Universidad Europea

GRADUATION PROJECT

Degree in Dentistry

SEXUALLY TRANSMITTED INFECTIONS AND THEIR RELATIONSHIP WITH THE ORAL CAVITY. A SURVEY OF DENTISTS FROM MADRID.

Madrid, academic year 2025/2026

Identification number: 184

RESUMEN

Introducción: Las infecciones de transmisión sexual (ITS) representaron un problema creciente de salud pública a nivel global, con un aumento notable de su incidencia en Europa y especialmente en Madrid. La cavidad oral se identificó como un sitio clave, aunque frecuentemente infravalorado, tanto para la transmisión como para la aparición de manifestaciones clínicas tempranas; **Objetivos**: Este estudio tuvo como objetivo evaluar el nivel de conocimientos teóricos, actitudes y prácticas clínicas de los odontólogos en Madrid respecto a la detección y manejo de las manifestaciones orales de las ITS, así como identificar posibles carencias formativas; **Metodología**: Se llevó a cabo un estudio observacional, descriptivo y transversal mediante un cuestionario estructurado y anónimo dirigido a odontólogos en ejercicio en Madrid. Los datos se recopilaron entre enero y marzo de 2026. Se analizaron un total de 38 respuestas válidas. El cuestionario evaluó características sociodemográficas, prácticas clínicas, conocimientos teóricos y necesidades formativas; **Resultados**: Se observó una discrepancia entre la importancia atribuida al cribado de ITS y su aplicación en la práctica clínica. Aunque la mayoría de los participantes reconoció su papel en la detección precoz, solo una minoría realizó una exploración sistemática de signos relacionados con ITS. El conocimiento sobre infecciones comunes como herpes, VPH y sífilis fue adecuado en general, aunque persistieron ciertas confusiones. La mitad de los participantes reportó haber diagnosticado alguna ITS durante su carrera. La mayoría indicó una formación universitaria insuficiente; **Conclusiones**: Se identificó una clara brecha entre el conocimiento y la práctica clínica. Los resultados evidenciaron la necesidad de reforzar la formación y proporcionar herramientas prácticas para mejorar la detección precoz y el papel del odontólogo en la salud pública.

PALABRAS CLAVE

Odontología, Infecciones de Transmisión Sexual, Manifestaciones Orales, Diagnóstico, Comunidad de Madrid.

ABSTRACT

Introduction: Sexually transmitted infections (STIs) represented a growing global public health concern, with increasing incidence rates observed in Europe and particularly in Madrid. The oral cavity was identified as a key but often underestimated site for transmission and early clinical manifestations; **Objectives:** This study aims to assess the level of theoretical knowledge, attitudes, and clinical practices of dentists in Madrid regarding the detection and management of oral manifestations of STIs, and to identify potential training gaps; **Methods:** An observational, descriptive, cross-sectional study was conducted using a structured and anonymous questionnaire distributed to practicing dentists in Madrid. Data were collected between January and March 2026. A total of 38 valid responses were analyzed. The survey evaluated socio-demographic characteristics, clinical practices, theoretical knowledge, and educational needs; **Results:** A discrepancy was observed between the perceived importance of STI screening and its actual implementation in clinical practice. While most participants recognized their role in early detection, only a minority reported systematic examination of STI-related signs. Knowledge of common STIs such as herpes, HPV, and syphilis was generally adequate, although misconceptions persisted, particularly regarding less recognized infections. Half of the participants reported having diagnosed an STI during their career. Most respondents expressed moderate confidence in discussing STIs with patients but reported insufficient undergraduate training; **Conclusions:** A significant knowledge-practice gap was identified among dentists in Madrid. The findings highlighted the need for improved education and practical training to enhance early detection and strengthen the role of dentists in public health strategies.

KEYWORDS

Dentistry, Sexually Transmitted Infections, Oral Manifestations, Diagnosis, Community of Madrid.

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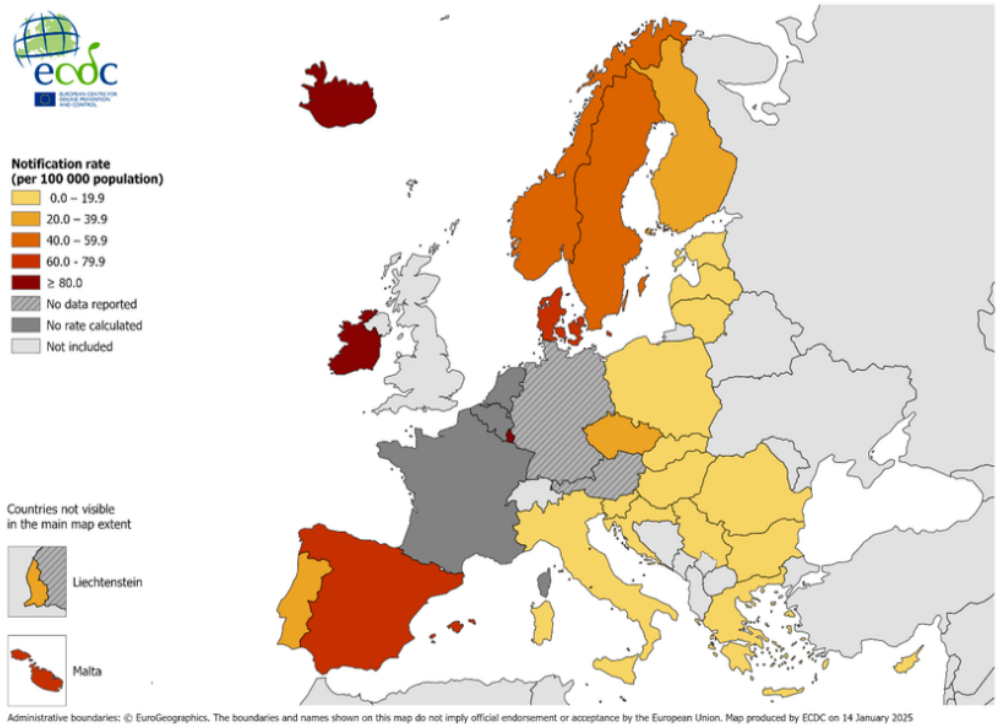
1. INTRODUCTION

1.1 Definition and etiologies of sexually transmitted diseases

Sexually transmitted infections (STIs) are defined as diseases transmitted essentially through unprotected sexual intercourse. However, some of them can also be transmitted during pregnancy, breastfeeding, or through blood. (1)
STIs are polymicrobial; they can result from infection with various agents, including viruses, bacteria, fungi, and parasites. (1)

1.2 Current epidemiological context

Knowledge and early appropriate diagnosis of these infections are a global public health issue. The World Health Organization estimates that 1 million people are infected every day worldwide, and that 375 million of these infections are caused by one of four curable sexually transmitted infections (STIs): chlamydia, gonorrhea, syphilis, and trichomoniasis (2). Other incurable viral infections include hepatitis B (HBV), human immunodeficiency virus (HIV), and human papillomavirus (HPV).
Despite the implementation of prevention and various technological advances, the number of cases of syphilis, gonorrhea, and chlamydia continues to rise, according to the European Center for Disease Prevention and Control (3,4).



Rates are calculated for countries with comprehensive STI surveillance that reported data for 2023.

