

## RESEARCH COMMUNICATION

# Evaluating Knowledge about Human Papillomavirus Infection among Brazilian Health Professionals

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### Abstract

Human papillomavirus (HPV) infection is one of the most common sexually transmitted diseases worldwide. Although two safe and clinically effective vaccines against HPV have been developed, they are not available to the public health network in Brazil. This study was performed to assess knowledge about HPV among seventy-nine professionals who completed a questionnaire about diagnosis, transmission, symptoms, prevention and general information. General knowledge about HPV was high, as most of them recognized that HPV is transmitted sexually (98.7%), the disease can be asymptomatic (82.3%) or warts can be present on the genitals (84.8%) and the Pap smear is the screening method to identify cellular changes on the cervix (88.6%). However, many professionals did not know that there are now vaccines available for many HPV variants (38.0%) and that not all of them are oncogenic (44.3%). These data show that further educational programs, especially about HPV prevention, are needed in Brazil.

**Keywords:** Papillomavirus infections - health personnel - knowledge - perception - Brazil

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### Introduction

Human papillomavirus (HPV) is one of the most common sexually transmitted diseases (STD). There are more than 100 different types, 40 of which reach the anogenital region, and among them HPV 16 and 18 are the most common causes of cervical cancer and infections worldwide (Hsueh, 2009). HPV prevalence varies from 5.2% in Europe to 25.6% in Africa (Rosa et al., 2009) while the prevalence of oncogenic HPV types is: 25% in Brazil, 16.9% in Canada, and 19.1% in the USA (Roteli-Martins et al., 2011). In Brazil, the overall prevalence of HPV cervical infection is between 13.7% and 54.3% (Ayres & Silva, 2010) and HPV 16 is the predominant type in invasive cervical cancers in the North, South, Southeast, Mid-West, Northeast regions with prevalences of 43.5%, 52%, 52%, 57%, 59%, respectively (Rosa et al., 2009).

HPV infection is transmitted primarily through any activity that involves genital skin or oral mucosa contact, including genital-to-genital, manual-to-genital and oral-to-genital contact. However, the virus can also be transmitted by a mother to her newborn and fomites (Hsueh, 2009). Risk factors for HPV acquisition are early sexual activity and number of sexual partners. Persistent infection with high-risk types of HPV may lead to invasive cervical cancer if left untreated and other STDs and nutritional disabilities may be cofactors (Rosa et al., 2009; Silva et al., 2009). The most important initial step

to determine the pathology associated with HPV infection is the clinical evaluation, followed by histological and / or cytological examination. Papanicolaou staining, immunohistochemical, and molecular biology techniques (PCR or in situ hybridization) are very sensitive and important methods for HPV diagnosis (Tchernev, 2009).

Specific antiviral treatment able to eradicate HPV infections is not available yet, thus the primary goal of treatment is to eliminate cervical precancer (Hsueh, 2009; Tchernev, 2009). Total sexual abstinence is the most effective method to prevent HPV infection, while lifetime mutual monogamy and condom use are also effective measures to reduce the risk of acquiring HPV infection (Hsueh, 2009). Nowadays, two vaccines have been developed for prophylactic HPV vaccination. Gardasil® (Merck and Co., USA) is approved for use in 123 countries while Cervarix® (GlaxoSmithKline, Belgium) is approved in 99 countries, both of them are approved in Brazil. Both of them target HPV16 and HPV18 and Gardasil® also targets HPV 6 and HPV 11 (Li et al., 2009; Romanowski, 2011). HPV16 and HPV18 are high-risk types potentially leading to cervical cancer while HPV6 and HPV11 are low risk types which result in warts/low-grade lesions, not cancer. Both HPV vaccines are more than 90% effective for the prevention of cervical cancer precursors (Romanowski, 2011).

