Nursing Undergraduates' Knowledge of Human Papillomavirus Infection: A Study of Social Representations

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Abstract: The present investigation is aimed at discussing nursing undergraduates' knowledge of Human Papillomavirus (HPV) infection and its Social Representations (SRs) he qualitative study, supported theoretically and methodologically by the procedural approach of the Social Representations Theory, was conducted at a public higher education institution in Rio de Janeiro with 30 sexually active nursing students. To this end, characterization data were collected, in-depth individual interviews were conducted between March and August 2020, and a thematic-categorical content analysis was conducted. The social group was predominantly heterosexual, with a partner, aged 21-24 years, living with their parents, and Catholic. Twenty percent reported having had an STI, with 10% of these indicating HPV. The category 'Undergraduates' Knowledge about HPV Infection' comprised 23% of the total Registration Units (RUs), encompassing 502 RUs and nine themes. The following subcategories emerged: 1 - Undergraduates' knowledge about HPV; 2 - Clinical manifestations and consequences of HPV infection and 3 - Aspects associated with HPV infection. The nursing students' understanding of HPV infection and the social representations they attribute to it reflect both academic knowledge, characteristic of their health professional training, and influences from their sociocultural and gender contexts.

➤ **Keywords:** Women's health. Knowledge. Nursing students. Human papillomavirus. Social psychology.

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Introduction

Sexually transmitted infections (STIs) are caused by etiological agents (bacteria, viruses, fungi, or protozoa) and represent a serious global public health problem. Among the existing STIs, Human Papillomavirus (HPV) has a particularly high proliferation rate. It is a virus from the Papillomavirus group, comprising over two hundred recognized types, with 45 of them capable of infecting the anogenital tract in both females and males (Brasil, 2022a; Hazra *et al*., 2021).

HPV is one of the most common STIs worldwide and is the primary risk factor for the occurrence of Cervical Cancer (CC). Its occurrence is common among sexually active youth and is a significant cause of morbidity and mortality in the global female population. However, early detection greatly increases the chances of a cure (INCa, 2023).

It is noteworthy that Cervical Cancer (CC) is the third most common type of cancer among Brazilian women. For 2023, 17,010 new cases were estimated, representing a considered risk of 13.25 cases per 100,000 women. When assessing the magnitude of the disease, it is CC ranks as the second most common cancer in the North (20.48/100,000) and Northeast (17.59/100,000) regions; third in the Central-West (16.66/100,000); fourth in the South (14.55/100,000); and fifth in the Southeast (12.93/100,000) (INCa, 2023).

Given this epidemiological issue, the relevance of this investigation is emphasized from the nursing students' perspective, as they represent a social group vulnerable to STIs like HPV (Spindola *et al*., 2020; Melo *et al*., 2022)

Knowledge is understood as useful information that enables appropriate action, as it corresponds to the reality experienced by social actors (Hessen, 2012). Students are in the process of building their body of knowledge as future professionals, given that nursing directly engages in actions/care in the context of collective health, sexual/reproductive health of women and men, at different levels of health care, and therefore are capable of producing their own Social Representations (SRs) (Trindade-Moerbeck, 2021). Thus, new knowledge emerges from the intersection of common sense and the reified universe, with these SRs guiding behaviors and reshaping elements of the university environment (Moscovici, 2015).

Therefore, understanding the SRs of nursing students as a social construct is relevant due to the observed gap in scientific knowledge, given the low production

of studies on this representational object from the perspective of this socially constituted group (Trindade-Moerbeck, 2021).

Thus, the objective was to discuss the knowledge of nursing students about the infection caused by Human Papillomavirus (HPV) and their social representations.

Methods

This is a qualitative, descriptive study that facilitated the incorporation of knowledge and intentionality as inherent aspects of actions, social relationships, and structures. The theoretical-methodological support was provided by the procedural approach of Social Representations Theory (SRT), which offered a basis for understanding the historical-cultural issues and values/beliefs related to the representational object. The study adhered to the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist to ensure theoretical-methodological rigor (Equator-Network, 2019).

Social Representations are understood as a form of specific knowledge intended for shaping behaviors and facilitating communication between people (Moscovici, 2015). The procedural approach encompasses the dimensions of SRT: the representational field, which is structured and hierarchized by groups; and attitudes and decision-making related to the object, which include affective aspects and (in) formal content to understand social practices (Jodelet, 2001).

The research was conducted at a public Higher Education Institution (IES) in the municipality of Rio de Janeiro (RJ), Brazil, with students from the Nursing undergraduate program, who exhibited common and shared characteristics, which allowed for the revelation of the existence of a social group.

