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PROFILES OF SEMINAL FLUID ANALYSIS AND RATE OF INFECTION IN JOS, NIGERIA: A FIVE YEAR ANALYSIS (JAN 2000- DEC 2004)

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ABSTRACT

The study was designed to assess the seminal fluid patterns and their rate of infection among males attending fertility clinic at Jos University Teaching Hospital (JUTH), Jos. Data generated from seminal fluid analysis at JUTH Microbiology laboratory over a period of five years (Jan 2000 to Dec 2004) was compiled. Samples were produced by masturbation, motility and morphology was carried out using X40 objective while sperm cells were counted with improved Neubauer and Burker chamber. Culture was done on MacConkey agar Chocolate agar and Blood agar while biochemical tests were appropriately carried out. The results were analysed using statistical software Epi Info 6, chi square (X^2) was used to compare association between proportions and p values <0.05 were considered significant. A total of 2,160 seminal fluid samples were analysed at JUTH between January 2000 and December 2005. Eighty two point six percent of the samples had normal sperm morphology while 66% had normal sperm concentration of 20 million per ml and above. Azoospermia was found in 5.7% of the samples while the rate of infection was 5.5%. There was a strong association between infection rate and sperm motility and concentration. The commonest organism isolated was *Staphylococcus aureus* (33.1%), followed by *Escherichia coli* (31.5%), *Klebsiella* (13.1%) while *Enterococcus* was the least encountered organism (2.3%) Infection was found to be a major cause of low sperm count and slow motility. In view of the influence of infection on seminal fluid abnormalities, it should therefore be sought out for and properly treated in cases of seminal fluid abnormalities so as to reduce incidence of infertility among our men.

KEYWORDS: Seminal Fluid, Profile, Infection, Rate.

INTRODUCTION

As the general knowledge of Nigerians and Africans continue to increase about infertility among couples, the male factor becomes more apparent (Alausa, & Osaba, 1976). This is against the long established cultural beliefs that the female was the sole responsible factor. It has long been established that the male factor contributes about a half in all cases of infertility among couples (Ajabor, *et al,* 1981). In Nigeria, oligospermia or azoospermia have emerged as the commonest causes of male infertility (Megafu, 1994; Chukudebelu, *et al,* 1998) Some of the causes of oligospermia include;- Gonococcal epididymorchitis, Non-gonococcal epididymorchitis, post-gonococcal epididymorchitis (Chlamydia, Mycoplasma and other bacterial agents) viruses, hormonal factors and idiopathic testicular atrophy (Speck, *et al,* 1999; Ping *et al,* 2000; Xu, *et al,* 1997; Kilmarx, *et al* 2000; and Rotchford, *et al,* 2000).

Seminal fluid analysis is the foremost investigation requested for by health personnel in our locality when investigating for infertility among males (Ezenyirioha, &

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Ajabili, 1994). This is as a result of its significant role it plays in fertility even when every other thing is clinically normal (Sahelian, 2002).

This study was designed to assess the patterns of seminal fluid analysis in Jos over a five year period (Jan 2000- Dec2004) and to also identify the microorganisms isolated therein.

MATERIALS AND METHODS

The study is retrospective in nature. Data generated at the Microbiology laboratory of Jos University Teaching Hospital (JUTH) over a period of five consecutive years (Jan 2000 – Dec 2004) was considered for the study. Additional information was obtained from the records department of each individual patent as the need arose. Only patients with at least two different episodes of seminal fluid patterns not less than two months apart were considered and the average was taken. Seminal fluid samples were produced either by masturbation or coitus interuptus. The samples were collected in closely capped sterile universal bottles and transported immediately to the laboratory at close to body temperature for onward processing (Gibs, 1980). The sperm concentration, motility, pus cells, presence of pathogens and antibiotic susceptibility patterns were noted. Microscopy was carried out with the aid of improved Neubauer and Burker chamber (Cheesbrough, 1987). Inoculation was done on Blood agar, Chocolate agar and Mac-Conkey agar and incubated both aerobically and anaerobically in humid atmosphere over night (Buchanan, & Gibbons, 1974; and Collee, & Miles, 1989). Biochemical tests of the isolates were carried out based on their gram reactions. All the laboratory procedures were carried out with the assistance of senior laboratory technologists with experience in seminal fluid analysis while the routine internal quality control machinery of the laboratory was in place.

ANALYSIS OF RESULTS

Findings were analysed using Epi Info 6 revised version 2002. Chi square (X^2) was used to compare variation among proportions, while P values < 0.05 were considered significant.

