*IOSR Journal of Pharmacy and Biological Sciences (IOSR-JPBS)*
*e-ISSN:2278-3008, p-ISSN:2319-7676. Volume 11, Issue 2 Ver. III (Mar.- Apr.2016), PP 71-74*
*www.iosrjournals.org*

# Follicle Stimulating Hormone, Luteinizing Hormone, Prolactin, Progesterone and Testosterone Level in *Chlamydia Trachomatis* Infected Subject

Ifeanyichukwu Martin Ositadinma[2], Dele-Ochie Patricia Ejenawome [1], Ebunu Ezekiel [3], Inege Lucky Chukwudi [3], Ngwu Amauche Martina [4]

[1]*Department of Medical Laboratory Science, Faculty of Health Sciences and Technology, Nnamdi Azikiwe University, Nnewi Campus, Anambra State, Nigeria*
[2]*Department of Immunology, College of Health Sciences, Nnamdi Azikiwe University, Nnewi Campus, Anambra State, Nigeria.*
[3]*General Hospital Ekpan Delta State*
[4]*Department of Hematology and Immunology, Enugu State University of Science and Technology, Enugu, Enugu State, Nigeria.*

***Abstract***
***Background****: Chlamydia trachomatis (Ct) is an obligate intracellular gram negative bacterial pathogen. Ct infection is a major and increasing public health problem worldwide. Currently, is the main cause of sexually – transmitted infection.*
***Aim****: The aim of this study is to compare the serum level of follicle stimulating hormone (FSH), luteinizing hormone (LH), prolactin (PL), progesterone and testosterone in Chlamydia trachomatis positive patients, ct negative patients with infertility and control subjects without infertility and Chlamydia infection*
***Materials and methods****: Two hundred patients that are clinically confirmed with primary and secondary infertility and 50 control subjects with no history of infertility were included. Chlamydia assay was done by Enzyme Immunosorbent Assay (EIA). FSH, LH, PL, progesterone and testosterone were measured by Enzyme Linked Immunosorbent Assay (ELISA).*
***Results****: The mean ± S.D. of FSH (IU/ml), LH (IU/ml) in male infertility with positive Chlamydia trachomatis (Ct) infection and negative Chlamydia trachomatis infection respectively were compared with fertile male control subjects. The result showed statistically higher significance difference in the male infertility compare with the normal (F=7.15; P =0.01, F=3.24; P = 0.04). The mean ± S.D. of FSH (IU/ml), progesterone (IU/ml) in female infertility due to positive Chlamydia trachomatis (Ct) infection, and the negative Chlamydia trachomatis infection respectively were compared with and fertile female control. The FSH result showed statistically higher significant difference in infertility compared with fertile counterpart (F=3.8; P = 0.025), while progesterone showed lower significant difference in infertility compared with normal control (F=4.48; P = 0.01). The prolactin and testosterone compared among the three groups in both male and female showed no significant difference.*
***Conclusion****: In this study, follicle stimulating hormone was elevated in male infertility while progesterone level was significantly low in female infertility.*
***Keywords****: progesterone, FSH, LH, infertility and Chlamydia trachomatis*

## I. Introduction

Infertility is the inability to conceive, carry pregnancy to full term or father a child after unprotected intercourse for a period of one year. The time needed to pass (during which the couple tries to conceive) for that couple to be diagnosed with infertility differs between different jurisdictions [1]. This condition affects approximately 10-15% of reproductive-aged couples. Two types of infertility exist; these are primary and secondary infertility. Primary infertility is the type of infertility where the couple has not given birth to a child at any point in time while secondary infertility is the type of infertility in which the couples has given birth to a child or children but desire to have more children but could not achieve it. Infertility affects both male and female. It is a big problem worldwide particularly the under developed countries. So many factors are responsible for infertility problem, ranging from social, cultural, environmental /occupational, hormonal abnormalities, infection and aging. *Chlamydia trachomatis (Ct)* is an obligate intracellular gram negative bacterial pathogen. *Ct* infection is a major and increasing public health problem worldwide. Currently, is the main cause of sexually transmitted infection. It is the leading cause of pelvic inflammatory disease in woman [2]. In 1999, World Health Organization (WHO) estimated that 92 million new *Chlamydia* infection occurred worldwide annually with the largest proportion ( 43 million) of this infection being contracted in south and

