Artículo original

Sexual transmitted infections leading to hospitalization in Ecuadorian patients

Fabricio González Andrade[1], Gabriela Aguinaga Romero[2]

Abstract

Aim: the aim of this paper is analyze the STIs prevalence in hospitalized patients to identify major epidemiological issues in these diseases.

Material and methods: this is an observational and retrospective study that analyzes the data and epidemiological information on STIs reported in Ecuador since 2001 until 2008. The data arise from the National Register of Hospital Admissions/Discharges from the INEC, and from the data of the Ministry of Health.

Results: the AIDS-related diseases were the most common STIs observed with a 73% of the cases and an APR of 116.94 per 100,000 admissions. AIDS-infections showed a prevalence of 88.49 (32.9%). Congenital syphilis was the third most prevalent disease with an APR of 14.96 (5.6%). Most diseases showed lower APR due that they were diagnosed and treated mainly in the outpatient clinics and, they were not hospitalized. If we adds all AIDS-related diseases the APR found was of 216.91, and all cases of syphilis infections showed an APR of 19.33. Finally, most common STI were gonococcal infections with a general prevalence rate (GPR) of 30.30, followed by primary and secondary syphilis with a GPR of 15.83, and herpes 2 infections, with a GPR of 12.22.

Conclusion: available data suggest that STIs in Ecuador are on the rise, especially CT infections. The first cause of discharge in the Ecuadorian hospitals was the AIDS-related infections followed by syphilis. Most common STI leading to hospitalization in Ecuador was gonorrhea. Chlamydia infections still remain unknown due to insufficient and inaccuracy diagnostic. The findings in this report represent a conservative estimate of the number of cases each year, across the nation; this data are only an estimate for STIs leading to hospitalization that would be higher in some cases, if based on systems that contain other sources of ascertainment.

Keywords: Ecuador, sexual transmitted infections, epidemiology, prevalence, *Chlamydia*, gonococcal infections

Resumen

Objetivo: el objetivo de este trabajo es analizar la prevalencia ITS en pacientes hospitalizados.

Material y métodos: se trata de un estudio observacional y retrospectivo que analiza los datos, y la información epidemiológica sobre ITS reportada en Ecuador desde 2001 hasta 2008. Los datos surgen del registro nacional de egresos del INEC, y partir de los datos de vigilancia del Ministerio de Salud.

1. Profesor titular de Genética, Facultad de Ciencias Médicas, Universidad Central del Ecuador
2. Profesora Titular de Epidemiología, Facultad de Ciencias Médicas, Universidad Central del Ecuador

Corresponding author
Fabricio Gonzalez Andrade. fabriciogonzaleza@gmail.com
Facultad de Ciencias Médicas, Universidad Central del Ecuador

Resultados: las ITS relacionadas con el SIDA fueron las más comunes, con una prevalencia de 73% de los casos, y una tasa de 116,94 por 100.000 admisiones. Las ITS relacionadas con SIDA mostró una prevalencia de 88,49 (32,9%). La sífilis congénita fue la tercera enfermedad más prevalente con una tasa de 14,96 (5,6%). Si se agrega todas las enfermedades relacionadas con el SIDA, a la tasa general, la tasa reportada aumenta a 216,91. Todos los casos de infecciones por sífilis mostraron una tasa de 19,33. Por último, la ITS más común fue la infección gonocócica con una tasa de 30,30, seguida de sífilis primaria y secundaria con una tasa de 15.83, y la infección por herpes 2, con un prevalencia de 12.22.
Conclusión: los datos disponibles sugieren que las ITS en Ecuador están en aumento, especialmente CT. La más común ITS que lleva a hospitalización en Ecuador fue la gonorrea. Las infecciones por clamidia todavía se desconocen debido a la insuficiencia e inexactitud de diagnóstico. Las conclusiones de este informe representan una estimación conservadora del número de casos cada año, en todo el país; estos datos son sólo una estimación de las ITS que conduce a la hospitalización, y que sería mayor en algunos casos, si se basa en otras fuentes de comprobación.

Palabras clave: Ecuador, infecciones de transmisión sexual, epidemiología, prevalencia, clamidias, infecciones gonocócicas.

