

# Groups at Risk: What does a Sample of Brazilian Students Know about HPV?

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## Abstract

*Human Papillomavirus (HPV) causes one of the most common sexually transmitted diseases in the world. Studies have estimated that nowadays there are 270 million women infected worldwide. We aimed to investigate the general knowledge of young people from public and private universities in Rio de Janeiro, Brazil, in different levels of education on the pathogenesis of HPV. We questioned 285 students, in Rio de Janeiro, Brazil, in 2008 and 2013. In addition, we analysed all the campaigns developed in the country on the subject of HPV. We discovered that most youngsters in 2008 knew little about what HPV is, how it is transmitted or what it causes. In parallel, we found only 16 advertising campaigns on the same subject aimed at adult women in that period. Five years later, we realized that the knowledge about HPV had not changed, despite all the campaigns about HPV vaccination. We believe that more extensive informative campaigns about this health problem aimed specifically at young people need to be included in the agenda of governmental and non-governmental organizations with a more ludic approach and interaction so it can be more effective among this specific population.*

**Key Words:** HPV, cancer, public health, adolescents, Brazil

## Introduction

Genital infection with Human Papillomavirus (HPV) causes one of the most common sexually transmitted diseases in the world. In studies involving several countries it was estimated to occur in 20 to 46 per cent of the population of young women in these countries (Ho, Bierman, Beardsley, Chang, Burk, 1998; Teixeira et al. 2002; Rama et al. 2006). The occurrence of HPV among women is estimated at 270 million cases worldwide (Gómez-García et al, 2005). In Brazil, three to six million males are estimated to be infected (nearly

7%) by the virus (Queiroz, Pessoa, Sousa, 2005). According to Giuliano et al. (2008), in a research with 1,160 men between 18 and 70 years old, the prevalence of HPV was higher in Brazil (72.3%) than in the United States (61.3%) and Mexico (61.9%).

Approximately three to five per cent of the sexually active Brazilian population has shown symptoms of the disease, and the detection of HPV in the country has grown by 500 per cent in the last decade (Queiroz et al, 2005), which may be related to advanced diagnostic techniques.

Out of all the 120 types of HPV, only 12 of them

are correlated with tumours. According to meta-analyses of 243 studies published worldwide between 1990 and 2010, 92.9% of the cervical cancers analysed were related to some types of HPV.

Despite being one of the most preventable and curable types, the number of cervical cancers in Brazil and around the world is still alarming. In 2012, the global estimate of the disease was 527,624 new cases, with a rate of 14 per every 100,000 women (World Health Organization, 2012). In Brazil for the year 2014, 15,590 new cases of cervical cancer are estimated with an estimated risk of 15.33 cases for every 100,000 women. This is the third most frequent type of cancer among women in Brazil.

Several studies have shown that the population in developed countries has very limited knowledge about HPV (Vanslyke et al., 2008; Ackerson, Pohl, Low, 2008; Giuseppe, Abbate, Liguori, Albano, Angelillo, 2008; Rama et al., 2010; Wong & Sam, 2010; Saha, Chaudhury, Bhowmik, Chatterjee, 2011; Hilton & Smith, 2011) and this is also apparent in Brazil (Doreto & Vieira, 2007; Pedrosa, Mattos, Koifman, 2008). Targeted at the adult female population, these studies show that the majority has never heard of HPV. Among those who have heard, most of them think of it as a sexually transmitted disease (STD) and only a few of them know that it can cause cancer. They seem to relate cancer to sexual relations, but not to HPV (Vanslyke et al., 2008), or correlate cervical cancer only with heritage (Ackerson, et al, 2008). Even women who have the disease may not understand it. Some Brazilian women, after receiving a diagnosis of HPV, believe that they have the human immunodeficiency virus (HIV) (De Sousa, Pinheiro, Barroso, 2008).

