Public Health Nursing

WILEY

PHN PUBLIC HEALTH NURSING

POPULATION STUDY

Sexual Behavior and Sexually Transmitted Infections: Case Management in a Specialized Center 2000–2018

Cristina Guerra-Marmolejo[1] | Beatriz Espadafor-López[2] | Adelina Martín-Salvador[3] | María Gázquez-López[4] | María Adelaida Álvarez-Serrano[4] | César Hueso-Montoro[5,6,7] | María Ángeles Pérez-Morente[3]

[1]Faculty of Health Sciences, University of Málaga, Málaga, Spain | [2]Dermatology Department, Hospital Universitario Virgen de las Nieves, Granada, Spain | [3]Faculty of Health Sciences, University of Granada, Granada, Spain | [4]Faculty of Health Sciences, University of Granada, Ceuta, Spain | [5]Faculty of Health Sciences, University of Jaén, Jaén, Spain | [6]Instituto de Investigación Biosanitario de Granada (ibs.Granada), Granada, Spain | [7]Centro de Investigación Mente, Cerebro y Comportamiento (CIMCYC), Granada, Spain

Correspondence: Adelina Martín-Salvador (ademartin@ugr.es)

Received: 9 August 2024 | **Revised:** 19 February 2025 | **Accepted:** 10 March 2025

Funding: The authors received no specific funding for this work.

Keywords: anal sex | community health nursing | condoms | sexual behavior | sexually transmitted diseases | unsafe sex

ABSTRACT

Background: There is a notable increase in sexual behaviors closely related to the increased risk of sexually transmitted infections, which is a problem that affects public health. The aim of this study was to analyze the relationship between sexual behaviors and the prevalence of sexually transmitted infections in the population who attended the Centre for Sexually Transmitted Diseases and Sexual Orientation of the province of Granada during the period 2000–2018.

Methods: This is a cross-sectional study, with 1671 clinical histories of subjects who attended a specialized center between 2000 and 2018 for a consultation related to sexually transmitted infections. Sociodemographic and clinical data, frequency and type of sexual behavior, frequency of condom use, and positive or negative diagnosis of infection were collected. Univariate, bivariate, and multivariate analyses were performed. The dependent variable was the diagnosis of sexually transmitted infections. As independent variables, variables classified as socio-demographic, medical, and other variables conceived as possible risk factors were collected.

Results: The results indicated that vaginal intercourse was the most frequent sexual activity during the entire period and that condom use was also the most common. Positive sexually transmitted infection diagnosis was related to anal sex: penis–anal (penetrative anal intercourse) ($p = 0.033$) and anal–penis (receptive anal intercourse) ($p = 0.001$). Multivariate analysis only showed association with receptive anal intercourse sexual behaviors.

Conclusions: The prevalence of sexually transmitted infections in the population attending a specialized center is related to the behavior of anal sex in passive subjects (receptive anal intercourse). An increase in oral sex behavior and almost no practice of use of condom in oral sex has been observed. There is a need to respond to sexual diversity and variability of sexual behavior.

1 | Introduction

Sexually transmitted infections (STIs) refer to pathogens that cause infections through sexual contact, whereas a sexually transmitted disease (STD) occurs when a recognizable disease has been caused by such an infection (Workowski et al. 2021). STIs are caused by three main types of pathogens: bacteria, viruses, and parasites (Krist et al. 2020). There are more than 30 types of

pathogens that are transmitted through sexual contact, including vaginal, anal, and oral intercourse (World Health Organization [WHO] 2024a).

The WHO states that STIs are a public health problem (WHO 2024b), because, when undetected and not treated promptly, they can cause discomfort through associated inflammation and tissue damage, and can leave sequelae such as chronic pain, infertility, genital scarring, dementia, or even death (Bonett et al. 2022). Globally, it is estimated that about 1 million people are infected every day, and about 374 million new infections per year are due one of the four curable STIs: chlamydia, gonorrhea, syphilis, and trichomoniasis (WHO 2024b). The other four incurable viral infections are hepatitis B virus (HBV), herpes simplex virus (HSV), human immunodeficiency virus (HIV), and human papillomavirus (HPV). It is estimated that more than 500 million people aged 15–49 years have a genital infection caused by HSV (WHO 2024b). Rates of such infections, including HIV, continue to increase worldwide year after year (O'Byrne 2020).

Across Europe, the incidence of syphilis, gonorrhea, and chlamydia continues to rise (European Centre for Disease Prevention and Control 2020a, 2020b). Globally, it is estimated that 50% of the sexually active population will be infected at some point in their lives (García-Villanueva et al. 2019). In Spain, there has been an even sharper increase in STIs since the beginning of the 21st century. According to the Survey of Health and Sexual Behavior, carried out by the National Institute of Statistics in 2003, that year alone, 1,047,300 people aged 18–49 were infected, of which 55.7% were men (Instituto Nacional de Estadística [INE] 2003a). Despite the seriousness of the figures, the situation that has led this country to have these figures is not fully known (del Romero et al. 2023). According to the Informe de Epidemiological Surveillance of Sexually Transmitted Infections in Spain, carried out by the National Epidemiological Surveillance Network (Red Nacional de Vigilancia Epidemiológica 2023), in 2019, there were 13,476 cases of gonococcal infection, 6448 cases of syphilis, and 18,694 cases of chlamydia trachomatis. This point marked an important period of progressive increase to grow exponentially after the COVID-19 pandemic (Sentís et al. 2021).

Despite being a widespread problem in Spanish society, there are specific populations in which the incidence is higher or in which the risk is greater. Half of new infections occur in people aged 15–24, who represent only 25% of the sexually active population (Kessler et al. 2020; Wangu and Burstein 2017). In terms of gender, according to the study by Gómez-Castellá et al. (2024), STIs tend to be more prevalent in men aged 25–34 years.

Although any sexually active person faces the risk of catching an STI, young people (15–24 years), men who have sex with men (MSM), and pregnant women may be more vulnerable to STIs than other groups (Del Pozo-Herce et al. 2024; Prosser 2019). The term MSM refers to "men who have sexual relations with men, regardless of whether or not they have sexual relations with women or whether, at a personal or social level, they have a gay or bisexual orientation" (Ministerio de Sanidad, Servicios Sociales e Igualdad 2018). Therefore, sexual minorities often experience high rates of stigma and socioeconomic and structural barriers to health care, which negatively affect its use and increase vulnerability to HIV infection and other STIs (Medina-Martínez et al. 2021; Workowski et al. 2021).

Currently, there is a marked increase in sexual behaviors that are closely related to the absence of protection and barrier methods, leading to an increased risk of contracting an STI.

A distinction must be made between sexual behavior and risky sexual behavior. Recent evidence indicates that sexual experience alone does not predict risky or maladaptive outcomes, and may even be a healthy social and psychological sign (Eckstrand et al. 2017). This is why we do not refer to risky groups, but rather risky behaviors. Although there is no single definition within the health sector, there is some agreement that sexual risks are any sexual behavior that increases the likelihood of a negative outcome, such as an STI or unwanted pregnancy (Blanc Molina and Rojas Tejada 2018).

There are risky behaviors where the condom is consciously removed, such as stealthing, which has been described as "a secretive form of condomless sex". This can occur when a man tricks his partner into believing that he is wearing a condom at the time of initial penetration, or during intercourse, when a man secretly removes the condom and then resumes intercourse with his partner (Drouin et al. 2024). Another risky behavior is barebacking, which can be associated with intentionally unprotected sex with casual partners or strangers, or with more generic condomless sexual activity, regardless of the relationship with the partner (da Silva et al. 2023). Similarly, other practices more closely related to anal sex such as fisting (insertion of the hand into the rectum or vagina), as a homo-, hetero-, or autoerotic practice, or activities such as chemsex in MSM significantly increase the risk of contracting an STI (Cappelletti et al. 2016; Del Pozo-Herce et al. 2024).

