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Chlamydia Infection among Women in Port Harcourt, Nigeria and Association with Socio-Demographic Factors

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Chlamydia is a sexually transmitted infection (STI) caused by the bacterium *Chlamydia trachomatis*. The bacterium invades "wet" (mucous membranes) bodily parts such as the epididymis and genital tracts. It can also infect the throat, anus and rectum. In addition, it can infect the eyes. The aim of this study was to determine the prevalence of chlamydia infection among women and its association with socio-demographic factors in Rivers State University Teaching Hospital (RSUTH) , Nigeria. A cross-sectional study was carried out using the samples of randomly selected 450 female participants of reproductive age to assay for chlamydial infection using ELISA method. The participants were classified into four groups; HIV patients (HP), pregnant women (PTW), out-patient (OP) and healthy volunteer (HV). Socio-demographic data (age, education, occupation and marital

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status) were obtained from well-structured questionnaires that were distributed to the participants who volunteered to partake in the study. The questionnaires entailed questions on selected sociodemographic characteristics. The result showed there no significant association (p>0.05) between chlamydiosis and age. Similarly, there was no significant relationship between education and chlamydiosis. Again, there was no connection between occupation and chlamydiosis. Finally, there was no link between marital status and chlamydiosis. This study has shown that there is no association between selected socio-demographic factors and chlamydial infection among women attending RSUTH.

Keywords: Chlamydia trachomatis; sexually transmitted infection; pregnancy; bacterium.

1. INTRODUCTION

Chlamydia is a sexually transmitted infection (STI) caused by the bacterium *Chlamydia trachomatis* [1]. The bacterium invades "wet" (mucous membranes) bodily parts such as the epididymis and genital tracts, which include the cervix, uterus, fallopian tubes, and urethra (the tube that allows urine and semen to exit the body) (a tube in the testicle that stores and carries sperm) [2]. It can also infect the throat (pharynx), anus and rectum. In addition, it can infect the eyes through contact with infected discharge. The scaring that results from these organs can lead to infertility, tubal (ectopic) pregnancy, chronic pelvic pain, abscesses (sores containing pus) and other serious problems [3]. This bacterium affects people of all ages but is most common in young women. The majority of reported cases of chlamydia occur in people under the age of 30. In United Kingdom, as many as 10% of women of childbearing age are infected. In most parts of Africa including Nigeria*, Chlamydia trachomatis* is not routinely screened for, and hence relative information about the frequencies of the organism is sparse [4]. The prevalence reported varies from as high as 56.10% in Jos to a much lower prevalence of 9% in Maiduguri [5]. The frequency of *Chlamydia trachomatis* infections in men may equal or exceed the frequency of gonorrhea. Nongonoccocal urethritis, epididymitis, and proctitis in men can result from infection with *Chlamydia trachomatis*. Super infection of gonorrhea patients with *Chlamydia trachomatis* also occurs. Acute salpingitis and cervicitis in young women can be caused by a *Chlamydia trachomatis* infection ascending from the cervix. A high rate genital tract co infection by *Chlamydia trachomatis* in women with gonorrhea has been reported and the bacteria was isolated from the fallopian tubes of infected women.

Transmission occurs when secretions from infected mucous membranes or semen of a person with a urethral infection comes into contact with the mucous membranes of another person. Chlamydia can also be transmitted when a person who has the infection in their mouth or throat performs oral sex on another person or when a person performs oral sex on a person who has a genital infection. Oral-anal contact (rimming) can transmit Chlamydia as well [2].

Sharing of sex toys can aide the transmission of Chlamydia according to Public Health England, [6]. It is theoretically possible to transmit Chlamydia through a hand job or fingering if infected fluids are present [2]. Chlamydia can be passed during childbirth if the newborn has come into contact with infected vaginal discharge or fluid. Many people with Chlamydia infection have no symptoms. If symptoms do occur, they usually appear two to three weeks after infection (the incubation period) but it can take as long as six weeks [2]. When the cervix is infected, symptoms may include an unusual discharge (a fluid that flows out of the opening of the vagina), unusual vaginal odour, pain during vaginal intercourse, and bleeding between menstrual periods. If the infection spreads to the uterus and fallopian tubes, symptoms such as lower abdominal pain, fever and nausea may occur. Infection of the urethra: Symptoms may include a yellow or white watery or milky discharge, a painful burning sensation during urination, urethral itching, and testicular pain and swelling.