Figure 1. European Centre for Disease Prevention and Control annual report of gonorrhea in 2018: *Distribution of confirmed gonorrhea cases per 100,000 population by country, EU/EAA*. (3)

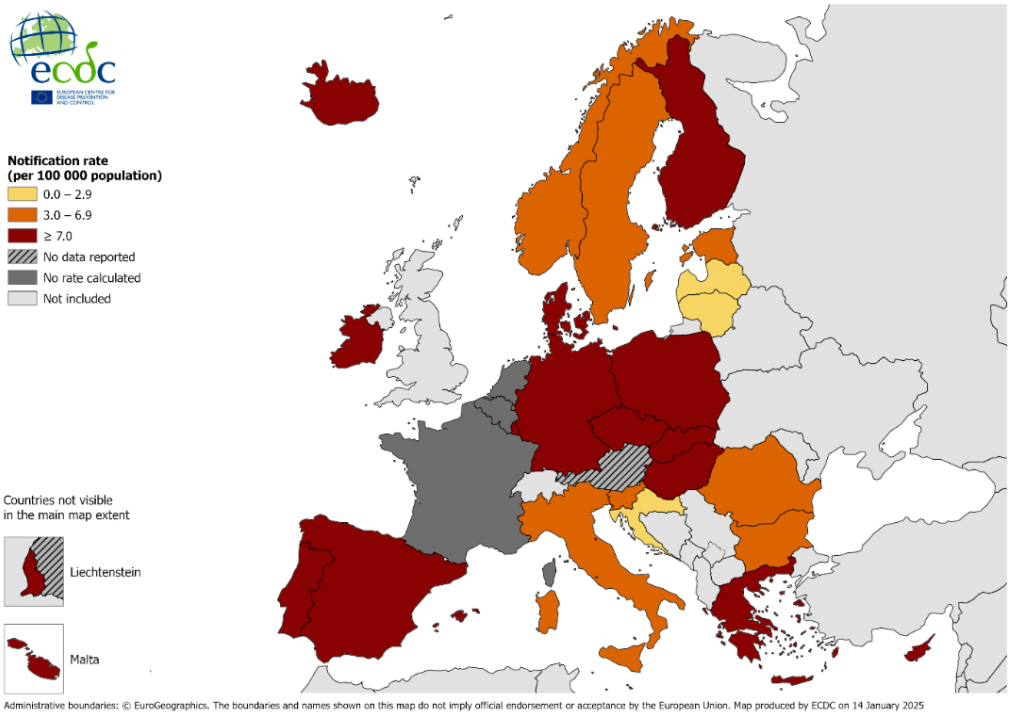


Figure 2. European Centre for Disease Prevention and Control annual report of syphilis in 2018: *Distribution of confirmed syphilis cases per 100,000 population by country, EU/EAA. (4)*

Spain, and more specifically the Community of Madrid, is experiencing a critical increase in this trend (5).

According to a study by Epidemiological Surveillance of Sexually Transmitted Infections in Spain conducted in 2023, gonorrhea and syphilis infections respectively increased by 42.6% and 24.1% from 2021 to 2023. The details of this same study place the Community of Madrid as an epicenter of infections, with between 56.69 and 165.30 cases per 100,000 inhabitants (3,4).

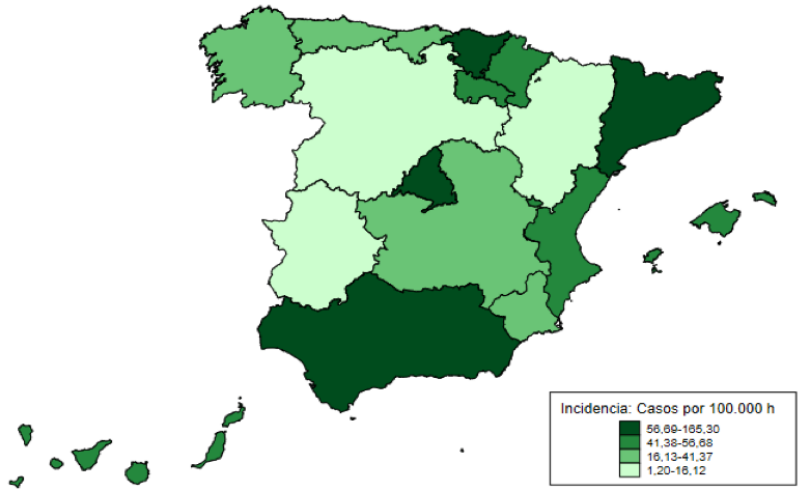


Figure 3. Incidence of gonorrhea infections in the Spanish community in 2023. Rates per 100,000 inhabitants. (3)

Although STIs are a global public health issue, certain populations in Spain are more affected. Young people aged 15-24 account 50% of new infections despite representing only 25% of the sexually active population, while, according to the Spanish Ministry of Health, the highest prevalence is observed among men aged 25-34 (5).

Changes in sexual behavior exacerbate this situation due to early access to social media from a young age. Unrestricted access to social media, online pornography, or dating platforms tends to promote and normalize risky sexual behaviors, thereby increasing exposure to pathogens, such as early debut or multiple sexual partners (6).

1.3 Oral manifestations of sexually transmitted infections

A study conducted in Grenada during the period from 2000 to 2018 showed a shift in trends and an increase in risky behavior. This study showed that since 2017, oral-genital sex has surpassed vaginal sex, which was previously the most common practice. This alarming behavioral pattern is further reinforced by the fact that oral sexual practices are mostly performed without consistent use of physical barriers, with over 95% of participants reporting

only occasional or no condom use (7). This exposes the oral mucosa to pathogens, thereby contributing to the resurgence of these infections.

In this context, the oral cavity emerges as a critical underestimated site in the transmission and dynamics of STIs. It acts as both a reservoir and a gateway, where exposure happens through direct contact between mucosal surfaces and infected body fluids (8).

The permeability of the oral mucosa further facilitates the inoculation and dissemination of a wide range of pathogens during oral sex practices. These mechanisms contribute to the diversity of oral manifestations associated with STIs, detailed in the following section.

1.3.1 Chlamydia

Chlamydia is a bacterial infection caused mainly by *Chlamydia trachomatis*, mainly transmitted during unprotected sex, infecting both the oral cavity and pharynx (9). Oral forms remain relatively rare, being asymptomatic in 95% of cases (10), and can even disappear spontaneously within a few weeks. When signs appear, they usually resemble trivial angina (sore throat, redness, swollen tonsils, fatigue), making clinical diagnosis difficult without a specific test (10–12).

1.3.2 Gonorrhea

Gonorrhea, caused by *Neisseria gonorrhoeae*, primarily affects moist, non-keratinized mucosa, including the oral cavity and pharynx, especially among sexually active people aged 15-35 (9). The pharyngeal form is often asymptomatic (up to 90% of cases (10)), thereby promoting its transmission. When present, symptoms are non-specific, such as sore throat, erythema, tonsillar swelling, or mild fever. Oral manifestations may include painful ulcers, gingivitis, tonsillar pustules, or glossodynia, but diagnosis requires biological testing (10–12). Although no specific vaccine is currently available, potential cross-protection from the meningococcal B vaccine has renewed interest in vaccine development and prompted new clinical trials (13).

1.3.3 HPV

Human papillomavirus (HPV) comprises over 200 viruses, with about 40 known to infect mucosal surfaces, especially the oral mucosa (12). It is transmitted mainly through direct mucous membrane contact — especially during oral-genital intercourse or deep kissing. Oral manifestations include several clinical forms: squamous papilloma, common wart, condyloma acuminata, and focal epithelial hyperplasia or Heck's disease (14,15).

