



## Perception and Knowledge of Dental Students About the Link Between Human Papilloma Virus and Oropharyngeal Cancer

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Article History	Abstract
Received: 06 June 2023 Revised: 05 Sept 2023 Accepted: 11 Sept 2023	<p><b>Aim:</b> Of particular importance is oropharyngeal cancer associated with the Human Papilloma Virus (HPV), which has been equated in relevance with certain types of anogenital cancer and cervical cancer, including it within the classification of sexually transmitted diseases. Since dentists have daily contact with the oral cavity of patients, it is essential that they are properly informed on this subject. <b>Material and method:</b> The main objective of this research was to determine the level of knowledge that the students of the 9th and 10th semester of the dental career at the Autonomous Regional University of Los Andes have regarding the human papillomavirus associated with oropharyngeal cancer, during the academic period from October 2020 to March 2021. For this, a mixed approach was used that combined qualitative and quantitative elements, with a descriptive and applied design. The methodology consisted of the use of a survey through a 20-question questionnaire, which was applied to a total of 84 students who met the established inclusion and exclusion criteria. <b>Statistics and Result:</b> The results obtained revealed that the level of knowledge of the students about HPV-associated oropharyngeal cancer is considered regular, with an average knowledge of 38.94%.</p>
<b>CC License</b> CC-BY-NC-SA 4.0	<b>Keywords:</b> Oropharyngeal cancer, HPV, Types of Cancer, Diseases, Sexual Transmission

### 1. Introduction

The human papillomavirus (HPV) is a small DNA virus that was discovered in 1950 for the first time in the cutaneous and mucous layer of the skin developing in these an affectation; however, there is a relationship with the pathogenesis of cervical cancer and recently important characteristics have been mentioned in relation to head and neck cancer establishing it as the main infectious etiological agent (Urbano et al., 2019; Fox et al., 2019). From the perspective of epidemiology, oropharyngeal cancer affects the world population, approximately 100,000 people annually; Although, after colorectal cancer, breast cancer, prostate cancer, bladder cancer and uterine cancer, it ranks sixth in the global incidence rate. Oropharyngeal cancer currently represents 15-20% of cancers of the airways and digestive tract despite this, squamous cell carcinomas correspond to more than 90% (Mirghani & Blanchard, 2020) some important functions such as swallowing are altered by these cancers, since they affect the integrity of complex anatomical areas (Mirghani & Blanchard, 2020). A review published in 2018 mentions that in Ecuador the status of cancer and the epidemiology of HPV is complex and uncertain. The cause of death from tumor diseases in women that ranks second in our

