

# Clarity of publications on HPV in Instagram profiles of official health agencies in Brazil

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**Abstract:** The study analyzed the clarity of publications on human papillomavirus (HPV) in the Instagram profiles of official Brazilian health agencies. An infodemiological study analyzed publications on HPV in the 81 Instagram profiles selected from the Health Ministry, States' Health Departments, and dental councils and associations. The following data were collected: classification of content, type of profiles, type of media, how the content was addressed, number of posts, frequency, likes, comments, viewings, and hashtags, and how the HPV vaccine was addressed. The clarity of the educational publications was assessed using the Brazilian version of the Clear Communication Index (BR-CDC-CCI). Data analysis was performed with Spearman's correlation and the Mann-Whitney test ( $p < 0.05$ ). A total of 504 publications on HPV were found. The average number of likes was 528.3 (SD = 2388.2) and the average BR-CDC-CCI score was 67.1 (SD = 14.1). The quality and clarity of the information was considered adequate (BR-CDC-CCI score  $\geq 90$ ) in 6.9% of the publications. A weak positive correlation was found between the number of likes and both the BR-CDC-CCI score ( $r = 0.195$ ) and number of posts ( $r = 0.124$ ). Publications from the Health Ministry had a significantly higher BR-CDC-CCI score (72.9) compared to the other profiles analyzed ( $p = 0.01$ ). Most publications concerned government actions, had low engagement, and written educational information was of low clarity and quality. However, the effort to reach the population was evident, with an increase in publications over the years.

**Keywords:** Health Communication; Health Education; HPV; Human Papillomavirus Viruses

## Introduction

Human papillomavirus (HPV) is considered the sexually transmitted infectious disease with the highest global prevalence and is strongly associated with cervical, anogenital, and oropharyngeal cancers.<sup>1,2</sup> One out of every ten people is infected with HPV and more than 500 thousand new cases of cervical cancer are detected per year, which is one of the main causes of death in women and therefore an important public health problem.<sup>3</sup>



In most cases, the infection is acquired in adolescence, mainly through the onset of sexual activity and skin contact with infected skin.<sup>4</sup> The lack of or inadequate knowledge on the disease and failure to use condoms increases the risk of infection and, consequently, the risk of HPV-related cancers.<sup>5</sup> Thus, frequent campaigns focusing on prevention of primary and secondary infections are extremely important to reduce the global incidence of cases.<sup>2</sup>

With the advent of the internet and social media, public health communication has been expanded and facilitated due its great potential for disseminating information.<sup>6,7</sup> Different public health agencies use communication channels such as the social medium Instagram to share online health-related content.<sup>7,8</sup> Instagram is considered one of the social media with the greatest engagement, surpassing one billion active users in the world,<sup>8</sup> educational strategies are implemented and addressed on the Instagram profiles of official health agencies in Brazil. Materials are published to disseminate information about disease transmission, risk factors, diagnosis, prognosis, treatment, campaigns, epidemiological bulletins, etc., while visitors can ask questions or present manifestations or complaints.<sup>9</sup>

Low health literacy has a long-term impact on risk of diseases and adverse health outcomes, generating negative consequences and affecting thousands of people.<sup>10,11</sup> It is therefore necessary to ensure that viewers understand the information provided and develop a rigorous approach in the production of these materials that is appropriate to the population's level of understanding so that individuals can use such information to promote individual, family, and community health.<sup>12,13</sup>

Infodemiology studies the determinants and frequency of distribution of health information in electronic media, specifically on the Internet, especially inaccurate information.<sup>14</sup> The excessive and often unreliable dissemination of information, without clear sources and with unreliable guidelines is called an infodemic. The constant bombardment of information that reaches the population through various means and media, if not well designed, can lead to misinformation, not reaching the proposed objective.<sup>15</sup>

The novelty of the present study is the overall and specific clarity analysis of all publications on HPV published on Instagram accounts of official Brazilian health agencies. Few studies have addressed the understandability of health-related educational materials in the virtual environment.<sup>13,16</sup> Therefore, the aim of this study was to assess the clarity of HPV information on Instagram accounts of official Brazilian health agencies.

## Methodology

### Type of study

An infodemiological study with a quantitative approach was conducted to assess publications on HPV in Instagram profiles of official health agencies in Brazil from 2011 to 2021. As a study involving the use of material in the public domain, no approval was necessary from the ethics committee.

