

**PATTERN AND MANAGEMENT OF SEXUALLY TRANSMITTED INFECTIONS  
(STIs) AMONG UNDERGRADUATES ATTENDING UNIVERSITY HEALTH CARE  
CENTRE IN BAYELSA STATE, NIGERIA**

**ABSTRACT**

Sexually transmitted infections are responsible for a variety of health problems, and can have serious consequences on reproductive health of the adolescents and young adults. Thus this study was designed retrospectively to explore the pattern and management of sexually transmitted infections (STIs) among undergraduates attending University health care centre within the period of six years between January 2007 and December, 2012. It was a descriptive cross sectional research study and data collection was done with the aid of a self developed checklist. Data obtained were analysed using Statistical Package for Social Sciences (SPSS-20.0). The results showed that 11770 undergraduates visited the health care centre within the study period, of which 342 (2.91%) presented with STIs. Trichomoniasis accounted for 155(45.3%) of the 342 STIs cases seen. The other STIs identified were gonorrhoea, 112(32.7%), candidiasis, 23(6.7%), chlamydiasis, 6(1.8%) and syphilis, 4(1.2%). It was also observed that 37(10.8%) of the identified STIs were co-infections and co-infection of *Candida albicans* (candidiasis) with *Trichomonas vaginalis* (trichomoniasis) was the most prevalent with 14(4.1%). Furthermore, the study showed the highest record of STIs was reported among 100 level students with 192(56.1%) cases while the least was recorded among the 500 level students with 2(0.6%). The study concluded that STIs with 2.91% prevalence must be regarded as significant notorious and real health burden on undergraduates, especially among the year one undergraduate students

**Key words:** Sexually transmitted infections, **Pattern, Management,** University Health care centre,

## INTRODUCTION

Sexually transmitted infections (STIs) formerly known as Sexually Transmitted Diseases (STIs) or Venereal Diseases remain a public health problem of major significance in most parts of the world. According to Centre for Disease Control and Prevention, STIs is an infection due to a variety of bacterial, viral, and parasitic infections that are transmitted primarily by sexual contact including vaginal intercourse, oral sex and anal sex.<sup>1</sup>

World Health Organization estimated that approximately 499 million incident cases of the four main curable STIs namely: gonorrhoea, Chlamydia spp, syphilis and *Trichomonas vaginalis* occur every year, with 85% in non- industrialised countries.<sup>2</sup> However: The overall yearly incidence rate of curable STIs in Africa is estimated at 254 per 1000 people in reproductive ages (15–49 years), compared to 77–91 per 1000 in industrialised countries<sup>3,4</sup>. Sub-Saharan Africa, whilst accounting for 20% of the global STI estimates, has the highest prevalence and incidence rates, followed by South and South-East Asia. This is not surprising given the large at-risk populations of young people in these countries<sup>5</sup>.

STIs impose an enormous burden of morbidity and mortality, both directly through their impact on reproductive and child health, and indirectly through their role in facilitating the sexual transmission of Human Immunodeficiency Virus (HIV) infection.<sup>6</sup> The greatest impact can be seen among women in whom severe complications include pelvic inflammatory disease, chronic pain, and adverse pregnancy outcomes (ectopic pregnancies, endometritis, spontaneous abortions, stillbirths and low birth weight). In both men and women, STIs play a major role in infertility. A growing number of malignancies are also attributed to STIs, notably cervical, anal and penile cancers as well as hepatocellular carcinoma. Congenital infections in the new-born include congenital syphilis, ophthalmia neonatorum and pneumonia.<sup>7,8</sup>

World Bank estimated that STIs, excluding HIV, are the second commonest cause of healthy life years lost by women in the 15-44 year age group<sup>10</sup>. They are responsible for 17% of the total burden of diseases in women of reproductive ages, outranked only by causes of maternal morbidity. Yet it is only in recent years that STIs have been accorded any priority by national ministries of health or by the international community, mainly because of their potential interaction with HIV<sup>10</sup>. Furthermore World Bank reported that the highest rates of STIs are generally found in urban men and women in their sexually most active years; between the ages of 15 and 35 which showed that youths shoulder a substantial burden of STIs<sup>10</sup>.

