

ORIGINAL PAPER

# Prevalence and Determinants of *Neisseria Gonorrhoea* and *Chlamydia Trachomatis* Infections in Patients with Pelvic Inflammatory Disease at Lusaka, Zambia

Goshon Kasanda

Department of Obstetrics & Gynaecology, University Teaching Hospital, Lusaka, Zambia

## ABSTRACT

**Background:** Pelvic inflammatory disease (PID) is an inflammatory process affecting typically the endometrium, fallopian tubes, ovaries, parametrium and pelvic peritoneum with its surrounding structures. More than 85% of spontaneous PID is caused by sexually transmitted infections like gonorrhoea, chlamydia, mycoplasma and others. WHO estimates that 340 million new cases of *n. gonorrhoea*, *chlamydia* and other sexually transmitted infections occur every year of which 85% are in developing countries. Gonorrhoea and chlamydia account for 62 million and 92 million new infections respectively. In Zambia, 10% of outpatient attendance at health institutions is due to sexually transmitted infections. At University Teaching Hospital, pelvic inflammatory disease accounts for about 10 - 15% of gynaecological attendance. Despite these, there is no adequate information on magnitude and prevalence of these two organisms among patients with PID in Lusaka.

**Objective:** The objective was to determine the prevalence and determinants of *neisseria gonorrhoea* and *chlamydia trachomatis* infection among gynaecological patients diagnosed clinically to have PID at University Teaching Hospital, Lusaka. Several socio-demographic factors, sexual behaviour and clinical factors associated with chlamydia and gonorrhoea were studied.

**Methodology:** This was a descriptive cross sectional study conducted on women presenting clinically with pelvic inflammatory disease to the emergency outpatient gynaecological ward at UTH. Information about demographic, sexual behavioural history and clinical presentation was obtained using a structured questionnaire. Endo-cervical smear was obtained and screened for gonorrhoea and chlamydia using respective immunoassay rapid test and gram stain for gonorrhoea.

**Results:** A total of 6 respondents were recruited out of which 43 (37%) had gonorrhoea while no chlamydia (0/6) was isolated. 4 (98.3%) had sexual partners while 2 had no sexual partner and no gonorrhoea was isolated from them. Among those with sexual partners, 101(78.3%) had steady sexual partners, 19 (4.8%) had casual partners and 9 (7.0%) had anonymous sexual partners with 37 (36.6%), 10 (52.6%) and 6 (66.7%) gonorrhoea isolation respectively. Some had multiple sexual partners. Gonorrhoea was isolated from 4 (28.6%) of the 14 respondents who had one new sexual partner, and those who had two or more sexual partners had gonorrhoea isolated. Gonorrhoea isolation in relation to frequency of sexual intercourse per week was as follows: once 1/13 (7.7%), twice 2/11 (18.2%), thrice 3/11 (27.3%) and more than three times 32/65 (49.2%). Gonorrhoea was high in those who had sex with casual or anonymous sexual partner under influence of alcohol 6/11 (54.5%) or obtained anonymous sexual partner from market, shopping centre 4/5 (80%), street, bar, disco, or night club 7/9 (77.8%). Regarding relationship to clinical features gonorrhoea detection was as follows: 18/36 (50.0 %) for those with adnexial tenderness, 21/45 (46.7%) with inflamed cervix, 37/92 (40.2%) with lower abdominal tenderness and 32/87 (36.8%) with normally appearing cervix.

**Conclusion:** The prevalence of *neisseria gonorrhoea* in gynaecological patients with PID at UTH in Lusaka was 37%. There was no chlamydia isolated. Low socio-economic status and young age were the socio-demographic factors associated with a higher risk of Gonorrhoea. The sexual risk behaviours associated with gonorrhoea were; the number of casual or anonymous sexual partners, frequency of sexual intercourse and non use of condoms. Lower abdominal pain and tenderness with cervical motion and adnexial tenderness were associated with higher gonorrhoea isolation. There was no specific clinical predictor of either gonorrhoea or chlamydia.