Sousa and colleagues (2008) warned that the main source of information on HPV and other sexually transmitted diseases is the public health clinic in addition to newspapers, magazines, television, friends and family. The authors point out that the HPV infection is discussed very little in comparison with other diseases such as AIDS. Doreto and Vieira (2007) concluded that all young people knew about HIV, but only around 28% knew about HPV.

To add to this situation, between 1999 and 2005, the Brazilian National Cancer Institute's database showed a linear increase in cervical abnormalities that was 2.6 times greater in adolescents (10 to 19 years) than in adults (Pedrosa et al., 2008). These data suggest the importance of developing strategies for informing young people about HPV.

In the face of his epidemiology panorama with the increase in cervical abnormalities and the lack of information about HPV among adolescents, the Brazilian Senate approved in September 2012 a law project that

proposed vaccination against HPV for girls from nine to 13 years old in the public health system. Some months later, the Health Ministry announced that the HPV vaccine would begin to be applied in 2014. The goal was to vaccinate 80% of adolescents, or around 5.2 million. Together with the vaccination, an advertisement was developed in 2014 with the theme "Every girl is unique, but all of them need protection". The campaign was developed through posters, radio, magazines, outdoors and social media (Programa Nacional de Imunizações, Ministério da Saúde, 2014) and was launched all over the country.

Moreover, the Brazilian Health Ministry, through the National Cancer Institute, alerted to the fact that vaccines do not protect against all types of HPV, and there is a risk of causing precancerous lesions in some cases. Also, women vaccinated against HPV could think that they are protected and then abandon the use of a condom. In addition, the World Health Organization states that the vaccine against HPV should be part of a larger strategy of prevention and screening of cervical cancer allied with monitoring of the prevalence of subtypes. The aim of this study is to investigate and compare the general knowledge of adolescents from public and private universities in Rio de Janeiro, Brazil, about basic aspects of HPV before HPV vaccination approval (2008–2013).

## Methods

### *Advertising campaigns*

A survey was conducted in 2008 and 2013 to investigate the Brazilian advertising campaigns developed around the HPV theme and its association with cancer. In this survey, we investigated what type of approach was used, the target audience and when it was carried out. We also identified the source, i.e. whether the campaign was produced by the Ministry of Health, non-governmental organizations or scientific and/or pharmaceutical societies.

### *Data collection*

Data about the campaigns analysed were collected from a data bank entitled "História do Controle do Câncer" (In English, "History of Cancer Control") by researchers from Casa de Oswaldo Cruz, at the Oswaldo Cruz Foundation. They created a virtual data bank in the Biblioteca Virtual em Saúde (in English, Virtual Health Library). We also conducted a search within the Health Ministry, Brazilian States and Municipalities and NGOs.

### *Survey*

In parallel, we aimed to find out what Brazilian

undergraduate students know about the basic facts concerning HPV, and if they have received this kind of information, where and how.

#### *Sample*

A cross-sectional survey using a convenience sample of 285 undergraduate students was carried out in 2008 and in 2013 to try to discover whether knowledge about HPV had increased among this group. The target population was students from public and private universities. Researchers from our group visited public and private faculties of health science, humanities and physical science at three universities; one of them is where the group works (the Federal University of Rio de Janeiro) and the other two are private and public universities that collaborate with the group. The studies were conducted in the geographical area of Rio de Janeiro state, Brazil. All respondents aged up to 29 years who had been studying at the selected units were eligible for this study. The exclusion criteria were non-Brazilian students and/or people who refused to participate in the study.

All potential candidates that were invited to participate in the study received information about its purpose and objectives. Their participation was voluntary. The study protocol was submitted and approved by the Ethics Committee of the Institute of Studies in Public Health (IESC) at the Federal University of Rio de Janeiro.

In 2008, we interviewed 156 students from the areas of health sciences (N=50), humanities (N=51) and physical science (N=55) in Rio de Janeiro, Brazil. The 128 participants in the second phase of the research, in 2013, were divided into health science students (N=49), humanities students (N=41) and physical science students (N=38).

