Article

Sexually Transmitted Infections in 2000–2018 in a Specialised Centre: Comparison between Pre-Crisis, Crisis, and Post-Crisis Period

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Abstract: (1) Background: Sexually Transmitted Infections (STIs) are a major public health problem due to their consequences in sexual and reproductive health. There is a close link between the crisis and the increase in communicable diseases. The objective of this study was to analyse the evolution of Sexually Transmitted Infections during the period 2000–2018 in the population attending the Centre for Sexually Transmitted Diseases and Sexual Orientation in Granada (Spain), specifically comparing the pre-crisis, crisis, and post-crisis periods. (2) Methods: A retrospective, observational, and analytical study was conducted by reviewing medical records. The sample analysed comprised 1666 cases. (3) Results: During the pre-crisis period (2000–2007), the percentage of diagnoses was 41.6% ($n = 126$) compared to 58.4% ($n = 177$) of negative results; during the crisis, the percentages were 63.5% ($n = 183$) and 36.5% ($n = 105$), respectively; and during the post-crisis period, the percentages were 42.9% ($n = 157$) and 57.1% ($n = 209$), respectively. The variables that were significantly associated with STI diagnosis were the time periods analysed, sexual orientation, occupation, and age at first intercourse. The evolution of the number of positive diagnoses during the entire study period showed a trend of progressive increase in Sexually Transmitted Infections from 2000 to 2018. (4) Conclusions: The period of economic crisis presented a higher risk of infection, although this is a finding with certain limitations due to the lack of homogeneity between the periods analysed.

Keywords: sexually transmitted diseases; risk factors; social determinants of health; economic recession; sexual behaviour; epidemiology

1. Introduction

Sexually Transmitted Infections (STIs) are a major public health problem, with more than one million people contracting them each year and their consequences leading to sexual and reproductive health complications [1]. This results in increased expenditure and, therefore, increased consumption and use of health and social care services [2]. This situation could further compromise the sexual and reproductive health of the most vulnerable population groups and those with the highest rates of STIs, such as sex workers, men who have sex with men, injection drug users, prisoners, nomadic populations, and adolescents [1].

Globally, some 374 million people are infected with syphilis, chlamydia, trichomoniasis, and blennorrhoea each year, while herpes simplex virus (HSV) affects an estimated 500 million people aged 15–49 years [1]. In Europe, the most frequent cause of morbidity is STIs, with over 400,000 cases of chlamydia, 89,000 cases of gonorrhoea, and 33,000 cases of syphilis diagnosed in 2017, according to the European Surveillance Authority [3]. In 2018 alone, in Spain there were 5079 cases of syphilis, 13,109 of Chlamydia trachomatis, 11,044 of gonococcal infection, and 282 of Lymphogranuloma venereum. These figures show a progressive increase in rates, more frequent in men than in women, with the exception of Chlamydia trachomatis, which is mostly contracted by women under 25 years of age [4].

The transmission of infectious agents has been increasing both for contextual reasons in the work and home environment, as well as for behavioural reasons such as drug use, unsafe sexual practices, and lack of therapeutic and preventive measures [5]. With economic crises, studies describe a worsening of some health indicators, especially in the most affected countries and in particularly vulnerable groups such as the unemployed, low-income earners, immigrants, and ethnic minorities [6], and at critical ages such as childhood, youth, and old age [5,7]. There is a close link between the crisis and the increase in communicable diseases due to the deterioration in epidemic prevention and control programs, poor living conditions, and the worsening in socioeconomic inequalities characterised by the destruction of employment, and by work and precarious housing. [6]. In addition to the above, the growing difficulty in accessing social and health services, and insufficient resources for epidemiological surveillance and public health systems due to abusive cuts, should be noted [5].

