SEMINAL FLUID PROFILE OF MALE PARTNERS OF INFERTILE COUPLES AT BOWEN UNIVERSITY TEACHING HOSPITAL, OGBOMOSO: A THREE YEAR REVIEW

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Received: 17th January, 2022 **Accepted:** 22nd April, 2022 **Published:** 30th June, 2022

ABSTRACT

Background: Infertility, according to the World Health Organization, has been defined as a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after twelve (12) months or more of regular unprotected sexual intercourse. Studies around the world have proven that at the very least, fifty (50) million couples worldwide suffer from infertility and these figures vary from one part of the world to the other. Male factor contribution to infertility remains significant and semen analysis is a major way to determine its contribution.

Materials and Methods: This study involved retrieval of the case files of infertile couple attending gynaecology and urology clinics at the Bowen University Teaching Hospital, Ogbomoso over a three year period. The seminal fluid analysis results were retrieved from the case files and relevant information checked, reviewed and inputted in a tabular form in Microsoft Excel.

Result: A total of 194 couples were managed for infertility between January 2018 and December 2020. Out of this number, seminal fluid analysis was requested for 125 couples, of which only 69 results were returned and 56 seminal fluid analysis results were not returned to the clinic.

Conclusion: It was observed that 36% of infertility cases had no evidence to show that seminal fluid analysis was requested for during the course of management of these infertile couple. The implication of this is that there may be an oversight factor on the part of the requesting physician. Other possible reasons is because the female partners of infertile couples often make the trip to the infertility clinics alone hence the physician may have no choice but to investigate the female partner alone. Azoospermia (36%) was the major contributing factors for to male infertility.

INTRODUCTION

Infertility, according to the World Health Organization, has been defined as a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse. Zegers-Hochschild *et al.*, 2009). Studies around the world have proven that at the very least, 50 million couples worldwide suffer from infertility (Mascarenhas *et al.*, 2012).

Citation: Ogunlaja, O.A. Bakare, Y.T., Bobo,T.I., Idowu, A., Ogunlaja, I.P., Abiola, O.O., Olasinde, A., Olasinde,Y.T. (2022): Seminal Fluid Profile Of Male Partners Of Infertile Couples At Bowen University Teaching Hospital, Ogbomoso: A Three Year Review *BJMLS. 7(1): 22 - 31*

Despite Sub-Saharan Africa having the highest fertility rates in the world i.e estimated at 4.7 births per woman in 2015–2020 by the United Nations (United Nations, Population Division. 2019), this region records one of the highest rates of infertility. (Zegers-Hochschild *et al.,* 2009). Although there is a paucity of relevant statistics on the infertility rates in the Nigeria as a whole in recent times, institution-based studies across several teaching hospitals have shown variations in infertility rates ranging from as low as 4% in Ilorin, North-Central Nigeria (Abiodun OM et al 2007), to as high as 48.1% in Osogbo, a city in South-Western Nigeria(Adeyemi AS et al 2009). Infertility continues to threaten marital peace and harmony among many couples in Nigeria, and very little is known about the major contribution of male factor to the aetiology of infertility in Nigeria.

Male infertility has been defined as the inability of a male to make a fertile female pregnant, also for a minimum of at least one year of unprotected intercourse (Leslie, 2020). Male fertility can be assessed by seminal fluid analysis and possible findings that could be made includes aspermia, oligospermia, azoospermia, asthenozoospermia, teratozoospermia, or a combination of any of these diagnosis (World Health Organization 2010).

Some other possible factors contributing to the relatively high number of abnormal seminal fluid profile findings may be from obstructions due to trauma or injury genital areas, infections. The Non-obstructive causes include genetic causes like Klinefelter's syndrome; hormone disorders including hypogonadotropichypogonadism, hyperprolactinemia and androgen resistance; ejaculatory problems such as retrograde ejaculation, testicular causes including anorchia, cyptorchidism, testicular torsion, varicocele. (Benjamine *et al.,* 2014; Owolabi *et al.,* 2013).

