

Pilot Test of a Spanish Version of a Previously Validated HPV Survey that Evaluates Dental Students' Knowledge, Perception and Clinical Practices in Latin America

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Abstract

Background: The global incidence of oropharyngeal cancer is increasing. Dental professionals play a key role in the detection of oral and OPC lesions that could lead to cancer. However, scientific-based HPV-OPC visual inspection guidelines are not fully defined. With sufficient knowledge and adequate training on how to educate patients about HPV vaccination, dental providers have the potential to lead HPV-OPC prevention. HPV knowledge and awareness has been reported to be low among dental student, oral health student, and oral health professional populations. Few if any of these studies have assessed the construct validity of instruments used to assess HPV knowledge and awareness among dental and oral health students and professionals.

Methods: This study aimed to evaluate the applicability of a Latin American Spanish translation of a multi-scale survey evaluating knowledge, perceptions, and clinical practices regarding HPV and HPV-OPC originally developed for English-speaking populations. Internal consistencies were measured using Cronbach Alpha. Analyses were conducted in SAS Version 9.4.

Results: Data from a total of 122 students, a majority of the which were female (58%), aged 18 to 29 years old (93%), and Hispanic/Latino(a)/Spanish (87%). The HPV, HPV-OPC, and HPV vaccine knowledge subscales demonstrated good internal consistency, the Cronbach's alpha was 0.83, 0.77, and 0.85 respectively. The Barriers subscale had a Cronbach's alpha of 0.92, showing a high internal consistency. The Clinical Procedures subscale focused on factors surrounding dental students' hypothetical clinical practice procedures and had a Cronbach's alpha of 0.80. The Scope of Practice scale had a Cronbach's alpha of 0.73.

Conclusions: Ultimately, this survey demonstrated reliability and applicability for the assessment of dental students' knowledge, perceptions, and clinical practices regarding HPV and HPV-OPC in Latin America.

Background

The global incidence of oropharyngeal cancer (OPC) is increasing, especially among those younger than 45 years [1]. An estimated 9,180 new cases of OPC were reported in Latin America and the Caribbean in 2018 with 80% of these cases occurring in men [2]. The countries with the most OPC cases were Brazil, Venezuela, Cuba, Colombia, Mexico, and Argentina [3]. Epidemiological and in vitro research reports suggest a strong association of human papillomavirus (HPV) with OPC [4], which is further supported by reports from Mexico and Colombia stating that HPV is the attributable factor in 36% of OPC cases [5].

Dental professionals play a key role in the detection of any oral and OPC lesions that could lead to cancer [6]; however, scientific-based HPV-OPC visual inspection guidelines are still underdeveloped. Previous studies suggest that oropharyngeal cancer screening via oral rinse may be a useful tool to detect HPV associated OPC [7, 8]. However, the U.S. Food and Drug Administration (FDA) has yet to approve any tests to detect HPV in the oral cavity [9], making widespread HPV vaccination the leading prevention strategy to

reduce the HPV-OPC burden. In an effort to increase HPV vaccination coverage, the FDA has recently approved HPV vaccine Gardasil-9 for men and women aged 27 to 45 years old [10]. Acknowledging the increase of HPV-OPC incidence, the American Dental Association's (ADA) recently adopted policy stating that dentists need to be current with HPV-OPC knowledge and support HPV vaccine use and administration [11].

With sufficient knowledge and adequate training on how to educate patients about HPV vaccination, dental providers have the potential to lead HPV-OPC prevention [12]. In fact, administering the HPV vaccine in the dental setting could be a viable option according to a multi-state study of United States (US) oral health students, where it was found that a majority of dental and dental hygiene students are open to be trained to administer the HPV vaccine [13]. Thus, it is crucial to evaluate dental professional's knowledge of, perceptions about, and clinical practices surrounding HPV and HPV vaccination. It is also important to understand what elements of dental school curriculum and clinical practices could improve HPV-OPC education and screening.

Globally, HPV knowledge and awareness has been reported to be low among the dental student, oral health student, and oral health professional populations; however, the construct validity of these instruments is questionable as many were study-specific [14–21]. Likewise, studies that examine HPV knowledge and awareness in Latin American countries are limited, but point to suboptimal levels of knowledge and awareness of HPV in countries such as Brazil and Ecuador [22, 23].

Validated instruments have been developed in the United States for HPV and HPV vaccine communication, advocacy, attitudes, and clinical practices among dental providers [24, 25, 18]. Researchers from the University of Minnesota utilized a validated 32-item survey instrument designed to measure head and neck surgeon's knowledge, attitudes, and practices regarding HPV communication and vaccine advocacy with dentists and dental hygienists, and found a lack of knowledge about HPV and HPV vaccination [18]. However, all of these scales were developed for English-speaking respondents, and to our knowledge, none have been tested for applicability to Latin America, a region with a high burden of emerging HPV-OPC and low HPV knowledge and awareness.