The peculiarity of undergraduates has been explored by various studies in Nigeria and reports showed increased level of risky sexual behaviour including sex with many partners and unprotected sex among undergraduates which are primarily predisposing factor to the spread of STIs. Furthermore, many undergraduates in tertiary institutions are without any parental control, couple with coercion from peers and the liberal atmosphere of the university further encourage unprotected casual sexual relationships<sup>12, 13, 14, 15</sup>

Traditionally, mechanisms for coping with and regulating adolescent's sexuality, especially marriage and norms of chastity before marriage are being eroded in Nigeria and all over the world. This could be attributed to the long duration of formal education, which has created a huge gap between the age of puberty and age at marriage, thus paving way for unprotected sex<sup>14</sup>

Nonetheless, the exact magnitude of the STIs burden is frequently unknown<sup>11</sup>. Although passive STIs surveillance systems exist in some countries, the data is not always reliable or complete. The completeness is further affected by the STIs natural history, since a large number of infections are asymptomatic. Moreover, only part of the symptomatic population seeks healthcare and even a smaller number of cases are reported. The social stigma usually associated

with STIs may result in people seeking care from alternative providers or not seeking care at all. As a result, report-based STI surveillance systems tend to underestimate substantially the total number of new cases.<sup>11</sup>

The availability of statistics on the pattern and management of STIs has a major role in the control of sexually transmitted infections (STIs) among undergraduates. Currently, the absence of statistical information and baseline data on STIs among undergraduate has been a major obstacle to efforts made by the Ministry of Health. Thus, the need to have information about the pattern and management of STIs among undergraduates attending health care centre in a tertiary institution in Bayelsa state Nigeria

## **Research Methodology**

A descriptive cross sectional research design was used for this study. It is designed retrospectively to determine the pattern and management of sexually transmitted infections (STIs) among undergraduates attending University health care centre within the period of six years between January 2007 and December, 2012. The research was carried out in the health care centre of Niger Delta University, Wilberforce Island, a state owned university located in Amassoma community of Southern Ijaw local government area of Bayelsa state. The health care centre offers free medical service and it is the first point of call for any student when ill since it offers free medical services and it is within the university premises. The study population comprises of all undergraduates that attended the health care centre of the University within the period of January, 2007 through December, 2012.

A purposive sampling technique was used to select case files of all STIs patients attended to from January 2007 through December 2012. Data were collected using checklist developed by the researchers after review of literature and records from the health centre. The face and content

validity of the research instrument was done by experts in the field of study. The services of the personnel in-charge of the record section was utilized in sorting out the necessary information based on the checklist. Data were collected based on medical records and case files of students who visited the University Health Centre from January 01, 2007 to December 31, 2012 by the researchers. Gathered data were analysed using Statistical Package for Social Sciences (SPSS-20.0) and were presented by descriptive statistics. The researchers obtained written permission from the university to use the centre. To ensure anonymity and confidentiality of the case files, no names were used, only codes and all the data obtained were kept in a secure place under lock and only available to the researchers.

## RESULTS

Table 1 above shows that majority of the undergraduate students 182(53.4%) were between the ages of 20-24 years, 85(24.9%) were between ages 25-29 years, 67(19.6%) were between 15-19 years, while, only 7 (2.1%) were between 30- 34years. All (100%) were Christians, and majority 313(91.5%) were female and 341(99.7%) were single.

Table 2 above shows the prevalent rate of STIs among the undergraduate students to be 2.87 (338/11770). The highest prevalent rate (8.67) was reported in 2009, followed by 3.21 in 2010, then 3.04 in 2011, 2.84 in 2012, 1.59 in 2008 and the least 1.49 in 2007.

Table3 shows that 67(19.6%) and 66(19.3%) of the undergraduates were in the faculties of Sciences and Management Sciences respectively. Forty-nine (14.4%) were in the faculty of Arts, while faculties of Education, Social Sciences, Agric Technology, Nursing, Engineering, Pharmacy and Basic Medical/Clinical Sciences had 34(9.9%), 30(8.8%), 21(6.14%), 19(5.56%), 14(4.1%), 13(3.8%) and 10(2.9%) respectively. Faculty of law had the least presentation with only 1(0.3%) STIs.

Table 4 shows the signs and symptoms experienced by the undergraduates with majority having combination of two or more signs and symptoms. The signs and symptoms listed in 1-5

in table 4 constitute the highest clinical manifestations in order of magnitude, followed by 6-10 while the last six had the least distributed frequency of occurrence

Figure 1 above shows that 300 (89.0%) of the undergraduates had single STIs infections and the most common cause of STIs among the undergraduates was *Trichomonas vaginalis* 155(45.8%), followed by *Neisseria gonorrhoea* 112(33.2%), *candidia albicans* 23(6.8%), *chlamydia trachomatis* 6(1.6%) and syphilis 4 (1.3%) respectively.