In such a country where great importance is placed on children for socioeconomic reasons, as well as the limited knowledge and use of contraceptives by its people, rising rates of infertility have resulted in infertility being the most common reason for a visit to the gynecologist, with the majority of the visits being paid by only the female partners of the infertile couple. It is not uncommon that in Nigeria, many women are made to bear the burden of infertility by themselves, including but not limited to the associated social neglect and psychological distress among these women, especially when the male partners can effectively attain erection and ejaculation (Agarwal *et al*., 2015; World Health Organization WHO 2010;Olajubu *et al*., 2015; Umar *et al.,* 2020;Fehintola *et al*., 2017). Interestingly, recent studies have shown that the contribution of male factor to infertility range from 20% to 70% worldwide, with the highest rates being in Africa and Central and Eastern Asia (Agarwal *et al*., 2015). Another study carried out in South-Eastern Nigeria shows that male factor infertility contributed about 42.4% of the total cases of infertility (Ikechebelu *et al.,* 2003).Likewise in a similar study conducted in Kano, North Western Nigeria showed male factor infertility was found to be responsible for about 40.8% of infertility cases (Emokpae *et al.,*2005).Semen analysis, despite being a useful tool for evaluation, it is not a direct measure of fertility, as many other factors (excluding semen and sperm quantity and quality) contribute to the ability of a viable sperm to fertilize an oocyte (Jequier A.M. 2010). Seminal fluid analysis, which assays the biological, quantitative and qualitative characteristics of semen and spermatozoa has proven to be an important method in investigating male infertility as there as significant correlations between abnormal semen and sperm quantity and quality and infertility (Ikyernum *et al.,* 2019).

The Common identified causes of male infertility includes previous history of sexually transmitted infections, exposure to environmental risk factors, genetic causes, erectile or ejaculatory dysfunction, varicocoele, endocrine disturbances, complications arising from previous male genital tract surgeries, congenital abnormalities, and in some cases, it may be idiopathic**(**Sharma, A. 2017)

This study was driven by the dearth of relevant studies on the pattern and presentation of male infertility among male partners of infertile couples in the socioeconomically unique and diverse city of Ogbomoso, located in South-Western Nigeria, which is still largely patriarchal. The core objectives of this study includes to assess the pattern of semen parameters, using the current WHO 2010 criteria (Table 1), in male partners of infertile couples who presented to the infertility clinic of Bowen University Teaching Hospital, Ogbomoso and to determine the contribution of male factor to the burden of infertility in Bowen University Teaching Hospital, Ogbomoso, Oyo state, Nigeria.

MATERIALS AND METHODS

The study was a retrospective study conducted in Bowen university teaching hospital (BUTH), Ogbomoso, Oyo State, located in the south western part of Nigeria. The study involved retrieval of the case files of infertile couples attending gynaecology and urology clinics at the Bowen University Teaching Hospital, Ogbomoso over a three year period. The seminal fluid analysis results were retrieved from the case files and relevant information checked, reviewed and inputted in a tabular form in Microsoft Excel. This was done while maintaining the confidentiality of the patients as much as possible. Data columns included; biodata, appearance of semen, volume of semen, white blood cell count, pH of semen, viscosity, percentages of active, dead and sluggish spermatozoa, percentages of normal and abnormal spermatozoa, and the total concentration of spermatozoa.

The data was analyzed using Microsoft Excel and Statistical Package for Social Sciences (SPSS) version 22. Frequency tables and charts were generated and chi-square test was used to test for association between the variables. The *P*-value was set at, 0.05 for the test statistics.

Ethical approval for the study was obtained from the ethical committee of the Bowen University Teaching Hospital, Ogbomosho to conduct the research. Confidentiality was ensured throughout the study period and the case files were identified with code numbers only.

RESULTS

A total of 194 couples were managed for infertility between January 2018 and December 2020. Out of this number, seminal fluid analysis was requested for 125 couples, of which only 69 results were returned and 56 seminal fluid analysis results were not returned to the clinic. 69 patients were managed without seminal fluid analysis. This information was summarized in Figure 1. Figure 2 shows the age distribution of the men whose seminal fluid analysis results were obtained. The age range of the patients was between 22 to 60 years, with the mean age of 31.16 years. Majority of the men belonged to the age category 30-39 years (57%), followed by those aged 40-49 years (19%), then those <30years (13.0%), after which was the category of those aged 50-59 years (10%), and the least category were those aged >59 years (1%).

Figure 3 shows the proportion of men who had been diagnosed with either primary or secondary infertility. 36 men (52%) were diagnosed with secondary infertility, while primary infertility accounted for 48% of cases. Figure 4 shows the trend in the duration of infertility in the male partners of infertile couples who presented to the infertility clinic. It shows the range to be between 1 year and 17 years, and that the majority of men who presented had a duration of infertility of two (2) years. The mean duration of infertility was 4.78 years.

