trust the vaccine.

Modality	*Number (n=430)*	*Percentage %*
How can cervical cancer be prevented?		
Condom	92	21.4
Screening	91	21.2
Vaccination	47	10.9
Loyalty	14	3.3
I do not know	125	29.1
Other	61	14.2
Which of these measures do you implement the most?		
Condom	180	41.9
Screening	68	15.8
Loyalty	4	.9
I do not know	112	26.0
Other	66	15.3
Have you already received information about vaccination?		
Yes	169	39.3
No	261	60.7
Do you know where you can receive this vaccine?		
Yes	178	41.4
No	252	58.6
Do you have confidence in this vaccine?		
Yes	81	18.8
No	349	81.2

Table 3: Level of knowledge on cervical cancer prevention and HPV vaccination.

Table IV below presents the results of the univariate regression of vaccination status with the studied independent variables. We note from this table that the independent variables which had a significant association with vaccination status are: insufficient knowledge on cervical cancer by parents/guardians [OR=2.14(1.31-3.45); pvalue =0.004], the fact of not have received information about vaccination [OR=4.78(2.66-6.25);pvalue≤0.001], the fact of not having confidence in the vaccine [OR =4.32(3.05-5.32);pvalue≤0.001], never having heard of HPV [OR=5.00(4.63-6.90);pvalue≤0.001], not having received enough information [OR=3.98(2.54-5.27);pvalue≤0.001], fear of vaccines [OR=2.65(1.74-3).50); pvalue =0.029], fear of side effects [OR=4.78 (3.62-5.61); pvalue =0.001], gender [OR=2.02(1.33-3.76); pvalue =0.035], and the parent's profession [OR=5.79(4.85-6.57); pvalue ≤0.001].

Variables	*cOR (IC)*	*pvalue*
Do you know about cervical cancer? (yes)	2,143 (1.31-3.45)	0.004**
Have you already received vaccination information? (yes)	4,777 (2.66-6.25)	≤0.001**
Do you have confidence in this vaccine? (yes)	4,320 (3.05-5.32)	≤0.001**
Never heard of it (no)	5,001 (4.63-6.90)	≤0.001**
Not enough information (no)	3,989 (2.54-5.27)	≤0.001**
Fear of vaccines (no)	2,654 (1.74-3.50)	0.029**
Side effects (no)	4,784 (3.62-5.61)	0.001**
I don't know any vaccination center (no)	1.005 (0.36-2.54)	0.471
Age	1,000 (0.47-1.83)	0.927
Sex (man)	2,021 (1.33-3.76)	0.035**
Marital status (single)	1,000 (0.20-2.08)	0.159
Occupation (official)	5,497 (4.85-6.57)	≤0.001**
School level (primary)	1,332 (0.16-2.10)	0.107
Monthly income (lousy)	1,000 (0.21-1.84)	0.990
Religion (presbyterian)	0.995 (0.43-1.76)	0.242

Table 4: Univariate regression of vaccination status with the independent variables of the study.

Table V below presents the multivariate regression analyses between vaccination status as the dependent variable and all the variables that were significant in the univariate. It appears after adjustment that the factors associated with non-adherence to the HPV vaccine are: insufficient knowledge of cervical cancer by parents/guardians [aOR =4.30(3, 18-6.76); pvalue =0.001], the fact of not have received information on vaccination [aOR =3.02(1.51-5.65); pvalue =0.003], not having confidence in the vaccine [aOR =5.21(4.33-6.12); pvalue≤0.001], have never heard of HPV [aOR =5.85(4.43-6.88); pvalue≤0.001], the fact of not have received enough information [aOR =3.83(1.67-5.42); pvalue =0.016], fear of vaccines [aOR =3.10(1.39-4.80); pvalue =0.039], fear of side effects [aOR =5.79 (3.17-6.91); pvalue≤0.001], parent's profession [aOR =4.98 (3.35-6.77) ; pvalue =0.004)].