The austerity measures imposed in the crisis years include increased privatisation in the management of public health services, wage cuts, and job insecurity, together with cuts in the service sector and an increase in the level of unemployment, all of which contribute to this increase in communicable diseases and, consequently, in STIs [5]. Low living standards in times of crisis increase economic pressure on many households, leading to overcrowding, malnutrition, and reduced immunity due to high levels of stress. As a consequence, infectious diseases have negative effects, including economic ones, making recovery even more difficult [2]. In Spain, between 2008 and 2014, coinciding with the period of crisis, some STIs that were thought to have been suppressed, such as gonorrhoea and syphilis, reappeared [8], together with an increase in the incidence of other infections such as hepatitis, HIV, and Human Papilloma Virus (HPV), when it was believed that there was detailed control of the latter [9].

According to the conclusions of the document on "Epidemiological surveillance of STIs in Spain in 2018", the increasing trend of gonococcal infection and syphilis, observed since the beginning of the 2000s, continues [4]. The present study is a continuation of a previously published study [10] which analysed the evolution and behaviour of STIs, from the period before and during the economic crisis, in users attending a specialised centre in the city of Granada, Spain. The analysis in the current research includes the period after the economic crisis, based on the premise that improvements in socioeconomic conditions after the recession years could have led to a decrease in the number of STI diagnoses. This research therefore provides evidence on how the period after the economic crisis has influenced the evolution of STIs. Based on the above, the aim of this study was to analyse the evolution of STIs during the period 2000–2018 in the population attending the Centre for Sexually Transmitted Diseases in the province of Granada, specifically comparing the pre-crisis, crisis, and post-crisis periods.

2. Materials and Methods

2.1. Design and Data

A retrospective, observational, and analytical study was conducted by reviewing medical records from the Centre for Sexually Transmitted Diseases and Sexual Orientation in Granada (Spain). This is a reference centre in southern Spain.

Data were obtained from the records of adult subjects without cognitive impairment (ascertained by accessing the clinical history) who came to the centre for consultation associated with the presence or suspected transmission of an STI. The clinical history included four options (symptomatology, control, contact tracing, and HIV) and those in which one of these options was ticked were selected. Data from sex workers were excluded because of the potential bias that could result from the inclusion of this group, which is more exposed to STIs.

2.2. Data Collection

The study period covered the years 2000 to 2018. Additionally, the periods 2000–2007, 2008–2014, and 2015–2018 were compared. These periods differ according to the impact of the economic crisis during the second period. Therefore, the pre-crisis period was considered as 2000–2007, the crisis period as 2008–2014, and the post-crisis period as 2015–2018. Subsequent periods have not been included in this research as the pandemic prevented data collection, an issue that will be addressed in future research.

The sample was drawn from the total number of records included in that period, in this case 26,834 records. To determine the sample size, a finite population was considered, with a 95% confidence level, a precision of 3%, and an expected proportion of STIs of 50% (to maximise the sample size), obtaining an *n* equal to 1026 records. Simple random sampling without replacement was used. The method of sample attainment was based on new records per year, from which the first and last record number of that year was taken, thus obtaining a proportional sample per year. When the selected medical record did not meet the inclusion criteria, the immediately preceding medical record was selected; if it also did not meet the criteria, the medical record immediately following the initial one was selected. If the inclusion criteria were not met in both cases, the selection continued backwards and forwards until a medical record that met the criteria was obtained.

An ad hoc data collection sheet was prepared based on the study variables. Subsequently, a computerised database was designed to contain the information compatible with the statistical analysis software used. Data collection was carried out face-to-face at the centre using paper medical records by three researchers who were previously trained to ensure a homogeneous and consensual process. An initial pilot study was conducted on 110 medical record to refine the data collection sheet and clarify doubts about some variables. The people who participated in the data collection had university training in health sciences.

2.3. Variable Selection

The dependent variable was STI diagnosis, which was coded as a dichotomous variable (Yes/No). Histories in which the positive or negative result of the STI diagnosis was explicitly recorded according to medical criteria were considered [11]. The remaining variables were grouped into two categories: socio-demographic characteristics and risk indicators. The data for each variable were collected as they appeared on the record sheet used in the centre where the research was carried out, adapting the categories of some of them to facilitate the analysis.

