PREVALENCE AND RISK FACTORS OF INFECTION WITH GONORRHEA AND SYPHILIS BETWEEN 2010 AND 2015 IN SELECTED HEALTH FACILITIES IN BUEA HEALTH DISTRICT, CAMEROON

Comment [p1]: To be reframed! Suggestion- Prevalence and Risk factors of Sexually tansmitted infections in selected Health facilities in Southwest Region of Cameroon

ABSTRACT

Background: Gonorrhoea and syphilis are common STIs in most developing countries, particularly among the reproductive age group. Their control is important considering the high incidence of acute infections, complications and their socioeconomic impact and a means of effecting control measures against Human Immunodeficiency Virus (HIV). Knowledge of the prevalence and risk factors of these infections in a student residential area will enable development of better strategies for STI control.

Methods: A health facility based historical study design was conducted where laboratory records of patients screened for Syphilis and/or Gonorrhea and HIV in selected primary health care (PHC) facilities in Buea Health District (BHD) between 2010 and 2015 were reviewed. Data analysis was done using EPI Info version 3.5.4. with a level of error set at 5%.

Results: A total of 1106 records were reviewed. Majority 472(42.7%) were between 21-30 years old, while 923(83.4%) were females. A significant proportion 78 (8.1%) were HIV positive. The prevalence of the both STIs was highest in 2015. The prevalence of gonorrhoea was 12.9% and that of syphilis was 16.9%. The odds of testing positive for syphilis for female compared to males was 0.33 (95% CI: 0.18-0.62); p-value of 0.001, while that for gonorrhoea was 0.22 (95%CI: 0.11, 0.44); p-value of 0.0001. Patients between 21 and 30 years were 2.46 times as likely to be syphilis positive compared to those below 21. Patients who were screened for gonorrhea were 3.33 (95%CI 1.66-6.69) times as likely to test negative for HIV with a p value of 0.001.

Conclusion: The study revealed a high prevalence of gonorrhoea and syphilis. Although these infections have similar risk factors, there are distributed differently in the sexually active student residential area. This thus calls for the implementation of targeted screening and to revise control measures for STIs in the population.

Keywords: Prevalence, Risk Factors, Gonorrhoea, Siphilis, Buea Health District, Cameroon

1. INTRODUCTION

Sexually Transmitted Infections (STIs) are a group of infectious or communicable diseases whose primary mode of transmission is through sexual contact[1]. There are among the major causes of illnesses in the world especially in the developing countries [2]. The diseases caused by STIs are classified according to the type of organism causing the infection, which could be bacterial, fungal, viral or of parasitic origin [3]. More than 25 infectious organisms are transmitted primarily through sexual activity and studies reveal that STIs are among the many related factors that affect the broad continuum of reproductive health [4].

STIs are characterized as hidden epidemics of tremendous health and economic consequences that can lead to pains, organs damage, and serious disabilities such as

blindness, deafness, infertility, insanity, paralysis and even death [5, 6]. Its effects have overlying economic and health burden at the community, household and individual levels. Probably of concern to all is that STIs, especially in pregnant women, have been associated with a number of adverse pregnancy outcomes including spontaneous abortion, stillbirth, prematurity, low birth-weight, post-partum endometritis, early onset of labour including premature rupturing of membranes, cervical and other cancers, chronic hepatitis, pelvic inflammatory diseases and various sequalae in surviving neonates while in non-pregnant women, STIs can lead to chronic infertility. In addition, these infections have been shown to facilitate transmission of HIV [7].

It is estimated that the number of pregnant women with STDs is increasing by about 250 million a year in the developed countries and double that number in the developing countries [3]. Infections with gonorrhoea and syphilis amongst other STIs are widely distributed in Africa [8–10] and Cameroon [11] and constitute a public health problem especially as prevalence is unexpectedly high even among married women in Cameroon[12].

