

# REPRODUCTIVE TRACT INFECTION PATTERN AND SOCIO-DEMOGRAPHIC CORRELATES IN A TERTIARY INSTITUTION IN SOUTH WEST NIGERIA

Jegade Solomon

## ABSTRACT

WHO estimates that over 340 million new cases of four curable STIs (gonorrhoea, chlamydia, syphilis and trichomoniasis) occurred in 1999. If viral STIs such as human papilloma virus (HPV), herpes simplex virus (HSV) and human immunodeficiency virus (HIV) infections are included, the number of new cases may be three times higher. This study assesses the reproductive tract infection pattern and socio-demographic correlate in a tertiary institution in South West Nigeria. The design of this study is retrospective. And the instrument used was checklist. Data were collected based on medical records and case files of undergraduates who visited the University health centre from 1<sup>st</sup> January 2011 to 31<sup>st</sup> December, 2015. The record books with date of clinic attendance, sex, age, department/faculty and the diagnosis of Students who attended the Health Centre were analysed. The result of this study revealed that majority of the undergraduates with RTIs were within the age range of 20-24 years. The pattern of reproductive tract infection shows that the prevalence rate of RTI was high overall, 2.59 (412/15933) within the studied period and the highest prevalence rate (3.53) was reported in 2014, followed by 3.33 in 2011. The result further observed that the most common types of RTIs among them was Trichomoniasis 112 (27.2%), followed by Gonorrhoea 87 (21.1%), Candidiasis 65 (15.8%), HIV/AIDs 38 (9.2%) and syphilis 33 (8.2%) respectively. The socio demographic correlates showed that trichomoniasis which was the most diagnosed RTIs was accounted for by 81.3% of the female students as against 18.75% males and gonorrhoea which accounted for the second most reported RTIs was majorly among male students (78.2%) while, candidiasis was found to be prevalent among female students (93.8%). It was also found in this study that females have 3 times chances of having RTIs compared with male students. Also the younger students have 2 times chances of having RTIs compared with older students. It is therefore recommended that there is need for enlightenment programmes on the prevention of reproductive tracts 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 RTIs Provision of separate special clinics.

**Keywords:** Trichomoniasis, Gonorrhoea, Candidiasis, Syphilis.

## INTRODUCTION

Reproductive Tract Infections (RTIs) are being increasingly recognized as a global health problem with serious impacts on individual women and men, their families and communities<sup>1</sup>. Reproductive tract infections are infections of the genital tract as it affects both women and men, caused by organisms normally present in the reproductive tract, or introduced from the outside during sexual contact or medical procedures. These different but overlapping categories of RTI are called endogenous, sexually transmitted infections (STIs) and iatrogenic, reflecting how they are acquired and spread<sup>2</sup>. Reproductive Tract Infections (RTIs) generally seen as a silent epidemic can have severe consequences including infertility, ectopic pregnancy, chronic pelvic pain, miscarriage, neonatal blindness, increased risk of HIV infection and even death. But the consequences of RTIs extend beyond the realms of health (WHO 2003).

Reproductive Tract Infections (RTIs) refer to three different types of infection which affect the reproductive tract, namely endogenous, iatrogenic and sexually transmitted infections, including HIV/AIDS. Endogenous Infections are probably the most common RTIs worldwide. They result from an overgrowth of

organisms normally present in the vagina. Endogenous infections include bacterial vaginosis and candidiasis. Iatrogenic Infections occur when the cause of infection, i.e. a bacterium or other micro-organism, is introduced into the reproductive tract through a medical procedure such as menstrual regulation, induced abortion, and the insertion of an IUD or during childbirth. This can happen if surgical instruments used during the procedure have not been properly sterilized, or if an infection that was already present in the lower reproductive tract is pushed through the cervix into the upper reproductive tract.

Sexually Transmitted Infections are caused by viruses, bacteria, or parasitic microorganisms that are transmitted through sexual activity with an infected partner. Some RTIs (such as syphilis and gonorrhoea) are sexually transmitted, but many are not. In women, overgrowth of endogenous microorganisms normally found in the vagina may cause RTI (yeast infection, bacterial vaginosis). Medical interventions may provoke *iatrogenic* infection in several ways endogenous organisms from the vagina or sexually transmitted organisms in the cervix may be pushed during a transcervical procedure into the upper genital tract and cause serious infection of the uterus, fallopian tubes and other pelvic organs. Organisms from outside the body can also be introduced into the upper genital tract during medical procedures if infection control is poor. In men, sexually transmitted infections are much more common than endogenous or iatrogenic infections (WHO, 2005).