## INTRODUCTION

Pelvic inflammatory disease (PID) is an inflammatory process of the woman's upper reproductive system. The infection sprays from the cervix and typically involves the endometrium, fallopian tubes, ovaries, parametrium and pelvic peritoneum with its surrounding structures. It is attributed to the ascending spread of micro organisms from the cervico-vaginal canal (1). PID is an important disease as it poses an enormous economic burden of morbidity and mortality for the sufferer through its direct impact on reproductive and child health. The true incidence of PID is unknown as most cases go unnoticed. However PID is estimated at 1 – 2 % per annum in sexually active women. More than 85% are due to spontaneous infection and following termination of pregnancy in sexually active females of reproductive age (1). Less than 15% follow procedures that favour the organisms to ascend up. Such iatrogenic procedures include endometrial biopsy, uterine curettage, intrauterine contraceptive device insertion and hysterosalpingography<sup>1</sup>. The primary organisms causing spontaneous PID are the sexually transmitted infections such as *neisseria gonorrhoea*, *chlamydia trachomatis* and *mycoplasma hominis*. The long term complications of PID such as infertility, ectopic pregnancy, chronic pelvic pain etc often result from failure to diagnose and effectively treat these infections at an early stage.

*N. gonorrhoea* was described by Albert Neisser in 1879. It's a small gram negative non-motile aerobic or facultative anaerobic intracellular diplococcus. It attacks mucous membranes of the genitourinary tract, eyes, rectum, and throat producing acute suppuration that lead to tissue invasion followed by chronic inflammation and fibrosis<sup>1,2</sup>. In female the primary infection is the endocervix. It may progress to fallopian tubes causing salpingitis, fibrosis and tubal obliteration.<sup>1,2</sup>

*Chlamydia trachomatis* is a small gram negative non-motile obligate intracellular bacterium. The serovars D – K cause sexually transmitted infections. In women it can cause urethritis, cervicitis and pelvic inflammatory disease. These infections may be asymptomatic or symptomatic. The symptoms include lower abdominal pain backache, per vaginal discharge, dysuria and frequency. (1, 2)

Pelvic inflammatory disease imposes an enormous economic burden on morbidity and mortality through their impact on reproductive and child health and its facilitation of sexual transmission of HIV by its causative agents like gonorrhoea and chlamydia. Gonorrhoea and chlamydia account for 62 million and 92 million new infections respectively. Africa has the highest incidence of about 250 per 1000 in age group of 15 to 49 years (3)

and in Zambia, 10% of outpatient attendance at health institutions are related to sexually transmitted infections such as gonorrhoea, syphilis, chlamydia among others<sup>4</sup>.

A review of information at University Teaching Hospital gynaecological outpatient ward showed that pelvic inflammatory disease was one of the most common gynaecological problems that patients presented with, being second to abortions. In 2007, an average of 50 patients was seen daily out of which 15% had PID (5). Apparently no specific cause of PID was identified as most treatment was empirical. Detailed risk behaviour of these patients was not obtained either. It was not known to what extent chlamydia and gonorrhoea contributed to the burden of PID. This study which had not previously been done in Zambia aimed to explore these aspects.

## STATEMENT OF PROBLEM

Many women are treated for pelvic inflammatory disease (PID) in general at University Teaching Hospital (UTH) but are not specifically screened for gonorrhoea and chlamydia despite literature evidence of their association. There is no adequate information on magnitude and prevalence of these two organisms among patients with PID in Lusaka. For these reasons the two infections are usually not specifically treated and the sexual partner(s) are not treated either. This could lead to reactivation and reinfection which could greatly contribute to complications of PID such as chronic lower abdominal pain, ectopic pregnancy and infertility.

## STUDY QUESTION

What is the contribution of chlamydia and gonorrhoea to the burden of disease among patients with clinical features of pelvic inflammatory disease at University Teaching Hospital in Lusaka?

## STUDY JUSTIFICATION

PID is a common problem in Lusaka. It accounts for 1 in 7 of gynaecological out patient attendance at UTH<sup>19</sup>. The treatment of these patients is mostly by 'syndromic management' and polytherapy because no specific organism has been identified as the commonest cause of PID. Different antibiotics and sometimes antifungal/antiviral have been prescribed. This becomes expensive for the institution and the patient. This study explored the contribution of chlamydia and gonorrhoea to the burden of PID. It is hoped that the results will help in formulating guidelines on focused therapy in patients with PID. Since the prevalence of gonorrhoea and chlamydia infections, which are sexually transmitted, is not known, the sexual partner is often not treated. This could lead to a vicious cycle where couples re-infect each other. This study therefore explored the need for

recommending partner treatment in patients found with PID.

### **HYPOTHESIS (NULL)**

The null hypothesis states that gonorrhoea and chlamydia are not common organisms in PID patients at UTH.

