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Original Research Article

Etiology of urogenital discharges and their antibiograms in HIV/AIDS positive patients at Bwizibwera Health Centre IV: Mbarara District- Uganda

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The study aimed at establishing the etiology of urogenital discharges and their antibiograms in HIV/AIDS positive patients attending the HIV/AIDS clinic at Bwizibwera health center IV in Mbarara district, Uganda. This was a non- interventional descriptive laboratory based study. Forty (40) HIV positive patients with a urogenital discharge, read, understood and signed the consent forms were enrolled into the study. Of these, (47.5%, 19/40) were males and (52.5%, 21/40) were females. Out of eighty (80) urogenital swabs obtained, 40 of them were cultured on various culture media while the other 40 were used for serological tests. Chloramphenicol, penicillin, ceftriaxone, gentamycin, erythromycin and tetracycline antibiotics were used for sensitivity.A total of nine microorganisms were isolated [*N. Gonorrhoeae* (37.1%, 13/35), *Staphylococcus aureus* (22.9%, 8/35), *Candida albicans* (14.3%, 5/35),*Enterococcus faecalis (*8.6%, 3/35), *Klebsiella pneumonia* (5.7%, 2/35), non *C. albicans* species (2.9%, 1/35), *Escherichia coli* (2.9%, 1/35), *Pseudomonas stuttzeri* (2.9%, 1/35) and *Pseudomonas aeruginosa* (2.9%, 1/35)], serologically, all participants tested negative for *Chlamydia*.Majority of the isolates were sensitive to chloramphenicol (85.2%, 23/27), gentamycin (66.7%, 18/27), erythromycin (68.2%, 15/22) and lastly ceftriaxone (51.9%, 14/27), but also resistant to penicillin (59.1%, 13/22) and tetracycline (51.9%, 14/27).The study revealed Gonorrhoea (37.1%) as the highly prevalent urogenital infection and the least was candidiasis. Most of the isolates proved sensitive to chloramphenicol, gentamycin, erythromycin and ceftriaxone, as applied antibiotics in this study and resistant to only two of them i.e. penicillin and tetracycline.

Key words: HIV/AIDS positive patients, urogenital discharges, sexually transmitted diseases

INTRODUCTION

Human immunodeficiency virus (HIV) positive patients are increasingly getting infected with other urogenital infections (Hansjakob, 2013). While HIV infects all body organs in order to manifest with different symptoms and complication, the genital urinary system is also affected (Azore, 2005). Diseases transmitted by the direct sexual contact usually affect the reproductive system and urinary system; but can also spread to other organs and body systems (sexually transmitted disease (STD), 2012). Yeast infections are also commonly diagnosed in the urogenital discharge in both men and women (STD, 2012).

Studies have shown that HIV positive individuals having other urogenital infections are more likely to be in a critical state than those without the urogenital infections because of their already compromised immunity (Centre for Disease Control, (CDC), 2010). Also, consequences of urogenital

infections amongst HIV positive clients/ patients can be grave, resulting in conditions like infertility, ectopic pregnancy, cancer, and neonatal infections (Charanchi, Kudi, & Tahir, 2012). Certain behaviors like having more than one sexual partner and irregular usage of condoms may lead to contracting these other urogenital infections (Workowski & Berman, 2010).

In the study done on the etiology and STI/HIV co-infections among patients with urethral and vaginal discharge syndromes in South Africa, it was found out that the prevalence of the male urethral discharge was at 92% while the vaginal discharge was at 85% (Mhlongo et al., 2010). *Neisseria gonorrhoeae* was found to be at 85% in Cape Town and 71% in Johannesburg, while *Chlamydia trachomatis* was found to be the second highest with 13% in Cape Town and 24% in Johannesburg (Mhlongo et al., 2010). In addition, the researchers also noted that, bacterial vaginosis was most common standing at 46 % in Cape Town and 36% in Johannesburg (Mhlongo et al., 2010). Trichomoniasis that was at 19% in Cape Town and 34 % in Johannesburg and syphilis that was at 4% was also documented (Mhlongo et al., 2010).