country is cervical cancer. Anatomical areas such as the oropharyngeal and anogenital regions are of affinity for 40 sexually transmitted HPV genotypes considered potentially oncogenic (Rivera et al., 2018; Poveda et al., 2019). Studies and information on oropharyngeal cancer or even the relationship with HPV are very few and scarce in Latin America. A study carried out in Chile in 2005 evaluated the morbidity and mortality of oral and oropharyngeal cancer, which showed that this represents 1% of all cancers and that malignant tumors correspond to squamous cell carcinomas of the mouth and oropharynx in 90% with predilection in the tongue (Contreras & Venegas, 2015). Oropharyngeal cancer refers to those that originate from the base of the tongue in the posterior third, tonsils, soft palate and posterior wall of the pharynx. 80% of HPV-induced carcinogenesis has as an anatomical site of predilection to the oropharynx especially in the amygdala, which represents 53.9% and 47.8% corresponds to the posterior third of the tongue, since they are sites that facilitate the infection of the virus (Boguñá et al., 2019; Lozano, 2019). Oropharyngeal cancer has 2 varieties: the first that is associated with HPV by sexually transmitted infection and is related to high-risk viral genotypes to a greater degree than subtype 16, but prevalence of subtype 18 has also been observed and the second that is not associated with HPV usually develop due to alcohol and tobacco consumption manifesting as premalignant lesions of the oropharyngeal and laryngeal mucosa that can induce carcinogenesis (Chimenos et al., 2019; Villa & Hanna, 2018). Tobacco, alcohol and poor oral hygiene are credited as risk factors for the development of oropharyngeal cancer; however, HPV infection seems to be increasingly relevant, therefore, the important thing is to establish primary prevention, requiring early diagnosis and identification of the type of cancer as secondary prevention (Chimenos et al., 2019). The incidence of HPV-related cervical cancer is decreasing, however, there is an increase in the incidence of HPV-associated oral and oropharyngeal cancer, therefore HPV-positive oral tumors can be considered an epidemic, due to the increase in the prevalence of the population despite which the highest rates of oral HPV infection occur in men (Villa & Hanna, 2018; Lafaurie et al., 2018). HPV-associated oropharyngeal cancer should be considered as important as certain types of anogenital cancer and cervical cancer, thus forming part of the classification of a sexually transmitted disease, since it is the route of infection that allows the proliferation of this virus increasing the prevalence of this infection (Montero, 2018; Balarezo et al., 2019) in addition, the risk factors are also usually alcoholism or smoking (Mirghani & Blanchard, 2020). Unlike HPV-negative oropharyngeal cancers, patients who are positive are more sensitive to radiation with a better survival rate and usually manifest in white men younger than 60 years who have little or no relationship to alcohol or tobacco rather relate to the number of lifetime sexual partners, Oral sexual practices and same-sex contact have also been mentioned that it can also originate from early sexual activity (Gámez et al., 2018; Tanaka & Alwi, 2018). In North America, approximately 26 million people are infected with HPV according to the U.S. National Health and Nutritional Assessment Study Series (NHANES). The prevalence of HPV-related head and neck cancer has been increasing over the past 15 years including oropharyngeal cancer and its incidence has increased in young men and developed countries. In the USA, it was evidenced that the incidence of the disease exceeded 53,000 cases and 11,000 deaths in 2013 Precancerous lesions are rare relevance, in, but their malignant transformation is since it can help us find prevention strategies in high-risk groups because their early diagnosis could improve their prognosis. Examinations performed by dentists should be based on a thorough examination and even more so patients who have relative risk factors for any type of head and neck cancer (Mateo & Somacarrera, 2015). Although HPV-associated oropharyngeal cancers have nothing to do with keratinizing dysplasias, they usually present with smaller tumor size and greater lymph node involvement, in addition histologically they present a non-keratinizing morphology and should be less than 10% in the case of being present (Lozano, 2019; Ricardo et al., 2019) The problem that arises mainly to detect cancer of, (Mateo & Somacarrera, 2015; Carlos et al., 2019). oropharyngeal associated with HPV lies in the fact that most of the time its arrest is achieved in advanced stages, since the symptomatology is scarce so only a mass is observed in the neck unlike those that are not related to HPV that have signs of local invasion such as sore throat, dysphagia, odynophagia, bleeding, or weight loss. It has been recommended that identification of the virus should be part of the diagnosis, which is why the American College of Pathologists suggested increasing routine pathologic examination for oropharyngeal cancer biopsy (Contreras & Venegas, 2015; Gaspar et al., 2019). It is

essential to establish an early diagnosis and set an adequate treatment in early stages in oropharyngeal cancer not related to HPV, it is best to minimize risk factors, treat cancerous lesions, guide a balanced diet establishing a healthy lifestyle; In addition, pharmacological or surgical treatments and follow-up controls can be used. On the other hand, considering that oropharyngeal cancers associated with HPV infection are of great relevance, it is advisable to opt for preventive measures in the practice of oral sex. Another preventive measure is the vaccine against the different genotypes of HPV as a preventive action, but its effectiveness remains to be determined (Chimenes et al., 2019).

The main treatments for oropharyngeal cancer are radiotherapy, surgery and chemotherapy, however at present research has been developed to reduce the intensity of treatment in patients with positive HPV because they respond more favorably than that of unrelated patients; for this reason it was proposed to establish a differential treatment in these types of patients with different types of carcinomas but the necessary evidence for a therapeutic in each case therefore the treatment in both is the same (Boguñá et al., 2019; Lozano, 2019). The choice of treatment type is based on TNM stage (tumor, nodule, metastasis) and anatomical location. HPV-associated oropharyngeal cancer has a better response to treatment with radiotherapy usually of modulated intensity and with greater survival, in 80% of patients RT may be sufficient, since it probably interferes with the capacity of E6/E7 proteins or because due to the presence of TP53 it favors apoptosis in these carcinomas (Boguna et al., 2019; Aparicio et al., 2014). Not all patients have the same diagnosis, therefore different treatments should be performed, which may involve chemotherapy as neoadjuvant, adjuvant or concomitant, and surgery can be used in the early stages with the intention of avoiding adverse effects with other treatment methods and in advanced stages in which surgery is extensive (Lozano, 2019). In the area of medicine, many investigations have been developed on this topic, which allows access to extensive information, but the same does not happen in the area of dentistry despite the fact that this is a very common virus in the oral cavity, so research on this topic is not safe and is under investigation (Montero, 2018; Chairez et al., 2015). Therefore, the objective of the article is to determine the level of knowledge regarding the human papillomavirus associated with oropharyngeal cancer of students of 9th and 10th semester of the dentistry career of the Regional Autonomous University of Los Andes of the academic period October 2020-March 2021.