The association between sexual behaviors, whether risky or not, and the presence of STIs has been studied, but this relationship is characterized by other variables that are not yet well defined. In Spain, a pressing problem has been observed with condom use, which is related to low-risk perception, as well as misconceptions about the perception of pleasure and intimacy (Rodrigues et al. 2024). Additionally, the care of patients with suspected STD is not homogeneous in Spanish emergency departments (Miró et al. 2021). Despite regulations, strategies, and sex education programs, the prevalence of the main STIs has been increasing over the years, with Spain becoming one of the countries with the highest rates in Europe (Pellico-López et al. 2022).

Studies also show that sexual risk behaviors increase the likelihood of contracting an STI. Such behaviors include, among others, having sex (vaginal, anal, or oral–genital) without barrier methods, having multiple sexual partners, having a high-risk sexual partner (who has an STI, or multiple partners), and having sex with sex workers or with someone who has injected or is injecting drugs (López de Munain 2019; Kann et al. 2018; Morgado-Carrasco et al. 2019; Redondo-Martín et al. 2021).

The trend over the last 10 years suggests that some behaviors are diminishing, such as excessive consumption of alcohol or drugs or pregnancy during adolescence; others are steadily maintained such as the non-use of condoms, or increasing, such as sexting

(sending sexually explicit photographs or messages voluntarily via electronic means) (Vannucci et al. 2020). There are some recent studies, which also highlight a relationship between risky behaviors and an increased risk of contracting an STI, as well as the constant use of new technologies and dating apps to find people with whom to have sex (Eckstrand et al. 2017; Ortiz-Martínez et al. 2018; Wang et al. 2020).

Complications arising from STIs have a significant effect on the health of adults, adolescents, and children, compromising their quality of life, while at the same time impacting domestic economies and health systems, as greater economic investment in health resources would be needed to cope with their treatment (Santa-Bárbara et al. 2020; WHO 2016). Thus, an increase in STIs raises significant concerns among international organizations. The WHO has developed a global health sector strategy on STIs, which positions the health sector's response to STIs as critical to achieving universal health coverage, one of the key health targets within Goal 3 (Ensure healthy lives and promote well-being for all at all ages) of the Sustainable Development Goals (SDGs) identified in the 2030 Agenda for Sustainable Development (WHO 2024c).

Community nursing holds significant value in addressing the global STI pandemic that both Spain and the world are currently facing (Guilamo-Ramos et al. 2021). Research has examined the pathways through which patients with suspected STIs are diagnosed and treated, revealing that these processes are not clearly defined, which leads to a greater problem for health systems (del Romero et al. 2023). Additionally, the variability in the availability of human and material resources among different centers that analyze and diagnose STIs results in differing capacities for detecting these infections across Spain's autonomous communities. Andalusia has been one of the regions where the centers have been proactive in sharing information and providing resources for STI treatment in previous decades (Otero-Guerra et al. 2021). With the introduction of new self-sampling kits for infection detection conducted by non-healthcare professionals, it is crucial for community nursing to receive training and take an active role in community health services to respond to meet the needs of at-risk populations for STIs (Gómez-Castellá et al. 2024).

Information on risky sexual behaviors and the possible factors that promote them is studied in a highly fragmented manner, which does not allow for an in-depth understanding of the relationship between these behaviors and the factors that trigger them. It is necessary to investigate the relationship between such risky sexual behaviors and their contributing factors, alongside the high prevalence of STIs in our population. Consequently, the primary objective was to analyze the prevalence of sexual infections according to the sexual practices undertaken and to examine the various sexual behaviors over the years.

2 | Methods

2.1 | Study Design

This is a cross-sectional, observational, and retrospective study based on the medical records of individuals attending the Centre for Sexually Transmitted Diseases and Sexual Orientation in Granada (Spain). This facility serves as a reference center in the south of Spain.

2.2 | Sample

The sample was derived from a database comprising 26,834 medical records of individuals who attended the Centre for Sexually Transmitted Diseases and Sexual Orientation in Granada during the period from 2000 to 2018. Data were extracted from the medical records of individuals who visited the center with issues related to the presence or suspicion of STI. For this research, there were 1671 records recruited until 2018. The cases were recruited according to the sampling criteria described in previous publications by the authors of this manuscript (Pérez-Morente et al. 2019). For a finite population, with 95% confidence, a precision of 3%, and an expected proportion of STIs of 50% (to maximize the sample size), 1026 patients would be required. The sample included in this manuscript was larger than what was required. On the other hand, the number of selected records ensured enough cases per variable included in the logistic regression model employed, in accordance with the method described by Peduzzi et al. (1996). A simple random sampling without replacement was conducted; the sampling method was based on new records per year, with the first and last record number of each year being taken, thus achieving a proportional sample per year.

As inclusion criteria, clinical histories whose reason for consultation was symptoms, control, contact tracing, and HIV were included. Likewise, medical records corresponding to adults with no cognitive impairment were selected. Exclusion criteria included the data belonging to sex workers, due to the bias that may be involved by the inclusion of such professionals, that is why the number of final records was smaller than the determined sample size.

Furthermore, each record belongs to a person, so there is no possibility of data duplication, and records are reviewed one by one by the member of the research team who took the data to create a data collection sheet. Since they were already complete records, there were missing data, so the sample sizes are specified in the results for each analysis conducted.

2.3 | Data Variables

The variables contemplated in the data collected in the medical records have been selected according to the objectives of this study.

The dependent variable was the diagnosis of STI, which was coded as a dichotomous variable (yes, no). The independent variables were those classified as sociodemographic, medical variables, and another group conceived as possible risk factors, which included the frequency of certain sexual behaviors as well as condom use. Six practices were identified within the sexual behaviors: vaginal sex, oral sex (mouth–vagina), oral sex (mouth–penis), oral sex (mouth–anus), anal sex (penetrative anal intercourse [PAI]), and anal sex (receptive anal intercourse [RAI]). For all sexual behaviors, the risk was understood to be the same regardless of the participating sex organ, except in the

TABLE 1 | Detailed description of study variables.

Variable	Type	Categories
Year of consultation	Continuous	—
Gender	Dichotomous, categorical	Male, female
Age	Continuous	—
Nationality	Categorical, polychotomous/dichotomous	For the statistical analysis, it became a dichotomous variable to distinguish the Spanish nationality from other nationalities; this category was called "other"
Occupation	Categorical, polychotomous/dichotomous	For the statistical analysis, it became a dichotomous variable: students and several, unpaid occupation
Working status	Categorical, polychotomous	Employed, unemployed, retired, student
Educational level	Categorical, polychotomous	With no studies, primary school, secondary school, vocational training, higher education
Marital status	Categorical, polychotomous	Single, married/living together, separated-divorced, widowed
Sexual orientation	Categorical, polychotomous	Heterosexual, bisexual, homosexual
Reason for consultation	Categorical, polychotomous	Symptoms, control, contact tracing, HIV
Regular partner	Categorical, dichotomous	Yes, no
Last time you had sex using condom	Categorical, polychotomous	Never, less than 1 month, between 1 and 6 months, between 6 and 12 months, more than 12 months
Sexual partners in the last month	Categorical, polychotomous	0–1, 2, 3–5, more than 5, contact with sex workers
Sexual partners in the last year	Categorical, polychotomous	0–1, 2, 3–5, 6–10, 11–20, more than 20, contact with sex workers
Use of drugs	Categorical, dichotomous	Yes, no
Previous STIs	Categorical, dichotomous	Yes, no
Suspicious contact	Categorical, polychotomous	Sex worker, regular partner, casual partner, syringe, accidental, several of the previous, regular former partner
Does the partner have symptoms?	Categorical, dichotomous	Yes, no
STI diagnosis	Categorical, polychotomous/dichotomous	For the statistical analysis, it became a dichotomous variable: yes, when there was a positive diagnosis confirmed (via tests, lab, and/or serology); no, when it was a diagnosis confirmed as negative by tests
Age of first sexual intercourse	Continuous	—
Previous consultation	Categorical, polychotomous	Specialized consultation, primary care, emergency care, other, private clinic, STI center
Previous treatment	Categorical, dichotomous	Yes, no
Contact with sex workers	Categorical, dichotomous	Yes, no

case of anal sex, where it was recorded in two different variables, whether it was the active or passive subject. The decision was made based on the scientific literature, which shows that in anal sex, the risk involved is not the same for the person whose anus is penetrated (RAI) and for the person whose penis is involved (PAI). The variables of sexual behaviors and condom use were coded as polychotomous, ordinal, and categorical variables (never, sometimes, often, and always). Table 1 shows all the study variables, specifying the variable type.