In the study conducted in Gombe on the antibiotic susceptibility of urogenital discharge causative agents in HIV positive patients, six opportunistic bacterial species were isolated of which *Staphylococcus aureus* had the highest frequency of 9 (30.0%) while *Enterococcus faecalis* had the lowest as 1(3.3%) (Charanchi et al., 2012).The most active drug against *S. aureus* observed was augmentin (71.4%) (Charanchi et al., 2012). In addition to the above isolates (*Staphylococcus aureus* and *Enterococcus faecalis*), two exogenous bacterial species were isolated; *Neisseria gonorrhoea* which was resistant to tetracycline and *Haemophilus* species which was sensitive to all antibiotics apart from co-trimoxazole and fusidin (Charanchi et al., 2012).

According to the study conducted in south west Ethiopia on the rates of susceptibility of urogenital discharge causatives to commonly used antibiotics, it was found out that, all the isolates were sensitive to chloramphenicol (100 %, 27/27) (Agersew et al., 2012). Most of Gram negative isolates were sensitive to ceftriaxone, ciprofloxacin, norfloxacin, gentamycin, amoxicillin-clavulanic acid, co-trimoxazole and tetracycline while Gram positive isolates were sensitive to ceftriaxone, gentamycin and amoxicillin-clavulanic acid (Agersew et al., 2012). It was also found out that, all the Gram negative isolates were resistance to ampicillin, and amoxacillin and that majority of Gram positive isolates were resistant to most of the antibiotics tested than the Gram negative isolates (Agersew et al., 2012).

According to the study conducted in Abakaliki, it was found out that, the antimicrobials used that showed the greatest sensitivity to the isolated organisms (*Klebsiella* species, *S. aureus*, *Pseudomonas* species, S*treptococcus* species, *E. coli, Proteus* species and *Citrobacter* species) were gentamycin (45.5%), ceftriaxone (44.5%), and ciprofloxacin (32.7%) (Muoneke & Ibekwe, 2012).

According to the study done in Uganda on the vulnerability and risk factors of STDs and HIV amongst the adolescents in Kampala, Uganda, the prevalence of *Chlamydia trachomatis, Neisseria gonorrhoeae, Trichomonas vaginalis* and *Treponema pallidum* was recorded to be 4.5%, 9.0%, 8.0%, and 4.0% respectively for female, and 4.7%, 5.7%, 0.0%, and 2.8% respectively for males (Rassjo, Mirembe & Darj, 2006). The study also revealed that 20.6% of the female and 13.2% of the male had at least one STD (Rassjo et al., 2006).

At Bwizibwera health center IV which was the study centre of this research project, the causative agents of urogenital discharges amongst these patients was not established and yet these HIV positive patients were constantly presenting with urogenital discharges with the rate of more than 4 cases per week (Kibombo Dan 2012, pers. comm., 31st February). Since a urogenital discharge is one of the commonest symptoms of urogenital infections, it indicates that, there might be a possibility of these patients having other urogenital infections in addition to HIV and/or there is an increase in HIV transmission within the community (CDC, 2010). This projected that the problem would therefore lead to an increase in HIV amongst the people in the Bwizibwera community and also since the immunity of these patients is already compromised, contraction of any other STDs would cause them to die (CDC, 2010).

The research was therefore intended to establish the actual causative microorganisms of the urogenital discharges amongst the HIV positive patients attending the HIV clinic at Bwizibwera health center and also establish the antibiograms of the causative microorganisms where possible. The specific objectives included identifying the microorganisms causing urogenital discharges in HIV positive patients using both serological and biochemical tests and determining the susceptibility pattern of the isolates to commonly used antibiotics.

MATERIALS AND METHODS

This was a non- interventional descriptive laboratory based study conducted at Bwizibwera health centre IV, Mbarara district, western Uganda which is about 25 km from Mbarara town, Ibanda road. Whose sample size was 40 that obtained from the standard formula shown below,

$$N = \frac{Z^2 P Q}{D^2}$$

(Lwanga and Yook, 1986)

Where N is the sample size in the study, Z is the zero score (1.96) equivalent to 95% confidence interval, P is the estimated prevalence = 0.13, Q is 1-p-0.05 where 0.05is the significance level, while D is the magnitude of the confidence interval which is 0.1% Solution: Therefore,

Table 1: Number of specimens: 35

Microorganisms	Frequency	Percent
Staphylococcus aureus	8	22.9
Candida albicans	5	14.3
Non C.albicans spp	1	2.9
Neisseria gonorrheae	13	37.1
Pseudomonas aeruginosa	1	2.9
E. coli	1	2.9
Klebsciella pneumoniae	2	5.7
Pseudomonas stutzeri	1	2.9
Enterococcus faecails	3	8.6
Total	35	100.0

N is 40.95: implying that the sample size of the study was 40.