The university offering the Nursing course has the mission of training professionals capable of meeting the health needs of society, serving as a reference for academic excellence. In addition to the recognized quality it imparts to the undergraduate program, the institution is characterized by its significant extensionist vocation, contributing to the qualification and requalification of human resources in the health care network, especially within the Unified Health System (SUS), and also by investing in the production and dissemination of knowledge in Nursing. Thus, the choice of the setting and social group was due to the fact that the largest concentration of young females is found in health-related courses.

Eligibility criteria included: university students, self-declared as sexually active, aged between 18-29 years, and duly enrolled in the final periods (eighth and ninth) of the Nursing undergraduate program. Exclusion criteria included: students absent from the campus during the data collection period due to leave of absence or enrollment suspension.

In the sampling process, the total number of students enrolled in the eighth and ninth semesters was approximately 80 undergraduates. The choice of students in the final semesters of the program was intentional, as these students had already completed the theoretical courses and had gained experience in clinical settings (through practical classes and curricular and extracurricular internships). This background allowed the group to be characterized as socially constituted and capable of developing and sharing SRs concerning their knowledge about HPV infection (Sá, 1998).

Convenience sampling involved 15 students from the eighth semester and 15 from the ninth semester of the Nursing undergraduate program, totaling 30 participants aged between 18 and 29 years. The age range adhered to the interval established by the Brazilian Youth Statute as well as the higher incidence of HPV infection (Trindade-Moerbeck, 2021).

The data collection process had two stages. In the first stage, a form was applied to characterize the participants (sociodemographic data and STI occurrence profile). In the second stage, semi-structured individual in-depth interviews were conducted, using a script organized into thematic blocks: meanings of HPV, knowledge about HPV transmission and prevention practices, among others.

The interviews were recorded using an audio device, with prior consent from the participants. The data collection with seven participants was face-to-face, in a private setting, at a convenient time for both the researcher and the participant, during the pre-pandemic period (until 03/13/2020). The remaining 23 interviews were conducted via video call over the internet, using the WhatsApp application. The audio recordings were conducted using a voice recording app installed on the principal researcher's mobile phone. Data were collected between March and August 2020, with each interview lasting approximately 40 minutes.

The research adhered to the minimum number of ≥30 participants recommended for qualitative investigations (Minayo, 2017). It is noted that theoretical saturation was reached, leading to the cessation of data collection, as

no new data or insights regarding the representational object were emerging, with information beginning to repeat itself.

Initial contact with each semester was made through the class representative, who provided the phone numbers of other classmates. Additionally, at the end of each interview, the participants recommended new contacts who met the eligibility criteria, following the methodological recommendations of the Snowball Technique (Lenaini, 2021).

In the analysis of numerical data, descriptive statistics (absolute and relative frequencies) were used with the support of Microsoft Excel 2018 software. The discursive data from the interviews were first transcribed into Microsoft Word 2018, followed by the formatting of the *corpus*. Finally, thematic-categorical content analysis was applied, addressing its three stages: 1) pre-analysis; 2) exploration of the material; and 3) treatment of results, interference, and interpretation (Oliveira, 2016; Bardin, 2020).

All ethical and legal aspects of research involving human subjects were observed. The main investigation was approved by the Research Ethics Committee under Consubstantiated Opinion No. 3,783,947. The agreement/consent of the university students to voluntarily participate in the research was secured through the signing of the Informed Consent Form (ICF). In the seven face-to-face interviews, participants signed the ICF in person, while for the 23 video call interviews, the ICF was sent via email and returned signed by the participants. Confidentiality/anonymity was ensured through coding with the letter E, followed by a sequential number of participation (e.g., E1, E2, ...).

Results and Discussion

Out of the 30 young participants, most were between 21-24 years old (80%); self-identified as heterosexual (86.66%); were in a stable relationship (70%); lived with their parents (43.4%) or with relatives (uncles and grandparents) (23.2%); identified as Catholic (40%) or Evangelical (26.7%). This profile was similar to findings in other studies (Spindola *et al*., 2020; Melo *et al*., 2022).

It is important to obtain the characterization profile of social actors in the SRs study because identifying the social and demographic variables of these individuals enables the understanding of the sociocognitive processes of SRs, as well as the origins of each representational element (Moscovici, 2015).

It is also crucial to address the basic research questions in SRT: "Who knows and where does knowledge come from?" (Jodelet, 2001). In this regard, the profile of STI occurrence among the young women was assessed, with 20% reporting having had some infection, such as HPV (10%), herpes (3.66%), and trichomoniasis (3.33%).