Introduction

Sex is the gateway to life, not only for humans but also for pathogens, so the safe sex has to be the first premise in the modern society. Sexually transmitted infections (STIs) are the most common infectious diseases of public health importance in the world [1]. Although these infections are important causes of acute morbidity and hospitalization, they also contribute to burden of disease as a result of late, chronic complications, including infertility, genital tract scarring and related conditions, psychological distress, and malignancy[2].

According to 1999 WHO estimates, 340 million new cases of curable STIs occur annually throughout the world in adults aged 15-49 years [3]. In developing countries, they and their complications rank in the top five disease categories for which adults seek health care. Infection with STIs can lead to acute symptoms, chronic infection and serious delayed consequences such as infertility, ectopic pregnancy, cervical cancer and the untimely death of infants and adults [4]. STIs are infections that are spread primarily through person-to-person sexual contact. There are more than 30 different sexually transmissible bacteria, viruses and parasites [5].

On the other hand, according with health authorities of Ecuador STIs have increased in the last years, arising from the fifth position in the general morbidity prevalence to third position[6]**.** This is due mainly to a better comprehension of these diseases, and also to improvement in the report of notifiable diseases[7]. Nevertheless, a great number of cases are still hidden because many Ecuadorians are reluctant to address sexual health issues in an open way and because of the biologic and social characteristics of these diseases [8].

Ecuador has slowly emerged from a deep political, economic, and social crisis that has had a heavy impact on all sectors, with vulnerable groups being the hardest hit, in the former years The main political and social problems that have a direct impact on the health situation include high levels of poverty, limited access to health services, and low health insurance coverage[9]. STIs epidemics have an enormous health and economic impact in the developing countries as Ecuador either[10]. The aim of this paper is analyze the STIs prevalence in hospitalized patients to identify major epidemiological issues in these diseases.

Subjects and methods

Study design: This is an observational and retrospective study that analyzes the data and epidemio-

logical information on STIs reported in Ecuador leading to hospitalizations, since 2001 until 2008. Those years were selected because there were available at the moment of this research as public and current information.

Source of information: the data arise from the National Register of Hospital Admissions/Discharges from the **Instituto Nacional de Estadísticas y Censos (INEC)**[11], and from the data of the **Ministry of Public Health (MoH)**[12]. The register is national, funded by the government. The information of the register is provided by the centers and hospitals belonging to the MoH that covers the whole country and include public maternity clinics, children's hospitals and general hospitals, who gather the information of each case. The register has been extensively used in epidemiological studies formerly. Ecuador does not have official disease-specific registries.

Studied variables: it used the definitions listed in Chapter I and XIV of the International Classification of Diseases ICD-10, current version of 2007[13]. As an additional measure, it has excluded from the database the duplicate records and, it reviewed if each patient was registered by only one time to aware the readmissions registry. This is a comprehensive analysis that studies STIs grouped without detailing specific subgroups.

Statistical analysis: we calculated the admission prevalence rate (APR) by 100,000 admissions with the all registered admissions/discharges.

Results

Table 1 shows the distribution of STIs by ranking and year; table shows 2 the distribution of pathologies grouped by etiology, rank and year. The AIDS-related diseases were the most common STIs observed with a 73% of the cases and, an APR of 116.94 per 100,000 admissions. AIDS-infections showed a prevalence of 88.49 (32.9%). Congenital syphilis was the third most prevalent disease with an APR of 14.96 (5.6%). Most diseases showed lower APR due that they were diagnosed and treated mainly in the outpatient clinics and, they were not hospitalized. If it adds all AIDS-related diseases the APR found increases to 216.91. All cases of syphilis infections showed an APR of 19.33.

Finally, table 3 indicates the most common STIs of mandatory notification (surveillance), including inpatients and outpatients according with MoH data, on diseases that were compulsorily notifiable. Most common disease were gonococcal infections with a general prevalence rate (GPR) of 30.30, followed by primary and secondary syphilis with a GPR of 15.83, and herpes 2 infection with a GPR of 12.22.

Discussion

In general terms, available data suggest that STIs in Ecuador are on the rise. However, there is a lack of information due to an under-register problem, and the generalized absence of new diagnostic methods around the country as nucleic acids testing for *Chlamydia trachomatis* (CT), *Neisseria gonorrhoae* (NG) and Human Papillomavirus (HPV).