southeast Asia [3]. A region that is mostly resource limited with respect to infectious disease diagnosis and management. A major problem of *Chlamydia trachomatis* infection is its asymptomatic nature of infected population, since 94% of people with urogenital *Chlamydia* infection do not manifest obvious symptoms [4]. It causes infertility in both men and women. The consequence of such *Chlamydia* urethral infection including Pelvic inflammatory disease, about 40% to approximately 50% of non gonococci urethritis in men, cervicitis, proctitis, endometritis, salpingitis, ectopic pregnancy, miscarriages, bleeding manifestation and cervical neoplasm. Some researchers reported on the infertility issues due to *Chlamydia trachomatis* (*Ct)* as mentioned above [5-12]. It has been observed that persistent *Chlamydia trachomatis* infection can result in the scaring of ejaculatory ducts or loss of stereocilia [7]. There might be hormonal changes as well in these infertile people, estimation of these hormones such as follicle stimulating hormone (FSH), luteinizing hormone (LH), Prolactin, Progesterone and testosterone might help in their diagnosis and treatment. These hormones can be found in both male and female, but progesterone is mainly female hormone while testosterone is mainly male hormone. In normal case these hormone are maintained in the body system within normal levels. Abnormality arises when there is hormonal imbalance in which the hormone levels rises or lower than normal [13]. Some researchers attributed infertility to hormone abnormality such as testicular abnormalities, ovarian failure, and Congenital/acquired hormonal defect. Gould and Betty, (2000) reported that testosterone insufficiency which is an abnormal low production of testosterone due to testicular dysfunction (primary hypogonadadism) or hypothalamic –pituitary (secondary hypogonadaism) can be congenital or acquired [13]. An acquired form is found in Aging. Anovulation is a hormone abnormality which is not supposed to be seen in women of child bearing age according to Schumacher [14]. In this condition the progesterone level is abnormally low leading to absence of corpus luteum development which results in infertility [14]. It was therefore the aim of this study to determine serum level of follicle stimulating hormone (FSH), luteinizing hormone (LH), prolactin (PL), progesterone and testosterone in *Chlamydia trachomatis* positive patients.

## II. Materials And Methods

**Study Area:** This study was carried out at Government hospital Ekpan Delta State. Ekpan is one of the densely populated crude oil refining towns in Delta State which is surrounded by two major Local Government Areas which are Warri and Udu. It is predominately inhabited by crude oil workers.

## III. Methodology

A total of two hundred and fifty (including Patients and controls) men and women were used for this study. The age of these Participants ranges between 18-45years. A total of 2ml of venous blood was collected by venipuncture under aseptic condition using a sterile disposable syringe and needle from each of the patients into Plain container and labeled. The blood sample in plain container was allowed to clot and after clot retraction the sample was spun with bucket centrifuge and sample separated into a plain container for *Chlamydia* assay, FSH, LH, PL, progesterone and testosterone. *Chlamydia trachomatis* antibody was determined by Immunocomb *Chlamydia trachomatis* IgG test (ORGENIC PRODUCT, ISREAL). Follicle stimulating hormone (FSH), luteinizing hormone (LH), prolactin (PL), progesterone and testosterone were determined by ELISA. The detail of the study was explained to each subject and informed consent was obtained before specimen was collected for analysis. This study took a period of Two (2) Months. Ethical approval for this study was obtained from Government Hospital Ekpan Warri, Delta state.

## IV. Result

Table 1 showed mean ± S.D level of follicle stimulating hormone (FSH) IU/ml in male infertility with *Chlamydia trachomatis* (Ct) infection; 6.83±2.83 IU/ml, without *Ct* infection; 9.11±6.67 IU/ml, and *fertile male* control 4.98 ± 2.19IU/ml without *Ct* were compared. There were statistically higher significant difference (in each case) with Ct infected infertility (p= 0.01) and infertility without *Ct* infection (p=0.01).The FSH mean level comparison between subjects with infertility with *Ct* infection and without *Ct* infection showed no significant difference (P=0.13).

The luteinizing hormone (LH) mean blood levels in male infertility with *Ct* infection and without *Ct* and fertile, without *Ct* infected subject were compared. The comparison showed significantly higher value in male fertility without *Ct* infection, compared with male infertility with *Ct* infection (p=0.05) other intercomparisons showed no significant difference. However, prolactin and testosterone mean blood levels compared among the group showed no statistical significant different (p>0.05) see table1 .

Mean blood level of FSH in female infertility with *Ct* infection, 6.91±3.10 without *Ct* infection 8.53±4.22 and fertile female without *Ct* infection 6.24±2.20 were compared. There was higher significant difference in infertility with and without *Ct* infection compared to normal fertile without Ct infection (F=3.8, p=0.025). The comparison between FSH levels in infertility without *Ct* infection and control showed

significantly higher value in infertility without Ct infection compared with normal. However other between comparisons on FSH levels showed no significant difference

Also the mean blood level of progesterone was compared among the infertile female with *Ct* infection 8.27±7.0, without *Ct* infection 11.29±8.11 and fertile female without Ct infection 14.52±5.10. There was statistical significantly difference among the groups (f=4.48, p=0.01). The comparison between the blood level of progesterone between the female infertility with Ct and and control subjects showed lower levels in the group with infertile and *Ct* infection (p=0.00). The other between comparisons in the progesterone levels in the groups showed no significant difference.