The Brazilian Public health system is a large government run system, known as SUS (Sistema Único

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de Saúde), which serves the majority of the population, and there is a private health system, managed by health insurance funds and private entrepreneurs. The Brazilian government has developed several special programs such as the Community Health Workers Program (Programa de Agentes Comunitários de Saúde or PACS) set up in 1991, and the Family Health Program (Programa de Saúde da Família or PSF) started in 1994 to bolster the primary health care services (Macinko et al., 2004). At present the HPV vaccination is not included in the Brazilian Public Immunization Program, so vaccines can only be found in the private sector. Health care providers play a key role in the control and prevention of diseases, like HPV infection, due to their participation in early diagnosis, proper treatment and counselling for disease prevention. Therefore a lack of knowledge concerning HPV among health professionals could impede health care delivery, since they would not be able to provide full information for HPV prevention and vaccine adherence.

Some knowledge surveys on HPV infection have been conducted among health professionals from different geographical areas around the world. Tafouri et al. (2010) demonstrated that 74.2% of Italian health professionals judged HPV vaccines to be very important for the immunization calendar and 62.2% believed that boys should also be vaccinated while Esposito et al. (2007) showed that only 20.9% of Italian paediatricians knew that more than 100 types of HPV had been identified, and 50.8% knew that types 16 and 18 are the most common cause of cervical cancer. Health professionals from Belgium and New Zealand also knew the role of HPV as the viral agent of cervical cancer (Baay et al., 2006; Henninger, 2009) while 72.2% of physicians from Thailand recognized that HPV infection is a sexually transmitted disease (STD) and 84.2% of them said that that multiple sexual partners are a risk factor (Nganwai et al., 2008).

In Brazil, surveys about HPV perception have been carried out but mainly among the female population and in terms of HPV vaccine knowledge (Rama et al., 2010; Cirino et al., 2010; Moreira et al., 2006). Studies conducted among young women and adolescents, who had had previous sexual intercourse, from the Southeast region showed that only 19% knew that HPV is a STD and 7 to 12.5% knew that it can cause cervical cancer (Rama et al., 2010; Cirino et al., 2010). Moreover, among adolescents (70.8%) did not know that the Papanicolaou test should be done periodically and (54.2%) did not know that this test is a screening test for cervical cancer diagnosis (Cirino et al., 2010). Another study among women from the Northeast region demonstrated that 67% did not know that HPV can cause cervical cancer (Moreira et al., 2006). On the other hand, only one study, which was conducted among health professionals with the aim to identify HPV vaccine awareness, showed that 79.7% indicate HPV vaccine, specially for girls aged 10–15 years old (De Carvalho et al., 2009).

This situation shows that individuals who lack knowledge about HPV and the development of cancer may not understand the intrinsic value of preventing infection, and they may be less willing to be vaccinated or participate

in strategies for disease prevention. Moreover, few studies have been conducted to study HPV knowledge among health professionals, especially in developing countries, like Brazil. So the present study was designed to assess health professionals' knowledge concerning HPV to identify areas which deserve particular attention and to give data for Health Authorities that may increase HPV vaccine acceptability and reduce the burden of the disease.

## Materials and Methods

### Study Design

In March 2009, a cross-sectional survey was carried out among a non randomized sample of Brazilian health professionals from the Southeast region of Brazil regarding HPV knowledge. Brazil has no accrediting board or registry of licensed health professionals on a national level; Minas Gerais State located in the Southeast region is the only region that conducted a census of health facilities in 2006 (Minas Gerais, 2006). So the sample included all health professionals (nurses, physicians and laboratory workers) working in public or private health facilities in the town of Muriaé in Minas Gerais State. All health professionals were included due to the easy access to them. Moreover, laboratory workers were included to provide new information about HPV knowledge among other health professional categories.

### Study Population

According to the Health facilities census, Muriaé has 67 health facilities, 35 public and 32 private, with a total of 226 health professionals. This database registered only the total number of employees working in each facility and their specialty; names of individual physicians were not available.

One of the authors made contact with the management of these 67 facilities and 18 of them agreed to participate in this study with half of them from public service. There is not difference between the facilities that agreed to participate and those that did not (data not shown). All of the health workers aged 18 and above from these 18 facilities were considered theoretically eligible for this study. These health professionals received a letter 30 days before the beginning of survey distribution in which they were asked whether they would be willing to respond to a brief questionnaire regarding HPV knowledge.