Forty (40) HIV positive patients with a urogenital discharge were enrolled into the study through signing the study consent forms. Of these, (47.5%, 19/40) were males and (52.5%, 21/40) were females. Out of eighty (80) urogenital swabs obtained, 40 of them were cultured on various culture media while the other 40 were used for serological tests.

For each participant, a pair of new sterile hand gloves was worn; cotton wool moistened in sterile normal saline was used to clean around the genital opening. For the urethral swab sample, the urethra was gently massaged from above downwards until sufficient amount of discharge was seen to be flowing which was then collected directly onto a new sterile swab stick. For the endocervical swab sample, the cervix was cleansed using a sterile swab moistened in sterile normal saline.

With the use of a sterile vaginal speculum, another sterile swab stick was then inserted down to the endocervical canal and gently rotated so as to obtain the specimen. All samples were carefully and properly labeled and immediately taken to the Mbarara university microbiology laboratory located on second floor, faculty of medicine building, Mbarara University for the period between the months of January to April, 2013 for processing and examination.

In the lab, the urogenital swab was subjected to culture, Gram stain, wet preparation and serology technique. Pure isolated organisms were subjected to antibiotic susceptibility testing using Kirby-Bauer disc diffusion method and the sensitivity pattern of the antibiotics was interpreted following the clinical and laboratory standard institute guidelines. Standard reference strains of *E. coli* ATCC (American Type Culture Collection) 2592 and *S.aureus* 25923 were used as controls with *E. coli* representing the Gram negatives while *S.aureus* representing the Gram positives.

The research findings were analyzed using a Statistical Package for the Social Sciences (SPSS) version 20 and presented in form of charts and tables.

Before the researcher started on this research, permission was sought from research participants, Faculty Research Ethics Committee (FREC), the site manager of Makerere Joint AIDS Programme (MJAP) at Bwizibwera heath center IV and the project manager of MJAP, Mbarara branch. A pilot study was conducted to test the data collecting tool. Codes instead of names were used as sample identification names. Results obtained were availed to only the clinicians, who helped in the proper management and treatment of the participants. The raw data was kept safe in the department of medical laboratory science.

RESULTS

Microorganisms isolated

In this study, 35 culture plates had significant growth while 5 culture plates did not have significant growth. Those with significant growth generated a total of nine isolates, of which *Neisseria Gonorrhoeae* was the highly prevalent isolate amongst the Gram negatives, *Staphylococcus aureus* was the highly prevalent isolate amongst the Gram positives while *Candida albicans* was the highly prevalent isolate amongst the *Candida* species. Serologically all participants tested negative for the chlamydia test. The isolated organisms are summarized in the Table 1. The male participants had more of *Neisseria Gonorrhoeae* as compared to their counterparts the female participants as shown in Figure 1.

Susceptibility pattern of the isolates

In this study, the most active drug against Gram positive organisms particularly *S. aureus* was gentamycin (27.6%) and most resistant was penicillin (20.8%) while the most active drug against Gram negative organisms' particularly *N. Gonorrhoeae* was erythromycin (41.7%) and most resistant was penicillin (33.3%). The antimicrobial susceptibility pattern of the isolates is summarized in Figure 2.

DISCUSSION

This study revealed a co-infection amongst the HIV positive participants. Both the exogenous microorganisms and the endogenous microorganisms were isolated adding up to nine (9) isolates in total. These finding were slightly similar to the study conducted by Charanchi et al (2012) who isolated six (6) endogenous microorganisms and two (2) exogenous microorganisms adding up to eight (8) isolates in total. This might have been due to the fact that the participants were already immune compromised (CDC, 2010).

