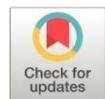


Does Sexual Behaviors Account for HPV-related Oropharyngeal Cancer (OPC)?

¿Los comportamientos sexuales explican el cáncer de orofaringe (OPC) relacionado con el VPH?

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Palabras

claves: Virus del Papiloma Humano, VPH, Cáncer de orofaringe, Conductas Sexuales.

Keywords:

Human Papillomavirus, HPV, Oropharyngeal Cancer, OPC, Sexual Behaviors.

Resumen

Introducción: El virus del papiloma humano (VPH) es una infección de transmisión sexual que se ha relacionado estrechamente con el cáncer de orofaringe. Alguna evidencia sugiere que los comportamientos sexuales pueden aumentar el riesgo de cáncer de orofaringe. **Objetivos:** Hacer una revisión de la información existente sobre el cáncer orofaríngeo asociado al VPH y su relación con conductas sexuales. **Metodología:** Se utilizó Google Scholar para buscar bases de datos electrónicos de casos clínicos y artículos de revisión sobre cáncer orofaríngeo relacionado al VPH desde el 2020 al 2023. **Resultados:** Ocho estudios revelaron que ciertas prácticas sexuales pueden aumentar el riesgo de cáncer de orofaringe, mientras que 2 estudios europeos afirman que no existe correlación entre las infecciones por VPH y los hábitos sexuales. **Conclusiones:** Las prácticas sexuales seguras pueden reducir el riesgo de infecciones por VPH y el riesgo de desarrollar cáncer de orofaringe. **Área de estudio general:** Medicina. **Área de estudio específica:** Virología. **Tipo de estudio:** revisión bibliográfica.

Abstract

Introduction: Human Papillomavirus (HPV) is a sexually transmitted infection which has closely been linked to oropharyngeal cancer. Some evidence suggests that sexual behaviors may increase the risk of oropharyngeal cancer. **Objectives:** To summarize the current information about HPV-related oropharyngeal cancer and its relationship with sexual behaviors. **Methodology:** Google Scholar was used to find electronic databases about HPV-associated oropharyngeal cancer cases and review articles from 2020 and 2023. **Results:** 8 studies revealed that sexual behaviors may increase the risk of oropharyngeal cancer, whereas 2 studies claim that there is no correlation between HPV infections and sexual habits. **Conclusion:** safe sexual practices may reduce the risk of HPV infections and the risk of developing oropharyngeal cancer. **General field of study:** Medicine. **Specific field of study:** Virology. **Type of study:** review article.

1. Introduction

Human Papillomavirus (HPV) has long been recognized as a sexually transmitted infection, with increasing evidence linking certain sexual habits to the rise in HPV-associated oropharyngeal cancer. As the prevalence of this cancer continues to grow, understanding the intricate relationship between sexual behaviors and HPV transmission becomes imperative for both public health initiatives and individual awareness. Cancer represents the second cause of death around the world and an HPV infection may lead to Cancer (Szymonowicz & Chen, 2020). HPV is primarily transmitted through intimate skin-to-skin contact, and sexual activity plays a significant role in its spread. Oropharyngeal cancer, associated with the oropharynx, including the base of the tongue and tonsils, has been increasingly linked to specific sexual behaviors, particularly oral sex. The virus can be present in the genital, anal, and oral regions, and engaging in oral-genital contact becomes a significant risk factor for the transmission of high-risk HPV types, such as HPV-16 (Wierzbicka et al., 2023).

In addition, studies have consistently shown that individuals with a history of multiple sexual partners are at a higher risk of contracting HPV, including the high-risk types associated with oropharyngeal cancer. The number of sexual partners, particularly those involving oral-genital contact, correlates with an increased likelihood of exposure to the virus. Promiscuity and the absence of consistent condom use further amplify the risk of transmission (Huang et al., 2020).

The landscape of oropharyngeal cancer has undergone a noticeable shift, with men being disproportionately affected. The prevalence of HPV-associated oropharyngeal cancer is higher in men than in women, and sexual habits are considered a significant contributing factor. The reasons behind this gender disparity warrant further exploration, but the link between sexual behaviors and HPV transmission is a crucial aspect of this evolving pattern. In a cross-sectional study, it was found that there was a 2.7% increase incidence of oropharyngeal cases among men in the United States (Damgacioglu, 2022).