The burden of untreated RTIs is especially heavy for women because these infections are often asymptomatic or the symptoms are not recognizable (CDC nd). The morbidity associated with RTIs affect economic productivity and the quality of life of many individual men, women and ultimately of whole communities. RTIs can cause serious physical

and psychological harm such as infertility, intrauterine growth retardation, premature labour, and increased vulnerability to HIV/AIDS, and may cause a heavy social and economic burden to the families (Ravi, and Ravishankar, 2013). .Morbidity and mortality related to RTIs deprive society of important contributions made by women in terms of economic, social, and cultural development. Although RTIs affect women in both developing and industrialized countries, the infections and their sequelae are an especially urgent public health problem in resource-poor areas around the world. Demographic changes in developing countries have led to a dramatic increase in the number of adolescent and young adult women and men in their most sexually active years, which translates into a greater proportion of the population at risk for RTIs. The large number of infants and children in these countries means that this trend will continue for several decades. The risk of RTIs is compounded by rapid urbanization and high male-to-female ratios in some regions. The problems associated with RTIs have become even more significant in the past decade with the emergence of HIV and acquired immunodeficiency syndrome (AIDS) (CDC nd).

Reproductive tract infections are a group of infectious diseases caused by bacteria, viruses, Chlamydia, Mycoplasma and other pathogens invading the genital tract. Female RTIs usually originate in the lower genital tract as vaginitis or cervicitis and may produce symptoms such as abnormal vaginal discharge, genital pain, itching and burning feeling with urination. However, a high prevalence of asymptomatic disease occur which is a barrier to effective control. At present, RTIs have become international public health problem, especially in developing countries. Female Sexual Workers (FSWs) constitute the group documented as being the most exposed population to sexually transmitted infections (STIs), and also are the high prevalence rate population of RTIs (Ravi, and Ravishankar, 2013).

Some of the more common bacterial infections occurring in developing countries include gonorrhoea, chlamydia, syphilis, bacterial vaginosis (BV), lymphogranulomavenereum (LGV), trichomoniasis, and chancroid. Viral infections most common to developing countries include human papillomavirus (HPV), hepatitis B virus (HBV), herpes genitalis (herpes simplex virus [HSV], primarily type HSV-2), and HIV.

Over 340 million curable, and many more incurable, STIs occur each year. Among women, non-sexually-transmitted RTIs are usually even more common. STIs/RTIs are among the most important causes of maternal and perinatal morbidity and mortality. Serious complications of STIs/RTIs such as ectopic pregnancy, pelvic inflammatory disease, preterm labour, miscarriage, stillbirth and congenital infection may lead to chronic disability (such as infertility and genital cancer) and death. Increased risk of HIV/AIDS is another consequence of STIs/RTIs. To reduce the burden of RTI, efforts are needed in both health care facilities and in the community. Effective prevention and case management practised by health workers reduce the STI/RTI burden in several ways. Effective treatment reduces STI transmission in the community, and safe and appropriate clinical procedures mean fewer iatrogenic infections. Community education and outreach are needed to promote prevention of infection and use of health care services and thus further reduce disease transmission within the community (WHO 2005).

## **MATERIALS AND METHOD**

A Retrospective cross-sectional study design was used for this study. The study area is Ladoke Akintola University of Technology (LAUTECH). LAUTECH is an autonomous public institution situated in Ogbomosho the second largest city in Oyo State after Ibadan. It's lies on the plateau of Yoruba land (elevation) 1,200 feet (366m) in an area of

savanna and farm land at the intersection of roads from Oyo, Ilorin, Osogbo, and Ikoyi. Saddled with the general function of providing liberal higher education and encouragement to the rapid advancement of learning throughout Nigeria. The university runs three academic programmes: pre-degree science programme, undergraduate programmes and post-graduate programmes. The university is jointly owned by two states in Western Nigeria: Oyo and Osun states. The entire student body population is presently about 40,000. For two consecutive seasons, 2003 and 2004, the university has been adjudged by the Nigerian Universities Commission (NUC) as the best state university in Nigeria. The university has two campuses: Ogbomosho and Osogbo campuses and is currently made up forty-two departments of six faculties and a college. Each Department is headed by a Head of Department who is responsible to the Dean of the Faculty for organizing and teaching courses of study within the Department. The Dean of Faculty is in turn responsible to the Vice-Chancellor and the Senate for organizing and teaching of courses within the Faculty.