Variables	*aOR (IC)*	*Pvalue*
Do you know about cervical cancer? (yes)	4,305 (3.18-6.76)	0.001**
Have you already received vaccination information? (yes)	3,020 (1.51-5.65)	0.003**
Do you have confidence in this vaccine? (yes)	5,207 (4.33-6.12)	≤0.001**
Never heard of it (no)	5,851 (4.43-6.88)	≤0.001**
Not enough information (no)	3,829 (1.67-5.42)	0.016**
Fear of vaccines (yes)	3,100 (1.39-4.80)	0.039**
Side effects (no)	5,789 (3.17-6.91)	≤0.001**
Sex (man)	1,111 (0.58-2.32	0.113
Occupation (official)	4,978 (3.35-6.77)	0.004**

Table 5: Multivariate regression between variables having a significant correlation with vaccination status.

Discussion

Cervical cancer remains a major health problem in Sub-Saharan Africa in general and in Cameroon in particular, due to the low level of knowledge, the low standard of living of the population and a lack of technical support provided and inappropriate for its diagnosis and prevention. Although efforts are being made through the vaccination of young girls and sensitization, it remains true that knowledge about HPV, cervical cancer and their risk factors is still embryonic. Hence the importance of our study, which had the general objective of studying the factors associated with non-adherence to the HPV vaccine by the parents of young girls aged 9 to 14 in the MIFI health district.

Of the 430 parents accessed in our study, the average age was 33±8 years. This average age of respondents is slightly lower than the 42 years obtained in 2022 in North-West Cameroon by Elit. And al., in rural areas. This age difference can be explained by the fact that the population in rural areas is older than that in urban areas, characteristic of the population of the Mifi District [12]. Regarding marital status, the class of "Married" was the one with the highest percentage (58.8%) and the most represented sex was that of "Women" (83.5%). These results are slightly similar to those obtained by Marie Ecollan et al., in 2016, where the percentage of parents in couple was 71%, and 74% of parents who responded to the questionnaire were mothers [6].

Vaccination coverage in our study was 7.9% with 34 parents which had vaccinated their daughters out of the 430 parents. This result is much lower than the 17.61% obtained in 2018 by Esther Kisaakye et al., in 2018 in Uganda [7]. This difference can be explained by the effective implementation of response actions by the Ugandan Ministry of Health, notably the existence of awareness raising by community health workers, the availability of vaccines at vaccination sites, full information reception on the vaccination site and audio sensitizations programs on radios which is not always the case in Cameroon. Although our coverage is below the national coverage (18.2% in 2021) and the 90% target set by the WHO [1].

The low HPV vaccination coverage can also be explained by a lack of knowledge and information about HPV or by a lack of sensitizations of preventive methods. As our study shows, 55.1% of parents had never heard of HPV, which is well below the 91% found in

North-West Cameroon by Elit. L. and al., in 2022 [12]. This result differs from that found between 2000 and 2010 by Baer, Allen, and Braun who found that only 4.2% of men and 11.6% of women had heard of HPV (Baer, Allen, & Braun [13], this is because in Europe the level of awareness is higher than in Sub-Saharan African countries. A study of adolescent girls aged 15 to 20 showed a similar result: 87% of adolescents had never heard of HPV [14]. Later, other studies shown that between 30% and 33% of adult participants had heard of HPV [15, 16]. A few years later, Gerend and Magloire, in 2007, found that 78% of participants were informed, then Short et al., (2010) reported a similar result, specifying that 89% of participants had heard of HPV. In France, Lerais et al., (2009) reported that 63% of middle and high school students had heard of HPV and 53% of participants showed good knowledge of HPV [17-19]. Studies also show that women and men know little about HPV and share many misconceptions [20, 21]. Despite the high rate of infections and the serious potential consequences of HPV, parents are still unaware of the risk of this virus and its link with cervical cancer because 52% of the parents accessed in our study did not know that HPV is a virus that is risky for their health and that of their children, also as demonstrated by the studies of [22, 23]. The sources of information collected during our study were mainly health personnel (22.60%) and the media (television, newspapers, Internet). Of course, the most credible source of information and the opinion which was most taken into account in the final decision on vaccination are those which came from medical profession and health professionals. Numerous studies have shown that people advised by their doctors for vaccination are more likely to follow their recommendations than those who do not receive such advice [24].