#### *Instruments*

The questionnaire was divided into two parts. The first part elicited personal details, such as age and sex. In the second part, participants were asked to answer three qualitative open questions:

- *What is HPV?*
- *How is it transmitted?*
- *What does HPV cause?*

Later, in 2014, we developed a second questionnaire, through the Google Docs® tool, to analyse from where these undergraduate students from health science, physical science and humanities, who participated in our research in 2013, had received information about HPV in the last year. This tool was sent to their virtual forums. We received 15 answers from the health science area, 28 answers from physical science students and another 15 questionnaires from

humanities. The options were:

- *Pamphlets and posters*
- *Videos on the Internet*
- *At the university*
- *Social media*
- *Actively, through my own research*
- *Magazines*
- *Newspapers*
- *Radio*
- *I did not receive any*

#### *Qualitative analysis*

For the analysis of the open questionnaire, the answers were separated into categories and their frequencies of distribution were analysed. The categories were built by clustering the central ideas of the answers that had the same kind of social representations (Moscovici, 2000). Data analysis consisted of cross-demographic variables and relevant items aimed at discovering what the participants knew about Human Papillomavirus. Three investigators, using the methods of analysis proposed by Bardin (1977), reviewed all the questionnaires separately. When the same category was perceived by all three researchers, it was considered valuable, but when they disagreed on a category, it was discarded.

#### *Analytic approaches*

Analyses were conducted using GraphPad Prism® 5.0. After separating the categories, their frequencies of distribution were analysed and compared by groups using a chi-squared test. The *p* value was considered when less than 0.05.

## **Results**

#### *Advertising campaigns*

Nine national and seven statewide advertising campaigns were found during the survey conducted in 2008. Federal and municipal governmental health areas were responsible for most of them, but some were produced by pharmaceutical companies and NGOs. In addition, most of them had been distributed through posters over a short period of time. The campaigns were aimed mainly at adult women, but one poster was also found for health professionals and another one for teenagers.

In 2013, we found 17 advertising campaigns about HPV vaccine, mainly from Brazilian municipalities and states and two from private vaccine laboratories.

This brief survey in 2008 showed a very small number of health campaigns about HPV in Brazil. The Ministry of Health promoted only six, and one of them was focused on a single day in November. It is worth noting that most of the campaigns were aimed at adult

women. The data, showing that cervical abnormalities were more widespread among adolescents (10 to 19 years) than among adults, between 1999 and 2005 in the Municipality of Rio de Janeiro (Pedrosa et al, 2008), suggest that it is a serious mistake not to target adolescents in campaigns about preventing HPV infection. There were no campaigns aimed at men, despite the fact that they are carriers and transmitters of the virus. In addition, they can also acquire penile cancer, lung cancer and other cancers as a result of HPV infection, as shown by several studies worldwide (Morris, Gray, Castellsangue, 2011).

*General understanding of HPV*

Through the circulation of a simple questionnaire on HPV among undergraduate students, in 2008 and 2013, we have been able to confirm a lack of knowledge about HPV among adolescents in Rio de Janeiro and to identify some critical aspects that are worth being focused on by educators and considered in the development of new health policies.

**Table 1** Answers from undergraduate students

	Before (n=157)	After (n=128)
<b>What is HPV</b>		
No answer	36 (23%)	10* (8%)
A virus	43 (27%)	57 (45%)
Human Papilloma Virus	16 (10%)	22 (17%)
A sexually transmitted disease	52 (33%)	49 (38%)
<b>How is it transmitted</b>		
No answer	34 (22%)	8* (6%)
Sexually	120 (76%)	119 (93%)
Blood transfusion	17 (11%)	11 (9%)
Some other way	3 (2%)	1 (1%)
<b>What does HPV cause</b>		
No answer	55 (35%)	29 (23%)
Cancer	82 (52%)	68 (53%)
Warts/Lesions	18 (11%)	26 (20%)
Other diseases/symptoms	20 (13%)	31 (24%)

Note: Categories frequencies were analyzed and compared by groups with a chi-squared test. The *p* value was considered significant only those less than 0,05.