These lesions are usually painless, often mimic normal mucosa, and require histological confirmation. Although most oral infections resolve spontaneously within two years, high-risk types such as HPV 16 and 18 are associated with oropharyngeal and oral cancers, especially in the presence of aggravating factors such as smoking or alcohol (12,16).
Literature shows that vaccination against HPV offers the best protection against an infection with oncogenic HPV subtypes (17,18); only 31.1% of the population is vaccinated against HPV at the age of 15 in Germany. In addition, a study based on STIs prevalence in Bern conducted on a total population of 5402 individuals highlights that a minority is vaccinated against HPV, with only 11.1% being men (19).

1.3.4 Herpes

Herpes is caused by the herpes simplex virus, with HSV-1 mainly responsible for oral lesions, and HSV-2 usually associated with genital forms but occasionally reaching the mouth (14,15). Most infections are asymptomatic, which promotes transmission, and a large part of the world's population has already been exposed to HSV-1 (14). The initial infection can cause herpes gingivostomatitis with fever and multiple painful vesicles that rupture and form ulcers on the lips, palate, or gums. Although lesions heal within one to two weeks, the latent infection can reactivate under stress or immunosuppression, leading to recurrent cold sores (10). While no vaccine or cure exists, antivirals can reduce the duration and intensity of flare-ups (15).

1.3.5 HIV

HIV (human immunodeficiency virus) is a chronic infection that weakens the immune system, making the body more vulnerable to infections and certain cancers. It is mainly transmitted through blood, sexual fluids, or vertically. Oral lesions are highly significant, affecting 50% of HIV infected patients and up to 80% of AIDS cases (20). Key indicators of immunodepression include oral candidiasis, hairy leukoplakia, Kaposi sarcoma, and particularly aggressive periodontal diseases (21). These oral lesions significantly impact patients' quality of life, as they can interfere with feeding, speech, and oral hygiene, and their early management is essential to reduce morbidity and mortality (20).

1.3.6 Hepatitis

Hepatitis refers to liver inflammation, most often viral (A-E), with hepatitis B and C transmitted through blood or sexual contact. Oral manifestations may reflect hepatic and immune disorders, including mucosal jaundice, gingival bleeding, petechiae, xerostomia, and lichenoid lesions, particularly in hepatitis C (14). Prevention relies on vaccination (particularly against hepatitis B (22)), hygiene, and reducing the exposure risks, while antiviral treatments can control or even cure certain forms. In a study conducted in Bern, nearly 60% of the population is vaccinated against hepatitis B (19).

1.3.7 Syphilis

Known as “the great imitator” (23,24), this infection caused by *Treponema Pallidum* is transmitted through sexual contact, via blood, or from mother-to-child transmission. It can evolve into four stages: primary, secondary, latent, and tertiary, each with specific clinical and oral manifestations.

1.3.7.1 Primary syphilis

Characterized by a syphilitic chancre, a painless, hardened ulceration at the site of inoculation (23,25). Early detection is difficult due to the asymptomatic nature; the patient may ignore the lesion. Only 30-40% of primary syphilis cases are diagnosed due to the condition being asymptomatic (23). In the mouth, 4-12% of chancres typically develop on the lips, tongue, or palate (23).

1.3.7.2 Secondary syphilis

Systemic stage resulting from the hematogenous dissemination. About 30% of patients present “snail-track” mucosal lesions (greyish with erythematous halo) (23) mostly on the tongue or palate (26), often accompanied by skin manifestations (maculopapular eruption) on the palms and soles (27).

1.3.7.3 Latent syphilis

Persistent asymptomatic phase with no visible oral symptoms. Diagnosis is based only on serological screening (28).

1.3.7.4 Tertiary syphilis

Characterized by syphilitic gums called "*gummas*" (granulomatous necrotic lesions), which can affect the palate or the tongue (26). This stage may also cause neurological damage, called neurosyphilis (27).

1.3.7.5 Congenital syphilis

Transmitted from the infected mother to the fetus. The classic Hutchinson triad includes notched incisors or mulberry molars (supernumerary cusps), interstitial keratitis, and sensorineural hearing loss (26,27).

1.4 Role of the dentist and justification

The major challenge in diagnosing STIs lies in their often-silent progression. Patients unaware of their infection unknowingly perpetuate the chain of transmission. If left undetected, STIs can lead to serious complications, including cancer, infertility, or death. Faced with rising incidence rates, conventional prevention measures, vaccination, screening programs, and contraception are reaching their limits.

This is where the dentist's role becomes crucial. As a frontline practitioner, the dentist is uniquely positioned to detect oral manifestations that often appear before any genital or systemic symptoms, and to refer patients for early, specialized care. However, for such screening to be effective, practitioners must be adequately trained and confident in addressing this sensitive subject with their patients.

In the specific context of Madrid as an epicenter (5), it is therefore essential to examine whether a gap exists between the theoretical role and the actual clinical practice. This study was conducted to assess the knowledge, attitudes, and practices of dentists in Madrid regarding the oral manifestations of STIs, to identify training gaps and strengthen their contribution to public health strategies.

2. OBJETIVES

Primary objective

To assess the level of theoretical knowledge, predominant attitudes, and clinical practices of dental surgeons in Madrid regarding the detection and management of oral manifestations of sexually transmitted infections (STIs).

Secondary objectives

To evaluate the level of knowledge regarding STI transmission routes and preventive measures, comparing general dentists with specialists, considering the influence of their professional experience and years of practice.

To analyze the frequency of routine mucosal examinations, the prevalence of STI diagnoses, their perceptions of the importance of their role in screening, and practitioners' comfort levels.

To gather dentists' opinions on the quality of their initial university training regarding STIs to identify the demand for continuing education and additional pedagogical resources.

3. MATERIAL AND METHODS

3.1 Type and design of the study

This study is classified as empirical research, including experimental, observational, and descriptive studies. It relies on primary data obtained directly through the questionnaire of dentists of Madrid **(ANNEXE 1),** complemented by scientific articles and research to provide context and discuss the findings. Specifically, the study adopts an observational and descriptive design, as it aims to observe and describe the current level of knowledge, attitudes, and clinical practices of dentists regarding the detection and management of oral manifestations of sexually transmitted infections (STIs) based on the data provided by the survey form, without manipulating any variables. Furthermore, it follows a cross-sectional approach, meaning that data were collected from each participant at a single specific point in time, without any subsequent follow-up.

3.2 Sample size

In a total population of 9,515 registered dentists in the Community of Madrid (COEM), the required sample size was calculated considering a confidence interval of 95%, a margin of error of 5%, and a response distribution of 50%. The resulting ideal sample size is 370 participants.

3.3 Inclusion and exclusion criteria

- **Inclusion:** Qualified dentists, currently practicing in the Community of Madrid, who have accepted informed consent.
- **Exclusion:** Dental students (not graduated), incomplete or illegible questionnaires, non-consented, dentists practicing in another municipality.

3.4 Interaction

No clinical intervention was performed as this is an observational study.

3.5 Method of data collection & Ethical issues

To achieve the study objectives, a structured and anonymous questionnaire **(ANNEX 1)** was designed for this research.

The first page of the survey includes informed consent that explains the voluntary nature of their participation, their right to withdraw from the study at any time, and the guarantee of anonymity.

The remaining questions have been formulated to address the study's objective. It consists of 18 items using different question types to maximize response accuracy: multiple-choice, dichotomous, short open-ended questions, Likert-type scale, and visual clinical cases.

The structure of the questionnaire is made up of five different thematic blocks:

A. Socio-demographic and professional profile (Q1-6): Obtain consent and collect data on participants such as age, field of practice, and years of professional experience.