A descriptive exploratory study, based on SRT and conducted with 200 students from 14 health fields at a public higher education institution in Rio de Janeiro, found that university students' Social Representations vary according to gender and sexual orientation, and that infection prevention is perceived as a female responsibility, corroborating the data from this investigation (Queiroz *et al*., 2022). Furthermore, it is a national reality that women more frequently seek health services compared to men, reflecting a sociocultural behavior present in their health (self)caring actions due to lower negotiation power regarding the use of condoms (Melo *et al*., 2023a).

The thematic-categorical analysis process occurred in three stages. The first stage, pre-analysis, involved selecting documents through a floating reading process conducted by the researcher to develop the indicators that guided the interpretation of the material (Bardin, 2016).

In the second stage, material exploration, the process of transforming aggregated raw data into Registration Units (RUs) occurred. These were subsequently grouped into thematic units, which represent characteristics of the content expressed in the text (Bardin, 2016; Oliveira, 2016).

In the third stage, the treatment and interpretation of results were carried out, involving marking the start and end of each observed RU in the text, totaling 2,182 RUs; defining the Units of Meaning (UMs) or themes, which amounted to 37; thematic analysis of the RUs and categorical analysis of the text, including treatment, presentation, and discussion of results; and returning to the study object. Thus, the UMs were grouped into four different categories (Oliveira, 2016; Trindade-Moerbeck, 2021).

In this article, the results from category 1, titled “Students' Knowledge about HPV Infection,” were selected. This category presented the participants' concepts and knowledge about HPV, HPV infection, and aspects associated with the infection. It constituted 23% of the total RUs, gathered 502 RUs, and nine themes, or UMs. The themes were grouped into three subcategories, respecting the specifics of the thematic blocks, illustrated in Table 1.

Chart 1. Summary of the construction of Category 1 and subcategories, Rio de Janeiro-RJ, 2023

Topics / USs	No. RUs / Topics	% RUs / Topics	Subcategories
Virus causing STI	41	1.90	**Subcategory 1** – Students' Knowledge about HPV
HPV: rarely discussed	42	1.92	
Types of HPV	23	1.05	
Treatment	40	1.83	
Clinical manifestations of HPV	55	2.52	**Subcategory 2** – Clinical manifestations and consequences of HPV infection
Consequences of HPV infection	99	4.53	
Sexual and vertical transmission	79	3.62	
Factors increasing the potential of HPV infection to cause cancer	76	3.48	**Subcategory 3** – Aspects associated with HPV infection
Female mortality: HPV as a precursor to CC	47	2.15	

Source: The authors, 2023.

Subcategory 1 - Students' Knowledge about HPV

This category represented 6.7% of the total RUs, gathered 146 RUs, and presented concepts about HPV, types, and treatment (informative/cognitive dimension of SRs). It was evident that HPV infection is still rarely discussed within the social group, as shown by the following statements:

> It is a virus that circulates widely and is much more prevalent in society than people realize or believe. (E18)
>
> It is a virus that you can get through sexual contact or just by skin-to-skin contact with someone who has HPV. (E19)
>
> HPV is caused by a virus that has no cure. (E23)
>
> It is a virus that can cause infections in the vagina, penis, and uterus. (E26)
>
> An STI caused by HPV, which is the main cause of CC and can be visible or not through clinical examination, identifying warts, or it may not be visible to the naked eye. (E29)
>
> HPV is transmitted sexually and is the leading cause of CC. (E30)

Most of the nursing students knew that HPV is a type of virus that poses a health risk. Knowledge about the virus's etiology directly influences behaviors, decision-

making regarding prevention methods, and the lack of information makes young people vulnerable to STIs (Melo *et al*., 2023b).

HPV is a small DNA virus that belongs to the Papillomaviridae family. It infects the basal cells of epithelial tissue through small ruptures in the skin or mucosa and, under normal conditions, can manifest in different forms of infection: latent, productive, or transformative. The transformative phase is the most susceptible to the development of CC (Monteiro *et al*., 2019).

Nursing students need to have knowledge about HPV so they can provide qualified and effective care, as well as engage in (self)care actions. Participants reported needing to study more and obtain more information about this etiological agent, as the virus is still rarely discussed compared to other STIs, such as Human Immunodeficiency Virus (HIV). Thus, there is frequently a knowledge deficit and embarrassment due to the taboos associated with STIs.