2.4 | Statistical Analysis

By means of the exploratory analysis, descriptive statistics of variables were used, where the medians (Me) and the interquartile range (IQR) for continuous variables were obtained. For categorical variables, absolute frequency (n) and percentage (%) were employed. To analyze the sample normality, asymmetry and kurtosis values were utilized, observing a sample non-normality.

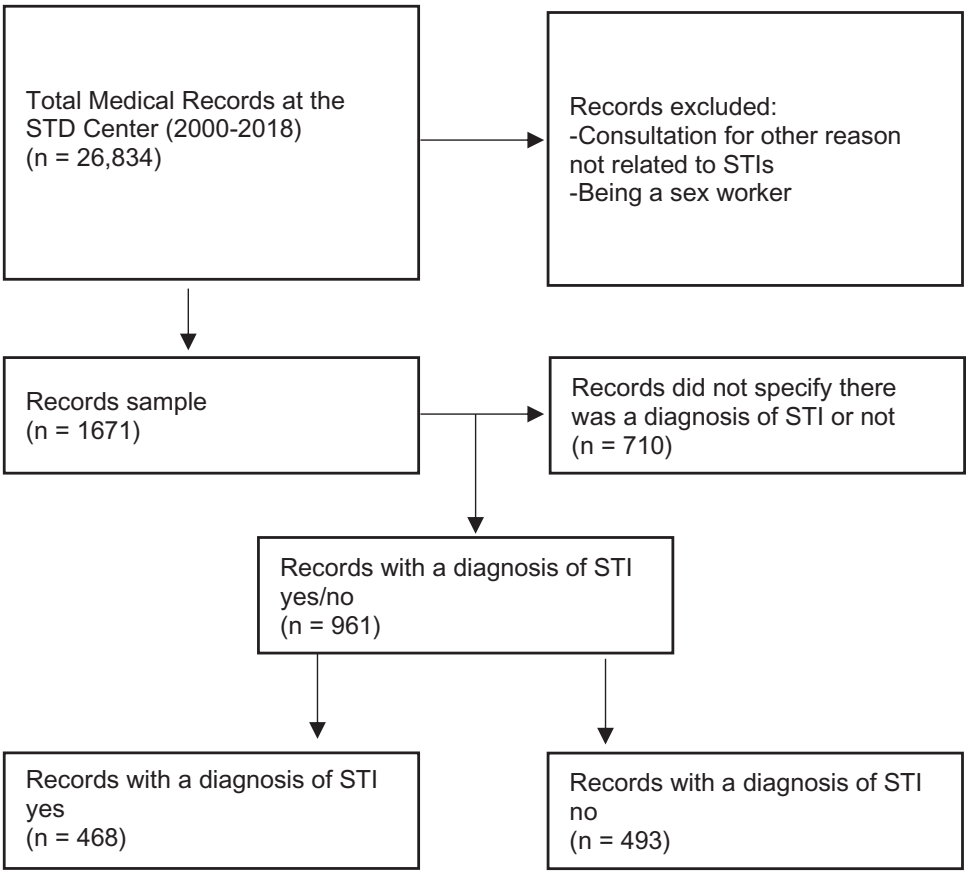

FIGURE 1 | Flow diagram for the selection of medical records.

For the bivariate analysis with the variable's behavior and condom use, the Kruskal–Wallis test was used. A bivariate analysis was also intended between the variables sexual behavior and condom use classified dichotomously. Based on this, contingency tables were created and a the chi-square test (χ^2) or Fisher's exact test was performed, if necessary. These calculations were performed using the statistical program IBM SPSS version 26.

A multiple logistic regression analysis was performed, taking the STI diagnosis as the outcome variable and anal sex behaviors (anus–penis) and anal sex (penis–anus) as main independent variables, depending on the model. These variables were taken based on the previous bivariate analysis. The association with confounding variables was adjusted. To select the confounding variables, it was necessary to adjust the number of variables included to the recommended requirement in the multivariate analysis of having at least 15 cases for each variable included in the model. In this case, the lowest number of variables studied was taken as a reference. For each variable included in each model, the odds ratio (OR) was calculated with a 95% CI. Once the models were generated, the adjustment conditions were verified. Collinearity between variables was investigated by calculating the variance inflation factor (VIF). Considering the absence of collinearity with VIF < 2.5, the linearity of the dependent variable with the continuous variables included in the models was verified and calibration was determined using the Hosmer–Lemeshow goodness-of-fit test, which is reflected in the absence of significant differences ($p > 0.05$) between the observed and expected values according to the model. Finally, discrimination was determined based on the value of the area under the ROC curve, which was considered adequate with >0.70. Several models were tested with different variables, and finally the model shown in the results, which best met the fit criteria mentioned above, was validated. The calculations were performed using the R commander software, version 4.0.5. In all analyses, $p < 0.05$ was considered statistically significant.

2.5 | Ethics

This study has been approved by the Biomedical Research Ethics Committee and by Health District Management involved. The study was conducted in compliance with every ethical principle of the Declaration of Helsinki, the good clinical practice guidelines, and the protection and confidentiality of data were guaranteed, by means of an anonymous treatment and segregation of personal data and study variables in the database created.

3 | Results

The final sample was composed of 1671 medical records, after refining the pertinent database. Figure 1 shows the participant selection process.

Table 2 shows the results corresponding to sociodemographic variables, as well as stated risk factors. The general sample profile was that of a young and single person, with a high level

TABLE 2 | Sociodemographic variables and risk factors.

Variable		n	%	Me (IQR)
Age		*1,669*		26 (16-74)
Age of first sexual intercourse		*1,083*		17 (11-38)
Gender		*1,671*		
	Male	995	59.50%	
	Female	676	40.50%	
Nationality		*1,654*		
	Spanish	1,363	82.40%	
	Other	291	17.60%	
Occupation		*1,553*		
	Several and unpaid	860	55.40%	
	Students	693	44.60%	
Working status		*1,477*		
	Employed	536	36.30%	
	Unemployed	236	16.00%	
	Retired	22	1.50%	
	Student	683	46.20%	
Educational level		*1,588*		
	With no studies	12	0.80%	
	Primary school	206	13%	
	Secondary school	290	18.30%	
	Vocational Training	196	12.30%	
	Higher education	884	55.70%	
Marital status		*1,659*		
	Single	1,379	83.10%	
	Married–Living together	177	10.70%	
	Separated-Divorced	96	5.80%	
	Widowed	7	0.40%	
Sexual orientation		*1,639*		
	Heterosexual	1,303	79.50%	
	Homosexual	258	15.70%	
	Bisexual	78	4.80%	
Reason for consultation		*1,671*		
	HIV	787	47.10%	
	STI symptoms	612	36.60%	
	Screening	225	13.50%	
	Contact tracing	47	2.80%	
Regular partner		*1,565*		
	Yes	976	62.40%	
	No	589	37.60%	
Last time you had sex with condom		*1,072*		
	Never use it	54	5%	
	In the last month	445	41.50%	
	1-6 months	444	41.40%	
	6-12 months	60	5.60%	
	More than 1 year	69	6.40%	

(Continues)

TABLE 2 | (Continued)

Variable		n	%	Me (IQR)
Sexual partners in the last month		*1,571*		
	0-1	1,261	80.30%	
	2	189	12%	
	3–5	96	6.10%	
	+5	25	1.60%	
Sexual partners in the last year		*1,555*		
	0-1	534	34.30%	
	2	330	21.20%	
	3–5	402	25.90%	
	6–10	188	12.10%	
	11–20	63	4%	
	+20	38	2.40%	
Use of drugs		*1,003*		
	Yes	335	33.40%	
	No	668	66.60%	
Previous STIs		*1,402*		
	Yes	304	21.70%	
	No	1,098	78.30%	
Type of contact		*521*		
	Sex worker	39	7.50%	
	Regular partner	204	39.30%	
	Casual partner	192	36.90%	
	Syringe	1	0.20%	
	Accidental	9	1.70%	
	Several of the previous	29	5.60%	
	Regular former partner	47	9%	
Does your partner have symptoms?		*578*		
	Yes	230	39.80%	
	No	348	60.20%	
Previous consultation		1,671		
	Yes	441	26.40%	
	No	1230	73.60%	
Previous treatment		1,571		
	Yes	438	27.88%	
	No	1,133	72.12%	
Contact with sex workers		1,671		
	Yes	169	10.11%	
	No	1,502	89.89%	

Abbreviations: IQR, interquartile range; Me, medians.

of education, in a relationship, and heterosexual. There was a similar ratio of men to women, the number of men being a little bit higher. The main reason for consultation was related to HIV, followed by STI symptoms.

