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Vaccine hesitancy against HPV: adolescents' perspectives

Hesitação vacinal contra HPV: olhares de adolescentes

Vacilación vacunal contra el VPH: miradas de adolescentes

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ABSTRACT

Objective: To analyze elements of HPV vaccine hesitancy from the perspective of adolescents. **Method:** Qualitative study conducted with 58 middle school students from a public school in São Paulo, developed through focus groups. Deductive content analysis was guided by the 5Cs framework of vaccine hesitancy. **Results:** Regarding **confidence**, many adolescents believed the vaccine was safe; however, boys demonstrated limited knowledge about adverse events. In terms of **complacency**, there was underestimation of risks and confusion about potential complications. Concerning **convenience**, barriers to access were highlighted, as well as the tendency to seek healthcare services only in situations of illness. In the domain of **communication**, participants reported difficulty obtaining reliable information and a lack of dialogue with family members. With respect to the **sociodemographic context**, there was a perception that the vaccine is primarily intended for girls, in addition to migration-related barriers. **Conclusion:** The findings reveal limited knowledge about HPV and the importance of immunization, combined with barriers related to access and communication. Nevertheless, opportunities were identified to expand adolescents' nowledge, particularly through Nursing, which plays a central role in health education processes.
Descriptors: Papillomavirus Vaccines; Vaccine hesitancy; Adolescents; Health Education.

RESUMO

Objetivo: Analisar elementos da hesitação vacinal contra HPV sob a perspectiva de adolescentes. **Método:** Estudo qualitativo descritivo-exploratório com 58 estudantes do ensino fundamental de escola pública de São Paulo, desenvolvido por meio de grupos focais em 25 de junho de 2024. A análise de conteúdo dedutiva foi ancorada pelos 5 Cs do conceito da hesitação vacinal. **Resultados:** Na "confiança", muitos adolescentes acreditavam na segurança da vacina, mas meninos desconheciam eventos adversos. Na "complacência", observou-se subestimação dos riscos e confusão sobre complicações. Na "conveniência", destacaram-se barreiras de acesso e a busca por atendimento apenas em casos de doença. Na "comunicação", houve dificuldade em obter informações confiáveis e ausência de diálogo com familiares. No "contexto sociodemográfico", houve a percepção de que a vacina é voltada ao público feminino, além de obstáculos migratórios. **Conclusão:** Os achados revelam desconhecimento sobre HPV e importância da imunização, somado a barreiras de acesso e comunicação. Contudo, identificam-se oportunidades para ampliação de conhecimento entre adolescentes, especialmente pela Enfermagem, que possui papel central no processo de educação em saúde.
Descritores: Vacinas contra Papilomavirus; Hesitação vacinal; Adolescentes; Educação em Saúde.

RESUMEN

Objetivo: Analizar los elementos de la vacilación vacunal frente al VPH desde la perspectiva de los adolescentes. **Método:** Estudio cualitativo descriptivo-exploratorio realizado con 58 estudiantes de educación primaria de una escuela pública de São Paulo, desarrollado mediante grupos focales el 25 de junio de 2024. El análisis de contenido deductivo se fundamentó en los 5 Cs del concepto de vacilación vacunal. **Resultados:** En la dimensión de la "confianza", muchos adolescentes creían en la seguridad de la vacuna, aunque los varones desconocían los eventos adversos. En la "complacencia", se observó una subestimación de los riesgos y confusión acerca de las complicaciones. En la "conveniencia", destacaron las barreras de acceso y la búsqueda de atención sanitaria únicamente en situaciones de enfermedad. En la "comunicación", se identificaron dificultades para obtener información confiable y ausencia de diálogo con los familiares. En el "contexto sociodemográfico", se percibió que la vacuna está dirigida principalmente al público femenino, además de evidenciarse obstáculos relacionados con la migración. **Conclusión:** Los hallazgos revelan un conocimiento insuficiente sobre el

VPH y la importancia de la inmunización, sumado a barreras de acceso y comunicación. Sin embargo, se identifican oportunidades para ampliar el conocimiento entre los adolescentes, especialmente mediante la Enfermería, que desempeña un papel central en el proceso de educación para la salud.
Descriptores: Vacunas contra Papilomavirus; Vacilación a la Vacunación; Adolescentes; Educación en Salud.

INTRODUCTION

Human Papillomavirus, better known by the acronym HPV, is a virus that affects the skin and mucous membranes, being transmitted mainly through sexual intercourse. HPV infection is one of the most common sexually transmitted infections (STIs) worldwide[1]. With a wide variety of subtypes, the virus can manifest itself in different ways, from genital warts to asymptomatic infections. The significant concern related to HPV lies in its association with the development of several types of cancer, especially cervical cancer in women[1].

During adolescence, a person goes through a period full of physical, emotional and social changes, and many adolescents face challenges without proper guidance from family, school and society[2]. This makes them more susceptible and less aware of the importance of protecting their health through vaccination against vaccine-preventable diseases[3]. In addition, there is a clear lack of seeking adequate health care in Primary Health Care (PHC) units by adolescents, whether due to lack of interest, feeling healthy enough, or a naive belief that they are not at risk of infection[4].

The HPV vaccination was incorporated into the vaccination schedule of the Unified Health System (SUS) in Brazil in 2014. Initially targeting girls aged 9 to 13, its scope was expanded over the years to include girls and boys aged 9 to 14 and boys, and later, adolescents and young people aged 15 to 19 who were not initially covered by the vaccine[5]. Recently, through Technical Note number 41/2024[6], the Ministry of Health adopted the single-dose HPV vaccine schedule. The importance of the target audience in this age group is understood, given its nature as a sexually transmitted infection, and prophylactic administration of the vaccine before the onset of sexual activity is recommended[7].

A systematic review was developed from the Medline and EMBASE databases, covering articles published between 2007 and 2022, which evaluated the effectiveness of the HPV vaccine by age group[8]. Most of these studies showed that early vaccination, before the age of 18, provides greater protection with an effectiveness of up to 89%. When administered after this age, the effectiveness decreases considerably, reaching only 28% in some cases. The

studies also highlighted the importance of early vaccination for reducing the risk of infection before exposure to HPV[8].