Figure 2 shows that 37 (11.0%) of the undergraduates had multiple (co-infections) infections. The most common multiple STIs among the undergraduates was candidiasis + trichomoniasis 14(4-1%). 12(3.5%) presented gonorrhoea + trichomoniasis, 7(2.0%) had candidiasis + gonorrhoea, 3(0.9%) had candidiasis + gonorrhoea + trichomoniasis, and 1(0.3%) presented gonorrhoea + syphilis.

Figure 3 shows the academic level (class) of the undergraduates that presented STIs during the period of study. The highest record was reported in among 100 level students with 192(56.1%) cases, 200 level with 63(18.4%) cases, 300 level had 47(13.7%), 400 had 30(8.8%), while the least was recorded among the 500 level students with only 2(0.6%) STIs cases.

### Discussions of findings

The study showed that majority of the undergraduates with STIs were within the age range of 20-24 years (Mean age, 22.43, SD  $\pm$  3.147). This indicates that these age groups are most vulnerable to STIs. The findings of this study supports the report of Centres for Disease Control and Prevention<sup>1</sup> that large proportion of STIs is believed to occur in people younger than 25, with the highest rates usually observed in the 20-24 year age group. Reasons inferred for this according to CDC<sup>16, 17</sup> are that this age group are sexually active youth and are more likely than older individuals engage in risky sexual behaviours such as unprotected sex and having multiple sex partners, thus, are potentially at risk of contracting sexually transmitted infections (STIs).

## **Prevalence of sexually transmitted infections among undergraduates**

As shown in the obtained results, the prevalence rate of STI was 2.91% (342/11770) within the studied period. This implies that STIs constitute an important health problem in the University. Apart from the health consequences, it could be adduced that STIs might be contributing factors to school absenteeism among the study populace thus supporting report made by Upchurch *et al.*<sup>18</sup>.

Gender-wise, findings from this study reveals that majority (91.5%) of the reported cases were among the female undergraduates compared to their male counterparts. This corroborates reports made by CDC<sup>17</sup> that young woman and female adolescents are more susceptible to STI due to their genitalia anatomy.<sup>16, 19</sup> In addition, Eng and Butler<sup>20</sup> reported that during adolescence and young adulthood, women's columnar epithelial cells are especially sensitive to invasion by sexually transmitted organisms. Furthermore, Taiwo<sup>21</sup> outlined four main factors which include: biological, psychological, economic, and social cultural as responsible for the specific susceptibility of young active women to STI.

It is important to note that in contrast to the observation recorded in trend increase on yearly basis, the incidence of STI decreases as the subjects advance to the next level of their academic programme. The highest prevalence was recorded at 100 levels and the least in 500 levels. One possible explanation for this observable difference could only be attributed to the fact that at 100 level majority of the subjects are new, thus, sex education, awareness and adequate knowledge maybe lacking. More so, as the student progress in their level of academic programme, maturity sets in and awareness of the stigma associated with STIs might have played a major role by developing new ways to promote protective behaviours, or they may be seeking alternative means of treatment or might have engage in self-medication.

**The commonest STIs among the undergraduates within the study period**

The most common aetiological cause of STIs among the study population was *Trichomonas vaginalis* 155(45.8%). This supports the report made by WHO that trichomoniasis is the most common non-viral STI with an estimated 276.4 million cases annually worldwide and it is associated with approximately 50% of STIs in women<sup>22, 23</sup>.

This study revealed that *Neisseria gonorrhoeae*, the causative agent of gonorrhoea 112(32.7%) is the second prevalent cause of STIs among these undergraduates. This findings support the documentation made by CDC<sup>1</sup> that gonorrhoea is the second most commonly reported notifiable disease in the USA. In addition, Dehne and Riedner<sup>24</sup> reported prevalent rate of 31% among women in Abidjan<sup>24</sup>. In contrast to this study, some studies showed that the prevalence of gonorrhoea among adolescent girls is usually of lower prevalence rates well below 10%<sup>25, 26</sup>.

