SYPHILIS INFECTION IN A MALE POPULATION: PREVALENCE AND RISK FACTORS

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Recebido em: 03/10/2016 – Aprovado em: 21/11/2016 – Publicado em: 05/12/2016
DOI: 10.18677/EnciBio_2016B_193

INFECÇÃO DE SÍFILIS EM UMA POPULAÇÃO MASCULINA: PREVALÊNCIA E FATORES DE RISCO

RESUMO

Introdução/objetivo: Conhecer as características da população masculina atendida em um ambulatório é importante para guiar as melhores políticas públicas para a prevenção das doenças sexualmente transmissíveis. Métodos: Um estudo de corte transversal foi realizado durante o período de 2014-2015. A amostra constituiu 186 homens entrevistados durante a consulta médica. Análises bivariadas e multivariadas foram realizadas para o diagnóstico de sífilis e fatores associados. Resultados: Aproximadamente 14% dos homens atendidos foram positivos na sorologia para sífilis. Na análise bivariada, apenas o uso de qualquer droga ilícita nos últimos 12 meses foi considerado como variável preditiva para o diagnóstico da doença. Na análise multivariada, apenas a circuncisão foi considerada estatisticamente significante como um fator de proteção contra sífilis. Conclusões: é alto o número de casos de sífilis nos homens tratados em uma clínica especializada e ser circuncidado constituiu uma variável independente para proteção. Conhecer a respeito das doenças sexualmente transmissíveis (DSTs) não repercutiu em medidas preventivas, como o uso de preservativos. Além disso, a resistência masculina em procurar atendimento médico especializado reforça a necessidade de estratégias contínuas e específicas para esses indivíduos.
PALAVRAS-CHAVE: sífilis, epidemiologia, comportamento sexual.

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ABSTRACT

Introduction/aim: Knowing the characteristics of the male population attended in a public outpatient clinic is important to best guide public politics for preventing the sexually transmitted diseases. Methods: A cross-sectional study was conducted in the years 2014 and 2015. The sample was composed of 186 men interviewed during

the medical consultation. Bivariate and multivariate analyses were performed for the diagnosis of syphilis and associated factors. Results: Approximately 14% of the attended men exhibited positive serology for syphilis. In the bivariate analysis, only the use of any illicit drug in the past 12 months was considered as a predictive variable for the diagnosis of syphilis. In the multivariate analysis, only the realization of circumcision was considered statistically significant as a protective factor for syphilis. Conclusions: the number of cases of syphilis in men treated in a specialized clinic is high, and being circumcised constituted an independent variable for protection. Having information on SDT (Sexually Transmitted Diseases) did not reverberate in care measurements, such as the use of condoms; also, the resistance of the male population in seeking health care reinforces the need for continuous and specific strategies for these individuals.
KEYWORDS: syphilis, epidemiology, sexual behaviour.

INTRODUCTION

Syphilis is an infectious disease caused by a bacteria of high pathogenicity called *Treponema pallidum*, the infection initially presents genital ulcer and chronic evolution if not treated, having the man as a reservoir (BRASIL, 2006, 2010). In the anogenital area, the transmission of acquired syphilis is sexual in almost all cases. Whilst in the congenital form of the disease, the fetal infection occurs by the haematogenous pathway at any stage of pregnancy or maternal disease. On the other hand, in 2015 the transmission by transfusions are rare (BRASIL, 2006, 2010, 2015).

Several parts of the world have experienced an increase in the number of syphilis cases. Moreover, the prevalence of co-infection HIV/Syphilis (Human Immunodeficiency Virus) in MSM (Men who Have Sex with Other Men) is high (PATHELA et al., 2011; MALINCARNE et al., 2013). The USA (United States of America) registered 9.8 cases per 100,000 inhabitants in 2013, being 91.1% in the male population and the majority composed of MSM (PATHON et al., 2014). Also in the USA, other studies have shown a 6% incidence of syphilis in 10 years for HIV-positive patients (YANG et al., 2013), and 707 cases per 100,000 inhabitants in MSM, a number 140 times higher in this population, characterizing an epidemic (PATHELA et al., 2011).

A significant increase in the number of patients infected with syphilis is well documented in China, with studies showing a prevalence in MSM of 5.5 % (LIAO et al., 2011), 8.3% (WEI et al., 2013), 11.8% (WU et al., 2013), 12.6 % (TANG et al., 2013), and up to 19.2 % (WANG et al., 2013 b). Still, a 7% prevalence of syphilis in Chinese students (ZHENG et al., 2012), 0.48% in blood donors (LIU et al., 2012), 5.6 % and 11.3 % in men with bisexual behaviour (YUN et al., 2011; ZHANG et al., 2013).

