

Azithromycin Efficacy in the Treatment of Chlamydia Trachomatis and Its Associated Factors among Male Subjects in Nnewi, Nigeria

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Abstract: *Chlamydia trachomatis* is a deadly silent killer and most prevalent bacterial sexually transmitted disease. The efficacy of Azithromycin in the treatment of *Chlamydia trachomatis* was assessed among male fertility subjects as well as other associated factors associated in Nnewi. Five hundred (500) males were randomly enrolled in the study. Four hundred (400) male subjects had infertility as their main complaint while the remaining 100 had no complaint and so were recruited as control group. Blood sample collected from the subjects was analyzed using immunocomb *Chlamydia trachomatis* IgG kit (ORGENICS, Israel). Single dose of Azithromycin (one gram) was administered for all subjects positive for *Chlamydia trachomatis* antibody and re-examined after two weeks to confirm the efficacy of Azithromycin. Majority of the subjects (including control group) had a sharp increase titer level (53.8%) from 1:32 to 1:128 and reached its peak at 1:256 (38.5%) with another sharp decline on titer level greater than 1:256 (7.7%). Fifty-two (80.0%) out of 65 subjects positive for *Chlamydia trachomatis* antibody were negative after the post treatment with Azithromycin. Subjects with secondary infertility had more *Chlamydia* infection (11.2%) than primary infertility (17.3%). However, the difference was not significant ($p = 0.129$). Males who are staying apart accounted for more *Chlamydia* infection (19.5%) than subjects who are residing together (14.6%), although there was no significant difference ($p = 0.709$). Finally, majority of subjects had previously treated *Chlamydia* infection more with herbal mixtures (38.8%) when compared to other methods of treatment. Therefore, this study has confirmed that azithromycin has high efficacy in the treatment of *Chlamydia trachomatis* antibodies among couples attending fertility clinics in Nnewi.

Keywords: Infertility, Efficacy, Azithromycin, Serum, *Chlamydia*.

1. INTRODUCTION

The number of couples seeking consultation for infertility problems has steadily increased over the past decade, affecting 10%-15% of the sexually active population (Singh and Jaiswal, 2011). Most common bacterial Sexually Transmitted Infection with 105.7 million new cases annually and 100.4 million adults are infected at any point in time, *Chlamydia trachomatis* deserves particular attention (WHO, 2012). The most recent guideline from the Centers for Disease Control and Prevention published in December of 2010 stated that single-dose azithromycin or doxycycline twice daily for 1 week remains the recommended treatment for uncomplicated infections (Workowski *et al.*, 2010). The effect of *Chlamydia* on male reproductive function appears to be relatively minimal and may be related primarily to sperm DNA fragmentation or female partner transmission (Samplaski and Dolme, 2014). Among males with issue of infertility, there is considerable variability in the rate of *Chlamydia trachomatis* infection. Infertility has become a public health problem in many

countries of the world including Nigeria. Male infertility is an important cause of infertility with a strong impact on the physiology and psychology of couples (Kumar and Singh, 2015). Azithromycin is particularly effective for chronic persistent genital *Chlamydia* because of its excellent tissue penetration, which is mandatory when treating obligate intracellular bacterial pathogens (Meenakshi *et al.*, 2013). Detection of anti-Chlamydial IgA and IgG antibodies in male serum has been associated with poor semen characteristics (Jorki-Korpela *et al.*, 2009) and reduced pregnancy rates regardless of female partner antibody status. Okwelogu, *et al.*, (2016) suggested that *Chlamydia trachomatis* may play contributory role in infertility and efforts should be made to screen male patients.

