Screenings for Chlamydia trachomatis Antigen among HIV and non-HIV Patients with Symptoms of Urogenital Tract Diseases at The Federal Medical Centre Gombe, Nigeria.

S Charanchi, F Tahir

Citation

S Charanchi, F Tahir. *Screenings for Chlamydia trachomatis Antigen among HIV and non-HIV Patients with Symptoms of Urogenital Tract Diseases at The Federal Medical Centre Gombe, Nigeria.*. The Internet Journal of Infectious Diseases. 2012 Volume 10 Number 1.

Abstract

C. trachomatis a sexually transmitted bacterial pathogen and the leading cause of bacterial sexually transmitted diseases (STDs) world wide can lead to serious complications in women and infants with untreated infections. Symptoms are normally unspecific, as such rapid screening tests with high specificity, though not confirmatory are highly valuable in converting its menace as large number of patients at high risk can be screened within a short period with ease in sample collection and patient management at very low cost. Three hundred urogenital swab samples; including 93 urethral swabs and 207 endocervical swabs were aseptically collected from patients with symptoms of urogenital tract diseases attending federal medical centre Gombe from January to March, 2010. Among them were 33 HIV patients and 267 non-HIV patients. All the swabs were subjected to Chlamydia antigen screening using Nova® One-Step Chlamydia trachomatis rapid immunochromatography antigen screening testing kits. In general, 11(3.7%) patients were found positive in this study. In the non-HIV patients, 2.6% were positive, with highest frequency of 3.1% recorded at the age group 21-30years. However in the HIV-patients, 12.1% were positive, with the highest frequency of 18.2% recorded at the age group 31-40years. The findings from this work has stressed the importance of rapid screening as a presumptive technique and call for use of more reliable confirmatory testing procedures in the prevention of pelvic inflammatory disease (PID), cervical carcinoma and other STDs. We also call for establishing a relationship between Chlamydia trachomatis and HIV infection in the locality.

INTRODUCTION

The Chlamydiales are bacteria that are obligate intracellular parasites of eukaryotic cells sharing greater than 80% sequence identity for the gene that encodes their 16S ribosomal ribosomal ribonucleic acid (rRNA) and/or greater than 80% identity for the gene that encodes their 23S rRNA (1). They also have distinctive biphasic developmental cycle which begins when metabolically inactive but infectious Elementary Bodies (EBs), get in to the host cell, differentiate into noninfectious, but metabolically active Reticulate Bodies (RBs), which multiply within 48 hours and form new EBs which are then released from the cell through exocytosis to initiate a new round of infection (2).

C. trachomatis is the most common sexually transmitted pathogen of humans, with an estimated 89 million new cases occurring world wide each year (3) and the leading cause of preventable bacterial sexually transmitted diseases (STDs) world wide, affecting both sexes (4), however as reported by Lentichia (5), young women are at highest risk. It is transmitted person to person by simple contact, via fomites or may require sexual contact, as it may also be transmitted transplacentally to the neonate during delivery (6).

Clinical signs due to Chlamydia, may include: low grade fever, exudates from the cervix and enlargement of local lymph nodes. However, these are not specific to Chlamydia as such where possible, laboratory tests should be performed to determine if evidence C. trachomatis is present (7).

Untreated, C. trachomatis infections can lead to serious complications as about 40% of women with untreated C. trachomatis infections experience pelvic inflammatory disease (PID) world wide (8). Of these, 20% may become infertile; 18% may experience debilitating and chronic pelvic pain; while up to 9% may have a life-threatening tubal pregnancy (9).

As it has been reported that STIs always facilitate HIV

transmission through direct biological mechanisms, early diagnosis and treatment of STIs should therefore be part of a high quality and comprehensive HIV prevention strategy (10).