B. Attitude and Practice (Q7-11): Evaluates the perceived role of dentists in screening, frequency of examination for signs, history of diagnosis, if it exists, and level of confidence addressing the subject.

C. Theoretical knowledge (Q12-16): Assess general knowledge about STIs, their prevalence, transmission routes, prevention methods, and the participant's perception of their own education level.

D. Training and Educational Resources (Q17-19): Analyzes the self-assessment of the current level of training of dentists, the perception of the need for additional educational resources, and the type of training desired.

E. Self-criticism (Q20): About dentists' awareness after completing the survey.

The survey was created in Spanish using Google Forms to facilitate distribution and data collection. Data collection was carried out from 27th January 2026 to 1st March 2026. The link was shared through a QR code; approximately 60 professionals were contacted directly. The link was also shared by faculty members in professional groups and through the academic portal to broaden its reach.

3.6 Approvals required

The department has validated the questionnaire; the approbation code is OD.057/2526.

3.7 Scientific research

A literature search was conducted using the Biblioteca CRAI Dulce Chacón, including PubMed and MEDLINE. Additional sources included official websites such as the Spanish Ministry of Health and the National Statistics Institute (INE). Studies conducted on animals were excluded, and only articles published within the last 10 years were considered, except for those of high relevance for the interpretation of the findings. The advanced search used in these databases was as follows:

((“Sexually transmitted infection” OR “sexually transmitted disease” OR “STI” OR “STD”) AND (“oral health”) AND (“oral manifestation”) AND (“relationship with oral cavity”) AND (“oral sex”) AND (“oral screening”) NOT (“animals”))

Additional focused searches were performed to explore specific hypotheses raised by the findings, about “sexual behavior”, “social media”, “communication”, “knowledge translation”, “evidence-based dentistry”, “guidelines”, “protocols”, and “recommendations”.

4. RESULTS

4.1 Study population and participants Flow (Flow Chart)

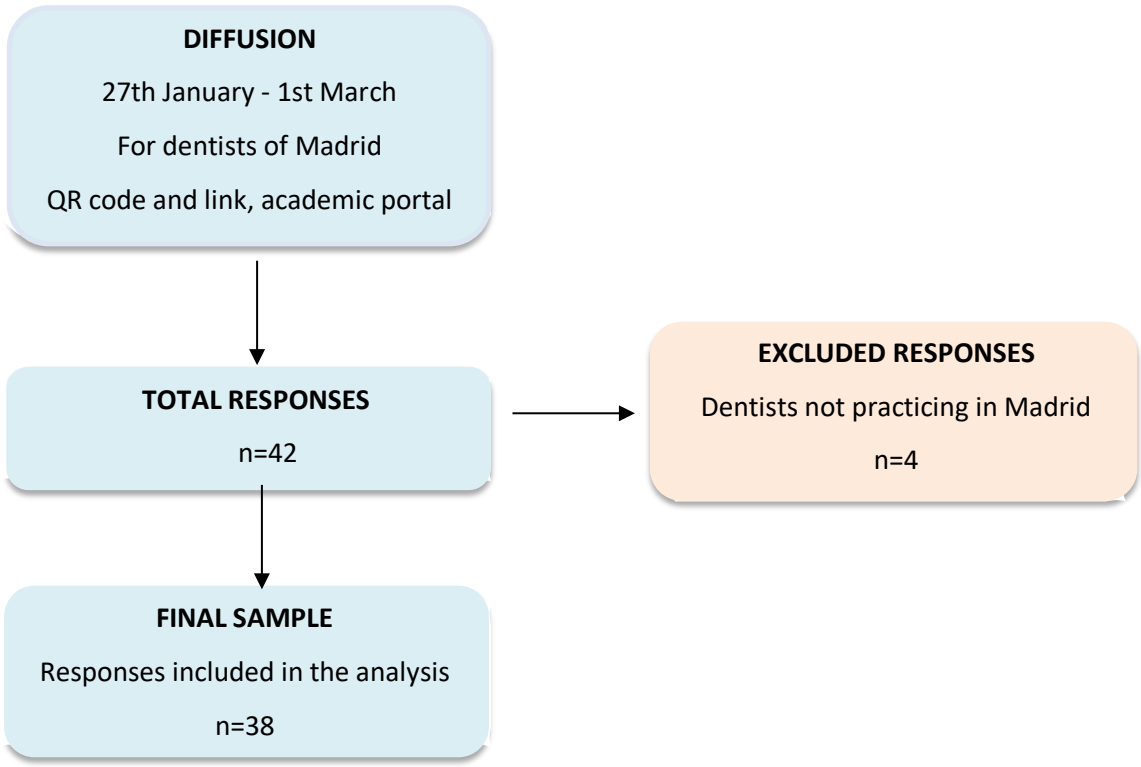


Figure 4. Flow chart: sample of the study detailed

The survey was distributed via three channels: direct contact with approximately 60 professionals, faculty-shared professional groups, and the academic portal. The total number of potential participants reached through the latter two channels could not be determined. A total of 41 responses were received, of which 4 were excluded for practicing outside the Community of Madrid, yielding a final sample of n=38. (Figure 4) (Refers to ANNEXE 1)

4.2 Socio-demographic and professional profile

Parameter	Propositions	Frequencies (n)	Percentages (%)
Age of participants	Between 20-30 years old	2	5,3%
	Between 30-40 years old	14	36,8%
	Between 40-50 years old	17	44,7%
	More than 50 years old	5	13,2%
Field of practice	Oral Surgery	12	31,6%

	General Dentistry	12	31,6%
	Prosthodontics	9	23,7%
	Pediatric Dentistry	9	23,7%
	Orthodontics	9	23,7%
	Endodontics	8	21,1%
	Periodontics	7	18,4%
	Restorative Dentistry	3	7,9%
	Other	2	5,3%
University of Graduation	Universidad Europea (UE)	13	34,2%
	Universidad Complutense de Madrid (UCM)	11	28,9%
	Universidad Alfonso X el Sabio (UAX)	8	21,1%
	Other institutions*	6	15,8%
	**Other institutions: URG, Zaragoza, CEU san Pablo, UAH, URJC*		
Years of experience	1-5	3	7,9%
	6-10	8	21,1%
	11-15	6	15,8%
	16-20	8	21,1%
	More than 20 years	13	34,2%

Table 1. Socio-demographic and professional characteristics of dentists practicing in the Community of Madrid (n=38)

Participants (n=38) were mostly aged 40-50 (44,7%) with over 20 years of experience. Oral Surgery and General Dentistry were the main fields (n=12 each), with degrees mostly from UE and UCM. (Table 1)

4.3 Attitude and Practice

A clear gap was observed between the perceived importance of STIs screening (55.3% rated 5/5) and its systematic application in practice (13.2% reported always assessing STI signs). (Figure 5).