The prevalence of these infections is an indicator of the level of compliance with safe sex in the population and a means of effecting control measures against HIV. In spite of the sequelae of these infections, there is inadequate statistical data on the prevalence of common STDS (Syphilis and Gonorrhea) in Cameroon in general and South West Region in particular. To develop strategies of prevention and control of gonorrhoea and syphilis and STDs in general, it is imperative to know their prevalence and associated risk factors.

2. MATERIAL AND METHODS

2.1. Study design

This was a health facility based historical study designed where records of patient screened for Syphilis and Gonorrhea in selected primary health care (PHC) facilities in Buea Health District (BHD) between 2010 and 2015 were reviewed to identify risk factors.

2.2. Study setting and procedure

The BHD has six (6) Health Areas served by twenty nine (29) health facilities of which 26 are PHC facilities. One PHC facility was randomly selected from each of the health areas as indicated in figure 1. At the selected health facility, laboratory registers corroborated with consultation registers were reviewed with the aid of the technicians working in the health facilities to identify predictors. We also found out if the patient did an HIV test and the results noted as demonstrated in figure 2. This was done with the help of a questionnaire. Data analysis was done using EPI Info version 3.5.4. Data collected was cross checked for accuracy and completeness before being entered into EPI Infos statistical software and analyzed according to the objectives. Level of error was 5% and a 95% confidence interval.