### Data collection

Active Instagram profiles of the Health Ministry, State Health Department (if not available, that of the respective state government was used), Dental Councils, and Dental Associations were selected, totaling 81 profiles. The universe of this study was all posts to Instagram feeds from first posting to December 31, 2021 (end of data collection period), totaling 130,398 posts analyzed.

### Initial exploratory study

A pilot study was performed with the selection of one Instagram profile among those selected to standardize the data collection process. Forty publications on the topic were randomly selected and analyzed, taking into account the chronological structure. The results of the pilot study revealed no need to alter the methods and the data from this step were included in the main study.

The inclusion criteria were all publications on HPV aimed at the general population written or recorded in Brazilian Portuguese. Publications not related to the topic of interest were excluded.

The publications were registered, named, dated, and classified according to the theme approach into government actions (actions that would be

carried out or that had already taken place by managers, not presenting educational information, just informative), educational (containing pertinent information about contagion, diagnosis, prevention, and treatment), epidemiological bulletins (an overview of HPV rates), and combating ‘fake news’ (warnings about information being erroneously disseminated). In some publications, educational information and government actions were presented simultaneously. In all of them, the educational aspect stood out and determined the classification of the publication. The other classifications were not found simultaneously.

The parameters adopted to assess engagement achieved through the publications were the type of profile and number of likes, comments, and views. Other data of interest were the hashtags used, type of media, way of addressing the content, frequency, number of posts, way of addressing the HPV vaccine, and whether the publications were from the Health Ministry profile. Given the Health Ministry’s leading role in setting health policies at the national level, the degree of visibility of the profile, and the high number of followers on the platform (2.7 million), the posts were categorized as belonging or not belonging to that account. Publications classified as educational were analyzed based on clarity of the information using the Brazilian version of the Clear Communication Index of the US Centers for Disease Control and Prevention (BR-CDC-CCI)<sup>17</sup>.

### **Instrument and calibration process**

The BR-CDC-CCI assesses the clarity of health information and was designed to be used in the development of new materials or assessment of existing materials. The instrument includes a set of questions based on criteria widely used in the field of health literacy and communication research. The Brazilian version was validated in 2020 in the full and modified forms containing items that assess the clarity of information and the public’s understanding, according to the scientific literature considering the main message, the call for action, the behavioral recommendations, the numbers, and the risks addressed in the material.<sup>17</sup>

The present study used the modified index, which is recommended for the evaluation of short messages, such as social media, in text-only format<sup>18</sup>. This index has 13 scored items with three response options (yes, no, or not applicable [NA]). The point value depends on the answer (0 or 1 per item). The score of the modified index is calculated by the sum of item scores, divided by the total number of applicable items and multiplied by 100. The total score ranges from 0 to 100, with 90 to 100 considered the recommended range. The score corresponds to the extent to which the material follows the index criteria.

Training and calibration for the use of this instrument were performed in three steps: theory, first practical application, and second practical application (15 days after first practical exercise). This process was conducted by the researcher in charge of the validation of the Brazilian version of the CDC-CCI (considered the “gold standard”). Four researchers examined 10 publications. The results were compared and a good level of agreement was achieved (intra-examiner and inter-examiner Kappa = 0.70).

### **Statistical analysis**

The variables were entered and organized in a Microsoft Office Excel 2016 spreadsheet and subsequently exported to the Statistical Package for the Social Sciences (SPSS version 25.0) for analysis. The data were first submitted to descriptive statistics for the calculation of absolute and relative frequencies and central tendency, dispersion, and position measures. Spearman’s correlation test was used to determine correlations between the BR-CDC-CCI score and number of posts, likes, comments, and hashtags. Significant differences in the BR-CDC-CCI score between the categories of vaccination, the use of hashtags, way of addressing the topic, and publication by the Health Ministry were determined using the Mann-Whitney test. All analyses were conducted considering a 5% significant level ( $p \leq 0.05$ ).

## **Results**

A total of 504 publications on HPV were found, accounting for 0.38% of the universe of the present study. The Health Ministry profile had the

highest percentage of publications on the topic (26.2%), whereas all publications compiled from State Departments of Health totaled 64.1% of the sample. Most publications had images as the media format (92.5%), addressed the topic of HPV as the main content (57.3%), which was mentioned in the media (image/video) and legend (55%), presented information on the HPV vaccine (55%), used hashtags (78%), and presented content about governmental actions (65.5%) (Table 1).