2.4. Data Analysis

For the statistical analysis, descriptive statistics were used to obtain the median (Me) and the interquartile range (IQR) for continuous variables. For categorical variables, absolute frequency (*n*) and percentage (%) were used. To analyse the normality of the continuous variables, the values of skewness and kurtosis were analysed, as well as the Kolmogorov–Smirnoff test, and a non-normal distribution was observed.

Subsequently, non-parametric hypothesis testing was carried out. The Kruskal–Wallis and U Mann–Whitney tests were used. To compare categorical variables, contingency tables were created and the chi-square test (χ^2) was performed; when this could not be applied, the generalisation of Fisher's exact test was used.

To complete the analysis, a multiple logistic regression analysis was performed, taking STI diagnosis as the outcome variable. In the selection of covariates, we first included those that were significantly associated with the main variable in the bivariate analysis, and then excluded those that lost statistical significance in the regression analysis. For each variable included in the model, the odds ratio (OR) was calculated with the 95% confidence interval (CI). Once the model was generated, the fit conditions were checked. Collinearity between variables was investigated by calculating the variance inflation factor (VIF); linearity of the dependent variable with the continuous variables included in the model was checked, and calibration was determined using the Hosmer–Lemeshow goodness-of-fit test. Finally, discrimination was determined from the value of the area under the Receiver Operating Characteristic (ROC) curve. The number of records selected ensured a sufficient number of cases per variable entered in the model, according to the method described by Peduzzi et al. [12].

In all analyses, a value of $p < 0.05$ was considered statistically significant. Calculations were performed with R commander software, R version 3.2.2 (https://www.r-project.org/, R-UCA Project, http://knuth.uca.es/R, accessed on 15 January 2023) and IBM SPSS© v.26 (IBM Corporation, Armonk, NY, USA) using the corporate licence of the University of Granada.

2.5. Ethical Considerations

This study was approved by the Biomedical Research Ethics Committee of the province of Granada.

3. Results

The final sample consisted of 1666 medical records, of which 656 were from the pre-crisis period, 629 from the crisis period, and 381 from the post-crisis period. The results show that in all three periods, the populations were homogeneous in terms of age, sex, and marital status, with statistically significant differences found by nationality, educational level, and sexual orientation (Table 1).

Table 1. Socio-demographic characteristics.

Variable	Pre-Crisis (*n* = 656)			Crisis (n = 629)			Post-Crisis (*n* = 381)			*p* [c]
	n	Me [a]	IQR [b]	*n*	Me [a]	IQR [b]	*n*	Me [a]	IQR [b]	
Age (*n* = 1664)	656	26	9	629	26	9	379	26	13	0.958
Variables	*n*	%		*n*	%		*n*	%		*p* [d]
Sex (*n* = 1666)										
Man	375	57.2%		392	62.3%		225	59.1%		0.166
Woman	281	42.8%		237	37.7%		156	40.9%		
Nationality (*n* = 1649)										
Spanish	510	79.4%		522	83.3%		330	86.8%		0.009
Another	132	20.6%		105	16.7%		50	13.2%		
Occupation (*n* = 1551)										
Another	307	53.0%		353	57.5%		198	55.3%		0.300
Student	272	47.0%		261	42.5%		160	44.7%		
Level of education (*n* = 1584)										
Superiors	315	51.6%		351	57.9%		217	59.0%		0.032
Other	295	48.4%		255	42.1%		151	41.0%		
Marital status (*n* = 1654)										
Single	526	80.7%		529	84.5%		319	84.8%		0.110
Another	126	19.3%		97	15.5%		57	15.2%		
Sexual orientation (*n* = 1634)										
Straight	564	87.7%		460	74.7%		276	73.6%		
Bisexual	16	2.5%		34	5.5%		27	7.2%		<0.001
Homosexual	63	9.8%		122	19.8%		72	19.2%		

[a] Median; [b] Interquartile Range; [c] Kruskal–Wallis test; [d] chi-square test (χ^2).