A sample size of 100 individuals was targeted, and assuming a response rate of 75–80%, 75 completed questionnaires would yield a power of 80% with a 5% type 1 error rate to detect a 16% difference when comparing dichotomous variables between two groups of equal size. The final sample was made up of 79 healthcare professionals including laboratory workers, nurses and physicians, irrespective of status. None of them had been diagnosed as having any cancer and had been directly involved in the delivery of HPV information to patients/parents for cervical cancer screening or had been involved in vaccine delivery. No incentive was done to these individuals to participate in this study. All of them agreed to participate in this study after signing the consent form in March 2009.

### Questionnaire

The questionnaire was divided into two topics: 1) demographic characteristics, 2) knowledge of HPV transmission, diagnosis, epidemiology and risk factors, prevention and general information. The questionnaire consisted of 18 items in two formats: 10 true/false/don't know questions; eight (8) multiple choice questions requiring one or more answers. The questionnaire was administered to the participants as a face-to-face interview by one of the authors in a confidential setting. The questionnaire was developed by the authors following a review of the literature on HPV aspects and it was pre-standardized on a convenience sample of health professionals that presented similar characteristics of the population studied (data not shown). At the end of the interview, the correct answers were shown to each volunteer.

### Data Collection and Analysis

Data was entered into an Excell file. Two members of the team entered the same data twice and the data files were compared to rule out errors in entering the data.

The HPV knowledge score was created based on the participants responses that were scored as follows: "low" (0–12 correct answers), "good" (13–16 correct answers) and "excellent" (17–18 correct answers). The following variables were used to examine associations between knowledge of HPV and socio-demographic characteristics: age, sex, and time since graduation.

Descriptive statistics were generated for the responses, and the chi-squared for independence or for trend and the Kruskal-Wallis test was used to compare categorical and continuous variables among the knowledge score groups. The two tailed test p-values < 0.05 were considered significant. All of the analyses were made using GraphPad Instat version 3.0 for Windows.

### Ethical Consideration

Ethical approval was given by Ethic Committee of the Universidade do Grande Rio, Rio de Janeiro, Brazil. Respondents were ensured about confidentiality, they were briefed that their participation was voluntary and that they had full right to withdraw from the study at any point. Informed consent was obtained from all the participants before joining the survey.

## Results

### Sample characteristics

The sample included 46 women and 33 men, including 25 laboratory workers, 24 nurses and 30 physicians. Participants' ages ranged from 21 to 59, the mean was 29.3 years old (SD 7.5 years). The average time since graduation was 5.7 years (SD 6.5 years) and 58 (73%) of them had taken postgraduate courses.

### General knowledge about HPV (see Table 1)

In terms of general knowledge about HPV, all the

**Table 1. Knowledge about Human Papillomavirus (HPV) Among Brazilian Health Professionals. (n=79)**

	True n (%)	False n (%)	Don't know n (%)
<i>General Information</i>			
The etiological agent of HPV infection is a virus	79 (100)	0 (0)	0 (0)
HPV infection can lead to cancer	73 (92.4)	6 (7.6)	0
There are different HPV variants	61 (77.2)	6 (7.6)	12 (15.2)
Not all HPV variants are oncogenic*	44 (55.7)	18 (22.8)	17 (21.5)
HPV does not cause acne*	65 (82.3)	2 (2.5)	12 (15.2)
<i>Transmission</i>			
HPV is transmitted by sexual intercourse	78 (98.7)	1 (1.3)	0
The risk of HPV transmission can be increased the earlier sexual activity begins	45 (56.9)	0 (0)	34 (43.1)
The risk of HPV transmission can be increased by having multiple sexual partners.	76 (96.2)	0 (0)	3 (3.8)
The risk of HPV transmission can be increased by not using condoms	73 (92.4)	0 (0)	6 (7.6)
The risk of HPV transmission can not be increased due to alcohol intake *	78 (98.7)	1 (1.3)	0 (0)
The risk of HPV transmission can not be increased due to contact with domestic animals *	77 (97.5)	2 (2.5)	0 (0)
The risk of HPV transmission can be increased due to the presence of other sexual transmitted diseases.	39 (49.4)	0 (0)	40 (50.6)
<i>Diagnosis and Epidemiology</i>			
Pap Smear Test is the best screening method for HPV diagnosis	70 (88.6)	9 (11.4)	0 (0)
HPV infection affects mainly sexually active women.	52 (65.8)	27 (34.2)	0 (0)
<i>Symptoms</i>			
The most common clinical manifestations caused by HPV are warts	66 (84.8)	12 (15.2)	1 (1.3)
HPV infection can be asymptomatic	65 (82.3)	13 (16.4)	1 (1.3)
<i>Prevention</i>			
HPV can be prevented by use of condoms during sexual intercourse	79 (100)	0 (0)	0 (0)
There are not vaccines available for all HPV variants	49 (62.0)	9 (11.4)	21 (26.6)