In the present study, it could see a significant difference between the prevalence of STIs in outpatients and hospitalized patients, when it compares table 2 and table 3, especially in relation with the of clinical findings. Moreover, the specific diagnostic of STIs during the admission process is limited when it compares with the female and male pathologies that can have an STI etiology.

In other words, many patients with a proven STI were admitted without a confirmatory diagnostic, only with a clinical presumptive diagnostic etiology. This, even when contributes to epidemiology of these infections, have demonstrated the lack of accuracy diagnostic procedures for some diseases in Ecuador.

Table 1 Distribution of STIs by ranking and year.

Code	Desease	2001	2002	2003	2004	2005	2006	2007	2008	Total	%	APR
B24	AIDS unspecified	438	497	824	821	975	1121	1511	1351	7538	43.4	**116.94**
B20	AIDS + infections	305	436	291	653	823	1030	912	1254	5704	32.9	**88.49**
A50	Congenital Syphilis	172	157	192	99	81	71	74	118	964	5.6	**14.96**
B16	Acute Hepatitis B	118	116	89	114	64	65	94	107	767	4.4	11.90
A63	Urogenital warts	68	78	75	52	65	79	94	164	675	3.9	10.47
B22	AIDS + specific diseases	5	30	12	41	94	69	24	23	298	1.7	4.62
B23	AIDS acute syndrome	43	33	36	26	9	16	27	99	289	1.7	4.48
A60	Ano genital herpes	34	15	14	12	9	13	22	35	154	0.9	2.39
B21	AIDS + neoplasias	9	16	10	22	16	27	25	28	153	0.9	2.37
A54	Gonococcal infection	15	17	21	12	22	19	13	19	138	0.8	2.14
A52	Late Syphilis	10	20	15	46	13	11	11	11	137	0.8	2.13
A58	Granulome inguinale	9	11	9	17	17	6	9	21	99	0.6	1.54
B18	Chronic Hepatitis B	7	15	9	8	6	8	9	21	83	0.5	1.29
A53	Syphilis latent or unspecified	9	9	15	14	7	10	11	7	82	0.5	127
A55	Chlamydial lympho-granuloma	17	23	6	4	7	3	8	12	80	0.5	1.24
A51	Early Syphilis	4	3	9	19	9	8	6	5	63	0.4	0.98
A59	Thrichomoniasis	10	9	4	4	10	8	4	6	55	0.3	0.85
A56	Chlamydial diseases	1	1	2	2	6	9	5	8	34	0.2	0.53
A64	Unspecified STDs	6	1	1	6	4	6	1	1	26	0.1	0.40
A57	Chancroid	3	2	1	0	2	2	2	1	13	0.1	0.20

APR Admissions prevalence rate by 100,000 admissions

Table 2 Distribution of pathologies grouped by etiology, rank and year

Code	Desease	Pathogen	2001	2002	2003	2004	2005	2006	2007	2008	Total	%	APR
B20 to B24	AIDS	*HIV*	800	1012	1173	1563	1917	2263	2499	2755	13982	80.58	**216.91**
A50 to A53	Syphilis, all stages	*T. pallidum*	195	189	231	178	110	100	102	141	1246	7.18	**19.33**
B16-B18	Hepatitis B	*Hepatitis B virus*	125	131	98	122	70	73	103	128	850	4.90	**13.19**
A63	Anogenital warts	*HPV*	68	78	75	52	65	79	94	164	675	3.89	10.47
A60	Anogenital herpes	*Herpes virus 2*	34	15	14	12	9	13	22	35	154	0.89	2.39
A54	Gonococcal infection	*N. gonorrhoae*	15	17	21	12	22	19	13	19	138	0.80	2.14
A55+A56	Chlamydial infections	*C. trachomatis*	18	24	8	6	13	12	13	20	114	0.66	1.77
A58	Granulome inguinale	*C. bacterium granulomatis*	9	11	9	17	17	6	9	21	99	0.57	1.54
A59	Thrichomoniasis	*T. vaginalis*	10	9	4	4	10	8	4	6	55	0.32	0.85
A64	Unspecified STDs	*Unspecified*	6	1	1	6	4	6	1	1	26	0.15	0.40
A57	Chancroid, HD	*H. ducreyi*	3	2	1	0	2	2	2	1	13	0.07	0.20

APR= Admissions prevalence rate by 100,000 admissions

Table 3. Most common STIs of obligatory notification, including inpatients and outpatients according with MoH data.