This study aimed to evaluate the applicability of a Latin American Spanish translation of a multi-scale survey evaluating Knowledge, Perceptions, and Clinical Practices (KPCP) regarding HPV and HPV-OPC originally developed for English-speaking US dental and dental hygiene student populations [25]. The primary aim of the study was to assess the reliability of the survey subscales using Cronbach alpha. The secondary aim of the study was to examine the translated survey for linguistic and cultural equivalency using qualitative open-ended questions and in-person discussions.

It is crucial that the next generation of Latin American dental professions have the tools needed to improve the health and well-being of their patients through increasing HPV vaccination coverage. This can be achieved through HPV-OPC patient education [26], HPV vaccination recommendation, and preventative OPC screening [27]. Having a validated Spanish instrument evaluating KPCP for HPV and

HPV-OPC would help identify areas of where Latin American dental schools could improve curriculum and secondarily help improve HPV-OPC prevention among their populations.

Methods

This study was conducted by researchers from the University of Utah School of Dentistry in Salt Lake City, Utah in the US and the Autonomous University of Baja California's Faculty of Dentistry in Tijuana, Mexico. Huntsman Cancer Institute and University of Utah School of Medicine also supported this research.

Questionnaire Development

This pilot study adapted a previously developed questionnaire for English-speaking oral health students. The translation of the pilot test questionnaire was done by two native Spanish-speaking members of the research team (LMP & AV) who are also fluent in the source language. Forward translation was done by a researcher who is a certified bilingual translator (LMP). The initial version was evaluated for semantic equivalence by the appointed in-country investigator (AV), who also served as an editor and highlighted grammatical and typographic errors. Reconciliation of forward translation concerns was made via a discussion between the members of the research team and a final version of the translated survey was made when all concerns were resolved. The resulting translated version was tested in this pilot study.

The HPV-OPC Knowledge, Perceptions, and Clinical Practices (KPCP) Spanish Version (SV) consisted of 147 items, of which 106 items were included in the final analysis. Items made up seven subscales: 1) HPV knowledge, 2) HPV-OPC knowledge, 3) HPV vaccine knowledge, 4) Barriers, 5) Clinical Procedures, 6) Scope of Practice, and 7) Curriculum Evaluation. The questionnaire also included demographic questions. The questions had a variety of response types, including true/false/don't-know, multiple choice, check all that apply, yes/no, and Likert scale. The pilot test survey questionnaire took between 30–40 minutes to complete. Approval from University of Utah's and Institutional Review Board (IRB), also known at the university's ethics committee, was obtained prior to this study (IRB_00087209).

Questionnaire Pilot Testing

Throughout Latin America, email invitations were sent to eight universities to participate in this pilot study, from which two agreed to participate; one program was located in Colombia (Facultad de Odontología de la Universidad de Antioquia) and the other, in Mexico (Facultad de Odontología de la Universidad Autónoma de Baja California, Tijuana campus). The two schools selected for this study are located in geographical regions where dental student's HPV-OPC knowledge has not been evaluated before. Thus, they were both good candidates to pilot test the HPV-OPC-KPCP-SV instrument and measure internal consistency. Eligible participants were first year dental (D1) students as they perform oral health educational duties as part of their program requirements. Since D1 student participants had not completed oral pathology curriculum prior to the pilot, the investigators were cautious in interpreting the knowledge section's accuracy and focuses on internal consistency. Study procedures were conducted

by two of the study investigators (Colombia-LMP; Mexico-AV) according to the IRB-approved study protocol in both sites to ensure consistency. First, study investigators gave a short oral presentation about the research project to D1 students. Students were then instructed on how to properly answer the questions and then completed the questionnaire at their own pace. The questionnaire was administered in pencil-and-paper format, and then study investigators manually entered the data into Vanderbilt University's Research Electronic Data Capture (REDCap) program for data management.

Students took between 30 to 40 minutes to complete the questionnaire, after which, they participated in an in-person discussion for about 30 minutes. During the in-person discussion, issues related to the survey questions were reviewed to gain additional feedback. Participants also provided their overall impressions of the instrument, suggested changes, shared what they liked or disliked about the instrument, and provided feedback on the order of questions. D1 students were incentivized to participate in the study by holding three raffles per University with the opportunity to win clinical dental instruments. Raffles were done immediately after participants finished the questionnaire and discussion. Analyses were conducted using SAS software, Version 9.4.

