

Full Length Research Paper

***Trichomonas vaginalis* cases presenting at the Komfo Anokye Teaching Hospital, Ghana over a period of 11 years: 1994 to 2004**

Welbeck A. Twum^{2*}, Clement Opoku-Okrah⁴, S. C. K. Tay¹, E. H. Frimpong¹, Charles O. Agyei¹ and Godfred Acheampong³

¹Department of Clinical Microbiology, School of Medical Sciences, Kwame Nkrumah University of Science and Technology, Ghana.

²Ghana AIDS Commission, Ghana.

³Department of Medical Microbiology, University of East London, UK.

⁴Department of Medical Laboratory Technology, Kwame Nkrumah University of Science and Technology, Ghana, Ghana.

Received 20 October, 2013; Accepted 4 April, 2014

The study aims at establishing the trend of *Trichomonas vaginalis* infections diagnosed at the Komfo Anokye Teaching Hospital (KATH) in Kumasi over an eleven (11) years period (1994 to 2004). The retrospective study involves the yearly distribution of the infection as well as the monthly distribution relating them to the ages and sex. The mean ages of males and females infected were 28.8 and 26.0 years, respectively. The prevalent age groups mostly infected were found to be 18 to 31 for both males and females. The age distribution of *T. vaginalis* cases from the high vaginal swab (HVS) records gave a standard deviation of 3.47 and the standard deviation of the age distribution for males from the urine routine examination (R/E) was 5.13. Analyses of records of *T. vaginalis* suggest that even though there has been a drastic decline in prevalence, the infection still persist and requires efforts to ensure its absolute extinction. The monthly distributions did not reveal any particular month in which transmission of the infection remains constantly high. This suggests that the climatic seasons (rainy or dry/cold or warm) have no effect on the rate of transmission. More pragmatic measures are needed to ensure better records keeping of the infection at KATH. New and more efficient methods such as cultures and polymerase chain reaction (PCR) should be employed to increase efficiency in the detection of the organism in patients. Another study is being designed to ascertain the level of *T. vaginalis* from 2005 to date.

Key words: Sexually transmitted infection, *Trichomonas vaginalis*, Komfo Anokye Teaching Hospital (KATH).

INTRODUCTION

Human trichomoniasis is a common sexually transmitted infection (STI) caused by the flagellate protozoan

parasite *Trichomonas vaginalis*. This infection is the most common non-viral STI worldwide (Cohen, 2000; Upcroft

*Corresponding author. E-mail: god2000ach@yahoo.com.

Author(s) agree that this article remain permanently open access under the terms of the [Creative Commons Attribution License 4.0 International License](http://creativecommons.org/licenses/by/4.0/)

and Upcroft 2001). The protozoan infects the vagina and urethra of females and may lead to severe vaginitis. In males, it infects the prostate, seminal vesicles and urethra causing urethritis and prostatovesiculitis (Sylvia, 1997). It infects mostly humans and infections are more common in females. Males who are infected are usually asymptomatic.

Bowden and Garnet reported that the epidemiology of the disease is still poorly understood and some practitioners continue to question its relevance. However, there is increasing evidence that *T. vaginalis* is an important pathogen, both in its own right due to the "immediate" morbidity associated with infection (Pettrin et al., 1998) for its role in the promotion of premature rupture of membranes, premature labour and low birth weight (Heine and McGregor, 1993; Cotch et al., 1997). The prevalence of this flagellate in developed countries is reported to be 5 to 20% in women and 2 to 10% in men (Murray et al., 2002). Worldwide, over 170 million cases of trichomoniasis are reported each year, with 40 to 60% in Africa (Bowden et al., 1999; World Health Organization (WHO), 2001). Notably, research has shown that infection with *T. vaginalis* increases the risk of HIV transmission (Forna and Gülmezoglu, 2003; Wang et al., 2001). Trichomoniasis is also associated with adverse pregnancy outcomes, infertility, postoperative infections and cervical neoplasia (Soper, 2004; Kaydos et al., 2002).