The parameters analyzed in the seminal fluid analysis results obtain include seminal volume, viscosity, appearance, white blood cell count, pH, morphology, vitality, motility, sperm concentration and time between sample collection and analysis of the results. These parameters were analyzed based on the World Health Organization recommendations given in 2010 (Table 1).

Figure 5 shows that only 22% of the men who presented had normal semen parameters. Of the remaining 78%, a majority of them had azoospermia (36%), followed by Asthenozoospermia only (20%), then Oligoasthenozoospermia (13%) and the least diagnosed abnormality was Oligozoospermia alone.

The result of other semen analysis is summarized in Table 2. 57(83%) of the patients had abnormal sperm volume with an average of 3.4mls. A pH of ≥7.2 was found in 88% of the results analyzed. Most patients had abnormal morphology of < 4% (55% of patients) and abnormal motility of < 40% (83% of patients). 57% of patients have normal sperm concentration of ≥15 x 10^6, with an average of 24.4 x 10^6 cells/ml. The lowest recorded sperm concentration was 0 x 10^6, and the highest was 265.6 x 10^6 cells/ml. Most patients (96%) have high levels of>1x 10^6 white blood cells in their seminal fluids.

Figure 6 shows the difference between the time taken to analyse the seminal fluid from the time of collection. It shows that the majority of results (96%) were analyzed less than 60 minutes after sample collection. The average time taken to analyze the samples was 42 minutes. There was a significant relationship between age and sperm count. (x^2=0.147, df=3, p=0.029).

Table 1: Reference Values for Human Semen Characteristics According to the World Health Organization (2010)

SEMEN PARAMETERS	REFERENCE VALUE
Volume (ml)	1.5
Sperm count (10^6)	39
Sperm concentration (10^6/ml)	15
Total motility (%motile)	40
Progressive motility (%)	32
Vitality (%)	58
Morphology (%)	4
Leukocyte count (10^6/ml)	<1
pH	≥7.2

Table 2: Summary of seminal fluid analysis results

Parameter	Variable	percentage
Volume	*<1.5ml*	17%(12)
	>1.5ml	83%(57)
PH	*<7.2*	22%(15)
	>7.2	88%(54)
Morphology%	*<4*	55%(38)
	>4	45%(31)
Concentration/ml	*<15x10^6*	43%(30)
	>15x10^6	57%(39)
Motility	*<1*	4%(3)
	>1	96%(66)
Vitality	*<58*	80%(56)
	>58	20%(13)

Table 3: shows the relationship between age and sperm count.

Age(Years)	Low sperm count (%)	Normal sperm count (%)
21-30	*6(8.7)*	5(7.2)
31-40	*30(43.5)*	11(15.9)
41-50	*8(11.6)*	5(7.2)
>51	*0(0.0)*	4(5.8)