In terms of risk indicators, there were significant differences between the three periods in age at first intercourse, time since last unprotected sex, partners in the last month and in the last year, lifetime partners, regular partner, and contact with sex workers. The population was homogeneous for all other variables (Table 2).

Table 2. Risk indicators.

Variable	Pre-Crisis (n = 656)			CRISIS (n = 629)			Post-Crisis (n = 381)			p [c]
	n	Me [a]	IQR [b]	*n*	Me [a]	IQR [b]	*n*	Me [a]	IQR [b]	
Age at first sexual intercourse (n = 1081)	288	18	3	449	17	2	344	17	3	<0.001

Variables	*n*	%	*n*	%	*n*	%	p [d]
Last unprotected sexual contact (n = 1071)							
Never	6	1.5%	38	8.4%	10	4.4%	
Less than 1 month	155	39.7%	189	41.8%	100	43.7%	
Between 1 and 6 months	169	43.3%	183	40.5%	92	40.2%	<0.001
Between 6 and 12 months	21	5.4%	24	5.3%	15	6.6%	
More than 12 months	39	10.0%	18	4.0%	12	5.2%	
Partners in the last month (n = 1568)							
0–1	501	85.2%	518	84.2%	241	66.0%	
2	56	9.5%	54	8.8%	78	21.4%	<0.001
3–5	28	4.8%	34	5.5%	34	9.3%	
More than 5	3	0.5%	9	1.5%	12	3.3%	
Couples in the last year (n = 1551)							
0–1	224	38.6%	219	36.1%	90	24.8%	
2	139	23.9%	122	20.1%	69	19.0%	
3–5	139	23.9%	158	26.0%	105	28.9%	<0.001
6–10	53	9.1%	80	13.2%	55	15.2%	
11–20	16	2.8%	15	2.5%	30	8.3%	
More than 20	10	1.7%	13	2.1%	14	3.9%	
Lifetime partners (n = 537)							
0–10	79	61.2%	108	51.2%	94	47.7%	
10–20	24	18.6%	51	24.2%	37	18.8%	0.034
More than 20	26	20.2%	52	24.6%	66	33.5%	
Stable couple (n = 1561)							
Yes	401	67.3%	376	61.8%	198	55.5%	
No	195	32.7%	232	38.2%	159	44.5%	0.001
Relationships with sex workers (n = 770)							
Yes	75	27.4%	53	18.3%	39	18.8%	
No	199	72.6%	236	81.7%	168	81.2%	0.017
Regular partner with STI symptoms (n = 577)							
Yes	66	38.8%	108	42.9%	56	36.1%	
No	104	61.2%	144	57.1%	99	63.9%	0.383
Drug use (n = 1001)							
Yes	108	37.0%	128	34.8%	98	28.7%	
No	184	63.0%	240	65.2%	243	71.3%	0.069
Previous STIs (n = 1397)							
Yes	447	80.0%	382	78.6%	265	75.3%	
No	112	20.0%	104	21.4%	87	24.7%	0.244

[a] Median; [b] Interquartile Range; [c] Kruskal–Wallis test; [d] chi-square test (χ^2).

When analysing the presence of STIs between the three periods, 957 medical records were analysed: 303 from the non-crisis period, 288 from the crisis period, and 366 from the post-crisis period. It was observed that, during the pre-crisis period, the percentage of diagnoses was 41.6% (*n* = 126) compared to 58.4% (*n* = 177) of negative results for STIs; during the crisis, the percentages were 63.5% (*n* = 183) and 36.5% (*n* = 105), respectively; and during the post-crisis period, the percentages were 42.9% (*n* = 157) and 57.1% (*n* = 209), respectively. According to bivariate analysis, this difference was statistically significant (p < 0.001) (Figure 1).

If we analyse the evolution of the number of diagnoses throughout the study period, we observe a trend of progressive increase from 2000 to 2018 (Figure 2).