### **AIM**

To study the prevalence and determinants of *neisseria gonorrhoea* and *chlamydia trachomatis* infection among gynaecological patients diagnosed clinically to have pelvic inflammatory disease at University Teaching Hospital in Lusaka.

### **SPECIFIC OBJECTIVES**

- (i) To determine the prevalence of gonorrhoea and chlamydia infections among patients presenting with symptoms of PID a
- (ii) To determine the socio-demographic factors associated with gonorrhoea and chlamydia infections.
- (iii) To describe the sexual risk behaviours associated with gonorrhoea and chlamydia infections
- (iv) To compare clinical features that are predictors of gonorrhoea and/or chlamydia infections in patients with PID

### **RESEARCH METHODOLOGY**

#### **Study Design**

This was a descriptive cross sectional study

#### **Target Population**

Women presenting with gynaecological complaints to the Department of Obstetrics and Gynaecology at University Teaching Hospital in Lusaka

#### **Study Population**

Women presenting clinically with pelvic inflammatory disease without competing diagnosis (6, 7) meeting the eligibility criteria.

#### **Setting:**

The study was conducted in the emergency gynaecological ward within the department of Obstetrics and Gynaecology at University Teaching Hospital.

#### **Sample Size**

Using epi info version 6 and taking a 2007 UTH's gynaecological ward (5) prevalence rate of 15% and assumed worst acceptable prevalence of 8 % at

confidence interval of 95% and power of 80% the minimum sample size required was calculated as 4. A total of 6 respondents were recruited in this study

#### **Inclusion Criteria**

Patients with one or more of the major symptoms of PID by CDC (6, 7) criteria without any competing diagnosis were included in the study.

#### **Exclusion Criteria**

Asymptomatic patients who did not meet the case definition as in inclusion criteria Patients who had received antibiotic treatment for their current episode of PID. Patients who refused to participate in the study.

#### **Data Collection and Testing**

Respondents were selected by systematic sampling taking the 5<sup>th</sup> PID case. Information about the study was given and informed consent was obtained from those who met the inclusion criteria. Information was obtained regarding demographic, sexual behavioural history and clinical presentation using a structured questionnaire. Endocervical smear was obtained using a sterile cusco's' speculum following guidelines in the standard procedure manual. The specimens collected were taken to the venereology laboratory for identification of gonorrhoea and chlamydia using gene probe and rapid test. Each participant was allocated a code which was indicated on the respective questionnaire, consent form and endocervical specimen form and container.

#### *Data Analysis*

Data collected was analysed using the statistical package for social scientists (SPSS Version 13). Double entry of data was done to minimise on errors. Range and consistency checks were then performed on the data. Means and medians were calculated for continuous variables. A univariate analysis of independent variables' (socio-demographic factors and sexual behaviour) association with gonorrhoea and chlamydia detection was conducted. A bivariate analysis of association of clinical features with gonorrhoea and chlamydia was done at confidence interval of 95%. Analysis became restricted to gonorrhoea as no cases of chlamydia were detected.

#### *Ethical Consideration*

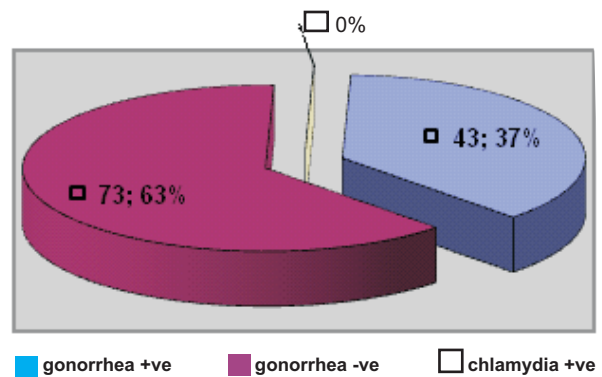
Permission was sought and obtained from the Ethics Committee of the University of Zambia prior to commencement of the study. The rights of the patients were respected and upheld. The recruitment of participants was considered after obtaining consent from interested participants. A participants' information sheet

(appendix) was provided. Participants with proven gonorrhoea were sent to venereology clinic 3 for treatment with their respective sexual partners.

**RESULTS**

A total of 116 participants diagnosed with pelvic inflammatory disease were enrolled in the study and all of them were screened for both chlamydia and gonorrhoea. All the 116 data sets were clean and included in the analysis. 3 other eligible patients refused to be included in the study giving a response rate of 98%. Out of the 116 participants 43 (37%) tested positive for gonorrhoea while none tested positive for chlamydia (chart 1).