Results

A total of $N = 122$ Latin American dental students participated in this study. The majority of participants were female (58%), aged 18 to 29 years old (93%), Hispanic/Latino(a)/Spanish (87%), and had at least an undergraduate associate or bachelor's degree prior to entering their dental program (95%). Table 1 contains a complete breakdown of participant demographics.

Table 1
Demographic characteristics of
participants; N = 122 [N(%)]

Sex	
Female	71 (58%)
Male	45 (36%)
Prefer not to answer	6 (5%)
Age	
< 18	2 (2%)
18–29	114 (93%)
Did not answer	6 (5%)
Religion	
Agnostic	4 (3.2%)
Atheist	3 (2.4%)
Buddhist	1 (0.8%)
Catholic	69 (56.5%)
Jehovah's witness	2 (1.6%)
Jewish	1 (0.8%)
Mormon/LDS	3 (2.4%)
Protestant	3 (2.4%)
Other	9 (7.3%)
Nothing in particular	6 (4.9%)
Prefer not to answer	11 (9%)
Did not answer	10 (8.1%)
Prior degrees earned	
Associate degree	25 (20%)
Bachelor's degree	92 (75%)
Master's degree	2 (1.6%)
Doctorate degree	1 (0.8%)

Table 2 contains a summary of the HPV-OPC-KPCP-SV scale reliability and correlation coefficients, the type of analysis performed, and the number of questions included in each scale. The HPV, HPV-OPC, and HPV vaccine knowledge subscales demonstrated good internal consistency, the Cronbach's alpha (α) was 0.83, 0.77, and 0.85 respectively. The Barriers subscale had a Cronbach's alpha of 0.92, showing a high internal consistency. The Clinical Procedures subscale focused on factors surrounding dental students' hypothetical clinical practice procedures and had a Cronbach's alpha of 0.80. The Scope of Practice scale had a Cronbach's alpha of 0.73. The Curriculum Evaluation scale had a Cronbach's alpha of 0.23; however this is likely due to the differences in curriculum between dental schools and differences in geographical regions (U.S. vs Mexico and Colombia). The questions used for these analyses are shown in Table 3. Qualitative comments from students were also concurrently reviewed. Overall, discussion feedback was positive, with some suggestions for improvement regarding missing accents and minor rewording of certain items.

Table 2
Summary of reliability and correlation coefficients of subscales

Subscales	Cronbach alpha	Items
1. HPV knowledge	0.83	22
2. HPV-OPC knowledge	0.77	13
3. HPV vaccine knowledge	0.85	25
4. Barriers	0.92	24
5. Clinical Procedures	0.80	11
6. Scope of practice	0.73	11
7. Curriculum Evaluation	0.23	12

Table 3
Subscale items analyzed for reliability

1. HPV knowledge	
Hay muchos tipos de Virus de Papiloma Humano (VPH)	There are many types of Human Papillomavirus (HPV)
VPH es una infección bacteriana	HPV is a bacterial infection
Una persona puede estar infectado con VPH sin saberlo	A person can have HPV without knowing it
Generalmente, casi todas las infecciones de VPH se resuelven espontáneamente después de dos años	Generally, most HPV infections resolve spontaneously within 2 years
El VPH puede ser transmitido por contacto sexual	HPV can be transmitted via sexual contact
Una persona sin verrugas genitales puede transmitir el VPH	A person can transmit HPV even if a genital wart is not present
VPH puede causar cáncer orofaríngeo	HPV can cause oropharyngeal cancer
VPH puede causar herpes	HPV can cause herpes
VPH puede causar VIH/SIDA	HPV can cause HIV/AIDS
VPH puede causar verrugas genitales	HPV can cause genital warts
VPH puede causar cáncer de cérvix	Some types of HPV cause cervical cancer
La tasa de VPH es más alta en mujeres	The rate of HPV is highest among women
La displasia relacionada con VPH es mas común en personas fumadoras	HPV related dysplasia occurs more commonly in smokers
VPH puede causar resultados anormales del examen Papanicolaou	HPV can cause an abnormal Pap smear test/Pap test in women
Las verrugas genitales son causadas por el mismo tipo de VPH que causa cáncer de orofaríngeo	Genital warts are caused by the same HPV type(s) that cause oropharyngeal cancer
Las verrugas genitales son causadas por el mismo tipo de VPH que causa cáncer de cérvix	Genital warts are caused by the same HPV type(s) that cause cervical cancer
Casi todos los canceres cervicales son causados por el VPH	Almost all cervical cancers are caused by HPV
Usar condón disminuye la posibilidad de contraer y de transmitir el VPH	Using a condom will decrease the chance of transmitting/acquiring HPV
Inclusive después de ser vacunado contra el VPH el uso de condón puede proveer protección de otras enfermedades sexualmente transmisibles y/o infecciones de VPH	Even after HPV vaccination, condoms continue to provide protection against future sexually transmitted infections (STIs) and/or HPV infections
Los antibióticos puedes curar el VPH	Antibiotics can cure HPV

