Poor semen parameters among infertile couples presenting at a gynaecological clinic of Federal Medical Centre Birnin Kudu North-west Nigeria

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ABSTRACT

Background: Male partners contribute significantly to infertile couple problem. The present study was undertaken to review the seminal fluid analysis (SFA) of couples presenting with inability to conceive at the gynaecological clinic of Federal Medical Centre, Birnin Kudu, Jigawa State using World Health Organization 2010 criteria, identify the correlation between poor semen quality and age and to identify culture and sensitivity patterns of isolates. Materials and Methods: This was a retrospective study. The sample size was 63. Ethical clearance was obtained. Patients’ case records and laboratory registers were retrieved. The volume, viscosity, pH, sperm count, motility, and the morphology of the seminal fluid were determined. Semen m/c/s was done. Data were analyzed by using SPSS version 16 (SPSS Inc., Chicago, IL, USA). Descriptive statistics was used. Association between age and semen parameters were determined using Pearson’s coefficient of correlations and Chi-square test and P < 0.05 was considered statistically significant. Main outcome measures: The proportion of infertile male with abnormal semen parameters. Results: Of the 308 couple presenting for infertility evaluation, only 63 male partners presented for SFA. This is 20.5% of the couples. After analysis, 52.38% were normospermic while 26.98% and 20.64% were azoospermic and oligospermic, respectively. Asthenospermia was the commonest motility/morphology abnormality occurring in 60.3%. The mean volume, sperm count, motility, morphology, and pH were 2.8 ± 1.8, 40.1 ± 52.3, 28.2 ± 27.7, 46.1 ± 35.6, and 8.3 ± 0.67, respectively. The volume, motility, morphology, and pH showed weak correlations with age. Conclusion: Male partners are significant contributors to the infertile couple problems in this study; therefore awareness is needed in order to engage more males in evaluation and treatment of infertility.

Key words: Infertile couples, North-West Nigeria, rural setting, seminal fluid, tertiary hospital

INTRODUCTION

Infertility is a common problem in Nigeria. Because of the much premium placed on children in traditional African setting and experiences of involuntary childlessness may cause marital disharmony. Some male partners often believe that they cannot be responsible for infertility, especially when there is no dysfunction of sexual functions such as erectile disorder. Studies done in Nigeria have shown that poor semen quality is responsible for 20-40% of the infertile couple problem. There have been reports that 30% of the cases of infertility are associated with male causative factors while 20% are associated with combined male and female factors.

Seminal fluid analysis (SFA) was thought to be of no value in the past but is now accepted that every male infertility workup should start with the basics, namely, a thorough history, physical examination, and semen analyses. In order to establish evidence-based reference values for semen analysis, the World Health Organization (W.H.O) 2010 manual describes the values obtained in eight countries from 1953 men who became fathers with a time to pregnancy of <12 months. Semen characteristics include volume, pH, sperm concentration, motility, morphology, and vitality. Azoospermia refers to the absence of spermatozoa in the semen ejaculate while, in oligozoospermia, the count is <15 million/ml. Other lowest limits of normal are volume of 1.5 ml (hypospermia if <1.5mL), progressive motility of 32% (asthenozoospermia if <32%) and normal forms 4% (teratozoospermia if <4%).
Sexually transmitted infections (STI’s) such as *Neisseria gonorrhoea* and those transmitted through the urinary tract such as *Staphylococcus aureus* are known to affect the testicle. These may lead to suboptimal sperm quality. Researchers have shown that early diagnosis and treatment are necessary to mitigate these problems which are associated with male infertility.

Previous studies used an older version of W.H.O criteria for semen profile. The W.H.O 2010 manual has updated previous recommendations and provides new evidence-based findings and improved explanations of important concepts. The present study was undertaken to analyze seminal fluid parameters of couples presenting with inability to conceive at the gynecology clinic of Federal Medical Centre (FMC), Birnin Kudu, Jigawa State, Nigeria from September 01, 2013 to September 30, 2014. Ethical clearance was obtained from Health Research Ethics Committee of FMC, Birnin Kudu. The FMC is one of the Tertiary Health Facilities in Jigawa State. It was established for the provision of service, teaching and research to cater for the needs of the local and wider community. Patients from other hospitals and clinics are referred here. Birnin Kudu is a rural setting made predominantly of Hausa Muslims.

Patients’ case records and laboratory registers were retrieved. A total of 308 cases of infertile couples were seen during this period. Only 63 of the male partners presented their semen for analysis. The samples were collected from patients who had 3 days of abstinence from sexual intercourse, using masturbation method. After collecting in a clean container, samples were transferred to the laboratory: Semen samples were examined within 1 h of collection; the seminal fluid was cultured using blood agar, chocolate agar, and MacConkey Agar at 37°C for 24 h. The cultures were examined for growth and antibiotics susceptibility testing were done accordingly. Data were analyzed by using SPSS statistical software (SPSS Incorporated, Chicago, IL, USA). Descriptive statistics such as frequency, percentage, and central tendencies such as mean and standard deviation were computed for data presentation. The association between age and semen parameters was determined using Pearson’s coefficient of correlations and Chi-square test and $P < 0.05$ was considered statistically significant.

