ORIGINAL ARTICLE

Semen quality of male partners of infertile couples in Ile-Ife, Nigeria

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Abstract

Objectives: The objective was to evaluate seminal fluid indices of male partners of infertile couples so as to identify the current status of the contributions of male factor to infertility in our environment.

Materials and Methods: This is a prospective study of the seminal fluid indices of consecutively consenting male partners of infertile couples seen at the Fertility and Endocrinology Research unit of the Department of Obstetrics Gynaecology and Perinatology, Obafemi Awolowo University Teaching Hospital Ile-Ife between May 2004 and June 2008.

Results: The results of the semen analysis of 661 male partners of the infertile couples were retrieved and analyzed. The patterns of semen parameters noted in infertile males were oligozoospermia, teratozoospermia, asthenozoospermia, azoospermia, oligoteratozoospermia, oligoasthenozoospermia, and oligoasthenoteratozoospermia, asthenoteratozoospermia found in 25.6%, 18.5%, 11.5%, 6.2%, 3.2%, 2.3%, 2.1%, and 0.9%, respectively. Among the age groups, age group 31-40 had a higher prevalence of oligozoospermia (13.3%) while among the occupational groups, the civil servants had the highest prevalence of oligozoospermia (12%). There was a high of level of leucocytospermia and bacterial infections in both normospermic and oligospermic semen.

Conclusion: This study showed a high rate of abnormal semen quality of male partners of infertile couple in our environment and is an indication for the need to focus on the management of this condition and the institution of preventive program for male infertility. There is urgent need for advocacy for men to accept responsibility for their contribution to infertility and to reduce stigmatization and ostracizing of women for infertility.

Key words: Abnormal semen parameters, infertility, male partners, semen analysis

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Introduction

Worldwide infertility is generally quoted as occurring in 8-12% of all couples.[1] Infertility rates among married couples in African countries range from 15% to 30%.[2] Experiences from clinical practice in Nigeria indicate that infertility is a major burden on clinical service delivery in Nigeria. Several reports indicate that infertility is the most frequent reason for gynecological consultation in Nigeria.[2-4] More than 50% of gynecological caseloads are as a result of infertility consultations and over 80% of laparoscopic investigations are for management of infertility.[3,4] About 30% of infertility is due to female problems, 30% to male problems, and 30% to combined male/female problems while in 10% there is no recognizable cause.[1] Recent data show that the male factor as a cause of infertility is present in 40-50% of cases.[5] Semen analysis plays a critical role in the assessment of male factor infertility and usually forms part of the initial investigation undertaking by an infertile couple.[6] World Health Organization (WHO) had defined normal values for semen analysis, which includes complete liquefaction within 60 minutes at room temperature, homogenous, gray, and opalescent appearance. A good sperm consistency is demonstrated by semen living the pipette as discrete

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droplets, semen volume of greater or equal to 2 ml and a pH greater or equal to 7.2. Other normal parameters includes a concentration of greater or equal to 20 million sperm cells per ml, a motility of 50% or more with forward progression, and a morphology of 30% or more normal forms.[7]

The present study was undertaken to evaluate the pattern of anomalies in the semen of male partners of couples presenting with infertility at the Infertility and Endocrinology Research Unit of the Department of Obstetrics Gynaecology and Perinatology of Obafemi Awolowo University Teaching Hospital Ile-Ife, Nigeria. This is to identify the contribution of male factors to overall infertility problem in our environment.