It was observed that 468 (28%) people were diagnosed with an STI through a lab test, 493 (29.5%) not having a positive diagnosis, and data corresponding to 710 (42.5 %) people were not collected clearly in the medical records.

TABLE 3 | Sexual behaviors and use of condom.

Variable		Never	Sometimes	Often	Always
Vaginal sex	Sexual behaviors *n* (%)	5 (0.5)	18 (1.7)	177 (16.3)	885 (81.6)
	Use of condom *n* (%)	158 (15.2)	220 (21.2)	460 (44.2)	202 (19.4)
Oral sex (mouth–vagina)	Sexual behaviors *n* (%)	51 (8.6)	49 (8.3)	262 (44.2)	231(39)
	Use of condom *n* (%)	452 (97.8)	3 (0.6)	6 (1.3%)	1 (0.2)
Oral sex (mouth–penis)	Sexual behaviors *n* (%)	41 (5.2)	68 (8.6)	212 (26.8)	471 (59.5)
	Use of condom *n* (%)	628 (90.5)	34 (4.9)	17 (2.4)	15 (2.2)
Oral sex (mouth–anus)	Sexual behaviors *n* (%)	51 (52.6)	26 (26.8)	6 (6.2)	14 (14.4)
	Use of condom *n* (%)	34 (100)			
Anal sex (PAI)	Sexual behaviors *n* (%)	204 (35.9)	138 (24.3)	78 (13.7)	149 (26.2)
	Use of condom *n* (%)	106 (31.4)	36 (10.7)	85 (25.1)	111 (32.8)
Anal sex (RAI)	Sexual behaviors *n* (%)	257 (46.1)	129 (23.2)	62 (11.1)	109 (19.6)
	Use of condom *n* (%)	92 (33.5)	25 (9.1)	71 (25.8)	87 (31.6)

According to the results, 73.6% (n = 1230) had not previously consulted a healthcare provider. Of those who did consult (n = 441), the most consulted service was primary care with 248 people, followed by the emergency service consulted by 86 people and specialized medical consultations by 80 people. A large majority of the people surveyed (72.12%) had not received previous treatment (n = 1133). In relation to risk factors, out of all the analyzed cases, 169 (10.11%) stated having had contact with sex workers, of which 11 stated having contact on a regular basis and 48 contacted sometimes. Table 3 shows the results of sexual behaviors and the use of condom in each practice.

Figures 2 and 3 show the analysis over the years of sexual behaviors and use of condom in them on the always-often basis. It is worth noting how vaginal sex and use of condom are the most frequent in every year under analysis. The less stated sexual behavior was mouth–anus sex, and the use of condom in this case was non-existent.

When analyzing the association among an STI diagnosis, sexual behaviors, and the use of condom, the only significant association has been between the STI diagnosis and anal–penile sex (Z = 11.203; p = 0.011). Table 4 shows the results of the association between risk factor exposure and use of condom, classified on a dichotomous basis, and the STI diagnosis. The STI diagnosis was significantly associated with PAI and RAI sex.

In the generated regression models, the association between the STI diagnosis and anal sex (penis–anus and anus–penis) was adjusted according to the following variables: age, occupation, contact with sex workers, partners in the last month, and age of first sexual intercourse (Tables 5 and 6). Gender and sexual orientation variables were initially included but then ruled out since both got very high values in the VIF.

It is observed that in the model containing the penis–anus variable, the association is missing (OR = 1.4629743 [0.7518969–2.8799657]; p = 0.265). In contrast, in the model containing the anus–penis behavior, the association observed is maintained (OR = 2.2576446 [1.01167900–5.1867987]; p = 0.0497).

4 | Discussion

This study has analyzed the relationship between sexual behaviors and prevalence of STI in people attending the Centre for Sexually Transmitted Diseases and Sexual Orientation in the province of Granada in the 2000–2018 period. There were significant associations between an STI diagnosis and the frequency of anal sex (PAI and RAI).

It should be highlighted that this study reinforces the previously published results of the research to which it belongs. It adds the analysis of sexual behaviors and the use of condom during the period, as well as factors explaining the higher probability of an

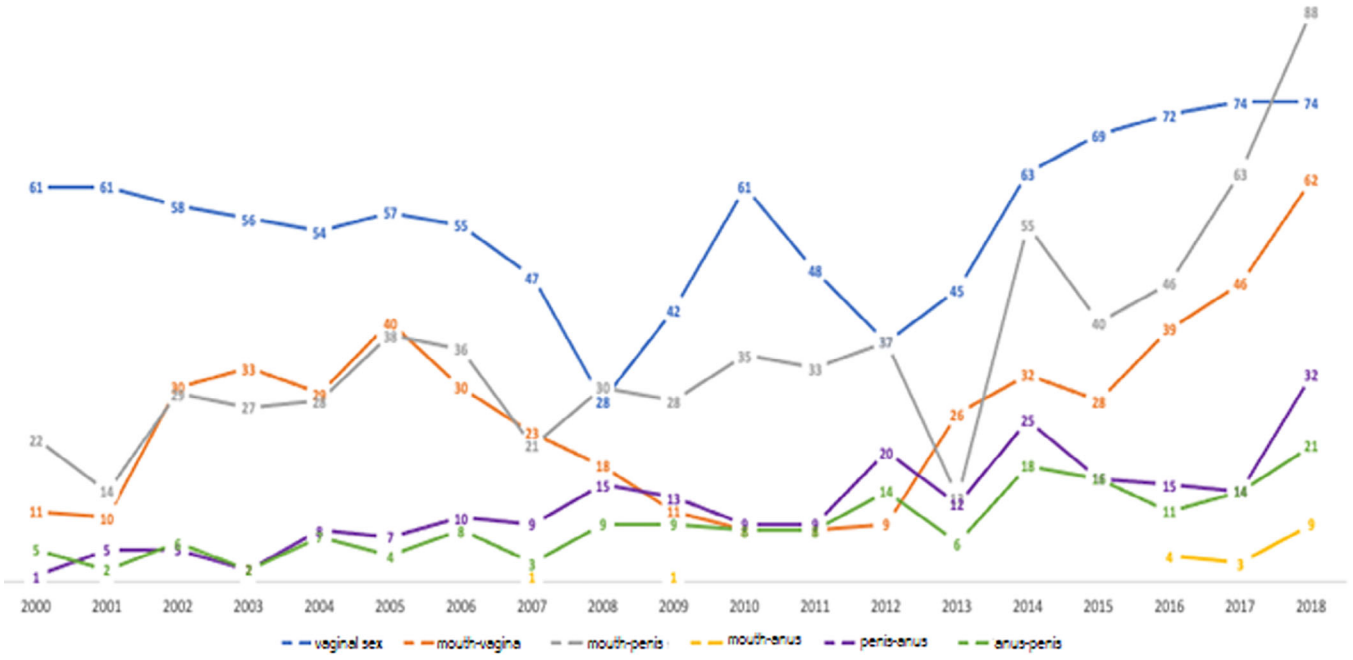

FIGURE 2 | Analysis of sexual behaviors. [Color figure can be viewed at wileyonlinelibrary.com]