Candidiasis, a fungi disease caused by *Candida albicans* 23(6.8%) is the third commonest cause of STIs followed by Chlamydiasis 6(1.6%), caused by *Chlamydia trachomatis*. Though, chlamydiasis is considered an adolescent infection, and its presence is a marker of recent onset of sexual activity, the outcome of this present study is in contrast to various reports where prevalence rate is high.<sup>27,28,29</sup> Nevertheless, the low prevalent rate recorded in the present study may be due to the asymptomatic nature of this disease, incomplete screening coverage and under reporting as documented by Levine,<sup>30</sup>

**Co-infection of STIs**

Sexually transmitted co-infections pose considerable health threats to people living with STIs, while multiple sexually transmitted co-infections are common because the pathogens share transmission routes. Findings from the study were able to show co-infections among 37(10.8%)

of the cases reported during the studied period. This outcome supports findings reported by Nusbaum *et al.*<sup>31</sup> and Kalichman *et al.*<sup>32</sup> In addition, WHO<sup>33</sup> supports the fact about co-infections and sequelae in patients treated for gonorrhoea in up to 50% of cases, which has led WHO to recommend that as a routine both infections should be treated simultaneously<sup>11, 33</sup>.

In this present study, co-infection of *Candida albicans* (candidiasis) with *Trichomonas vaginalis* (trichomoniasis) was the most prevalent with 14(4.1%). This finding supports earlier report made by Alo *et al.* in Abakaliki, South eastern Nigeria<sup>34</sup>. Though in contrast to this, a higher prevalent rate of co-infection of 21.7% was reported by them. Furthermore, co-infection of Gonorrhoea with Trichomoniasis(3.5%) was also observed, followed by Candida co-infected with gonorrhoea (2.0%). It is noteworthy, that three (0.9%) of the undergraduates in this study were co-infected with triple STIs agents (Candida, Gonorrhoea and Trichomonas).

### **Management patterns**

Clotrimazole, Metronidazole, Ciprofloxacin, doxycycline, and Gentamicin were the drugs majorly prescribed in this centre for treatment of STIs. However, because of the burden attributed to STIs, WHO has recommended a syndromic approach to diagnosis and management of STIs in patients presenting with consistently recognised signs and symptoms of particular STIs. Findings from this study is in line with CDC and WHO recommendations that multiple, combinatory antibiotics are recommended for the management of all types of STIs<sup>13,33</sup>

## Recommendations

There is need for enlightenment programmes on the prevention of sexually transmitted infections among undergraduates during the orientation of newly admitted students and routinely for old students, bearing in mind that the higher the level, the lower the incidence of STIs

Provision of separate special clinics (youth friendly clinic) and trainings of professionals particularly Nurses for STIs cases in university. With the Provision of separate special clinics undergraduates would be better encouraged to utilise the STIs clinic and get information that will help prevent or reduce the occurrence of STIs among undergraduates.

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**Table 1: Demographic Data (n = 342)**

<b>Variable</b>	<b>Frequency</b>	<b>Percent (%)</b>
<b>AGE (Years)</b>		
15 - 19	67	19.6
20 - 24	182	53.4
25 - 29	85	24.9
30 - 34	7	2.1
*Missing	1	
<b>Sex</b>		
Male	29	8.5
Female	313	91.5
<b>Marital Status</b>		
Single	341	99.7
Married	1	0.3
<b>Religion</b>		
Christian	342	100.0
Islam	0	0.0
Traditional	0	0.0

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312 **Table 2: Prevalence Rate of STIs presented to the health care centre during Jan, 2007**  
 313 **through Dec., 2012 (n = 342)**

<b>Period</b>	<b>No of Patients (Sickbay Attendance)</b>	<b>No. of Patients with STIs</b>	<b>Prevalence rate</b>
2007	940	14	1.49
2008	1945	35	1.59
2009	496	43	8.67
2010	1435	46	3.21
2011	3153	96	3.04
2012	3801	108	2.84
Total	11770	342	2.87

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316 **Table 3: Faculty of students with STIs presented to health care centre during Jan, 2007**  
 317 **through Dec., 2012 (n = 342)**

Variable	Frequency	Percent
Sciences	67	19.6
Management Sciences	66	19.3
Arts	49	14.3
Education	34	9.9
Social Sciences	30	8.8
Agricultural Technology	21	6.1
Nursing	19	5.6
Engineering	14	4.1
Pharmacy	13	3.8
Basic Medical/clinical Sciences	10	2.9
Law	1	0.3
Total	342	100.00

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320 **Table 4: Signs and symptoms presented by undergraduates with STIs at the health care**  
 321 **centre during Jan, 2007 through Dec., 2012 (n = 342)**

Variables	Frequency	Percentage
1. Vaginal Discharge + Itching + lower abdominal pain	76	22.2
2. vaginal discharg + Itching + dysuria	56	16.4

