

## PATTERN OF ASYMPTOMATIC SEXUALLY TRANSMITTED INFECTIONS IN WOMEN UNDERGOING HYSTEOSALPINGOGRAPHY FOR INFERTILITY EVALUATION IN IBADAN NIGERIA.

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### ABSTRACT

The roles of gonorrhoea and non-gonococcal urethritis due to *Chlamydia trachomatis* in the etiology of infertility due to tubal occlusion have been established by various studies. Hysterosalpingography (HSG) is done to investigate tubal patency. This study was aimed at finding the prevalence of asymptomatic sexually transmitted infections (STIs) in women being investigated for infertility in a tertiary institution.

**Methods:** This was a cross-sectional study of asymptomatic infertile women referred for pre-HSG screening. Detailed medical history, Endocervical and high vaginal swabs were collected to establish diagnosis of STIs following clinical examination and informed consent. These specimens were evaluated microscopically for *Chlamydia trachomatis* and bacterial vaginosis. **Endocervical secretions were Gram-stained for intracellular Gram – Negative diplococci and suspected isolates were confirmed as *Neisseria gonorrhoeae* by standard laboratory methods.**

**Results:** There were 250 participants with a mean age of 34.6 years (SD = 5.4, range = 25 -49). The mean age of sexual debut of participants was 21.5 years (SD = 4.3). Fifty-six (22.5%) of the women engaged in oral sex while 53 (21.2 %) shared their spouses with other sexual partners. 17.7% had previous PID, 43.1% of them has vaginal discharge syndrome. The commonest STI was Vulvo- vaginal candidiasis (24.4%) and others were bacterial vaginosis (18.4%), *Chlamydia cervicitis* ( 17.6% ), trichomoniasis (11.2% ), and gonorrhoea ( 2.4 %).

**Conclusion:** The procedure of HSG is invasive and asymptomatic infections in the cervix can be dislodged and propagated by injection of contrast to the fallopian tubes thus causing tubal blockage. Routine Pre-HSG screening for occult STIs is encouraged to avoid iatrogenic Pelvic Inflammatory Disease.

**Keywords:** Hysterosalpingography, Sexually Transmitted Infections, Infertility.

### INTRODUCTION

Tubal disease due to infections caused by sexually transmitted organisms like *Chlamydia trachomatis* and *Neisseria gonorrhoeae* is a common cause of infertility. The prevalence of diagnosed cases of tubal factor infertility (TFI)

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can be correlated to the epidemiological situation regarding these agents that was prevailing several years ago.<sup>1</sup>

*Neisseria gonorrhoeae* and *Chlamydia trachomatis* are among the leading cause of pelvic inflammatory disease (PID), which can lead to infertility, ectopic pregnancy, and chronic pelvic pain. Chlamydial infection develops into PID in up to 40 percent of untreated women<sup>2,3</sup>, and 12 percent of women are infertile after their first experience with PID.<sup>4</sup> Salpingitis may lead to tubal infertility, the relative risk of which, after one or more episodes of salpingitis, varies between 12.8% and 75%<sup>5,6</sup>. Tubal damage after infection is estimated to be an aetiological factor in 30-40% of infertile women<sup>6</sup>. Most cases of salpingitis are caused by the ascending spread of infection from the lower genital tract due to polymicrobial nature<sup>7</sup>.

In Nigeria, available evidence in the past suggested that the majority of the cases of infertility in the country were due to previous reproductive tract infections that produce severe damage to the female pelvic organs. It has been estimated that about two-thirds of the cases of infertility in Nigeria are attributable to infections.<sup>8</sup> Infertility amongst women in Nigeria has a serious social-cultural implication that invariably leads to broken marriages and up to 25% of Nigerian women will be investigated for infertility during their reproductive life.