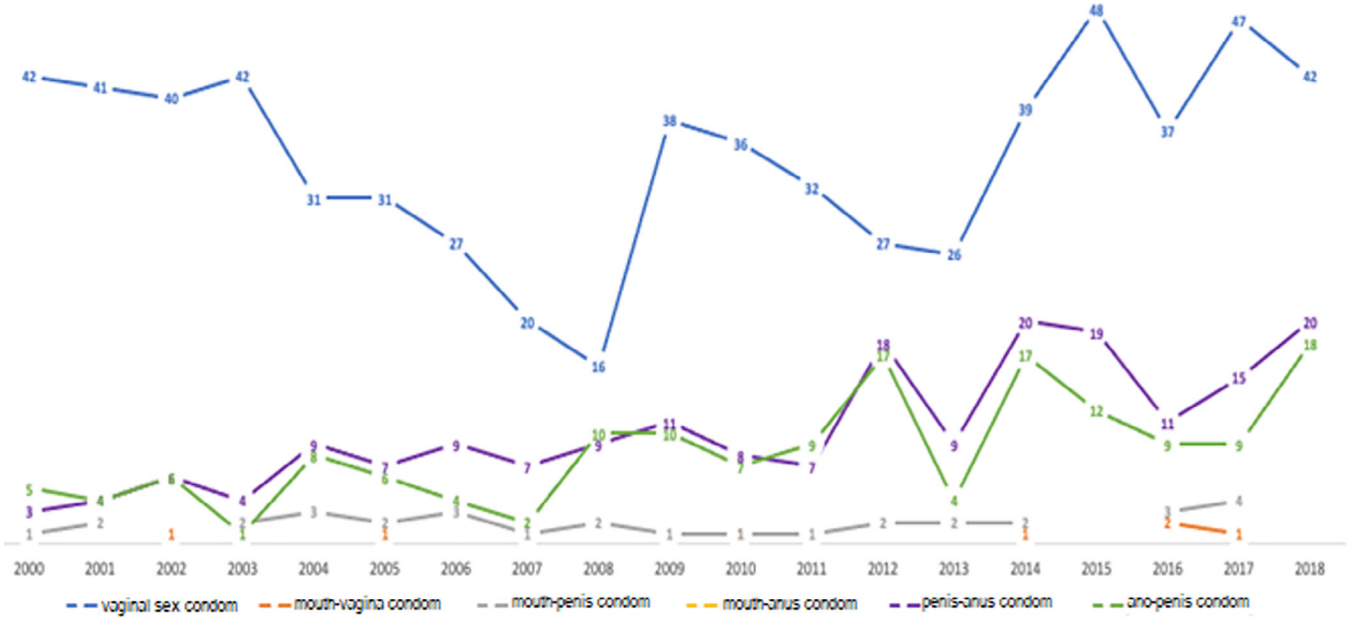

FIGURE 3 | Analysis of condom. [Color figure can be viewed at wileyonlinelibrary.com]

STI diagnosis in cases of anal sex (RAI) (Santa-Bárbara et al. 2020; Pérez-Morente et al. 2019).

Based on sexual behaviors, the most frequently performed, indicated as "always", was vaginal sex, followed by oral sex (mouth–penis) and oral sex (mouth–vagina). Likewise, based on the use of condom declared as "always" used, the most frequently reported was vaginal sex, followed by anal sex (PAI and RAI). The results show that over the years, the sexual behavior declared as "always frequent" most frequently has also been vaginal intercourse, with the number of people who declare it stabilizing in recent years and being surpassed in the last year by oral sex (mouth–penis). These data may be related to the different percentages of declared sexual orientation, of which 79.5% declared themselves heterosexual in this study (Blanc Molina and Rojas Tejada 2018). Likewise, the increase in recent years of oral sex (mouth–vagina and mouth–penis) may be related to the conception of a broader sexuality of the new generations, since the median age was 26 years. It may also be related to the visibility of other sexual practices, due to the increased visibility and acceptance in health systems of the different sexual diversities that have been invisible, such as women who have sex with other women, where the use of condoms in oral sex is not widespread either (Gil-Llario et al. 2023). Based on the use of

TABLE 4 | STI diagnosis and sexual behaviors and use of condom.

Variable		Yes STI		No STI				
		n	%	*n*	%	*p*	V	OR (95% CI)
Vaginal sex	**Behaviors (*n* = 601)**							
	Sometimes-never	2	33.3	4	66.7	0.703*	0.020	1.531 (0.278–8.424)
	Often-always	258	43.4	337	56.6			
	Use of condom (*n* = 569)							
	Sometimes-never	102	47	115	53	0.135	0.063	0.771 (0.548–1.085)
	Often-always	143	40.6	209	59.4			
Oral sex (mouth–vagina)	**Behaviors (*n* = 360)**							
	Sometimes-never	26	44.8	32	55.2	0.802	0.013	0.930 (0.528–1.637)
	Often-always	130	43	172	57			
	Use of condom (*n* = 286)							
	Sometimes-never	119	42.2	163	57.8	1.000*	0.019	1.370 (0.190–9.863)
	Often-always	2	50	2	50			
Oral sex (mouth–penis)	**Behaviors (*n* = 466)**							
	Sometimes-never	23	37.7	38	62.3	0.082	0.081	1.628 (0.936–2.831)
	Often-always	201	49.6	204	50.4			
	Use of condom (*n* = 418)							
	Sometimes-never	197	49	205	51	0.163	0.068	0.473 (0.161–1.386)
	Often-always	5	31.3	11	68.8			
Oral sex (mouth–anus)	**Behaviors (*n* = 79)**							
	Sometimes-never	28	44.4	35	55.6	0.690	0.045	1.250 (0.417–3.751)
	Often-always	8	50	8	50			
	Use of condom (*n* = 32)							
	Sometimes-never	18	56.3	14	43.8			
	Often-always							
Anal sex (RAI)	**Behaviors (*n* = 322)**							
	Sometimes-never	88	39.5	135	60.5	0.001	0.187	2.263 (1.396–3.668)
	Often-always	59	59.6	40	40.4			
	Use of condom (*n* = 153)							
	Sometimes-never	33	49.3	34	50.7	0.507	0.054	1.242 (0.655–2.355)
	Often-always	47	54.7	39	45.3			
Anal sex (PAI)	**Behaviors (*n* = 341)**							
	Sometimes-never	102	48.8	107	51.2	0.033	0.115	1.614 (1.037–2.511)
	Often-always	80	60.6	52	39.4			
	Use of condom (*n* = 203)							
	Sometimes-never	52	57.8	38	42.2	0.928	0.006	1.026 (0.585–1.799)
	Often-always	2	50	2	50			

Abbreviations: CI, confidence interval; OR, odds ratio; V, Cramer's V.
*Fisher's exact test.

the condom "often-always", it is observed that also over the years where it is most used is in vaginal sex, and an increase in its use has been observed in anal sex (PAI and RAI), in line with the results of recent studies (Arribas et al. 2018; Blanc Molina and Rojas Tejada 2018). The low consistency in the use of condoms among adolescents and young adults in Spain, together with the increase in substance use, in many cases, makes us consider the difficulties of adherence to safe sexual relations (Ballester-Arnal et al. 2022). This situation increases the concern that the public health problem of STIs in Spain will worsen, following the trend

TABLE 5 | Logistic regression model for STI diagnosis (RAI).

Variable	OR (95% CI)	*p*	VIF
Age	0.971 (0.910–1.034)	0.370	1.61
Occupation			
Student	0.351 (0.128–0.908)	0.034	1.5
Professionals and unpaid	Ref.		
Age of first sexual intercourse	0.917 (0.768–1.086)	0.321	1.6
Contact with sex worker			
No	0.664 (0.028–8.232)	0.754	1.06
Yes	Ref.		
Partners in the last month			
1	Ref.		
2	0.612 (0.207–1.766)	0.363	
3–5	1.274 (0.287–6.709)	0.755	1.08
More than 5	1.501 (0.172–31.970)	0.735	
Anal sex (anus–penis)			
Often-always	2.257 (1.011–5.186)	0.049	1.05
Sometimes-never	Ref.		