**Chart 1:** Gonorrhoea and Chlamydia detection in PID patients in Lusaka



**Table 1:** Univariate association between socio-demographic factors and gonorrhoea

Variable		Gonorrhoea results		Frequency N (%)	P-value
		+ve N, (%)	-ve N (%)		
Age (years)	Less than 20	4 (50.0)	4 (50.0)	8 (6.9)	0.862
	20 – 29	25 (36.8)	43 (63.2)	68 (58.6)	
	30 – 39	9 (33.3)	18 (66.7)	27 (23.3)	
	40 and more	5 (38.5)	8 (61.5)	13 (11.2)	
Marital status	Single	20 (37.7)	33 (62.3)	53 (45.7)	0.522
	Married	23 (36.5)	40 (63.5)	63 (54.3)	
Education level	None	4 (26.7)	11 (73.3)	15 (12.9)	0.787
	Primary	14 (38.9)	22 (61.1)	36 (31.0)	
	Secondary	16 (36.4)	28 (63.6)	44 (37.9)	
	Tertiary	9 (42.8)	12 (57.2)	21 (18.1)	
Residence	High density	26 (35.1)	48 (64.9)	74 (63.8)	0.676
	Medium density	12 (42.9)	16 (57.1)	28 (24.1)	
	Low density	5 (35.7)	9 (64.3)	14 (12.1)	
Employment status	Employed (formal and informal)	19 (34.5)	36 (65.5)	55 (47.4)	0.593
	Unemployed	24 (39.3)	37 (60.3)	61 (52.6)	
Financial support *	Self	14 (34.1)	27 (65.9)	41 (35.3)	0.630
	Parents	10 (45.5)	12 (54.5)	22 (19.0)	
	Other relatives	8 (33.3)	16 (66.7)	24 (20.7)	
	Husband	22 (37.3)	37 (62.7)	59 (50.9)	
	Boy friend	2 (50.0)	2 (50.0)	4 (3.4)	
Income (kwacha)	<1000000	24 (35.8)	43 (64.2)	67 (59.8)	0.951
	1000000 - 2000000	11 (39.3)	17 (60.7)	28 (25.0)	
	2000000 – 5000000	4 (40.0)	6 (60.0)	10 (8.9)	
	>5000000	2 (28.6)	5 (71.4)	7 (6.3)	
Parity	0 nulliparous	15 (38.5)	24 (61.5)	39 (33.6)	0.984
	1 – 4	25 (37.3)	42 (62.7)	67 (57.8)	
	5 and above	3 (30.0)	7 (70.0)	10 (8.6)	
Contraceptive use	None	29 (35.4)	53 (64.6)	82 (70.7)	0.063
	Oral pills	3 (37.5)	5 (62.5)	8 (6.9)	
	Injectable	2 (22.2)	7 (77.8)	9 (7.8)	
	Implant/Jadelle	2 (100)	0	2 (1.7)	
	IUCD/loop	2 (40.0)	3 (60.0)	5 (4.3)	
	Condoms	5 (50.0)	5 (50.0)	10 (8.6)	

**SOCIO-DEMOGRAPHIC VARIABLES**

The association between socio-demographic variables and gonorrhoea isolation in patients with pelvic inflammatory disease were tabulated in table 1;

**Age distribution for gonorrhoea**

Many of the respondents 68 (58.6%) were in the age group of 20-29 and least in age group less than 20 years old 8 (6.9). 37% of those aged between 20-29 years had cervical isolation of gonorrhoea. (Table 1)

**Marital status**

Single women accounted for 53 (45.7%) while 63 (54.3%) were married. Among the single women, 37.8% (n = 20) were found to have gonorrhoea while 23 (36.5 %) of the married women had gonorrhoea (Table 1).

**Education level**

Women who had secondary education accounted for 37.9% (44/116) of respondents of which 36.4 % had gonorrhoea isolated while this was 38.9% for those with primary education and 26.7% for those without education. 9 (42.8%)



of the 21 respondents with tertiary education had gonorrhoea.

**Residence**

Most of the respondents were from high density area 74 (63.8%). Of these 26 (35.2%) had gonorrhoea. 12 (42.9%) of the 28 in medium residential area had gonorrhoea. 14 (12.1%) respondents were from low density area and gonorrhoea was found in 5 (35.7%).