### MATERIALS AND METHODS

This was a retrospective study of seminal fluid analyses of male partners of infertile couples presenting at the gynecological clinic of FMC Birnin Kudu, Jigawa State, Nigeria. Of the 308 couples presenting for infertility evaluation, only 63 male partners presented for SFA giving a proportion of 20.5%. As shown in Table 1, the mean age of the male partners was 34.1 ± 5.8 and most of the males were 25-30-year-old and followed by those who were 36-40-year-old. Table 2 shows that 52.38% were normospermic, while 26.98% and 20.64% were azoospermic and oligospermic, respectively. As shown in Table 3, asthenospermia was the commonest motility/morphology abnormality occurring in 60.3% of by applying a drop of the sample onto a slide, covered with a cover slip. The sample was then viewed under the microscope using ×40 objective lens. The microscopy was done systematically, and accordingly motility of each spermatozoon encountered was graded rapid progressive motility, nonprogressive motility and immotile. The number of spermatozoa in each category was counted with the aid of a laboratory counter. Usually, four to six fields were viewed to classify 100 successive spermatozoa. All motile spermatozoa with the ones that had their heads moving were recorded. Sperm morphology and vitality were determined by using pap and eosin-nigrosin staining technique.

Culture of seminal fluid samples was done in an aseptic condition, within 1 h of the collection; the seminal fluid was cultured using blood agar, chocolate agar, and MacConkey Agar at 37°C for 24 h. The cultures were examined for growth and antibiotics susceptibility testing were done accordingly. Data were analyzed by using SPSS statistical software (SPSS Incorporated, Chicago, IL, USA). Descriptive statistics such as frequency, percentage, and central tendencies such as mean and standard deviation were computed for data presentation. The association between age and semen parameters was determined using Pearson’s coefficient of correlations and Chi-square test and $P < 0.05$ was considered statistically significant.

### RESULTS

#### Table 1: Age distribution

| Age  | Frequency | Percentage | Mean ± SD | Overall mean ± SD |
|------|-----------|------------|-----------|-------------------|
| 25-30| 24        | 38.1       | 27.9±2.3  | 34.1±5.8          |
| 31-35| 14        | 22.2       | 34.5±0.9  |                   |
| 36-40| 21        | 33.3       | 39.2±1.3  |                   |
| >41  | 4         | 6.4        | 45.7±3.3  |                   |
| Total| 63        | 100        |           |                   |

$SD$ – Standard deviation

#### Table 2: Distribution of sperm count

| Parameter   | Frequency | Percentage |
|-------------|-----------|------------|
| Normospermia| 33        | 52.38      |
| Oligospermia| 13        | 20.64      |
| Azoospermia | 17        | 26.98      |
| Total       | 63        | 100        |
cases and other forms such as oligoasthenoteratozoospermia and oligoasthenozoospermia were also quite common each occurring in 33.3% of cases. In Table 4, it is shown that the mean volume, sperm count, motility, morphology, and pH were 2.8 ± 1.8, 40.1 ± 52.3, 28.2 ± 27.7, 46.1 ± 35.6, and 8.3 ± 0.67, respectively. The proportion of males with hypospermia was 17.6%. The volume, motility, morphology and pH showed weak correlations with age. There was isolation of bacteria predominantly Klebsiella species (66.6%) and Pseudomonas aeruginosa (33.3%) in 13.6% of cases and these were very sensitive to amoxicillin, ampicillin, streptomycin, gentamycin, ciprofloxacin and levofloxacin.

**DISCUSSION**

Studies done in Nigeria have shown that poor semen quality is responsible for 20-40% of the infertile couple problem. The present study has shown that only 20.5% of male partners of infertile couples presented for SFA. This proportion was low when compared with an earlier study where about 67.5% presented for SFA, that is, 56 out of 83. Some male partners often believe that they cannot be responsible for infertility, especially when there is no dysfunction of sexual functions such as erectile disorders. Moreover, in a polygamous setting as seen in the environment where the current study was carried out, couples are reluctant at presenting for SFA when the husband already has fathered children from other wives.

The mean age of the male partners was 34.1 ± 5.8 and most of the males were 25-30-year-old and followed by those who were 36-40-year-old. This is similar to previous studies, although the proportion in this age group was higher. Some workers in Sudan similarly reported a mean age of 38.2. Genitourinary tract infections, including STI’s could occur in this group and some studies have associated the presence of bacteria in semen as a cause of poor semen parameters.