## **2. Materials And Methods**

The following work was mixed, combining qualitative and quantitative elements, with the purpose of obtaining a complete and deep analysis about the level of knowledge of the students of 9th and 10th semester of the dentistry career at the Regional Autonomous University of Los Andes, during the academic period from October 2020 to March 2021.

To conduct this study, two data collection tools were used: observation and a survey with a 20-question multiple-choice questionnaire. The observation allowed to obtain relevant information about the behavior of the students in relation to the topic of interest, while the survey with the questionnaire designed specifically for the research allowed to collect precise and structured data on their level of knowledge.

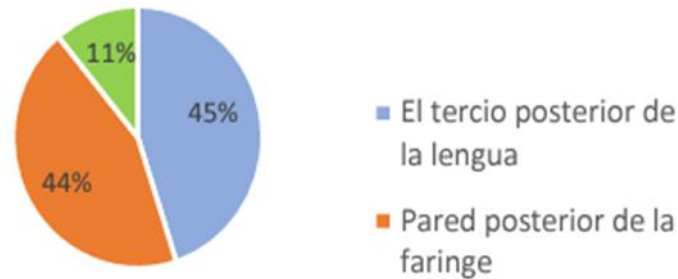
The target population of this research was made up of 87 students from the last two semesters of the dentistry career. The data collection process was rigorous and systematic, guaranteeing the participation of all students included in the study, with the aim of obtaining a representative sample of the population of interest.

Once the data was collected, it was coded and analyzed using Microsoft Excel. For the analysis of the results, descriptive statistics including frequency and percentage for categorical data were used. These statistical tools made it possible to summarize and clearly present the responses of the survey participants, offering an overview of the level of knowledge of the students in relation to the topic under study.

The blended approach used in this research has provided a more complete and holistic perspective of the topic addressed, allowing not only to quantify the level of knowledge of students, but also to understand the perceptions and opinions that underlie their answers. The combination of qualitative and quantitative techniques has enriched the analysis and has provided a more complete and nuanced view of the situation studied.

### 3. Results and Discussion

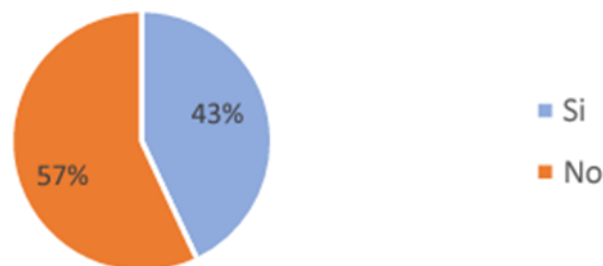
**The oropharynx is made up of palatine and lingual tonsils, soft palate and:**



**Figure 1.** Prepared by: Escobar Alisson

Regarding how the oropharynx is formed, 5% of the students answered correctly; 45% mentioned that it is made up of the posterior third of the tongue, 44% that it is the posterior wall of the pharynx and 11% the floor of the mouth.