Oral sex, once considered a lower-risk sexual activity, has emerged as a potential route of HPV transmission leading to oropharyngeal cancer. The practice of oral-genital contact, irrespective of gender, is associated with an increased likelihood of exposure to HPV. Notably, the rise in HPV-associated oropharyngeal cancer has prompted researchers to delve deeper into the dynamics of oral HPV infection and its implications for cancer development (Bruno et al., 2023).

Given the strong association between sexual habits and the transmission of HPV, prevention strategies play a pivotal role in mitigating the risk of HPV-associated oropharyngeal cancer. HPV vaccination, which has traditionally been emphasized for preventing cervical cancer, now holds promise as a preventive measure for oropharyngeal

cancer. Public health campaigns promoting vaccination, along with education on safe sexual practices, can contribute to reducing the incidence of HPV transmission and subsequent oropharyngeal cancer. Some evidence suggests that vaccination could successfully prevent some types of cancer. It was proved that the risk of invasive cervical cancer could significantly be reduced by the HPV vaccine (Lei et al., 2020).

2. Methodology

I used electronic databases to collect data for this review article. Google Scholar was used to find retrospective, cohort, multicenter, case-controlled studies about HPV-related oropharyngeal cancer cases and their relationship with sexual behaviors. In addition, I also decided to include three review studies with meta-analysis in order to compare them with the case-controlled studies. In addition, the inclusion criteria were comprised of studies published between 2020 and 2023. I decided to exclude other previous studies before the year 2020. I gathered data related to the type of study, number of patients, the methodology, results, and conclusions. I used the following keywords: "human papillomavirus", "HPV", "oropharyngeal cancer", "sexual behaviors", "sexual habits", "HPV-associated oropharyngeal cancer", to find eligible studies. I only chose articles written in English, I excluded articles written in Spanish. Finally, I only selected 10 studies in total, which include 3 review articles and 7 case studies. I excluded other types of HPV-associated cancers, such as: cervical cancer and penile cancer. I only focused on HPV-related oropharyngeal cancer studies and their association with sexual habits.

3. Discussion

Some studies have shown that sexual behaviors may play a key role in HPV-transmission and HPV-related oropharyngeal cancer development. The vast majority of studies that were included in this review have shown that indeed sexual habits may directly contribute to the transmission of HPV and cancer development. However, only 2 studies indicated that there was no correlation between sexual habits and HPV-associated oropharyngeal cancer. The authors attributed these differences to some cultural and geographical factors which may have influenced these results.

Table 1

Summary of case studies and review articles' findings on HPV-related OPC cancer

#	Author	Number of studies	Number of patients	Type of Study	Method	Conclusions
1	Wierzbicka et al. (2021)	23	Unknown	Review	Electronic databases were reviewed	HPV infection and oropharyngeal cancer depends mainly on sexual behaviors
2	Quabius et al. (2020)	1	106	Retrospective study	Questionnaires were completed	No correlation between sexual habits and HPV infections

Table 1

Summary of case studies and review articles' findings on HPV-related OPC cancer (continuation)

#	Author	Number of studies	Number of patients	Type of Study	Method	Conclusions
3	Wichmann et al. (2023)	1	329	Cohort study	Questionnaires were completed from 2010 to 2012	Sexual behaviors may not be the main cause of oropharyngeal cancer development
4	Drake et al. (2021)	1	163	Multicenter case-controlled	Surveys were filled out from 2013 to 2018	Sexual behaviors increase the risk of developing OPC
5	Rodriguez-Achilla & Suarez-Machado (2022)	36	Unknown	Review and meta-analysis	Electronic databases between 1981 and 2018	Sexual practices increase the risk of an HPV infection
6	Antonsson et al. (2022)	2	1165	Case-case cohort study	Questionnaires were completed between 2013 to 2016	Sexual behaviors increase the risk of developing OPC and HPV infection
7	Bruno et al. (2023)	1	347	Questionnaires	Screenings took place between 2021 and 2022	Sexual behaviors may play a key role in Oropharyngeal Cancer
8	Ferreira (2023)	21	Unknown	Review	Electronic databases were reviewed	Changes in sexual behaviors contribute to Oropharyngeal Cancer
9	Tokita et al. (2020)	1	437	Retrospective study	Questionnaires were completed	Sexual behaviors may lead to Oropharyngeal cancer
10	Brouwer et al. (2022)	1	394	Cohort study	Questionnaires were completed between 2018 to 2020	Sexual behaviors may lead to Oropharyngeal cancer

Table 1, summarizes the type of studies that were included in this review, the number of patients involved, the methodology, and the findings of each study.