**Employment Status**

Unemployed respondents accounted for 52.6% (61/116) of whom 24 (39.3%) had gonorrhoea detected (table 1). The figure for the employed was 55 of which 19 (34.5%) had gonorrhoea isolated.

**Financial support and average monthly income**

Most of the respondents had financial support from husband 59 (50.9%) while 41 (35.3%) supported themselves. Gonorrhoea detection in those women who supported themselves was 14 (34.1%) while those supported by husbands had a detection of 22 (37.3%). The detection of gonorrhoea also varied according to amount of actual money received or earned. Those receiving or earning less than K1000000 had a detection of gonorrhoea of 24(35.8%) while those earning more than K5000000 had detection of 2 (28.6%)(Table 1)

**Parity**

Most of the respondents had delivered children before 67 (57.8%) while 39 (33.6%) had never delivered before. There was no difference in terms of gonorrhoea detection among those with different parity. The detection was 25/67 (37.3%) and 15/39(38.5%) respectively.

**Contraceptives**

Eighty-two (70.7%) of respondents were not using any

form of family planning (Table 1) and had 29 (35.4%) gonorrhoea isolated. Only 2 (1.7%) were using implants (jadelle) and all of them had chlamydia isolated. 10 (8.6%) were using condom and 5 (50%) of these had gonorrhoea isolated

**SEXUAL BEHAVIOUR**

PID is common in patients who are sexually active. None of the respondents with no sexual partner had gonorrhoea isolated. Table 2 shows the sexual behavioural factors that were considered in this study:

**Table 2: Association Between Sexual Behaviour and Gonorrhoea**

Variable		Gonorrhoea results		P-value
		+ve n, (%)	-ve n (%)	
Sexual orientation	Straight	43 (37.1)	73 (62.9)	*
	Gay	0	0	
	Bisexual	0	0	
Has sexual partner	Yes	43 (37.7)	71 (62.3)	0.274
No	0	2 (100)		
Type of sexual partner(s) in previous six months **	Steady	37 (36.6)	64 (63.4)	0.027
	Casual	10 (52.6)	9 (47.4)	
	Anonymous	6 (66.7)	3 (33.3)	
Apparent age of sexual partners **	Same	3 (42.9)	4	0.412
	Older	46 (41.1)	66 (58.9)	
	Younger	2 (50)	2 (50)	
Number of new sexual partner in previous 6 months **	None	34 (35.8)	61 (64.2)	0.031
	One	4 (28.6)	10 (71.4)	
	Two	3 (100)	0	
	Three	2 (100)	0	
Place where casual or anonymous sexual partner was obtained from	Market, shopping center	4 (80)	1 (20)	0.136
	Street, bar, disco etc	7 (77.8)	2 (22.2)	
	school, college	0	1 (100)	
	workplace and seminar	1 (33.3)	2 (66.7)	
	party	0	2 (100)	
Thinks sexual partner has other sexual partners	Yes	6 (60.0)	4 (40.0)	0.192
	No	14 (30.4)	32 (69.6)	
	Do not know	23 (40.4)	34 (59.6)	
Received money, drugs, alcohol in exchange for sex in past 6 months	No	36 (36.7)	62 (63.3)	0.567
	Yes	6 (42.9)	8 (57.1)	
Has had sex with anonymous or casual partner after alcohol, dagga or drugs in last 6 months	No	37 (35.7)	68 (64.8)	0.194
	Yes	6 (54.5)	5 (46.5)	
Frequency of sexual intercourse per week	Once	1 (7.7)	12 (92.3)	0.012
	Twice	2 (18.2)	9 (81.8)	
	Thrice	3 (27.3)	8 (73.3)	
	More than thrice	32 (49.2)	33 (50.8)	
Has had an STI before	Yes	8 (32.0)	17 (68.0)	0.529
no	35 (38.9)	55 (61.1)		
Type of previous STI	Gonorrhoea	1 (20.0)	4 (80.0)	0.435
	Chlamydia	0	1 (100)	
	Syphilis	4 (33.3)	8 (66.7)	
	Bacterial vaginosis	1 (100)	0	
	Warts	1 (50)	1 (50)	
	Trichomonas	0	2 (50)	
Known HIV status	No	12 (34.3)	23 (65.7)	0.767
	Yes	29 (37.2)	49 (62.8)	
HIV status	Negative	18 (34.6)	34 (65.4)	0.508
	Positive	11 (42.3)	15 (57.7)	

\* No statistics (p-value) are computed because variable is a constant  
 \*\* Some had more than one sexual partner

### Sexual partner(s)

The majority of respondents 114/116 (98.3%) had at least one sexual partner and 43 (37.7%) of gonorrhoea was detected. Only 2 (1.7% %) had no sexual partner and no gonorrhoea was isolated from them. 112 (90.3 %) of respondents had sexual partners who were older than them while 7(%) had sexual partners of the same age and 4 (3.2%) had sexual partners who were younger than the respondent. Gonorrhoea detection in these sexual age groups were 46 (41.1%) ,3 (42.9%) and 2 (50.0%) respectively.