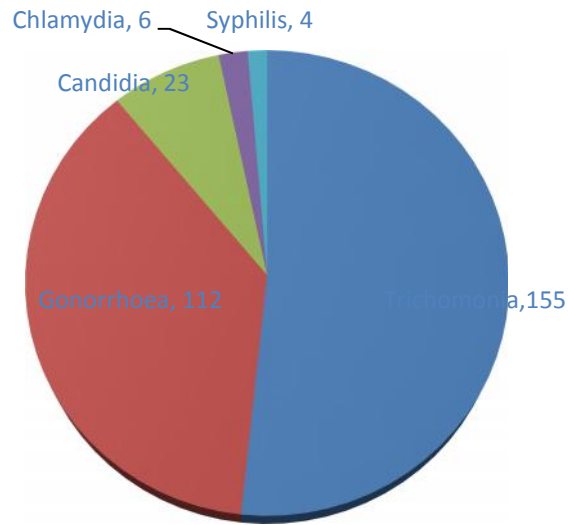
3. vaginal discharge	34	9.9
4. vaginal discharge + itching	26	7.6
5. Vaginal discharge+ rashes + itching +sore	20	5.8
6. Dysuria + Lower Abdominal Pain	12	3.5
7. Penile discharge + lower abdominal pain + dysuria	10	2.9
8. Purulent Penile discharge + dysuria	9	2.6
9. dysuria	8	2.3
10. Vaginal discharg+ frequent micturation	7	2.0
11. Vaginal discharge +itching + Rashes + sore + dysuria	5	1.5
12. Dysuria + Rashes + fever	3	0.9
13. vaginal discharge + Nausea + vomitting	2	0.6
14. Penile discharge + Itching	2	0.6
15. Blister around the corona of penis	1	0.3
16. Epididymitis	1	0.3

Total	342	100
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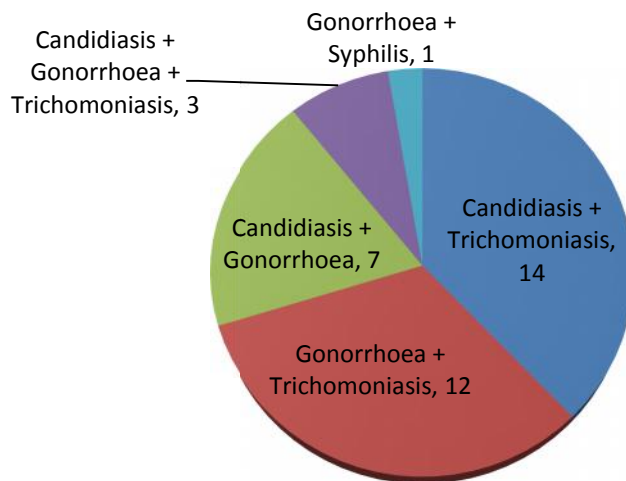
**Table 5: Treatment (drugs prescribed) administered to undergraduates with STIs during Jan, 2007 through Dec., 2012 (n = 342)**

Variables	Frequency	Percent
Metronidazole + doxycycline + clotrimazole (vaginal pessary)	45	13.2
Ampiclox+Metronidazole+ doxycycline + clotrimazole (V. pessary)	38	11.1
Gentamicin + Metronidazole + Ciprofloxacin + clotrimazole (vagina pessary) + Ibrupofen + Piriton/ Prednisolone	28	8.2
Ciprofloxacin + Metronidazole + Clotrimazole	24	7.0
Amoxil+ Ciprofloxacin + Metronidazole + doxycycline + dichlofenac + clotrimazole (vaginal pessary)	21	6.1
Ciprofloxacin + Piriton/ Prednisolone + doxycycline + Metronidazole + Clotrimazole (vaginal pessary)	20	5.0
Gentamicin + Ciprofloxacin + Metronidazole + doxycycline +Clotrimazole (vaginal pessary)	16	4.7
Gentamicin + Ciprofloxacin + Metronidazole + doxycycline + dichlofenac + clotrimazole (vaginal pessary)	16	4.7
Metronidazole + Prednisolone + Clotrimazole (Vaginal Pessary)	14	4.1
Fluconazole (diflucan) + Piriton + Clotrimazole (vagina pessary)	14	4.1
Fluconazole + Metronidazole + Ciprofloxacin + doxycycline	9	2.6