T. vaginalis infections can be diagnosed by observing the characteristic microscopic forms including the motile trophozoites (Koneman et al., 1992). The most practical method of diagnosis is the microscopic examination in a drop of saline (wet mount method) for motile trichomonads of the fresh vaginal discharge. Occasionally, cultures will reveal the organism when the microscopic examination is negative. Prostatic secretions following prostatic massage and urine of the male should be examined (Franklin and Harold, 1994; Lo et al., 2002). Other methods of *T. vaginalis* detection include Kupferberg liquid medium, Hirsch charcoal agar and the Papanicolaou smear. The latter is the least sensitive among the aforementioned methods (Thomason et al., 1988).

In Ghana, *T. vaginalis* cases is still a public health concern (Adu and Amankwaa, 2005) even though data available on the epidemiology in the country is scanty. This work aims to do a retrospective study of *T. vaginalis* and monitor the progress of the disease over the targeted year range. It will add to the body of knowledge available on *T. vaginalis* in Ghana.

MATERIALS AND METHODS

The high vaginal swab (HVS) and urine routine examination (R/E) records were obtained from the KATH microbiology and parasitology laboratories respectively, from which all cases diagnosed and recorded from January, 1994 to December, 2004 were listed. The attributes considered included age, sex, month and outcome of laboratory examination. From the records of the

laboratories, the number of cases reported each month for the period of study was obtained and the following data derived: total number of cases diagnosed and confirmed as *T. vaginalis* infection, age and sex distribution, monthly distribution. Analyses were made covering the following areas: age and sex distribution of cases, monthly incidence. The observations made were compared for the years of study and the variations noted. An attempt was made to account for the observation. The information obtained was discussed and suggestions made on how to eliminate the infections.

Study design

This is a longitudinal study that employed retrospective data to determine *T. vaginalis* cases over eleven years period. The study population included all suspected cases referred for screening. Cases confirmed as *T. vaginalis* in the KATH laboratories were taken note of. All documented cases of the infection in the high vaginal swab, urine routine examination and urethral discharge examination records were included in the study. Suspected cases that have not been documented in the laboratory records were excluded.

Study area

KATH is located in Kumasi, the regional capital of Ashanti Region of Ghana, with a total projected population of 4,725,046 (2010). The geographical location of the over 1000-bed hospital, the road network of the country and commercial nature of Kumasi make the hospital accessible to all the areas that share boundaries with Ashanti region and others that are further away. As such, referrals are received from all northern regions (namely Northern, Upper East and Upper West Regions), Brong Ahafo, Central, Western, Eastern and parts of the Volta Regions.

Ethical statement

The study protocol was approved by the ethical committee of KATH in collaboration with committee on human research, publications and ethics, School of Medical Sciences, Kwame Nkrumah University of Science and Technology, Kumasi-Ghana.

Statistical analysis

The main statistical software used in this study was microsoft office excel 2007. All data recorded were entered into excel according to the age, sex, month, year and the outcome of the laboratory examination. The data were analysed to determine the monthly and annual trends of the infection. The age and sex distribution of the infection rate were also analysed.