Despite the importance of this preventive measure, HPV vaccine uptake in Brazil does not reach the coverage recommended by the World Health Organization (WHO), set at 90%. Recent data show that, in 2024, vaccination coverage among girls aged 9 to 14 reached more than 82%, while among boys in the same age group it reached 67%[9].

Studies show that lack of knowledge about HPV, prejudices related to sexuality, and difficulties in discussing the subject with children and adolescents also play an important role in low vaccination adherence[10]. In this context, Nursing is a potential agent of change in this reality, as it is responsible for immunization actions, welcoming, listening, active search, and longitudinal follow-up of these adolescents. Furthermore, it plays a strategic role in health education actions, clarifying doubts, deconstructing myths, providing evidence-based information, and promoting more informed decision-making[11].

The concept of vaccine hesitancy arises from the observation of population behaviors in the face of non-adherence to vaccination. It has been identified as one of the main threats to global health and is understood as the delay or refusal to accept recommended and available vaccines[12]. It is influenced by several factors, including aspects present in the "5 Cs" model — confidence, compliance, convenience, communication, and sociodemographic context[12].

Confidence refers to concerns about the safety and efficacy of the vaccine. Complacency, in turn, arises from underestimating the importance of vaccination due to a lack of knowledge of the severity and related diseases, reducing motivation for vaccination. Convenience relates to conditions that hinder or facilitate access to vaccination, such as the physical availability of the vaccine, access to health services, and the cost of the vaccine[12,13].

Recently incorporated as relevant factors in the aforementioned model, communication deals with the quality and reliability of the dissemination of information about vaccination, especially in contexts marked by the circulation of misinformation. And, finally, the sociodemographic context encompasses the possible barriers to access and social understanding historically constructed by ethnic, religious or gender particularities, for example[13].

Considering the above, the present study focuses on HPV vaccine hesitancy in early adolescence. This topic is original given the existing gaps in Brazilian scientific literature, despite the low vaccination coverage achieved. Furthermore, it is relevant to the adolescent health and nursing agenda, which can mobilize actions that empower this population and make them protagonists of their own history. In this regard, studies highlight that nursing plays a key role in the health education process, leading to the promotion of health literacy, strengthening

of bonds, and stimulation of behavioral changes, thus contributing to health prevention and promotion[11]. Therefore, the objective is to analyze the elements present in HPV vaccine hesitancy from the perspective of adolescents.

METHOD

Type of Study

This is a descriptive-exploratory study with a qualitative approach, anchored in the conceptual framework of vaccine hesitancy, reported according to the guidelines of the Consolidated Criteria for Reporting Qualitative Research (COREQ). The qualitative approach is appropriate for examining people's relationships, representations, beliefs, perceptions, and opinions. In other words, it focuses on the interpretations that individuals make about their lives, their artifacts, and themselves[14]. The conceptual framework focused on vaccine hesitancy[12,13]. This is a theme that emerged from the matrix study entitled "Sexuality and virtual media: perceptions of adolescents, parents, and health and education professionals".

Study Location and Participants

The study was conducted in a medium-sized municipality in São Paulo, Brazil. The city is part of the Central Administrative Region of the state of São Paulo, with 254,857 inhabitants according to the 2022 census, with an estimated 265,294 inhabitants for 2024. The population aged 10 to 19 years is 30,303 people, about 11.9% of the total population[15]. It has two important public universities, one state and one federal, constituting an important technological and knowledge production field. The specific field was a state elementary and high school in a peripheral neighborhood, characterized as a group exposed to high social vulnerability for an urban sector, being classified as category 5 (five) according to the São Paulo Social Vulnerability Index (IPVS).

The school was selected for its convenience and potential, considering the feasibility of the research and the existence of a previously established institutional partnership in extension projects. This partnership did not influence the findings, as the researchers had no prior connection with the participants and, being ethical, did not allow interference in their responses.

The decision to include only one school was made to ensure a more in-depth data collection, allowing for detailed observation.

The study participants were 7th and 8th grade elementary school students regularly enrolled and attending the selected school. This was considered the initial stage of adolescence and the recommended period for HPV vaccination. All those who voluntarily agreed to participate in the study, signing the Informed Assent Form (IFA) and the Informed Consent Form (ICF) through their guardians, were included. Those who did not attend on the day of data collection were excluded.

The students were invited in their respective classes, and the study was explained to them, including its objectives, procedures, and the role of the researchers, followed by an invitation to participate. There were 4 classes of approximately 25 students each. On the agreed-upon day, out of the 100 eligible students, 58 participated in the study.

Data Collection Procedure

Focus groups and field notes were used for data collection. In addition, a socioeconomic questionnaire and an HPV vaccination questionnaire were used to characterize the participants.

The focus group is an important data collection strategy for research that seeks to understand group experiences and the transformation of reality. It allows the emergence of viewpoints and meanings that would be difficult to access through individual techniques; it is anchored in Pichon's assumptions of the operative group[16]. It brings with it the understanding of the group as a space for learning and transformation, organized around a common task. It articulates individual and collective dimensions, mobilizing group roles and the elaboration of anxieties in the face of change[16].

Methodological rigor in operationalization, knowledge of the technique, immersion in the objective and theme of the research, as well as the researcher's knowledge of the participants' characteristics, were essential to guarantee the reliability and trustworthiness of the data[16]. The group was moderated by the last author (DMC), a nurse and PhD in Sciences, and observed by the first (LRJS), as an undergraduate student in Nursing. Both had experience in qualitative research.