Note: Calibration through the Hosmer–Lemeshow goodness-of-fit test: chi square = 10.996, df = 8, *p* value = 0.2019. Discrimination according to the receiver operating characteristic (ROC) curve: area under the ROC curve with a value of 0.69 (95% CI = 0.59–0.79).
Abbreviation: VIF, variance inflation factor.

TABLE 6 | Logistic regression model for STI diagnosis (PAI).

Variable	OR (95% CI)	*p*	VIF
Age	0.960 (0.916–1.004)	0.085	1.64
Occupation			
Student	0.474 (0.214–1.027)	0.061	1.49
Professionals and unpaid	Ref.		
Age of first sexual intercourse	0.778 (0.661–0.905)	0.002	1.03
Contact with sex worker			
No	1.053 (0.417–2.613)	0.911	1.30
Yes	Ref.		
Partners in the last month			
1	Ref.		
2	1.185 (0.533–2.667)	0.677	
3–5	1.791 (0.605–5.784)	0.304	1.11
More than 5	2.066 (0.403–15.437)	0.411	
Anal sex (penis–anus)			
Often-always	1.462 (0.751–2.879)	0.265	1.12
Sometimes-never	Ref.		

Note: Calibration through the Hosmer–Lemeshow goodness-of-fit test: chi square = 5.7355, df = 8, *p* value = 0.6768. Discrimination according to the receiver operating characteristic (ROC) curve: area under the ROC curve with a value of 0.69 (95% CI = 0.62–0.77).
Abbreviation: VIF, variance inflation factor.

of our results, where more than 25% of people have had a previous infection with an STI.

According to the results of this study, oral sex practices, both mouth–penis and mouth–vagina, are quite common behaviors, and it is worth mentioning that condom use is very rare among them, despite the fact that it is also related to the transmission of STIs, which coincides with other studies that show that there are still some levels of risky sexual behaviors among adolescents and young adults (Kann et al. 2018; Bauzà et al. 2018). It is true that this risky behavior is becoming increasingly important in a scenario where the use of pre-exposure prophylaxis (PrEP) is increasingly widespread and in which the use of condoms in the face of risky behaviors is decreasing (Iniesta et al. 2021; Ugarte et al. 2023). Therefore, it is important to know the risk behaviors and their evolution detected in this study, given the changes in society without community health care or most health professionals being prepared for this situation (Galicia et al. 2023).

On the one hand, associations between different variables and the STI diagnosis variable have been analyzed. As shown by the results of the multivariate analysis, the risk of an STI infection in anal sex varies if performed as the active or passive subject, with such association becoming weak when it is the active subject (PAI). On the other hand, the regression results associating the STI variable with anal–penile sex show that the significant association observed is maintained for the rest of the covariables included in the model. Said results are supported by other studies showing that passive subjects (RAI) have a higher risk of getting an STI (Berry et al. 2012; Kusters et al. 2024). Fernández-Dávila and Lorca's (2011) article is in line with our results, thus evidencing that younger people are usually passive subjects, hence the variables of the model (Lachowsky et al. 2016; Jacobs et al. 2010). Furthermore, the variables introduced in Model 1 are factors that could increase the risk of getting an STI. Therefore, we can continue studying how the variables introduced in the model such as age, sexual experience, or educational or socioeconomic level can influence and modulate the sexual risk behaviors assumed (Morales et al. 2021). In line with the results of this study, it has been observed that there are a significant number of people who have contact with sex workers, 395,500 people in Andalusia, according to the INE in 2003 (INE 2003b). This behavior increases the risk of contracting an STI, so if it is not taken into account when preventing infection or in sexual education, this important risk factor will not be counteracted. Likewise, the probability of infection is lower in students, which may be determined by the fact that they are people who have received sex education at school, thus favoring awareness of the use of condom for protection against STIs (Lachowsky et al. 2016).

The findings of this study are in line with the WHO's proposed global strategy to prevent STIs; the contribution of local data is necessary given the disparity of reports and data provided in different regions, countries, and continents (WHO 2024c). In contrast, limitations have included the amount of missing data due to the fact that the data have been taken from already completed medical records, which has also limited the statistical power of the study. As with some variables, the medical records did not indicate whether condom use was by a man or a woman, so an information bias could have been caused. Likewise, another limitation is the type of cross-sectional study, since a causal relationship cannot be observed, so another type of study is required. In addition, the data should be taken with caution, since they belong to a population that attends a specialized STI center. This may be a sample selection bias. In addition, people who have frequent sex with sex workers were not excluded. For future studies, more specific populations, such as sex workers, and the correlation between different factors, not just STI diagnosis, should be considered. Likewise, it would be convenient to analyze the type of STI according to sexual behavior, especially those behaviors (RAI and PAI) that have had a statistically significant association with STIs.

Despite the constant increase in STIs worldwide over the last century (del Romero et al. 2023), only a limited time sequence from 2000 to 2018 was analyzed in this study, because the outbreak of the COVID-19 pandemic prevented the continuity of data collection in subsequent years and decreased preventive and diagnostic testing due to the pandemic (Bonett et al. 2022). However, the detailed presentation of risky sexual behaviors in this extended time sequence and the large sample size (1671 medical records) support the robustness of the results presented.

5 | Conclusions

A relationship has been found between anal sex in RAI and the prevalence of STIs.

In recent years, an increase in oral sex (mouth–vagina and mouth–penis) has been observed, even surpassing vaginal sex. Condom use has increased, especially in anal sexual relations (PAI and RAI). However, its use is almost non-existent in oral sex behaviors.

Given the variability of sexual behaviors beyond vaginal sex, it is necessary that in clinical practice, health professionals have updated training in sexual health in order to respond to and prevent STIs and other problems in all the sexual diversity that characterizes the adolescent or young adult population.

Author Contributions

Conceptualization: M.A.P.M. and M.G.L. Methodology: A.M.S. and C.H.M. Software and data curation: M.A.A.S. Validation: B.E.L. and A.M.S. Formal analysis: C.H.M. and C.G.M. Investigation and writing–original draft preparation: C.G.M. Resources: M.G.L. Writing–review and editing: B.E.L. and M.A.P.M. Visualization: M.A.P.M. Supervision: C.H.M. All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The author has nothing to report.

References

Arribas, M. M., A. Rivero, E. Fernández, T. Poveda, and J. A. Caylá. 2018. "Magnitud de la infección por VIH, poblaciones vulnerables y barreras de

acceso a la atención sanitaria." *Enfermedades Infecciosas y Microbiología Clínica* 36: 3–9. http://doi.org/10.1016/S0213-005X(18)30239-8.

Ballester-Arnal, R., C. Giménez-García, E. Ruiz-Palomino, J. Castro-Calvo, and M. D. Gil-Llario. 2022. "A Trend Analysis of Condom Use in Spanish Young People Over the Two Past Decades, 1999–2020." *AIDS and Behavior* 26, no. 7: 2299–2313. https://doi.org/10.1007/s10461-021-03573-6.

Bauzà, M. L., M. Esteva, J. Molina, I. Pereiró, M. Ingla, and S. March. 2018. "Emergency Contraception and Risk Habits in a University Population." *European Journal of Contraception & Reproductive Health Care* 23, no. 6: 427–433. https://doi.org/10.1080/13625187.2018.1533547.

Berry, M., A. L. Wirtz, A. Janayeva, et al. 2012. "Risk Factors for HIV and Unprotected Anal Intercourse Among Men Who Have Sex With Men (MSM) in Almaty, Kazakhstan." *PLoS ONE* 7, no. 8: e43071. https://doi.org/10.1371/journal.pone.0043071.

Blanc Molina, A., and A. J. Rojas Tejada. 2018. "Uso del preservativo, número de parejas y debut sexual en jóvenes en coito vaginal, sexo oral y sexo anal." *Revista Internacional de Andrología* 16, no. 1: 8–14. https://doi.org/10.1016/j.androl.2017.02.009.

Bonett, S., D. Teixeira da Silva, N. Lazar, S. Makeneni, and S. M. Wood. 2022. "Trends in Sexually Transmitted Infection Screening During COVID-19 and Missed Cases Among Adolescents." *Public Health* 213: 171–176. https://doi.org/10.1016/j.puhe.2022.10.007.