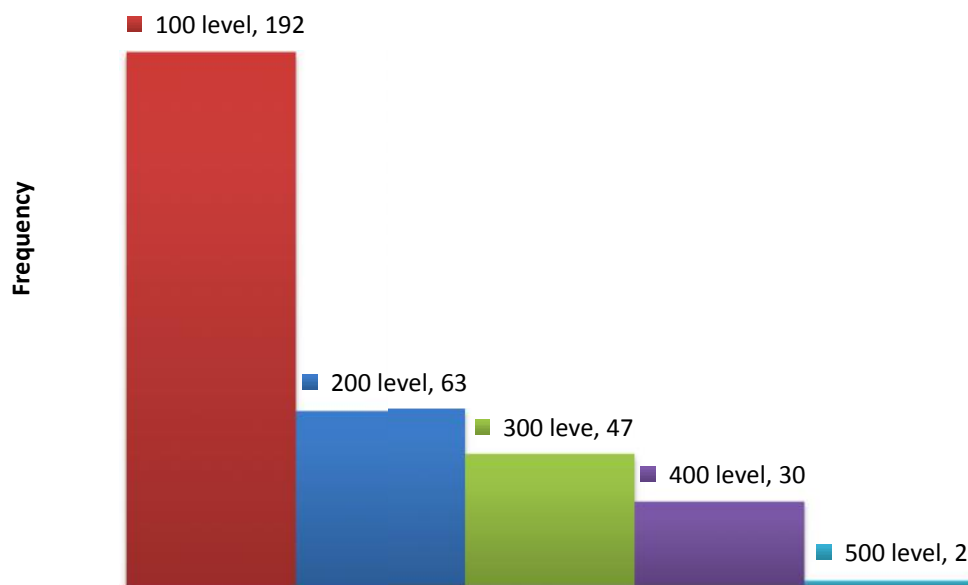
+Gentamicin + Clotrimazole		
Ampiclox + Gentamicin + Metronidazole + Clotrimazole	8	2.3
Gentamicin + Metronidazole + doxycycline + Clotrimazole	7	2.1
Metronidazole+Erythromycin + fluconazole + Clotrimazole	6	1.8
Tetracycline + gentamicin +Co-trimoxazole + Ciprofloxacin +	6	1.8
Ampiclox + dichlofenac + piriton + Clotrimazole (vaginal pessary)	5	1.5
Gentamicine + Metronidazole + doxycycline + clotrimazole	5	1.5
Gentamicin + Ciprofloxacin + doxycycline + diclofenac	5	1.5
Gentamicin + Metronidazole + Clotrimazole	5	1.5
Fluconazole + Metronidazole + Clotrimazole	5	1.5
Gentamicin + Erythromycin + Ciprofloxacin + clotrimazole	5	1.5
Procaine Penicillin + Ciprofloxacin + doxyxcline + clotrimazole	5	1.5
Metronidazole + Erythromycin + doxycyline	4	1.2
Fluconazole + Metronidazole + Ciprofloxacin + clotrimazole	4	1.2
Co-trimoxazole + PCM + vit C	3	0.9
Fluconazole + doxycycline + Metronidazole + dichlofenac	3	0.9
Ampiclox + Metronidazole + Ciprofloxacin + Clotrimazole	3	0.9
Ampiclox + Ciprofloxacin + Gentamicin + Dichlofenac + Clotrimazole	3	0.9
Amoxyl + Ciprofloxacin + Ibrufen +clotrimazole (vaginal pessary)	2	0.6
Prazequantel + ciprofloxacin + Metronidazole	1	0.3
Amoxyl + Metronidazole + Clotrimazole	1	0.3
Strptomycin + doxycycline + clotrimazole + Ibruprofen	1	0.3
clotrimazole + Vit C + folic acid	1	0.3
Doxycycline + Dichlofenac	1	0.3
Ampiclox + Ibrufen + clotrimazole	1	0.3
Ampiclox + Gentamicin + Metronidazole + doxycycline + clotrimazole	1	0.3
Fluconazole + Erythromycin + Prednisolone	1	0.3
Ampiclox + Amoxyl + Gentamicin	1	0.3
Ofloxacin + Gentamicin + Doxycycline	1	0.3
Total	342	100.



**Figure 1: Common Cause of STIs among adolescents during the period of study, Jan 2007 through Dec., 2012 ( $n=300$ )**



**Figure 2: Co-infections (Multiple) courses of STIs among adolescents during the period, Jan 2007 through Dec., 2012 ( $n= 37$ )**



**Figure 3: Academic level of adolescents with STIs during the studied period, Jan 2007 through Dec., 2012**