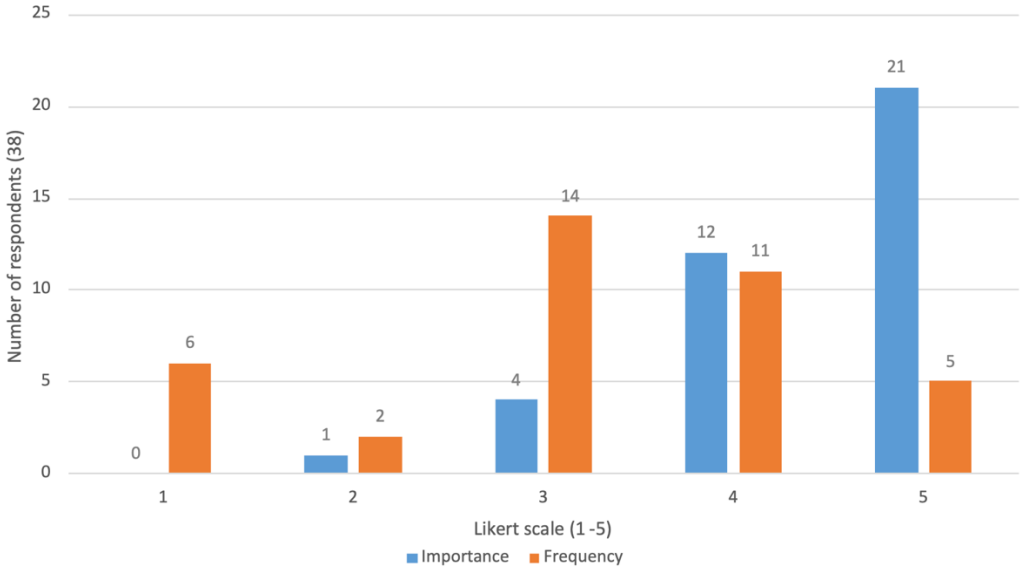


Figure 5. Importance of dentists in STI diagnosis and frequency of assessment of STI signs during consultations (Importance in orange: 1=unnecessary, 5=essential) (Frequency in blue: 1=never, 5=every time).

50%, n=19 reported having previously diagnosed a sexually transmitted infection, the other half reported no prior experience with such cases.

Example of cases reported by participants as diagnosed lesions or infections, without further interpretation:

- Diagnosis of papilloma. In some cases, patients were referred to a dermatologist when the lesion was reported to be in the pharynx. Other referrals included social services or maxillofacial specialists. Diagnostic confirmation was reported to be performed through biopsy, and treatment consisted of surgical excision.
- 3-4 patients with very recurrent herpes, bad habits, and smokers. Referred directly to the hospital or a specialist in oral medicine.
- Herpes type 1 could be non-sexual.
- Oral candidiasis, but unclear if due to sexual transmission; Resorbina (oral antifungal) was prescribed.
- Tertiary syphilis, lingual lesion, specific diagnostic test. Mantoux. Antibiotic treatment.
- Gonorrhea, a white lesion on the tongue, and antibiotic treatment.
- Kaposi's sarcoma. Red-purple lesions on the palate. Biopsy. Antiretrovirals.
- Observed a lateral hairy leukoplakia on the tongue and recommended HIV testing, coming back positive a few weeks later.

Most participants reported a mid-to-high confidence level in discussing STIs with patients, with 76.4% scoring 3 or above. (Figure 6)

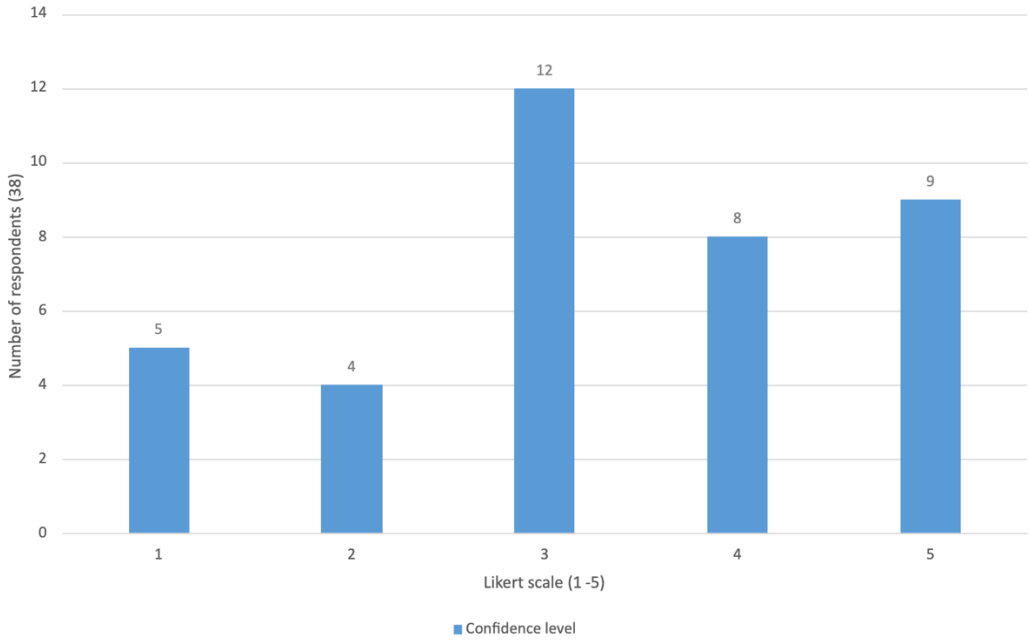


Figure 6. Level of confidence among dentists in discussing sexually transmitted infections with their patients (1 = not confident, 5 = very confident)

4.4 Theoretical knowledge

Most participants reported being able to name 3 to 4 oral STIs (n=20). (Figure 7)

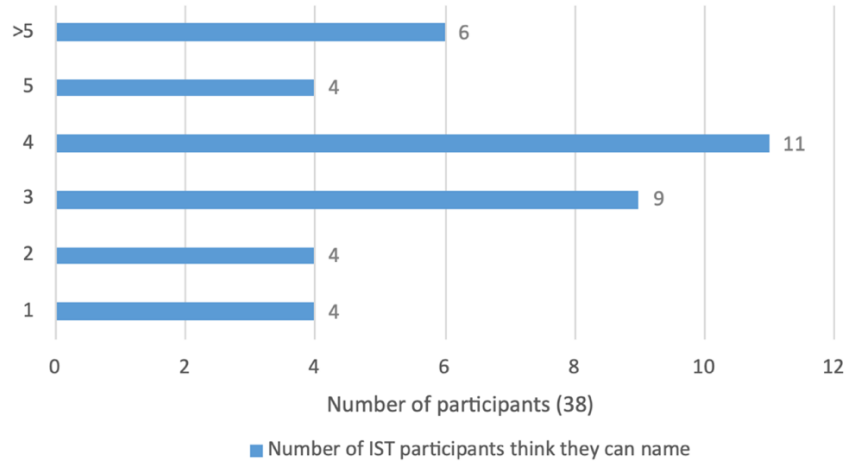


Figure 7. Participants' self-reported capacity to name oral STIs (n=38).

Syphilis, herpes, and HPV were the most frequently cited infections (89.5%, 71.1%, and 71.1%, respectively), while chlamydia was notably underrecognized (18.4%). Some responses included non-STIs. (Table 2)

STIs	Frequencies (n)	Percentages (%)
Syphilis	34	89,5%
Herpes	27	71,1%
HPV	27	71,1%
HIV	22	57,9%
Gonorrhea	17	44,7%
Chlamydia	7	18,4%
Candidiasis	5	13,2%
Condyloma	2	5,3%
Molluscum contagiosum	2	5,3%
Infectious mononucleosis	1	2,6%
Muguet	1	2,6%
Lupus	1	2,6%
Hepatitis	1	2,6%

Table 2. Participants were asked to name the sexually transmitted infections that can manifest orally.