Cappelletti, S., M. Aromatario, E. Bottoni, et al. 2016. "Variability in Findings of Anogenital Injury in Consensual and Non-Consensual Fisting Intercourse: A Systematic Review." *Journal of Forensic and Legal Medicine* 44: 58–62.

da Silva, L. A. V., S. A. Brasil, F. M. Duarte, L. A. Cunha, and M. E. P. Castellanos. 2023. "Between Risk and Pleasure: Reflections on HIV Prevention and Care in the Current Context of PrEP Use by Men Who Have Sex With Men." *Cadernos de Saúde Pública* 39, no. S1: e00139221. https://doi.org/10.1590/0102-311XEN139221.

Del Pozo-Herce, P., E. Baca-García, A. Martínez-Sabater, et al. 2024. "Descriptive Study on Substance Uses and Risk of Sexually Transmitted Infections in the Practice of Chemsex in Spain." *Frontiers in Public Health* 12: 1391390. https://doi.org/10.3389/fpubh.2024.1391390.

Del Romero, J., S. Moreno Guillén, F. J. Rodríguez-Artalejo, et al. 2023. "Sexually Transmitted Infections in Spain: Current Status." *Revista Espanola de Quimioterapia* 36, no. 5: 444–465. https://doi.org/10.37201/req/038.2023.

Drouin, M., J. M. Ross, J. D. DiClementi, I. Palhoni de Lima, and A. Atkins. 2024. "Stealthing: Nonconsensual Condom Removal in Same-Sex and Opposite-Sex Intimate Relationships." *Psychology of Violence* 14, no. 2: 117–126. https://doi.org/10.1037/vio0000505.

Eckstrand, K. L., S. Choukas-Bradley, A. Mohanty, et al. 2017. "Heightened Activity in Social Reward Networks Is Associated With Adolescents' Risky Sexual Behaviors." *Developmental Cognitive Neuroscience* 27: 1–9. https://doi.org/10.1016/j.dcn.2017.07.004.

European Centre for Disease Prevention and Control. 2020a. "Gonorrhoea Annual Epidemiological Report for 2018." https://www.ecdc.europa.eu/en/publications-data/gonorrhoea-annual-epidemiological-report-2018.

European Centre for Disease Prevention and Control. 2020b. "Syphilis Annual Epidemiological Report for 2018." https://www.ecdc.europa.eu/en/publications-data/syphilis-annual-epidemiological-report-2018.

Fernández-Dávila, P., and K. Z. Lorca. 2011. "Hombres jóvenes que tienen sexo con hombres: ¿un colectivo en alto riesgo para la infección por el VIH?" *Gaceta Sanitaria* 25, no. 5: 372–378. https://doi.org/10.1016/j.gaceta.2011.05.012.

Galicia, P., S. Chuvieco, L. S. Larrégola, J. Cuadros, J. M. Ramos-Rincón, and M. Linares. 2023. "Conocimiento sobre chemsex, profilaxis preexposición contra el VIH (PrEP) y entrevista sexual en atención primaria: ¿estamos preparados?" *Medicina de Familia. SEMERGEN* 49, no. 4: 101929. https://doi.org/10.1016/j.semerg.2023.101929.

García-Villanueva, S., M. D. González, J. G. Martínez, et al. 2019. "Comparative Study of the Prevalence of the Human Papilloma Virus in Spanish and Foreign Women Participating in a Population Screening Programme in Castilla y León." *Enfermedades Infecciosas y Microbiología Clinica (English Ed)* 37, no. 5: 314–318. https://doi.org/10.1016/j.eimce.2019.03.003.

Gil-Llario, M. D., V. Morell-Mengual, M. García-Barba, J. E. Nebot-García, and R. Ballester-Arnal. 2023. "HIV and STI Prevention Among Spanish Women Who Have Sex With Women: Factors Associated With Dental Dam and Condom Use." *AIDS and Behavior* 27, no. 1: 161–170. https://doi.org/10.1007/s10461-022-03752-z.

Gómez-Castellá, J., M. Cobos Briz, N. Nuño, et al. 2024. "Quality, Acceptability and Usability of Self-Sampling Kits Used by Non-Healthcare Professionals for STI Diagnosis in Spain: A Single-Blind Study." *Sexually Transmitted Infections* 100, no. 7: 405–410. https://doi.org/10.1136/sextrans-2024-056124.

Guilamo-Ramos, V., D. D. Flores, S. D. Randolph, and E. B. Andjembe Etogho. 2021. "Nursing Contributions to Ending the Global Adolescent and Young Adult HIV Pandemic." *Journal of the Association of Nurses in AIDS Care* 32, no. 3: 264–282. https://doi.org/10.1097/JNC.0000000000000227.

Iniesta, C., P. Coll, M. J. Barberá, et al. 2021. "Implementation of Pre-Exposure Prophylaxis Programme in Spain. Feasibility of Four Different Delivery Models." *PLoS ONE* 16, no. 2: e0246129. https://doi.org/10.1371/journal.pone.0246129.

Instituto Nacional de Estadística. 2003a. "Encuesta de salud y hábitos sexuales. Año 2003." https://www.ine.es/jaxi/Datos.htm?path=/t15/p455/a2003/p02/l0/&file=02018.px.

Instituto Nacional de Estadística. 2003b. "Encuesta de salud y hábitos sexuales. Año 2003." https://www.ine.es/jaxi/Datos.htm?path=/t15/p455/a2003/p09/l0/&file=09012.px.

Jacobs, R. J., M. I. Fernandez, R. L. Ownby, G. S. Bowen, P. C. Hardigan, and M. N. Kane. 2010. "Factors Associated With Risk for Unprotected Receptive and Insertive Anal Intercourse in Men Aged 40 and Older Who Have Sex With Men." *Aids Care* 22, no. 10: 1204–1211. https://doi.org/10.1080/09540121003615137.

Kann, L., T. McManus, W. A. Harris, et al. 2018. "Youth Risk Behavior Surveillance—United States, 2017." *MMWR Surveillance Summaries* 67, no. 8: 1–114. https://doi.org/10.15585/mmwr.ss6708a1.

Kessler, R., B. T. Hinkle, A. Moyers, and B. Silverberg. 2020. "Adolescent Sexual Health." *Primary Care Clinics in Office Practice* 47, no. 2: 367–382. https://doi.org/10.1016/j.pop.2020.02.012.

Krist, A. H., K. W. Davidson, C. M. Mangione, et al. 2020. "Behavioral Counseling Interventions to Prevent Sexually Transmitted Infections." *JAMA* 324, no. 7: 674. https://doi.org/10.1001/jama.2020.13095.

Kusters, J. M., I. Obels, F. R. van der Klis, et al. 2024. "Prevalence and Risk Factors for HPV Seropositivity and Anogenital DNA Positivity Among Men Who Have Sex With Men: A Repeated Cross-Sectional Study." *International Journal of Infectious Diseases* 145: 107094. https://doi.org/10.1016/j.ijid.2024.107094.

Lachowsky, N. J., P. J. W. Saxton, A. J. Hughes, et al. 2016. "Frequent Condom Use With Casual Partners Varies by Sexual Position Among Younger Gay and Bisexual Men in New Zealand: National Behavioural Surveillance 2006–2011." *Sexual Health* 13, no. 1: 81. https://doi.org/10.1071/sh14220.

López De Munain, J. 2019. "Epidemiología y control actual de las infecciones de transmisión sexual. Papel de las unidades de ITS." *Enfermedades Infecciosas y Microbiología Clínica* 37, no. 1: 45–49. https://doi.org/10.1016/j.eimc.2018.10.015.

Medina-Martínez, J., C. Saus-Ortega, M. M. Sánchez-Lorente, E. M. Sosa-Palanca, P. García-Martínez, and M. I. Mármol-López. 2021. "Health Inequities in LGBT People and Nursing Interventions to Reduce Them: A Systematic Review." *International Journal of Environmental Research and Public Health* 18: 11801. https://doi.org/10.3390/ijerph182211801.