The publications occurred between 2014 and 2021. An increase was found in the frequency of publications in all profiles analyzed over the years, with a total of 19 publications in 2014 and 138 in 2021 (Table 1).

The average number of posts per publication was 1.8 (SD: 1.8), with an average of 528.3 likes (SD: 2388.2), 13.2 comments (SD: 55.9), 5567.7 video views (SD: 10785.5), 3.63 hashtags (SD: 3.69), and an average BR-CDC-CCI score of 67.1 (SD: 14.1) (Table 1). Among the publications classified as educational (n = 169), 25 were videos and were not submitted to analysis using the BR-CDC-CCI, as the instrument only applies to text format. Based on the index, the quality and clarity of the information was considered adequate (score ≥ 90%) in only 6.9% (n = 10) of the educational publications.

A weak positive correlation was found between number of likes and both BR-CDC-CCI score (r = 0.195) and number of posts (r = 0.124) (Table 2). Moreover, publications from the Health Ministry had a significantly higher BR-CDC-CCI score (72.9) compared to the other profiles analyzed (p = 0.01) (Table 3).

The most used hashtags were #SUS [Brazilian public healthcare system] (70 mentions), #HPV (66 mentions), #VaccinaHPV (62 mentions), #Health (39 mentions), and #prevention (38 mentions), with an average of three descriptors per publication.

## Discussion

This is the first study to analyze the clarity of online content in the social medium Instagram on HPV produced by official Brazilian health agencies. The results reveal an unsatisfactory level of clear

**Table 1.** Characteristics of the sample.

Variable	Frequency	
	n	%
Number of publications	504	100.0
Instagram profile		
Health Ministry	132	26.2
State Health Department	323	64.1
State government	6	1.2
Dental Councils	31	6.2
Dental Associations	12	2.4
Type of publication		
Image	466	92.5
Video	36	7.1
Image and video	2	0.4
Address of the topic		
Main content	289	57.3
Mentioned	215	42.7
Mentioning of vaccination		
Yes	277	55.0
No	227	45.0
Classification of publications		
Educational	169	33.5
Governmental actions	330	65.5
Epidemiological bulletins	4	0.8
Combating 'fake news'	1	0.2
Publications per year		
2014	19	3.8
2015	12	2.4
2016	45	8.9
2017	45	8.9
2018	38	7.5
2019	86	17.1
2020	121	24.0
2021	138	27.4
Use of hashtags		
Yes	393	78.0
No	111	22.0
Variable	Mean (SD)	Median (Q <sub>1</sub> -Q <sub>3</sub> )
Number of posts <sup>a</sup>	1.8 (1.8)	1 (1-2)
Number of video views <sup>a</sup>	5561.7 (10785.5)	741 (250-4998)
Number of likes <sup>a</sup>	528.3 (2388.2)	80 (30-309)
Number of comments <sup>a</sup>	13.2 (55.9)	1 (0-6)
BR-CDC-CCI score <sup>b</sup>	67.1 (14.1)	69 (55-76)
Number of hashtags <sup>a</sup>	3.63 (3.69)	3 (1-6)

<sup>a</sup>Sample size for this variable was 504 publications. <sup>b</sup>Sample size for this variable was 144 publications.

**Table 2.** Correlations between study variables.

Variables	BR-CDC-CCI score	Number of posts	Number of likes	Number of comments	Number of hashtags
BR-CDC-CCI score	1 <sup>a</sup>				
Number of posts	0.081 <sup>a</sup>	1 <sup>b</sup>			
Number of likes	0.195 <sup>a</sup>	0.124 <sup>**b</sup>	1 <sup>b</sup>		
Number of comments	0.115 <sup>a</sup>	0.069 <sup>b</sup>	0.784 <sup>b</sup>	1 <sup>b</sup>	
Number of hashtags	-0.047 <sup>a</sup>	0.024 <sup>b</sup>	-0.037 <sup>b</sup>	-0.014 <sup>b</sup>	1 <sup>b</sup>

\* $p \leq 0.05$ , \*\* $p \leq 0.01$ . <sup>a</sup>Sample size for this analysis was 144 publications. <sup>b</sup>Sample size for this analysis was 504 publications.