> People with HPV do not like to talk about it because it is an embarrassing subject. Everyone needs to discuss it more. (E1)

> It is concerning due to the lack of information because it is a big taboo. A friend has HPV and the doctor who treated her never explained it to her. I was even worried about how to talk about it because she is uninformed; if I tell her she has HPV, she might think it is HIV because people still confuse them. (E10)

> HPV is an STI that is still not well known or debated. I know more about it because of college and I am interested in the subject because I want to pursue a career in oncology. The topic is still a taboo. There is a lack of information about it. (E14)

> I notice, even during internships, that women and men are very concerned about HIV and even confuse it with HPV. Other STIs are forgotten, and women are the most affected because of CC. We receive women with various warts, in a more advanced stage, who will need surgical intervention because of the lack of information and failure to seek treatment. (E15)

> We don't talk about it much, so this lack of knowledge is not just mine, as I know a bit more because I am a student in the field. There is a general lack of knowledge about HPV. Many people have it and do not know they have it; many people have it without symptoms. (E18)

Research analyzing young university students' knowledge about STIs revealed that students had more knowledge related to HIV. Other infections such as chlamydia, HPV, and herpes were still unknown to the group (Spindola et al., 2019). The occurrence of these STIs is of high incidence (inter)nationally and increases the chances of HIV occurrence (Brasil, 2022a; Hazra *et al*., 2021). However, there is

little discussion about HPV and other STIs, leading people to seek information from websites (Garcia *et al*., 2018).

Another factor contributing to the scarcity of information is the lack of dialogue in schools, with family, and the low demand for specialized health services. Thus, whether due to fear or shame, even today, "sexuality" is still treated with prejudice, surrounded by myths and taboos that have worsened recently due to sociopolitical issues and "conservative" positions (Melo *et al*., 2023b).

There is a lack of dialogue in schools about sexuality and gender issues; however, these topics are often a focal point for the clash of viewpoints, religious beliefs, and political values. Conflicts are observed in the formulation of educational policy guidelines, public controversies surrounding educational policies on sexuality and gender issues, daily work processes of educators and educational institutions, and various debates over school curricula (Leite, 2019).

In the last decade, especially in the Brazilian context, numerous controversies have accumulated in various media, where gender and sexuality expressions related to children and adolescents in school environments have been at the center of discourse. These controversies intersect in the confrontation of moralities concerning gender and sexuality and the mobilization of discourse in defense of children and adolescents (Leite, 2019). Thus, such social constructs are capable of modifying the constituent processes of SRs and their core over the years concerning a specific representational object, such as this study on HPV (Sá, 1998).

Continuing with the content analysis, among the participants, 12 students discussed the classification of HPV types:

> There are several types, with low and high-risk subtypes for cancer. High-risk HPV types are 70-80% responsible for causing CC; they can also affect the rectum. If not prevented, it can be lethal. (E14)
>
> Four more common serotypes cause CC, but there are various serotypes. Warts are also a type of HPV. (E15)
>
> Four types, I think 6, 11, 18, but I don't remember the other one right now. (E17)
>
> There are several types; if I am not mistaken, 16 and 18 are more aggressive. (E22)

Participants showed uncertainties when reporting the types responsible for causing genital warts, with types 6 and 11, and 16 and 18 being the most cited. These are the ones that cause most cases of CC, but they are also related to other types of cancer, such as head and neck, vagina, vulva, etc. (Brasil, 2014).

HPV can be classified into low and high-risk types for developing cancer. There are 12 types identified as high risk (16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, and 59) that have a higher likelihood of persistence and causing pre-cancerous lesions. Types 16 and 18 account for the majority of CC cases worldwide (about 70%). They are also responsible for the incidence of anal cancers (90%), vaginal (60%), and vulvar (50%) cancers. Types 6 and 11, found in most genital warts (genital condylomas) and laryngeal papillomas, have a low risk of progression to malignancy (Brasil, 2014). Thirteen students discussed HPV treatment in their descriptions. Below are some excerpts from statements showing this:

> He also had treatment; he had to undergo burning, and I also did; there were some where I needed to have surgical procedures. I went to have my procedure done at a specific place. (E1)
>
> And normally the treatment is done by electrocauterization, which is the process of burning these warts. (E10)
>
> A woman with multiple warts, in a more advanced stage, will require surgical intervention. (E15)
>
> I had the warts removed using acid. (E29)

Discourse is observed regarding the procedures for treating warts associated with HPV infection: the use of trichloroacetic acid (TCA) and electrocauterization, and in more advanced and severe cases, surgical removal through conization or high-frequency surgery. The procedures mentioned by students E1 and E29, to which they were subjected, illustrate the informational/cognitive and behavioral/attitudinal dimensions of SRs stemming from their personal experiences.

Treatments involve applying a special cream or solution to the warts or removing them through freezing, cauterization, or laser. If genital warts do not respond to these treatments, surgery may be required for their removal. In 25% of cases, they are recurrent and reappear even after treatment, but the goal is to reduce, remove, or destroy HPV lesions with chemical, surgical, and immunostimulatory treatments (Brasil, 2014).

