

PREVALENCE OF GENITAL *CHLAMYDIA* AND *GONOCOCCAL* INFECTIONS IN AT RISK WOMEN IN THE KUMASI METROPOLIS, GHANA

B. K. OPOKU and Y.A. SARKODIE

Department of Obstetrics & Gynaecology and Microbiology, Kwame Nkrumah University of Science and Technology, School of Medical Sciences, Kumasi, Ghana

Corresponding Author: Dr Baafuor K. Opoku

E-mail: baafuoropoku@yahoo.com

Conflict of interest: None declared

SUMMARY

Objective: To study the prevalence of genital chlamydia and gonococcal infections in women at risk of acquiring sexually transmitted infections in the Kumasi metropolis, Ghana.

Design: Structured interviews and clinical examination of participants and obtaining vaginal swabs to test for gonorrhoea and chlamydia infections.

Participants: Women aged between 18-35 years (inclusive) with a history of having at least 3 sexual acts per week and having had at least 2 sex partners in the previous 3 months and were willing to be part of the study.

Results: One thousand and seventy (1070) women participated in the study. Genital chlamydia infection was found in 4.8% of participants whilst gonococcal infection was found in 0.9% of participants.

Conclusion: The prevalence of genital chlamydia and gonococcal infections was low in these at-risk women. The prevalence is also lower than reported in other female populations in the country.

Keywords: *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, at-risk women, Kumasi metropolis

INTRODUCTION

Chlamydia trachomatis is a small obligate intracellular bacterium transmitted by sexual intercourse. It is a cause of endocervicitis and also pelvic inflammatory disease (PID) in women.^{1,2,3} Chlamydial infection of the genital tract is seen most frequently in young women who are sexually active. Most infections are asymptomatic^{1,2,3,4} and can lead to sequelae such as tubal damage, tubal infertility and ectopic pregnancy. In addition, untreated infections are estimated to increase the likelihood of HIV transmission.^{5,6} *Neisseria gonorrhoeae* is a gram-negative intracellular diplococcus (GNID) which causes disease only in humans. It is also sexually transmitted and infects the columnar epithelium of the endocervix in women.^{1,2} It can also infect the urethra and the rectum. About 50% of gonococcal infections in women are asymptomatic.^{1,2} Untreated gonococcal infections, like chlamydia, can lead to tubal

damage and blockage, chronic pelvic pain, infertility and ectopic pregnancy.^{7,8,9}

In Ghana, only a few studies have been conducted into chlamydia and gonococcal infections.^{10,11,12,13} In these studies the prevalence of both organisms were found to be low compared to that found in some African states and the western world. Only one of these studies¹² involved symptomatic patients attending a sexually transmitted infections (STI) clinic for one reason or the other. The others involved asymptomatic obstetric and gynaecologic patients.^{10,11,13}

Data from these studies suggested lower prevalence of these infections in women in the said low-risk populations. This study set out to study prevalence among women at higher risk of acquiring these infections.

METHODS

Women considered to be at higher risk of acquiring chlamydia and gonococcal infections were identified during field surveys of areas known to be receptive and conducive for sexual favours and activities in the Kumasi metropolis by trained field assistants. These areas included drinking bars, night clubs, female hostels and work places of apprentice seamstresses and hairdressers.

The inclusion criteria for recruitment were:

1. Age between 18 and 35 years (inclusive)
2. Vaginal sex of at least 3 times per week
3. At least 2 sexual partners in the previous 3 months

Once a participant was identified, the study was introduced to her and if she agreed to be part and met the eligibility criteria she was invited to the study office where written informed consent was obtained. Participants answered interviewer-administered questionnaires which sought information on socio-demographic data. This was followed by pelvic examination which involved the passage of a disposable speculum, inspection for any vaginal/cervical discharge/abnormality and the taking of swabs.

One endocervical (ECS) and 2 high vaginal swabs (HVS) were taken from each participant.

