

# Knowledge about human papillomavirus transmission and prevention among physicians in Rio de Janeiro state, Brazil

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## SUMMARY

**OBJECTIVE:** This study aimed to assess physicians' knowledge about human papillomavirus infection and its prevention.

**METHODS:** Descriptive web-based survey with 15 objective questions targeted to physicians affiliated with the Regional Council of Medicine from Rio de Janeiro state, Brazil. Participants were invited by e-mail and the Council social networks, between January and December 2019.

**RESULTS:** The study sample had 623 participants, with a median age of 45 years, predominantly women (63%). The most frequent specialties were Obstetrics and Gynecology (21.1%), Pediatrics (11.2%), and Internists (10.5%). Concerning human papillomavirus knowledge, 27.9% of the participants were able to identify accurately all possible forms of transmission, and none of them could recognize all the risk factors of infection. Nevertheless, 95% recognized that asymptomatic infection could occur in both sexes. Regarding knowledge about clinical manifestations, diagnosis, and screening, only 46.5% were able to identify all human papillomavirus-related cancers, 42.6% were aware of the periodicity of Pap smears, and 39.4% indicated that serological test was not adequate for diagnosis. The recommended age group for human papillomavirus vaccination was recognized by 94% of the participants, as well as the need for a Pap smear and the use of condoms, even after vaccination.

**CONCLUSIONS:** There is good knowledge about prevention and screening for human papillomavirus infections; many gaps were identified regarding transmission, risk factors, and associated diseases among physicians in Rio de Janeiro state.

**KEYWORDS:** Papillomaviridae. Uterine cervical neoplasms. Genital neoplasms, female. Papillomavirus vaccines. Knowledge. Physicians.

## INTRODUCTION

Cervical cancer is a preventable disease, which is also curable if detected early and adequately treated. Nevertheless, it remains the fourth most common cancer among women globally and is expected to increase among young, undereducated women in the world's poorest countries. The World Health Organization (WHO) launched the first global health strategy for the elimination of cervical cancer as a public health problem, and one of the goals is to reduce knowledge gaps concerning HPV infection<sup>1</sup>. Additionally, HPV is involved in other cancers, such as anogenital and oropharyngeal ones, all of them susceptible to prevention by vaccine<sup>2</sup>.

The success of HPV prevention programs will depend on whether health care professionals recommend the vaccine to patients. They influence the decision-making of patients and guardians, minimize vaccination barriers, and increase its acceptability<sup>3</sup>.

The knowledge on HPV and related cancers is developed throughout medical education and will be essential to physicians, especially those dealing with HPV malignant lesions at different levels of care—health counseling and education, prevention by vaccination and screening, diagnosis, treatment, and recovery<sup>4</sup>.

In Brazil, cervical cancer is still an important cause of cancer and death<sup>5</sup>. Urgent and bold action is needed to scale up and sustain evidence-based interventions. The identification of knowledge gaps among physicians can support proposals for improving medical education, reduce negative beliefs, and promote adherence to vaccination and other HPV prevention methods, contributing to HPV incidence reduction and cervical cancer control<sup>1</sup>.

The objective of the study was to assess physicians' knowledge about HPV infection and its prevention in Rio de Janeiro (RJ) state, Brazil.

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Conflicts of interest: the authors declare there is no conflicts of interest. Funding: none.

Received on October 04, 2022. Accepted on November 14, 2022.

## METHODS

The study was approved by the Faculty of Medicine Ethics Committee from UFF (CAAE14660613.2.0000.5243) on May 20, 2013. All respondents were instructed about the goals of the study, and all of them filled out written online-administered informed consent. Participation was anonymous and voluntary, and the confidentiality of data was kept throughout the study. Participants were not involved in the development of this study.

We conducted a survey targeted to all physicians registered on “Conselho Regional de Medicina do RJ (CREMERJ)” between January and December 2019. Participants were invited by e-mail and social networks, such as Facebook.