Disease	2000	2001	2002	2003	2004	2005	2006	2007	Total	%	GPR
Gonococcal infections	7139	5623	3952	2693	3392	2974	2962	2999	31734	42.60	**30.30**
Primary and secondary syphilis	1691	2811	2091	2273	2112	2282	1885	1438	16583	22.26	**15.83**
Herpes infection, HS2	1688	1694	1463	1443	2122	1382	1393	1612	12797	17.18	**12.22**
HIV	348	294	370	525	627	1069	1319	1858	6410	8.61	6.12
AIDS	315	318	425	352	481	470	478	555	3394	4.56	3.24
Hepatitis B	448	409	436	191	238	294	167	236	2419	3.25	2.31
Congenital syphilis	116	178	145	190	172	114	110	124	1149	1.54	1.10
Total	22738	23512	27803	24106	35136	48248	64692	91960	74486	100	

GPR = prevalence rate by 100.000 inhabitants.
MoH = Ministry of Health.

Limitations of this study

The findings in this report represent a conservative estimate of the number of cases each year, across the nation; this data are only an estimate for STIs leading to hospitalization that would be higher in some cases, if based on systems that contain other sources of ascertainment. These national estimates represent minimum estimates for the impact of these diseases, because even those surveillance systems with active case-finding, do not achieve 100% ascertainment. On the other hand, some of the most common cases could be under represented and, could not be included because identification of these conditions depends on referral patterns and, access to and use of diagnostic procedures which shift of one hospital to another.

Syphilis

Syphilis causes significant complications if untreated and facilitates the transmission of HIV. Untreated early syphilis in pregnant women results in perinatal death in up to 40% of cases and, if acquired during the four years preceding pregnancy, may lead to infection of the fetus in 80% of cases. It is the second most prevalent disease in hospitalized patients with STIs in Ecuador, considering all the stages of this disease. Primary and secondary syphilis were the second most prevalent disease in all country It was highest in persons in the 20 to 29 year old age groups. These stages have remained stable during the last years, with a slight decrease in 2007. Syphilis remains an important problem in the urban areas of the country.

The congenital syphilis was showed steadily along these years. Most cases of congenital syphilis occur among infants whose mothers have had some prenatal care, limited or late prenatal care has been associated with congenital syphilis. Failure of health care providers to adhere to maternal syphilis screening recommendations also contributes to the occurrence of congenital syphilis.

The prevalence of this disease among men who have sex with men or women and men is still unknown, due that the register does not consider those variables. High rates of HIV co-infection and high-risk sexual behaviors have been observed in this particular group. In relation with syphilis and sex behavior, the male-to-female rate ratio for primary and secondary syphilis has risen steadily. Our registry did not collect information on sex partners of patients neither on the stage of disease in a detailed way, this information is still limited.

Gonorrhea

Infections due to NG, as those resulting from CT were the major cause of Pelvic Inflammatory Disease (PID). NG can lead to serious outcomes in women such as tubal infertility, ectopic pregnancy, and chronic pelvic pain. In addition, epidemiologic and biologic studies provide strong evidence that

gonococcal infections facilitate the transmission of HIV infection. Gonococcal infections in this study were the most prevalent disease in both, outpatients and inpatients. In hospitalized patients the prevalence is lower mainly due to treatment that can be used in an ambulatory way. True increases or decreases in disease burden may be masked by changes in screening practices as the use of diagnostic tests with differing test performance, and changes in reporting practices [14,15]. NG and CT are coinfections that have to be treated together, to avoid further re-infections.