According to the bivariate analysis, the STI variable was also associated with age at first sexual intercourse, sex, nationality, occupation, educational level, and sexual behaviour (Table 3).
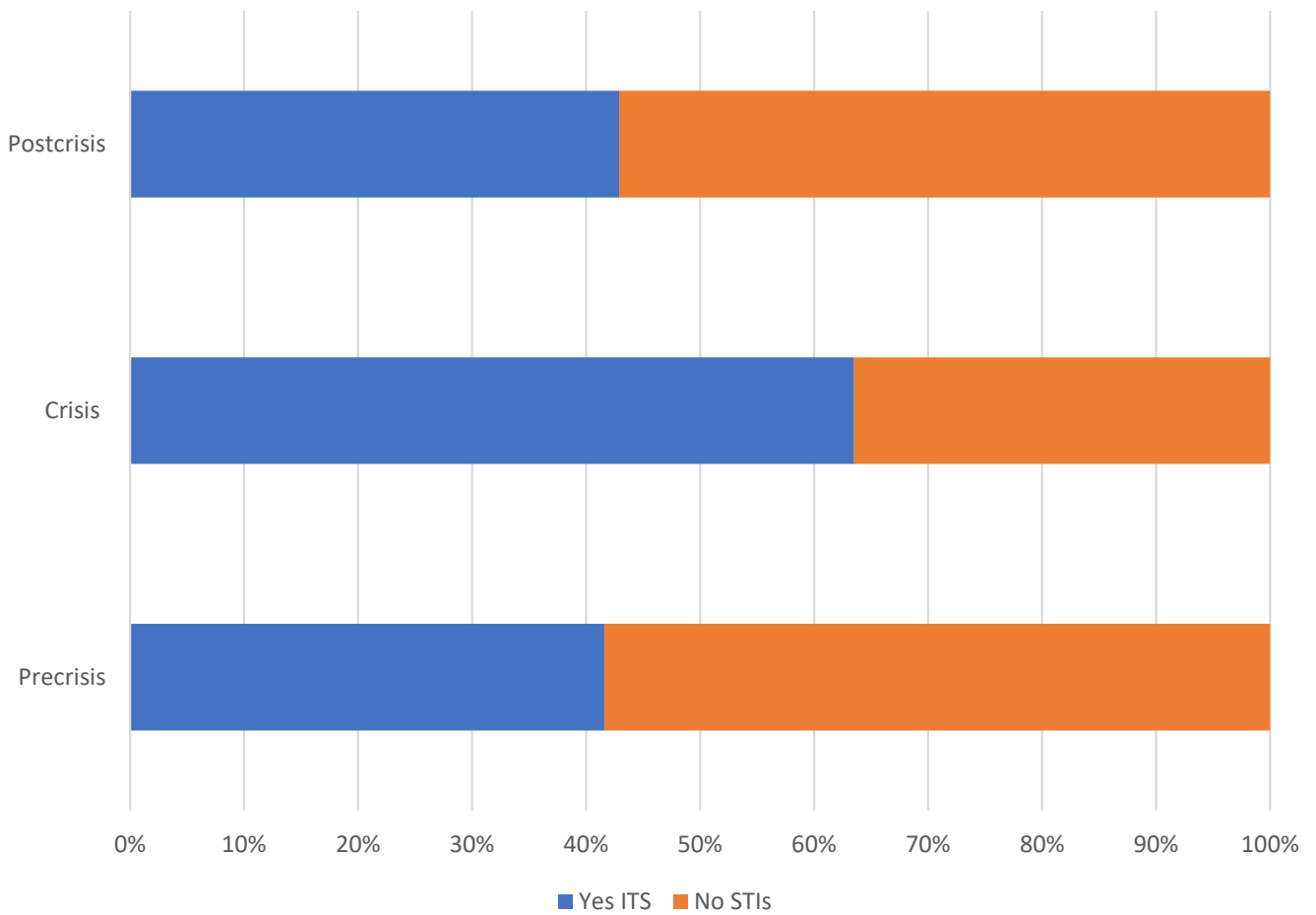