Sample size calculations were based on a 70% estimated HPV knowledge<sup>6-8</sup>, according to previous studies<sup>6-8</sup>, with a 5% precision rate and a 95% confidence level. Considering a population of 60,000 physicians in RJ state<sup>9</sup>, we estimated a sample of 321 participants.

Participants completed a web-based survey (Google Forms) with 15 questions, including demographic data (gender, age), time since graduation, post-graduation (yes or not), university (public or private), and specialty (Internal Medicine, Pediatrics, Obstetrics/Gynecology, Urology, Dermatology, others). There were some closed questions (yes/not) requiring a single answer; others had multiple answers format, and a few had open fields.

Questions about HPV knowledge involved transmission (type of sexual intercourse, transplacental, and delivery routes), risk factors (partnership, toilet items, use of condoms and oral contraceptives, and age at sexarche), clinical presentation (warts and HPV-related cancers), cervical screening (frequency, technique, and interpretation), and HPV-vaccine recommendations (age and need of cervical screening).

Knowledge on HPV transmission, types of cancer, PAP smear, and serology was compared among specialties, and differences in proportions of total hits were tested using chi-square tests.

Data were entered and analyzed using SPSS Statistics version 23. Descriptive analysis used means or median for continuous variables and proportions for categorical ones. We described percentages of correct answers and percentages of total correct items when appropriate.

## RESULTS

We obtained 623 answers, representing 1% of RJ physicians. Participants, whose median age was 45 years, were mostly women, with a postgraduate degree, and graduated for more than 10 years. Obstetricians/Gynecologists (OBGyn) comprised

the most frequent specialty. A minority declared to be vaccinated against HPV was mostly women (Table 1).

Regarding HPV knowledge, the item on clinical manifestations had the highest percentage of participants who answered all questions correctly. In contrast, none of the participants answered all risk factors correctly. As to transmission, this percentage was 30% (Table 2).

**Table 1.** Sociodemographic profile, Rio de Janeiro state physicians (n=623), 2019.

Variables	n (%)
Age	45 (median)
Sex	
Female	392 (63)
Male	230 (37)
Graduation	
Graduates	95 (15,3)
Postgraduates	527 (84,7)
Time since graduation	
1-4 years	110 (17,7)
5-10 years	80 (12,9)
>10 years	432 (69,5)
Specialty	
Internal medicine	65 (10,5)
Dermatology	33 (5,3)
Gastroenterology	20 (3,2)
Gynecology and obstetrics	131 (21,1)
Pediatrics	70 (11,2)
Urology	19 (3,1)
Others	285 (45,8)
Public universities	
UFF <sup>a</sup>	96 (15,4)
UFRJ <sup>b</sup>	98 (15,7)
UERJ <sup>c</sup>	44 (7,1)
UNIRIO <sup>d</sup>	54 (8,7)
Private universities	
FTESM <sup>e</sup>	67 (10,8)
Vaccinated against HPV	
Yes	138 (22,2)
Complete vaccination scheme	
Yes	121 (19,5)

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**Table 2.** Knowledge about human papillomavirus, among Rio de Janeiro state physicians (n=623), 2019.