The focus group followed this script: (1) welcoming and introducing participants, with the creation of identification badges; (2) guidance on focus group procedures; (3) conducting the focus group; (4) closing and evaluation. As a starting point, a playful strategy was developed using cards with questions about HPV (“What is HPV?”, “What does the acronym HPV stand for?”, “How many doses of the HPV vaccine are recommended for complete protection?”, “Is

the HPV vaccine safe? What are the side effects?", "At what age and for whom is HPV vaccination recommended?", "Where can I find the HPV vaccine?", "Is there a cure for HPV?", "Why is it important for boys to also receive the HPV vaccine?", "How is HPV transmitted?", "Is HPV a virus, a bacterium, or a fungus?", "Can HPV be transmitted through skin-to-skin contact in areas not protected by a condom?", "What parts of the body are most affected by HPV?", "Does the use of condoms comp**l**etely eliminate the risk of HPV transmission?", "Are there many different types of HPV?", "Can people who have already been vaccinated against HPV still transmit the virus?" and "What do I do to get vaccinated?" and challenges ("Choose a classmate and imitate how you would talk to your parents about the importance of getting vaccinated," Imitate a nurse explaining the importance of the HPV vaccine to a patient," "Create a slogan about HPV prevention and share it with the group," "Create a jingle about HPV vaccination," "Make a 30-second advertising campaign for HPV vaccination," "Tell an interesting fact about HPV," "Do a celebratory dance because you got vaccinated against HPV," and Imagine you are a superhero fighting HPV; what would your superpower be and why?") related to HPV vaccination. Six focus groups were conducted, three with boys and three with girls. The groups met in the school library, arranged in a circle with tables and chairs. Each group meeting took place on June 25, 2024, and lasted approximately fifty minutes.

The focus groups were identified as G, followed by the letter M when referring to boys and F to girls; then an Arabic numeral was inserted indicating the sequence in which the group was held. It was decided to hold separate groups based on biological sex, as indicated in the literature; it is noted that younger adolescents may feel embarrassed to share experiences in front of participants of different sexes[17]. With the participants' permission, the focus group meetings were audio-recorded and subsequently transcribed in full by the first author (LRJS) for analysis.

The field diary was established as a relevant instrument for data analysis. The researchers in the field described in it their investigative experiences; methodological appropriation; movements, doubts and concerns; reactions of the participants; theoretical reflections raised by the empirical basis in the process of analysis[18]. It was used as a complementary instrument for the study, enabling the contextualization of speeches, the interaction between participants, reactions to questions, and non-verbal aspects during the meetings.

In this study, we opted to look for code saturation*;* this corresponds to a more extensive discussion of a given object, when there is no emergence of new themes or codes [19].

Data Analysis

The characterization of the participants was presented using descriptive statistics. The qualitative data were analyzed using deductive content analysis[20], anchored in the theoretical model of the 5Cs of vaccine hesitancy[12,13].

The analytical process ba**sed** on the deductive content analysis technique occurred in three stages[20]. Initially, in the preparation phase, a literal transcription of the focus groups was carried out, followed by exhaustive readings and re-readings of the material, seeking immersion in the data and identification of units of meaning related to the investigated phenomenon. In the organization phase, an analytical matrix was constructed guided by the *a priori* categories derived from the 5Cs model: confidence, compliance, convenience, communication and sociodemographic context[12]. These categories constituted the initial structure for coding. The units of meaning were highlighted and grouped according to their conceptual adherence to the established theoretical domains. When contents did not immediately fit into the predefined categories, an interpretative analysis was carried out, organizing them as subcategories within the corresponding domains.

The coding was performed by the first and last authors, both with experience in qualitative research. Interpretive differences were discussed with the second author until consensus was reached. The field diary was used as a complementary instrument for contextualizing the statements and supporting the interpretation of the data. In the reporting phase, an interpretative synthesis of the findings was carried out, articulating the empirical data with the domains of the theoretical model. To ensure analytical consistency, constant reference was made to the raw material to verify the representativeness of the categories.

Ethical Aspects

The study followed the recommendations of Resolution No. 466/2012 on research involving human beings, and was only initiated after approval by the Research Ethics Committee with Human Beings of the Universidade Federal de São Carlos under CAAE no 57116122.8.0000.5504 and protocol no 5.627.683. The directors of the selected school were consulted beforehand regarding authorization for the research. After verbally consenting to participate in the research, participants were asked to sign the Informed Consent Form (TCLE) and their guardians, the Informed Consent Form (TCLE), as already recorded.

RESULTS

The study participants were 58 adolescents. Regarding the sociodemographic characteristics of the participants, there was a greater predominance of those aged between 12 and 13 years (56.9%), with the remainder aged 13 to 14 years (43.1%). Of these participants, 34 (58.6%) were female and 24 (41.4%) were male.

Regarding knowledge about receiving doses, 14 boys (53.8%) and 6 girls (23.1%) reported not having received or not knowing if they had received a dose of the HPV vaccine, respectively. Among the girls, 16 (47.1%) received two doses and 12 (35.3%) received one dose. Most boys (n=10, 47.6%) reported that not knowing about the need for vaccination was the reason for not having been vaccinated.

Also, most girls (n=31, 91.2%) and boys (n=20, 76.9%) considered the vaccine important. Regarding family discussions about HPV vaccination, 20 boys (76.9%) and 25 girls (73.5%) did not feel comfortable discussing the topic. The final themes are presented below.

Theme 1 - Trust

This theme highlighted the dimension of Trust, related to the degree of credibility attributed to the safety, efficacy, and legitimacy of the vaccine and the institutions that recommend it. The statements reveal that, in general, adolescents demonstrate trust in HPV vaccination, anchoring this perception mainly in institutional legitimacy and social validation.

> *It's safe.* (GM1)
> *If they offer a vaccine, it's because it's safe.* (GM1)
> *[Do you think the vaccine is safe?] Yes, because many people take it and it's to prevent a disease.* (GF1)

It can be seen that trust is not predominantly based on technical knowledge about efficacy or safety, but rather on health authority and the social norms of vaccination. This form of institutionalized trust indicates symbolic adherence to the health system, but with a limited argumentative basis, which can make it vulnerable to misinformation. Among the boys, doubts emerged regarding adverse events following immunization (AEFI), highlighting fragility in the consolidation of this trust.