ETHICAL CONSIDERATIONS

Ethical approval for this study was duly sought for and obtained from the ethical committee of JUTH.

RESULTS

A total of 2,160 seminal fluid samples were received and processed at JUTH between January 1st 2000 and December 31st 2004.

Table I shows age distribution of the men whose seminal fluids were analysed. Fifty one point four percent (n =1,112) of the men belonged to the age range 40-60 years while 473(21.4%) had unclassified ages. The least group 73(3.4%) belonged to those who were 60 years and above while 5.8% (n =125) were less than 30 years old.

Table II shows the distribution of the morphology of sperm cells of the samples under study. One thousand, seven hundred and eighty three (82.6%) of the samples had sperm cells with normal morphology of 60% and above. Two hundred and twenty three (10.3%) and 154 (7.1%) of the samples had a normal morphology of 20 -59% and less than 20% respectively.

Table III shows sperm concentration and rate of infection of seminal fluid among the samples under study. Sixty six percent (n=1426) of the samples had normal sperm concentration of 20 million and above per ml while 123(5.7%) seminal fluid samples had no sperm cells. The remaining 611(28.3%) samples had varying degrees of concentration from 19 to less than 1 million sperm cells per ml.

One hundred and twenty (5.5%) seminal fluid samples were infected over all. Fifty one samples (2.4%) among those with normal sperm concentration of 20 million and above per ml were infected while 13(0.6%) of the 123(5.7%) samples with no sperm cell were infected. Twenty three (1.0%), 18(0.8%) and 15(0.7%) samples were infected respectively in the 2nd, 3rd and 4th groups respectively as in table III. This finding is statistically significant, $p < 0.05$.

Table IV shows seminal fluid infection in relation to motility among the samples under study. One thousand two hundred and

eighty eight (59.4%) had a normal motility of 50% and above while 217 (10.0%) had a motility of less than 20%. Six hundred and sixty (30.6%) had varying intermediate ranges of motility. Sixty one (2.8%) samples infected belonged to the normal motility group while 21(0.5%) of the infected samples belonged to motility less than 20% group. Thirty eight (2.2%) of the infected samples had varying degrees of motility ranging from the normal to the extremely low range. This finding was statistically significant ($p < 0.05$).

Table V shows the organisms isolated from the seminal fluid samples under study in Jos. The commonest organism encountered was *Staphylococcus aureus* (33.1%), followed closely by *Escherichia coli* (31.5%) and Klebsiella species a distant third (13.1%). The least common organism encountered was *Enterococcus* (2.3%). There were 10 samples in which more than one organism was isolated.

Table 1: Age distribution pattern of the men under study in Jos.

Age(Years)	Prevalence (Percent %)
< 30	125(5.8)
30 – 39	377(17.5)
40-60	1112(51.4)
≥ 60	73(3.4)
Unclassified	473(21.9)
Total	2160(100)

Table 2: Distribution of sperm cell morphology among seminal fluid samples studied in Jos (Jan 2000 – Dec 2004).

Sperm cell morphology		
Normal Morphology	No. of Samples	Percent (%)
≥60%	1,783	82.6
20 – 59%	223	10.3
< 20%	154	7.1
Total	2160	100

Table 3: Distribution of sperm cell concentration and the rate of infection among the seminal fluid samples studied in Jos (Jan 2000- Dec 2004).

Sperm cell concentration and rate of Infection		
Million sperm cells/ml	No. of Samples (%)	No. Infected (%)
≥ 20	1426(66.0)	51(2.4)
10-19	349(16.1)	23(1.0)
1-9	189(8.8)	18(0.8)
< 1	73(3.4)	15(0.7)
Nil	123(5.7)	13(0.6)
Total	2160(100)	120(5.5)

$X^2 = 6.78$, df=1, P =0.009

Table 4: Seminal fluid motility and rate of infection among samples studied in Jos (Jan 2000-Dec 2004).

Seminal fluid motility and rate of infection		
Sperm Motility Normal	No. of Samples (%)	Rate of Infection (%)
≥ 50%	1,288(59.4)	61(2.8)
40-49%	375(17.4)	20(1.3)
20-39%	285(13.2)	18(0.9)
0-19%	217(10.0)*	21(0.5)
Total	2160(100)	120(5.5)

$X^2 = 7.64$, df=1, P= 0.005

* Includes the 123 azoospermic samples.