This study revealed *Neisseria gonorrhoeae* as the highly prevalent isolate which was similar to the studies

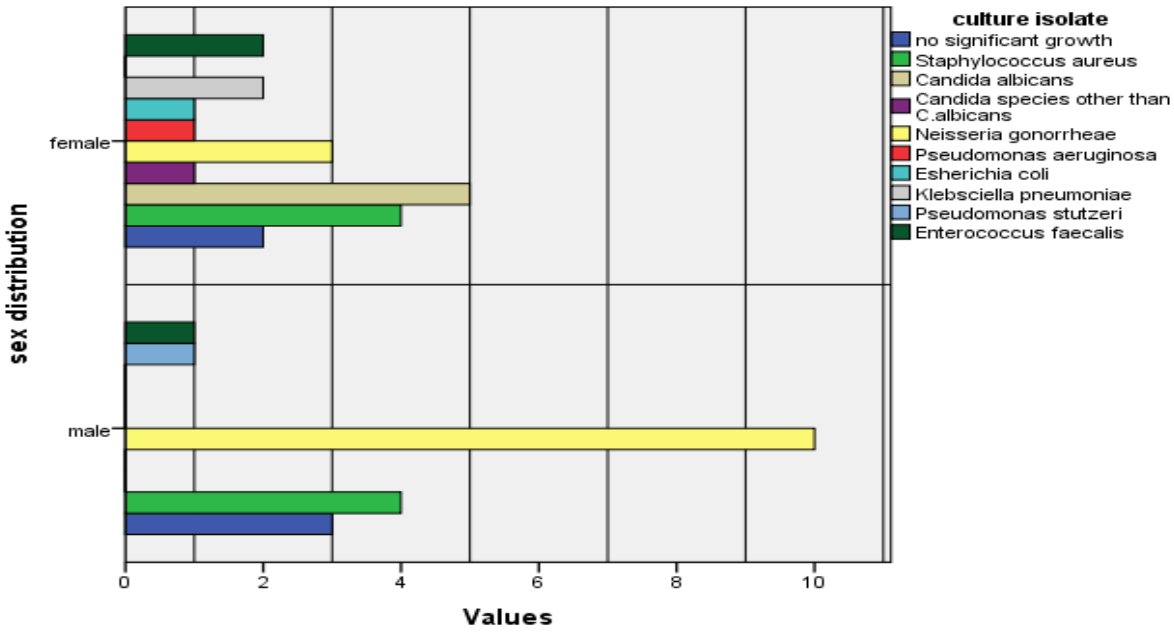

Figure 1: Isolated microorganisms amongst female and male research participants

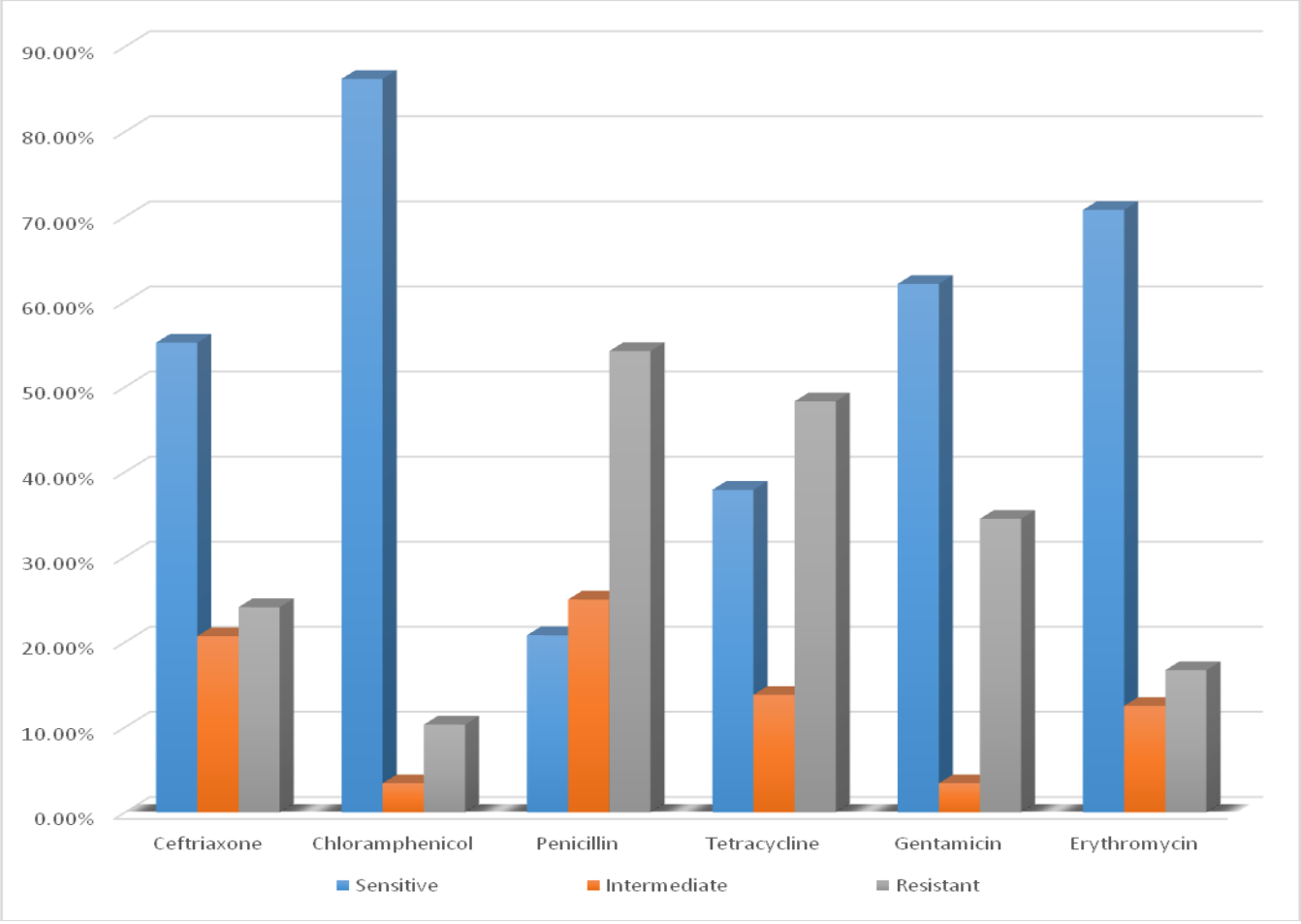

Figure 2: Antibiotic sensitivity pattern

conducted in South Africa by Mhlongo et al (2010) and that conducted in Uganda by Rassjo et al (2006) who also obtained *Neisseria gonorrhoeae* as their highest isolate with a prevalence of (85%) and (9%) respectively but contrary to that by Charanchi et al (2012) whose *N. gonorrhoeae* (6.6%, 2/30) was not the highest. This is probably because it is the most prevalent isolate amongst these research participants.

Among the opportunistic bacterial infections isolated in this study, *Staphylococcus aureus* had the highest percentage prevalence of (22.9%, 8/35), which was close to the study done by Charanchi et al (2012) who also obtained *Staphylococcus aureus* as their highest opportunistic bacteria at (30%, 9/30). This might have been because *Staphylococcus aureus* has the ability to, survive in minimal growth requirements, withstand high resistance from environmental factors, colonise and establish infection in almost every site of the body especially those that have reduced immunity (Charanchi et al., 2012).