Comment [p2]: Laboratory Technicians

Comment [p3]: Testing

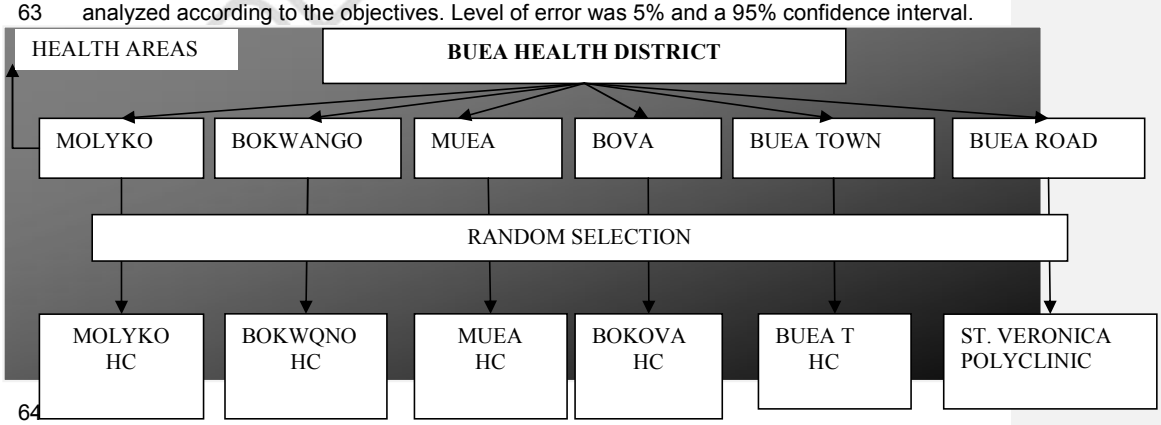

Figure 1: selection of health facilities

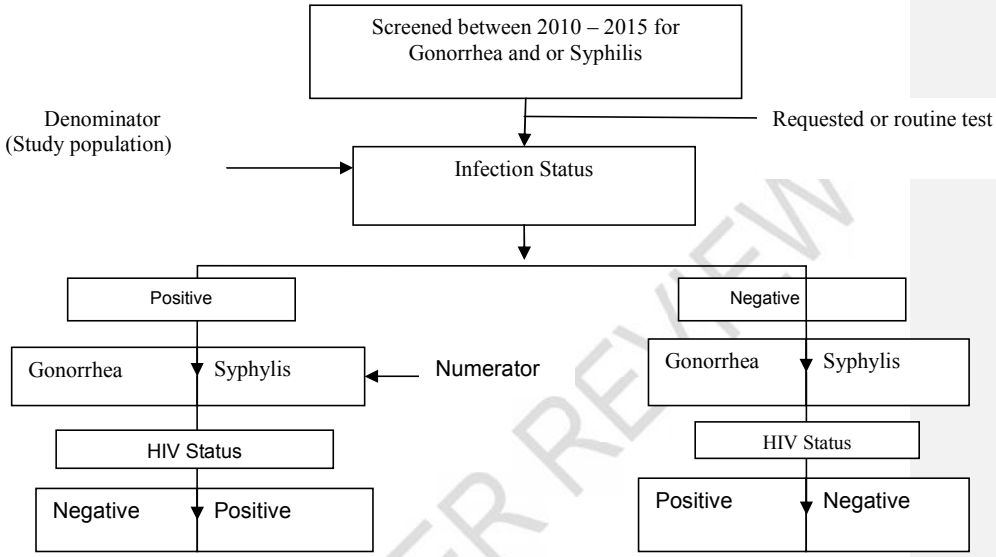

Figure 2: Procedure of data collection (study flow chart)

2.3. Data analysis

Data analysis was done using EPI Info version 3.5.4. Data collected was cross checked for accuracy and completeness before being entered into EPI Infos statistical software and analyzed according to the objectives. Level of error was 5% and a 95% confidence interval.

2.4. Ethical approval

Ethical review was done and approved by the Faculty of Health Sciences Institutional Review Board (FHS-IRB). Administrative authorization was gotten from the Regional Delegation of Public and from the DMO for the Buea Health District.

3. RESULT AND DISCUSSION

3.1. Results

A total of 1106 patient's laboratory records were reviewed for either syphilis or gonorrhea or both infections in the selected health facilities within the Buea Health District (2010 to 2015). Of the 1106 patients, majority 472(42.7%) were between 21-30 years old, while 923(83.4%) were females. A significant proportion 78 (8.1%) were HIV positive while the rest had either negative or undetermined HIV status. The Bokwango Health Area (HA) registered the greatest number of patients 301 (27.2%) while the Bova HA registered the least number of patients, 58(5.2%).

3.1.1. Hospital based Prevalence of Syphilis and Gonorrhoea in the Buea Health District

The prevalence of Syphilis in the buea health district was 16.9% with its highest contributor being the Muea Health Area and its lowest contribution coming from the Buea Town Health Area. For gonorrhoea, its prevalence in the district was 12.9% with most of its contribution

coming from the Bokwango Health Area and its least contributor being the Buea Road Health area (Figure 3).

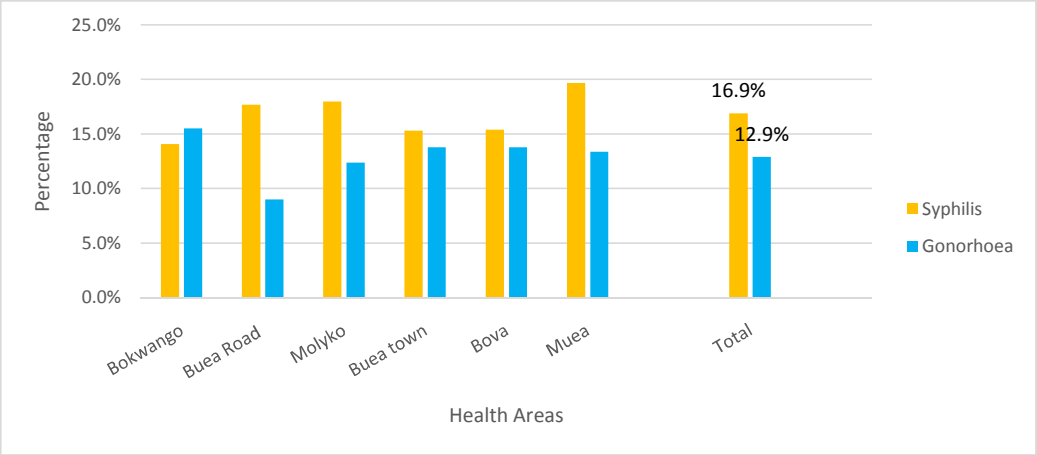

Figure 3: The prevalence of syphilis and gonorhoea in the sampled health areas of the Buea

3.1.2. Prevalence of Gonorrhoea and Syphilis across predictors in the study population.

Of the patients screened for gonorrhoea in the Buea health area between 2010 - 2015, majority of those who tested positive were females 90(65.2%) and 58(42.0%) were above 31years of age. Also, 16(16.5%) of the patients who tested positive for gonorrhoea were also positive for syphilis. Again, 16(14.4%) of those who tested positive for gonorrhoea were tested positive for HIV.