Trachoma, inclusion conjunctivitis, and lymphogranuloma venereum can all be caused on by Chlamydia trachomatis transmission from one person to another. It is possible to spread these bacteria from the urogenital tract to the eyes and vice versa by touching contaminated hands, towels, or other objects. In newborns, the birth canal can also be a source of transmission. When there are poor hygiene standards in a population, many diseases might become epidemic. According to the research carried out

by Mariani et el. [7] on the relationship between knowledge and personal hygiene and the occurrence of occurrence of sexually transmitted diseases, the proportion of teenagers with STDs who practiced poor personal hygiene was found to be greater (case group) than those who practiced personal hygiene. Crichton et al. [8] showed in their research that there was a relationship between *C. trachomatis* infection and lower occupational class or unemployment. According to the studies conducted by Goulet et al. [9] and Gravningen et al. [10] on the prevalence of *C. trachomatis* with respect to academic attainment and/or opportunities, it was suggested that there is a link between decreased educational chances or achievement and an elevated risk of contracting chlamydia. The research carried out by Patrick et al. [11], and Lee et al. [12] reported that married adults having fewer sexual partners and are less likely to participate in dangerous sexual activities, compared to their single counterparts.

The focus of this study is to determine the association between sero-prevalence of Chlamydiosis and socio-demographic factors such as age, education, occupation, and marital status among women of reproductive age in Port Harcourt.

2. MATERIALS AND METHODOLOGY

2.1 Study Design

A cross-sectional study was carried out using the sample of randomly selected participants. A total of 450 women of age between 15- 55 who met the inclusion criteria were enrolled in the study. The women were grouped into four; HIV patients (HP), pregnant women (PTW), out-patient (OP) and health volunteer (HV). Data were generated from well-structured questionnaires that were distributed to the participants who volunteered to partake in the study. The questionnaires entailed questions on socio-demographic characteristics such as age, educational status, employment and marital status.

2.2 Study Area

The study was carried out in Port-Harcourt at Rivers State University Teaching hospital (RSUTH), formerly known as Braithwaite Memorial Hospital, located at 5-8 Harley street, Old GRA 500101. The hospital is located in Rivers State, Nigeria. RUSTH is a tertiary hospital and serves as a reference for many other healthcare facilities in the state.

2.3 Eligibility Criteria

Inclusion Criteria: All consenting women who were registered with RSUTH were including. Only women within the age of 15 and 55 years were allowed to participate.

Exclusion Criteria: the study excluded women of age below 15 years, those above 55 years and those who did not meet the inclusion criteria. Women not registered with RSUTH were also not included.

2.4 Sample Collection and Preparation

A 2 ml volume of blood was collected from each subject by venipuncture in a plain tube under aseptic condition, samples were transported in ambient temperature to the working laboratory. Serum was separated from the clotted blood and stored at -20^{o}c till ready for laboratory determination of chlamydia IgG antibodies using ELISA method [13,14].

2.5 Quality Assurance

Positive and negative controls were added to ensure accuracy.

2.6 Statistical Analysis

Statistical Package for Social Sciences (SPSS) was used to analyze the data generated in this study. Prevalence of markers were expressed in percentages. The association between socio-demographic factors and seroprevalence of chlamydiosis was tested using Pearson chi-square. Statistical significance was accepted at $p < 0.05$(95% confidence limits).

3. RESULTS

Table 1 shows the seroprevalence of chlamydia infection based on socio demographic factors. The socio dermographic factors include age, occupation, marital status and educational status.

Table 2 shows the association socio demographics and seroprevalence of chlamydiosis. The result showed that there is no association ($p>0.05$) between socio dermgraphic and seroprevalence of chlamydiosis.