There is no specific treatment to eliminate the virus. Treatment of genital warts should be individualized, depending on the extent, quantity, and location of the lesions. Laser, electrocauterization, TCA, and immunostimulants may be used. Precursor lesions can be treated in various ways, with the most common being the use of acids or surgical removal. In women aged ≤40 years, it is removed with local anesthesia during colposcopy. In some cases, conization (cone biopsy) of the cervix

may be necessary. Both procedures are performed via the vagina and have a low risk of complications (Brasil, 2022a).

A small number of interviewed students (43.3%) have information about the treatment, which could aid in decision-making for identifying lesions and initiating early treatment. Thus, it would prevent the progression of HPV infection. The privileged social construction occurs because this group, being from the health field, has information related to the topic.

In contrast, a study with women in the inner regions of São Paulo, about the treatment of HPV infection, revealed that 72.2% of participants reported that the infection is treatable. These data are concerning, as the later the start of treatment, the lower the prognostic chances of cure and the greater the potential for carcinogenic progression (Souza *et al*., 2017). This reinforces the need for more information about the particularities of HPV infection.

Subcategory 2 - Clinical Manifestations and Consequences of HPV Infection

This subcategory represented 13.67% of the total RUs and included 233 RUs. These refer to the SRs of concepts about HPV infection, including the presentation of clinical manifestations of HPV, the consequences of the infection, and the modes of transmission, demonstrating the functions of knowledge, identity, and normative SRs from the cognitive/informative, behavioral/attitudinal, evaluative/affective, and imagistic dimensions. Regarding clinical manifestations, the following testimonies stand out:

> The lesions appeared as condylomas. I don't know which relationship I ended up contracting it from. I am unsure of the specific relationship through which I contracted it. Later, I noticed a lump that began to grow. My partner at the time also became concerned because similar growths appeared on him as well; it turned out to be HPV. I already had several lesions on my genitals and cervix. (E1)

> Having warts is unattractive and harmful to health. Aesthetically, it is neither nice nor pleasant. (E11)

> It manifests on genitals, not necessarily just inside the woman but also around. It is transmitted through oral, vaginal, and anal sex. (E17)

> Even mucosa transmits it. I believe it only passes from man to woman when the man has the wart, the condyloma, when it is already symptomatic. (E22)

> My self-image changed because I didn't have warts before. It feels like a visible sign that I didn't take care of myself, which is bad. (E29)

Doubts about clinical manifestations are evident, especially regarding subclinical lesions, which are not visible. Participant E1, by describing that she and her partner identified the genital warts, reveals the difficulties faced when the infection occurred, highlighting the high potential for virus transmission and the involvement of the cervix. E11 reported that the lesion affects her self-image, describing it as "aesthetically ugly."

The statements from E1 and E29 corroborate this description, as they affirm that the presence and appearance of the warts cause embarrassment. For the student E29, "the wart feels like a visible sign that I didn't take care of [...]". It becomes evident that the person did not follow prevention recommendations and became infected, leading to embarrassment, stigma, and prejudice.

For individuals with HPV and/or herpes, the stigma is associated with STIs, which cause more embarrassment and negative feelings compared to other health conditions. This occurs because many aspects involved are still stereotypes of these infections (supposedly originating from inappropriate sexual conduct) and future risk of potential transmission to others, despite the asymptomatic phase (Foster *et al*., 2016).

When analyzing knowledge about HPV among infected individuals, stigma-related feelings were identified, affecting their motivation to disclose the diagnosis to others. They felt judged and worried about their positive status for HPV, denying their condition, and only a few informed their sexual partners about it. In addition, few used barrier methods in all sexual relationships (Schwarz, 2018).

The period required for manifestations of HPV infection to appear is approximately 2-8 months, but it can take up to 20 years. Thus, it is impossible to determine precisely when and how a person was infected with HPV. It is estimated that approximately 10% of people (both men and women) will develop genital warts over their lifetime. These may appear weeks or months after sexual contact with an infected person (Brasil, 2022b).

In a small number of cases, the virus can replicate and cause lesions, such as genital warts, which are highly contagious, while subclinical infection has lower transmission potential. The virus can remain in the body for several years without causing any clinical or subclinical manifestations. Low immunity can trigger the replication of HPV and, consequently, lead to the appearance of clinical and/or subclinical lesions (Brasil, 2014).