Of the patients screened for syphilis, 136 (80.5%) of those who tested positive were females and 85(50.3%) were between the ages 21-30 years. Of the patients tested positive for syphilis, 16(10.3%) also tested positive for gonorrhoea. Again, 15(10.7%) of those tested positive for syphilis were HIV infected as can be seen in table 1.

Table 1: Prevalence of syphilis and gonorrhoea across predictors

Variable		Syphilis		Gonorrhoea	
		Positive, n(%)	Negative, n(%)	Positive, n(%)	Negative, n(%)
Sex	Male	33 (19.5)	88 (10.1)	48 (34.8)	114 (12.2)
	Female	136 (80.5)	741 (89.9)	90 (65.2)	818 (87.8)
Age categories	Below 21 years	21 (12.4)	163 (19.8)	26 (18.8)	162 (17.4)
	21-30 years	85 (50.3)	338 (41.0)	54 (39.1)	406 (43.6)
	Above 31 years	63 (37.3)	323 (39.2)	58 (42.0)	364 (39.1)
Health Area	Bokwango	40 (23.8)	244 (29.6)	45 (32.6)	245 (26.3)
	Buea Road	34 (20.2)	158 (19.2)	20 (14.5)	203 (21.8)
	Molyko	32 (19.0)	146 (17.7)	24 (17.4)	169 (18.2)

	Buea town	9 (5.4)	50 (6.1)	9 (6.5)	56 (6.0)
	Bova	8 (4.8)	44 (5.1)	8 (5.8)	50 (5.4)
	Muea	45 (26.8)	183 (22.2)	32 (23.2)	207 (22.3)
HIV Infection	Positive	15 (10.7)	54 (7.3)	16 (14.4)	61 (7.4)
	Negative	125 (89.3)	686 (92.7)	95 (85.6)	768 (92.6)
The other STI	Positive	16 (10.3)	81 (10.1)	16 (16.5)	140 (16.3)
	Negative	140 (89.7)	720 (89.9)	81 (83.5)	720 (83.7)

3.1.3. Annual prevalence of gonorrhoea in the BHD (2010–2015)

The highest prevalence of gonorrhea and syphilis was in 2015 which were 27.2% and 28.4%nrespectively and lowest prevalence were in 2014 and stood at 8.3% for gonorrheoa and 11.7% for syphilis. As demonstrated in figure 4, the prevalence of the two STIs have been less variable between 2010 and 2012