### Type and Number of new sexual partner in previous six months.

Among the respondents, 101(78.3%) had steady sexual partners, 19(14.7%) had casual sexual partners and 9 (7.0%) had anonymous sexual partners (table 2). Some respondents reported having more than one type of sexual partner 5 (4.3%). All the five respondents who had more than one casual or anonymous sexual partner in previous 6 months had gonorrhoea isolated. 6 (66.7) of the 9 participants who had anonymous sexual partners had gonorrhoea (table 2) while 37 (36.6%) of those with steady partners had gonorrhoea.

19 (16.7%) respondents had new sexual partners in previous six months. All the five respondents who had two or three new sexual partners had gonorrhoea.

46 (40.7 %) of the respondents thought their steady sexual partner had another sexual partner(s). Of these 14 (30.4%) had gonorrhoea isolated (table 2)

14 respondents had received either money, drugs, alcohol or other favours in exchange for sexual intercourse of which 6 (43%) were detected with gonorrhoea

### Gonorrhoea versus place where casual or anonymous sexual partners was obtained

7 (77.8%) of the nine respondents who had their casual or anonymous sexual partners from the street, bar or night clubs had gonorrhoea isolated. The detection of gonorrhoea was also similar to those who had sexual partner from market or shopping centre 4 (80%).

6 (54.5%) of the 11 respondents who had sex with casual or anonymous sexual partner under the influence of alcohol; dagga or other drugs had gonorrhoea isolated. The risk was high in those who had not used condom with casual or anonymous sexual partner 4/5 (80.0%). (Table 3)

**Table 3: Relationship between Condom use with type of sexual partner and gonorrhoea**

Condom use	Type of sexual partner		
	Steady partner (+ve Gonorrhoea results)	Casual partner (+ve Gonorrhoea results)	Anonymous partner (+ve Gonorrhoea results)
Always	4 (2)		1 (0)
Some times	38 (15)	1 (1)	
Never	69 (25)	2 (2)	1 (1)

### Frequency of sexual intercourse

Gonorrhoea was isolated in 32 (49.2%) of those who had PID and had sexual intercourse more than 3 times per week while this was less for those with less than this frequency per week 6 (17.1%)

### Previous history of STI

Respondents who had a previous history of sexually transmitted infection accounted 25(21.6%) (Table 2). All of them said the STI was treated. 8 (32%) of those who previously had an STI were found to have gonorrhoea

### CLINICAL FEATURES

Most respondents presented with multiple symptoms such as lower abdominal, 105 (90.5 %) backache 98(84.5%), vaginal discharge 75(64.6%) etc (Table 4). Among those who presented with lower abdominal, backache, dysuria, vulval itchness and vaginal discharge gonorrhoea detection was 39 (37.1%), 37 (37.8%), 15 (42.9%), 23 (39.7%) and 29 (38.7%) respectively (table 4).

Of the three major CDC diagnostic criteria for diagnosis of PID, 92 (79.3%) had lower abdominal tenderness, 88 (75.9%) had cervical motion tenderness and 36 (31%) had adnexial tenderness (Table 4). Some had more than one physical signs. Gonorrhoea detection was as follows: 18 (50.0 %) for those with adnexial tenderness, 21 (46.7%) with inflamed cervix, 37 (40.2%) with lower abdominal tenderness and 32 (36.8) with normally appearing cervix (Table 5)