Although, the diagnosis of Chlamydia infections evolved rapidly with Nucleic acid amplification tests, such as polymerase chain reaction (PCR), transcription mediated amplification (TMA), and the DNA strand displacement assay (SDA) now as the mainstays (11), however, screening tests (with high specificity), can presumptively identify Chlamydia infection in asymptomatic patients including pregnant women, (12). Screening for Chlamydia antigens may be performed on swab specimens collected from the cervix (women), urethra (men), or on voided urine, especially in settings where nucleic acid amplification tests or cultural technique is impractical (12).

Because of the improved test accuracy, ease and convenience in specimen management, and hope for screening large number of sexually active men and women, the rapid immunochromatographic screening tests have largely replaced culture (the historic gold standard for Chlamydia diagnosis), and the most expensive nucleic acid amplification as tests in the developing countries (13).

There is also good evidence that screening for Chlamydia infection in women who are at increased risk can reduce the incidence of PID due to Chlamydia as this will prevent mother to child transmission, identify infected among high risk group and improved pregnancy and birth outcomes for women who are treated for Chlamydia infection after screening (14).

This study was therefore set up to identify the possible prevalence of Chlamydia trachomatis antigens from genital samples among HIV and non-HIV patients based on rapid chromatographic screening technique.

MATERIALS AND METHODS

STUDY SITE

The study was conducted in Federal Medical Centre Gombe, a tertiary hospital within Gombe, the capital city of Gombe State, Nigeria.

ETHICAL CLEARANCE

This work has received ethical clearance from the Research and Ethical Committee of the Federal Medical Centre Gombe.

SAMPLE COLLECTION

A total of 300 Urogenital swabs including 93 urethral swabs (URS) and 207 endocervical swabs (ECS) were aseptically collected from HIV and non HIV-patients attending Federal Medical Centre Gombe with clinical presentation related to urogenital tract diseases.

SCREENING OF ANTIGEN

The screening of the patients for Chlamydia trachomatis antigen from endocervical swab and urethral swab specimens was done based on standard operation procedure for rapid immunochromatography diagnosis of Chlamydia trachomatis in female cervical swab, male urine and urethral swab and following instructions from leaflet by the kit manufacturer (15).

DATA ANALYSIS

Data collected and results obtained were presented and statistically analyzed using Chi Square Contingency table.

RESULTS

Table 1: Chlamydia trachomatis Antigen in Relation to Sex and Age of Patients

Table 1 explicit the prevalence of Chlamydia antigen among 300 samples with a total positivity rate of 11(3.7%). Out of the 93 URS samples tested, 3 (3.2%) were positive, while out of 207 ECS tested, 8 (3.9%) were positive. It was observed that in both male (URS) and female (ECS) samples, the highest frequency of Chlamydia antigen was in the age range 21-30years with 4.8% and 4.7% respectively. Chlamydia antigen was not detected in the age group 41-50 and those ≥ 51years in both sexes.

Figure 1

Table 1: Prevalence of Chlamydia Antigen across Age and Sex of Patients

	URS		ECS		TOTAL	
Age	No. Tested	Pos. (%)	No. Tested	Pos. (%)	Total Tested	T/Pos. (%)
11-20	15	0 (0.0)	25	1 (4.0)	40	1 (2.5)
21-30	21	1 (4.8)	127	6 (4.7)	148	7 (4.7)
31-40	46	2 (4.3)	42	1 (2.4)	88	3 (3.4)
41-50	3	0 (0.0)	11	0 (0.0)	14	0 (0.0)
≥ 51	8	0 (0.0)	2	0 (0.0)	10	0 (0.0)
Total	**93**	**3 (3.2)**	**207**	**8 (3.9)**	**300**	**11(3.7)**

Table2 shows the prevalence of Chlamydia antigen across age and sex of HIV-negative patients presented with

symptoms of urogenital tract diseases. Out of 267 non-HIV patients tested, 7 (2.6%) were positive. In the males, highest frequency of Chlamydia antigen was at the age group 21-30 years with 5.6%, while in the females, the highest frequency was at the age group 31-40 with 2.8%.