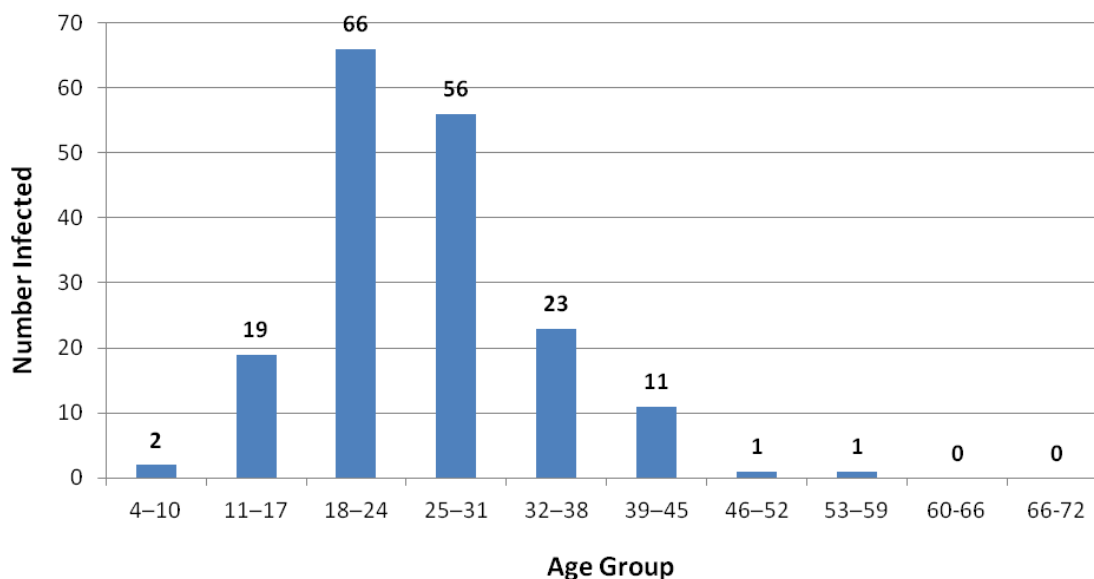
RESULTS

After the retrospective study the following analyses were made: These are shown in Table 1 and Figure 1. The prevalent age groups of the infection were 18 to 31 for both females and males. The mean age and standard deviation for females were 26.0 and 3.47, respectively and that of males were 28.8 and 15.53, respectively (Figure 2).

Table 1. Yearly prevalence of *T. vaginalis* infection.

Year	Total no. of HVS patients (N)	No. of T.V positives recorded (n)	Percentage (%)
1994	3150	166	5.3
1995	3441	181	5.3
1996	3003	123	4.1
1997	2889	107	3.7
1998	2070	58	2.8
1999	2830	52	1.8
2000	2001	56	2.8
2001	1949	24	1.2
2002	1597	42	2.6
2003	2499	17	0.7
2004	2838	27	1.0

T.V = *T. vaginalis*.

**Figure 1.** Age Distribution of *T. vaginalis* among females.

DISCUSSION

This study was done to determine the trend that *T. vaginalis* infection has taken over eleven (11) years. An important finding in this study is that there has been a decline in the number of *T. vaginalis* cases recorded over the years from 1994 to 2004. This decline may be accounted for by the effective STI treatment regimen given to patients. Even though there is a general decline, it is evident that if proper measures are not put in place to find out the actual factors of this trend and steps not taken to check the transmission rate of *T. vaginalis*, its prevalence can go higher in the future. In 2003, a prevalence of 16.2% was found among a high school student of both female and male population by Kaydos et

al. (2002) which exceeds any of the prevalence recorded over the years of this study (Figures 3 and 4).

In a study conducted by Lo et al. (2002) in Auckland, the mean age of females mostly infected was 26.5 years. The current study showed that the mean age of females was 26.0 and 28.8 years, respectively. These do not show any significant margin from that obtained in the study carried out by Lo et al. (2002). The age group predominantly infected with *T. vaginalis* is 18 to 31 for both males and females even though the mean ages of infection are 26.0 for females and 28.8 for males. This suggests that people who are mostly infected are the young sexually active group. This implies that unprotected sex may be a major factor in the transmission of *T. vaginalis* in the study area.