Moreover, some studies have pointed out that HPV-positive and HPV-negative oropharyngeal cancers might have some differences. HPV-positive cases have better prognosis than HPV-negative cases. Furthermore, the number of oropharyngeal cases is expected to increase, especially in high-income countries. On the other hand, some evidence indicate that oropharyngeal cancer affects more men than women (Lechner et al., 2022).

Wierzbicka et al. (2021), argues that HPV transmission of the pharynx and the oral cavity might happen through sexual contact. Certain sexual practices (such as: oral sex and number of sexual partners) may contribute to an HPV infection due to the vulnerability of the oropharyngeal mucosa. The author points out that these type of high-risk HPV infections are the main cause of oropharyngeal cancer. Moreover, it has been discovered that HPV is the common sexually transmitted disease in the world. Researchers have classified HPV-16 and HPV-18 as high-risk and are responsible for over 90% of oropharyngeal cases. Therefore, sexual habits may play a key role in HPV transmission

and later development of oropharyngeal cancer. Furthermore, Drake et al. (2021) states that the number of oral sex partners could increase the risk of HPV-associated oropharyngeal cancers. It was also found that age and time of exposure might be precursors of HPV-related oropharyngeal cancer. Rodriguez-Archilla & Suarez-Machado (2022), also indicate that the number of sexual partners increase the risk of an HPV infection. It was also revealed that individuals who started their sexual life at an early age, have a higher probability of contracting oral cancer. Furthermore, Antonsson et al. (2022) also highlights that the number of sexual partners and engagement in oral sex may be risk factors for oropharyngeal cancer and HPV infections. The author also emphasizes that there are some differences in sexual behaviors depending on the geographical region and culture; that might be why some results were completely different between the United States and Australia. In a Japanese study conducted by Tokita et al. (2020), the authors claim that sexual behaviors are potential contributors to contract a high-risk HPV infection. In a review article performed by Ferreira (2023), the relationship between Oropharyngeal cancer and HPV infections was analyzed. It was found that 65% of oropharyngeal cancer patients had an HPV infection. Moreover, it was also discovered that out of all HPV types, HPV-16 is the most prevalent strain among HPV cases. Some of the most relevant risk factors for the development of oropharyngeal cancer are alcohol consumption, smoking, engaging in oral sex, kissing, and having more than 6 sexual partners. In addition, oropharyngeal cancer as well as oral HPV is more prevalent in men than women (Brouwer et al., 2022).

On the other hand, a few studies have shown that there is no correlation between sexual habits and HPV-infection. In a German study conducted by Quabius et al. (2020), the authors point out that there was no association between HPV-infection and sexual behaviors. Furthermore, the authors also revealed that smoking and the number of sexual partners may influence the transmission of HPV-related cancers. It was also found that smokers tend to be more affected by oral HPV than non-smokers. However, non-smokers are more likely to develop HPV-associated Oral Squamous Cell Carcinoma (OSCC). Moreover, Wichmann et al. (2023), argues that sexual behaviors might not be the leading etiology of oropharyngeal cancer in Europe. It was revealed that there was no correlation between high-risk sexual behaviors (such as: oral sex and number of sexual partners) and oropharyngeal cancer cases. However, these findings significantly differ from American studies. Therefore, the geographical location and culture may play a key part in HPV transmission and oropharyngeal cancer development.

4. Conclusion

- The rising incidence of HPV-associated oropharyngeal cancer underscores the importance of recognizing the role of sexual habits in the transmission of HPV. Multiple studies have shown that sexual behaviors (such as: oral sex and number

of sexual partners) might play a crucial role in HPV infection. Sexual habits seem to increase the risk of HPV infection and later development of HPV-related oropharyngeal cancer. Moreover, the geographical and cultural aspects of certain regions in the world may influence people's sexual behavior.

- Understanding the link between specific sexual behaviors, multiple partners, and the risk of oropharyngeal cancer is crucial for both healthcare professionals and the public. Comprehensive public health initiatives that address the nuances of sexual transmission, promote vaccination, and advocate for safe sexual practices can collectively contribute to the prevention and control of HPV-associated oropharyngeal cancer.

5. Conflict of Interest:

There is no conflict of interest.

6. Author contribution statement

All authors contributed significantly to the preparation of the article.

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