Of the 2 high vaginal swabs, one was used for the detection of *Chlamydia trachomatis* by a rapid immuno-assay, *Quickvue*¹⁴ (Quidel Corporation, USA). This lateral flow test, with a reported sensitivity and specificity of 94% and 99% respectively in asymptomatic subjects detects the outer membrane protein of *C. trachomatis*¹⁴. The endocervical swab was plated immediately on modified Thayer-Martin medium, put in a candle extinction jar and sent immediately to the laboratory to be incubated at 37°C for the growth and identification of *Neisseria gonorrhoeae*. Gonococci were identified by the observation of grey glistening colonies on the medium, which stained Gram negative with diplococcus morphology, tested positive with oxidase, and also utilized glucose but not maltose in sugar fermentation tests.

A smear of the second vaginal swab was made on a microscopic slide and gram-stained and bacterial vaginosis diagnosed by Nugent's score¹⁵. The swab was then immersed in a saline solution and *Trichomonas vaginalis* diagnosed from a wet mount. Ethical approval for the study was obtained from the Committee on Human Research, Publications and Ethics (CHRPE) of Kwame Nkrumah University of Science and Technology School of Medical Sciences (KNUST-SMS), Kumasi.

RESULTS

One thousand, three hundred and fifty (1350) women were recruited into the study between April and November 2006. Two hundred and seven (207) declined to be screened for various reasons. Seventy-three (73) who were enrolled into the study were found to have had incomplete data entry and were therefore excluded from the final analysis. Results as presented are for one thousand and seventy (1,070) of the participants.

The age of participants ranged between 18 and 35 years with a mean of 22.7 years (SD--3.6). Nine hundred and forty-five (945) of the participants constituting 88.4% were single whilst 103 (9.5%) were co-habiting with a partner. Twenty-two (2.1%) said they were married. On contraceptive usage, whilst 31.7% used the condom, 16.2% were on the combined pill. Almost half of women enrolled (46.3%) were not on any form of contraception. Table 1 shows the sexual behaviour of the women. Eleven and half percent of participants had ever had anal sex whilst 42.3% had had oral sex in the past.

Table 1 Sexual behaviour of respondents

Number of partners in last 3 months	n	%
3	935	87.4
4-5	134	12.5
6 and above	1	0.1
Mean	2.22	
Median	2.00	
Standard Deviation	0.63	
Frequency of vaginal sex in past week	n	%
3-6	913	85.3
7-10	147	13.6
11 and above	10	0.9
Mean	3.6	
Median	3.0	
SD	1.55	

Table 2 shows the prevalence of the two organisms in the population studied.

Table 2 Prevalence of isolates

	Total number screened	Number positive	Number negative	% positive
<i>Chlamydia</i>	1070	51	1019	4.8
<i>Gonococcus</i>	1070	10	1060	0.9

Table 3 shows the age-specific prevalence of the 2 organisms.

Table 3 Age-specific prevalence of isolates

Organism	Age group (years)				Total
	18-20	21-25	26-30	31-35	
Chlamydia: Positive; n (%)	19 (37.2)	15 (29.4)	12 (23.5)	5 (9.8)	51 (4.8)
Negative; n	363	499	128	29	1019 (95.2)
Gonococcus: Positive; n (%)	4 (40.0)	4 (40.0)	2 (20.0)	0 (0.0)	10 (0.9)
Negative; n	378	510	138	34	1060 (91.1)

The prevalence of both organisms seems to fall with increasing age. The highest prevalence of both organisms was seen in the younger ages of 18-25. Whilst 80% of gonococcus was found in this age, chlamydia was found in 66.6%.

Vaginal discharge was found in 27.2% of participants. The major cause was bacterial vaginosis found in 20.5% followed by candidiasis in 18.7% and trichomoniasis in 2.4%.