However, LH and prolactin blood levels compared among the groups showed no significant difference (f=0.04, p=0.97) and (f=0.22, p=0.080) respectively see table 2.

## V. Discussion

This study is aimed at evaluating hormone parameters in infertility due to *Chlamydia trachomatis* infection in Ekpan in Uwvie Local Government Area of Delta state. Follicle stimulating hormone (FSH) and luteinizing (LH) IU/ml level in male infertility were significantly higher than fertile male subjects. This might be due to testicular failure and in which the FSH and LH levels are higher than normal male subjects. This was observed by Fowler [15] who reported that increased in FSH and LH could be the result of testicular failure. It could also be due to situations where the normal restricting feedback from the gonad is absent. Fowler, attributed the high level of FSH and LH to failure of the normal restricting feedback from the gonad, which is abnormal in the reproductive year [15]. It could also be attributed to *Chlamydia trachomatis* infection that causes proctitis in the male [12]. The follicle stimulating hormone (FSH) IU/ml level in female infertility due to positive *Chlamydia trachomatis* infection was higher than fertile normal female. This elevated level in infertility might also be attributed to both hormone imbalance and various abnormalities seen in *Chlamydia trachomatis* infection. The elevated level might be also due to situations where the normal restricting feedback from the gonad is absent as suggested by Fowler [15]. Testosterone (lU/ml) level in male infertility due to positive *Chlamydia trachomatis* infection and negative *Chlamydia trachomatis* infection compared with fertile normal male without infertility was not significant. The study showed low progesterone level (IU/ml) in female infertility compared to fertile normal females without history of infertility. The lower progesterone level in female infertility in the study might be due to anovulation caused by Chlamydial infection or hormonal abnormality. According to Schumacher, anovulation is a contributing factor for low progesterone level leading to Corpus Luteum development [14]. As mentioned earlier, anovulation may be as a result of *Chlamydia trachomatis* infection or abnormal hormonal secretion due to other factors. This can be predisposing these females to infertility. The prolactin level in both male and female with infertility was similar to the control subjects without infertility.

## VI. Conclusion

From the findings and observations in this study the following conclusions were reached: Hormonal changes were observed; follicle stimulating hormone (FSH) and luteinizing hormone (LH) levels were elevated in male infertility. FSH level was increased in female infertility and also progesterone level was significantly low in female infertility.

## References

[1]. Gurunath, S., Pandian, Z., Anderson, R. A., Bhattacharya, S. 2011. "Defining infertility--a systematic review of prevalence studies. Human Reproduction Update. 17 (5): 575–88.

[2]. Scholes, D. A., Stergachis, F. E., Heidrich, H., Andrilla, K., Holmes, K., Stamm, W.E., 1996. Prevention of pelvic inflammatory disease by screening for cervical chlamydial infection.New England journal of Medicine. 334: 1362-1366.

[3]. World Health Orgnisation. 1999. Contraceptive efficacy of testosterone-induced azoospermia in normal men, Task Force on methods for the regulation of male fertility. Lancet. 336 (8721): 955–959.

[4]. Korenromp, E.L., Sudaryo, M.K., deVlas, S.J., Gray, H.R; Sewankambo, N.K., Serwadda D., Wawer, M.J., Habbema, J.F., 2002. What proportion of episodes of gonorrhea and Chlamydia trachomatis in urogenital becomes symptomatic. International of Sexually transmitted Disease AIDS. 13: 91-101.

[5]. Johnson, R. E., Newhall, W. J., Papp, J .R., Knapp, JS., Black, C. M., Gift, T.L., 2002. Screening tests to detect Chlamydia trachomatis and Neisseria gonorrhoeae infections. MMWR Recomm. Rep. 51(RR–15): 1–38.

[6]. Eley, A., 2003. Chlamydia trachomatis is bad for your sperm. Microbiology Today. 30: 61-62

[7]. González-Jiménez, M A., Villanueva-Díaz, C.A., 2006. Epididymal stereocilia in semen of infertile men: evidence of chronic epididymitis. Andrologia. 38: 26–30.

[8]. Ajonuma, L.C., Chan, P.K., Ng, E.H., Fok, K.L., Wong, CH., Tsang, L.L., Tang, X.X., Ho, L.S., Lau, M.C., Chung, C.M., He, Q., Huang, H.Y., Yang, D.Z., Rowland, D.K., Chung, Y.W., Chan, H.C., 2008. Involvement of cystic fibrosis transmembrane conductance regulator (CFTR) in the pathogenesis of hydrosalpinx induced by Chlamydia trachomatis infection. Journal of Obstetrics and Gynecology Research. 34 (6): 923-930.