Table 1. The association between age and seroprevalence of chlamydiosis

Variables number examined		Number positive (%)			
		HP	PTW	OP	HV
Age group					
15-25	117	0(0.0)	0(0.0)	0(0.0)	8(9.3)
26-35	145	4(8.0)	3(7.5)	4(9.8)	2(14.3)
36-45	155	11(16.0)	2(4.3)	6(14.6)	0(0.0)
46-55	33	4(16.0)	0(0.0)	1(12.5)	0(0.0)
Occupation					
Unemployed	77	3(17.6)	1(4.8)	1(3.6)	0(0.0)
Employed	94	2(3.0)	2(5.0)	2(33.3)	0(0.0)
Self-employed	154	10(18.2)	2(5.3)	8(14.0)	0(0.0)
Students	124	4(13.8)	0(0.0)	0(0.0)	10(11.6)
Education					
Non-formal	3	0(0.0)	0(0.0)	0(0.0)	0(0.0)
Primary	18	0(0.0)	1(10.0)	1(1.0)	0(0.0)
Secondary	119	8(5.3)	1(1.0)	6(6.0)	0(0.0)
Tertiary	310	11(2.4)	3(3.0)	4(4.0)	10(10.0)
Mar. Status					
Single	160	5(13.2)	0(0.0)	1(4.2)	10(10.2)
Married	288	14(12.5)	5(5.1)	10(13.3)	0(0.0)
Divorced	1	0(0.0)	0(0.0)	0(0.0)	0(0.0)
Overall	450	19(12.7)	5(5.0)	11(11.0)	10(10.0)

NE = Number Examined; HP = HIV Patients; PTW = Pregnant Women; OP = Out Patients;HV = Healthy Volunteers MAR.Status = Marital Status P-value= (p>0.05)

Table 2. Association between socio-demographics and seroprevalence of chlamydiosis

Variables	X^2	p-value	Remark
Age	3.324	0.34	N/S
Occupation	5.94	0.11	N/S
Education	1.578	0.90	N/S
Marital Status	0.224	0.97	N/S

MAR.ST = Marital Status; NE = Number Examined; NP = Number Positive HP = HIV Patients; PTW = Pregnant Women; OP = Out Patients; HV = Healthy Volunteers; X^2 = Chi square; N/S =Not significant

4. DISCUSSION

Chlamydia trachomatis infection is generally considered as a silent infection and hence, known as an asymptomatic infection. It is usually a latent infection occurring unnoticed and remain endemic in the population for a long time [15]. This study consisted of 450 women attending Rivers State University Teaching Hospital in Port-Harcourt Rivers State.

This study reports a prevalence of 10% (45/450) using the serological approach. This result falls between rates reported by other study in similar subject (7.3%, 9.5%) by Garba et al. [3]. The data obtained from pregnant women in this study showed a prevalence rate lower than 46.5% recorded by Idemudia et al. [16] in pregnant women in four LGAs in Delta State [15].

On the basis of age, several studies suggest that sexually active women of age less than 25 are at risk for Chlamydia [17]. Data from this study showed a higher prevalence among sexually active women of age 36-45. This is in accordance with the research carried out in Niger Delta by Azuonwu et al. [18]. However, age was not associated with sero-prevalence of chlamydiosis which implies that age may not considered a factor that is related to chlamydiosis.

A comparative analysis of the association between occupation and seroprevalence of chlamydiosis was also carried out and the result proved there was no relationship. This outcome is contrary to that presented in the study of Crichton et al. [8] where it was reported that lower occupational class or unemployment is connected to *Chlamydia* infection. It can be

deduced from this research by Crichton et al. [8] that people of higher occupational class are not prone to *Chlamydia* infection.

With respect to the association between education and seroprevalence of chlamydiosis, there was no association between the prevalence of *Chlamydia* infection and education. This implies that level of education does not have any effect the spread of *Chlamydia*. This is in agreement with the work of Goulet et al. [9] and Gravningen et al. [10] who reported that lower academic class or opportunities encouraged the prevalence of *Chlamydia*.

The association between marital status and seroprevalence of chlamydiosis revealed there was no connection. This is in agreement with the work of Patrick et al. [11] and Lee et al. [12] where the same assumption was made.

5. CONCLUSION

This study has demonstrated that age, education, occupation and marital status do not have any impact or effect on the rate of chlamydial infection among women attending RSUTH.

ETHICAL APPROVAL AND CONSENT

Ethical approval was obtained from Rivers State teaching hospital ethics committee with ethical approval number (RSUTH/REC/2022147). Written consent to participate in the study was obtained from participants.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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