**Table 4: Bivariate relationship between symptoms and gonorrhoea**

Symptom	Gonorrhoea results,		p-value
	positive n (%)	Negative n (%)	
Passing urine frequently	15 (42.9%)	20 (57.1%)	0.260
Lower abdominal pain	39 (37.1%)	66 (67.9%)	0.267
Extra genital lesion	3 (40%)	5 (60%)	0.349
Vulval itchiness	23 (39.7%)	35 (60.3%)	0.350
Pain on passing urine	19 (36.5%)	33 (63.5%)	0.355
Vaginal discharge	29 (38.7%)	46 (63%)	0.391
Backache	37 (37.8%)	61 (62.2%)	0.470
Genital sore	4 (28.6%)	10 (71.4%)	0.483
Genital lesion	1 (50)	1 ((50)	0.606
Rash	4 (28.6%)	10 (71.4%)	0.629

**Table 5: Bivariate relationship between Physical signs and gonorrhoea**

Physical sign	Gonorrhoea results,		p-value
	positive n (%)	Negative n (%)	
Adnexial tenderness	18 (50.0)	18 (50)	0.053
Inflamed cervix	21 (46.7)	24 (53.3)	0.066
Lower abdominal tenderness	37 (40.2)	55 (59.8)	0.127
Adnexial fullness	1 (14.3)	6 (85.7)	0.256
Febrile	3 (23.1)	10 (76.9)	0.268
Lower Abdominal tender mass	3 (50)	3 (50)	0.394
Cervical erosion	2 (50)	2 (50)	0.474
Lymph nodes	0	2 (100)	0.394
Normal cervical appearance	32 (36.8)	55 (63.2)	0.540
Rash and site	7 (43.8)	9 (56.7)	0.551
Cervical motion tenderness	33 (37.5)	55 (62.9)	0.526

**DISCUSSION**

The main objective of the study was to determine the prevalence and determinants of *neisseria gonorrhoea* and *chlamydia trachomatis* infections among gynaecological patients diagnosed clinically to have PID at University Teaching Hospital in Lusaka, Zambia. In this study only patients diagnosed with pelvic inflammatory disease were considered as per inclusion criteria. The prevalence of gonorrhoea was found to be 37% (43/116) among PID

patients. There was no chlamydia (0/116) detected among the participants in the study. For chlamydia, this is comparable with the findings by Chavuma et.al in a study done in Zambia to detect HIV, chlamydia, gonorrhoea and herpes simplex by DNA PCR on cervico-vaginal fluids (6). This study found more gonorrhoea because the subjects were patients with PID while Chavuma's subjects were from non PID participants. Other studies elsewhere have shown variable gonorrhoea and chlamydia endocervical isolation ranging from 5% to 54% (7,8). Mirza had found only 26% of gonorrhoea and only less than 5% for chlamydia in Kenya an African setting (9)

This study gave an insight on the magnitude and prevalence of gonorrhoea and chlamydia as stated in the statement of the problem. It shows that gonorrhoea is a common STI isolated from patients with PID while chlamydia is not a common endocervical isolate in Lusaka. Chlamydia may be common in western setting where isolates of up to 47% have been found (10). With this finding, the null hypothesis which stated that gonorrhoea and chlamydia were not common organisms in PID patients at UTH was found to be statistically significant and true at a cut off 5% for chlamydia but not true for gonorrhoea. Gonorrhoea was a common organism in patients with pelvic inflammatory disease in Lusaka.

Most of the patients diagnosed with PID were in the age group of 20 – 29 years and had 36.8% gonorrhoea detection within the group. This age group accounted for 58.1% of the positive isolates. Hoover also found higher prevalence in this age group (20). For women, this age group is at the peak of their sexual activities and are likely to acquire an STI like gonorrhoea. There was no statistical difference between married and single women in terms of gonorrhoea of isolation. (Table 2) Participant from high density areas had a higher isolates (60.5%) than those from low density areas (11.6%)

Unemployed participants were found to have a higher prevalence of gonorrhoea isolation compared to their counterparts even within the group. Although the number for those supported by boy friend was small, 50% within this category had gonorrhoea isolated.

59.8% of participants had net income less than K 1,000, 000. This group also accounted for 58.5% of gonorrhoea isolation. This confirms that low income groups are at higher risk of having an STI related PID.

Although there was no statistical significance between number of children and gonorrhoea isolation, the percentage of those who had gonorrhoea was higher in those with one to four children (67%) compared to those with five or more children (10%).

The study showed that low social economic status was associated with higher prevalence of PID and higher isolation of gonorrhoea.

