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PREVALENCE AND RISK FACTORS OF SEXUALLY TRANSMITTED 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 Gonorrhoea 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 gonorrhoea 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.

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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

28 with a number of adverse pregnancy outcomes including spontaneous abortion, stillbirth,
29 prematurity, low birth-weight, post-partum endometritis, early onset of labour including
30 premature rupturing of membranes, cervical and other cancers, chronic hepatitis, pelvic
31 inflammatory diseases and various sequelae in surviving neonates while in non-pregnant
32 women, STIs can lead to chronic infertility. In addition, these infections have been shown to
33 facilitate transmission of HIV [7].

34 It is estimated that the number of pregnant women with STDs is increasing by about 250
35 million a year in the developed countries and double that number in the developing countries
36 [3]. Infections with gonorrhoea and syphilis amongst other STIs are widely distributed in
37 Africa [8–10] and Cameroon [11] and constitute a public health problem especially as
38 prevalence is unexpectedly high even among married women in Cameroon[12].

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

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46 2. MATERIAL AND METHODS

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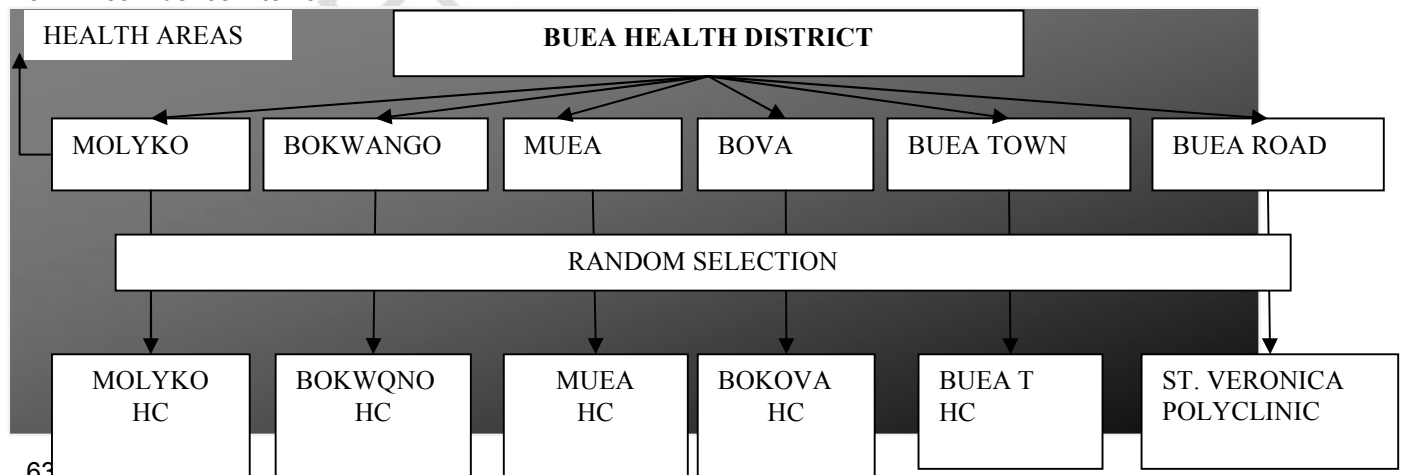
48 2.1. Study design

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

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52 2.2. Study setting and procedure

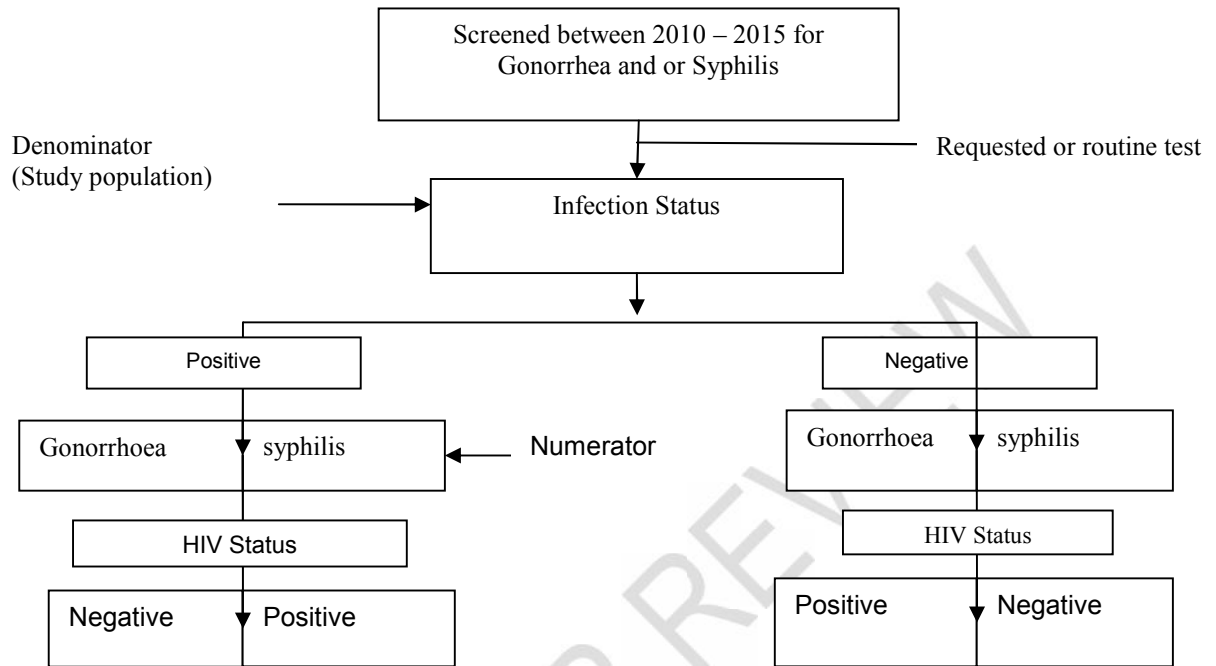
53 The BHD has six (6) Health Areas served by twenty nine (29) health facilities of which 26 are
54 PHC facilities. One PHC facility was randomly selected from each of the health areas as
55 indicated in figure 1. At the selected health facility, laboratory registers corroborated with
56 consultation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