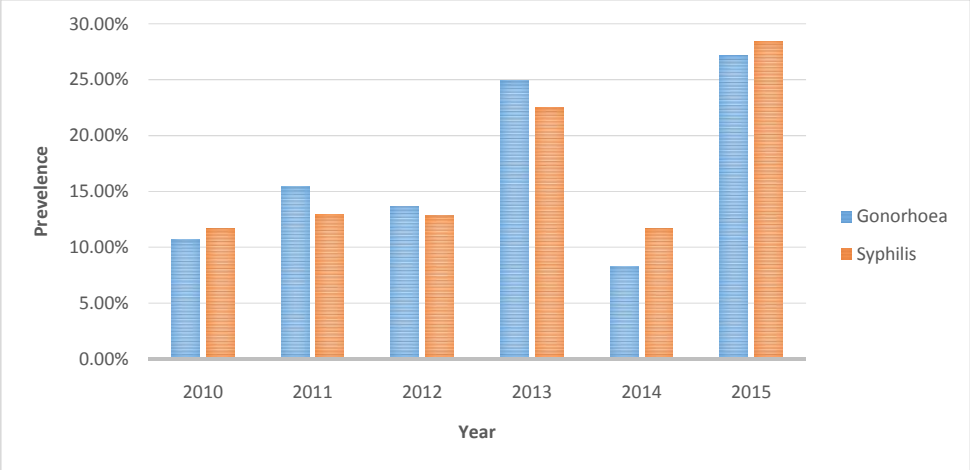

Figure 4: Prevalence of syphilis and gonorrhoea from 2010 to 2015 in the BHD

3.1.4. Association between predictors and the STIs

Compared to male, females were 0.33 times as likely to be positive for syphilis which was statistically significant with a p-value of 0.001(95%CI: 0.18, 0.62). Although not statistically significant, patients who were between the 21 and 30 were 2.46 times as likely to be syphilis positive compared to patients who were below the age of 21, and compared to syphilis positive patient who tested positive for HIV, Patient who tested positive for syphilis were 1.38 (95%CI 0.72-2.62) times as likely to test negative for HIV with a p value of 0.332.

The odds of testing positive for gonorrhea in female compared to male, was 0.22 which is statistically significant with a p-value of 0.0001(95%CI:0.11, 0.44). Although not statistically significant, patients who between the 21 and 30 were 0.65 times as likely to be gonorrhoea positive compared to patients who were below the age of 21. Compared to gonorrhoea positive patient who tested positive for HIV, gonorrhoea positive patients were 3.33 (95%CI 1.66-6.69) times as likely to test negative for HIV with a p value of 0.001 (table 2).

Table 2: Association between syphilis, gonorrhoea and predictors in the BHD

Predictors		Syphilis		Gonorrhoea	
		Odd ratio, (95% CI)	P value	Odd ratio, (95% CI)	P value
Sex	Male	1			
	Female	0.33 (0.18-0.62)	0.001*	0.22(0.11-0.44)	0.000*
Age categories (years)	Below 21	1			
	21-30	2.46(0.37-4.44)	0.503*	0.65(0.36-1.19)	0.163
	Above 31	1.41(0.18-2.65)	0.285	0.50(0.27-1.97)	0.041*
Health Area	Bokwango	1			
	Buea Road	1.44(0.81-2.57)	0.209	0.44(0.20-0.96)	0.039
	Molyko	1.28(0.69-2.33)	0.427	0.46(0.20-1.03)	0.06
	Buea town	0.60(0.19-1.84)	0.376	0.35(0.08-1.57)	0.17
	Bova	1.68(0.98-2.87)	0.759	1.06(0.37-3.03)	0.908
	Muea	1.38(0.72-2.87)	0.057	0.79(0.43-1.46)	0.465
The other STI	Positive	1			
	Negative	0.74(1.37-1.49)	0.408	0.73(0.36-1.49)	0.397
HIV Infection	Positive	1			
	Negative	1.38(0.72-2.62)	0.332	3.33(1.66-6.69)	0.001*

3.2. Discussions

STIs have a direct impact on reproductive and child health through infertility, cancers and pregnancy complications, and they have an indirect impact through their role in facilitating transmission of HIV and thus they also have an impact on national and individual economies. Reported disease rates underestimate the true burden of infection because the majority of STDs are asymptomatic [13]. This study provides the prevalence and risks factors of infections with gonorrhoea and syphilis.

The prevalence of gonorrhoea was found to be high among the study participants. This study found a prevalence of 12.5%. This figure is higher when compared to a study by Buve and collaborators [14] which found a prevalence of 2.5% among men in Yaoundé. This can be explained by the fact that only men were targeted in the above mentioned study. This study

however compares well with a study conducted by Ryan and collaborators [15] within Douala and Yaoundé which targeted commercial sex workers. The study found a prevalence of 11% for gonorrhea.

The prevalence of syphilis was also found to be high in this study. The study points to a prevalence of 16.9%. This is way higher than previous studies conducted in Cameroon and surrounding sub Saharan countries for example it is slightly higher than that from a similar study carried out in Yaoundé, Cameroon. A study conducted in 2005 [12] found out a prevalence of 6% among woman attending family planning clinic. Possible reasons for this disparity could be that, the study was concentrated on woman and more to that only those who were attending family planning clinic.