Figure 1. Proportion of STIs (Yes/No) in all three study periods.
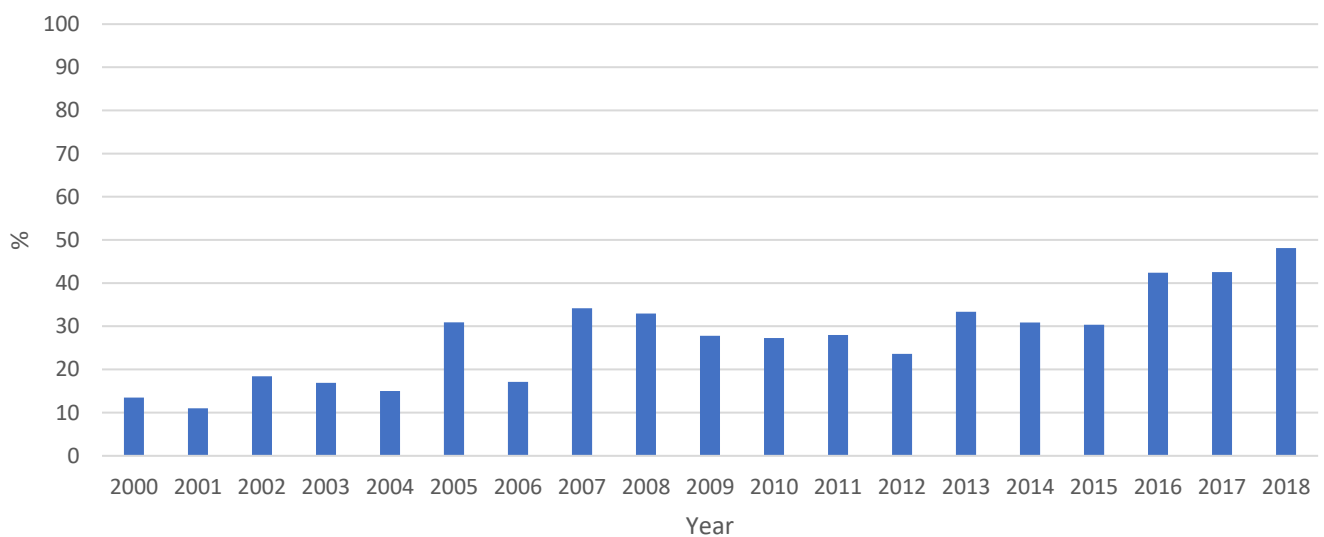
Figure 2. Evolution of the number of STIs over the entire study period. Proportion of STI diagnoses as a function of the total number of cases per year.