The University Health Centre (UHC) situated in the university premises was established to achieve in more practical terms, the aims and objectives of the World Health Organization. Here, it pursues vigorously, both preventive and curative aspect of medicine by offering students and staff, wide range of health services e.g. admission facilities, backed by adequate doctors, nursing and paramedical care, pharmaceutical services, well-equipped medical laboratory, standard record keeping with wide range of medical laboratory services, public health services for both preventive and curative back up, immunization and child health facilities, ante-natal and post-natal care, family planning and counseling services, etc.

**Study Population:** The study population comprises of undergraduates that attended the University health centre within the period of 1<sup>st</sup>

January 2011 through 31<sup>st</sup> December 2015. The population is estimated at 15,933. All undergraduates of LAUTECH, Ogbomoso who has presented with a complaint in the University Health Centre between January 2011 and December 2015 were included in the study. A total of 15,933 Undergraduate students with a complaint were seen at the University Health Centre from January 2011 – December 2015.

Research Instruments; The study was a retrospective research in which data were collected using checklist developed by the researcher after review of literature and records from the University health centre. Data were collected based on medical records and case files of undergraduates who visited the University health centre from 1<sup>st</sup> January 2011 to 31<sup>st</sup> December. 2015. The record books with date of clinic attendance, sex, age, department/faculty and the diagnosis of Students who attended the Health Centre were analyzed. The Checklist was

used to get necessary data for the study from the case files of patients diagnosed of Reproductive Tract Infections.

The Checklist was manually sorted out, entered into a computer and the obtained data was analyzed using Statistical Package for Social Sciences (SPSS) version 21. Frequency distribution tables were generated from variables.

**RESULTS**

Table 1 above shows the socio- demographic characteristics of the students. Most 202 (49.1%) of the students were between the ages of 20-24 years, 111 (26.9%) were between 25-29 years, 78 (18.9%) were between 15-19 years while, only 21(5.1%) were between 30-34 years. Majority 254 (61.7%) were female. Most 234 (56.8%) have multiple sexual partner while only 85 (20.6%) were smokers and 112 (27.2%) were Alcoholics.

**Table 1:  
Socio- demographic characteristics of the students**

Variable	Frequency (n=412)	Percentage (%)
Age group (years)		
15-19	78	18.9
20-24	202	49.1
25-29	111	26.9
30-34	21	5.1
Gender		
Male	158	38.3
Female	254	61.7
Religion		
Christianity	158	38.3
Islam	254	61.7
No of sexual partner		
Single	178	43.2
Multiple	234	56.8
Alcoholic		
Yes	112	27.2
No	300	72.8
Smoking		
Yes	85	20.6
No	327	79.4

Table 2 above shows the signs and symptoms presented by the students. Majority of respondents presented the following signs and symptoms: Fever 326 (79.1%), Lower

abdominal pain 217 (52.7%), genital itching followed 342 (83%), while only 11 (2.7%) presented with inguinal bulbo.

**Table 2:  
Signs and symptoms presented by the students**

Symptoms	Yes (%)	No (%)
Dyspareunia	111 (26.9)	301 (73.1)
Fever	326 (79.1)	86 (20.9)
Lower abdominal pain	217 (52.7)	195 (47.3)
Genital itching	342 (83)	70 (17)
Genital ulcer	18 (4.4)	394 (95.6)
Genital rash	119 (28.9)	293 (71.1)
Dysuria	201 (48.8)	211 (51.2)
Vaginal discharge	195 (47.3)	217 (52.7)
Inguinal bulbo	11 (2.7)	401 (97.3)
Cervical excitation tenderness	35 (8.5)	377 (91.5)
Abdominal tenderness	105 (25.5)	307 (74.5)
Foul smelling discharge	164 (39.8)	248 (60.2)

Table 3 above shows the prevalence rate of RTIs presented to the health care center during January, 2011 through December, 2015. The overall prevalence of RTIs among the students

was 2.59 (412/15933). The highest prevalence rate (3.53) was reported in 2014, followed by 3.33 in 2011, then 2.56 in 2015, 2.44 in 2013 and the least 1.75 in 2012.