Figure 2

Table 2: Antigen in HIV Negative Patients

	MALE		FEMALE		TOTAL	
Age	HIV Neg.	Chl. Pos. (%)	HIV Neg.	Chl. Pos. (%)	Total HIV Neg.	T/Chl. Pos. (%)
11-20	14	0 (0.0)	22	1 (4.5)	36	1 (2.8)
21-30	18	1 (5.6)	114	3 (2.6)	132	4 (3.1)
31-40	41	1 (2.4)	36	1 (2.8)	77	2 (2.6)
41-50	3	0 (0.0)	9	0 (0.0)	12	0 (0.0)
≥ 51	8	0 (0.0)	2	0 (0.0)	10	0 (0.0)
Total	**84**	**2 (2.4)**	**183**	**5 (1.1)**	**267**	**7 (2.6)**

Table3 however, indicates the occurrence of the Chlamydia antigen across age and sex of HIV-patients tested in this study. Only 33 HIV-patients with symptomatic urogenital tract infections were tested and among them, 4 (12.1%) were reactive to Chlamydia antigen. The highest frequency of the infection was recorded at the age range 31 to 40 years, as 18.2%.

Figure 3

Table 3: Antigen in HIV Positive Patients

	MALE		FEMALE		TOTAL	
Age	HIV Pos	Chl. Pos. (%)	HIV Pos	Chl. Pos. (%)	Total HIV Pos.	T/Chl. Pos. (%)
11-20	1	0 (0.0)	3	0 (0.00)	4	0 (0.0)
21-30	3	0 (0.0)	13	2 (15.4)	16	2 (12.5)
31-40	5	1(20.0)	6	1 (16.6)	11	2 (18.2)
41-50	0	0 (0.0)	2	0 (0.0)	2	0 (0.0)
≥ 51	0	0 (0.0)	0	0 (0.0)	0	0 (0.0)
Total	**9**	**1(11.1)**	**24**	**3 (12.5)**	**33**	**4 (12.1)**

DISCUSSION

This study indicates a general positivity rate of 3.7% Chlamydia antigen among patients involved. The incidence was very low compared to 27% reported by Anttila (8) among patients screened for cervical carcinoma in the USA, using a technique higher in sensitivity and specificity than one employed in this study.

The highest frequency of 4.8 % and 4.7% observed in males and female at age group 21-30 years is supported by reports from previous works that indicates highest frequency of Chlamydia trachomatis infections to occur mostly among sexually active adolescents and young adults (5&8).

High prevalence (4.3%) of Chlamydia antigen was observed in the male age group 31-40. According to Witkin and Bowie (16&17), in a separate works done among asymptomatic males suggested that high prevalence of sexually transmitted infections among adult males in developing countries may not be unconnected to economic stability, ego to have sex and sexual assault by the adult male.

In the non-HIV patients, there was no positive result recorded at age group 41-50 and those ≥51. This may likely be due to fear of HIV and STI or due to high religious morale, lack of sexual ego, poverty or any other factor that may discourage sexual relationship at old age, as suggested in related findings from works done in Potiskum and Ibadan (18&19).

Out of the 33 HIV-seropositive patients with symptoms of urogenital tract infections in this study, high prevalence of 12.1% were screened positive for Chlamydia trachomatis. This report agreed with a finding in a work done among female sex workers in Abidjan, Cote d Ivoire (20) and is supported by a statement by Laga, (21) that bacterial infections increase the possibility of HIV infection by disruption of the normal epithelial barrier through genital ulceration, thus causing accumulation of pools of HIV susceptible or HIV infected cells in the semen and vaginal secretions.