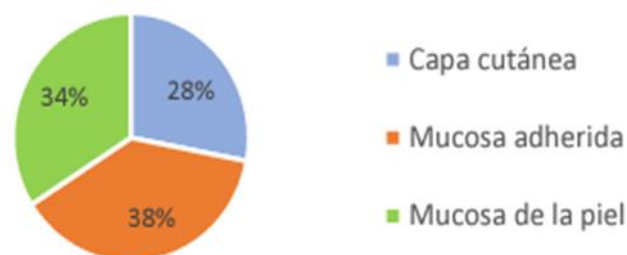
**You consider all HPV genotypes to be oncogenic**



**Figure 2.** Prepared by: Escobar Alisson

43% of students answered this question correctly and 57% do not consider HPV genotypes to be oncogenic

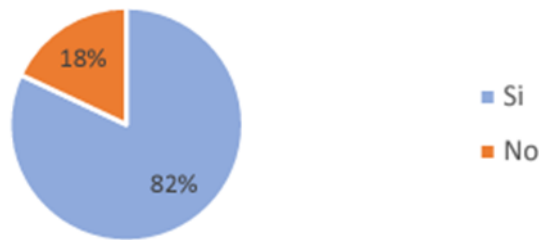
**Which of the following areas do you think is affected by HPV?**



**Figure 3.** Prepared by: Escobar Alisson

4% of students answered this question correctly; 28% mentioned that the affected area is skin layer, 38% adhered mucosa and 34% believe that it is skin mucosa.

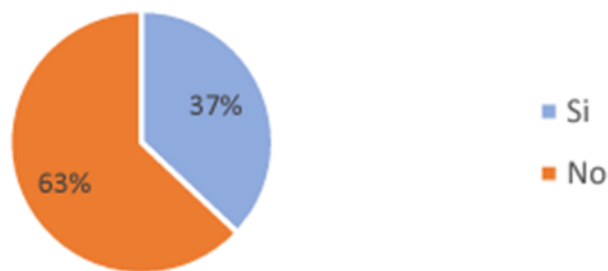
**You believe HPV16 is linked to oropharyngeal cancer**



**Figure 4.** Prepared by: Escobar Alisson

82% of the students answered this question correctly while 18% stated that oropharyngeal cancer is not related to the HPV-16 subtype.

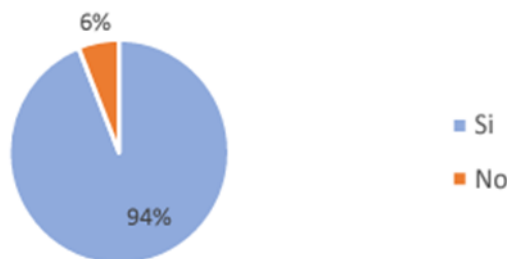
**Do you think the HPV vaccine is only for women**



**Figure 5.** Prepared by: Escobar Alisson

63% of students answered this question correctly, but 37% of students say the vaccine is only for women.

**The presence of HPV in the oral cavity may be a risk factor for oral or oropharyngeal cancer**

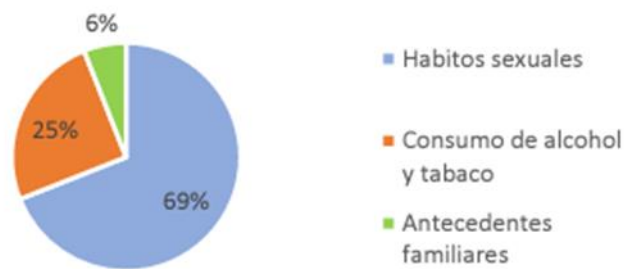


**Figure 6.** Prepared by: Escobar Alisson

94% of the students answered this question correctly and 6% stated that the presence of HPV is not a risk factor for oral or oropharyngeal oncogenesis.

**Which of the following risk factors do you think is most important for developing oropharyngeal cancer?**

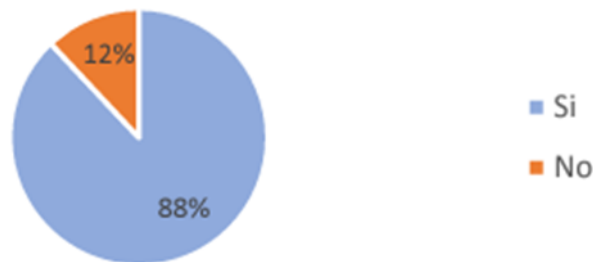
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**Figure 7.** Prepared by: Escobar Alisson

25% of the students answered this question correctly mentioning that the risk factors are the consumption of alcohol and tobacco, however, that a risk factor is family history while 6% that are sexual habits.