**Table 3:  
Prevalence rate of RTIs presented to the health center during January, 2011 through December, 2015**

Period	No of patients (clinic attendance)	No of patients with RTIs	Prevalence rate
2011	2250	75	3.33
2012	4115	72	1.75
2013	3809	93	2.44
2014	2552	90	3.53
2015	3207	82	2.56
Total	15933	412	2.59

Table 4 above shows the distribution of types of commonly reported RTIs among the students. The most common types of RTIs among them was Trichomoniasis 112 (27.2%), followed by

Gonorrhoea 87 (21.1%), Candidiasis 65 (15.8%), HIV/AIDs 38 (9.2%) and syphilis 33 (8.2%) respectively.

**Table 4:**  
**Distribution of types of commonly reported RTIs among the students**

Types of RTIs	2011	2012	2013	2014	2015	Total	%
HIV/ AIDs	3	8	9	11	7	38	9.2
Gonorrhoea	15	13	16	19	24	87	21.1
Candidiasis	23	7	19	6	10	65	15.8
Chlamydia	3	9	7	5	4	28	6.8
Genital wart	-	6	3	8	2	19	4.6
Herpes simplex	1	3	6	-	3	13	3.2
Bacterial vaginosis	2	4	4	5	2	17	4.1
Trichomoniasis	22	17	27	21	25	112	27.2
Syphilis	6	5	2	15	5	33	18.2

Table 5 shows the age distribution pattern of students with RTIs who attended the university health center from 2011- 2015. Students within the age range 20-24 years accounted for 49.1% of the diagnosed cases of RTIs and this was

followed by those within the age range of 25-29 (26.9%). Students whose age range falls within 15-19 years had 18.9% of RTIs cases and least were those students whose age is 30 and above years accounting for 5.1% of the RTIs cases.

**Table 5:**  
**Age distribution of RTIs in students (n=412)**

Age group	HIV/ AIDs	Gonorrhoea	Candidiasis	Chlamydia	Genital wart	Herpes simplex	Bacterial vaginosis	trichomoniasis	syphilis
15-19	9	10	11	1	2	7	6	29	3
20-24	16	44	28	19	6	2	7	56	24
25-29	11	28	22	8	10	2	3	22	5
30-34	2	5	4	-	1	2	1	5	1

Table 6 reveals the distribution of RTIs among male and female students who attended the university health center from 2011-2015. Trichomoniasis which was the most diagnosed RTIs was accounted for by 81.3% of the female students as against 18.75% male students with

similar RTIs. Gonorrhoea which accounted for the second most reported RTIs was seen majorly among male students (78.2%). Candidiasis was found to be prevalent among 93.8% of the female students.

**Table 6:**  
**distribution of RTIs among male and female students (n=412)**

Gender	HIV/ AIDs	Gonorrhoea	Candidiasis	Chlamydia	Genital ulcer	Herpes simplex	Bacterial vaginosis	Trichomoniasis	Syphilis
Male	13	68	4	11	-	13	-	21	28
Female	25	19	61	17	19	-	17	91	5
Total	38	87	65	28	19	13	17	112	33

Table 7 reveals the investigations carried out on the students. The most common investigation carried out is urinary MCS (74.5%) followed

by FBC (56.8%) then HVS (39.8%), VDRL (27.2%) and USS (23.8%) respectively.

**Table 7:**  
**Investigations carried out on RTIs (n=412)**

Investigations	Yes (%)	No (%)
VDRL	112 (27.2)	300 (72.8)
HVS	164 (39.8)	248 (60.2)
FBC	234 (56.8)	178 (43.2)
USS	98 (23.8)	314 (76.2)
Urinary MCS	307 (74.5)	105 (25.5)

Table 8 above revealed that there is a significant difference in the prevalence of RTIs between male and female students (P=0.024).

it also revealed that there is a significant difference in the prevalence of RTIs between younger and older students (P=0.001).