Similarly, in this study, it was observed that Chlamydia trachomatis in HIV-positive female patients (15.4%) was higher in prevalence than in the male patients (0.0%) at age group 21-30 years. This agreed with report by Workowski and Berman, (22) that young adult women with HIV are more susceptible to STI due to regular changes in women; such as change in hormonal distribution, increased vaginal microbial ecology and other physiological changes that resulted in lower immune status in addition to HIV infection. It was also observed that in developing countries, females may show higher prevalence in genital infections due to sexual assault which greatly increases the risk of STI/HIV transmission in women because protection is rarely employed, while physical trauma to the vaginal cavity frequently occurs and these facilitate infection (13).

Also in the HIV-patients, there was no positive result recorded at the 41-50 and ≥51 years, possible reason as observed by Dale, (23) was that production of squamous

epithelial cells (the actual reservoirs for Chlamydia trachomatis) is very low with old age and in menopause, hence viability may be low or absent.

CONCLUSION

Looking at the overall result of 3.7% positivity rate, it could be concluded that Chlamydia trachomatis need to be considered as one of the regular causative agents of urogenital tract diseases at least in Gombe State and its environment. Also stressed from the results of this work is the importance of rapid screening technique in detection of Chlamydia trachomatis infection.

It was equally noted that sexually active age may have an impact on the incidence of Chlamydia trachomatis as highest prevalences (4.8% and 4.7%) observed in both URS and ECS were from young adults (21-30 years) that are in their sexually active stage.

Although, there was no significant difference in infections between the two sexes ($P< 0.05$), a higher prevalence (3.9%), was noticed from the ECS. This confirms that females are more vulnerable to sexually transmitted infections compared to the males.

Finally, a relationship between HIV and Chlamydia trachomatis was also proved in this study as 4 (12.1%) of the 33 HIV-seropositive patients involved in this study had co-infection with Chlamydia trachomatis.

RECOMMENDATIONS

On the ground of the above conclusions, we will like to recommend that, clinicians in tertiary institutions and Federal Medical Centre Gombe in particular should include request for rapid screening of Chlamydia trachomatis as part of the routine investigations on urogenital tract specimens. Laboratories should provide improved techniques for the identification and confirmation of Chlamydia trachomatis. While on the ongoing campaign against HIV, fight against sexual promiscuity should be intensified.

References

1. Everette, K. D. E., Bush, R. M. & Andersen, A. A. (1999). Emended description of the order Chlamydiales, proposal of Parachlamydiaceae family, revised taxonomy of the family Chlamydiaceae, and standards for the identification of organisms. International Journal of Systematic and Evolutionary
Microbiology 49: 415 - 440.
2. Meyers, D.S., Halvorson, H. and Luckhaupt, S., (2007). Screening for chlamydial
infection: an evidence update for the U.S. Preventive Services Task Force. Ann

Intern Med ;147
3. Gerbase, A. C., Rowley, J. T., Heymann, D. H., Berkley, S. F. & Piot P. (1998). Global prevalence and incidence estimates of selected curable STDs. Sexually Transmitted Infections 74: Suppl 1: S12 - 16.
4. Schachter, J. (1999). Infection and disease epidemiology. In: (Stephens, R. S. ed.,) Chlamydia: Intracellular biology, pathogenesis and immunity. American Society of Microbiology Press. Page 139 – 169.
5. Lentrichia, B.B., Hecht, S.S., Lapen, D. & Corkill, M.K. (1998). Potential for routine
concurrent determination of chlamydia and cervical abnormalities by single fluid-
based sampling. Primary Care update in Obstetrics and Gynecology 5: 149- 150.
6. Hackstadt, T. (1999). Cell biology. In: Chlamydia: Intracellular Biology, Pathogenesis and Immunity, pp. 101-138. Edited by R. S. Stephens. Washington, D.C.: ASM Press. ISBN 1-55581-155-8.
7. Washington, A. E., Aral, S. O., Wolner-Hanssen, P., Grimes, D. A.. & Holmes, K. K. (1990). Assessing risk for pelvic inflammatory disease and its sequelae. Journal of the American Medical Association (JAMA) 266: 2581 - 2586.
8. Anttila, T., Saikku, P., Koskela, P., Bloigu, A., Dillner, J. and Ikaheimo, I., (2001). Serotypes of Chlamydia trachomatis and risk for development of cervical squamous cell carcinoma. Journal of the American Medical Association 285, 47-56
9. Eley, A., Oxley, K. M., Spencer, R. C., Kinghorn, G. R., Ben-Ahmeida, E. T. & Potter, C. W. (1992). Detection of Chlamydia trachomatis by the polymerase chain reaction in young patients with acute epididymitis. European Journal of Clinical Microbiology and Infectious Diseases 11, 620 - 623.
10. Deschamps, M..M., Pape, J.W., Hafner, A., and Johnson, W.D., (1996). "Heterosexual transmission of HIV in Haiti". Annals of Internal Medicine 125 (4): 324.
11. Wilson, R. W. and Sande, A.M (2001). Current Dianosis and Treatment in Infectoius