\*Presented with false statements in the questionnaire; however n reordered as true sentences for presentation data consistency

**Table 2. Knowledge Scores about HPV for the Main Characteristics of the Brazilian Health Professionals Studied (n=79).**

Characteristic	Knowledge Score			P value
	Low (n=8)	Good (n=38)	Excellent (n=33)	
Sex (%)				
Male	7 (87.5)	1 (12.5)	22 (57.9)	<b>0.008</b>
Female	16 (42.1)	10 (30.3)	23 (69.7)	
Age (Years)				
Median	30.0	26.0	27.0	0.47
Minimum	21.0	21.0	21.0	
Maximum	42.0	50.0	59.0	
Time since graduation (Years)				
Median	5.5	4.0	3.0	0.51
Minimum	1.0		1.0	1.0
Maximum	19.0	25.0	35.0	
Professional Area				
Laboratory Workers	6 (75)	12 (31.6)	7 (21.2)	<b>0.04</b>
Nurses	0 (0)	12 (31.6)	10 (30.3)	
Physicians	2 (25)	14 (36.8)	16 (48.5)	
Highest Degree				
Bachelor	5 (62.5)	7 (18.4)	11 (33.3)	0.62
Postgraduate	3 (37.5)	31 (81.6)	22 (66.7)	

participants were aware that HPV is a virus, 92.4% of them knew that HPV can lead to cancer, 82.3% of them answered that HPV can not lead to acne and 77.2% of them reported the existence of different HPV variants. Concerning HPV transmission - most of the professionals recognized that HPV is transmitted by sexual intercourse (98.7%), and there is an increased risk by having multiple sexual partners (96.2%) and due to the non-use of condoms (92.4%). It is important to note that many professionals were unaware that the risk of HPV transmission can be increased by the presence of other sexual diseases (50.6%) or by the earlier initiation of sexual activities (43.1%).

Most of the professionals recognized that the screening method for HPV diagnosis is the Pap Smear (88.6%) but few of them did not realized that the virus affects mostly women (34.2%). For HPV symptoms, the professionals recognized that the most common clinical manifestations caused by HPV were warts (84.8%) and can be asymptomatic (82.3%). For HPV prevention, all of them recognized that HPV can be prevented by using condoms but 38% of them reported that there were vaccines available for all HPV variants.

#### *Knowledge about HPV according to the main characteristics.*

Sixteen individuals responded correctly to all questions, none of them reported incorrect answers to all questions (see Table 2). Knowledge level was not associated with age, highest educational degree, or time after graduation but was associated with sex and professional area. Males presented lower knowledge compared to females ( $p=0.008$ ).

The frequency of correct answers by occupation was as follows: 86.5% among physicians, 84.9% among nurses and 76.6% among laboratory workers, the latter presented the lowest knowledge compared to others ( $p=0.04$ ).