This study was slightly similar to the study conducted in Gombe that also isolated *E. coli* (23.3%, 7/30), *Klebsiella pneumoniae* (16.5%, 5/30), *Pseudomonas aeruginosa* (10%, 3/30), *Entrobacter* species (6.6%, 2/30), *N. Gonorrhoeae* (6.6%, 2/30), *Hemophillus* species (3.3%, 1/30) and *Enterococcus faecalis* (3.3%, 1/30) (Charanchi et al., 2012). This was contrary to the studies done in South Africa by Mhlongo et al (2010) and in Uganda by Rassjo et al (2006), who both, in addition to *Neisseria gonorrhoeae*, isolated; *Chlamydia trachomatis*, *Trichomonas vaginalis* and *Treponema pallidum*. This is probably because these research participants do not have these infections (*Chlamydia trachomatis, Trichomonas vaginalis* and *Treponema pallidum*).

Pseudomonas stuttzeri isolated in this study, is one of those rare isolates obtained from urogenital discharges (Bisharat, Gorlacev & Keness, 2012). Previous literature has it that, when *P. stutzeri* is isolated from clinical material, it most likely represents colonization in hospitalized patients and uncommonly indicates pathogenicity thus implying that, the clinical significance of this isolated still remains unknown (Bisharat et al., 2012). Cases of *P. stutzeri* infection concern typically immunocompromised patients with underlying diseases like HIV/AIDS (Bisharat et al., 2012).