Table 3. STIs vs. other variables.

	No STIs (*n* = 491)			Yes ITS (*n* = 466)			*p* [c]
Variables	*n*	Me [a]	IQR [b]	*n*	Me [a]	IQR [b]	
Age (*n* = 956)	490	26	12	466	26	11	0.614
Age at first sexual intercourse (*n* = 593)	314	17	3	279	17	3	<0.001

Variables	n	%	n	%	*p* [d]
Sex (*n* = 957)					
Man	291	59.3%	315	67.6%	0.008
Woman	200	40.7%	151	32.4%	
Nationality (*n* = 950)					
Spanish	408	83.8%	411	88.8%	0.026
Another	79	16.2%	52	11.2%	
Occupation (*n* = 887)					
Another	227	50.9%	277	62.8%	<0.001
Student	219	49.1%	164	37.2%	
Level of education (*n* = 914)					
Top	275	58.6%	229	51.5%	0.029
Another	194	41.4%	216	48.5%	
Marital status (*n* = 951)					
Single	395	81.3%	381	81.9%	0.793
Another	91	18.7%	84	18.1%	
Sexual orientation (*n* = 933)					
Straight	388	81.2%	342	75.2%	
Bisexual	34	7.1%	18	4.0%	<0.001
Homosexual	56	11.7%	95	20.9%	
Last unprotected sexual contact (*n* = 549)					
Never	14	5.3%	17	6.0%	
Less than 1 month	121	45.5%	125	44.2%	
Between 1 and 6 months	108	40.6%	112	39.6%	0.950
Between 6 and 12 months	10	3.8%	14	4.9%	
More than 12 months	13	4.9%	15	5.3%	
Partners in the last month (*n* = 901)					
0–1	354	77.5%	342	77.0%	
2	70	15.3%	58	13.1%	
3–5	27	5.9%	35	7.9%	0.427
More than 5	6	1.3%	9	2.0%	
Partners in the last year (*n* = 897)					
0–1	157	34.6%	160	36.1%	
2	88	19.4%	76	17.2%	
3–5	119	26.2%	113	25.5%	
6–10	66	14.5%	57	12.9%	0.284
11–20	19	4.2%	23	5.2%	
More than 20	5	1.1%	14	3.2%	
Couples throughout life (*n* = 317)					
0–10	84	53.8%	70	43.5%	
10–20	33	21.2%	34	21.1%	0.101
More than 20	39	25.0%	57	35.4%	
Stable couple (*n* = 898)					
Yes	290	63.3%	284	64.5%	0.702
No	168	36.7%	156	35.5%	
Relationships with sex workers (*n* = 465)					
Yes	52	23.3%	41	16.9%	0.086
No	171	76.7%	201	83.1%	
Regular partner with STI symptoms (*n* = 371)					
Yes	69	39.2%	87	44.6%	0.292
No	107	60.8%	108	55.4%	
Drug use (*n* = 571)					
Yes	85	28.3%	90	33.2%	0.207
No	215	71.7%	181	66.8%	
Previous STIs (*n* = 814)					
Yes	323	78.2%	292	72.8%	0.074
No	90	21.8%	109	27.2%	

[a] Median; [b] Interquartile Range; [c] U Mann–Whitney test; [d] chi-square test (χ^2).

The regression model generated is shown in Table 4. The variables included that were significantly associated with STI diagnosis were the time periods analysed, sexual orientation, occupation, and age at first intercourse.

Table 4. Logistic regression model of variables associated with STIs [a].

Variable	OR [b] [95% CI] [c]	*p*	VIF [d]
Period			
Crisis	Ref.	Ref.	
No Crisis	0.55 (0.31–0.94)	0.031	1.06
Post-crisis	0.40 (0.26–0.60)	<0.001	
Sexual orientation			
Straight	Ref.	Ref.	
Bisexual	0.35 (0.14–0.76)	0.012	1.05
Homosexual	1.87 (1.17–3.01)	0.009	
Profession			
Other	Ref.	Ref.	1.02
Student	0.54 (0.37–0.77)	<0.001	
Age of first sexual intercourse	0.88 (0.82–0.95)	0.001	1.08

[a] Calibration (Hosmer–Lemeshow goodness-of-fit test): X-squared = 4.61, degrees of freedom = 8, *p* = 0.798. Area under the ROC curve = 0.68 (95% CI = 0.63–0.72). *n* = 554. [b] Odds ratio (OR); [c] 95% Confidence interval (95% CI); [d] Variance Inflation Factor (VIF).

4. Discussion

This study provides data on the evolution of STIs and their behaviour during the period 2000–2018 in a population that attended a specialised reference centre for the care of these infections, comparing three different periods (pre-crisis, crisis, and post-crisis) due to the economic crisis that occurred between 2008 and 2014.

The profile of the population analysed and delimited in the three periods significantly show a progressive decrease in the proportion of the immigrant population attending the centre, which was accompanied by an increase in the population with a higher level of education. These findings coincide with the official data published by the National Institute of Statistics [13] on the foreign population in Spain from 1998 to 2021 and with the study by the EPI-VIH group [14], as well as with those published by the INE [15] regarding the progressive increase in the educational level of the Spanish population during the post-crisis period. Another striking fact is the progressive increase in the proportion of subjects with homosexual or bisexual orientation compared to those with heterosexual orientation. If we analyse the risk factors, it is worth highlighting the increase in the time of unprotected sexual relations in the post-crisis period compared to the crisis period, as well as an increase in the number of partners.