Aspect of knowledge	Correct answers n (%)
Genital-genital	612 (98.4)
Oral-genital	541 (87.0)
Anal-genital	572 (92.0)
Transmission	
Manual-genital	315 (50.6)
Transplacental	512 (82.3)
Transvaginal delivery	438 (70.4)
All answers are correct	185 (29.7)
Toilet seat	567 (91.2)
Share underwear and towels	462 (74.3)
Sex without condoms	613 (98.6)
Risk situation	
Oral contraceptives	605 (97.3)
Sex before 18 years old	0
Share glasses and cutlery	604 (97.1)
Multiple sex partners	577 (92.8)
Partner with multiple partners	553 (88.9)
Pool bath	619 (99.5)
All answers are correct	0
Pruritus	590 (94.9)
Clinical manifestations	
Bleeding	605 (97.3)
Wart	600 (96.5)
Pain	600 (96.5)
Discharge	606 (97.4)
All answers are correct	558 (89.7)
Asymptomatic occurrence	611 (98.2)
Asymptomatic transmission	594 (95.5)
Occurrence in both sexes	
Anal	490 (78.8)
Oral	139 (60.4)
Types of cancer-associated	
Cervical	545 (87.6)
Oropharynx	435 (69.9)
Penile	514 (82.6)
Vaginal	440 (70.7)
Vulvar	469 (75.4)
All answers are correct	289 (46.5)
Cervical cytology (PAP test)	
Test performed to detect changes in cervical cells	540 (86.8)
Main strategy for detecting precursor lesions and cervical cancer	563 (90.5)
Collection involves peeling the outer and inner surfaces of the cervix	498 (80.1)
Performed by 25- and 64-year-old women who have or had a sexual life	482 (77.5)
After two first annual exams with normal results, perform every 3 years	327 (52.6)
All answers are correct	265 (42.6)
Diagnosis by serology	245 (39.4)
HPV vaccine	
Recommended age	587 (94.4)
Need to realize PAP	618 (99.4)
Need to use condoms	618 (99.4)

Less than half were right about HPV-related cancers. The majority are aware of uterine cervix cancer, and the lowest percentage was of oral cancer (Table 2).

Notably, 60% wrongly considered serological tests for diagnosis. The majority recognized the physiopathological basis of Pap smear. Despite this, only 42.6% correctly answered all the questions. In relation to the HPV vaccine, knowledge about age and recommendations was almost universal (Table 2).

OBGyn physicians performed better on PAP questions, but almost 30% did not answer all the items correctly ( $p < 0.01$ ). Urologists had the best score on HPV-related cancers, followed by OBGyn and dermatologists ( $p = 0.04$ ). OBGyn and urologists had better results than other specialties. There was no difference for transmission questions ( $p = 0.13$ ) (Table 3).

## DISCUSSION

In our study, physicians' knowledge about HPV transmission was low, without differences among specialties. Although nearly 75% correctly marked the main routes of transmission, 25% wrongly identified non-related events. Knowledge about risk factors was good, except age at sexarche, but none of the participants could recognize all the risk factors. Most of them were able to identify the main clinical manifestations and the virus pathogenesis. There was a good perception of HPV infection and warts, but less than half of the participants correctly associated all HPV-related cancers, of which oral cancers being the less recognized ones. Finally, for the HPV vaccine, knowledge was almost universal.

Other studies confirmed the understanding of HPV as a sexually transmitted infection (STI) and gaps in knowledge about transmission, related diseases, and vaccination<sup>4,6-8,10-17</sup>.

It was noteworthy that none of the RJ physicians recognized early sexarche as a risk factor. In New Zealand, this question had a 73.8% score of correct answers<sup>6</sup>. The transplacental route was wrongly assigned by almost 20.0% of participants, a mistake also reported among Italian general practitioners (13.0%)<sup>12</sup>.

The relationship between HPV and oral cancers, like our results, had one of the lowest scores in several studies<sup>10,12,13,15,16</sup>. Besides cervical cancer, knowledge about other HPV-related cancers was also low<sup>11,12</sup>. In contrast, physicians in RJ know more about warts than those in some other places<sup>6,11,12,14</sup>.

More than half of the RJ doctors wrongly indicated serological tests for viral diagnosis. We also observed a lack of knowledge about the Brazilian cervical cancer screening protocol. Among ObGyn physicians, we found a better understanding of Pap test and HPV diagnosis, in agreement with Canadian studies<sup>18,19</sup>.

**Table 3.** Comparison of the number of correct answers about human papillomavirus outcomes, prevention, and diagnosis according to the specialties, Rio de Janeiro state physicians (n=623), 2019.