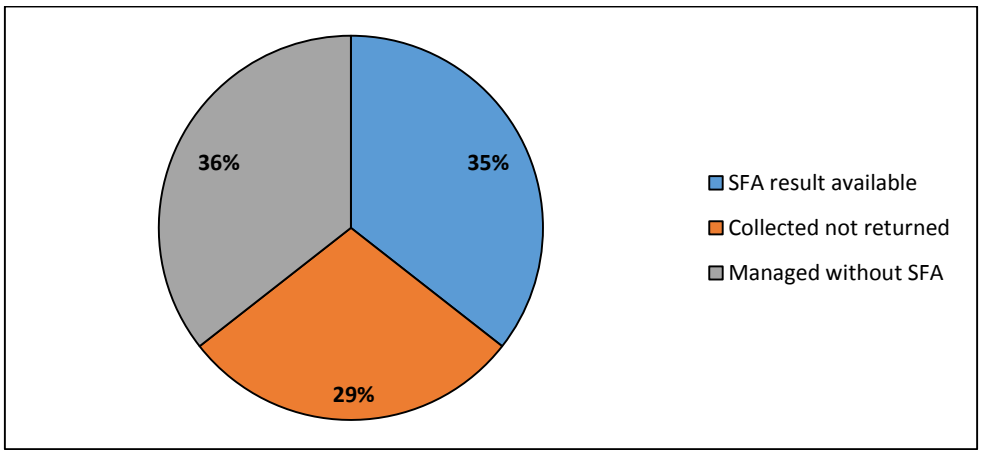

Figure 1: Summary of Infertility between January 2018 and December 2020

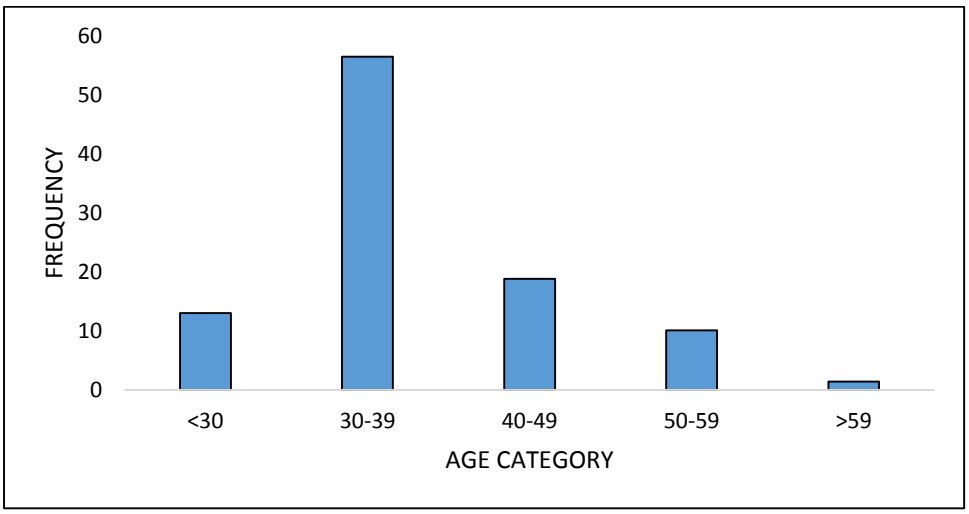

Figure 2: Age distribution of male partners

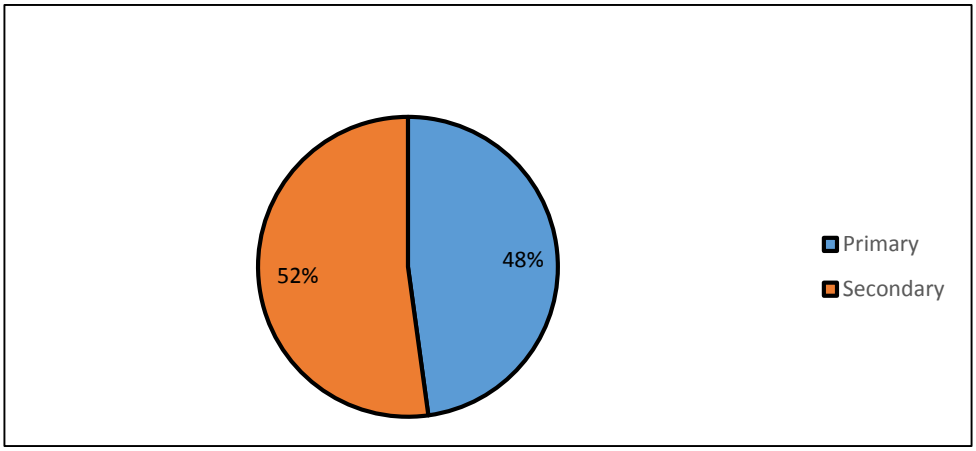

Figure 3: Type of infertility

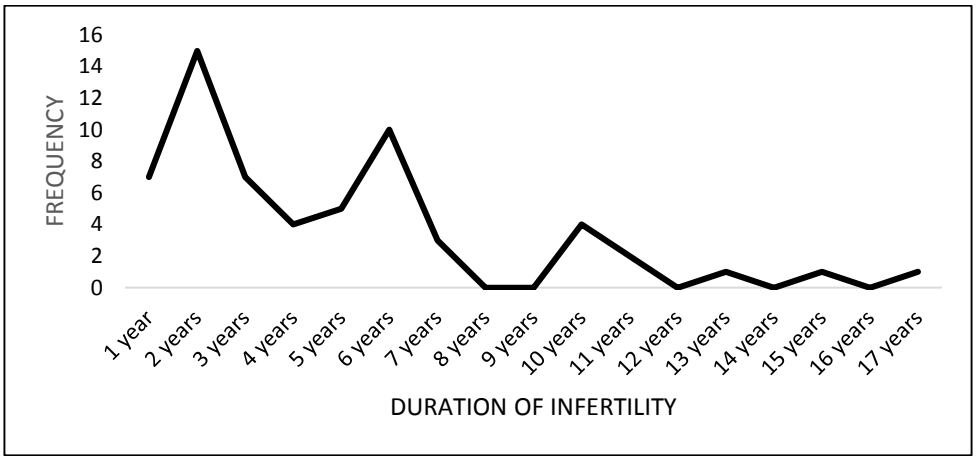

Figure 4 : Duration of Infertility

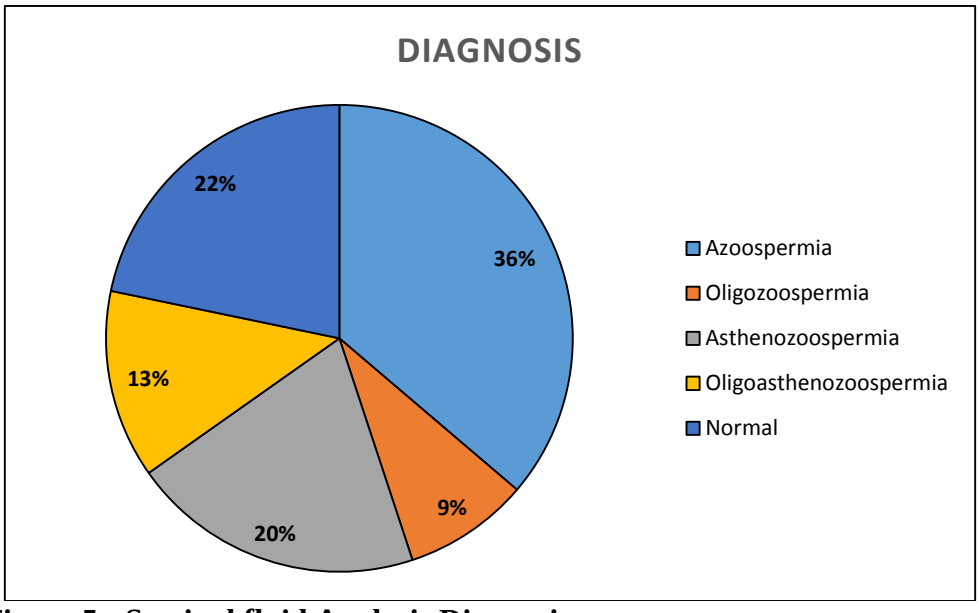