The laparoscopic investigation of infertility in Nigerian hospitals has demonstrated the presence of pelvic infection and bilateral tubal occlusion in 35% of infertile women in Ibadan,<sup>9</sup> 44% in Ile-Ife<sup>10</sup> and 65% of women in Jos.<sup>11</sup> Uterine instrumentation carried out routinely as

part of the infertility investigation may reactivate or introduce upper tract dissemination of Endocervical *N. gonorrhoeae* and *C. trachomatis* infection, resulting in iatrogenic PID. Hysterosalpingography (HSG) is usually carried out as an investigation of tubal patency when evaluating women with infertility. Clinical pelvic infection following Hysterosalpingography (HSG) has been reported in up to 4% of cases and in 10% of patients with tubal disease.<sup>12-14</sup>

The risk of infection from HSG appears to be confined to patients with existing tubal damage. These infections can be prevented by appropriate antibiotic treatment and may prevent infected women from being at increased risk of the adverse sequelae such as ectopic pregnancy and tubal factor infertility.<sup>15</sup>

In Nigeria, there is a dearth of current data on the prevalence of asymptomatic chlamydial and gonococcal cervicitis infections in women being evaluated for infertility. This study was aimed at finding the prevalence of asymptomatic sexually transmitted infections in women being screened for infertility and referred for HSG in Radiology Department of University College hospital in Ibadan., Nigeria and the results should help us to determine whether a policy of screening these women routinely for pre – HSG genital infections is justifiable.

## METHODS

**A cross-sectional study was conducted in a population of women with infertility** that had been referred for HSG in the Department of Radiology, University College Hospital (UCH), Ibadan, South –western, Nigeria between February 2009 and November 2010. **A total of 250** asymptomatic women with infertility that

had been referred for routine pre-HSG screening in the Department of Medical Microbiology & Parasitology, UCH, Ibadan and agreed to participate in the study were enrolled after obtaining an informed consent. Those who were menstruating or have used antibiotics in the preceding two weeks were excluded from the study.

The women were interviewed about their medical history and symptoms suggestive of abnormal vaginal discharge. Under aseptic condition, complete pelvic examination was performed during which an un-lubricated sterile speculum was inserted into the vagina. Samples of the vaginal secretions were obtained by sterile cotton-tipped applicators from the vaginal fornices and endocervix. A wet mount of each of the high vaginal swabs was prepared and examined macroscopically for the diagnosis of trichomoniasis, candidiasis and bacterial vaginosis. The endocervical swabs were inoculated on the chocolate agar and Modified Thayer Martins agar. These plates were incubated at 37°C in 5.0 % CO<sub>2</sub> humidified extinction jar. Endocervical secretions were also Gram-stained for the presence of intracellular Gram – negative diplococci and suspected isolates were confirmed as *Neisseria gonorrhoeae* by standard laboratory methods<sup>16</sup> at the Special Treatment Clinic (STC)'s Laboratory, University College Hospital, Ibadan. The second Endocervical swab was evaluated for Chlamydia trachomatis using DIAQUICK Chlamydia cassette of DIALAB kit (Lot –CHL8040004-. 2009-2010).

#### DATA ANALYSIS

Data was analyzed using SPSS ( Inc, Chicago, IL) version 17 software for windows'. Association between groups was performed

using the chi-square test for categorical variables and student-t test for continuous variables and statistical tests were carried out at 5 % significance level.

#### RESULTS

A total of 250 women who consented to pre-HSG screening for asymptomatic STIs were recruited for the study. The socio-demographic characteristics and reproductive health history of the women are shown in Tables 1.

As shown , the mean age of the women was 34.27 years (SD = 4.0, range = 25 -49). The mean age of sexual debut of participants was 19.49 years (SD = 2.24). More than half of the women had secondary education while 40.8% of them had tertiary education. Seven-four (29.6%) of these women were senior professionals, Directors, senior tutors and top business Executives.

Fifty-six (22.5%) of the women usually practiced oral sex while 2.4% occasionally engaged in anal sex. Majority of them were living with their spouses while 53(21.2 %) of them were aware that they shared their spouses with other sexual partners. 17.6 % had previous PID while 43.1 % had vaginal discharge. 73.2 % of these women were referred for HSG because of secondary infertility while sixty-seven of them had primary infertility. Table 1.

The commonest STI diagnosed was Vulvo-vaginal candidiasis (24.4%). Other STIs were bacterial vaginosis (18.4%), Chlamydia cervicitis (17.6%), trichomoniasis (11.2%), and gonorrhea (2.4 %). Table 2.

Association of risk factors and development of any STIs showed that vaginal discharge syndromes was statistically significant (P<0.001). The odd ratio of the presence of vaginal discharge syndrome for the acquisition

of any STI in these women with infertility was 5.7 (CI<sub>95%</sub>= 2.1-15.4). Other risk factors like previous HSG, Previous PID, oral sexual intercourse and spouse's other sexual partners were not statistically significant. Table 3.