Specialty	Transmission	Types of cancer	PAP smear	Diagnosis by serology
	n (%)	n (%)	n (%)	n (%)
Gynecology and obstetrics	36 (27.5)	73 (55.7)	93 (71.0)	83 (63.4)
Internal medicine	18 (27.7)	24 (36.9)	33 (50.8)	14 (21.5)
Urology	12 (63.2)	13 (68.4)	1 (5.3)	12 (63.2)
Pediatrics	20 (28.6)	25 (36.6)	15 (21.4)	21 (30.0)
Gastroenterology	5 (27.3)	5 (36.4)	3 (18.2)	7 (36.4)
Dermatology	11 (33.3)	17 (51.5)	8 (24.2)	13 (39.4)
Others	83 (29.1)	129 (45.3)	110 (38.6)	96 (33.7)
<b>p-value</b>	0.13	<b>0.04*</b>	<b>&lt;0.01*</b>	<b>&lt;0.01*</b>

\*Bold indicates statistically significant p-values.

As to the HPV vaccine, 94.4% of RJ physicians were aware of the recommended age, while other studies showed lower scores: in Polonia, only 24.9%<sup>13</sup>; in Liguria, Italy, 73.7%<sup>7</sup>; in Italy, among general practitioners, 87.0%<sup>12</sup>; in Lebanon, 81.5%<sup>20</sup>; and in the USA, 56.0% (family physicians) and 85.0% (pediatricians)<sup>21</sup>. Like our results, more than 90% of Irish physicians know that cervical cancer screening must continue in vaccinated women<sup>11</sup>, but, in a study from Saudi Arabia, only 59.0% had this knowledge<sup>17</sup>.

Health care providers (HCPs) disseminate sexual health and prevention information to patients and their parents, especially concerning vaccination. Educational interventions are primarily directed at patients and parents rather than HCPs, despite evidence that provider recommendation is a key determinant of vaccine uptake<sup>10</sup>.

Along with cervical screening programs implemented by the Brazilian government, two vaccines, a bivalent and a quadrivalent one, are available in the National Immunization Program for females (9–14 years old) and males (11–14 years old) in a two-dose schedule<sup>22</sup>. However, a decrease in uptake has been observed: in 2014, 87% of Brazilian municipalities reached the target for the first dose but only 32% for the second dose<sup>23</sup>.

The identification of knowledge gaps can support proposals for improving medical education content<sup>10</sup>. Students from health care courses in RJ state had difficulty to recognize all risk factors of HPV infection<sup>24</sup>. We recommend additional education about HPV infection and prevention. Medical societies are recommended to offer continuous education for graduated professionals<sup>21</sup>.

Considering the study limitations, the sample represented only 1% of the RJ medical population, i.e., 59,366 professionals<sup>9</sup>.

Mean age was similar, but females had a higher frequency (63%) than that of the State (50.8%). The sample size was adequate, but it was not random, allowing selection biases.

Our questionnaire used a closed question for specialties, offering five options, including “other”, which represented 45.8% of the answers. The four most common specialties in Brazil are Internal Medicine (11.2%), Pediatrics (10.3%), General Surgery (8.9%), and ObGyn (8%), while Dermatology represented 2.2% and Urology 1.4%<sup>9</sup>. Our sample distribution was adequate for Internal Medicine and Pediatrics, but ObGyn was overrepresented.

Although partially limited by selection and participation biases, this study confirmed gaps in HPV knowledge.

## CONCLUSION

There is good knowledge about prevention and screening for HPV infections. Many gaps were identified regarding transmission, risk factors, and associated diseases among physicians in RJ state.

## ACKNOWLEDGMENTS

We thank Conselho Regional de Medicina do Estado do Rio de Janeiro (CREMERJ) for publicizing our study *online* for the Rio de Janeiro physicians and associations.

## AUTHORS' CONTRIBUTIONS

**VMSM:** Conceptualization, Data curation, Formal Analysis, Writing – original draft, Writing – review & editing. **VCGS:** Formal Analysis, Writing – original draft, Writing – review

& editing. **ADB:** Formal Analysis, Writing – original draft, Writing – review & editing. **SCF:** Conceptualization, Formal Analysis, Writing – original draft, Writing – review & editing. **CAF:** Conceptualization, Formal Analysis, Writing – original draft, Writing – review & editing. **CLV:** Conceptualization,

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