Figure 5 : Seminal fluid Analysis Diagnosis

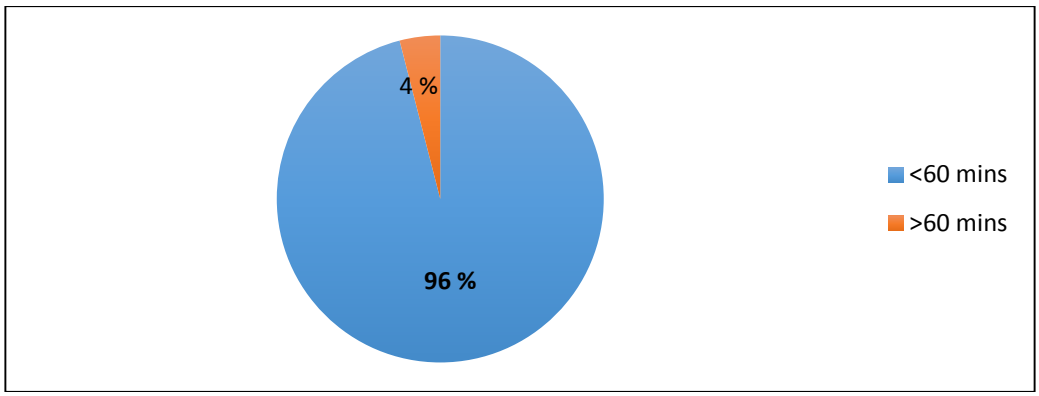

Figure 6: Time from sample collection to sample analysis

DISCUSSION

Infertility is a common reproductive health problem globally, hence there is need to document the male contributions to the burden of infertility in this environment. Seminal fluid 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.