Materials and Methods

This is a prospective study of the seminal fluid indices of consecutively consenting male partners of infertile couples seen at the Fertility and Endocrinology Research Unit of the Department of Obstetrics Gynaecology and Perinatology, Obafemi Awolowo University Teaching Hospital Ile-Ife between May 2004 and June 2008.WHO standard was used in the collection and processing of the samples.[7] A total of 661 consenting male partners of infertile couple were recruited into the study. Sample collection was done following abstinence from ejaculation for 3-5 days, transported to the laboratory within less than 1 hour of production while maintaining sample at body temperature (37°C). Samples were collected using masturbation only into sterile screw capped plastic universal containers. No prior usage of antibiotics and spilled sample collection were avoided. Cases that did not follow the above-standard criteria were not included in the analysis. Using WHO standard[7] semen analysis was carried out by determining semen liquefaction, volume, appearance, pH, sperm concentration, motility, morphology, viability, and the presence of WBC or RBC. Each semen sample was cultured in appropriate culture media at 37°C for 24-48 hours to detect any associated bacterial pathogens and positive samples were subcultured to determine the sensitivity pattern to antimicrobial agents. Data were analyzed using SPSS for windows version 15.0 statistical package. Data were analyzed for frequencies, mean, and chi-square (χ^2) with level of significant set at less than 0.05 ($P < 0.05$).

Results

During the period of study, 661 male partners of infertile couples were investigated at our laboratory. A total of 463 (70%) partners presented as cases of secondary infertility (had previously impregnated a woman) whereas 198 (30%) of the cases were cases of primary infertility (never achieved conception with a woman irrespective of the outcome). Figure 1 shows the pattern of semen density of male partners of infertile couple in Ile-Ife. A total of 451 (68.2%) had normospermia and 169 (25.6%) had oligozoospermia (spermatozoa concentrations less than 20 million per milliliter) while 41 (6.2%) had azoospermia (absence of spermatozoa in the ejaculate). Other types of semen abnormalities encountered in this study were listed in Figure 2. Morphological abnormalities (teratozoospermia) were the most common abnormalities observed in 122 (18.5%) subjects followed by motility abnormalities (asthenozoospermia) in 76 (11.5%) subjects. Multiple abnormalities such as oligoteratozoospermia, asthenoteratozoospermia, oligoasthenozoospermia, and oligoasthenoteratozoospermia were seen in 21 (3.2%), 6 (0.9%) 15 (2.3%), and 14 (2.1%) of subjects respectively. There was a statistically significant difference ($P < 0.05$) in the distribution of the semen findings according to the

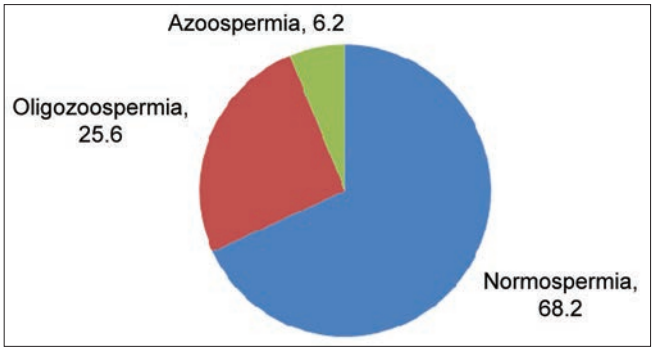

Figure 1: Pattern of semen density among infertile males at Ile-Ife

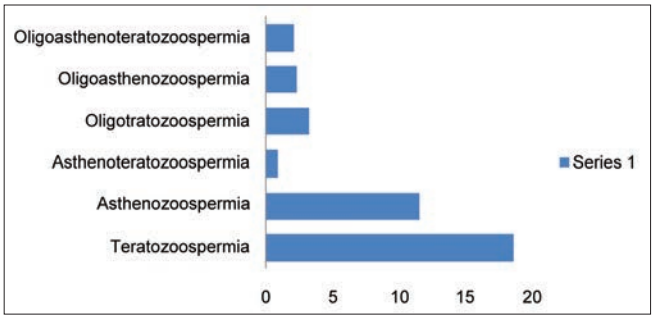

Figure 2: Abnormal sperm parameters of male partners of infertile couples at Ile-Ife

Table 1: Semen findings by occupation (percentage in parenthesis)

Type	Civil servants	Traders	Artisans	Farmers	Total
Normospermia	211 (31.9)	140 (21.2)	71 (10.7)	29 (4.4)	451 (68.2)
Oligozoospermia	79 (12.0)	63 (9.5)	22 (3.3)	5 (0.8)	169 (25.6)
Azoospermia	13 (2.0)	8 (1.2)	16 (2.4)	4 (0.6)	41 (6.2)
Total	303 (45.9)	211 (31.9)	109 (16.4)	38 (5.8)	661 (100)