Table 5: Organisms isolated from the seminal fluid samples under study in Jos (Jan 2000-Dec 2004).

Organisms Isolated	
Organisms	Number of Samples (%)
Staphylococcus aureus	43(33.1)
Escherichia coli	41(31.5)
Klebsiella Species	17(13.1)
Proteus mirabilis	15(11.5)
Pseudomonas aeruginosa	11(8.5)
Enterococcus	3(2.3)
Total*	130(100)

Parenthesis = Percent.

* 10 patients had more than one organism isolated

DISCUSSION

The 2160 seminal fluid samples studied at Jos University Teaching Hospital over a period of five years were requested on fertility related problems. Over 51% of the subjects were of the middle age group (40-60 years). The increased desire of this age group to establish families and raise children could account for their resolve to appear for fertility test at any slightest need. Oghagbon *et al* (Oghagbon, *et al,* 2004) in a similar study in Ilorin had a similar finding. Also previous multiple sexual contacts in the young adulthood could predispose to infections which may manifest in the middle age period with sperm abnormalities; since infections have severally been associated with abnormal seminal fluid patterns (Alausa, & Osaba, 1976; and Obiechina, *et al,* 2002). A normal sperm concentration of 20 million and above per millilitre was found in 66% of the subjects. This finding is similar to that of earlier studies (Obiechina, *et al,* 2002; and Ladipo, 1979). It is a well known fact that fertility is better guaranteed with sperm concentration of above 20 million/ml although fertility is possible at lower concentrations and may not occur at normal sperm concentrations.

Azoospermia was found in 5.7% of the samples under study. This finding compares favourably with that of Obiechina *et* al (Obiechina, 2002) in Onitsha and that of Adeniji *et* al (Adeniji, *et al,* 2003) in Ibadan who found 6.2% and 6.7% respectively in their separate studies.

Seventeen percent of the sperm cells had abnormal morphology. This finding is lower than that of a similar study in Ibadan where 27.8% abnormality was found[20]. Several factors were linked with these abnormalities such as: infections, (68%), undescended testis, (1.3%), drugs (5.4) congenital malformations, (2.1%) hormonal abnormalities, (0.2%), and idiopathic testicular atrophy, (0.1%). In 22.9% of the patients, there was no readily available associated factor.

The rate of seminal fluid infection was found to be 5.5% in this study. This finding is lower than that of Obiechina *et al* (Obiechina, *et al,* 2002) who recorded 20.5% in Onitsha. The commercial and cosmopolitan nature of Onitsha with a large influx and exit of people on a regular basis could predispose to a higher level of social interactions and consequently increased infection rate. Jos on the other hand is not a commercial centre but a civil service state and so may attract fewer people with possibly lower rate of interaction and consequently, lower infection rate.

The study showed a significant association between rate of infection and sperm concentration and motility with the respective reduction in their values. The impact of infection on the fertility of men has well been documented (Alausa, & Osaba, 1976; and Chukudebelu, et al, 1998).

The commonest organism encountered in the study was *Staphylococcus aureus* while the least encountered was *Enterococcus*, 10 subjects had more than one organism isolated. This pattern has earlier been reported (Anate, 1994). The isolation of *Enterococcus* could pose serious challenges in its treatment as it has of recent been found to be highly resistant to the majority of antibiotics in common use (Swenson, *et al,* 1994; and Quale, *et al,* 1996).Thorough and properly standardized antibiotic susceptibility tests should therefore be carried out especially on its isolation to ensure prompt and complete treatment.

The establishment of more elaborate and specialized laboratory services will be of immense benefit. Such facilities would aid in the identification of organisms such as viruses, mycoplasma and chlamydia which were not sought for in this study due to infrastructural constraint.

Andrology laboratories should be established in the country so as to help carry out detailed investigations such as: Computerized routine semen analysis; Leukocytospermia Quantitation/ Endtz test; Kruger's Strict morphology classification; Nuclear fast red-picroindigocarmine; Direct and Indirect Immunobed test for sperm antibody and Semen Biochemistry Fructose test. These will fortify the seminal fluid analysis results frequently released at the nation's referral health centres and as well enhance the quality of healthcare these patients deserve.

In conclusion, Azoospermia has been found to be a common feature among men attending fertility clinic in Jos and infections have shown a strong association with it as well as the motility and abnormal morphology. There is therefore the need for prompt and timely treatment of all genital infections in men to help reduce the incidence of sperm abnormalities and hence infertility.

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