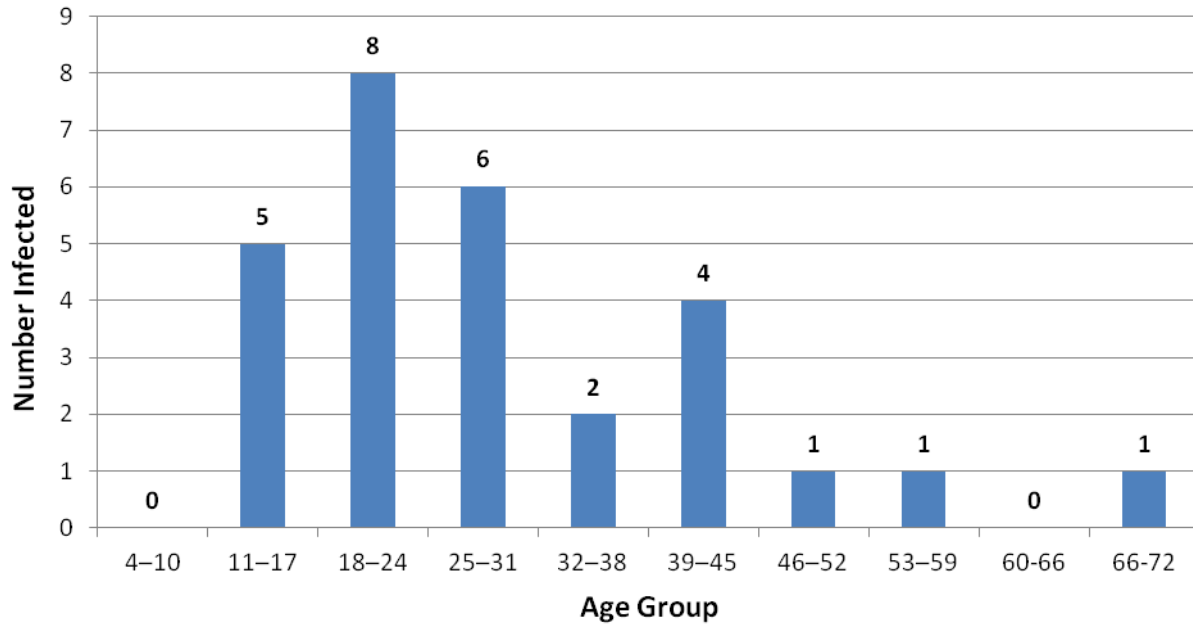


Figure 2. Age distribution of *T. vaginalis* among males.

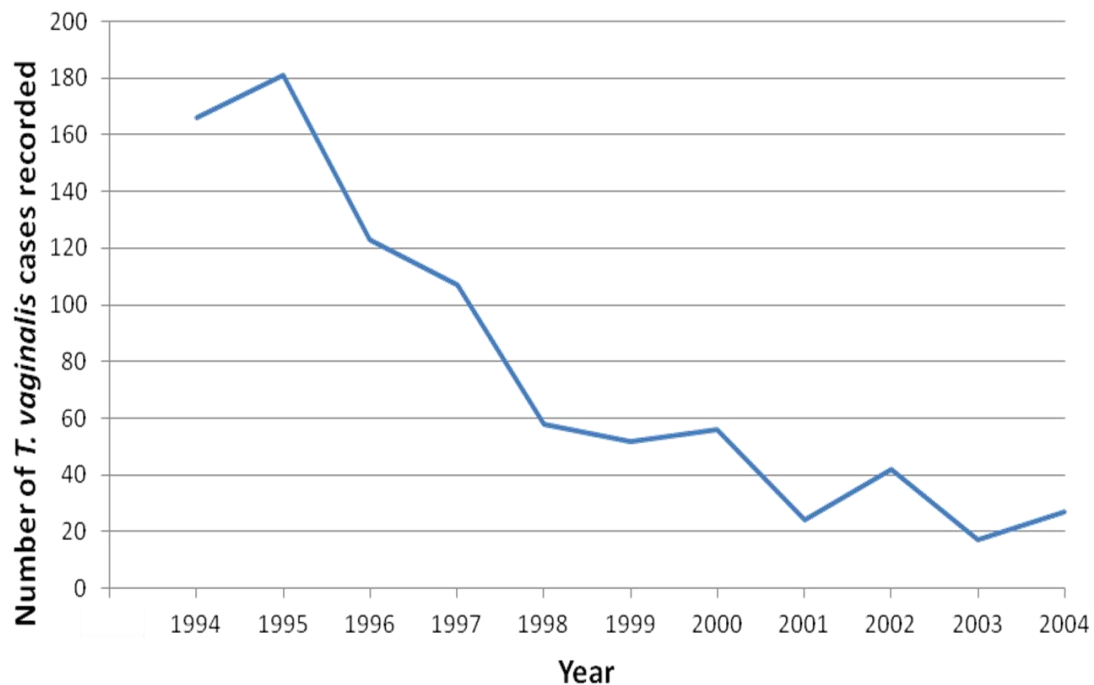


Figure 3. Yearly trend of *T. vaginalis* infection.

In a study carried out by Helms et al. (2008), the results showed that 4.6% of women had an incident infection of *T. vaginalis* while a study carried out by Sutton et al. (2007) showed 3.1% prevalence among women. This current study obtained a mean incidence of 2.8% which is lower than those obtained in the above studies. A study

carried out in 2000 by Adu-Sarkodie et al. (2000) concluded that training in the syndromic management of STIs among pharmacists led to improvements in the treatment of urethral discharge. Between April, 1997 and June, 1998, health workers had attended training course which covered history taking and examination, therapy,