> *[What are the side effects?]* M1: *Oh, I don't know…* M2: *Fever.* M3: *Nausea.* M4: *Dizziness, headache.* M5: *I don't think the vaccine is safe.* (GM3)

Most participants, however, mentioned the main adverse events following imminent death (AEFI), demonstrating clarity regarding the absence of neurological events:

> *[What are the side effects of the vaccine?] M1: My arm gets weak. M2: Sore. And it*

> *starts to hurt. [And does it cause fainting, seizures?] M3: No, no.* (GM1)
> *M1: It's like the coronavirus vaccine. M2: I think it causes fever, body aches. M3: Headache, arm pain. M4: Numbness.* (GM2)
> *I think it's safe, but you feel some pain in your arm.* (GM2)
> *F1: I think it's arm pain and fever.* (GF1)

The oscillation between recognizing mild side effects and questioning safety demonstrates that confidence is not homogeneous, existing on a continuum between acceptance and uncertainty—a central characteristic of the concept of vaccine hesitancy. The presence of doubt, even in the minority, indicates that confidence can be circumstantial and dependent on access to qualified information.

Despite a basic level of vaccine literacy, the limited circulation of specific information about the HPV vaccine becomes evident when some participants report never having heard of related side effects or when there is confusion between disease consequences and adverse events following immunization (AEFI). This lack of understanding can compromise confidence.

> *[Have you heard of any side effects?] No, not that one.* (GM2)
> *[And fainting, dizziness? Does that happen too?] I don't think so.* (GM2)
> *The skin warts you mentioned.* (GF1)

Theme 2 - Complacency

This topic reflected the lack of knowledge among adolescents about HPV, its modes of transmission, and the serious diseases it can cause, such as cervical cancer. Initially, when questioned about HPV, some participants—especially the boys—demonstrated a lack of knowledge about the virus:

> *M1: I didn't know the word HPV existed.*
> *M2: This is the flu vaccine.* (GM2).

The lack of knowledge about the virus's own nomenclature and its confusion with other vaccines show that HPV is not perceived as a concrete threat. This invisibility of the disease fosters complacency, since the unrecognized risk tends not to mobilize preventive behavior. As the discussion progressed, adolescents began to associate HPV primarily with sexuality and visible bodily manifestations:

> *[What is HPV?]* M1: *It's a disease that affects the genitals.* M2: *Bacteria.* M3: *Little bumps.* M4: *It makes you sick, very sick.* (GM1)
> *[ADVERTISING CAMPAIGN CHALLENGE]:* M1: *Protect yourselves against HPV because it's a disease that affects the genitals and you can't leave them unprotected.* (GM1)

> *[Caused by?]* M1: *Virus.* M2: *Sexual intercourse.* (GM2)
> *[What do you think HPV is?] It is a sexually transmitted disease. [And what does it cause?]* M1: *Wound, discomfort.* (GM2)

The teenagers also demonstrated an initial lack of knowledge regarding treatment options, revealing a limited understanding of the repercussions of HPV. As they discussed the issue, the understanding that "there is no cure" seemed to gain centrality.

> *[What is HPV?]* F1: *Oh, it's a disease.* F2: *If you get it, there's no cure.* F3: *I think it's some kind of virus.* (GF1)
> *[CHALLENGE: Create a jingle about HPV vaccination] Vaccination is important, vaccination is important, if... You don't get vaccinated you'll get sick, you'll have to be "neutered," you'll have to be hospitalized.* (GM1)

As evidenced in the statements, adolescents attributed greater severity to diseases without a defined treatment or associated with the risk of death. The reference to "castration" was used pejoratively, indicating a significant challenge for health education initiatives. This perception was also linked to the association with HIV/AIDS.

Doubts still persist regarding the preventive nature of the vaccine, which is sometimes interpreted as a form of treatment.

> *[Is HPV curable?]* M1: *Yes.* M2: *Yes.* M3: *By getting vaccinated.* M4: *By taking precautions.* M5: *Surgery.* (GM1)
> *Vaccination improves immunity, and if immunity improves, there may be a cure.* (GM2)

Throughout the discussion, a greater understanding of the preventive role of the vaccine was observed, especially after a more in-depth conceptual exploration of HPV:

> *[CHALLENGE: Imitate a nurse explaining the importance of the vaccine to a patient].* M: *To take care of him regarding HPV, because the virus, besides cancer, is important.* (GM3)
> *[CHALLENGE: Create a slogan about HPV prevention]* M: *HPV is a disease and there is no cure. Get vaccinated.* (GM3)
> *We have to get vaccinated against HPV, it's something that has no cure, we have treatment.* (GF1)
> *[What do you know about the HPV vaccine?] That it helps so there are no victims[...].* (GF2)

The use of condoms — especially external condoms — also appeared associated with preventive measures, linked to vaccination after further studies on HPV. The presence of these elements suggests that risk perception can be enhanced when mediated by interactive educational processes.

> *[CHALLENGE: Create a 30-second advertising campaign for HPV vaccination] We're on Globo with the microphone. Alert, alert, alert! Everyone get vaccinated! Welcome to the Protection News! I'm the condom. People, protect yourselves, understand? That's it!* (GF3)
> *[CHALLENGE: Imagine you are a superhero fighting HPV. What would your superpower be and why?]* F1: *Kill HPV.* F2: *Super condom.* F1: *Oh, because… if you protect yourself, you won't get it.* F2: *I would be the super vaccine.* (GF2)

Theme 3 - Convenience

Understanding another fundamental dimension explored in the focus groups, this theme addressed the relevance of knowledge about vaccine availability and access to health services in the decision to vaccinate. Adolescents' understanding of access to primary health care units proved limited, frequently being associated with care in situations of illness and centered on medical consultations.

> *[What will you do at the health center?]* M1: *Get vaccinated.* M2: *Take medicine. When you're sick.* M3: *Go to the dentist.* M4: *Have a check-up.* (GM1)
> M1: *Vaccination, dressings, consultation. I went there when I got hurt.* M2: *There was a day I got hurt, I went there and they sent me away.* (GM3)

The statements reveal that primary health care (PHC) is primarily perceived as a space for resolving acute health problems, and not as a place for longitudinal follow-up and prevention. This restricted understanding of the function of PHC weakens the perception of vaccination as a routine practice and continuous care, shifting it to an episodic logic.