**Table 3.** Associations between BR-CDC-CCI score and mention of vaccination, use of hashtags, addressing of the topic, and publication by Health Ministry (n=144).

Variable	Median (Q <sub>1</sub> -Q <sub>3</sub> )	p-value
Mention of vaccination		
Yes	66.6 (55.5-75)	0.43
No	70 (56.9-80)	
Use of hashtags		
Yes	70 (55.5-76.9)	0.94
No	67.9 (58.2-75)	
Addressing of the topic		
Main content	69.2 (55.5-80)	0.99
Mentions	70 (58.3-75)	
Publication by Health Ministry		
Yes	75 (57.1-84.6)	0.01
No	69.2 (55.5-75)	

Significant results at 5% level.

communication in written educational materials related to health. Assessment studies of educational materials in Brazil are scarce, and also report low quality.<sup>13,19-21</sup>

A previous study found that publications on COVID-19 by public agencies using the same platform were also not structured clearly enough (average BR-CDC-CCI score: 65) for the public to understand the message, defining the material poor and of low quality.<sup>22</sup> The similar results of the studies demonstrate that the content produced for the general public presents information in a complex manner, especially for individuals with low health literacy, making it difficult or even impossible to interpret the message.<sup>23,24</sup>

With more than 2.7 million followers, the official profile of the Health Ministry has daily posts

on diverse health-related topics and its reach is impressive. Indeed, the Ministry's Instagram account had the largest percentage of publications on HPV. The Ministry's publications were also clearer compared to the other profiles analyzed ( $p = 0.01$ ) using the BR-CDC-CCI. Some of the content is reported by the profiles of State Departments of Health or other health agencies and therefore the same material/information is shared and offered to the general public.<sup>25</sup>

Another important point highlighted in the present investigation is the frequency of publications on HPV. Only 0.38% of more than 130 thousand publications analyzed were about HPV in the last eight years. This subject has little public information, despite there are more than 700 thousand new cases per year in Brazil.<sup>26</sup> Previous studies detected insufficient knowledge and negative attitudes among Brazilian adolescents with regards to prevention.<sup>26,27</sup> These findings underscore the need for an increase in the frequency of materials available on social media, as the dissemination and reach of such information are important components of health promotion actions and, when produced by official health agencies, the information is influential in its institutional role.<sup>19,25</sup>

The oldest publication on HPV in this study was from 2014. Coincidentally, the Health Ministry and National Secretary of Health Surveillance implemented a vaccination campaign for this disease in that year. During the initial phases (first and second steps), there was a lack of clarity in the media on reactions to the vaccine and low adherence to vaccination. Public mistrust - which was poorly allayed by official health agencies - may have contributed to this situation.<sup>28</sup> Only one publication among a total

of 504 was classified in this study as “combating fake news”, further demonstrating the lack of direct clarifications for the population.

The reach of publications on HPV measured by likes, comments, and views is considered low compared to the number of followers of the analyzed profiles. Interaction with readers, such as answering questions, receiving topic suggestions, and maintaining a high volume of publications, is important to achieve mobilization around the issues.<sup>25</sup> This engagement should be strategic in order to expand knowledge on health and provide users with information and make them aware of accessible ways to prevent, diagnose, and treat diseases.<sup>29</sup>

Publications that had a higher BR-CDC-CCI score and those with a greater number of posts had a greater number of likes. The use of clear, objective language makes the informative content more attractive, arousing the interest and attention of the visitor,<sup>24,28</sup> which may explain our findings.

One limitation of this study was the assessment of publications on only one online platform (Instagram). The analysis of the educational publications was restricted to media with written texts, which is a limitation of the use of the BR-CDC-CCI, and it was

not possible to measure the clarity of publications in media with a video format. The strength of this study was the finding that Brazilian authorities need to more attention to the production of educational materials and interaction with readers in social media to improve understanding, engagement, and proper dissemination of the subject, consequently reducing the high incidence of HPV.

## Conclusion

The results of this study reveal the low quality and clarity of educational publications about HPV posted on the Instagram profiles of official Brazilian health agencies. Adjusting these materials with language appropriate to the level of health literacy of the general public is necessary to contribute to channeling public resources and, consequently, improving health outcomes.

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