Throughout Europe, 18,000 cases of syphilis were reported in 2010, mainly in MSM (VAN DE LAAR et al., 2012). Only Germany registered a growth of 22% in the incidence, with 3648 cases in 2011 (94% of men) (BREMER et al., 2012). In the same manner, other studies reported an incidence of 10.2 cases per 100,000 inhabitants in England (SAVAGE et al., 2012), a prevalence of 10.4% in MSM of Madrid (SANCHEZ et al., 2013), and an increase of 248% in the registry cases of syphilis in HIV-positive patients, Florence, Italy (MARTINELLI et al., 2012). Between 2000 and 2010, there was a rise of more than 20 times the number of cases of syphilis (primary, secondary and early latent) in the Canadian city of Toronto, with annual rates increasing from 1.9 to 38.3 cases per 100,000 men (TUITE et al., 2013).

In Brazil, the epidemiological data relate almost exclusively to cases in pregnant women and newborns, and the infection notification in men is practically non-existent. In 2013, there was a detection rate of 7.4 cases of syphilis in pregnant women for every 1,000 live births, and in all regions, there was a considerable upsurge in notification of syphilis in pregnant women in relation to the previous year, ranging from 14.8% (Northeast) and 44.7% (South). Over the past 10 years, 100,790 cases of syphilis were reported in pregnant women, and there was a progressive increase in the incidence rate of congenital syphilis: from 1.7 cases for every 1,000 live births in 2004 to 4.7 cases per 1,000 live births in 2013 (BRASIL, 2015).

Therefore, the aim of this study was to estimate the prevalence of syphilis and analyse the associated variables within the male population attended in a public outpatient clinic.

MATERIAL AND METHODS

This is a cross-sectional, non-controlled research about the exposure to the risk factors. The unit of analysis was the individual, with a full selection scheme and convenience sample (MEDRONHO et al., 2009).

The studied population consisted of 186 men forwarded or that spontaneously sought the specialized clinic. The sample included men aged over 14 years who have allowed the collection of data or that were authorized by their responsible, in case of 18 years minors, regardless of their sexual orientation. For the assessment of the syphilis outcome, the individuals who have not had the serology for STD performed were excluded.

The data was collected between June 2014 and February 2015 in the municipality of Catalão, GO (Goiás). The data collection instrument (clinical record) was applied by the researcher, an urologist physician, and answered by the interviewee after its proper orientation. There was parity between the gender of the researcher and the participants, which has minimized the male resistance in approach to health issues, in particular the ones related to sexual behaviour.

In the clinical record, the following predictor variables were mentioned: age, marital status, schooling, family income, onset age of first sexual intercourse, sexual activity, sexual behaviour, number of partner(s), steady partner, condom use, payment to maintain sexual contact, knowledge about transmission of STD, use of illicit drugs, circumcision and prior diagnosis of STD. These variables were tested in relation to the outcome of syphilis and were elaborated on the basis of possible risk factors and protection regarding to the topic (BRASIL, 2006; DOHERTY et al., 2012; LIU et al., 2012; BRASIL, 2015).

The sociodemographic variables: age, class and schooling were then defined. Thus, in accordance with the Brazilian Youth Statute, are considered as young, people aged between 15 and 29 years (DOHERTY et al., 2012). Whereas, the division of social classes by family income and education levels were determined based on the IBGE (Brazilian Institute of Geography and Statistics) (IBGE, 2010) and the National Law of Directives and Bases for Education, respectively (BRASIL, 2013). In addition, a study has shown the mean age of Brazilian first sexual intercourse as being 15.7 years (HUGO et al., 2011), which makes it possible to define this behavioural variable with a cut-off of 16 years.

The blood samples were collected by venipuncture and sent for analysis in the Municipal Diagnosis Center. Subsequently, the analysis has been done through the serological tests standardized by the Brazilian Ministry of Health, for instance: quick tests and search for antibodies anti-HIV-1 and anti-HIV-2 by ELISA (Enzyme-

Linked Immunosorbent Assay), HBsAg (Hepatitis B surface antigen), anti-HBc total (antigen antibody of the of Hepatitis B virus), anti-HBs (antibodies against Hepatitis B surface antigen) and anti-HCV (antibodies against the Hepatitis C virus) (BRASIL, 2006, 2010). The syphilis diagnosis was defined by the reaction of the VDRL (Venereal Disease Research Laboratory) test, and confirmed by the FTA-ABS (Fluorescent treponemal antibody absorption) test (BRASIL, 2006, 2010, 2015).