Herpes and HPV were considered the most prevalent oral STIs by most participants. (Figure 8)

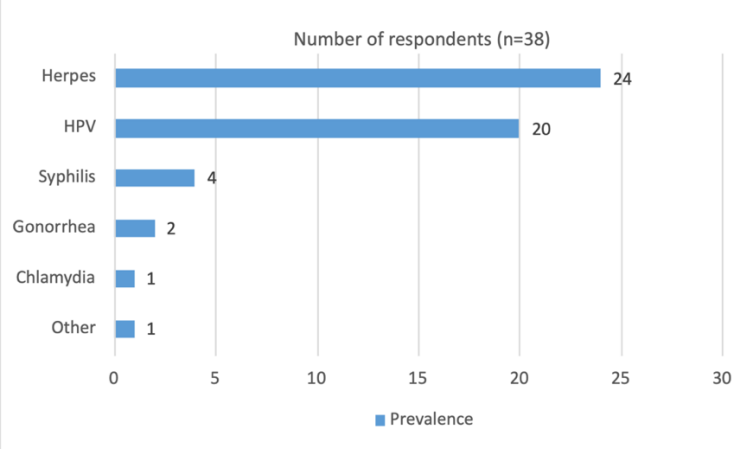


Figure 8. Identification of the most prevalent oral STI according to participants' professional opinion (n=38).

Most participants reported oral-genital practices (36; 94,7%), followed by oral-oral (12; 31,6%), oral-anal (6; 15,8%), and other practices (1; 2,6%). Multiple responses were allowed. (Figure 9)

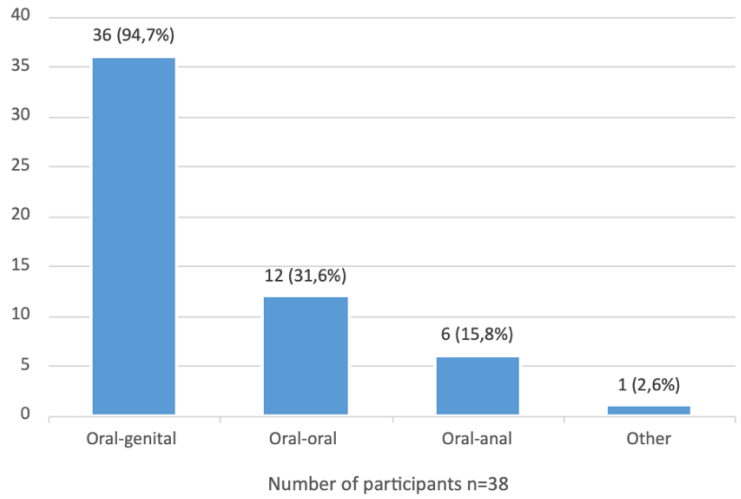


Figure 9. Distribution of perceived transmission routes for STIs affecting oral health (n=38)

The responses were grouped into six categories. Barrier methods dominated responses (81.6%), while screening and vaccination were poorly identified as prevention strategies (18.4% each) (Table 3).

Category of responses	Frequencies (n)	Percentages (%)	Examples of responses (Original Spanish)
Barrier methods	31	81,6%	*Preservativos, condón, métodos de barrera, láminas de látex para sexo oral, protección.*
Regular screening & testing	7	18,4%	*Análisis con la persona antes de tenerlas, revisiones, observación y control periódicos/en caso de sospecha.*
Vaccination	7	18,4%	*Vacunas, vacunación (VPH, hepatitis B).*
Behavioral measures & education	10	26,3%	*Abstinencia, educación sexual, pareja estable, evitar momentos contagiosos, conocer que enfermedades pueden llegar por la boca, evitar conductas de riesgos, no ser promiscuo.*
Hygiene	5	13,1%	*Higiene, buena higiene oral.*
Incorrect/Irrelevant	6	15,8%	*Sífilis gonorrea, utilizar precauciones,*

			prevención, ninguna, sin responder.

Table 3. Categories of STI prevention strategies mentioned by participants (n=38)
Note: Percentages do not total 100% because participants could provide multiple responses. Categorization is based on the thematic analysis of open-ended answers.

4.5 Training and Educational Resources

Ratings of personal knowledge assessment were predominantly low to neutral: 52.6% (n=20) selected scores 1–2 and 42.1% (n=16) selected score 3. Only 5.3% (n=2) rated training as 4, and no participant selected the highest score (5) (Figure 10).

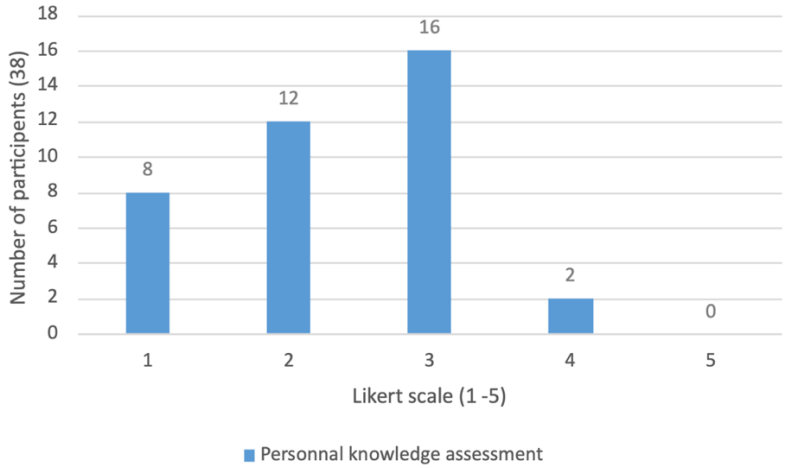


Figure 10. Participants' assessment of the adequacy of their professional education regarding STIs.

Most respondents (89%, n=34) indicated that additional educational resources on this topic are needed, while 11% (n=4) reported that they are not (Figure 11).

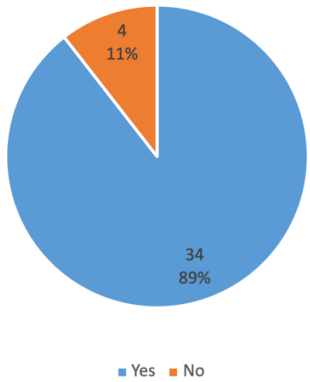


Figure 11. Participants' perception of need for additional educational resources

As some participants mentioned more than one type of resource, the percentage may exceed 100%. Continuing education courses were the most requested resource (43.3%), including

mandatory training, short in-person or online courses. This was followed by seminars and professional talks (36.7%), awareness and communication tools (26.7%), and educational and clinical resources such as image libraries and updated guidelines (20%). A minority highlighted the need for improved undergraduate education (16.7%). (Figure 12)

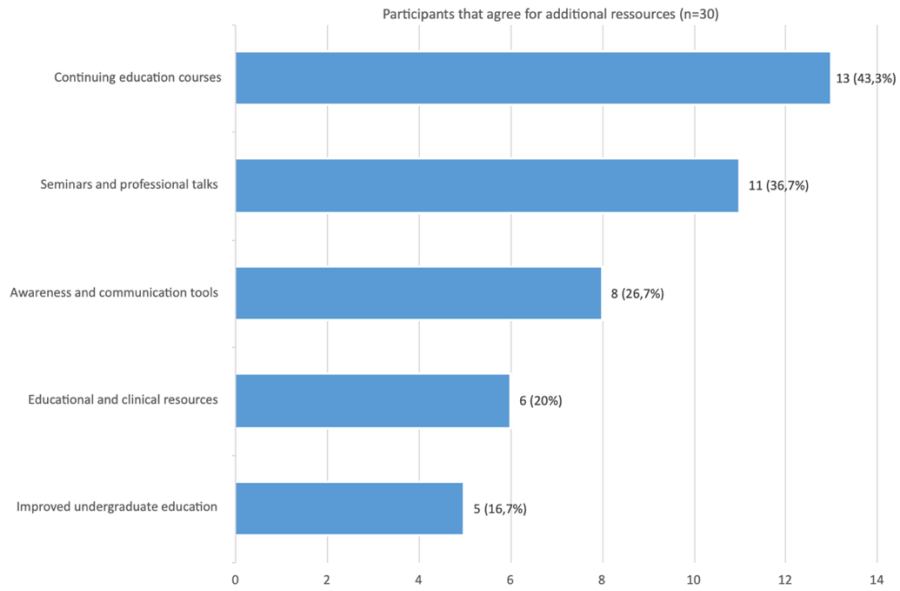


Figure 12. Types of educational resources suggested by participants to improve dentists' knowledge of sexually transmitted infections (n=30).