Prevalence across the years (2010-2015) showed the highest prevalence of both gonorrhea and syphilis in 2015 that is (27.2%) and (37.0%) respectively. Possible reasons for this high prevalence in 2015 could be that the number of persons screened was more compared to the other years. Also majority screened could have been men who were requested the tests and were more likely to be positive compare to women who took the tests as routine during ANC or that in 2015 there was success in control measures. The prevalence for both infections was lowest prevalence in 2014 (8.3%) and **(**9.4%) respectively. This could be due to a drop in in the total number of persons screened.

Compared to male, females were 0.33 times as likely to be positive for syphilis which was statistically significant with a p-value of 0.001(95%CI: 0.18, 0.62) this means that female were less likely to be tested positive for syphilis. This is in line with findings from a study carried out by Fichtner and collaborators who discover too that male are more likely to be tested positive to syphilis than women [16]. This disparity is likely due to the fact that, females many females were routinely tested during ANC where men went to the health facility on request and with signs and symptoms.

Although not statistically significant, patients who between the 21 and 30 were 2.46 times as likely to be syphilis positive compared to patients who were below the age of 21. This is not to be unexpected since syphilis is an STI and so a less sexually active group should not be too vulnerable for the disease. Compared to the Bokwango health area, with the exception of Buea Town Health Area, all other health areas were more likely to be tested positive for syphilis. Thought this association were not statistically significant at the bivariate level, it is worth nothing that the Buea Town and Bokwango health areas are the only health area that harbor the least number of university (Sexually active) students.

Like with Siphilis, females were less likely to be tested positive for gonorrhea compared to men with an odd ratio of 0.22 which is statistically significant with a p-value of 0.0001(95%CI: 0.11, 0.44). Again, this is in line with findings from a study carried out by Fichtner and collaborators who discover too that male are more likely to be tested positive to syphilis than women [16]. Possible explanations for this finding include the facts that women may be less likely to see primary lesions than men because they are internal and that men may have lower rates of secondary syphilis due to higher rates of diagnosis and treatment of primary cases [17].

Although not statistically significant, patients who between the 21 and 30 were 0.65 times as likely to be gonorrhoea positive compared to patients who were below the age of 21. This relationship is peculiar and not expected since this is a sexually active age group and should be exposed to gonorrhoea.

With respect to health areas, compared to the Bokwango health area, with the exception of Bova Health Area, Buea Road, Molyko, Buea Town and Muea Health Areas were less likely to be tested positive for gonorrhoea with odds ratios of 0.44, 0.46, 0.35, and 0.79 respectively.

Compared to gonorrhoea patients who tested positive for HIV, the odds of testing negative for HIV for these gonnorrhoea patients was 3.33 (95%CI: 1.66, 6.69). This relationship though not statistically significant is comparable to the finding by [18]. Both diseases are transmitted

Comment [p4]: Delete

Comment [p5]: Age of

Comment [p6]: Syphilis

Comment [p7]: Age of

sexually but HIV positive patients are likely to watch over their sexual behavior. Hence they are unlikely to contract gonorrhoea.

4. CONCLUSION

Although these infections have similar risk factors, the prevalence of syphilis was higher than that of gonorrhoea. The high prevalence of these infections is disturbing because they are preventable and also curable. The diseases have similar risk factors but are not similarly distributed in the BHD.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

CONSENT

Not Applicable

ETHICAL APPROVAL

All authors hereby declare that the study have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki. Ethical approval was granted by the University of Buea Faculty of Health Science Ethical Review Board (FSH IRB). Administrative authorization was gotten from the Regional Delegate of Public Health and the District Medical Officer of the Buea Health District.