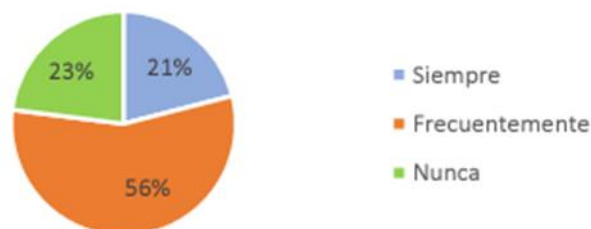
**You think that the risk factor that is most related to the development of HPV-associated oropharyngeal cancer is sexual habit**



**Figure 8.** Prepared by: Escobar Alisson

88% of the students answered this question correctly, but 12% state that the risk factor that is most related to HPV is not the sexual habit.

**Do you regularly have a clinical diagnostic exam for precancerous lesions or possible oral or oropharyngeal cancer?**

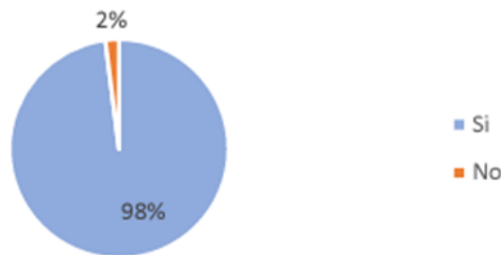


**Figure 9.** Prepared by: Escobar Alisson

21% of the students of the Universidad Regional Autónoma de los Andes of 9th and 10th semester always perform a diagnostic clinical examination to detect precancerous lesions or possible oral or oropharyngeal cancer, while 56% perform it frequently and 23% do not.



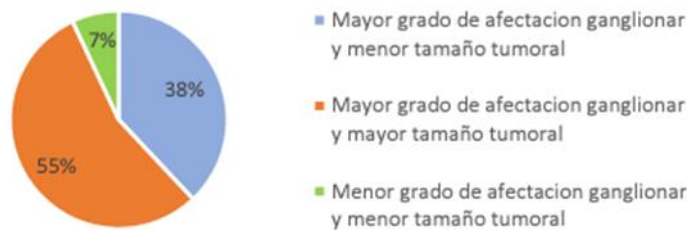
**For the diagnosis of oropharyngeal carcinomas you think it is important to perform the initial examination, visual examination, palpation of the mucous membranes, and palpation of lymph nodes for the detection of certain masses or lymph nodes.**



**Figure 10.** Prepared by: Escobar Alisson

98% of students consider it important to perform clinical examination for the detection of oropharyngeal carcinomas, however, 2% do not consider it important.

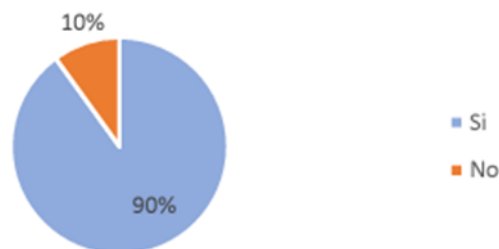
**HPV-associated oropharyngeal cancer usually has:**



**Figure 11.** Prepared by: Escobar Alisson

38% of the students who completed the questionnaire answered this question correctly, mentioning that they have a greater degree of lymph node involvement and smaller tumor size, while 55% state that HPV-associated oropharyngeal cancer usually has a greater degree of lymph node involvement and a larger tumor size, and 7% consider that it has a lower degree of lymph node involvement and smaller tumor size.

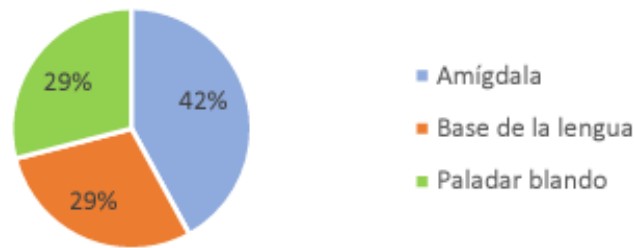
**You consider that among the symptoms that usually occur in the diagnosis of oropharyngeal cancer associated with HPV are signs of local invasion, such as sore throat, dysphagia, odynophagia, bleeding or weight loss.**



**Figure 12.** Prepared by: Escobar Alisson

10% of students answered this question correctly and 90% consider HPV-associated oropharyngeal cancer to show signs of local invasion.