## Discussion

A good knowledge of HPV infection was reported among the health professionals in the present study, because most of them recognized the basic aspects of HPV infection, such as the viral nature and the mode of transmission (sexual) of the infection. This observation was also reported among physicians in Belgium (Baay et al., 2006) and nurses in Thailand (Nganwai et al. 2008). Most of the health professionals recognized the Pap Smear test as screening method for HPV diagnosis and condom usage for HPV prevention. Italians doctors and CDC also recommend condom use for primary prevention of HPV infection (Tafari et al., 2010; CDC, 2011).

On the other hand, few Brazilian health professionals reported a higher risk of HPV transmission due to the presence of other sexually transmitted diseases or the early onset of sexual activity, just as observed in other studies conducted among the general population in Brazil (Thanappapasr et al., 2010; Rama et al., 2010; Cirino et al., 2010; Moreira et al., 2006). These gaps may be due to a lack of information or the inefficient transfer of information to this population.

Many health workers are unaware that not all HPV strains are oncogenic and that there are no vaccines available for all HPV variants. Women in the United States did not know for sure if HPV causes cervical cancer (Kobetz et al., 2010) while most Brazilian physicians and medical students (75.3%) understood that the vaccine does not contemplate all HPV types involved in oncogenic mechanisms and that continued cervical cancer screening through Papanicolaou testing is necessary regardless of vaccination (De Carvalho et al., 2009).

Currently, there are two major vaccines available for clinical usage, which have been shown to have a very high efficacy in preventing persistent infection and the development of precancerous lesions caused by high-risk HPV types (Li et al., 2009; Romanowski, 2011). The HPV vaccination can reduce cervical cancer indices, the required frequency of cytologic testing in the future, and the number of women who will be subjected to the stress of abnormal test results, colposcopy and treatment (Bosch et al., 2008; Adams et al., 2007). To obtain these positive effects, a high level of vaccination uptake is necessary, preferably before the onset of sexual activity. This in turn is dependent upon the willingness of individuals to accept vaccination, parents' willingness to have their children vaccinated and health professionals' willingness to administer HPV vaccines (Henninger, 2009; Dillard et al., 2010). Although, only one question regarding HPV vaccination was presented in the present study, low frequency of correct answers were achieved, reflecting the necessity of health campaigns to clarify the main aspects.

The highest level of HPV knowledge was reported among women and physicians. This situation was probably due to the educational campaigns aimed at women and physicians that enhance their knowledge. The same level of HPV knowledge was also reported among family physicians in the USA (Jain et al., 2006) and health care professionals from Thailand (Nganwai et al., 2008). The high HPV knowledge level among women is probably

due to the fact they have gynaecological examinations and subsequently receive clarification on the matter. It is important to implement continuing education programs especially among men and health professionals other than physicians to improve HPV knowledge in these groups.

The limitations of this study should include the characteristics of the subjects studied, since approximately 70% of them are graduated. Health professionals who were not graduated probably would not have the same performance in the questionnaire. Besides, the small sample size and the inclusion of health professionals of one single geographical area limit the generalization of the results. However, the search strategy to select these individuals was chosen due to the recent survey on the number of health professionals which facilitated the selection of the population surveyed. In this context, larger studies with undergraduate health professionals are needed before the results could be considered to represent a specific group of individuals.

On the other hand, this is one of the first studies to identify HPV knowledge among health professionals in Brazil and it can be very useful to define preventive measures against HPV infection. To date, HPV vaccination is not included in National Program of Vaccination and health professionals play an important role giving information about HPV prevention to the general population. When health providers are well-informed, they are able to advise and counsel their patients and hopefully reduce the burden of disease related to HPV infection, especially cervical and other cancers. Because Brazil has not put HPV vaccines on the public immunization schedule, it is definitely worthwhile to explore HPV knowledge among the providers as well as the public.

In conclusion, HPV knowledge was good to excellent among the population studied, despite some conceptual errors. However, some specific groups presented a low HPV knowledge, such as men and the laboratory workers. One possible measure to increase HPV knowledge among this group would be the development of continuing education programs for health professionals, such as educational videos as reported by Chapman et al. (2010), in order to enable staff to provide correct information about HPV prevention to their patients.

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