Seven (15.9%) of the women with *Chlamydia trachomatis* infection had primary infertility while 37(84.1%) had secondary infertility. There is increased risk of women with secondary infertility to have been infected with genital Chlamydia trachomatis infection (P< 0.05; OR=1.1 (CI<sub>95%</sub>=1.02-1.4). Other results as presented in Table 4 showed that women with secondary infertility had a higher rate of *Neisseria gonorrhoeae* (83.3%), *Trichomonas vaginalis* (71.4%), *Candida albicans* (68.9%) and bacterial vaginosis (69.6%) infections. (P> 0.05). However, these infections were not significantly associated with secondary infertility.

**Table 1:** Demographic Characteristics & Reproductive Health History of the women with infertility

CHARACTERISTICS	FREQUENCY N=250	PERCENTAGE %
(a) Age		
20-24	27	10.8
25-29	105	42.0
30-34	93	28.2
35-39	21	8.4
40-49	4	1.6
(b) Level of Education		
Primary	17	6.8
Secondary	131	52.4
Tertiary	102	40.8
(c) Occupation *		
Class I	2	0.8
Class II	72	28.8
Class III	107	42.8
Class IV	20	8.0
Class V	31	12.4
Class VI	18	7.2
(d) Age of Sexual debut (Yrs)		
15-19	3	33.2
20-24	66	60.0
25-30	109	5.2
(e) Mode of sexual intercourse		
Anal + Vaginal	6	2.4
Oral + Vaginal	56	22.4
Vaginal only	250	100
(f) Types of Infertility		
Primary infertility	67	26.8
Secondary infertility	183	73.2

**Table 2:** Prevalence of Stis among Women with Infertility

Types of STIs	Frequency ( N – 250 )	Percentage ( % )
<b>Bacterial Vaginosis</b>	46	18.4
<b>Trichomoniasis</b>	32	11.2
<b>Chlamydial Cervicitis</b>	44	17.6
<b>Gonorrhea</b>	6	2.4
<b>Vulvo-vaginal candidiasis</b>	61	24.4

\*Some of the patients had more than one STIs.

**DISCUSSION**

The prevalence of infertility worldwide varies between 8-12% and this has been reported to be higher in resource poor countries with the description of an infertility belt in Sub-Saharan Africa projecting figures as high as 30%.<sup>17</sup> In Nigeria, Infertility was found to be the leading cause of for gynecological consultation with a prevalence rate of about one-third of the couples.<sup>17</sup> Sexually active adolescents and young women have the highest incidence of Chlamydia trachomatis, Neisseria gonorrhoeae, and pelvic inflammatory disease.

This study was aimed at finding the prevalence of asymptomatic *Neisseria gonorrhoeae*, *Chlamydia trachomatis* and other sexually transmissible agents in women being investigated for infertility and referred for HSG in our hospital. In this study Vulvo –vaginal candidiasis was the commonest sexually transmissible infection (24.4%) while the prevalence for Chlamydia infection and Gonorrhea were 17.6 % and 2.4% respectively. This is in conformity with other studies in the United States and most parts of the World where Chlamydia *trachomatis* is the most common sexually transmitted bacterial pathogen and a major cause of pelvic inflammatory disease.<sup>18</sup> However, in contrast to what was observed in different studies in high risk population about two decades ago in Nigeria which showed a higher rate of *Neisseria gonorrhoeae*, our study had shown a downward trend in the prevalence of gonorrhea in Nigeria. This may not be unconnected with increased use of common antibiotics in the country.<sup>19-21</sup> Women with infertility in this study reported higher levels of education. About 40.8% had a tertiary education and 29.6% of them had top class Executive job. These women also reported an older age at