The researcher, along with a research assistant, have done the double data entry and checked about the consistency of the database. The information was then analysed using the statistical software SPSS (Statistical Package for Social Sciences for Windows) version 20.0 (MAROCO, 2011).

We performed a descriptive statistical analysis to determine the relative and absolute frequencies, and the chi-square test (x^2) for comparison among the percentage values (qualitative variables). The association strength between each of the explanatory variables and the response variable were assessed by calculating the PR (Prevalence ratio), together with the corresponding 95% CI (Confidence interval). In all analyses, the results were considered significant when they presented a level of significance (alpha) of 5 %, i.e., a p-value equal to or less than 5% (≤ 0.05). The multivariate analysis between the presence of syphilis and possible associated factors was performed by means of generalized linear models, using the Poisson distribution with logarithmic link function and robust error variance to approximate to the binomial. For the construction of that model, the variables that obtained a p-value less than or equal to 0.20 in the bivariate analysis were included.

The project was approved by the REC (Research Ethics Committee), under the opinion number 640.871, and the information grant about the research work was provided to the participants via the Consent Form and by the Consent Form for Minors under 18 years, which were duly signed.

For the men who were diagnosed with syphilis, or any other STD surveyed during the work, were offered treatment and follow-up by a team of doctors and nurses from the Municipal Department of Health of Catalão city, through the UHS (Unified Health System).

RESULTS

Of the 186 men attended in the public clinic of urology, 26 cases (14 %) had positive serology for syphilis (VDRL reagent, confirmed with FTA-Abs), only two (1 %) for HIV I/II, three (1.6 %) for hepatitis B (Bs-Ag and Total anti-HBc) and one (0.5 %) to hepatitis C (anti-HCV).

Approximately half of the population has more than 29 years of age and 59.14% of the individuals are "not married". In terms of education, 40.9% of men had completed primary school, 41.4% completed secondary school and only two patients declared as illiterate. According to the IBGE classification, two-thirds of individuals are in Class D.

Around two-thirds of patients reported having had the first sexual intercourse with less than 16 years of age. Concerning the sexual practice, almost all stated vaginal sex, half-oral and less than a quarter, anal sex. Of the attended, 90.3% reported heterosexual behaviour, 5.9% bisexual and just five men affirmed homosexual behaviour.

About the number of partners: 61.8% had two or more partners in the last 12 months, and 64.5% declared having a fixed partner. It was considered as condom use when it was used throughout all the sexual activity and in every relation over the last twelve months. Therefore, only 11.8% of men answered "yes" according to that

criterion. Additionally, a little more than two-thirds of the men reported having some knowledge about STD and 81.2% denied prior diagnosis of these diseases.

Finally, 10.2% of participants reported use of any illicit drug and 15.1% informed having paid to maintain sexual intercourse in the last year. Only 8.1% of men were submitted to circumcision. All of that data is shown in Table 1. In the bivariate analysis, only the use of any illicit drug in the past 12 months was a predictive variable for the diagnosis of syphilis (Table 2). Were considered in the multivariate analysis, the independent variables that showed a level of significance (p) ≥ 20 %, such as: vaginal sexual practice, anal sex activity, sexual behaviour, steady partner, use of any illicit drug in the past 12 months and circumcision. After this analysis, only the realization of circumcision was considered independent factor on protection for syphilis (Table 3).

TABLE 1. General characterization of the syphilis population. Catalão, GO, 2015.

Attribute	N	%
Age ≤ 29 years	90	48.39
Age > 29 years	96	51.67
Civil status		
Married	71	38.17
Single	110	59.14
No data	5	2.69
Schooling		
Illiterate	2	1.1
Primary school	76	40.9
Secondary school	77	41.4
Higher education	30	16.1
Post-graduation	1	0.5
Income		
Class A: Above R$ 15.300,00	1	0.5
Class B: from R$ 7.650,00 to R$ 15.300,00	13	7.0
Class C: from R$ 3.060,00 to R$ 7.650,00	26	14.0
Class D: from R$ 1.020,00 to R$ 3.060,00	125	67.2
Class E: up to R$ 1.020,00	17	9.1
No data	4	2.2
Onset age of first sexual activity		
<16 years	120	64.52
≥ 16 years	65	34.98
No data	1	0.5
Sexual activity		
Vaginal	178	95.7
Oral	92	49.5
Anal	50	26.9
Sexual behaviour		
Heterosexual	168	90.3
Homosexual	5	2.7
Bisexual	11	59
No data	2	1.1
Number of sexual partners		
None	5	2.7
One	58	31.2
Multiple	115	61.8

Attribute	N	%
Steady partner	120	64.5
Condom use	22	11.8
Payment to maintain sexual intercourse	28	15.1
Knowledge about transmission of STD	136	73.1
Use of any illicit drug in the past 12 months	19	10.2
Circumcision	15	8.1
Previous history of SDT	35	18.8

Note: N: value; **%** (n/total*100). The authors, 2016.