Parents play an important role in the decision about HPV vaccination because this vaccination is recommended for minors. According to Stretch et al., in 2008, only 6% of parents were informed by a health professional [25]. Most obtain information about the HPV vaccine from media such as television or the Internet or from newspapers and magazines. However, research shows that just reading information about the HPV vaccine has a very small effect on parents' decision [26-28]. In the study by Cassidy et al., in 2013, the majority of parents (62%) admitted that educational booklet helped them to better understand the risks and consequences of HPV infection [29], but in our study, no parents had received information on HPV vaccination through bnooklets although their doctor made the most important contribution to their decision (78.2% of parents). Similarly, Natan et al., in 2011 reported that parents' decision-making on vaccinating their daughters is more influenced by attending physicians and their spouses than by their level of knowledge of HPV [30].

In our study, knowledge of the disease by parents/guardians, lack of information on vaccination, distrust of vaccines, fear of side effects, and the parent's profession were significantly associated with refusal of vaccination. Furthermore, we did not find a statistically significant association between the sex of the parents and the vaccination of girls against HPV. The results are consistent with those of [31]. This situation shows there is an almost similar position of women and men regarding to vaccination. This is can be considered as a remarkable progress if we take into account certain social stereotypes which considers that "the vaccination is a women's affair." On the other hand, in a study conducted in Morocco, parents refusing HPV vaccination were predominantly male [8]. Previous research as well as this present study found that, parental sensitization about cervical cancer and HPV is significantly associated with vaccination adherence [32, 33]. In a survey conducted by (Naima Baddouh et al, 2018) the acceptability rate of the vaccine by parents increased from 63% to 82% after having knowledge about cervical cancer and the human papilloma virus [8]. In Kenya, lack of information about the vaccine has been identified as a barrier to vaccination [34]. Which shows that increasing parents' knowledge about the vaccine can positively influence the decision to vaccinate. There was a link between vaccination status and lack of confidence in the vaccine. Apart from the knowledge and information aspect, there are other factors that come into play such as fear of side effects. This major concern has been raised by other studies [35-37]. This is a very serious issue taken into account in national vaccination programs around the world because it can reduce the efforts to prevent cervical cancer and compromise the success of vaccination in general. In our study, side effects were absent. Previous research has also concluded that side effects are rare and that there is a need for broader information on the protective capabilities of the vaccine and its safety [38].

Contribution of Authors

ATT, AJKK, Design and execution of the survey; ATT, AJKK, Data collection; ATT, AJKK, EDT, DNM, LDNM, Data analysis; ATT, AJKK, EDT, DNM, HMP Interpretation of results; ATT, AJKK, EDT, ACM, DNM, HMP, LDNM, KA, CK, RTS, VC, RG, Manuscript writing; All au-

thors participated in critical revision for important intellectual content, and all authors approved the final version for publication. All authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved, and declare that they have confidence in the integrity of the contributions of their co-authors.

Ethical Considerations

To conduct this study, we obtained ethical clearance from the Regional Ethics Committee for Human Health Research of the West Region N° 584/30/06/2023/CE/CRERSH-OU.

Informed Consent

Informed consent was obtained from health facility managers before any use of the information.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

Funding

This work did not receive any funding.

Acknowledgement

Our thanks go respectively to:

- The MIFI Health District,
- The Mayors of the three sub-division of the city of Bafoussam,
- Parents/guardians of children aged 9 to 14 who participated in this study.

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