1. HPV knowledge	
El cáncer orofaríngeo como resultado del consumo de tabaco (cigarrillos) es una causa de muerte más común que el cáncer orofaríngeo causado por el VPH	Oropharyngeal cancer caused by smoking is more deadly than oropharyngeal cancer caused by HPV
Las etapas tempranas de cáncer orofaríngeo asociado con VPH son a menudo asintomáticas	Early stages of HPV oropharyngeal cancer are often asymptomatic
2. HPV-OPC knowledge	
En un consultorio odontológico, ¿qué tan seguido debe un paciente recibir un examen oral y de cabeza y cuello para evaluar lesiones que pueden ser cancerosas?	In the dental office, how often should a patient receive an oral, head, and neck cancer examination?
¿En qué grupo de edades se debe realizar examinación oral y de cabeza y cuello para evaluar lesiones que pueden ser cancerosas?	Which age group(s) should an oral, head, and neck cancer examination be performed on?
¿Qué grupo étnico/racial tiene la tasa más alta de cáncer orofaríngeo?	Which ethnic/racial background has the highest rate of oropharyngeal cancer?
¿En cuál grupo de edades se tiene la tasa más alta de cáncer orofaríngeo?	Which age group has the highest rate of oropharyngeal cancer?
¿Cuál sexo/genero tiene la tasa más alta de cáncer orofaríngeo?	Which sex/gender has the highest rate of oropharyngeal cancer?
¿Cuál grupo de edades se tiene la tasa más alta infección con VPH?	Which age group has the highest rate of HPV infections?
¿Qué porcentaje de cáncer orofaríngeo es atribuido al VPH?	What percentage of oropharyngeal cancer is attributed to HPV?
Durante los últimos 10 años, ¿cuál de todas las áreas de la cavidad oral mencionadas abajo ha presentado la mayor tasa de cáncer orofaríngeo asociado al VPH?	Over the last ten years, which of the following oral locations had the most increase in rate for HPV related oropharyngeal cancer?
Durante los últimos 10 años, ¿cuál grupo de edad ha mostrado el mayor incremento de tasa de cáncer orofaríngeo?	Over the last ten years, which age group has shown the most increase in rate for HPV related oropharyngeal cancer?
¿Cuál de estos profesionales son fuentes de conocimiento clínico confiable sobre cáncer orofaríngeo asociado al VPH?	Which of the following professionals are the most reliable clinical sources of HPV and oropharyngeal cancer information?
Discutir la asociación entre cáncer orofaríngeo y el VPH es parte del rol del odontólogo	Discussing the link between HPV and oropharyngeal cancer falls within the scope and role of a dental professional.
Recomendar a un paciente la vacuna del VPH es parte del rol profesional del odontólogo	Recommending HPV vaccination falls within the scope and role of a dental professional.
La administración de la vacuna del VPH en el consultorio odontológico es parte del rol profesional del odontólogo	Administering the HPV vaccines inside the dental office falls within the scope and role of a dental professional.