Although participants mentioned access to the HPV vaccine, some reported that it could also be found in Urgent Care Units and hospitals, demonstrating a lack of knowledge about the organization of the network and the appropriate vaccination points. Furthermore, they expressed doubts about the access process—whether an appointment was necessary—and were unaware of the service hours, in addition to reporting delays in service.

> *[Do you think you need to make an appointment to get vaccinated?] M1: I don't think you need to make an appointment at the health center. M2: Yes, you do. If there are a lot of people, it will take a long time.* (GM3)
> *[And do you know what the opening hours of the health centers are?]* F: *No, I only know that when I get there it's open.* (GF1)

Uncertainty about the need for scheduling, coupled with the perception of queues and delays, highlights perceived organizational barriers. Although these barriers are not necessarily prohibitive, anticipating them can act as a factor in delaying vaccination, especially in an age group with less decision-making autonomy.

Access can also be hindered by factors such as geographical distance to primary health care units and prolonged waiting times. Furthermore, the absence of longitudinal follow-up and

continuous preventive actions by primary health care was evident, as illustrated by the statement: "*I'm terrified of needles, I haven't been vaccinated.*" (GM2)

Theme 4 - Communication

This topic highlighted the challenges related to the dissemination and discussion of reliable information about the vaccine. In general, as already addressed in other topics, adolescents—especially boys—demonstrated a lack of knowledge about the concept of HPV, its consequences and risks, as well as fundamental aspects of vaccination, such as the number of doses, recommended age, and target population. This informational gap reveals that institutional communication has not reached adolescents in a systematic and appropriate way for their stage of development.

Participants reported seeking information through doctors, the internet, health centers and websites, as well as using search engines like Google. However, difficulty in identifying reliable sources was evident, especially in the digital environment. For many, contact with healthcare professionals dated back to childhood, and this dialogue did not continue during adolescence.

> *[Have healthcare professionals talked to you about this?]* M1: *Oh, I don't remember, I was very young.* M2: *Yeah, it's been a while now[...].* (GM3)
> *I only remember my mother taking me [for vaccination]. I remember that when I went to get the vaccine, there's a little square over there in X, which is near my house. She was doing a vaccination campaign there.* (GF1)

Discussing the topic with family members, especially primary caregivers, also emerged as a challenge. Adolescents reported difficulties in communicating with their parents and, in some cases, feelings of shame or anxiety. In this context, teachers and peers appeared as alternative sources of information considered reliable.

> *[Have you talked about this with your parents? About sexuality?]* M1: *No.* M2: *I haven't, because I can't...* M3: *I'm ashamed[...] anxious[...].* (GM3)
> F1: *Normally, we ask the teachers at school. But I don't know if I would ask anyone... I only ask people I trust a lot, because I know I can't ask my parents[...]* F2: *I would ask my friend X, because she's calm. She doesn't think bad things, she never has[...].* (GF2)

Theme 5 - Sociodemographic Context

This topic addressed how social and comprehension barriers influence vaccine acceptance. Initially, a difference in understanding emerged between boys and girls regarding the reasons for vaccination, reinforcing the perception that only girls had this need. However,

throughout the discussion about HPV, adolescents began to recognize the importance of vaccination for both sexes.

> *No, it's for everyone, but as far as I know it's more recommended for girls.* (GF1)
> *[Why is it important that boys also receive the HPV vaccine?]* M1: *To avoid passing the virus on to another person.* M2: *To avoid passing it on to girls.* (GM1)
> *Why is it important for boys to also receive the HPV vaccine? Because they can get gonorrhea.* (GM2)

This formulation indicates that the male role in the prevention chain is perceived as secondary and relational—protecting the other—and not as a direct risk factor. Such a perception may reduce autonomous motivation for vaccination, since male vulnerability to HPV is not fully recognized. In addition to these perceptions, the issue of migration also emerged as a barrier, evidenced by the account of an adolescent from another state who had not yet been able to access health services for vaccination updates:

> *No. It's because when I arrived I couldn't get vaccinated. I came from Bahia, and from when I arrived until now I've never had any vaccines.* (GM1)

In summary, Figure 1 provides an interpretative synthesis of the findings anchored in the 5 Cs of vaccine hesitancy:

Figure 1 - Interpretive synthesis of the findings anchored in the 5 Cs of vaccine hesitancy. São Carlos, São Paulo, Brazil, 2024.

5Cs of Vaccine Hesitancy	Interpretative synthesis of the findings of the adolescents	Evidence from the Focus Groups (examples)
CONFIDENCE	The adolescents demonstrate general confidence in the vaccine, although this perception coexists with significant gaps in their understanding of potential adverse events following immunization (AEFI) and with more frequent questions among boys. The knowledge presented is fragmented, based primarily on bodily experiences and personal interpretations, without any connection to technical information or guidance from healthcare professionals. Vaccine safety is often perceived as common sense ("everyone gets vaccinated"), whereas uncertainties arise due to the limited circulation of qualified information and the absence of structured dialogue with healthcare teams.	"It is safe." (GM1) "I don't think the vaccine is safe." (GM3) "My arm goes weak... sore." (GM1) "Have you heard of any side effects? – No, not of that one." (GM2)
COMPLACENCY	Lack of knowledge about HPV reduces risk perception and creates a limited understanding of the severity of the infection. The adolescents show confusion when defining HPV, associating it with "bacteria", "bumps" or even the "flu vaccine". They only paid attention to the physical visible signs that appear when HPV infection occurs, highlighting an underestimation of the risks and the importance of the vaccine.	"I didn't know the word HPV existed." (GM2) "It's a disease that affects the genitals." (GM1) "If you catch it, there's no cure." (GF1) "He'll have to get castrated..." (GM1)
CONVENIENCE	Access to healthcare services is perceived as limited and restricted to situations of illness. Additionally, there are doubts regarding the access process and a lack of knowledge about service hours, along with experiences of long waiting times.	"What are you going to do at the health center? - M1: Get vaccinated. M2: Take medicine. When I am sick. M3: Go to the dentist. M4: Have a consultation. "(GM1) "And you know what the opening hours are for the health centers? - F: No, I only know that when I get there is open."(GF1)
COMMUNICATION	The adolescents seek information about HPV and vaccination in a non-systematic way. They demonstrate difficulty in identifying reliable sources and feel great discomfort when discussing the topic with family members, as some experience feelings of shame or anxiety. In contrast, teachers and peers emerge as alternative sources of information considered reliable.	"Google." (GF1) "Ah, I don't remember... I was very young." (GM3) "I feel ashamed... anxious." (GM3) "I would ask my friend X..." (GF2)
SOCIODEMOGRAPHIC CONTEXT	The perception of responsibility initially appears to be intertwined with gender issues, leading adolescents to understand HPV vaccination as primarily aimed at girls, reducing the perceived importance among boys. Migration also emerges as a barrier to vaccination adherence.	"It is more recommended for girls." (GF1) "So as not to pass the virus on to the other person." (GM1) "Because they can get gonorrhea." (GM2) "I came from Bahia... I've never had any vaccines." (GM1)