Ministerio de Sanidad. Servicios Sociales e Igualdad. 2018. "Glosario de términos sobre diversidad afectivo sexual. Plan Nacional sobre el SIDA." https://www.sanidad.gob.es/ciudadanos/enfLesiones/enfTransmisibles/sida/docs/GlosarioDiversidad.pdf.

Miró, O., E. Miró, E. J. García-Lamberechts, A. Villamor Ordozgoiti, and J. González Del Castillo. 2021. "Map of Sexually Transmitted Disease Care in Spanish Emergency Departments." *Revista Espanola de Quimioterapia* 34, no. 4: 353–364. https://doi.org/10.37201/req/051.2021.

Morales, A., S. Tomczyk, M. Orgilés, and J. P. Espada. 2021. ""Who Are at Higher Sexual Risk?" Latent Class Analysis of Behavioral Intentions Among Spanish Adolescents." *International Journal of Environmental Research and Public Health* 18, no. 4: 1855. https://doi.org/10.3390/ijerph18041855.

Morgado-Carrasco, D., M. A. Gibert, J. B. Mestres, M. Á. Martínez, J. L. B. Arévalo, and I. F. De Vega. 2019. "Infecciones de transmisión sexual con afectación anorrectal: agentes causales, coinfecciones, infección por el VIH y conductas de riesgo." *Medicina Clinica* 152, no. 3: 98–101. https://doi.org/10.1016/j.medcli.2018.02.014.

O'Byrne, P. 2020. "Considerations for Research on Sexually Transmitted Infections (STIs): Reflections of an STI Clinician–Researcher." *Archives of Sexual Behavior* 49, no. 6: 1863–1873. https://doi.org/10.1007/s10508-020-01726-7.

Ortiz-Martínez, Y., A. Buelvas-Pérez, A. Martínez-Torres, K. Vásquez-Rada, and A. E. Carrascal-Angelo. 2018. "Dating Apps and Increased Sexual Risk Behaviors While Traveling: Challenges and Opportunities for Public Health." *Travel Medicine and Infectious Disease* 24: 7. https://doi.org/10.1016/j.tmaid.2018.04.015.

Otero-Guerra, L., L. Gil-Alonso, J. López-de Munain, et al. Sexually Transmitted Infections Study Group GEITS. 2021. "Survey of Diagnostic Resources for STI in Spain." *Enfermedades infecciosas y microbiologia clinica (English Ed.)* 39, no. 8: 390–394. https://doi.org/10.1016/j.eimce.2021.07.002.

Peduzzi, P., J. Concato, E. Kemper, T. R. Holford, and A. R. Feinstein. 1996. "A Simulation Study of the Number of Events per Variable in Logistic Regression Analysis." *Journal of Clinical Epidemiology* 49, no. 12: 1373–1379. https://doi.org/10.1016/s0895-4356(96)00236-3.

Pellico-López, A., L. Ruiz-Azcona, M. Sánchez Movellán, et al. 2022. "Evolution of the Epidemiological Surveillance Indicators of the Main Sexually Transmitted Infections in Spain: A Retrospective Observational Study (2011-2019)." *Midwifery* 111: 103362. https://doi.org/10.1016/j.midw.2022.103362.

Pérez-Morente, M. Á., M. T. Sánchez-Ocón, E. Martínez-García, A. Martín-Salvador, C. Hueso-Montoro, and I. García-García. 2019. "Differences in Sexually Transmitted Infections Between the Precrisis Period (2000–2007) and the Crisis Period (2008–2014) in Granada, Spain." *Journal of Clinical Medicine* 8, no. 2: 277. https://doi.org/10.3390/jcm8020277.

Prosser, R. 2019. "The Itchy, Scratchy, Bumpy, and Burning Truths about Sex, and Pre-Exposure Prophylaxis (PrEP)." In *Manual of Men's Health a Practice Guide for APRNs and PAs*, edited by S. A. Quallich, M. Lajiness, and K. Mitchell, 231–241. Springer.

Red Nacional de Vigilancia Epidemiológica. 2023. "Epidemiología de enfermedades transmisibles." https://cne.isciii.es/es/servicios/enfermedades-transmisibles/protocolos-renave.

Redondo-Martín, S., C. Amezcua-Prieto, M. M. Suarez-Varela, et al. 2021. "Declared Experiences of Risky Sexual Behaviors in Relation to Alcohol Consumption in the First Year of College." *Revista Española Salud Publica* 95: 1–16.

Rodrigues, D. L., A. C. Carvalho, M. Prada, et al. 2024. "Condom Use Beliefs Differ according to Regulatory Focus: A Mixed-Methods Study in Portugal and Spain." *Journal of Sex Research* 61, no. 5: 709–726. https://doi.org/10.1080/00224499.2023.2181305.

Santa-Bárbara, R. C., C. Hueso-Montoro, A. Martín-Salvador, M. A. Álvarez-Serrano, M. Gázquez-López, and M. Á. Pérez-Morente. 2020. "Association Between Sexual Habits and Sexually Transmitted Infections at a Specialised Centre in Granada (Spain)." *International Journal of Environmental Research and Public Health* 17, no. 18: 6881. https://doi.org/10.3390/ijerph17186881.

Sentís, A., M. Montoro-Fernandez, E. Lopez-Corbeto, et al. 2021. "STI Epidemic Re-Emergence, Socio-Epidemiological Clusters Characterisation and HIV Coinfection in Catalonia, Spain, During 2017–2019: A Retrospective Population-Based Cohort Study." *BMJ Open* 11, no. 12: e052817. https://doi.org/10.1136/bmjopen-2021-052817.

Ugarte, A., L. De la Mora, D. García, et al. 2023. "Evolution of Risk Behaviors, Sexually Transmitted Infections and PrEP Care Continuum in a Hospital-Based PrEP Program in Barcelona, Spain: A Descriptive Study of the First 2 Years' Experience." *Infectious Diseases and Therapy* 12, no. 2: 425–442. https://doi.org/10.1007/s40121-022-00733-6.

Vannucci, A., E. G. Simpson, S. Gagnon, and C. M. Ohannessian. 2020. "Social Media Use and Risky Behaviors in Adolescents: A Meta-Analysis." *Journal of Adolescence* 79, no. 1: 258–274. https://doi.org/10.1016/j.adolescence.2020.01.014.

Wang, H., J. Zhang, Z. Chu, et al. 2020. "Risk-Taking Behaviors and Adherence to HIV Pre-Exposure Prophylaxis in Users of Geosocial Networking Apps: Real-World, Multicenter Study." *Journal of Medical Internet Research* 22, no. 10: e22388. https://doi.org/10.2196/22388.

Wangu, Z., and G. R. Burstein. 2017. "Adolescent Sexuality." *Pediatric Clinics of North America* 64, no. 2: 389–411. https://doi.org/10.1016/j.pcl.2016.11.008.

Workowski, K. A., L. H. Bachmann, P. A. Chan, et al. 2021. "Sexually Transmitted Infections Treatment Guidelines, 2021." *MMWR Recommendations and Reports* 70, no. 4: 1–187. https://doi.org/10.15585/mmwr.rr7004a1.

World Health Organization. 2016. "Global Health Sector Strategy on Sexually Transmitted Infections 2016–2021." https://iris.who.int/bitstream/handle/10665/246296/WHO-RHR-16.09-eng.pdf?sequence=1.

World Health Organization. 2024a. "Framework for Monitoring Sexually Transmitted Infections and Strengthening Surveillance." https://iris.who.int/bitstream/handle/10665/378238/9789240097674-eng.pdf?sequence=1.

World Health Organization. 2024b. "Sexually Transmitted Infections (STIs)." https://www.who.int/news-room/fact-sheets/detail/sexually-transmitted-infections-(stis).

World Health Organization. 2024c. "Implementing the Global Health Sector Strategies on HIV, Viral hepatitis and Sexually Transmitted Infections, 2022–2030: Report on Progress and Gaps 2024, Second Edition." https://iris.who.int/bitstream/handle/10665/378246/9789240097872-eng.pdf?sequence=1.