1. HPV knowledge	
3. HPV vaccine knowledge	
¿Sabías algo sobre el VPH antes de responder este cuestionario?	Were you aware of the HPV vaccines before taking this survey?
Hay unas vacunas que proveen inmunidad en contra ciertos tipos de VPH	There are vaccines that provide immunity against certain types of HPV
La efectividad de la vacuna del VPH no disminuye con el tiempo	The effectiveness of the HPV vaccine does not decrease over time
Las vacunas del VPH protegen a las mujeres de contraer cáncer cervical asociado al VPH	HPV vaccines can protect women against HPV related cervical cancer
Las vacunas del VPH protegen a las mujeres de contraer cáncer orofaríngeo asociado al VPH	HPV vaccines can protect women against HPV related oropharyngeal cancer
Las vacunas del VPH protegen a las mujeres de contraer cáncer anal asociado al VPH	HPV vaccines can protect men and women against HPV related anal cancer
Las vacunas del VPH no protegen a un individuo de todos los tipos de VPH	HPV vaccines do not protect an individual from all types of HPV
Individuos vacunados en contra del VPH no tienen que preocuparse de tener sexo seguro	Individuals who receive the HPV vaccines do not have to be concerned with practicing safe sex (e.g. using condoms)
La vacunación en contra del VPH incrementa la posibilidad de que las personas incurran en actividades sexuales de riesgo	HPV vaccination increases the likelihood of people engaging in risky sexual behaviors (e.g. multiple partners, unprotected sex, etc.)
Generalmente, las vacunas del VPH son seguras	Generally, HPV vaccines are safe
En general, las vacunas del VPH no causan efectos secundarios serios	In general, HPV vaccines do not cause serious side effects
Las vacunas de VPH son muy costosas para personas sin seguro médico	HPV vaccines are expensive for uninsured individuals
Las vacunas de VPH son cubiertas por casi todos los seguros médicos	HPV vaccines are covered by most insurance providers
Las vacunas de VPH son administradas en una sola dosis	HPV vaccines are administered in one dose
Las vacunas de VPH pueden proteger a las mujeres y hombre de las verrugas genitales asociadas a VPH	HPV vaccines can protect men and women against HPV related genital warts
Personas con verrugas genitales no pueden ser vacunados con la vacuna del VPH	People who already had genital warts cannot get the HPV vaccines
La vacuna del VPH es efectiva solo en personas que no han tenido ningún tipo de contacto sexual	HPV vaccines are only effective for individuals who have never had sex
Estar en una relación monógama elimina el riesgo de infectarse con VPH	Being in a monogamous relationship eliminates your risk of HPV infection

1. HPV knowledge	
Mujeres con resultados anormales de Papanicolaou no deben ser vacunas la vacuna del VPH	Women who have had an abnormal Pap smear/Pap test should not receive the HPV vaccines
El centro de control y prevención de enfermedades (CDC) recomienda la vacunación de VPH para mujeres y hombres	The Centers for Disease Control and Prevention (CDC) recommends that the HPV vaccines should be administered to both males and female
Discutir con sus pacientes sobre VPH le permite tener una conversación con sus pacientes sobre el comportamiento sexual de ellos	Discussing the HPV vaccines provide an opportunity to have a conversation with your patients about their sexual behaviors (e.g. sexual history, practicing safe sex, etc.)
Las vacunas de VPH son altamente efectivas para la prevención de precursores de cáncer cervical	HPV vaccines are highly effective at preventing cervical cancer precursors
¿Cuándo es recomendada idealmente la vacuna del VPH?	When is HPV vaccination ideally recommended?
¿Cuál es la edad optima para administrar la vacuna del VPH a las mujeres?	What is the optimal age for HPV vaccination in females?
¿Cuál es la edad optima para administrar la vacuna del VPH a los hombres?	What is the optimal age for HPV vaccination in males?
4. Barriers	
Basado en su experiencia como profesional de la salud oral, ¿qué tan difícil o fácil es discutir los siguientes temas con sus pacientes?	Based on your experience, how difficult or easy is it to discuss the following topics with your patients?
Abuso (ejemplo: violencia domestica, abuso a menores, abuso adulto mayor)	Abuse (e.g., domestic violence, child abuse, elder abuse)
Desordenes alimenticios	Eating disorders
Historia de enfermedades sexualmente transmisibles (ETS)	Sexually transmitted infection (STI or STD) history
Comportamientos sexuales (ejemplo: sexo oral, sexo anal)	Sexual behaviors (e.g. oral sex, anal sex)
Consumo y dependencia de sustancias psicoactivas (tabaco, alcohol, drogas)	Substance use disorders (e.g. tobacco use, alcohol use, illicit drugs)
Historial de vacunas	Vaccination history
El paciente es del sexo opuesto	The patient is of the opposite sex
No hay suficiente tiempo para discutir el tema durante la cita	There is not enough time to discuss this during appointments
No me siento cómodo(a) con el tema	I do not feel comfortable with the topic