2. MATERIALS AND METHODS

Study Area: Nnewi is located between latitudes (5° 59' 41.64"N and 6° 03' 28.44"N) and longitudes (6° 03' 28.44"E and 6° 52' 41.64"E). It is made up of four villages namely Otolu, Uruagu, Umudim and Nnewichi. The indigenes are predominantly Ibo and their major occupations are farming and trading. There are also public servants, teachers and students. After successful advocacy visits to the communities, informed consent was obtained from subjects to be enlisted in the study. They were interviewed in either English or native Igbo vernacular depending on peculiar circumstances of the subjects. During oral interviews, questions that elicited responses on socio-demographic characteristics were carefully explained to participants. Five hundred (500) males were successfully enrolled in the study. Four hundred (400) male subjects had infertility as their main complaint while the remaining 100 had no complaint and so were recruited as control group. Pharmacists and doctors assisted the researcher during the study for proper subject's clinical evaluation and treatment of infected subjects. Single dose of Azithromycin (one gram) was used for all subjects positive for *Chlamydia trachomatis* antibody and re-examined after two weeks to confirm the efficacy of Azithromycin. Subjects were properly educated on drug regimen and were asked to report any unusual reaction immediately to the doctor. Ethical approval was sought from the community head. For each participant, 2mls of blood specimen was collected and placed inside well labelled plain test tube. The whole blood was allowed to clot in order to aspirate the serum for the detection of Immunocomb *Chlamydia trachomatis* antibody. Sample collected was analyzed using immunocomb *Chlamydia trachomatis* IgG kit (Inverness medical innovations, ORGENICS, Israel (Osazuwa, *et al.*, 2013), which is an indirect solid phases Enzyme Immuno Absorbent (E.I.A). Majority of the subjects (including control group) had a sharp increase antibody titer level (53.8%) from 1:32 to 1:128 and reached its peak at 1:256 (38.5%) with another sharp decline on titer level greater than 1:256 (7.7%) (Table 1). Fifty-two (80.0%) out of 65 participants were negative for *Chlamydia trachomatis* antibody after the post treatment with single dose of Azithromycin. Three (3) participants from control group treated with Azithromycin had 100% cure rate (Table 2). Subject with secondary infertility had more *Chlamydia* antibody titer (11.2%) than primary infertility (17.2%) (Table 3). However, the difference was not significant (p = 0.129). Table 4 indicates the distribution of *Chlamydia trachomatis* among patients in relation to living situation. Interestingly, males who are staying apart due to their occupation accounted for more *Chlamydia* antibody (19.5%) than subjects who are residing together (14.6%), although there was no significant difference (p = 0.709) between the infection and living situation (Table 4). Finally, it was observed that majority of subjects had previously treated *Chlamydia* infection with herbal mixtures (38.8%) compared to other methods of treating *Chlamydia trachomatis* infections such as recommended antibiotics.

TABLE 1: SUBJECTS POSITIVE FOR CHLAMYDIA TRACHOMATIS ANTIBODY BEFORE TREATMENT IN NNEWI

TITER LEVEL	NO. POSITIVE BEFORE TREATMENT		TOTAL
	TEST GROUP (%)	CONTROL GROUP (%)	
1:32	7 (11.3)	0 (0.0)	7.0
1:64	12 (19.4)	0 (0.0)	12.0
1:128	15 (24.1)	1 (0.0)	16.0
1:256	23 (37.1)	2 (0.0)	25.0
>1:256	5 (8.1)	0 (0.0)	5.0
TOTAL	62 (15.5)	3 (3.0)	65 (13.0)

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TABLE 2: CURE RATE OF AZITHROMYCIN AMONG SUBJECTS IN NNEWL.

VARIABLES	NO. EXAMINED	NO. INFECTED (%)
Primary Infertility	116	13 (11.2)
Secondary Infertility	284	49 (17.2)
TOTAL	400	62 (15.5)

TABLE 3: PREVALENCE OF CHLAMYDIA TRACHOMATIS IN RELATION TO TYPE OF INFERTILITY AMONG SUBJECTS IN NNEWL.

VARIABLES	NO. INFECTED BEFORE TREATMENT (%)	NO. INFECTED AFTER TREATMENT (%)	CURE RATE (%)
TEST GROUP	62 (15.5)	13 (21.0)	49 (79.2)
CONTROL GROUP	3 (3.0)	0 (0.0)	3 (100.0)
TOTAL	65 (13.0)	13 (20.0)	52 (80.0)

TABLE 4: DISTRIBUTION OF CHLAMYDIA TRACHOMATIS IN RELATION TO AMONG SUBJECTS IN NNEWL.

VARIABLES	NO. EXAMINED	NO. INFECTED (%)
Couples staying apart	77	13 (19.5)
Couples staying together	323	49 (14.6)
TOTAL	400	62 (15.5)