Table 3: Association of the risk factors and STIs in women with infertility

S/N	Characteristics	Diagnosis of any STI		P-value	95% CI
		Yes (%)	No (%)		
1	Previous PID	19 (38.0%)	31(62.0%)	0.414	1.13 (0.6-2.14)
2	Previous HSG	32 (33.7%)	63(66.3%)	0.361	0.87 (0.51-1.50)
3	Primary Infertility	27 (40.3%)	40(59.7%)	0.214	1.30 (0.74-2.30)
4	Secondary Infertility	62 (33.9%)	121(66.1%)	0.373	1.19 (0.83-1.69)
5	Vaginal discharge	22 (62.9%)	10 (22.7%)	0.010	5.70 (2.1-15.40)
6	Oral Intercourse	10 (55.6%)	8(44.4%)	0.210	1.80(0.62-5.20)
7	Anal Intercourse	2 (33.3%)	4(66.6%)	0.907	0.90(0.16-5.03)

Table 5: Association of sexually transmitted infections with types of infertility

S/N	Characteristics	Types of Infertility		P value	95% CI
		Primary	Secondary		
1	Gonorrhea	1 (16.7%)	5(83.3%)	0.490	054 (0.06-4.7)
2	Chlamydia infection	7 (15.9%)	37(84.1%)	0.050	1.1(1.02-1.4)
3	Trichomoniasis	8(28.6%)	20(71.4%)	0.419	1.14(.46-2.64)
4	Vulvo -Vaginal Candidiasis	19(31.1%)	42(68.9%)	0.235	1.33(0.71-2.5)
5	Bacterial Vaginosis	14(30.4%)	32(69.6%)	0.328	1.25(.618-2.514)

sexual debut. This is also consistent with previous studies in Nigeria and India.<sup>18,22.</sup>

In our study, women with abnormal vaginal discharge were at increased odds of having any STI and hence infertility (adjusted OR: 5.7; 95% CI: 2.14, 15.40) compared to women without abnormal discharge.. While a biological explanation of this observation seems likely, however, one possible explanation for this is that women who have no history of abnormal vaginal discharge may not likely seek reproductive health services

Our study also showed that women with secondary infertility have higher rates of infection with *Chlamydia trachomatis*, *Trichomonas vaginalis*, *Neisseria gonorrhoeae*, *Candida albicans* and bacterial vaginosis than women with primary infertility. This could be due to the effect of age since women with secondary infertility were on the average older than women with primary infertility<sup>23</sup>. Available reports also indicated that most cases of secondary infertility in Africa are attributable to previous infection causing bilateral tubal occlusion and pelvic adhesions and up to 50%-80% of women with secondary infertility may have had prior infection.<sup>23,24</sup> It is also possible that couples without children may be actively trying to conceive by increasing the number of unprotected sexual acts, which may account for this association. It has also been reported that women with secondary infertility would have higher cervical carriage of *Neisseria gonorrhoeae* and other pathogenic organisms than women with primary infertility since some of the organisms could be carried for few years in the cervical crypts.<sup>23</sup> In addition, it is possible that women with secondary infertility would be more susceptible to

reacquisition with the same or another pathogenic organism since they are likely to continue with the risky sexual behavior.<sup>23</sup>

In this environment the method of choice for all patients being investigated for infertility to rule out tubal obstruction is Hysterosalpingography. Pelvic infection is the most common, but preventable, cause of infertility in our environment. Prompt treatment of acute infections have good prognosis, favoring advocacy for screening for occult pelvic infection which though curable but can lead to catastrophic outcome if not detected and treated before HSG is performed in these patients. The procedure of HSG is invasive and asymptomatic infections in the cervix can be dislodged and propagated by injection of contrast to the fallopian tubes thus causing tubal blockage.

This study had shown that occult infections do occur in the genital tract of women undergoing HSG for infertility, and that some the attributable organisms isolated could cause lasting damages to the fallopian tubes which can further compound their infertility.

It is recommended that in this environment where there is a high prevalence of infertility which carries heavy financial burden, social and cultural stigma, all patients for HSG procedure should be routinely screened for occult asymptomatic cervical infections like *Chlamydia* and *Gonorrhea*.

Routine Pre-HSG screening for *Chlamydial* and *Gonococcal* infections should be carried out to avoid iatrogenic Pelvic Inflammatory Disease which could further jeopardize the course of infertility.

Our findings highlighted the importance of infertility as a public health issue. These data can be used to guide future reproductive health

programmes in the country.

### Limitations

The main limitation of our study was the cross-sectional analysis of our baseline data; thus, it was not possible to determine temporality or causality of the associations between types of infertility and the selected covariates.

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