DISCUSSION

In summary, the findings revealed diverse perceptions among adolescents regarding HPV vaccination, highlighting their confidence in the vaccination itself, but also identified gaps in knowledge about adverse events following immunization (AEFI), modes of transmission, prevention, and access to healthcare services. It was observed that, despite recognizing the importance of the vaccine, doubts persist, especially among boys, about the virus and the preventive nature of the vaccine. There is also difficulty in communicating the topic with family members. Furthermore, barriers to vaccination were observed to include access to primary health care services and the identification of reliable sources by adolescents.

In the present study, Theme 1 highlighted adolescents' perspectives on confidence in the safety and efficacy of the HPV vaccine. There was an expression of both knowledge and doubt regarding the related AEFI. Such hesitancy can be attributed to the dissemination of incorrect information and a lack of knowledge of the benefits of the vaccine, which influence the acceptance of immunization among young people[12].

Furthermore, it should be noted that, despite the general confidence in the safety of the vaccine, adolescents had different levels of knowledge about adverse events, especially boys, who demonstrated doubts and, in some cases, distrust regarding the safety of immunization. As also pointed out, these findings suggest that the lack of consistent information about possible AEFI and the preventive nature of the vaccine affects adolescents' understanding and acceptance[12].

In the analysis of Theme 2, it was observed that HPV complacency among adolescents is strongly linked to a lack of knowledge about the virus and its consequences. Many participants demonstrated confusion in defining HPV, associating it with "bacteria," "bumps," or even "flu vaccine," and showed a lack of knowledge about its complications, relating it to the absence of treatment and consequences such as death and suffering. This limited understanding affects vaccination practices, as identified in a study that showed that, although many students should already be vaccinated, a lack of knowledge about HPV remains a challenge, especially among boys[21]. This aspect is closely related to an underestimation of the risks and importance of the vaccine.

To understand the factors influencing vaccine hesitancy among adolescents, we need to consider their developmental process, in which a perception of invulnerability prevails and there is difficulty in recognizing medium- and long-term risks. This limitation translates into a lack of knowledge about the virus, its complications, and the importance of immunization as a preventive strategy. Evidence suggests that comprehensive educational strategies in sexual and reproductive health, when applied in the school context, contribute to greater preventive awareness and vaccine adherence, strengthening protection against infections such as HPV[22]. Nurses are essential in these actions, and can incorporate the actions explored by the Health in School Program.

In this regard, adolescents also demonstrated concern only with the evident physical signs that arise with HPV infection. Thus, the perception of risk is underestimated and reduced, which hinders prevention. Studies indicate that adolescents and young people perceive the risk vaguely, do not think about the consequences, and do not understand that contracting the infection should be a daily concern[23]. Furthermore, they are unaware that prevention is more effective than treatment.

However, after broader discussion about HPV, awareness of combined prevention developed. Even given the scarcity of research investigating adolescents' awareness of combined HPV prevention, the evidence available in this study and others[21,24] suggests that higher levels of knowledge and favorable attitudes towards the topic can act as additional

stimuli to change harmful behaviors, enabling prevention through HPV vaccination and condom use.

When analyzing the discussions of Theme 3, it was observed that convenience factors, such as the physical availability of the vaccine and access to health services, significantly influence adherence to HPV vaccination. Adolescents' perception of access to primary health care units was mainly linked to care in situations of illness and not to preventive care, including routine vaccination. This aspect highlights, therefore, a knowledge gap about the preventive function of these units. A study sought to understand how Brazilian adolescents access health services, analyzing data from the 2019 National Health Survey. It showed low demand, being more frequent among adolescents with health insurance[25].

This disconnection between primary health care and vaccination, coupled with a lack of knowledge about its function and schedules, as well as the possibility of queues, discourages many young people from seeking the service. Moreover, doubts arise regarding scheduling, which can hinder the process and lead to the postponement of vaccination. Studies corroborate these results, highlighting that this age group faces barriers to accessing health services due to factors such as delays in care, lack of adaptation of services to the needs and language of adolescents, embarrassment, and lack of knowledge about their rights[26]. Varying knowledge about the availability of the HPV vaccine and fear of injectable applications also stood out as factors that negatively influence adherence and can be managed by Nursing, in particular.

Theme 4 addresses the challenges faced by adolescents in seeking and understanding reliable information about the HPV vaccine. In general, adolescents demonstrated little knowledge about fundamental aspects, such as the concept of HPV, the risks of infection, and the importance of vaccination. Furthermore, there is a lack of clarity regarding practical details, such as the number of doses and the recommended age. Although many report seeking health services and professionals for informational support, there is difficulty in identifying reliable sources, especially online. This limitation suggests a lack of continuous and updated guidance on vaccination, reflecting a lack of dialogue with health professionals throughout adolescence, a crucial time for understanding disease prevention.