Diagnosis is obtained through clinical and laboratory tests. Clinical lesions are assessed through urological, gynecological, and dermatological tests. Subclinical lesions are diagnosed with laboratory tests such as cervicovaginal cytology, colposcopy, peniscopy, anoscopy, hybrid capture, and histopathological study (Brasil, 2022b). According to the participants, HPV infection has consequences in people's lives, such as:

> It can cause CC and warts; in men, it can also cause cancer. (E10)
>
> HPV will cause changes in the cervical cells, leading to neoplasias. (E14)
>
> The consequences are psychological, including insecurities, loss of control over the body, and alteration of the woman's image. HPV can cause warts and CC, and in men, penile cancer. It is the main cause of CC because it multiplies, affects the uterus, and causes the proliferation of malignant cells. (E15)
>
> Infection and its progression can even lead to the loss of the uterus. It can result in cervical cancer, infertility, in addition to warts. In men, warts can also occur. (E16)
>
> It can cause genital warts and can turn into cancer. It is a disease that can cause depression, psychological problems, issues in relationships, and affect self-image. (E17)

HPV has had a significant impact on health due to its oncogenic potential and its association as a precursor to tumors, particularly CC. The participants reported that one of the main consequences of HPV infection is the development of cancer. They associate the infection directly with CC and emphasize the occurrence of clinical lesions. CC is the disease most frequently linked to HPV, and nearly all cases of this neoplasm can be attributed to HPV infection (Hazra *et al*., 2022).

Some young women were unable to explain how HPV is a precursor to CC. CC is a group of more than one hundred diseases characterized by disordered cell growth, which can invade tissues and organs and may spread to other parts of the body. Cancer cells divide rapidly and tend to be aggressive and invasive, leading to the formation of tumors that can be either benign or malignant (Brasil, 2022b).

Cancer originates from a process in which normal cells are transformed into tumor cells, involving various stages, and these cells typically progress from a precancerous lesion to malignant tumors. The cellular mutations that lead to cancer formation are the result of the interaction between genetic factors and external agents, which can be classified as physical, chemical, and biological, with the latter including infections like HPV (Hazra *et al*., 2022).

These STIs are detected through the Pap smear test and are curable in most cases. The importance of regular Pap smears is emphasized, meaning two consecutive years of testing. In the absence of histological abnormalities, the interval can be extended to three years, with a new routine of collection for two consecutive years, for women classified as at normal risk (Melo *et al*., 2022).

The students pointed out the differences in HPV infection between men and women. In women, it is mainly associated with CC and its precursor lesions. In men, it manifests as genital warts and contributes to the development of penile cancer (Brasil, 2022b).

Specific knowledge about HPV as a risk factor for the development of CC was significant among the majority of nursing students at a public higher education institution in northeastern Brazil (Silva-Júnior *et al*., 2021), which supports the findings of this study. A study identified a lay knowledge among the interviewees, and the lack of information is likely the main reason for the high rates of HPV and CC. It emphasized the importance of investing in youth education regarding health promotion and STI prevention, especially those caused by HPV (Torres *et al*., 2019).

The psychological repercussions involve the fear of carrying HPV, living with the doubt of being infected, the progression of the disease, and uncertainty about the prognosis. Women exhibit a greater degree of vulnerability, not only biological but also due to socioeconomic and psychosocial factors. It is noted, therefore, that health policies directed towards women deserve greater attention to their psychological aspects (Félix *et al*., 2022).

The effect of HPV presence in semen is widely debated and is associated with impaired sperm motility, suggesting that the infection could be an emerging risk factor for male infertility. Researchers analyzed the integrity of HPV DNA in sperm cells using Real-Time Polymerase Chain Reaction (qPCR) technology. In one sample, more than half of the viral genomes were defective, suggesting a possible recombination event. The data from this study support the proposed role of HPV in decreased fertility and point to new possible consequences of semen infection (Capra *et al*., 2019). In the present study, a low level of knowledge about HPV transmission was observed:

> Yes, it is an STI; I am not sure if there are other ways. In fact, I am uncertain whether it can be transmitted through blood transfusion. (E4)
>
> Through sexual intercourse with contaminated fluid. (E9)
>
> It is transmitted through oral, vaginal, and anal sexual relations. (E16)

> HPV can be contracted not only through sexual contact but also sometimes through skin-to-skin contact, with sexual contact being the most common. Regarding oral sex, I believe it can be transmitted because it involves the mucosa. Anal sex too. (E19)

> Through secretions, wounds, and the condyloma itself. Through oral, vaginal, and anal sex. Even the hand can transmit it if it has been in contact. (E22)

HPV is highly contagious, and it is possible to become infected with a single exposure. Transmission occurs through direct contact with infected skin or mucosa, where microabrasions allow the virus to penetrate the epithelial tissue. The primary mode of transmission is sexual, which includes orogenital, genital-genital, or manual-genital contact. Contagion can occur even without vaginal or anal penetration, and transmission can occur during childbirth. The virus can also spread through hand contact, although this is rare. Since many HPV carriers do not show any signs or symptoms, they may not be aware that they carry the virus but can still transmit it. Transmission can also occur in the presence of flat lesions that are not visible to the naked eye (Brasil, 2014).