**Table 2** Answers from health science undergraduate students

	Before (n = 51)	After (n = 49)
<b>What is HPV</b>		
No answer	5 (10%)	1 (2%)
A virus	23 (45%)	43* (88%)
Human Papilloma Virus	10 (19%)	17 (35%)
A sexually transmitted disease	13 (25%)	4 (8%)
<b>How is it transmitted</b>		
No answer	5 (10%)	1 (2%)
Sexually	43 (84%)	48 (98%)
Blood transfusion	7 (14%)	5 (10%)
Some other way	0	0
<b>What does HPV cause</b>		
No answer	11 (22%)	6 (12%)
Cancer	31 (61%)	41 (84%)
Warts/Lesions	12 (24%)	10 (20%)

Other diseases/symptoms	9 (17%)	2 (4%)
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Note: Categories frequencies were analyzed and compared by groups with a chi-squared test. The *p* value was considered significant only those less than 0,05.

**Table 3 Answers from humanities undergraduate students**

	Before (n=51)	After (n =41)
<b>What is HPV</b>		
No answer	11 (22%)	4 (10%)
A virus	9 (18%)	9 (21%)
Human Papilloma Virus	3 (6%)	5 (12%)
A sexually transmitted disease	23 (45%)	19 (46%)
<b>How is it transmitted</b>		
No answer	11 (22%)	2* (5%)
Sexually	40 (78%)	38 (93%)
Blood transfusion	2 (3%)	6* (14%)
Some other way	0	1 (2%)
<b>What does HPV cause</b>		
No answer	11 (22%)	6 (14%)
Cancer	38 (75%)	24 (59%)
Warts/Lesions	4 (8%)	10 (24%)
Other diseases/symptoms	2 (3%)	11 (27%)

Note: Categories frequencies were analyzed and compared by groups with a chi-squared test. The *p* value was considered significant only those less than 0,05.

**Table 4 Answers from physics undergraduate students**

	Before (n =55)	After (n = 38)
<b>What is HPV</b>		
No answer	20 (36%)	5* (13%)
A virus	11 (20%)	5 (13%)
Human Papilloma Virus	3 (5%)	0
A sexually transmitted disease	16 (29%)	26 (68%)
<b>How is it transmitted</b>		
No answer	18 (33%)	5* (13%)
Sexually	34 (62%)	33 (87%)
Blood transfusion	8 (15%)	0
Some other way	3 (5%)	0
<b>What does HPV cause</b>		
No answer	33 (60%)	17 (45%)
Cancer	13 (24%)	3 (8%)
Warts/Lesions	2 (4%)	6 (16%)
Other diseases/symptoms	9 (16%)	18 (47%)

Note: Categories frequencies were analyzed and compared by groups with a chi-squared test. The *p* value was considered significant only those less than 0,05. Do they receive information about HPV? If yes, where? When they said yes, it was through television (see the paragraph below)

In this stage of the research, we identified that among health science students, 73% said that the university was where they received information about HPV and 47% said that they were informed through

posters and pamphlets distributed on the university campus. Between the two other groups (humanities and physical science areas), the most common avenue of information was television, with 47% and 36% respectively. As we identified a lack of knowledge about

HPV between these two groups (humanities and physical science), we can conclude that the campaign on television was not effective until 2013, maybe because it was not broadcast often or because the message was incorrect.