In this study, 52.38% of male partners were normospermic while 26.98% and 20.64% were azoospermic and oligospermic respectively. An earlier study in Kano Metropolis by Agu et al. reported azoospermia (14.2%) and oligospermia (39.4%), values which were lower and higher than the present study, respectively. Another study reported twice oligospermic men as those of this study.

In this present study, asthenospermia was the commonest motility/morphology abnormality occurring in 60.3% of cases and other forms such as oligoasthenoteratozoospermia and oligoasthenozoospermia were also quite common each occurring in 33.3% of cases. These were higher than those from a recent study in the south-west which reported that the patterns of semen parameters noted in infertile males were oligozoospermia, teratozoospermia, asthenozoospermia, azoospermia, oligoteratozoospermia, oligoasthenozoospermia, and oligoasthenoteratozoospermia found in 25.6%, 18.5%, 11.5%, 6.2%, 3.2%, 2.3%, 2.1%, and 0.9%, respectively. Agu et al. also reported morphology and motility abnormalities which were far lower than those of the present study.

This study has shown that the mean volume, sperm count, motility, morphology, and pH were 2.8 ± 1.8, 40.1 ± 52.3, 28.2 ± 27.7, 46.1 ± 35.6, and 8.3 ± 0.67, respectively. Because of the high proportion of males with normal seminal fluid volume in this study, it seems that fertility is affected little by seminal fluid volume. This has been similarly reported in a study carried out in Sudan. The volume, motility, morphology, and pH showed weak correlations with age. The weight of evidence primarily from clinical studies suggests that age is associated with diminished semen volume, sperm motility and/or sperm morphology, but that sperm concentration is affected little by age.

The proportion of culture-positive semen reported in this study was 13.6%. This was lower than 30% reported elsewhere. The lower culture rate may be due to abuse of antibiotics among our patients. Interestingly, Klebsiella species was isolated in 66.6% and P. aeruginosa in 33.3% of culture positive semen which were largely sensitive.

**Table 3: Distribution of motility and morphology abnormalities**

| Parameter                        | Frequency | Percentage |
|----------------------------------|-----------|------------|
| Asthenospermia                    | 38        | 60.3       |
| Teratozoospermia                  | 21        | 33.3       |
| Oligoasthenoteratozoospermia      | 21        | 33.3       |
| Oligoasthenozoospermia            | 8         | 12.7       |

**Table 4: Semen profile and age-related correlation**

| Semen parameter | Frequency | Percentage | Mean ± SD | r     | P   |
|-----------------|-----------|------------|-----------|-------|-----|
| Volume          |           |            |           |       |     |
| <1.5            | 11        | 17.6       | 2.8±1.8   | −0.15 | 0.08|
| 1.5-3           | 32        | 50.9       | 40.1±52.3 | 0.01  | 0.1 |
| >3              | 20        | 31.5       | 40.1±52.3 | 0.01  | 0.1 |
| Count           |           |            |           |       |     |
| <15             | 30        | 47.6       | 28.2±27.7 | −0.18 | 0.081|
| >15<40          | 12        | 19.1       | 40.1±52.3 | 0.01  | 0.1 |
| >40             | 21        | 33.3       | 40.1±52.3 | 0.01  | 0.1 |
| Motility        |           |            |           |       |     |
| <3              | 38        | 60.3       | 28.2±27.7 | −0.18 | 0.081|
| 3-50            | 10        | 15.9       | 28.2±27.7 | −0.18 | 0.081|
| >50             | 15        | 23.8       | 28.2±27.7 | −0.18 | 0.081|
| Morphology      |           |            |           |       |     |
| <4              | 21        | 33.3       | 46.1±55.6 | −0.21 | 0.075|
| 4-50            | 7         | 11.1       | 46.1±55.6 | −0.21 | 0.075|
| >50             | 35        | 55.6       | 46.1±55.6 | −0.21 | 0.075|
| pH              |           |            |           |       |     |
| <7.2            | 8         | 12.7       | 8.3±10.67 | 0.30  | 0.06|
| 7.2-8           | 27        | 42.9       | 8.3±10.67 | 0.30  | 0.06|
| >8              | 28        | 44.4       | 8.3±10.67 | 0.30  | 0.06|

SD – Standard deviation
Male partners are significant contributors to the infertile couple problems in Birnin Kudu, Jigawa State, Nigeria as the prevalence of poor semen parameters was higher than those of other studies; therefore, awareness is needed in order to engage more males in evaluation and treatment of infertility. The limitation of this study is that it did not investigate etiological factors of poor semen parameters or cause-effect relationship. Therefore, future research is anticipated to fully understand the etiology of poor semen parameters among infertile couples in Birnin Kudu, Jigawa State. The clinical significance of bacteria in semen is still unclear and requires further studies.

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