DISCUSSION

Chlamydia and *gonococcal* infections constitute the major cause of pelvic inflammatory disease. The prevalence of these organisms in most of West Africa is low compared to Southern and East Africa and the western world. In the work done by Pepin et al on women presenting with vaginal discharge in five cities in West Africa, chlamydia was found in 3.2% whilst the gonococcus was 1.9%.¹² In some populations in East and Southern Africa, chlamydia had a prevalence of 5-11% whilst gonococcus was 7-17%.^{17,21} In Johannesburg, chlamydia was found in 13% of women attending an STI clinic.¹⁷

A previous study in Kumasi reported a prevalence of 3.6% for chlamydia infections in patients presenting with infertility and for routine antenatal care.¹⁰ A study done on 162 women who attended the gynaecology clinic of Korle Bu Teaching Hospital, Accra, for various reasons found prevalence of 4.9% and 3.1% respectively for *Chlamydia trachomatis* and *Neisseria gonorrhoeae*.¹¹ In the same study the respective prevalence among 148 postpartum women were 7.7% and 3.4%.

The current study found a prevalence of 0.9% for gonococcus and 4.8% for chlamydia and compares with that found by Appea-Kubi et al in ante-natal and gynaecologic women in Accra who had 3.0% prevalence of chlamydia and 0.6% of gonococcus.¹³ The latter study was on women presenting with symptoms including vaginal discharge. In our work, vaginal discharge was found in 27.2% of participants.

Studies have shown that a complex matrix of behavioural, biological and social factors contributes towards high risk sexual behaviour and the likelihood of acquiring STIs.^{16,17,18,19} These include younger age, the number of sexual partners at any given period, the use or otherwise of barrier forms of contraception, use of alcohol and other social drugs and economic disposition. In this study, participants by their sexual behaviour were considered to be at high risk for acquiring STIs.

These behaviours included a mean of 2.75 new sexual partners in the previous 3 months and 5.72 sexual acts in the previous one week, coupled with the fact that 46.3% were not using any form of contraception. A larger part of the infections was seen in the younger age group of 18-25 years.

As was also adduced by Adu-Sarkodie²², reasons for the low prevalence of chlamydia and gonococcal infections in this study could be attributed to the more rampant use of unprescribed antibiotics, easy availability of over-the-counter drugs and syndromic management

of STI. Health workers have over the past years been trained in syndromic management of sexually transmitted infections. In view of the low prevalence found in this study, one wonders whether we should be moving more towards aetiological management as opposed to syndromic management of STIs. Similar concerns have been raised by Pepin et al.¹²

Although there has been a marginal decline of condom use among sexually active unmarried women in the country from 18% to 17.6% between 2005 and 2008 as reported by the Demographic and Health Surveys^{23,24}, condom use prevalence of 31.7% found in this study is very encouraging. The massive campaign against HIV/AIDS by the National AIDS Commission and National AIDS Control Programme, among others, may have raised awareness and increased the use of condoms as a preventive measure. This invariably would also have reduced the transmission of other STIs including chlamydia and gonorrhoea and could explain the low prevalence of these organisms in women who are at a higher risk of acquiring these infections.

CONCLUSION

The study found that the prevalence of genital chlamydial and gonococcal infections in women considered to be at higher risk of acquiring sexually transmitted diseases is low and comparable to the general population.

ACKNOWLEDGEMENT

The authors express their deepest appreciation to all women who consented to be part of this study. Also acknowledged are the field assistants and all other workers who ensured a good collection of data for the study.

REFERENCES

1. Mishel DR, Stenchever MA, Droegemuller W, Herbst AL, eds. Infections of the upper genital tract. In: *Comprehensive Gynecology* 3rd Edition 1997, Mosby; 664-667
2. Cates W, Wasserhelt JN. Genital chlamydial infections: epidemiology and reproductive sequelae. *Am J Obstet Gynecol* 1991; 164: 1771-1784
3. Turner CF, Rogers SM, Miller HG, Gribble JN et al. Untreated gonococcal and chlamydial infections in a probability sample of adults. *JAMA* 2002; 287: 726-733
4. Bolam M.J, Stokes T., Shukla R., Bhaduri S. and Schober P. Controlling genital Chlamydia infection. *BMJ* 1997; 314 (7072): 516-516.
5. Laga M, Alary M, Nzila N, et al. Condom promotion, STD treatment and declining HIV-1 infection