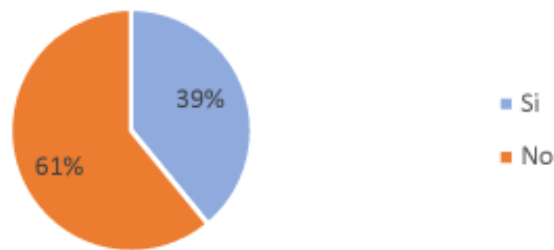
**What are the anatomical sites of preferential involvement in the HPV-associated oropharyngeal?**



**Figure 13.** Prepared by: Escobar Alisson

13% of the students answered this question correctly mentioning the amygdala and base of the tongue as a site of affectation; 42% mention the tonsil, 29% consider it the basis of the tongue and the other 29% think it is the soft palate.

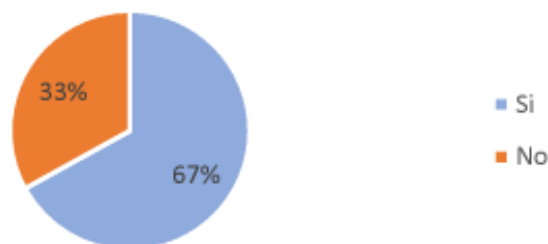
**In most cases of HPV-associated oropharyngeal cancer, is men at higher risk than women?**



**Figure 14.** Prepared by: Escobar Alisson

39% of the students answered correctly however 61% consider that men have no greater risk than women in HPV-associated oropharyngeal cancer.

**You believe that patients younger than 60 years of age have a higher prevalence of HPV-associated oropharyngeal cancer.**



**Figure 15.** Prepared by: Escobar Alisson

67% of the students answered this question correctly, although 33% consider that patients under 60 years of age do not have a higher prevalence.

**Which of the. The following considers to be the common histological morphology of HPV-associated oropharyngeal cancer.**

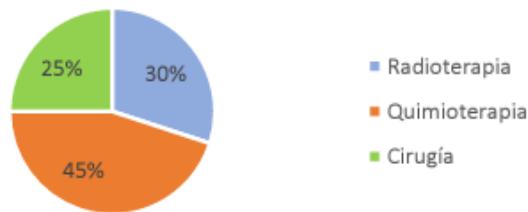




**Figure 16.** Prepared by: Escobar Alisson

Of the students, 15% answered correctly mentioning that the common histological morphology of HPV-associated oropharyngeal cancer is nonkeratinizing, while 60% consider it to be keratinizing and 25% mention it is cubic stratified.

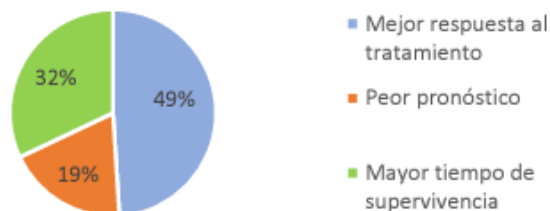
**What do you think is the best treatment for HPV-associated oropharyngeal cancer?**



**Figure 17.** Prepared by: Escobar Alisson

30% of students consider that the optimal treatment is radiotherapy, 45% think that it is chemotherapy and the remaining 25% mention that it is surgery.

**Due to its clinical and histopathological characteristics, HPV-associated oropharyngeal cancer presents:**

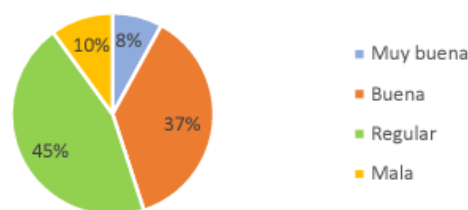


**Figure 18.** Prepared by: Escobar Alisson

7% of students answered this question correctly; 49% mentioned that they have a better response to treatment, 19% think they have a worse prognosis and 32% consider that they have a longer survival time.

**How he considers his university training on HPV associated with oropharyngeal cancer**

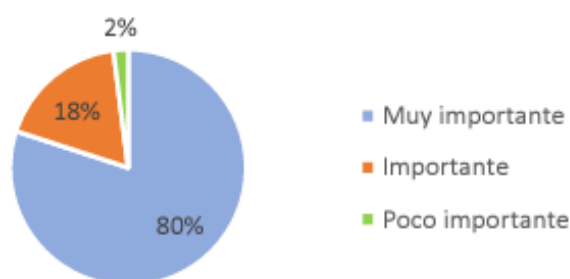
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**Figure 19.** Prepared by: Escobar Alisson

8% of students said that the training is very good, 37% that it is good, 45% mention that it is fair and the remaining 10% that it is bad.