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Figure 1: selection of health facilities



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

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2.3. Data analysis

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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.

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2.4. Ethical approval

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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.

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3. RESULT AND DISCUSSION

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3.1. Results

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

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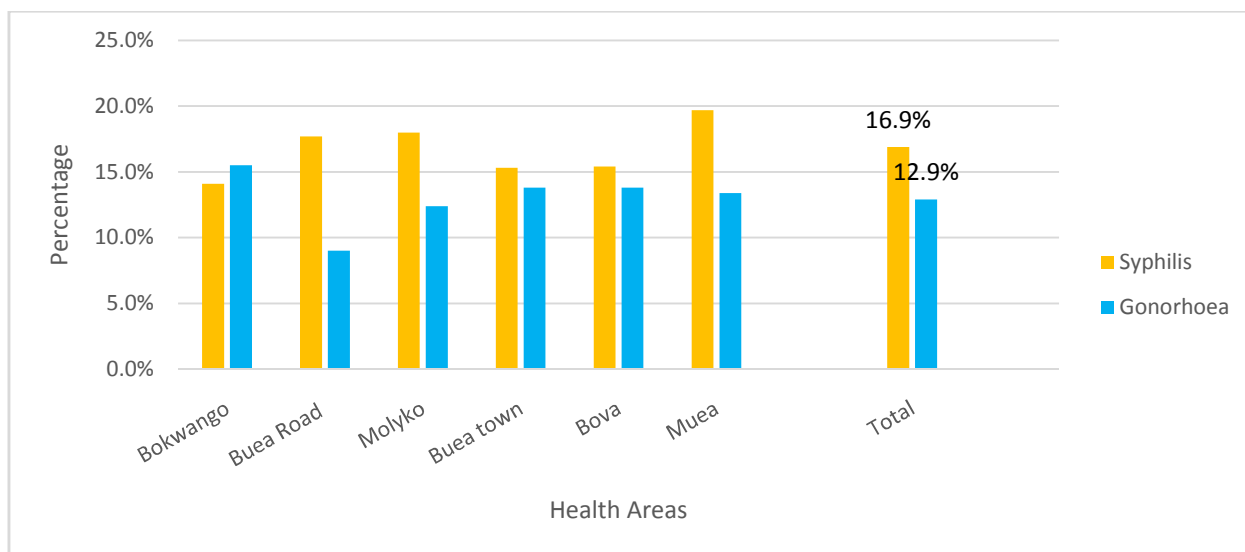
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The prevalence of Syphilis in the buea health district was 16.9% with its highest contributor being the Muea Health Area and its lowest contribution coming from the Buea Town Health Area. For gonorrhoea, its prevalence in the district was 12.9% with most of its contribution coming from the Bokwango Health Area and its least contributor being the Buea Road Health area (Figure 3).



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

95 **3.1.2. Prevalence of Gonorrhoea and Syphilis across predictors in the study**
 96 **population.**

97 Of the patients screened for gonorrhoea in the Buea health area between 2010 - 2015,
 98 majority of those who tested positive were females 90(65.2%) and 58(42.0%) were above
 99 31years of age. Also, 16(16.5%) of the patients who tested positive for gonorrhoea were also
 100 positive for syphilis. Again, 16(14.4%) of those who tested positive for gonorrhoea were
 101 tested positive for HIV.