**TABLE 8:**  
**Socio Demographic Characteristics Of Respondents and Prevalence Of RTIS**

Variables	Overall n=15933	Rtis+ n=412	Rts_ n=15521	X2	Df	P-value
Gender						
Male	6075	159	5916	1.275	1	0.024
Female	9858	253	9605			
Age						
Younger	8725	280	8445	2.992	3	0.001
Older	7208	132	7076			

REF indicates the reference point which is the variable to which others are being compared

In the regression model constructed (Table .9), it was found that females have 3 times chances

of having RTIs compared with male students. Also the younger students have 2 times chances of having RTIs compared with older students.

**Table 9:**  
**Prevalence of RTIS and selected socio demographic variables using binary logistic regression**

Variables	Odds ratio	P-value	95% ci
Gender			
Male (ref)	1		
Female	3.17	0.01	0.20-0.64
Age			
Younger	2.24		
Older (ref)	1	0.032	0.67-2.55

**DISCUSSION OF FINDINGS**

This study assessed the pattern and socio demographic correlates of RTIs in a tertiary institution in South West Nigeria. The study reveals that majority of the undergraduates with RTIs were within the age range of 20-24 years (mean age, 22.12, SD ± 3.147). This indicates that these age groups are most vulnerable to RTIs. The finding of this study supports the report of Centre for Disease Control and Prevention<sup>1</sup> that large proportion of STIs is believed to occur in people younger than (Kilmarz, Black & Limpakarnjanarat 1998), with the highest rates usually observed in the 20-24 year age group. Reasons inferred for this according to CDC 2009 and 2012 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).

As shown in the obtained results, the prevalence rate of RTI was high overall, 2.59 (412/15933) within the studied period. The highest prevalence rate (3.53) was reported in

2014, followed by 3.33 in 2011. This implies that RTIs constitute an important health problem in the University. Apart from the health consequences, it could be adduced that RTIs might be contributing factors to school absenteeism among the study populace thus supporting report made by Upchurch, Mason, Kusunaki and Kriechbaum (2004). Gender-wise, findings from this study reveals that majority (61.7%) of the reported cases were among the female undergraduates compared to their male counterparts. This corroborates reports made by CDC (2012) that young woman and female adolescents are more susceptible to STI due to their genitalia anatomy (CDC 2009 and Eng & Butler 1997). In addition, Eng and Butler (2007) reported that during adolescence and young adulthood, women's columnar epithelial cells are especially sensitive to invasion by sexually transmitted organisms. Furthermore, Taiwo (2011) 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 600 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 most common cause of RTIs among the study population was *Trichomonas vaginalis* 112 (27.2%). 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 (WHO 2001 and WHO 2011). This study revealed that *Neisseria gonorrhoeae*, the causative agent of gonorrhoea 87(21.2%) is the second prevalent cause of STIs among these undergraduates. This findings support the documentation made by CDC1 that gonorrhoea is the second most commonly reported notifiable disease in the USA. In addition, Dehne and Riedner (2005) reported prevalent rate of 31% among women in Abidjan (Dehne & Riedner 2005). 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% (Kilmarz, Black & Limpakamjanarat 1998 and Blankhart, Muller & Gresenguet 1999). Candidiasis, a fungi disease caused by *Candida albicans* 65(15.8%) is the third commonest cause of STIs followed by Chlamydiasis 6 (1.6%), caused by *Chlamydia trachomatis*. Though, chlamydiasis 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 (Vuylsteke, Laga & Alary 1993 & Behets, Williams, Brathwaite 1995). 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 (2004).

This study reveals Trichomoniasis which was the most diagnosed RTIs was accounted for by 81.3% of the female students as against 18.75% male students. Gonorrhoea which accounted for the second most reported RTIs was seen majorly among male students (78.2%). Candidiasis was found to be prevalent among 93.8% of the female students. Generally, the sex ratio distribution of RTIs shows that 61.7% of students with RTIs were females. The high percentage of female students found to be infected with RTIs could be because women are physiologically more susceptible to infection and are less likely to experience symptoms which makes detection more difficult until serious problems developed (Dehne & Riedner 2005).