Majority of the isolates were sensitive to chloramphenicol (86.2%, 25/29), erythromycin (70.8%, 17/24), gentamycin (62.1%, 18/29) and ceftriaxone (55.2%, 16/29), but also resistant to penicillin (54.2%, 13/24) and tetracycline (48.3%, 14/29). The most active drug against Gram positive organisms particularly *S.aureus* was gentamycin (27.6%) and most resistant was penicillin (20.8%). The most active drug against Gram negative organisms particularly *N. gonorrhoeae* was erythromycin (41.7%) and most resistant was penicillin (33.3%). This was partly similar to the study by Charanchi et al (2012) who demonstrated that *N. gonorrhoeae* was resistant to tetracycline. In their study, they used augmentin which was the most active drug against *S.aureus* and yet in this study, gentamycin was used which also proved to be the most active drug against *S.aureus*. The 5 culture plates did not have significant growth probably because of the antibiotics taken prior to sample collection.

In conclusion, this study revealed *N. gonorrhoeae* most prevalent isolate in the urogenital tract infections and that most of the isolates proved sensitive to chloramphenicol, gentamycin, erythromycin and ceftriaxone, as applied antibiotics in this study and resistant to only two of them i.e. penicillin and tetracycline.

The researcher therefore recommends that hospitals should improve on the way of counseling the HIV positive patients in relation to safe sex practice; a larger sample size be conducted to obtain the prevalence of *Neisseria gonorrhoeae* and in relation to HIV in the Bwizibwera community; microbiology lab be set up in order to conduct the earlier and effective diagnosis for proper patient management and care; chloramphenicol, gentamycin erythromycin and ceftriaxone, be used to treat Urogenital / Urinary Tract Infections (UTIs) while tetracycline and penicillin be removed from the antibiotic spectrum for treating UTIs due to the development of antibiotic pressure against these two antibiotics.

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REFERENCES

Agersew A, Feleke M, Yitayal S, Ketema T, Afework K, Belay A, Abebe A (2012). Bacterial profile and drug susceptibility pattern of urinary tract infection in

pregnant women at University of Gondar Teaching Hospital, Northwest Ethiopia. BMC res. notes, 5 (197): 8-10.

Azore E (2005). Causative bacterial microorganisms of urinary tract infection and their antibiogram in HIV/AIDS patients at Mbarara university teaching hospital .Mbarara. Dissertation, (1): 1-2.

Bisharat N, Gorlacev T, Keness Y (2012). 10-Years Hospital Experience in Pseudomonas stutzeri and Literature review. Open Infec. Dis. J. 6(12): 21-24.

Centers for Disease Control and Prevention (2010). Sexually Transmitted Diseases (STDs). Accessed on 4th/June/2013. Available at: www.cdc.gov/std/treatment/2010/hiv.htm.

Charanchi S, Kudi A, Tahir F (2012). Antimicrobial sensitivity patterns of urogenital bacterial isolates among HIV positive patients in the federal medical centre in Gombe. Int. J. Infect. Dis.10 (1):1

Hansjakob F (2011). Prevalence of Sexually Transmitted Infections (STIs) in HIV-positive Patients. University Hospital Berne. Accessed on 04/September/2014. Available at: http://clinicaltrials.gov/show/NCT00973466.

Lwanga SK, Yook T (1986). Calculation of sample size. Belgium: Ceuterick.

Mhlongo S, Magooa P, Muller EE, Nel N, Radebe F, Wasserman E, Lewis DA (2010). Etiology and STI/HIV co-infections among patients with urethral and vaginal discharge syndromes in South Africa. American STD Assoc. J. 37(9): 566-570.

Muoneke V, Ibekwe R (2012). Childhood Urinary Tract Infection in Abakaliki. Annals Medical Health Sci. Res. II(1): 29-32.

Rassjo E, Mirembe F, Darj E (2006). Vulnerability and risk factors for sexually transmitted infections and HIV among adolescents in Kampala, Uganda. 18(7): 710-716.

Sexually transmitted disease (2012). Encyclopaedia Britannica, Inc. Accessed on 3rd/ 09/2012. Available at: http://www.britannica.com/EBchecked/topic/537217/sexually-transmitted-disease-STD.

Workowski KA, Berman S (2010). Sexually Transmitted Diseases Treatment Guidelines. Centers for disease control and prevention. Accessed on 8th/09/2014. Available at: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5912a1.htm.