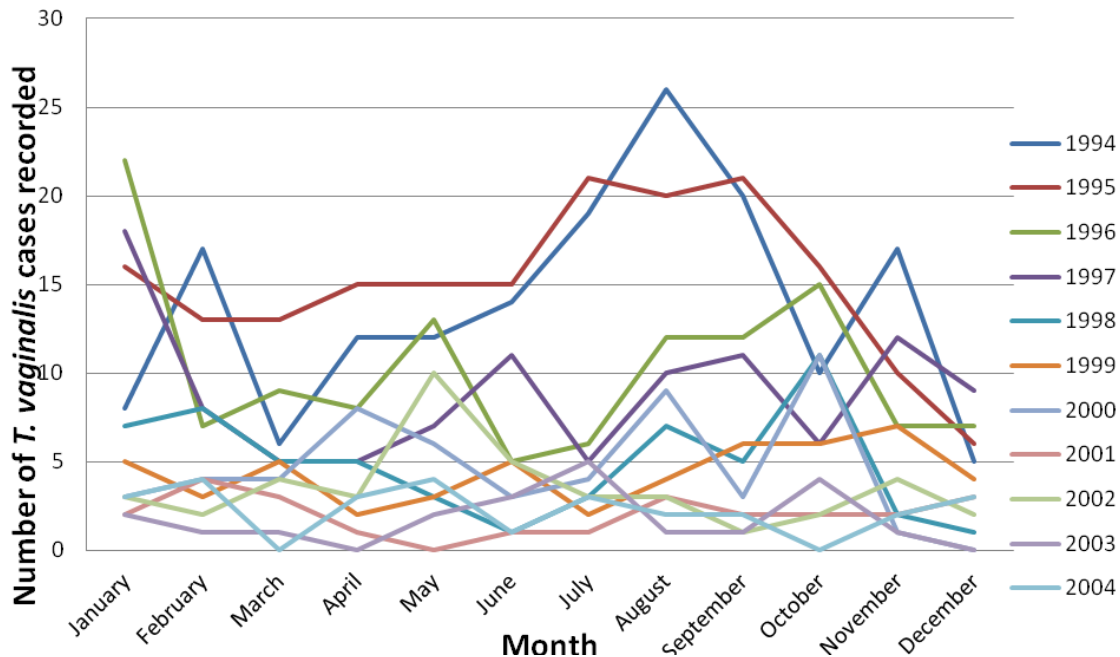


Figure 4. Monthly distribution trend of *T. vaginalis* infection over eleven years period.

condom promotion, partner notification, health education and counseling and STI record keeping using the syndromic approach. It enables all trained first-line service providers to diagnose STI syndrome and treat patients 'on the spot'. This helps prevent the further spread of STI, resulting in effective case management and decrease in the number of *T. vaginalis* cases. The reduction of *T. vaginalis* through the syndromic approach at KATH is consistent with previous research for the prevention of STI. In a landmark pilot study in Kwanza, Tanzania, use of the syndromic approach to STI treatment that AIDS CAP has advocated worldwide reduced HIV incidence and other STI by 42 percent. Again, recent research in Malawi produced strong Biological evidence that STI treatment can make HIV-positive men less infectious (AIDSCAP, 1991 to 1997).

The decrease in *T. vaginalis* and other STIs can also be attributed to the work of governmental organizations such as the Ghana AIDS Commission and non-governmental organizations. These organizations deliver innovative products and projects in support of HIV and AIDS prevention, fertility management, adolescent reproductive health and education. The combination of mass media and interpersonal activities has helped lower barriers for contraceptives and scaled-up family planning products and services in Ghana. This has increased people's acceptability for condom use and improved their health seeking behaviors over the years. The organisations provided technical support and organised workshops for health workers on comprehensive STI case management including syndromic approach. There is also an initiated integration of comprehensive STI case

management including syndromic approach into the curricula of medical schools and training institutions of nurses and midwives. All these training are geared towards prevention and information to prevent STI acquisition, improve access to STI services at all levels and outlets of health care delivery, improve quality of STI care and promote early health care seeking behavior and to promote effective partner notification and management.

Conclusion

There has been a significant decrease in *T. vaginalis* infection reported to KATH over the eleven year period. Young people between the ages of 18 to 31 are those mostly infected and decline in infection rate could be attributed to increased reproductive health education, increased acceptability to condom use and improved health seeking behaviors in the study area.