### Discussion

In 2008, 20% of the 156 participants (33) were unable to answer any of the three questions. Among the humanities students, 21% (11/51) could not answer any of the three questions, while 30% (17/55) of the physical science students and 10% (5/50) of the health science students could not do so either. In 2013, the rates proved to be much better, with 6% of the 128 participants not being able to answer any of the three questions. Among the students, 2.4% (1/41) in the humanities, 13.15% (5/38) in the physical science area and 2.04% (1/49) in the health science area could not answer any of the questions. These results show that respondents tried to answer the questions, however this does not mean that the answer was correct.

Regarding the first question, "What is HPV?", the response profile was as follows, regardless of whether they were affiliated to biomedical, humanities or physical science:

There was a significant drop among those who could not answer in 2008 compared to 2013. Among 157 participants in 2008, the rate was 23%, which decreased to 8% from 128 participants in 2013. On the other hand, there was an increase among those who thought it was a virus: 27% in 2008 to 45% in 2013. This shows us that not only are more people becoming aware of HPV, but they are also learning correct information about it.

In the second question, "How is it transmitted?", again there was a significant decrease among those who did not know: 22% in 2008, to only 8% in 2013. Meanwhile there was an increase among those who indicated that it was caused by sexual transmission 76% (2008) to 93% (2013).

"What Causes HPV?" was the third question. In this item, the decrease, between 2008 and 2013, among the respondents who did not know was from 35% to 23%. Despite not being significant, these rates show a decreasing trend in the lack of knowledge. In 2008, 52% of the 157 respondents answered that cancer was an effect of HPV infection, and 53% of those who participated in 2013 answered the same. It is important to highlight that this slight increase was due to the health science students, and the other two groups had a decrease. In the humanities group (Table 3), 75% of the students pointed toward cancer in 2008 and we saw a decrease to 59% in 2013. In the physical science group (Table 4), we see a decrease from 24% to 8% and only in the health science group (Table 2) do we have an

increase, from 61% to 84%.

Notwithstanding the increase in information on HPV, and although our sample is small, we see that ignorance is still great. A couple of respondents (2/49) in the biomedical field in 2013 pointed toward cancers of the throat and penis as factors of contamination. In the humanities, 15% pointed out that HPV is transmitted by blood and toilet seats.

For us it is important to mention, as shown by health science students, that the university environment was where they received most information about this topic and it was essential to better understand this subject.

In 2007, the Brazilian Federal University of Rio Grande do Sul, a state in the south of the country, included in their entrance examination a multiple-choice question about HPV: "In 2006, two types of vaccines were brought to Brazil to prevent HPV infection, which is the most common sexually transmitted disease caused by a virus. "HPV can cause \_\_\_\_:". Five choices were listed (Syphilis, Gonorrhea, AIDS, Cervical Cancer and Chancre). Only 44% of the students answered cervical cancer, 28.9% answered syphilis and 15.9% answered gonorrhea. From these data, we see that 56% of over 30,000 students from public and private high schools in this state marked the wrong answer.

In comparison with the entrance examination to the Federal University of Rio Grande do Sul, our questionnaire was qualitative and allowed individuals to use their own words. These similar results obtained in different models of evaluation provide an alarming X-ray of the lack of knowledge among Brazilian youth in relation to HPV.

Sousa et al. (2008) pointed out that HPV is still discussed very little in comparison to other viruses such as HIV. Hence young people still get confused between the two types of viruses and other agents and their diseases. Vanslyke and colleagues (2008) also warned about the lack of information that young people in developing countries have in relation to HPV, and they suggested that this situation could be changed with adequate health communication campaigns.

One effective way to reduce the incidence of HPV in the Brazilian population, where the prevalence is still high (Brenna, Hardy, Zeferino, Namura, 2001; Queiroz et al., 2005; Guiliano et al., 2008; Sousa et al, 2008; Pedrosa et al, 2008), requires information about what the lack of knowledge about the subject is first, and then campaigns aimed at changing sexual habits with the more frequent use of condoms and regular application of a detection test (Pap smear test). Only then will Brazil – and other countries – be able to see lower rates of cervical cancer, where HPV is responsible for 90% of the cases (INCa, 2014).