1. HPV knowledge	
Miembros adicionales del equipo odontológico deberían estar en el consultorio	Additional dental team members would also have to be in the room
Problemas de confidencialidad	Confidentiality issues
El paciente era un menor de edad	The patient was a minor
Hay mucha diferencia de edad (mayor/menor) entre el paciente y yo	There was a large age difference (older/younger) between the patient and me
No creo que sea mi papel como profesional de la salud oral discutir la historia sexual de los pacientes	I do not believe it is my role as an oral health professional to discuss a patient's sexual history
El diseño físico de mi consultorio no proporciona suficiente privacidad	The physical layout of my office does not afford enough privacy (e.g., other patients' presence in a larger exam area, no doors on the exam room, etc.)
No tengo suficiente información acerca de las vacunas contra el VPH	I do not have enough information about the HPV vaccine
Estoy preocupado por la seguridad de las vacunas contra el VPH	I am concerned with the safety of the HPV vaccines
Razones de responsabilidad legal	Liability reasons
No creo que sea mi papel como profesional de la salud oral recomendar vacunas contra el VPH a mis pacientes	I do not believe it is my role as an oral health professional to recommend the HPV vaccines to my patients
No hay políticas establecidas ni guías profesionales pertinentes en la recomendación de la vacuna contra VPH	There are no established professional policies/guidelines pertaining to recommendation of the HPV vaccines
No hay suficiente tiempo para discutir el tema en las citas	There is not enough time to discuss this during appointments
No me siento cómodo hablando de la historia sexual con mis pacientes o de temas relacionados	I am not comfortable discussing sexual history/topics with patients
Las normas sociales y culturales juegan un papel en la discusión del VPH y de las vacunas contra el VPH en el consultorio odontológico	Social and cultural norms play a role in discussing HPV and the HPV vaccines in the dental office
La ideología religiosa del paciente juega un papel en la discusión del VPH y de las vacunas contra el VPH en el consultorio odontológico	A patient's religious ideology plays a role in discussing HPV and the HPV vaccines in the dental office
5. Clinical Procedures	
¿Cuál de las siguientes opciones describe mas apropiadamente su procedimiento normal para conversar con sus pacientes sobre el propósito y resultados de las evaluaciones de cáncer oral y de cabeza y cuello?	Which of the following describes your typical approach in communicating with patients about the purpose and the results of their oral, head, and neck cancer examination?

1. HPV knowledge	
Si usted tuviera que discutir la relación entre VPH y el cáncer orofaríngeo con sus pacientes, ¿cuál de los siguientes puntos cree usted que facilitarían esta conversación?	If you were to discuss the relationship between HPV and oropharyngeal cancer with your patients, which of the following do you think would best facilitate this conversation?
¿Cuál frase describe mejor como usted se comunica con pacientes acerca de las vacunas contra el VPH?	Which statement best describes how you communicate with patients about the HPV vaccines?
¿Cuál frase describe mejor como usted comunica a sus pacientes la conexión de la salud oral y sistémica?	Which statement best describes how you communicate with patients about their oral/systemic health?
¿Cuál frase describe mejor como usted se comunica con pacientes acerca de su historia sexual?	Which statement best describes how you communicate with patients about the HPV vaccines?
De los métodos listados a continuación, ¿cuál cree usted produciría la información más certera respecto a la historia sexual de los pacientes?	Which statement best describes how you communicate with patients about their sexual history?
6. Scope of Practice	
¿Usted estaría interesado en participar en un entrenamiento para administrar vacunas contra el VPH en su práctica odontológica?	How willing would you be to participate in a training to administer the HPV vaccines in your dental practice?
¿Usted estaría interesado en participar en un entrenamiento para administrar vacunas contra de la influenza/gripe en su práctica odontológica?	How willing would you be to participate in a training to administer the flu vaccines in your dental practice?
Si recibiera entrenamiento, ¿usted estaría interesado en administrar vacunas contra el VPH en su practica odontológica?	If trained, how willing would you be to administer the HPV vaccines in your dental office?
Si fuera adecuadamente entrenado, ¿qué tan dispuesto estaría de administrar la vacuna contra la gripe en su consultorio odontológico?	If properly trained, how willing would you be to administer the flu vaccine in your dental office?
7. Curriculum evaluation	
¿Cuál(es) estructura(s) examina usted visualmente durante una evaluación de cáncer oral y/o de cabeza y cuello?	Which structure(s) do you visually examine during an oral, head, and neck cancer examination?
¿Cuál estructura palpa usted durante una evaluación de cáncer oral y/o de cabeza y cuello?	Which structure(s) do you palpate during an oral, head, and neck cancer examination?
¿Qué tan buena ha sido su educación en odontología para hacer una evaluación de cáncer oral y de cabeza y cuello?	How well has your dental education prepared you to perform an oral, head, and neck cancer examination?
¿Qué tanta confianza tiene en su habilidad para hacer una evaluación de cáncer oral y de cabeza y cuello?	How confident are you in your ability to perform an oral, head, and neck cancer examination?