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

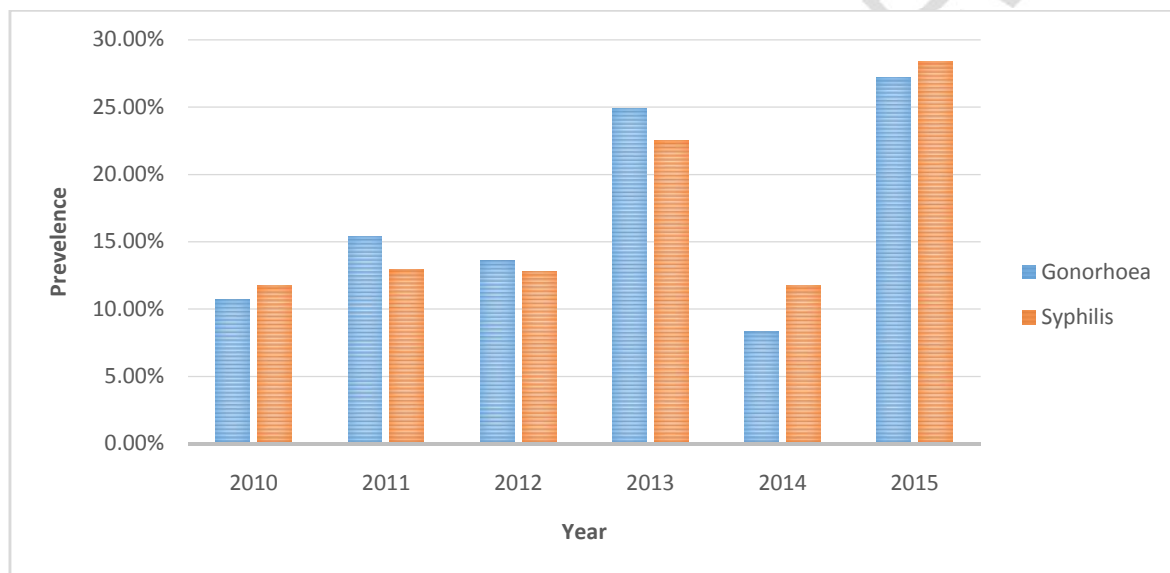
Variable		Syphilis		Gonorrhoea	
		Positive, n(%)	Negative, n(%)	Positive, n(%)	Negative, n(%)
Sex	Male	33 (19.5)	88 (10.1)	48 (34.8)	114 (12.2)
	Female	136 (80.5)	741 (89.9)	90 (65.2)	818 (87.8)
Age categories	Below 21 years	21 (12.4)	163 (19.8)	26 (18.8)	162 (17.4)
	21-30 years	85 (50.3)	338 (41.0)	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)

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

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



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

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3.1.4. Association between predictors and the STIs

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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.

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The odds of testing positive for gonorrhoea 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*		

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3.2. Discussions

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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 gonorrhoea.

149 The prevalence of syphilis was also found to be high in this study. The study points to a
150 prevalence of 16.9%. This is way higher than previous studies conducted in Cameroon and
151 surrounding sub Saharan countries for example it is slightly higher than that from a similar study
152 carried out in Yaoundé, Cameroon. A study conducted in 2005 [12] found out a prevalence of
153 6% among woman attending family planning clinic. Possible reasons for this disparity could be
154 that, the study was concentrated on woman and more to that only those who were attending
155 family planning clinic.

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

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

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

179 Like with Syphilis, females were less likely to be tested positive for gonorrhoea compared to men
180 with an odd ratio of 0.22 which is statistically significant with a p-value of 0.0001(95%CI: 0.11,
181 0.44). Again, this is in line with findings from a study carried out by Fichtner and collaborators
182 who discover too that male are more likely to be tested positive to syphilis than women [16].
183 Possible explanations for this finding include the facts that women may be less likely to see
184 primary lesions than men because they are internal and that men may have lower rates of
185 secondary syphilis due to higher rates of diagnosis and treatment of primary cases [17].

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

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

193 Compared to gonorrhoea patients who tested positive for HIV, the odds of testing negative for
194 HIV for these gonorrhoea patients was 3.33 (95%CI: 1.66, 6.69). This relationship though not
195 statistically significant is comparable to the finding by Fleming[18]. Both diseases are transmitted
196 sexually but HIV positive patients are likely to watch over their sexual behavior. Hence they are
197 unlikely to contract gonorrhoea.

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4. CONCLUSION

Gonorrhoea and Syphilis are the most common STIs and although they have similar risk factors, the prevalence of syphilis was higher than that of gonorrhoea with their respective prevalence growing as the years pass by probably due to improvement in diagnostic techniques. HIV positive patients are likely to watch over their sexual behavior making them unlikely to contract 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 student predominantly student residential area of Buea Health District of the South West Region of Cameroon.

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.

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