### Conclusions

This study has focused primarily on identifying the knowledge of young people about basic aspects of HPV, its transmission and correlation with some diseases. We also tried to investigate the health communication campaigns undertaken in Brazil on the topic of Human Papillomavirus in two different periods and before the vaccination against HPV.

We identified that these campaigns appear to be insufficient in number and are targeted only at adult women and adolescents of both sexes. The participants knew little about the relationship between Human Papillomavirus and various types of cancer, as shown in this study and others worldwide (Friedman & Sheppard, 2007). In addition, the Brazilian National Cancer Institute's database showed a linear increase in cervical abnormalities between 1999 and 2005, which were 2.6 times greater in adolescents – 10 to 19 years – than in adults (Pedrosa et al., 2008). Therefore, we believe that it is vitally important to promote campaigns focused on those young teenagers and concomitantly to promote the importance of earlier discussions about sexually transmitted diseases, such as those caused by HPV, in private and public schools.

Another important fact that must be considered is that adolescence is a stage where young people go through a major change in standards of identity, especially as they are open to outside influences regarding the formation of habits and personalities that will be consolidated in adulthood (Serra & Santos, 2003). Moreover, it is known that the media contribute greatly to the learning of these young people in terms of ways to behave and establish themselves (Fischer, 2002). These facts highlight the extreme importance of considering communication strategies that are attractive to young people, and are efficient in transmitting the necessary information on health topics. Taking all these factors into consideration, combined with the fact that HPV infection is increasing faster among youths than among adults, we judge it necessary to emphasize the importance of

investing in awareness campaigns on the issue of HPV that are specifically aimed at young people.

Although our research has a limited number of students in Rio de Janeiro and we do not extrapolate to other states and municipalities, our data corroborate studies from Brazil and other countries (Doreto & Vieira, 2007; Vanslyke et al., 2008; Ackerson, et al, 2008; Sousa et al, 2008) that show that there is still very limited public knowledge about HPV.

Many youngsters associate the HPV infection with a disease and nearly half know it can be sexually transmitted, but they are generally unaware that it is a virus that can cause cancer. These findings, coupled with the evident confusion between HPV and other infections (AIDS, syphilis, herpes, influenza, etc.), indicate that these young people have little notion of the diseases to which they are being exposed. Clearly they do not give importance to preventive examinations, a key to early diagnosis and better prognosis. These results also show that there is no difference, regarding the knowledge of youngsters about basic aspects of HPV and the importance of preventive examinations, between scholastic and public or private schools.

Thus, faced with the panorama shown in this study, we believe that more extensive informative campaigns about this health problem aimed specifically at young people need to be added to the agenda of governmental and non-governmental organizations.

Campaigns should also focus on students at universities. Our study showed that the only group that understands Human Papillomavirus well is the group of students from health science; and as they pointed out, university campus helps them in the knowledge of this subject.

Studies carried out by The Population Institute (The Population Institute, w/d) show that diseases that could be avoided are the cause of half of the deaths in a variety of developing countries.

### Competing interests

The authors declare that they have no competing interests.

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### Authors' contributions

Gabriel de Oliveira Cardoso Machado substantial contributions to the conception, design, acquisition, analysis and interpretation of data as well as being involved in drafting the manuscript and giving final approval of the version to be published.

Marina Verjovsky made substantial contributions to the conception, design, acquisition, analysis and interpretation of data as well as being involved in drafting the manuscript and revising it critically for important intellectual content, and giving final approval of the version to be published.

Tainá Maia Rêgo made substantial contributions to the analysis and interpretation of data as well as being involved in revising it critically for important intellectual content, and giving final approval of the version to be published.

Claudia Jurberg made substantial contributions to the conception, design, acquisition, analysis and interpretation of data as well as being involved in drafting the manuscript and revising it critically for important intellectual content, and giving final approval of the version to be published.

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