Chlamydia

Chlamydia trachomatis infections are the most common STD worldwide currently. They are among the most prevalent of all STDs and have comprised the largest proportion of all STDs reported. Chlamydial infections are usually asymptomatic and, in women, may result in PID, which is a major cause of infertility, ectopic pregnancy, and chronic pelvic pain. Data from a randomized controlled trial of chlamydia screening in a managed care setting suggested that screening programs can lead to a reduction in the incidence of PID by as much as 60% [16]. As with other inflammatory STDs, chlamydial infection can facilitate the transmission of HIV infection. In addition, pregnant women infected with chlamydia can pass the infection to their infants during delivery, potentially resulting in neonatal ophthalmia and pneumonia. Because of the large burden of disease and risks associated with infection, some developed countries recommend annual CT screening of all sexually active women younger than 26 years of age.

In our study, the prevalence of this infection is lower than other developing countries. The main reason is the absence of accuracy diagnostic tests, highly sensitive, called nucleic acid amplification tests (NAATs), and that can be performed on urine samples. However, the hospitalizations of women with pathologies associated a CT/NG have showed high prevalence, which would mean a high prevalence of this pathogen.

There are only two studies on CT in Ecuador. One local study [17] made in the city of Borbón, province of Esmeraldas in Ecuador, in order to examine the relationship between sexual conduct and infection with CT/NG reported high incidence of the infection in sexual workers and, in women who multiple sexual partners, in both groups the STI prevalence was similar. Other study[18] performed to identify CT endocervical infection among gestations at risk for threatened preterm labor, and preterm premature rupture of membranes, by means of DNA amplification. They could not be rule out CT infection completely rule out and, they did recommend the antenatal routine screening program in order to provide appropriate therapy.

Of course, major improvements in the diagnosis are needed to avoid lost cases. Next step in the management of Ecuadorian patients is the expansion of chlamydia screening activities, the use of increasingly sensitive diagnostic tests, and the increase of case reporting from providers and laboratories, such as the improvements in the information systems.

Human Papillomavirus (HPV)

Persistent infection with high-risk human papillomavirus (HPV) can lead to development of anogenital cancers and cervical cancer. In the last years, a quadrivalent HPV vaccine was licensed. The vaccine provides protection against types 6, 11, 16, and 18. Types 6 and 11 are associated with genital warts, while types 16 and 18 are oncogenic types associated with anogenital cancers. HPV genotyping requires DNA technology.

HPV infections are highly prevalent, especially among young sexually-active women. While the great majority of HPV infections in women resolve within one year, they are a major concern because persistent infection with specific types are causally related to cervical cancer; these types also cause Pap smear abnormalities. Other types cause genital warts, low grade Pap smear abnormalities and,

rarely, recurrent respiratory papillomatosis in infants born to infected mothers.

A few studies performed in Ecuador have showed interesting findings. In one of them[19], researchers found a high prevalence of HPV 66, and coexistence of two genotypes, 51 and 58, in the same lesion. This suggested that the proposed vaccine can be ineffective in some ethnic groups. Other study[20] found high-risk HPV genotypes 16, 52, 58, and 59 and the low-risk HPV types 62, 71, 72, and 83. The number of lifetime sexual partners was positively associated with detection of any HPV type, detection of oncogenic HPV, and abnormal Pap smears[21]. However, HPV 16 is the genotype of high prevalence among women with cervical lesions in Ecuador [22].

In this study, it found a high prevalence of patients with dysplasia of cervix uteri that was admitted in Ecuadorian hospitals, APR 42.35 and, a important prevalence of women with anogenital warts, APR of 10.47; both diseases with the same pathogen of origin, HPV. The early screening and routine diagnostic with nucleic acids can be decreases the number of hospitalizations, and moreover, could reduce the prevalence of cervical intra-neoplasia. How in the other mentioned cases, the implementation of DNA testing methods in the clinic routine is mandatory in Ecuador, especially to differential diagnosis of some genotypes.

Herpes Simplex Virus (HSV)

Genital herpes is a common, chronic, life-long viral infection. Two types of Herpes simplex virus (HSV) have been identified: HSV-1 and HSV-2. The majority of cases (85%–90%) of recurrent genital herpes are caused by HSV- 2 although HSV-1 might become more common as a cause of first episode genital herpes. HSV-2 is one of the most common STIs worldwide and the primary cause of genital and neonatal herpes and genital ulcer disease. Multiple studies have shown that HSV-2 infection increases the risk for human immunodeficiency virus (HIV) infection by at least twofold. HSV-2 infection is lifelong, and serologic testing provides the best method, to estimate prevalence. The majority of people infected with HSV-2 have not been diagnosed with genital herpes. Sero-positivity to HSV-2 is higher in HIV-infected persons and adults of lower and middle socioeconomic status. Most women with HSV-2 antibodies have no clinical manifestations [23].