1. HPV knowledge	
¿Con qué frecuencia se ha discutido durante su educación odontológica sobre el VPH y la relación entre el VPH y el cáncer orofaríngeo?	How frequently has HPV or HPV related oropharyngeal cancer been discussed during your dental education?
¿Hasta que punto está de acuerdo con la siguiente declaración: "mi plan de estudios odontológicos debería haber tenido más énfasis sobre la asociación del VPH con el cáncer orofaríngeo?"	What is your level of agreement with the following statement: "More emphasis should have been placed on HPV related oropharyngeal cancer education during my dental curriculum."
¿Cuál de las siguientes metodologías fueron utilizadas por su facultad de odontología para educarlos en el tema del VPH?	Which of the following methodologies were used for HPV education by your dental institution?
Durante su educación formal como estudiante de odontología, ¿dónde aprendió acerca de la relación entre VPH y cáncer orofaríngeo?	During your formal dental education training, where did you learn about the link between HPV and oropharyngeal cancer?
¿Cuáles son los factores de riesgo más comunes del cáncer orofaríngeo asociado al VPH?	What are the probable risk factors for HPV oropharyngeal cancer?
¿Cuál es el área mas común para realizar biopsia de diagnóstico del cáncer orofaríngeo asociado al VPH?	Where is the most common location for a HPV related oropharyngeal cancer biopsy?
Existen estándares o pruebas de rutina para el cáncer orofaríngeo específicamente	There are standards or routine screening tests for oropharyngeal cancer, specifically.
¿Cuáles de los siguientes puntos están presente en la historia clínica de su facultad de odontología?	Based on what you remember, which of the following items are included on the medical history forms at your dental school?

Discussion

This pilot study aimed to evaluate internal consistency of the HPV-OPC Knowledge, Perceptions, and Clinical Practices (KPCP) Spanish Version (SV) in a sample of Latin American dental students, which was adapted from a previously validated English version. The main findings indicate high internal consistency of most subscales in the instrument. Feedback received from students suggest some minor orthographical and grammatical corrections, as well as to specify when questions are single or multiple option response. In general, there was evidence of equivalence between the HPV-OPC-KPCP-SV and the English version. Culturally, the survey also demonstrated strong practical relevance for students in Latin American countries, as participants expressed interest in acquiring knowledge related to the topic through open-ended questions.

However, findings also showed lower internal consistency of the Curriculum Evaluation subscale. This could be due to the curriculum differences between dental schools in the U.S. and in Latin America. To improve the internal consistency for Curriculum Evaluation, analysis and comparison between American and Latin American curriculum should be conducted. This analysis would assist researchers in

understanding which questions in Curriculum Evaluation must be revised and adapted to the dental schools where the survey will be administered.

Compared to the alpha coefficients of the English version, HPV-OPC-KPCP-SV had a higher internal consistency in the following subscales: HPV and HPV-OPC Knowledge, HPV Vaccine Knowledge, and Scope of Practice. The English version had Cronbach's alpha coefficient of 0.71 and 0.79 for HPV and HPV-OPC Knowledge, and HPV Vaccine Knowledge, respectively. These two categories in the English version had lower value of Cronbach's alpha coefficient, probably due to the lower number of items—the English version had fewer items compared to the Spanish version. The English version had two items for Scope of Practice and thus was analyzed using Spearman correlation, which resulted in an alpha coefficient of 0.71. This value was slightly lower than the Cronbach's alpha coefficient of Spanish Scope of Practice (0.73).

Previous researches in Latin America have evaluated different aspects related to HPV-OPC in dental students [28]. Each research group developed a questionnaire regarding dental students' demographic, sexual habits, sexual-related pre-existing pathologies, and HPV-OPC knowledge. Two studies claimed that their questionnaires were validated [28, 29]. Although, there are no statistical reports and references in these studies that allows us to evaluate and compare the validation process of their questionnaires with ours. The description provided by the researchers were as followed: Medina et al. reported that experts validated their questionnaire with high reliability; on the other hand, Lama-González's group simply reported the implementation of a pilot study with dental students of La Facultad de Odontología de la Universidad Autónoma de Yucatan. In both studies, no reports were found in the publications about Cronbach's alpha coefficient or any statistical analysis used to validate their questionnaires [28, 29].

Even though the previous studies listed above were valuable in assessing dental students' knowledge regarding HPV-OPC, they did not demonstrate any methodological steps needed to claim validity of their new scales. HPV-OPC-KPCP-SV is the first to describe their validation methodology. Besides assessing dental students' knowledge, perception, and clinical practice, the current survey also assessed the HPV-OPC curriculum in Latin American dental schools. The study results reveal a great opportunity for curriculum evaluation and development among Latin American dental schools and can be used to further implement research in Latin American countries regarding HPV-OPC. By comprehensively evaluating dental students' knowledge, perception, curriculum, and clinical practice, the barriers that prevent or limit the discussion of HPV-OPC and HPV vaccination with patients can be identified and mitigated. Knowing these barriers provides the foundation to propose a guide and/or intervention that would aim to increase HPV-OPC education among patients and increase HPV vaccination rates in Latin America.