REFERENCES

1. Gilson RJC, Mindel A. Sexually transmitted infections. BMJ. 2001;322:1160–4.

2. Usanga V, Abia-Bassey L, Inyang-etoh P, Udoh S, Ani F, Archibong E. Prevalence Of Sexually Transmitted Diseases In Pregnant And Non-Pregnant Women In Calabar, Cross River State, Nigeria. The Internet Journal of Gynecology and Obstetrics. 2010;14. doi:10.5580/27f1.

3. Edem A, Ntekpe M, Umoekam N. Prevalence of Syphilis and Gonorrhea in Patients Attending General Hospital, Calabar, Nigeria. 2013;:14.

4. Io O, Po O, Ao A, Cc O. Prevalence of sexually transmitted infections (stis) among attendees of lead city university medical centre in Ibadan, Southwestern, Nigeria. 2012;:8.

5. Division of STD Prevention. 2019. https://www.cdc.gov/std/dstdp/default.htm. Accessed 29 May 2019.

6. Institute of Medicine (US) Committee on Prevention and Control of Sexually Transmitted Diseases. The Hidden Epidemic: Confronting Sexually Transmitted Diseases: Summary. Washington (DC): National Academies Press (US); 1997. http://www.ncbi.nlm.nih.gov/books/NBK233453/. Accessed 29 May 2019.

7. van de Wijgert JHHM, Morrison CS, Cornelisse PGA, Munjoma M, Moncada J, Awio P, et al. Bacterial vaginosis and vaginal yeast, but not vaginal cleansing, increase HIV-1 acquisition in African women. J Acquir Immune Defic Syndr. 2008;48:203–10.

8. Francis SC, Mthiyane TN, Baisley K, Mchunu SL, Ferguson JB, Smit T, et al. Prevalence of sexually transmitted infections among young people in South Africa: A nested survey in a health and demographic surveillance site. PLOS Medicine. 2018;15:e1002512.

9. N WC, A S. Associated Risk Factors of STIs and Multiple Sexual Relationships among Youths in Malawi. PLOS ONE. 2015;10:e0134286.

10. Duncan ME, Tibaux G, Kloos H, Pelzer A, Mehari L, Perine PL, et al. STDs in women attending family planning clinics: A case study in Addis Ababa. Social Science & Medicine. 1997;44:441–54.

11. Zekeng L, Yanga D, Trebucq A, Sokal D, Salla R, Kaptue L. HIV prevalence in patients with sexually transmitted diseases in Yaounde, (Cameroon) in 1989 and 1990: necessity of an STD control programme. Sexually Transmitted Infections. 1992;68:117–9.

12. Mbu RE, Mbopi-Keou FX, Alemnji G, Alemdji G, Meli C, Eteki N, et al. Unexpectedly high prevalence of sexually transmitted diseases in married women attending family planning clinics in Yaounde, Cameroon. Int J STD AIDS. 2005;16:270–1.

13. World Health Organization. WHO guidelines for the treatment of treponema pallidum (Syphilis). 2016. http://www.ncbi.nlm.nih.gov/books/NBK384904/. Accessed 29 May 2019.

14. Buvé A, Weiss HA, Laga M, Van Dyck E, Musonda R, Zekeng L, et al. The epidemiology of gonorrhoea, chlamydial infection and syphilis in four African cities. AIDS. 2001;15 Suppl 4:S79-88.

15. Ryan KA, Zekeng L, Roddy RE, Weir SS. Prevalence and prediction of sexually transmitted diseases among sex workers in Cameroon. Int J STD AIDS. 1998;9:403–7.

16. Fichtner RR, Aral SO, Blount JH, Zaidi AA, Reynolds GH, Darrow WW. Syphilis in the United States: 1967-1979. Sex Transm Dis. 1983;10:77–80.

17. Nakashima AK, Rolfs RT, Flock ML, Kilmarx P, Greenspan JR. Epidemiology of syphilis in the United States, 1941--1993. Sex Transm Dis. 1996;23:16–23.

18. Fleming DT, Wasserheit JN. From epidemiological synergy to public health policy and practice: the contribution of other sexually transmitted diseases to sexual transmission of HIV infection. Sex Transm Infect. 1999;75:3–17.