The third objective of the study was to describe the sexual behaviour associated with chlamydia and gonorrhoea isolation. Since no chlamydia was isolated, the analysis was done only on gonorrhoea isolation from patients with PID. All the participants were of straight sexual orientation. 114 (98.3%) had sexual partners with only 2 (1.7%) without sexual partners in the previous six months. All the 43 (100%) participants who had gonorrhoea had sexual partners

The number of new sexual partners was highly associated with gonorrhoea isolation. The study showed that those who had two or more new sexual partners in previous six months had a higher risk of having gonorrhoea (Table 2). This was more pronounced in those participants who had sexual intercourse with casual or anonymous sexual partners and under the influence of alcohol. The study also showed that those who had a casual or anonymous sexual partners from the street, night clubs or bar, shopping centres or markets had a higher risk of gonorrhoea isolation (Table 2) compared to those who obtained casual or anonymous sexual partners from work place, seminars or parties.

84.2% of the isolates had sexual intercourse more than three times per week. While only 2.6% had once, Jossen et al also shown that frequency of sexual intercourse even the same sexual partners were associated with PID and gonorrhoea isolation (10).

Lack of condoms use for all categories of sexual partners was associated with higher gonorrhoea isolation (Table 3). This was pronounced if the partner was a casual or anonymous compared to a steady sexual partner.

Twenty participants had reported having an STI before and were treated. Syphilis was reported more than other types. No participant reported of having had PID before. This could be attributed to the fact that most patients were not sensitized on PID. However, there was no statistical difference as to whether one had an STI before and gonorrhoea isolation.

23 (50.1%) did not know whether sexual partners had another sexual partner(s). Although only 10 (8.8%) thought their sexual partners did not have another sexual partner, 6 (60%) among this category had gonorrhoea isolated.

HIV testing was not done during the study. However participants were asked if they knew their HIV status. 78 (69%) knew their HIV status while 35 (31%) did not know their HIV status. Among those who knew their status 26 (33.3) were HIV positive and gonorrhoea was isolated in 11 (42.3%). Similarly 52 (66.7%) were negative of which 18 (34.6%) had positive isolates.

The study showed that number of sexual partners, especially casual and anonymous sexual partners, frequency of sexual intercourse and non use of condoms with anonymous or casual partners were associated with higher gonorrhoea isolation from the endocervix.

The commonest presenting symptom was lower abdominal pain 105(90.5%) followed by backache 98(84.4% and vaginal discharge 25(21.6%. 39% of those who presented with over abdominal pain had gonorrhoea isolates. Bevan, Teisala et. al had also shown that gonorrhoea isolation in PID patient was associated with 48% abdominal pain (11). Lower abdominal tenderness, cervical motion tenderness and adnexial tenderness had 37/92 (40.2%), 33/88 (37.5%) and 18/36 (50%) for gonorrhoea isolation within each group respectively. 32/87 (36.8%) of normally appearing cervix had gonorrhoea isolated while 21/45 (46.7%) of inflamed cervix had gonorrhoea isolated

## CONCLUSION

The prevalence of *neisseria gonorrhoea* in gynaecological patients with clinical pelvic inflammatory disease at University Teaching Hospital (UTH) in Lusaka was 37%. Chlamydia was not isolated from the endocervix of PID patients in Lusaka.

Lower social economic status and young age in 20s were the socio-demographic factors associated with a higher risk of gonorrhoea isolation in patients with PID.

The sexual risk behaviours associated with Gonorrhoea isolation were; the number of casual or anonymous sexual partners, number of new sexual partners in previous six months, frequency of sexual intercourse and non use of condoms.

Lower abdominal pain and tenderness with cervical motion and adnexial tenderness were associated with higher gonorrhoea isolation. However, no specific predictor of either gonorrhoea or chlamydia was determined in this study because no chlamydia was isolated.



## STUDY LIMITATIONS

- (i) Sensitivity testing – the rapid gonorrhoea and chlamydia antigen test does not test for sensitivity.
- (ii) Other organisms that may cause PID would not be tested
- (iii) Respondent may not provide all and accurate information about their sexual behaviors as such information is not usually provided easily.

## RECOMMENDATIONS

- A further larger study be conducted in Zambia using PCR to identify prevalence of chlamydia in other parts of Zambia
- Patients with spontaneous PID should be screened and treated for gonorrhoea and in areas with no screening tests the treatment should cover for gonorrhoea
- Sexual partners for patients with spontaneous PID should be screened and treated for gonorrhoea especially those whose sexual history shows multiple sexual partners and new sexual partners.
- Educational programme about PID, gonorrhoea and other sexually transmitted infections should be intensified as part of preventive measure.

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