Limitations

The HPV-OPC-KPCP-SV survey appears to have been successfully translated from English to Spanish. Moreover, the reliability and cross-cultural applicability is appropriate to be implemented in dental students from Latin America countries. However, in interpreting the results, it is important to take the

study's limitations into account. Despite the success of the pilot testing of the HPV-OPC-KPCP-SV, the results could not be generalizable, as the study was not randomized. The study was conducted in only two countries: Mexico and Colombia, thus findings may not generalize to other Latin American countries. Nevertheless, people from different cultural and demographic background were included in this study and reliability was high suggesting that generalizability may be appropriate yet additional research is needed to support this claim.

This study administered one survey in a cross-sectional design meaning Cronbach's alpha was the only feasible reliability measure that could be assessed. The study could not measure test-retest reliability because the students were only asked to complete the survey once. Concurrent validity or discriminant reliability measures were not possible as the students were only asked to complete one survey. Floor and ceiling effects are also possible limitations in surveys of this type. Administering this survey to a wider range of other dental students and professionals, both in experience and knowledge, and at multiple time points would reduce these limitations.

After the survey was administered, there was an in-person group discussion. This may have limited the ability of participants to confidently express and share their feedback. Also, it is possible that the participants' responses could have been influenced by social desirability and conformity bias. Since participants were relatively new to the dental school academic environment, they may have been knowingly or unknowingly responding to items while taking into consideration their peers or the researchers' perceptions of their responses. This was mitigated by an anonymous comment field that allowed the participants, who may feel uncomfortable to discuss in the in-person group discussion, opportunities to provide their feedback. However, these biases could still exist.

Since the participants were first-year students, they might feel uncomfortable answering some questions in this pilot due to the limited patient hours and the knowledge regarding cancer-related topics. This limitation of knowledge may be the reason why the Curriculum Evaluation had a low alpha coefficient.

Future research should focus on the evaluation of knowledge that senior dental students (D4 and D5) as well as dentists and dental hygienists have about HPV Knowledge, HPV-OPC Knowledge, HPV Vaccine Knowledge, Barriers, Clinical Procedures, Scope of Practice, and Curriculum Evaluation in order to identify and overcome real or perceived barriers. This could take the form of offering continuing education courses, workshops, or changes in dental school curriculums. Subsequent studies should focus on further validation of the HPV-OPC-KPCP-SV and include assessment of additional reliable measures.

Conclusions

This study aimed to evaluate the applicability of a Spanish translation of an English survey developed for the US dental and dental hygiene student population in dental students from Latin America. Aside from assessing the linguistic and cultural equivalency of the Spanish version of the survey, this study found high internal consistencies for the majority of subscales examining HPV Knowledge, HPV-OPC Knowledge, HPV Vaccine Knowledge, Barriers, Clinical Procedures, and Scope of Practice.

The process of a Spanish translation of the HPV-OPC-KPCP-SV survey demonstrated initial reliability and applicability for the assessment of the knowledge, perceptions, and clinical practices regarding HPV-OPC for dental students in Latin America. However, this is only a first step, the next step would be to do further reliability and validity assessments using a larger sample. This study has implications for dental HPV curriculum development and may be used to assess needs for improving the quality of dental practice among our future dental health professionals in the area of HPV education, HPV vaccination, and detection of HPV-OPC cancers at early stages.

Declarations

Ethical Approval and consent to participate

This study was approved by the University of Utah's and Institutional Review Board (IRB), also known as the university's ethics committee (IRB_00087209). All methods were performed in accordance with the relevant guidelines and regulations approved by University of Utah's IRB and ethics committee for this study (IRB_00087209). Participation was voluntary and completion of the questionnaire included a cover letter that served as informed consent as approved by the University of Utah's IRB or ethics committee. Informed consent was obtained from all participants.

Consent for publication

Not applicable

Availability of data and materials

The datasets have been attached as supplementary tables. The datasets used and/or analyzed during the current study will be made publicly available by May 2021. Please contact the corresponding author at deanna.kepka@hci.utah.edu to locate the publicly available data for this study.

Competing interests

None of the authors have a conflict of interest.

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Authors' contributions

L.P, D.K., S.A. and A.V. wrote and edited the manuscript. L.P, A.V., H.R, D.T., L.M., C.D., S.A., B.D., J.W., and D.K. contributed to the study design, survey development, survey administration, data analyses activities, and interpretation of results. L.P, A.V., H.R, D.T., L.M., C.D., S.A., B.D., J.W., and D.K. read and approved the final manuscript.

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