### **How important it is for you as a future dentist to have knowledge about oropharyngeal cancer.**



**Figure 20.** Prepared by: Escobar Alisson

The importance of having knowledge about oropharyngeal cancer for 80% of students is very important and for 18% it is important while for 2% this topic is unimportant.

There are different types of specialties within dental practice that allow us to assess the variety of pathologies presented by patients. Within the world population there is a high incidence of oropharyngeal cancer occupying the sixth place. Generally, when talking about oropharyngeal cancer, it is associated with tobacco and alcohol consumption, therefore its relationship with HPV is little studied. As it could be seen from the results, the knowledge that dental students have about HPV-associated oropharyngeal cancer is regular, since the average is 38.94%. Falcao et al, commented that the knowledge of students regardless of their area is limited; therefore, they suggest that it is necessary to implement HPV study and prevention programs to raise awareness among people especially in health care (Falcao et al., 2009). Rajiah et al, in their research, evaluated the knowledge of dental students about risk factors, symptoms and prevention methods of HPV-related cancer in which a moderate level of knowledge was evidenced (Rajiah et al., 2017). Studies conducted in the United States of medical students showed basic knowledge correctly identifying risk factors and less than a quarter identified HPV as a potential risk factor. Although in dental students knowledge about HPV and its relationship with head and neck cancer was considerably low by less than 50% of students. The students did not know certain information among them that the average age of patients decreased and that patients are more likely to lack risk factors such as tobacco and alcohol (Freiser et al., 2016). The publication by Ortunio et al, the results of their research showed that university students had a knowledge of 95.9% that is to say excellent about the virus and its relationship with cancer, however, it does not coincide with what was published by Bustamante Ramos et al, since the latter author also reported that there was 14xclinical pressure of infection due to ignorance among students about the virus and cancer (Ortunio et al., 2014; Bustamante et al., 2015). Poelman et al, mentioned essential points about the role of the dentist in the face of this virus, including the importance of informing patients about the existence of HPV, discussing the pros and cons of vaccination against the virus, as well as making early diagnosis. Dental schools should add this topic

to their curriculum for proper preparation of students and their future professional roles (Poelman et al., 2018). In the Caves mentions that the participation of the dentist as the first line of care of the oral cavity is of great relevance for early identification, so updating knowledge about HPV is a growing need, in order to (Cuevas et al., 2018). be able to identify mucosal changes due to HPV in a timely manner.

#### 4. Conclusion

The results obtained in the present study have shown that the level of knowledge of dental students at the Universidad Regional Autónoma de los Andes is qualified as "regular". These findings are of great relevance, as they highlight the need to strengthen knowledge related to Human Papillomavirus (HPV) infection and its association with oropharyngeal cancer. It is essential that future dentists are fully aware of the importance of early detection of cancer, so they should be familiar with the risk factors, clinical manifestations and treatment options.

In this context, prevention programs and topics related to HPV and its association with head and neck cancers should be fundamental elements within the curriculum of dental schools. The inclusion of these topics would allow students to acquire the necessary knowledge to effectively address the prevention, detection and treatment of these oncological pathologies.

In addition, it is very important that health teams, especially dentists, have updated and accurate information about HPV and its implications in the development of these carcinomas. Thorough investigation of the current situation of the virus in relation to these neoplasms is critical to understanding its impact and progression. Currently, HPV-associated oropharyngeal cancer is increasingly occurring in young patients, and in many cases, without known predisposing factors such as alcohol or tobacco use.

Therefore, the constant training and updating of dental professionals regarding HPV and its relationship with oropharyngeal cancer becomes an essential task to improve the attention and care of patients. The development of training and continuing education programs in this area will be essential for dentists to contribute significantly to the prevention and early detection of these diseases, as well as their timely and effective treatment. The adequate preparation of future dentists in this issue is a crucial step to comprehensively address the problem of oropharyngeal cancer associated with HPV and thus improve the health and quality of life of the population..

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