4.6 Self-criticism

Participants were asked whether completing the questionnaire increased their awareness of the dentist's role in diagnosing sexually transmitted infections.

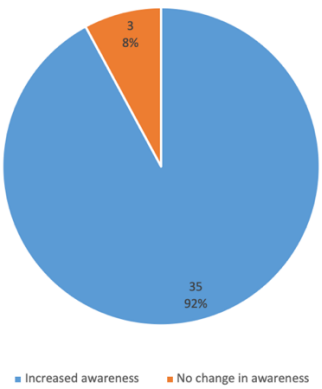


Figure 13. Impact of the questionnaire on awareness of the dentist's role in the diagnosis of STIs.

Most participants reported an increased awareness (92%, n=35), while 8% (n=3) indicated no change in awareness (Figure 13).

5. DISCUSION

5.1. Demographic and professional characteristics of the sample

In Spain, the WHO recommends a ratio of one dentist per 3,500 inhabitants; however, by 2024, the actual ratio is approximately one dentist per 755 inhabitants (29).

Despite this high level of coverage, the Community of Madrid is identified as one of the main epicenters of the resurgence of sexually transmitted infections (STIs) in Spain (5).

In this context, the present study enables the formulation of hypotheses regarding the importance of dentists' training and their involvement in STI screening. The implications of which may extend beyond the regional level and could be further explored at the national scale through additional studies.

The final sample analyzed consists of 38 dentists practicing in the Community of Madrid, encompassing all specialties and different generations of practitioners. The majority of respondents are over 30 years old and, for the most part, have more than 15 years of clinical experience.

5.2 Influence of specialty and experience on STIs screening practices

The diversity of specialties represented among the respondents indicates that attitudes toward STI diagnosis are not uniform across the profession. Some disciplines, by the nature of their clinical practice, are more aware of suggestive symptoms—such as oral surgery compared to orthodontics.

We could suggest that screening is directed solely at high-risk groups, thereby automatically excluding older people or those in stable relationships.

The prosthodontists who took part in the study show the opposite trend. Indeed, all nine specialists, treating the older population predominantly, attach great importance to screening for potential STIs (average 4.7/5), indicating that professional awareness can counteract this bias. As highlighted in the study of Afrashtehfar et al., only 14% of new recommendations are applied in practice, and this change of practical behavior takes 17 to 20 years to assimilate (30). This aligns with the observation that the frequency of STI screening, communication skills, and professional confidence increases progressively with practitioners' age.

5.3 Knowledge and misconceptions among dental practitioners

The sample profile suggests that a significant proportion of them have likely encountered sexually transmitted infections during their professional practice. However, only 50% of

respondents reported having diagnosed an STI at some point in their career, while the other half never had.

As a justification, many of these infections present oral manifestations that are discrete, asymptomatic, or transient. For instance, a syphilitic chancre typically resolves spontaneously within two to three weeks, and a herpetic lesion generally disappears within one to two weeks. Consequently, the short duration of these manifestations reduces the likelihood that a dental consultation coincides with a clinically detectable phase.

Nevertheless, knowledge of herpes and the human papillomavirus (HPV) proved to be well-established and well-understood, featuring among the most frequently cited topics throughout the questionnaire. This can be explained by the increased visibility of these infections on social media, as well as the implementation of vaccination campaigns. The study of Jo et al. has shown that individuals using social media demonstrate higher awareness of HPV and hepatitis C (31).

In contrast, syphilis, known as “the great imitator” (23,24), which presents with early symptoms in the mouth, was cited less frequently. In the absence of targeted training, diagnostic confusion may further contribute to under recognition; some non-infectious conditions, such as lupus and pyorrhea, were incorrectly cited as STIs. This interpretation is supported by Medeiros et al. study, where 83% of respondents found their knowledge of syphilis to be partially adequate or inadequate, aligning with other research on healthcare professionals’ understanding of STIs like HPV and HIV globally (32).

5.4 The Knowledge-Practice Gap: barriers and demand for practical resources

The high level of awareness observed reflects a strong acknowledgment of the importance of STI screening within dental practice, but this recognition is not consistently translated into clinical behavior. This, with the implementation of literature, highlights a clear dissociation between the dentists’ ideal role in STI screening, current recommendations, and their actual implementation in clinical practice (30,33).

The moderate level of ease reported in discussing STIs with patients (mean score: 3.32/5) suggests that such conversations tend to be avoided, potentially limiting diagnostic vigilance, and reducing opportunities for early detection, a tendency also exposed in Medeiros et al’s study (32).

However, Ho et al. study confirms that dentists who prioritize communication are more likely to achieve positive outcomes (34). This being underscored by Frustino et al which proves that

75% of the patient that received proper recommendations are more likely to initiate HPV vaccine for their child (33).

Although guidelines exist, they are not adequately implemented. Notably, among non-diagnosing practitioners, 8 out of 19 rated the importance of screening as 5/5, highlighting a disconnect between awareness and clinical action. This pattern illustrates the classical structure of “Knowledge Practice Gap”: awareness alone does not necessarily induce clinical action, as described by Medeiros et al. study (32).

As shown by Cabana et al., barriers such as lack of awareness, familiarity, and inertia of previous practice hinder guideline adoption (35). Consistently, Medeiros et al. report a global demand for improved knowledge translation into clinical practice. In line with this study, 89.5% of respondents expressed the need for additional educational resources, favoring practical, directly applicable tools. These findings point to a structural limitation in dental education that extends beyond the Madrid context and reflects a broader global issue (30,32–35). Interestingly, 92% of respondents reported that completing the questionnaire itself heightened their awareness of the topic, suggesting that even brief educational interventions may be sufficient to reactivate clinical vigilance.

5.5 Study limitations and research perspectives

The interpretation of these results must be nuanced by several limitations.

In the absence of tests based on photographic clinical vignettes, the reported diagnostic competencies rely on subjective perception. This may lead to an overestimation of real diagnostic abilities.

Furthermore, younger dentists are poorly represented in the sample, although they are likely to have benefited from more recent epidemiological data and educational resources.

Finally, while the study identifies a pressing need for resources (89% of respondents), it does not measure the effectiveness of the proposed solutions (30).

The implementation and prospective evaluation of a targeted training module would constitute a crucial step. Measuring the effective change in clinical behaviors at 6 and 12 months would allow the scientific validation of the relevance of the recommendations arising from this work.

6. CONCLUSIONS

This study assessed the level of theoretical knowledge, predominant attitudes, and clinical practices of dental surgeons in Madrid regarding the detection and management of oral manifestations of sexually transmitted infections (STIs). A clear knowledge-practice gap was identified across all specialties and generations: while most participants acknowledged the importance of STI screening in dental practice, this awareness was not consistently translated into clinical behavior, with only a minority reporting systematic assessment of STI signs during consultations.