TABLE 2. Syphilis vs. non-syphilis (bivariate analysis). Catalão, GO, 2015.

Attributes	**Syphil**		**p; PR (CI)**
	Yes n (%)	**No n (%)**	
Age ≤ 29	9	81	1
Age > 29	15	81	0.25; 1.56 (0.72-
Single	15	95	1
Married	8	63	0.64; 1.21 (0.54-
Onset age of first sexual activity			
≥ 16 years	13	83	1
<16 years	10	79	0.63; 1.20 (0.55-
Income			
Classes A. B e C	4	36	1
Classes D e E	20	122	0.50; 1.40 (0.51-
Schooling			
Illiterate and primary school	13	92	1
Secondary school, higher education and post-graduation	11	70	0.80; 1.09 (0.51- 2.31)
Sexual practice			
Vaginal			
Yes	21	157	1
No	2	5	0.18; 2.42 (0.70-
Oral			
No	13	79	1
Yes	10	83	0.48; 1.31 (0.60-
Anal			
No	10	4	1
Yes	13	122	0.05; 2.07 (0.97-
Sexual behaviour			
Heterosexual	19	149	1
Homosexual and Bisexual	4	12	0.11; 2.21 (0.85-
Number of sexual partners			
None or one	6	57	1
Multiple	15	100	0.48; 1.36 (0.55-
Steady partner			
Yes	11	109	1
No	10	51	0.15; 1.78 (0.80-
No condom use	3	19	1
Condom use	20	142	0.86; 1.10 (0.35-
Knowledge about transmission of			

STDs			
No	18	118	1
Yes	6	44	0.82; 1.10 (0.46-2.62)
Payment to maintain sexual intercourse			
No	19	139	1
Yes	5	23	0.39; 1.48 (0.60-3.65)
Use of any illicit drug in the past 12 months			
No	17	149	1
Yes	6	13	0.007; 3.08 (1.38-6.86)
Circumcision			
Yes	0	15	0.11; (undefined)
No	24	146	0.11; (undefined)
Previous history of SDT			
Yes	4	31	1
No	20	131	0.77; 1.15 (0.42-3.17)

Note: p< 0,05; **PR:** prevalence ratio; **CI:** 95% confidence interval.
The authors, 2016.

TABLE 3. Syphilis vs. non-syphilis (multivariate analysis). Catalão, GO, 2015.

Items	p	PR	CI (95%)
Vaginal sexual practice	0,156	1,22	0,927-1,605
No anal sexual practice	0,313	0,948	0,855-1,051
Heterosexual behaviour	0,597	0,939	0,745-1,184
Steady partner	0,263	0,951	0,870-1,039
Use of any illicit drug in the past 12 months	0,133	1,147	0,959-1,373
Haven't done circumcision	0,001	1,109	1,044-1,178

Note: p ≤ 0,05; **PR:** prevalence ratio; **CI:** 95% confidence interval. The authors,2016.

DISCUSSION

The high prevalence of syphilis reported in this study can be partially explained by the fact that the male population was attended in a clinic set up to accommodate men with complaints, questions, or even suspicions of STDs. Even considering this limitation, this finding is confirmed by other scientific publications. Four current Brazilian studies showed results of syphilis infection within the male population, with a prevalence of 0.53% in recruits (RIBEIRO et al., 2012), 14% among MSM (BRIGNOL et al., 2015), 15.4% in men and transsexuals (SCHUELTER-TREVISOL et al., 2013), and 20.5% in HIV-positive patients (ADOLF et al., 2012).

The majority of men included in the study has more than 29 years, has completed the secondary or primary school, belongs to social classes C or D, reported having heterosexual behaviour and prior knowledge about transmission of STDs. Other studies have demonstrated differences in the characteristics mentioned

above in the studied populations (GUO et al., 2011; PAN et al., 2013). By another hand, in this study, the majority of attended individuals is not married, have had the first sexual relation with less than 16 years, has multiple partners and does not use condoms, these are common features in epidemiological studies of sexually transmitted diseases (FAN et al., 2012; OTIENO et al., 2014).

Despite the fact that most of the surveyed men reporting having knowledge on the topic, only a minority took over the use of condoms in every sexual intercourse and throughout all the sexual act. It is clear, then, that the tested individuals have prior knowledge about STDs, however they show low adherence to preventive measures and, thus, have greater risk of acquiring these diseases.