The Findings from this study shows that a total of one hundred and twenty five (125) seminal fluid analysis results were obtained during the study period of which 35% of the results were returned, 29% of the results were not returned to the clinic and 36% of the result were managed without seminal fluid analysis. This is much lower than 97.6% retrieved in Federal Teaching Hospital, Abakaliki and 85% retrieved in Usman Dan-Fodio University Teaching Hospital, Sokoto (Ugwuja*et al*., 2008; Panti and Sununu 2014). However, this retrieval rate is much higher than 20.5% retrieved in Federal Medical Centre, Birnin-Kudu, Jigawa (Ugwa EA et al 2015). About 29% of the seminal fluid analysis results were not returned, this may be due to the largely patriarchal nature of our society hence most of these men do not subscribe to the notion that male factor contributes significantly to infertility.

Furthermore, it was observed that 36% of infertility cases had no evidence to show that seminal fluid analysis was requested for during the course of management of these infertile couple. The implication of this is that there may be an oversight factor on the part of the requesting physician. Other possible reasons is because the female partners of infertile couples often make the trip to the infertility clinics alone hence the physician may have no choice but to investigate the female partner alone.

The mean age of these male partners was 31.16 years with majority (57%) between the ages 30-39 years. The mean age obtained from our study is unlike the mean age at presentation of 40 years obtained in similar previously conducted studies (Omokanye*et al*., 2016; Onyebuchi*et al*., 2018).Of the couples that presented to the infertility clinic, fifty two percent were diagnosed with secondary infertility, while 48% had primary infertility. This is lower though comparable to the 62.8% of patients diagnosed with secondary infertility in a similar study(Omokanye*et al*., 2016).The mean duration of infertility at presentation in our study was 4.78 years and this is comparable with4.5-6.9 years obtained from a previous studies(Omokanye*et al*., 2016;Ngwu *et al*., 2017).

Our study demonstrated abnormal semen profile was found in 78% of the male partner of couples with the inability to conceive seeking remedy for the inability to conceive.

This finding was noted to be comparable with the report of between 69.1%-71% abnormal seminal fluid analysis results obtained from Abakaliki, Lagos and Jos respectively (Omokanye *et al.,* 2016; Akinola *et al.,* 2010).It is worthy of note that previous studies from Ilorin (43.9%) and Ibadan (27.3%) revealed a lower prevalence of abnormal semen profile(Ugwuja*et al.,* 2008,Benjamine*et al.,* 2014).

On further analysis, it was observed that azoospermia (36%) was the major contributing factors for to male infertility this was higher than 4% observed in Abakaliki and 6.7 % in Ibadan 6.2 % in Ile Ife and 12.6 % in Sokoto (Ugwuja *et al*., 2008; Panti and Sununu 2014; Akinola*et al*., 2010).This findings is an eye opener to ensure that the factors responsible for this findings are mitigated.

From our study we observed a significant relationship between age and sperm concentration with a p value of 0.029. The highest percentage of normal sperm count (15.9%) was seen among those 31-40 years and the least was seen in those aged 51 and above (5.8%). Table 3.This was similar to the findings from other local and international studies (Paasch *et al*., 2010; Cui et al 2009; Levitas *et al.,* 2007).

CONCLUSION

From our study we can safely conclude that a zoospermia seems to be the underlying major factor responsible for male infertility amongst male partners of infertile couples that presented to the gynaecology and urology clinic of Bowen University Teaching Hospital, Ogbomoso. A correlation was observed between age and sperm count. It was also observed that sperm count decreases with increasing age. Finally, the study shows that to make the needed progress in the management of infertility, the role of the male factor must not be underestimated. Hence, there is the need for advocacy and male partner education. Legislation may also be considered for this to be enhanced.

RECOMMENDATIONS

From the findings of this study, the following recommendations have been made:

*Increased sensitization on the contribution of male factor to infertility and request for both partners to be present at consultations.

*Training and retraining of health care workers in order to ensure seminal fluid analysis is requested and retrieved during infertility management.

CONFLICT OF INTEREST

There is no conflict of interest.

ACKNOWLEDGEMENT

I wish to acknowledge the following :Abogunloko R, Adeleye M, Ahiakwo M, Ajayi O, Bayo-Philip O, Egwu E, Komolafe P for their support during the conduct of this study. This support varies for data collection, data collation and analysis.

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