Knowledge of STIs transmission routes was generally adequate, with oral-genital contact firmly established as the primary vector. However, discrepancies were observed between general dentists and specialists, suggesting that professional confidence plays a significant role in overcoming barriers to STI-related practice.

Regarding the prevalence of STI diagnoses, half of the participants reported having diagnosed at least one STI during their career, with papilloma, syphilis, and Kaposi sarcoma being the most frequently cited. Most participants reported a mid-to-high confidence level in discussing STIs with patients, while recognizing that this comfort is not always reflected in systematic clinical vigilance.

Dentists collectively rated their undergraduate preparation as insufficient, with a mean score of 2.32 out of five, and no participants attributed the highest score. Nearly 90% expressed a demand for additional educational resources, favoring practical and immediately applicable tools over theoretical content, highlighting a structural gap in dental education that calls for urgent attention.

7. SUSTAINABILITY

7.1 Environmental sustainability

Early recognition rationalizes healthcare resources by reducing unnecessary diagnostic tests and repeated consultations, thereby lowering the cumulative carbon footprint of the patient's journey.

7.2 Economic sustainability

Dental professionals act as cost-effective gatekeepers, preventing the progression of STIs toward chronic complications that impose a heavy financial burden on public health systems.

7.3 Social sustainability

Improving clinical communication reduces stigma and encourages early healthcare-seeking. This strengthens social well-being and improves patient outcomes through timely intervention.

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9. ANNEXES

ANNEX 1 : Survey published for Dentists from Madrid about Sexually Transmitted Infections and their relation with oral cavity.

Infecciones de transmisión sexual y su relación con la cavidad bucal

Infecciones de transmisión sexual y su relación con la cavidad bucal. Una encuesta a dentistas de Madrid.

Explicación del proyecto:
Hola, me gustaría invitarte a participar en el siguiente cuestionario sobre «Las infecciones de transmisión sexual y su relación con la cavidad bucal. Una encuesta a dentistas de Madrid» para mi Trabajo de Fin de Grado bajo la supervisión del Dr. Jaime Durán Somacarrera.

El objetivo de esta encuesta es recopilar, analizar y evaluar los conocimientos básicos sobre las infecciones de transmisión sexual y su relación con la cavidad bucal en los odontólogos de Madrid, concretamente en la Facultad de Odontología de la Universidad Europea de Madrid. Asimismo, se pretende poner de relieve la posible necesidad de impartir seminarios o cursos educativos sobre el conocimiento y el diagnóstico de las infecciones de transmisión sexual (ITS) en los estudios de grado.

Se le presentará un cuestionario con 15 infecciones de transmisión sexual y su relación con la cavidad bucal, preguntas relacionadas, algunas de ellas de sí/no y otras de escala o preguntas abiertas muy breves (1 o 2 palabras). Esta encuesta es voluntaria, pero se recomienda su participación para la evaluación de los conocimientos en la Facultad de la Universidad. Además, cualquier información que se recopile se tratará de forma privada y no se utilizará para ningún otro fin que no sea el mencionado anteriormente y específico de la investigación. Los datos personales recopilados serán tratados de conformidad con lo dispuesto en la Ley Orgánica 3/2018, de 5 de diciembre, de Protección de Datos y Garantía de los Derechos Digitales. La base de datos de identificación estará encriptada con una contraseña y será custodiada por el investigador principal.

Si tiene alguna duda o consulta sobre esta investigación, puede ponerse en contacto conmigo en cualquier momento en la siguiente dirección de correo electrónico: 22004671@live.uem.es o JAIME.DURAN@universidadeuropea.es
Tenga en cuenta que si desea dejar de participar en el estudio, independientemente de la fase en la que se encuentre, puede hacerlo sin

1. Acepto participar voluntariamente en esta investigación. Se me ha informado sobre los objetivos del estudio y se me ha explicado lo que implica mi participación. Reconozco que la información que proporcione durante esta investigación es estrictamente confidencial y no se utilizará para ningún otro fin que no sea el de este estudio sin mi consentimiento. Se me ha informado de que puedo hacer preguntas sobre el proyecto en cualquier momento y que puedo retirarme de él cuando lo desee, sin que ello suponga ningún perjuicio para mí. *

   - ◯ Sí, acepto participar en el estudio.
   - ◯ No, no acepto participar en el estudio.

2. ¿Trabaja usted en Madrid? *

   - ◯ Sí, trabajo en Madrid
   - ◯ No trabajo en Madrid

3. ¿Cuántos años tienes? *

   - ◯ Entre 20 y 30
   - ◯ Entre 30 and 40
   - ◯ Entre 40 y 50
   - ◯ Más de 50 años

4. ¿Cuál es su principal área de práctica o especialidad? *

- [ ] Odontología general
- [ ] Odontología restauradora
- [ ] Cirugía oral
- [ ] Periodoncia
- [ ] Prostodoncia
- [ ] Endodoncia
- [ ] Odontopediatría
- [ ] Ortodoncia
- [ ] Otro

5. Indique el nombre de la institución en la que obtuvo su título de odontología. *

6. ¿Cuántos años lleva trabajando como dentista, aproximadamente? *

- ◯ 1-5
- ◯ 6-10
- ◯ 11-15
- ◯ 16-20
- ◯ Más de 20 años

7. ¿Qué importancia tendría el odontólogo en la detección de infecciones? *

0 Completamente innecesario / 5 Esencial

1	2	3	4	5

8. ¿Con qué frecuencia examina a sus pacientes en busca de signos de posibles ITS durante sus consultas? *

0 Nunca / 5 Siempre

1	2	3	4	5

9. ¿Alguna vez ha diagnosticado una infección de transmisión sexual? *

- ◯ Sí
- ◯ No

10. En caso afirmativo, ¿podría describir brevemente el caso (nombre de la infección, manifestación, pruebas realizadas, tratamiento)? *

11. ¿Qué opina sobre abordar el tema con sus pacientes? *

0 Incomodidad / Cómoda

1	2	3	4	5

12. ¿Cuántas infecciones de transmisión sexual que pueden manifestarse oralmente puedes nombrar? *

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5
- ◯ +5

13. Por favor, nómbrelos. *

14. ¿Qué ITS crees que es la más prevalente por vía oral? *

- [ ] Herpes
- [ ] VPH (Virus del Papiloma Humano)
- [ ] Gonorrea
- [ ] Otro
- [ ] Sífilis
- [ ] Clamidia

15. En su opinión, ¿cuáles son las principales vías de transmisión de las ITS que pueden afectar a la salud bucodental? *

- [ ] Otro
- [ ] Oro-anal
- [ ] Oral-oral
- [ ] Oro-genital

16. Nombra las diferentes opciones que conoces y que puedes proponer a tu paciente para prevenir la transmisión de ITS. *

17. En su opinión, ¿cómo calificaría el nivel de formación de los dentistas en lo que respecta al diagnóstico de infecciones de transmisión sexual? *

0 Desinformados / 5 Informados

1	2	3	4	5

18. En su opinión, ¿cree que debería haber más recursos educativos sobre este tema? *

- ◯ Sí
- ◯ No

19. Si crees que sí, ¿de qué tipo?

20. ¿Este cuestionario le hace cuestionarse a sí mismo, tomar conciencia de la importancia de nuestra profesión en el diagnóstico de las infecciones de transmisión sexual y su relación con la salud bucodental? *

- ◯ Sí
- ◯ No

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