In participant E4's statement, there is noticeable doubt regarding whether the virus can be transmitted through blood transfusion. This suggests that the young woman has anchored HPV within the SRs of HIV and the belief in bloodborne transmission. It is known that the advent of HIV brought a new understanding of STIs due to its correlation with death. However, with the maintenance of Antiretroviral Therapy (ART), this SR has been undergoing changes (Stefaisk *et al*., 2020). Since HIV has broad media coverage and greater social impact, it is evident that some students mention aspects of HIV to understand and construct the SR of HPV.

The achievement of treatment access, effective use of ART, increased availability of diagnosis, and the chronic nature of the disease have led to a decrease in morbidity and mortality, increased life expectancy, and the redefinition of future plans. These factors, along with the implementation of measures to combat HIV and Acquired Immunodeficiency Syndrome (AIDS), have influenced representational change, incorporating the meaning of a chronic disease, as presented in the last decade (Stefaisk *et al*., 2020). Only three participants mentioned vertical transmission, but without much conviction.

> And from mother to baby (E1)

> HPV does not transmit to the baby. (E18)

> I think vertical transmission too. (E23)

Screening for HPV infection during pregnancy is essential to help prevent the emergence of conditions that could lead to obstetric complications, particularly those related to placental dysfunction (Sousa *et al*., 2018). Beyond maternal health aspects, there is concern about the vertical transmission of the virus from mother to fetus. Current epidemiological data indicate that vertical transmission can occur not only during childbirth but also before and after it (Sousa *et al*., 2018; Cirino *et al*., 2020).

The prevalence of HPV in pregnant women is associated with a lack of knowledge and having multiple sexual partners. Most of the participants were young or adolescent women, and despite their young age, they were in their second or third pregnancy. Even though they used contraceptive methods, they were unable to avoid both situations due to a lack of understanding about these methods. Additionally, research indicates that a higher number of pregnancies leads to an increase in hormonal load, which increases vulnerability and susceptibility to acquiring HPV in the cervical region (Cirino *et al*., 2020).

Due to hormonal changes during pregnancy, warts can increase in size and number. If the lesions are too large and interfere with the baby's passage through the birth canal, a cesarean section may be recommended. However, small, microscopic, or latent lesions do not contraindicate vaginal delivery. There is a possibility that HPV could be transmitted to the fetus or newborn (NB), potentially causing warts on the baby's larynx and/or genitals (Brasil, 2014).

HPV transmission primarily occurs through sexual contact (98%). However, during pregnancy, there is increased viral replication, especially in the second half, raising the risk of vertical transmission. The main complication for the NB is juvenile recurrent respiratory papillomatosis and/or the development of lesions in the anogenital and conjunctival regions (Campos *et al*., 2016).

It is emphasized that the primary measures for prevention include changes in sexual behavior, reducing the number of sexual partners (both steady and casual), consistent use of condoms, and vaccination of adolescents against HPV (Melo *et al*., 2023a).

Subcategory 3 - Aspects Associated with HPV Infection

The aspects associated with HPV infection represented 5.63% of the total RUs, totaling 123 RUs. Thus, the informative/cognitive dimensions and the function of knowledge were demonstrated. Factors that increase HPV's potential to cause cancer were mentioned:

> Lack of vaccination and non-use of condoms. I think hygiene also matters. Failure to attend medical or nursing consultations, and not having routine exams once a year. (E5)
>
> Low immunity, unprotected sexual relations, and HIV. (E13)
>
> Smoking, a weakened immune system, and the use of contraceptives. (E14)
>
> Previous exposure to the virus, having had other STIs, having multiple partners, and engaging in unprotected sex. Multiparity increases the chances of CC. (E22)
>
> Obesity, smoking, concurrent infections with other STIs such as HIV, and not using condoms. (E23)

Certain factors increase the potential for developing genital cancer in women infected with HPV, such as the use of oral contraceptives, smoking, HIV infection and other STIs (such as herpes and chlamydia). Tobacco and its derivatives can induce numerous changes in the immune system, particularly in natural killer cells (Brazil, 2014). Continuous use of hormonal contraceptives, including steroids administered to women during their reproductive years, increases the activity of HPV oncogenes involved in transformation (Busnardo *et al*., 2022).