Furthermore, it is important to highlight that communication about HPV in the family environment has proven to be limited, with many adolescents reporting discomfort in addressing the topic with their parents. Fear and anxiety about discussing sexuality and vaccination in the family context have led them to seek information from teachers and trusted friends, who are perceived as more accessible and supportive sources[23]. In this context, not only peer-to-peer education and continuing education should be strategic for health education

of this population, but also meaningful outreach and information to families – deconstructing myths and presenting clear scientific evidence. Nursing, due to its legitimate place in health teams, can lead these actions at an interprofessional and intersector level.

Given the above, studies show that, although adolescents use the internet more frequently, many have difficulty identifying fake news[27]. In this context, the infodemic, defined by the WHO as the excess of reliable and unreliable information that hinders access to safe information, plays a central role, favoring doubts and misconceptions about HPV and its vaccination among adolescents[28]. Therefore, strategies based on clear and reliable communication become indispensable to promote confidence in the vaccine, highlighting the role of nursing in this endeavor. Their proximity to users and capacity for health education can impact elements of vaccine hesitancy[29].

Theme 5 addresses physical and knowledge barriers to HPV vaccination. Participants expressed perceptions that vaccination is primarily aimed at women, partly attributed to the fact that the initial vaccination campaign in the SUS focused on this population due to the relationship between HPV and cervical cancer. This approach, however, may have reinforced the perception that HPV is an exclusive concern for women, reinforcing gender inequalities and contributing to low vaccination rates among male adolescents[30].

It was also observed that male adolescents showed greater lack of knowledge about the vaccine, the virus, and its consequences. This aspect was evidenced by reports that demonstrated a lack of knowledge about the complications related to HPV, including erroneous associations with other infections, such as gonorrhea. Lower access to primary health care and a lack of knowledge about how to access it were also mentioned, as well as a lack of knowledge about adverse events following immunization (AEFI), which contributes to low confidence in vaccination. These aspects are consistent with a narrative literature review, which reinforces the mistaken perception that HPV presents risks only for the female population[30]. In this sense, nursing and health teams should develop gender-sensitive actions, considering the particularities of care.

The present study has limitations. Due to the initial stage of adolescent experiences, there were limitations in critical reflection on the topic of HPV vaccination. Individual interviews using creative strategies could allow for a deeper analysis of the data, as well as listening to other actors, such as family members and education professionals, and are recommended for future studies. As a strength, the use of the 5Cs framework in vaccine hesitancy stands out, enabling an understanding of the factors involved among adolescents.

Nursing, with its privileged position in primary health care units in conjunction with schools, as well as families and teachers, plays a fundamental role in assisting adolescents and promoting adherence to HPV vaccination. Continuous dialogue with adolescents is essential to strengthen knowledge, fight vaccine hesitancy, and promote a positive attitude towards prevention.

FINAL CONSIDERATIONS

The findings of this study reveal several elements related to HPV vaccine hesitancy among adolescents, linked to the 5 Cs. Regarding trust and compliance, the perceptions and experiences shared by the participants highlighted, above all, a lack of knowledge about HPV and the vaccine, as well as a lack of understanding of the risks and importance of immunization at this stage of life. Related to convenience and communication, factors such as distance from primary health care for preventive care, difficulty accessing reliable information, and limited communication with family about health issues emerge as significant barriers to vaccine adherence. The perception that the vaccine is only for girls, as well as migratory obstacles, also emerged regarding the sociodemographic context.

Despite these difficulties, there are also opportunities to expand knowledge among adolescents. Based on the results, health professionals should develop accessible, meaningful, and continuous communication and education strategies, creating welcoming environments for discussions about health and prevention. The active and close approach of professionals, especially nurses, can not only provide information but also encourage positive attitudes towards vaccination. Furthermore, the data point to the need for more targeted and salutogenic interventions in schools, so that adolescents and their families have access to accurate information and feel supported in their health decisions, thus promoting more effective and conscious vaccine adherence.

REFERENCES

1. World Health Organization (WHO). Human papillomavirus and cancer [Internet]. Geneva: World Health Organization. 2024 [cited 2026 Feb 12]. Available from: https://www.who.int/news-room/fact-sheets/detail/human-papilloma-virus-and-cancer
2. World Health Organization. Adolescent health [Internet]. Geneva: WHO; 2025 [cited 2026 feb 13]. Available from: https://www.who.int/health-topics/adolescent-health#tab=tab_1
3. Zewdie A, Kasahun AW, Habtie A, Gashaw A, Ayele M. Human papillomavirus vaccine acceptance among adolescent girls in Ethiopia: a systematic review and meta-analysis. BMC Public Health. 2023;23(1):1369. https://doi.org/10.1186/s12889-023-16305-3