The higher prevalence of syphilis in several parts of the world can be attributed to various factors being considered as sexual bridges, for example: bisexual men, injecting drug users, people who are involved in commercial sex and simultaneously sexual partners (BROSH-NISSIMOV et al., 2012; DOHERTY et al., 2012; BERNSTEIN et al., 2013). The greater number of cases of this pathology is recorded mainly in MSM (PONYAI et al. 2013; YANG et al., 2013; PATHON et al., 2014) men who have sex with men and women (CAMPOS et al., 2012; SHRIVASTAVA & BOBHATE, 2012; WEI et al., 2013) HIV-positive patients (COHEN et al., 2012; KATZ et al., 2013; YANG et al., 2013) in those who have more than ten men sexual partners (COHEN et al., 2012; KATZ et al., 2013; WU et al., 2013), or multiple partners (SANCHEZ et al., 2013; WEI et al., 2013; WANG et al., 2013 a). The prevalence is also marked in those who have partners in other localities (BERNSTEIN et al., 2013), in migrant workers (WU et al., 2012), the ones who seek partners via on line (CHAMPENOIS et al., 2013), in saunas, public bathrooms or parks (WU et al., 2013), and in male clients of low pay sex workers.

Similarly, some studies show high prevalence of syphilis in young men (VAN DE LAAR et al., 2012; WU et al., 2012; GAO et al., 2013), black (TORRONE et al., 2011; COHEN et al., 2012), in ethnic minorities (WU et al., 2013), drug users (ZHENG et al., 2012; ZHANG et al., 2014), particularly methamphetamine (CHEW-NG et al., 2013), psychic stimulants (SANCHEZ et al., 2013), and poppers (CHAMPENOIS et al., 2013).

Several studies have reported the association of risk factors and the escalation of syphilis, such as: receptive oral sex (MARTINELLI et al., 2012; CHAMPENOIS et al., 2013), unprotected anal sex (CDC, 2013; SANCHEZ et al., 2013; WEI et al., 2013), low condom use (TANG et al., 2013; WANG et al., 2013 b; ZHANG et al., 2014), low level of education (RIBEIRO et al., 2012; CHAMPENOIS et al., 2013; WANG et al., 2013 b;), presence of genital ulcers (RIBEIRO et al., 2012; SANCHEZ et al., 2013), previous history of SDTs (RIBEIRO et al., 2012; SAVAGE et al., 2012; SANCHEZ et al., 2013;), use of sexual toys with casual partners and use of medications for erectile dysfunction (DOHERTY et al., 2012).

Another study has shown that the surge of the testing frequency in at-risk populations, such as MSM, is more efficient in reducing the incidence of syphilis when compared to the increase in the number of screened individuals (TUITE et al., 2013). As protective measures equally efficient are the promotion of condom use (RUAN et al., 2013) and the treatment of chemical dependence with methadone (LI et al., 2012; SCHUELTER-TREVISOL et al., 2013).

In the bivariate analysis, the use of any illicit drug in the past 12 months was a predictive variable for syphilis and is in agreement with other published studies (FAN et al., 2012; PAN et al., 2013; OTIENO et al., 2014). On the other hand, in multivariate analysis, only the realization of circumcision was considered

statistically significant as a protective factor for syphilis. Further, a study has indicated a lower HIV prevalence among circumcised men, but sexual risk behaviours were more common among these individuals when compared to the non-operated. Such observations suggest the need in promoting the already known STD prevention strategies also for in this population, since the circumcision may lead to disinhibition to risk behaviours (KIBERA et al., 2014).

It is pointed out as study limitations: the cross-sectional design, the convenience sample and the subjectivity of interviews as a tool for study. Even so, the found data provide subsidies for preventive actions for popular education in health.

In view of the foregoing, it is concluded that is high the number of syphilis cases in men treated at specialized clinic, not being detected significant differences for most of the analysed factors between carriers and non-carriers. The completion of circumcision has constituted an independent variable for protection, but having information on STDs did not reflected in care measures such as the use of condoms. Associated with the data obtained, the male resistance to seek health care reinforces the need for specific and continuous strategies for prevention, screening, early diagnosis and treatment in this population group.

ACKNOWLEDGMENTS

We thank Fundação de Amparo à Pesquisa do Estado de Goiás (FAPEG) and Federal University of Goiás (UFG) – Catalão Unit for their financial and structural support.

CONFLICT OF INTEREST

All authors declare that there are not any conflict of interest.

FINANCIAL SUPPORT

First author was granted a scholarship by the Fundação de Amparo à Pesquisa do Estado de Goiás (FAPEG).

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