The study reveals that majority of the undergraduates with RTIs were within the age range of 20-24 years (mean age, 22.12, SD  $\pm$  3.147). This indicates that these age groups are most venerable to STIs. The finding of this study supports the report of Centre for Disease Control and Prevention that large proportion of STIs is believed to occur in people younger than Kilmarz, Black & Limpakamjanarat (1998), with the highest rates usually observed in the 20-24 year age group. Reasons inferred for this according to CDC (2009) and (2012) 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).

## CONCLUSION AND RECOMMENDATIONS

This study has revealed the prevalence of RTIs among the university students and the females and younger students being more affected by the infections. It is therefore recommended that school based intervention programmes that will promote protective behaviours should be developed. In view of the major findings of this study, the following recommendations are hereby made: There is need for enlightenment programmes on the prevention of reproductive tracts 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 RTIs Provision of separate special clinics (youth friendly clinic). Proper and effective management should be rendered to students with RTIs. Students should be educated about causes, prevention, signs and symptoms and treatment of RTIs. Periodic health assessment of university students

## REFERENCES

- Araoye. O.T. (2004) pattern and management of STIs among undergraduate attending University health centre in Kogi state. *Intern. Journal of health sciences*.3:28-31
- Behets F.M.T, Williams Y, Brathwaite A. (1995). Management of vaginal discharge in women treated at a Jamaican sexually transmitted disease clinic: Use of diagnostic algorithms versus laboratory testing. *Clin Infect Dis*. 21:1450-5.
- Blankhart D, Muller O, Gresenguet G, Weis P. (1999). Sexually transmitted infections in young pregnant women in Bangui Central African Republic. *International Journal of STD and AIDS*. 10(9):609-614.
- CDC. (2003). Reproductive tract infections health epidemiology series module 3. [www.cdc.gov/reproductivehealth/products/pubs/pdfs/epi\\_module\\_03A\\_Tag508.pdf](http://www.cdc.gov/reproductivehealth/products/pubs/pdfs/epi_module_03A_Tag508.pdf)
- Centers for Disease Control and Prevention (CDC) (2008). Sexually Transmitted Disease Surveillance. Atlanta, GA: U.S. Department of Health and Human Services; November; 2009.
- Centers for Disease Control and Prevention (CDC) (2012). Sexually transmitted infections (STIs) indicators on children and youth. *Child Trends Data Bank*. 2012; 3 - 11 . Available : [www.childtrendsdatabank.org](http://www.childtrendsdatabank.org)Upchurch MD, Mason MW, Kusunaki Y, Kriechbaum JM. (2004). Social and Behavioural determinants of Self-Reported STD among Adolescents. *Perspectives on Sexual and Reproductive Health*. 2004;36(6):276-287.
- Dehne K.L, Riedner G. (2005). Sexually transmitted infections among adolescents: the need for adequate health care. Geneva: WHO.
- Eng TR, Butler WT. (1997). The hidden epidemic: Confronting sexually transmitted diseases. Washington, DC: National Academy Press.
- Galvin SR, Cohen MS. (2004). The role of sexually transmitted diseases in HIV transmission. *Nat Rev Microbiol*. 2004 Jan;2(1):33-42.
- Gerbase A, Stein C, Levison J, Htun Y. (2006). Global burden of sexually transmitted diseases excluding (HIV) in the year 2000. World Health Organization, Geneva.
- Habibu, A.U. (2014). Prevalence of proteusmirabills and Pseudomonas aeruginosa among female patients with suspected reproductive tract infections attending Muhammad Abdullahi Wase