4. Santos MAP, Fernandes FCGM, Lima KC, Barbosa IR. Desconhecimento sobre a campanha de vacinação contra o HPV entre estudantes brasileiros: uma análise multinível. Ciênc Saúde Colet. 2021;26(12):6223–34. https://doi.org/10.1590/1413-812320212612.35842020
5. Ministério da Saúde (BR). Ministério da Saúde reforça estratégia de vacinação contra HPV[Internet]. Brasília; 2025 [cited 2026 Feb 15]. Available from: https://www.gov.br/saude/pt-br/assuntos/noticias/2025/marco/ministerio-da-saude-reforca-estrategia-de-vacinacao-contra-hpv
6. Ministério da Saúde (BR). Nota Técnica nº 41/2024-CGICI/DPNI/SVSA/MS: Atualização das recomendações da vacinação contra HPV no Brasil [Internet]. Brasília, 2024. [cited 2026 Feb 13]. Available from: https://www.gov.br/saude/pt-br/centrais-de-conteudo/publicacoes/notas-tecnicas/2024/nota-tecnica-no-41-2024-cgici-dpni-svsa-ms
7. World Health Organization (WHO). WHO updates recommendations on HPV vaccination schedule. Genebra; 2022 [cited 2026 Feb 13]. Available from: https://www.who.int/news/item/20-12-2022-WHO-updates-recommendations-on-HPV-vaccination-schedule.
8. Ellingson MK, Sheikha H, Nyhan K, Oliveira CR, Niccolai LM. Human papillomavirus vaccine effectiveness by age at vaccination: a systematic review. Hum Vaccin Immunother. 2023;19(2):2239085. https://doi.org/10.1080/21645515.2023.2239085
9. Ministério da Saúde (BR). Brasil supera média global e avança na vacinação contra HPV [Internet]. Brasília; 2025[cited 2025 Sep 23]. Available from: https://www.gov.br/saude/pt-br/noticias/2025/08/brasil-supera-media-global-e-avanca-na-vacinacao-contra-hpv
10. Cooper SC, Williams IV, Porter A, Presti C, Mikhaylov A, King A, et al. 'They're not going to tell you everything': A qualitative study with HPV vaccine hesitant parents and caregivers in the northeast and southeast U.S. Vaccine. 2025;68:127948. https://doi.org/10.1016/j.vaccine.2025.127948
11. Wilandika A, Pandin MGR, Yusuf A. The roles of nurses in supporting health literacy: a scoping review. Front Public Health. 2023;11:1022803. https://doi.org/10.3389/fpubh.2023.1022803
12. França AP, Domingues CMAS, Domingues RAS, Barata RB, Teixeira MG, Guibu IA, et al. Vaccine hesitancy in the vaccination of children in Brazil. Vaccine. 2025;53:126905. https://doi.org/10.1016/j.vaccine.2025.126905
13. Nwachukwu G, Rihan A, Nwachukwu E, Uduma N, Elliott KS, Tiruneh YM. Understanding COVID-19 vaccine hesitancy in the United States: a systematic review. Vaccines. 2024;12(7):747. https://doi.org/10.3390/vaccines12070747
14. Minayo MCS. O desafio do conhecimento: pesquisa qualitativa em saúde. 12ª ed. São Paulo: Hucitec; 2014.
15. Instituto Brasileiro de Geografia e Estatística (IBGE). São Carlos (SP) – Panorama. Rio de Janeiro: IBGE; 2022.
16. Kinalski DDF, Paula CC, Padoin SMM, Neves ET, Kleinubing RE, Cortes LF. Focus group on qualitative research: experience report. Rev Bras Enferm. 2017;70(2):424–9. https://doi.org/10.1590/0034-7167-2016-0091
17. Carlos DM, Campeiz AB, Silva JL, Fernandes MID, Leitão MNC, Silva MAI, et al. Intervenções na escola para prevenção da violência nas relações de intimidade entre

adolescentes: revisão integrativa da literatura. Rev Enferm Ref. 2017;4(14):133-46. https://doi.org/10.12707/RIV17030

18. Araújo LFS, Dolina JV, Petean E, Musquim CDA, Bellato R, Lucietto GC. Diário de pesquisa e suas potencialidades na pesquisa qualitativa em saúde. Rev Bras Pesq Saúde. 2013;15(3). https://doi.org/10.21722/rbps.v15i3.6326
19. Hennink MM, Kaiser BN, Marconi VC. Code saturation versus meaning saturation: how many interviews are enough? Qual Health Res. 2017;27(4):591–608. https://doi.org/10.1177/1049732316665344
20. Elo S, Kyngäs H. The qualitative content analysis process. J Adv Nurs. 2008;62(1):107–15. https://doi.org/10.1111/j.1365-2648.2007.04569.x
21. Galvão MPSP, Araújo TME, Rocha SS. Knowledge, attitudes, and practices of adolescents regarding human papillomavirus. Rev Saúde Pública. 2022;56:12. https://doi.org/10.11606/s1518-8787.2022056003639
22. Myat SM, Pattanittum P, Sothornwit J, Ngamjarus C, Rattanakanokchai S, Show KL, et al. School-based comprehensive sexuality education for prevention of adolescent pregnancy: a scoping review. BMC Womens Health. 2024;24:137. https://doi.org/10.1186/s12905-024-02963-x
23. Ventura-Miranda MI, Alcaraz-Córdoba A, Alcaraz-Córdoba T, Molina-Torres G, Fernandez-Medina IM, Ruíz-Fernández MD. Adolescents' perceptions of sexuality: a qualitative study. Healthcare. 2023;11(20):2757. https://doi.org/10.3390/healthcare11202757
24. Zhao X, Huang Y, Lv Q, Wang L, Wu S, Wu Q. Knowledge, awareness, and correlates of HPV vaccine acceptability among male junior high school students in Zhejiang Province, China. Hum Vaccin Immunother. 2024;20(1):2357238. https://doi.org/10.1080/21645515
25. Silva LAN, Nunes BP, Lima JG, Tomasi E, Facchini LA. Características contextuais e procura por serviços de saúde entre adolescentes brasileiros: pesquisa nacional de saúde, 2019. Cad Saúde Pública. 2023;39(12):e00070223. https://doi.org/10.1590/0102-311XPT070223
26. Monteiro SS, Leal AF, Barbosa RM, Magno L, Neves ALMD, Honorato IB, et al. Sexual and reproductive health of adolescents and young people: identification of demands and experiences based on a qualitative study in communities in five Brazilian cities. Cad Saude Publica. 2025;41(4):e00047824. https://doi.org/10.1590/0102-311XEN047824
27. Greškovičová K, Masaryk R, Synak N, Čavojová V. Superlatives, clickbaits, appeals to authority, poor grammar, or boldface: Is editorial style related to the credibility of online health messages? Front Psychol. 2022;13:940903. https://doi.org/10.3389/fpsyg.2022.940903
28. World Health Organization (WHO). Infodemic [Internet]. 2023[cited 2026 Feb 15]. Available from: https://www.who.int/health-topics/infodemic#tab=tab_1
29. Pullis BC, Hekel BE, Pullis RJD. Addressing vaccine hesitancy: a nursing perspective. J Community Health Nurs. 2024;41(2):138-44. https://doi.org/10.1080/07370016.2024.2312144
30. Grandahl M, Nevéus T. Barriers towards HPV Vaccinations for boys and young men: a narrative review. Viruses. 2021;13(8):1644. https://doi.org/10.3390/v13081644

Availability of data and material

Access to the dataset may be obtained by requesting it from the corresponding author.

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