Diseases. Lange Medical Books, McGraw- Hill Companies Inc USA.
12. Ness, R. B., Goodman, M. T., Shen, C., Brunham, R. C. (2003). Serologic Evidence of Past Infection with Chlamydia trachomatis, in Relation to Ovarian Cancer. Journal of Infectious Diseases 187, 1147 - 1152.
13. World Health Organization, (2006). Multi-country Study on Women's Health and

Domestic Violence against Women.
14. Centre for Disease Control and Prevention, (2008). Division of Sexually Transmitted
Diseases Elimination.
http://www.cdc.gov/nchstp/stds/pubs/slideset.htm
15. Nova, (1994). One-step Diagnostic Rapid Immunochromatography Test Cassette Kit for the Detection of Chlamydia trachomatis in Female cervical swab, Male Urine and
Urethral Swab with Sterile Dacron Tipped Applicator. Operation Manual. Guilford,
Maine 04443-0149 USA.
16. Witkin, S. S., Kligman, I. & Bongiovanni, A. M. (1999). Relationship between an
asymptomatic male genital tract exposure to Chlamydia trachomatis and an
autoimmune response to spermatozoa. Human Reproduction

10: 2952 - 2955.
17. Bowie, W. R. (1990). Approach to men with urethritis and urologic complications of
sexually transmitted diseases. Medical Clinics of North America 74, 1543 - 1557.
18. Adome, D. I., Oyawoye, O.M., Uba, A., and Kudi., A.A., (2005) Incidence of Neisseria gonorrhea in Pregnant Women Attending Antenatal Clinics in Potiskum and its Environment, Yobe State. Nigerian Biomedical Science Journal. Vol. 1 (4) 134
19. awole, O.J., Okesola, A.O. and Fawole A.O, (2000). Genital ulcer diseases among
sexually transmitted disease clinics attendees in Ibadan, Nigeria. African Journal of

Medical Sciences 29:17-22.
20. Ghys, P. D. Fransen, K. and Drallo, M.O. (1997). The association of cervicovaginal HIV shedding, sexually transmitted diseases and immunosuppression in female sex workers in Abidjan, Cote d Ivoire. AIDS 13: 327-32
21. Laga, M, Nzila, N, and Goeman, J. (1991). The interrelationship of sexually transmitted diseases and HIV infection: implications for the control of both epidemics in Africa. AIDS 5 (Suppl 1): 555–63.
22. Workowski, K. and Berman, S. (2006). Sexually transmitted diseases treatment guidelines. MMWR Recommendation. Rep. 55 (RR-11): 1-94.
23. Dale A, Wilson J, Forster G, Daniels D, Brook G. (2001). Management of chronic
prostatitis in Genitourinary Medicine clinics in the United Kingdom's North Thames
Region 2000. International Journal of STD and AIDS. 12: 256 - 259.

Author Information

S.M. Charanchi
Department of Medical Microbiology and Immunology, Federal Medical Centre

F. Tahir
Biological Sciences Program, Abubakar TafawaBalewa University