Pearson chi-square = 23.323 dif = 6 $P < 0.001$ significant

occupations of the subjects [Table 1] with the civil servants having the highest percentage of oligozoospermia (12%) while the artisans had the highest percentage of azoospermia (2.4%). Table 2 compares semen findings according to the age group. The highest anomalies were seen in the age group 31-40 years (13.3% and 3.3%) for oligozoospermia and azoospermia respectively, with the lowest abnormalities in the lower age groups (2.7% and 2.5% for oligozoospermia and azoospermia respectively). These differences were however not statistically significant ($P > 0.05$). Table 3 compares the abnormal parameters in normospermia and the oligozoospermia subjects. Patients with oligozoospermia had statistically significantly higher abnormal motility (8.9% vs. 4.4%, $P = 0.000$), abnormal morphology (19.5% vs. 10.6%, $P = 0.000$), and lower PH (3.6% vs. 2.2%, $P = 0.000$) than the those with normospermia. Other abnormalities such as appearance (97% vs. 93%), lower volume (39.6% vs.31.9%), and WBC (86.6% vs. 59.8%) were greater in the oligozoospermia than in the normospermia but were not statistically significant ($P > 0.05$). Pathogenic organisms were isolated from 495 (74.9%) of the sample [Table4], more in the normospermia than in the oligozoospermia (50.2% vs. 20.3%) but the difference was not statistically significant ($P > 0.05$). Staphylococcus aureus was the most common organism isolated from all the samples followed by *E. coli, Candida albicans* and *klebsiela* while *proteus* and *strep feacalis* were the least isolated [Table 5].

Discussion

This study demonstrated abnormal semen quality in about one-third (31.8%) of male partners of couples seeking remedy for their inability to conceive in our environment. This finding is similar to the findings at Ibadan in South Western Nigeria by Adeniji *et al*.[8] but less than the findings at Abakaliki, in South Eastern Nigeria by Ugwuja *et al*.[9] Various semen quality disorders responsible for infertility such as oligozoospermia (25.6%), azoospermia (6.2%), asthenozoospermia (11.5%), oligoteratozoospermia (0.9%), oligoasthenozoospermia (2.3%), and oligoasthenoteratozoospermia (2.1%) as recorded in this study are major contributory factors to infertility in Nigerian couples in agreement with earlier studies in our environment.[8-10] These factors are responsible for the poor results obtained by the use of conventional methods of infertility treatment in this environment, hence the current advocacy for the use of assisted reproductive technology to solve the problem of male factor infertility in Nigeria.[4]

Semen analysis is the cornerstone of the laboratory evaluation of the infertile male and helps us to define the severity of the male factor; it gives indications on testicular function and of the integrity of the male genital tract which may facilitate treatment plans. It is also now recognized that it is a guide to fertility and not an absolute proof of fertility of an individual except in cases of azoospermia where the cumulative conception rate is reduced to zero.[10,11] Samples were collected by masturbation rather than coitus interruptus which can lead to wastage of part of the semen due to incomplete sample collection. It is recommended that samples should be collected after a minimum of 48 hours but no longer than 7 days of sexual abstinence. Increased sperm concentration is associated with prolonged abstinence while improved motility is associated with shorter period of abstinence but with lower sperm density. The sperm morphology does not vary with length of sexual abstinence. [10,11] Occupational status had statistically significant effect on the result of the seminal fluid analysis in this study as there was a high prevalence of abnormal semen in civil servants (oligozoospermia of 12%) and in the artisans (azoospermia of 2.4%); similar to the findings reported by Ugwuja *et al*.[9] Further research into the role of various occupations on semen parameters of fertile and infertile men is necessary to validate this finding. The incidence of asthenozoospermia and teratozoospermia is significantly higher in oligospermic semen than in normospermic semen in agreement with findings of previous studies[8,12]; further reducing the fertilizing capacity of oligospermic semen and