Triphase or low-dose contraceptives are significantly associated with increased transcription of HPV types. Using these hormones for ≥5 years raises the level of development of high-grade intraepithelial lesions. This risk can be higher if this medication is started early (age ≤17 years) before the complete development of the female genital tract (Busnardo *et al*., 2022). Regarding female mortality, participants revealed:

> It is concerning to know that it is something that, whether one likes it or not, is quite fatal and is usually discovered very late. It is something that can be prevented through vaccination and safe sex. (E7)
>
> Even as a nurse, we are concerned about such complex things and don't ask or talk about them... we know all the concepts, but we don't do the simple things. We need to focus on health education because the statistics wouldn't be like this. (E8)
>
> Fear and sadness arise because it is something that can be addressed and screened for, and can be intervened with vaccines. Yet, we still have such a high mortality rate. (E25)
>
> Fear, because it is often invisible to the eyes and is directly related to our own practices, which cause so much lethality. Especially for me because I had the warts. (E29)

The students expressed feelings of surprise, concern, fear, and sadness. A cross-sectional study using data from the System of Information on Morbidity and Mortality from CC in Brazil showed an increase over the observed years, with more

deaths in the 50-54 age group. Deaths were recorded in women not covered by the screening recommendations for this neoplasia in Brazil. Regional variations were found due to the heterogeneity of the locations. The South region showed the highest increase in specific mortality rates. Controlling CC is a challenge; therefore, improvements in prevention programs are needed (Tallon *et al*., 2020).

Final considerations

The nursing students' knowledge about HPV infection and the SRs they assign to it suggest that their understanding is linked with the typical information from their professional training. This understanding is influenced by the sociocultural and gender context and is imbued with myths, taboos, values, and customs.

In the discourse of these young students, elements revealing limited knowledge about HPV, its clinical manifestations, the possible consequences of the infection, and personal and subjective aspects related to it are evident. Their representations of HPV are shaped by their own experiences and those of others, both within and outside the higher education institution (IES). These results challenge the effectiveness of the university as a health-promoting institution, which has been corroborated by other studies on the topic.

This study highlights the inadequate or incorrect information within the group regarding HPV/CC, even among young women in training as health professionals. Thus, it occupies the social imagination and emerges in the SRs as an evaluation of insufficient knowledge to be converted into an effective prevention strategy against HPV and other STIs. This aligns with findings from numerous studies indicating the prevalence of risky sexual behavior among young university students.

Understanding the representations of nursing students regarding HPV contributes to the training of future professionals in addressing sexually transmitted infections (STIs). This knowledge allows for the development of strategies and implementation of care that consider the social environment, behaviors, attitudes, beliefs, and knowledge.

It is expected that universities, as health-promoting institutions, will be able to act more effectively by providing educational approaches that are innovative, engaging, problematizing, and contextualized to the social realities of the IESs. It would be beneficial for these educational practices to include not only students but also faculty, sexual partners, family members, and society at large.

It is suggested that the HPV topic be addressed with young university students through interdisciplinary and intersectoral actions, incorporating issues of gender and sexuality as transversal themes related to STIs.

The study's limitation is that it was conducted in a single setting—a public university with health science students. It is recommended that future research expand the discussion by including other undergraduate programs and both public and private higher education institutions.[1]

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Note

[1] N. S. T. Moerbeck and T. Spindola: study design, data analysis, and final review, with critical and intellectual contribution to the manuscript. L. D. de Melo and D. C. Oliveira: data analysis and final review, with critical and intellectual contribution to the manuscript.

Resumo

Conhecimento de graduandas em Enfermagem sobre a infecção pelo Papilomavírus Humano: estudo de representações sociais

A presente investigação objetivou discutir o conhecimento sobre a infecção pelo Papilomavírus Humano (HPV) e suas Representações Sociais (RSs) segundo graduandas em Enfermagem. O estudo de caráter qualitativo, com suporte teórico-metodológico na abordagem processual da Teoria das Representações Sociais, foi realizado em uma instituição de ensino superior pública, carioca, com 30 estudantes do curso de Enfermagem, sexualmente ativas. Para isso, coletaram-se dados de caracterização e procedeu-se à entrevista individual em profundidade entre março-agosto/2020 e à análise de conteúdo temático-categorial. O grupo social era predominantemente de heterossexuais; com companheiro; idade 21-24 anos; residiam com os pais e eram católicas; 20% afirmaram já terem tido IST e destas, 10% mencionaram o HPV. A categoria "Conhecimento das graduandas sobre a infecção por HPV" foi constituída por 23% do total das Unidades de Registro (URs), sendo 502 URs e nove temas, emergindo as subcategorias: 1 - Conhecimento das graduandas sobre o HPV; 2 - Manifestações clínicas e consequências da infecção pelo HPV e 3 - Aspectos associados à infecção pelo HPV. O conhecimento de graduandas de enfermagem acerca da infecção pelo HPV e as RSs atribuídas por elas denotam que estas guardam nexo com o conhecimento acadêmico, característico do processo de formação de profissionais da área de saúde, mas também com o contexto sociocultural e de gênero.

➤ **Palavras-chave:** Saúde da mulher. Conhecimento. Estudantes de enfermagem. Papilomavírus humano. Psicologia social.