In relation to the behaviour of STIs, it is worth recalling that the study preceding this research [10] concluded that the probability of infection was higher in the crisis period compared to the pre-crisis period. In the new period analysed, which was characterised by economic recovery, there was a lower proportion of positive diagnoses compared to the crisis period, which was similar to the pre-crisis period. These findings are in line with what has already been published on how economic crises affect the health of the population and, in particular, infectious diseases such as STIs [2,10,16–19].

However, the above hypothesis has nuances that should be clarified in the light of the results obtained. The data on the evolution of STIs in the period of time analysed shows a trend of progressive increase in the number of infections from 2000 to 2018, so that, in absolute terms, the number of STIs was higher in recent years than in previous years. This coincides with the epidemiological data for Spain in recent years, which maintain an upward trend in the diagnosis of these infections; this was especially marked from 2005 to 2018, both in gonorrhoea and syphilis [20], as well as in Chlamydia trachomatis, with more than double the number of notifications in 2019 compared to 2016 [21]. Although the evolution of the main STIs in Spain follows the same upward pattern as in Europe, Spain is one of the countries with the highest rates [22].

It is important to note that the number of medical records with a positive or negative result of the clinical diagnosis recorded in the centre where the research was carried out was higher in the post-crisis period, despite fewer years of analysis. This, on the one hand,

shows an improvement in screening procedures due to greater control of the diagnostic procedure, which could be due to improved economic conditions and greater accessibility to the health system following the restrictive measures of Royal Decree Law 16/2012 [23]. On the other hand, these data must be taken into account to contextualise the difference observed in terms of the proportion of STIs in the three periods analysed, which could call into question the attribution to the economic crisis of a greater probability of infection of these infections.

Finally, regression analysis also shows that starting sex earlier, being gay, and working (not being a student) are factors that predict a higher likelihood of STI transmission. Evidence confirms that early sexual debut is a contributing factor to an increase in STIs [24,25]. Behavioural patterns in the adolescent population confirm that young people are starting to engage in full sexual relations at an increasingly younger age [26], which, together with a lack of information and guidance, and the immaturity at younger ages, exposes young people to significant risks [27]. Hence, this population group is considered among the most vulnerable to STIs [1,28,29]. Scientific evidence also places homosexual men and other men who have sex with men (MSM) [30] among the groups vulnerable to infection by these infections, which is in line with the results of this research. Likewise, the relationship found between being in employment and having a higher probability of STIs could be justified because a better economic situation may predispose to risk behaviour. In this sense, a previous study found an association between socioeconomic status and the prevalence of Chlamydia trachomatis in three regions with different levels of development, observing higher prevalence in the most economically developed region; among the reasons given by the authors was the greater likelihood of extramarital sexual behaviour and multiple sexual partners [31].

This study has some limitations, one of which is related to the high percentage of missing values in some variables, which is a common handicap when researching medical records. Furthermore, it is important to be cautious with the extrapolation of results, as this was a single-centre, single-province study, which limits its external validity. Nevertheless, the WHO has emphasised in recent years the need for local-level data to improve the approach to STIs [32]. It should also be borne in mind that, despite having analysed a large time series and having a high number of cases, as this was a cross-sectional design, the associations found should be considered to be causal hypotheses that should be verified with other studies. Finally, the post-crisis period has fewer years of analysis due to the outbreak of the COVID19 pandemic, which poses the challenge of assessing its influence on the behaviour of STIs in future research.

5. Conclusions

In conclusion, the results show that the period of economic crisis, in proportional terms, presented a higher risk in the study population with respect to STI infection. However, there was a clear trend towards a progressive increase in these infections from 2000 to 2018, which could be explained by the improvement in screening systems. This could raise doubts about the effect of the economic crisis on these infections, at least in the series analysed.

Our results also confirm the existence of already studied risk factors such as early sexual debut or the vulnerability of certain groups. It is therefore a priority objective to pay attention to risk behaviours and vulnerable groups in sexual health prevention programmes. In addition, the social and economic context of the country should be taken into account, so that in situations of recession the health system should be strengthened to minimise its impact on the health of the population.

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