- in female Zairian sex workers. *Lancet* 1994; 344: 246-248
6. Fleming DT, Wasserhelt J. From epidemiological synergy to public health policy and practice: the contribution of STIs to sexual transmission of HIV. *Sex Transm Infect* 1999; 75: 3-17
 7. Safrin S, Schachter J, Dahrouge D, Sweet RL. Long term sequelae of acute pelvic inflammatory disease; a retrospective cohort study. *Am J Obstet Gynecol* 1992; 166: 1300-1305
 8. Buchan H, Vessy M, Goldcard M, Fairwaether J. Morbidity following pelvic inflammatory disease. *Br J Obstet Gynaecol* 1993; 100: 558-562
 9. Westrom L. Effect of acute PID on fertility. *Am J Obstet Gynecol* 1975; 121: 707-713
 10. Drescher C, Elkins TE, Adkeo O, Aikins-Bekoe P, Agbemadzo T, Foster RL, Martey JO. The incidence of urogenital chlamydia trachomatis infection among patients in Kumasi, Ghana. *Int J Gynaecol Obstet* 1988; 27 (3): 381-383
 11. Bentsi C, Klufio CA, Perine PL, Bell TA, Cles LD, Koester CM, Wang SP. Genital infections with chlamydia trachomatis and neisseria gonorrhoeae in Ghanaian women. *Genitourin Med* 1985; 61 (1): 48-50
 12. Pepin J, Deslandes S, Khonde N, Kintin DF et al. Low prevalence of cervical infections in women with vaginal discharge in West Africa: Implications for syndromic management. *Sex. Transm Inf* 2004; 80: 230-235
 13. Appea-Kubi KA, Shinya Y, Sakyi B, Kisimoto T et al. Neisseria gonorrhoea, chlamydial trachomatis and treponema pallidum infection in antenatal and gynaecological patients at Korle-Bu Teaching Hospital, Ghana. *Jpn J Infect Dis* 2004; 57: 253-256
 14. Quidel Corporation. www.quidel.com
 15. Nugent RP, Krohn MA, Hillier SL. Reliability of diagnosing bacterial vaginosis improved by a standardized method of Gram stain interpretation. *J. Clin Microbiol.* 1991; 29: 297-301
 16. Mabey D, Lloyd Evans NE, Conteh S, Forsey T. Sexually transmitted diseases among randomly selected attendees at an ANC clinic in the Gambia. *Br J. Vener Dis.* 1984; 60: 331-336
 17. Orroth KK, Korenromp EL, White RG et al. Comparison of STD prevalences in the Mwanza, Rakai and Masaka trial populations: the role of selection bias and diagnostic errors. *Sex Tran Infect* 2003; 79: 98-105
 18. Kalmuss, D., Davidson, A., Cohall, A., Laraque, D., & Cassell, C. Preventing sexual risk behaviors and pregnancy among teenagers: Linking research and programs. *Perspectives on Sexual and Reproductive Health*, 2003; 35: 87-93.
 19. Fergusson, D. M., & Lynskey, M. T. Alcohol misuse and adolescent sexual behaviors and risk taking. *Pediatrics*, 1996; 98: 91-96.
 20. Upchurch DM, Kusunoki Y. Associations between forced sex, sexual and protective practices & STDs among a national sample of adolescent girls. *Women's Health Issues*; 2004; 14: 75-84
 21. Mayaud P, ka-Gina G, Cornillessen J, et al. Validation of a WHO algorithm with risk assessment for the clinical management of vaginal discharge in Mwanza, Tanzania. *Sex Transm Infect* 1998; 74: S44-49
 22. Adu-Sarkodie Y.A. Antimicrobial self-medication in patients attending a sexually-transmitted diseases clinic. *Int J. STD/AIDS* 1997; 8: 456-458
 23. Ghana Statistical Service (GSS), Noguchi Memorial Institute for Medical Research (NMIMR), and ORC Macro 2004. *Ghana Demographic and Health Survey 2003*; p71
 24. Ghana Statistical Service (GSS), Ghana Health Service and ICF Macro 2009. *Ghana Demographic and Health Survey 2008, Accra Ghana*; p86
-