REFERENCES

- Adu S, Amankwaa Y (2005). Epidemiology of trichomoniasis in Kumasi, Ghana. PhD thesis, London School of Hygiene & Tropical Medicine.
- Adu-Sarkodie Y, Steiner MJ, Attafuah J, Tweedy K (2000). Syndromic management of urethral discharge in Ghanaian pharmacies. *Sex Transm. Infect.* 76(6):439-42.
- Cotch MF, Pastorek JG, 2nd, Nugent RP (1997). *Trichomonas vaginalis* associated with low birth weight and preterm delivery. The Vaginal Infections and Prematurity Study Group. *Sex Transm. Dis.* 24:353-60.
- Thomason JL, Gelbart SM, Sobun JF, Schullien MB, Hamilton PR (1988) Comparison of four methods to detect *Trichomonas vaginalis*. *J. Clin. Microbiol.* 26(9):1869-1870.
- Bowden FJ, Paterson BA, Mein J, Savage J, Fairley CK, Garland SM,

- Tabrizi SN (1999). Estimating the prevalence of *Trichomonas vaginalis*, *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, and human papilloma virus infection in indigenous women in northern Australia. *Sex Transm. Infect.* 75:431-4.
- Cohen J (2000). HIV transmission - AIDS researchers look to Africa for new insights. *Science* 287:942.
- Forna F, Gülmezoglu AM (2003). Interventions for treating trichomoniasis in women. *Cochrane Database Syst Rev.* CD000218.
- Franklin AN, Harold WB (1994). *Basic Clinical Parasitology.* pp. 42-44.
- Heine P, McGregor JA (1993). *Trichomonas vaginalis*: a reemerging pathogen. *Clin. Obstet. Gynecol.* 36:137-44.
- Helms DJ, Mosure DJ, Metcalf CA, Douglas JM Jr, Malotte CK, Paul SM, Peterman TA (2008). Risk factors for prevalent and incident *Trichomonas vaginalis* among women attending three sexually transmitted disease clinics. *Sex Transm. Dis.* 35(5):484-8.
- Kaydos S, Swygard H, Wise SL, Sena AC, Leone PA, Miller WC, Cohen MS, Hobbs MM (2002). Development and validation of a pcr-based enzyme-linked immunosorbent assay with urine for use in clinical research settings to detect *Trichomonas vaginalis* in women. *J. Clin. Microbiol.* 40:89-95.
- Koneman EW, Allen SD, Janda WM, Schreckenberger PC, Winn Jr, WC (1992). *Colour Atlas and Textbook of Diagnostic Microbiology,* Fourth Edition. P 87.
- Lo M, Reid M, Brokenshire M (2002). Epidemiological features of women with trichomoniasis in Auckland sexual health clinics: 1998-99. *J. N. Z. Med. J.* 115(1159):U119.
- AIDS Control and Prevention (AIDSCAP) (1997). *Making Prevention Work. Global Lessons Learned from the AIDS Control and Prevention (AIDSCAP) Project 1991-1997.* pp.19-25.
- Murray PR, Rosenthal KS, Kobayashi GS, Pfaller MA (2002). *Medical Microbiology,* 4th Edition. P 703.
- Petrin D, Delgaty K, Bhatt R, et al (1998). Clinical and microbiological aspects of *Trichomonas vaginalis*. *Clin. Microbiol. Rev.* 11:300-17.
- Soper D (2004). Trichomoniasis: under control or undercontrolled? *Am. J. Obstet. Gynecol.* 190(1):281-90.
- Sutton M, Sternberg M, Koumans EH, McQuillan G, Berman S, Markowitz L (2007). The prevalence of *Trichomonas vaginalis* infection among reproductive-age women in the United States, 2001-2004. *Clin. Infect. Dis.* 45(10):1319-26.
- Sylvia SM (1997). *Inquiry into Life-* 8th Edition. pp 555.
- Upcroft P, Upcroft JA (2001). Drug targets and mechanisms of resistance in the anaerobic protozoa. *Clin. Microbiol. Rev.* 14:150-164.
- Wang CC, McClelland RS, Reilly M, Overbaugh J, Emery SR, Mandaliya K (2001). The effect of treatment of vaginal infections on shedding of human immunodeficiency virus type 1. *J. Infect. Dis.* 183(7):1017-22.
- World Health Organization, WHO (2001). *Global Prevalence and Incidence of Selected Curable Sexually Transmitted Infections: Overviews and Estimates.* WHO/HIV_AIDS/2001.02. Geneva: World Health Organization.