[9]. Wang, W., Stassen, F.R., Surcel, H.M., Öhman, H., Tiitinen, A., Paavonen, J., de Vries, H.J., Heijmans, R., Pleijster, J., Morré, S.A., Ouburg, S., 2009. Analyses of polymorphism in inflammasome associated NLRP3 and miRNA-146A genes in the

susceptibility to and tubal pathology of Chlamydia trachomatis infection. Drugs of Today (Barcelona, Spain). 45 (Suppl B): 95–103.
[10]. Beck, S., Wojdyla, D., Say, L., Betran, A.P., Merialdi, M., Requejo, J.H., Rubens, C; Menon, R., Van Look, P.F., 2011. The worldwide incidence of preterm birth: a systematic review of maternal mortality and morbidity. Bulletin of the World Health Organization. 88 (1): 31-38.
[11]. Paavonen, J., 2011. Chlamydia trachomatis infections of the female genital tract: State of the art. Annals of Medicine; 36: 785-890.
[12]. Shaw, J. L., Wills, G. S., Lee, K. F., Horner, P. J., McClure, M. O., Abrahams, V. M., Wheelhouse, N., Jabbour, H. N., Critchley, H. O., Entrican, G., Horne, A.W., 2011. Chlamydia trachomatis infection increases fallopian tube PROKR2 via TLR2 and NFκB activation resulting in a microenvironment predisposed to ectopic pregnancy. The American Journal of Pathology. 178 (1): 253-260.
[13]. Gould, D. C., Petty, R., 2000. The male menopause: does it exist, For: Some men need investigation and testosterone treatment. Western Journal of Medicine. 173 (2): 76–78.
[14]. Schumacher, M., Guennoun, R., Robert, F., Catherine, G., 2004. Local synthesis and dual actions of progesterone in the nervous system: neuroprotection and myelination. Journal of Growth Hormone and IGF Research. 14 Suppl A: 518–533.
[15]. Fowler, P.A., Sorsa-Leslie, T., Harris, W., Mason, H.D., 2003. Ovarian gonadotrophin surge-attenuating factor (GnSAF): where are we after 20 years of research? Reproduction. 126 (6): 689–699.

Table 1: mean ± S.D of Hormonal parameters compared amongst male infertility due to Positive *Chlamydia trachomatis* infection *Ct (*1), Negative *Chlamydia trachomatis* (*Ct*) infection (2), and fertile male as control (3) using Anova.

| | FSH | LH | PROL | TESTO (IU/ml) |
|---|---|---|---|---|
| +ve *Ct* (n=67) | 6.83±2.83 | 6.01±3.02 | 8.12±3.66 | 5.84±2.80 |
| –ve *Ct* (n=37) | 9.11±6.67 | 7.83±4.61 | 7.81±3.94 | 6.11±3.64 |
| Fertile male (n=23) | 4.98±2.19 | 6.05±3.56 | 6.73±3.48 | 6.91±2.39 |
| F(p) value | 7.15( 0.00)* | 3.24(0.04)* | 1.21(0.30) | 1.09(0.34) |
| 1v2 | 0.13 | 0.05* | 0.92 | 0.92 |
| 1v3 | 0.01* | 1.00 | 0.24 | 0.19 |
| 2v3 | 0.00 | 0.22 | 0.51 | 0.66 |

Table 2: mean ± S.D of Hormonal parameters compared amongst female infertility due to Positive *Chlamydia trachomatis* infection (*Ct)* 1, Negative *Chlamydia trachomatis* (*Ct*) infection (2), and fertile female as control (3) using Anova.

| | FSH | LH | PROL | PROG (IU/ml) |
|---|---|---|---|---|
| (1) +ve *Ct* (n=68) | 6.91±3.10 | 5.77±3.0 | 9.15±6.28 | 8.27± 7.00 |
| (2) -ve *Ct* (n=28) | 8.53±4.22 | 5.71±3.34 | 8.79±6.31 | 11.29±8.11 |
| (3) Fertile female (n=27) | 6.24±2.20 | 5.55±2.68 | 5.56±1.06 | 14.52± 5.10 |
| F (p) value | 3.8 (0.025)* | 0.04 (0.97) | 0.22 (0.80) | 4.48 (0.01)* |
| 1v2 | 0.17 | 1.00 | 0.98 | 0.51 |
| 1v3 | 0.46 | 0.95 | 0.70 | 0.00* |
| 2v3 | 0.04* | 0.98 | 0.82 | 0.46 |

Key: *=Level of significant, S.D= Standard Deviation, -ve =negative, +ve= positive and V= versus, PROL= prolactin, PROG=progesterone