Table 2: Semen findings by age group (percentage in parenthesis)

Type	21-30	31-40	>40	Total
Normospermia	57 (8.6)	258 (39.1)	136 (20.6)	451 (68.2)
Oligozoospermia	18 (2.7)	88 (13.3)	63 (9.3)	169 (25.6)
Azoospermia	10 (1.5)	22 (3.3)	9 (1.4)	41 (6.2)
Total	85 (12.9)	368 (55.7)	208 (31.3)	661 (100)

Pearson chi-square = 8.27, diff = 4 $P = 0.068$ not significant

Table 4: Comparison of bacteriological findings by semen quality (percentage in parenthesis)

Type	Positive	Negative	Total
Normospermia	332 (50.2)	119 (18.0)	451 (68.2)
Oligozoospermia	134 (20.3)	35 (5.29)	169 (25.6)
Azoospermia	29 (4.4)	12 (1.8)	41 (6.2)
Total	495 (74.9)	166 (25.1)	661 (100)

Pearson chi-square 15.182 diff = 14 $P = 0.366$

Table 3: Comparison of abnormal semen parameters between normospermia and oligozoospermia (percentage in parenthesis)

Type	MOT	MOP	pH	DEN	APP	VOL	LEU
Oligozoospermia	15 (8.9)	33 (19.5)	6 (3.6)	141 (85.5)	164 (97.0)	67 (39.6)	166 (86.6)
Normospermia	20 (4.4)	48 (10.6)	10 (2.2)	142 (32.1)	420 (93.1)	144 (31.9)	269 (59.8)
P-values	0.000×	0.000×	0.000×	0.000×	0.929	0.212	0.223

×$P < 0.05$ is considered significant MOT = Motility; MOP = Morphology; DEN = Density; APP = Appearance; VOL = Volume; LEU = Leucocytes

Table 5: Organism isolated from samples (%)

Organism	Normospermia	Oligozoospermia	Azoospermia	Total
Staph aureus	246 (49.7)	92 (18.6)	23 (4.6)	361 (72.9)
E. coli	50 (10.1)	32 (6.5)	3 (0.6)	85 (17.2)
Candida albica	13 (2.6)	2 (0.4)	0	15 (3.0)
Klebsiela	11 (2.2)	3 (0.6)	2 (0.4)	16 (3.2)
Proteu	5 (1.0)	2 (0.4)	0	7 (1.4)
Step feacali	4 (0.8)	1 (0.2)	1 (0.2)	6 (1.2)
Pseudomona	3 (0.6)	2 (0.4)	0	5 (1.0)
Total	332 (67.1)	134 (27.1)	29 (5.8)	495 (100)

necessitating the use of intracytoplasmic sperm injection (ICSI) of semen rather than the conventional *in vitro* fertilization and embryo transfer in such group of patients.[13]

The findings in this study of a high level of leucocytospermia and bacterial infections in both normospermic and oligospermic semen is similar to findings in studies done in this environment and beyond.[8-10,14] Male genital tract infection is an important etiological factor leading to deterioration of spermatogenesis, impairment of sperm function and/or obstruction of seminal tract. It is noteworthy that the age group 31-40 has the highest rate of abnormalities (oligozoospermia of 13.3% and azoospermia of 3.3%) even though the reason for this is not clear. Further studies are necessary in this environment to elucidate and classify role played by the various causes of male factor infertility such as varicocele, testicular infection (parasitic or viral), endocrine disorders, and disturbances of hypothalamic-pituitary-testicular axis. Others include cryptorchidisim, ductal obstruction, stress, smoking, alcohol, systemic granulomatous infections, trauma, testicular torsion, and the use of chemotherapeutic drugs.[15,16]

In conclusion this study showed the rate of abnormal semen quality of male partners of infertile couple to be 31.8% in our environment and is an indication for the need to focus on the management of these conditions and the Institution of Preventive Program for Male Infertility. There is an urgent need for advocacy for men to accept responsibility for their contribution to infertility and to reduce stigmatization and ostracizing women for infertility.

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