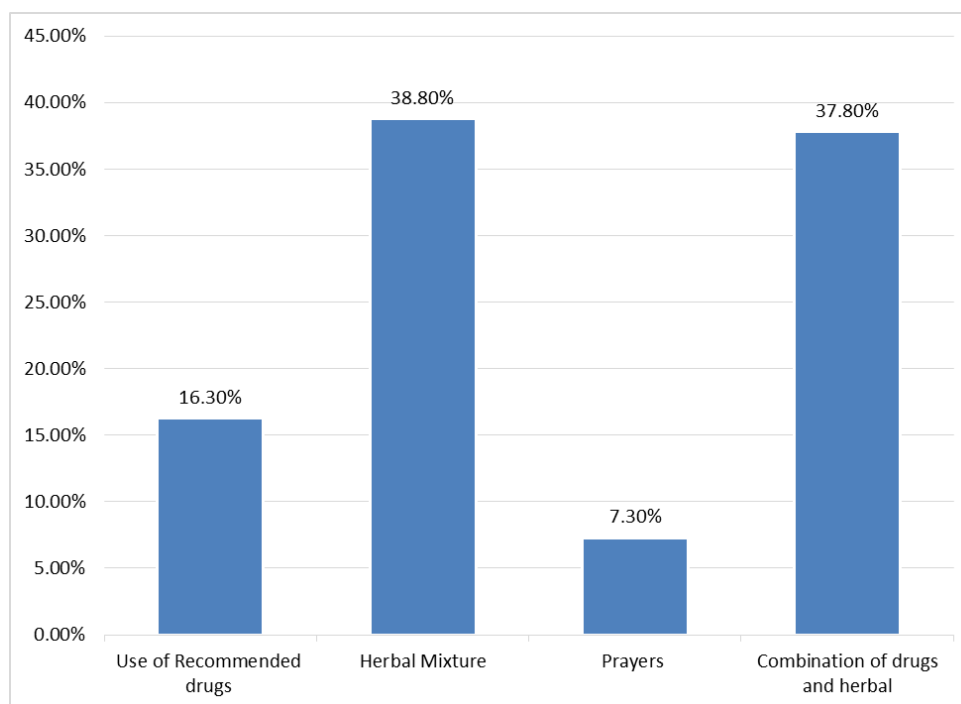


Figure 1: Method of treatment of infertility among the test group prior to attending fertility clinics in Nnewi.

3. DISCUSSION

Majority of the subjects examined (including control group) had a sharp increase and reached its peak at 1:256 (38.5%). This is in line with Osazuwa *et al* (2013) who reported this same trend in titer levels among couples with infertility in Delta State, Nigeria. Most males had heavy *Chlamydia* antibody titer in this study and lack of awareness could be the reason why the infection was neglected in this area. Fifty-two (80.0%) out of 65 participants were negative for *Chlamydia trachomatis* antibody after the post treatment with single dose of Azithromycin while three (3) participants from control group treated with Azithromycin had 100% cure rate. Efficacy of azithromycin cited in studies with symptomatic men ranges from 77.4% to 96.1% (Manhart *et al.*, 2013, Beyda *et al.*, 2014). The statistical difference between prevalence of *Chlamydia trachomatis* infection when no treatment has been administered was significant (Cochran Q test = 17.0, df = 1, $p = 0.000$). This signified that Azithromycin used for the treatment of infected subjects in this study was well tolerated. High cure rate recorded among the participants could be as a result of their level of compliance with the chemotherapeutic regimen. Also, all the subjects were properly sensitized on the importance of complete drug regimen and therefore they adhered strictly to it. It was observed that majority of subjects with secondary infertility (17.2%) had *Chlamydia* infection when compared with subjects with primary infertility (11.2%). However, the differences between prevalence of *Chlamydia* infection in relation to type of infertility was not significant ($X^2 = 2.30$, df = 1, $p = 0.25$). This is in line with Osazuwa *et al.*, (2013) who reported 39.0% in a study carried out in Delta State. This probably, could be as a result of likelihood of long exposure to risky and sexual behaviours, which could encourage *Chlamydia* infection transmission. Other factors that might have played some significant roles include location of the study area and distance between spouses of the subjects. Subjects who are living together with their spouse had more *Chlamydia* antibody (19.5%) than those living together; perhaps due to high level of infidelity. However, there was no significant difference between the infection and living situation among couples ($X^2 = 0.139$, df = 1, $p = 0.709$). Human migration for various reasons is on the increase and the trend is causing new and previously unrecognized reproductive challenges (Gupta, 2014). Majority of the subjects had previously treated *Chlamydia* antibody with herbal mixtures (38.8%) (Figure 1). The reasons why subjects in this area relied on different herbal mixtures or even combine it with recommended antibiotics could be as a result of possible social stigma associated with infertility as most people refrain discussing issue or related to sexually transmitted infections publicly. Accusation of marital infidelity, poverty, lack of awareness and poor access to modern health facilities may have attributed their behaviour.

4. CONCLUSION

This study however, confirmed that single dose of azithromycin has high efficacy in the treatment of *Chlamydia trachomatis* antibodies and has also increased the awareness of the infection among couples attending fertility clinics in Nnewi.

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