In this study, the prevalence in inpatients of HSV-2 is lower but does not means that the global prevalence also is. It think that most of this lesions are hidden, misdiagnosed or in remission stages that cannot be verified by the physical examination. HSV-2 and cervico-vaginal HPV infection were associated with an increased risk of HIV acquisition in women, and specific HPV types were implicated in this association neither.

Chancroid

Haemophilus ducreyi (HD) is the causative agent of the sexually transmitted infection known as chancroid. On a global basis, chancroid is thought to be the most common cause of genital ulcer disease. It occurs commonly in parts of Africa, Asia and Latin America, accounting for 20% to 60% of ulcer infections [24]. The basis for this differing geographic distribution is unknown. In geographic locations where chancroid is endemic, the overlap in clinical symptoms among the most common genital ulcer diseases as syphilis, herpes or chancroid, makes diagnosis based on clinical symptoms unreliable.

The accuracy of clinical diagnosis for chancroid ranges from 30% to 80%, and coinfection with syphilis has been reported in 10 of 81 individuals. Furthermore, infection with HD increases the likelihood of acquiring and transmitting HIV. Coinfection is important to recognize because the response to antibiotic therapy for chancroid in patients with AIDS is less effective compared with therapy in patients without AIDS. However, in our results the prevalence of this disease was the lowest.

STI in vulnerable groups

STIs in women: women disproportionately bear the long term consequences of STIs. Women infected with NG/CT can develop PID, which, in turn, may lead to reproductive system morbidity such as ectopic pregnancy and tubal factor infertility. A substantial proportion of women with chlamydia or gonorrrhea may develop PID if not adequately treated, generally estimated to be from 10 to 40%. Among women with PID, tubal scarring can cause involuntary infertility, ectopic pregnancy, and chronic pelvic pain.

Approximately 70% of chlamydial infections and 50% of gonococcal infections in women are asymptomatic. These infections are detected primarily through screening. The vague symptoms associated with PID cause 85% of women to delay seeking medical care, thereby increasing the risk of infertility and ectopic pregnancy. Data from a randomized controlled trial of chlamydia screening in a managed care setting suggest that such screening programs can reduce the incidence of PID by as much as 60%.

Gonorrhea and chlamydia can result in adverse outcomes of pregnancy, including neonatal ophthalmia and, in the case of chlamydia, neonatal pneumonia. Although topical prophylaxis of infants at delivery is effective for prevention of gonococcal *ophthalmia neonatorum*, prevention of neonatal pneumonia requires prenatal detection and treatment. Genital infections with HSV are extremely common, may cause painful outbreaks, and may have serious consequences for pregnant women. When a woman has a syphilis infection during pregnancy, she may transmit the infection to the fetus *in utero*. This may result in fetal death or an infant born with physical and mental developmental disabilities. Most cases of congenital syphilis are easily preventable if women are screened for syphilis and treated early during prenatal care.

Like chlamydia, gonorrhea is often asymptomatic in women. CT/NG screening, therefore, is an important strategy among women. Although the gonorrhea rate in men has historically been higher than the rate in women, the gonorrhea rate among women has been comparable to the rate among men for the last consecutive years

Adolescents and young adults: compared to older adults, sexually-active adolescents 15 to 19 years of age and young adults 20 to 24 years of age are at higher risk for acquiring STIs for a combination of behavioral, biological, and cultural reasons. For some STIs, such as CT, adolescent women may have a physiologically increased susceptibility to infection due to increased cervical ectopy. The higher prevalence of STIs among adolescents may also reflect multiple barriers to accessing quality prevention services, including inability to pay, lack of transportation, and discomfort with facilities and services designed for adults, cultural misconceptions and concerns about confidentiality. In Ecuador there are not estimates in this particular group.