- Specialist Hospital, Kano, Nigeria. Intern. Journal of engineering and sciences.3:28-31.
- Kilmarz P.H, Black C.M, Limpakarnjanarat K. (1998). Rapid assessment of sexually transmitted diseases in a sentinel population in Thailand: prevalence of chlamydial infection, gonorrhoea, and syphilis among pregnant women Sex Trans Inf. 1998;74:189-193.
- Laga M, Manoka A, Kivuvu M, Malele B, Tuliza M, Nzila N, et al. (1993). Non-ulcerative sexually transmitted diseases as risk factors for HIV-1 transmission in women: results from a cohort study. AIDS. 1993 Jan ;7(1):95-102.
- Levine W.C. (2004). Indirect estimation of chlamydia screening coverage using public health surveillance data. American Journal of Public Health.
- Nigeria Demographic and Health Survey National Population Commission (NPC) and ICF (2012). Abuja, Nigeria: NPC and ICF Macro; 2013.
- Ravi, Rejoice Puthuchira, and Ravishankar Athimulam Kulasekaran. "Trends in Reproductive Tract Infections and Barriers to Seeking Treatment among Young Women," American Journal of Epidemiology and Infectious Disease 1.4(2013): 53-58
- Sangani P, Rutherford G, Wilkinson D. (2004). Population-based interventions for reducing sexually transmitted infections, including HIV infection. Cochrane Database Syst Rev. 2004; (2):CD001220.
- STD Surveillance. (2003). Special Focus Profiles, STDs in adolescents and young adults. 53-61. [http://www.hawaii.edu/hivandaids/STDs\\_in\\_Adolescents\\_and\\_Young\\_Adults\\_2003.pdf](http://www.hawaii.edu/hivandaids/STDs_in_Adolescents_and_Young_Adults_2003.pdf) (Retrieved: April 20, 2009).
- Stirling, M., Rees, H., Kasedde, S., & Hankins, C. (2008). Addressing the vulnerability of young women and girls to stop the HIV epidemic in southern Africa. Geneva:
- Taiwo O.O. (2011). Young female and African: issues in sexual vulnerability. Sexuality in Africa Magazine and Monographs. 7(1):3-4.
- UNAIDS. UNAIDS and WHO. (2007). 2007 AIDS epidemic update. Geneva: UNAIDS.
- UNAIDS. UNAIDS. (2008). 2008 Report on the global AIDS epidemic. Geneva: UNAIDS.
- Vuylsteke B, Laga M, Alary M, (1993). Clinical algorithms for the screening of women for gonococcal and Chlamydial infection: Evaluation of pregnant women and prostitutes in Zaire. Clin Infect Dis. 17:82-8.
- WHO (2001). Global prevalence and incidence of selected curable sexually transmitted infections. Overview and estimates. Geneva, World Health Organisation, 2001. (WHO/HIV\_AIDS/2001.02 and WHO/CDC/CSR/EDC/2001.01)
- WHO (2001). Guidelines for the management of sexually transmitted infections. Geneva, World Health Organisation, 2001 (document WHO/HIV\_AIDS/2001.01; WHO/RHR/01.10) ([http://whqlibdoc.who.int/hq/2001/WHO\\_HIV\\_AIDS\\_2001.01.pdf](http://whqlibdoc.who.int/hq/2001/WHO_HIV_AIDS_2001.01.pdf), accessed 13 April 2016)
- WHO, (2003). Prioritization of interventions for sexually transmitted and other Reproductive Tract Infections in Ghana (GHS/HRU/HORIZONS/USAID and WHO, 2003).

- WHO, (2005). Sexually transmitted and other reproductive tract infections. A guide to essential practice. Geneva, ([http://www.who.int/reproductive health/pages\\_resouces/listing\\_RTIs\\_STIs.html](http://www.who.int/reproductive_health/pages_resouces/listing_RTIs_STIs.html),accessed 4 April 2016)
- WHO (2006). Prevention and Management of Sexually transmitted and other reproductive tract infections. Standards for Maternal and Neonatal Care , Geneva , ([http://www.who.int/making\\_pregnancy\\_safer/publication/en.html](http://www.who.int/making_pregnancy_safer/publication/en.html),accessed 4 April 2016).
- WHO (2013). Report on global sexually transmitted infection surveillance Geneva, Switzerland: World Health Organization, 2013.
- World Health Organization (WHO). (2001). Global Prevalence and Incidence of Selected Curable Sexually Transmitted Infections: Overview and Estimates, Geneva: WHO.
- World Health Organization [WHO] fact sheet; (2011). Available :[http://www.who.int/hiv/pub/progress\\_report2011/summary\\_en.pdf](http://www.who.int/hiv/pub/progress_report2011/summary_en.pdf)