Native Amerindians of Ecuador

Surveillance data show higher rates of reported STIs among some ethnic groups when compared with rates among mestizos. Ethnicity in Ecuador is a risk marker that correlates with other more fundamental determinants of health status such as poverty, access to quality health care, health care seeking behavior, and living in communities with high prevalence of STDs.

Rural populations living in the northern Ecuadorian Amazonia experience the highest health burden of any region in the country. One study analyzed this situation; they studied two different ethnic groups, one of colonist Mestizos and other, Native Amerindians living in the same area, and compared their morbidity and mortality experiences. Indigenous groups had 30% higher probability of mortality and 63% higher incidence rate of all-cause morbidity compared to colonists. Vector-borne, chronic, gastrointestinal, and diseases of unknown origin were particularly high among indigenous

groups. Of course, this is relevant also for STDs. It needs specific studies focused on this vulnerable group.

Conclusion

Available data suggest that STIs in Ecuador are on the rise, especially CT infections. The first cause of discharge in the Ecuadorian hospitals was the AIDS-related infections followed by syphilis. Most common STI in Ecuador leading to hospitalization was gonorrhea. Chlamydia infections still remain unknown due to insufficient and inaccuracy diagnostic. On the other hand, there is an important lack of information on STIs due mainly to sub-register of these diseases, and the absence of new diagnostic methods.

Conflict of interests

The authors state that they have no competing interests.

References

1. Henderson Z, Tao G, Irwin K. Sexually transmitted disease care in managed care organizations. Infect Dis Clin North Am. 2005; 19(2):491-51.
2. Da Ros CT, Schmitt Cda S. Global epidemiology of sexually transmitted diseases. Asian J Androl 2008; 10(1):110-4.
3. World Health Organization, Department of Reproductive Health and Research Global strategy for the prevention and control of sexually transmitted infections: 2006 - 2015. Breaking the chain of transmission, WHO, 2007
4. García Vega EM, Puigvert Viu N. Sexual transmission infections. Rev Enferm. 2010; 33(4):42-6.
5. Crepaz N, Horn AK, Rama SM, et al. HIV/AIDS Prevention Research Synthesis Team. The efficacy of behavioral interventions in reducing HIV risk sex behaviors and incident sexually transmitted disease in black and Hispanic sexually transmitted disease clinic patients in the United States: a meta-analytic review. **Sex Transm Dis.** 2007; 34(6):319-32.
6. UNAIDS/WHO. Working Group on Global HIV/AIDS and STI Surveillance. Epidemiological Fact Sheet on HIV and AIDS, Core data on epidemiology and response- Ecuador, December 2008, update.
7. Callister LC, Corbett C, Reed S, et al. Giving birth: the voices of Ecuadorian women. J Perinat Neonatal Nurs. 2010; 24(2):146-54.
8. Breilh J. Latin American critical ('Social') epidemiology: new settings for an old dream. Int J Epidemiol. 2008; 37(4):745-50.
9. López-Cevallos DF, Chi C. Assessing the context of health care utilization in Ecuador: a spatial and multilevel analysis. BMC Health Serv Res. 2010; 10:64.
10. Chesson HW, Collins D, Koski K. Formulas for estimating the costs averted by sexually transmitted infection (STI) prevention programs in the United States. Cost Eff Resour Alloc. 2008; 6:10.
11. INEC, Instituto Ecuatoriano de Estadísticas y Censos. Integrated System of Electronic Consults, National Vital Statistics, available in: http://www.inec.gov.ec/
12. MSP, Ministry of Public Health of Ecuador, National Epidemiological Surveillance System, available in: http://www.msp.gov.ec/
13. WHO, International Statistical Classification of Diseases and Related Health Problems, 10th Revision, 2007 Version, available in: http://www.who.int/
14. Dearborn JL, Lewis J, Mino GP. Preventing mother-to-child transmission in Guayaquil, Ecuador: HIV knowledge and risk perception. Glob Public Health. 2009; 2:1-14.
15. Centers for Disease Control and Prevention. Sexually Transmitted Diseases Treatment Guidelines, 2006. MMWR, 2006; 55.
16. Dean D. Chlamydia trachomatis today: treatment, detection, immunogenetics and the need for a greater global understanding of chlamydial disease pathogenesis. Drugs Today (Barc). 2009; 45:25-31.