Asian Journal of Medicine and Health

11(1): 1-6, 2018; Article no.AJMAH.38237
ISSN: 2456-8414

Seminal Analysis as a Tool to Determine the Infertility Prevalence among Men Reported to Infertility Clinic in Port Harcourt

K. I. Green[1*] and E. O. Nwachukwu[2]

[1]Department of Obstetrics and Gynaecology, University of Port Harcourt Teaching Hospital, Green Care Medical Consultants, Port Harcourt, Nigeria.
[2]Department of Medical Laboratory Science, Rivers State University, Green Care Medical Consultants, Port Harcourt, Nigeria.

Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJMAH/2018/38237
Editor(s):
(1) Abdelmonem A. Hegazy, Professor, Department of Anatomy and Embryology, Faculty of Medicine, Zagazig University, Egypt.
Reviewers:
(1) Shabir Ahmad Lone, ICAR-National Dairy Research Institute, India.
(2) Vesna Otasevic, Institute for Biological Research, University of Belgrade, Serbia.
(3) Juliano Scheffer, Brazil.
Complete Peer review History: http://www.sciencedomain.org/review-history/23681

Original Research Article

Received 9th November 2017
Accepted 13th January 2018
Published 17th March 2018

ABSTRACT

Objectives: The aim of this study was to determine the prevalence of male infertility among men that attended the infertility clinic of Green Care Medical Consultants, in Port Harcourt such that those with severe seminal parameters were referred for assisted conception.
Methods: A retrospective review of couples managed for infertility in this clinic was conducted. The case notes of couples managed for infertility over five years' period between 1st January 2012 and 31st December 2016 were retrieved. Semen collection, processing and analysis were carried out as per WHO standards.
Results: The results of the semen analysis of 382 male partners of the infertile couples were retrieved and analyzed. The patterns of semen density noted in infertile males were normospermia, oligospermia and azoospermia, found in 52%, 46% and 3%, respectively. Morphological abnormalities (teratozoospermia) were observed in18.3% and motility abnormalities (asthenozoospermia) were found in 20.9%of the subjects. Other multiple abnormalities such as

**Corresponding author: E-mail: kiniks_green@yahoo.com;*

oligoteratozoospermia, asthenoteratozoospermia and oligoasthenozoospermia were seen in 2.9%, 3.9% and 3.9% of subjects respectively. Rig workers and older patients 50-59 years had the highest percentage of azoospermia found in 6.45%, and 4,55% of cases respectively. There was a high level of bacterial infections in oligospermic semen.
Conclusion: There is 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.

Keywords: Abnormal semen parameters; infertility; male partners; semen analysis.

1. INTRODUCTION

Infertility has remained a burden amongst couples in developing countries like Nigeria. Experiences from clinical practice in Nigeria have indicated that this 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 [1-3]. More than 50% of gynecological cases are as a result of infertility consultations and over 80% of laparoscopic investigations are for management of infertility [2,3]. 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 [4]. Recent data showed that the male factor as a cause of infertility is present in 40-50% of cases [5]. Unfortunately in some cultures, it is an abomination to declare a man infertile. The brunt of infertility is often ignorantly borne by women [6].

In majority of cases of male infertility, the causes of abnormal semen parameters are unknown [7]. However, some of the etiologies are genital tract infections leading to obstructive azoospermia/oligospermia. Tuberculosis, gonococcal and Chlamydia infections are common in our environment [8]. Bilateral viral orchitis especially after 12 years of age might impair sperm parameters. Congenital abnormality (cryptorchidism) and chromosomal disorders also contribute to sperm abnormality [8]. The role of varicocoele is inconclusive. It occurs in 12% of normal men [9]. However, studies showed that varicocoelectomy improved sperm parameters [10]. Tobaccos, alcohol, cannabis, drugs and wearing of tight underwear are also implicated [7]. The task before an infertility clinic is to make diagnosis of the actual cause of infertility, and seminal fluid analysis (SFA) is very important in this regard [11].

The assessment of the male factor infertility using semen analysis is inexpensive, objective and readily available. Semen analysis therefore plays a critical role in the assessment of male factor infertility and usually forms a part of the initial investigation undertaking by an infertile couple [12]. The current study aimed to evaluate the prevalence of male infertility among men attending to an infertility clinic at Port Harcourt.

2. SUBJECTS AND METHODS

A retrospective review of couples managed for infertility in this clinic. The case notes of couples managed for infertility over a five-year period between 1st January 2012 and 31st December 2016 were retrieved.

WHO standard was used in the collection and processing of the samples [13]. 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). No prior usage of antibiotics and spilled sample collection were avoided.

According to WHO standard [13], semen analysis was carried out by determining semen liquefaction, volume, appearance, pH, sperm concentration, motility, morphology, viability, and the presence of WBC or RBC and cultured appropriately.

Data were analyzed for frequencies, mean, and chi-square ($\chi 2$) with level of significance set at less than 0.05 ($P < 0.05$).

3. RESULTS AND DISCUSSION

During the period of study, 382 male partners of infertile couples were investigated at our laboratory. The study demonstrated a high prevalence of abnormal semen quality amongst male partners of infertile couples in our environment as 49% of them had abnormalities in their semen's fluid as seen in Fig. 1.

Fig. 1 shows the pattern of semen density of male partners of infertile couple. A total of 197 (52%) had normospermia and 175 (46%) had oligozoospermia (spermatozoa concentrations less than 20 million per milliliter), while 10 (3%) had azoospermia (absence of spermatozoa in the ejaculate).

Forty nine percent of the male partners tested had at least one abnormality of semen quality while 10.7% had multiple abnormalities of semen quality as seen in Fig. 2.

Fig. 2 shows other types of semen abnormalities encountered in this study. Morphological abnormalities (teratozoospermia) were observed in 70 (18.3%) and motility abnormalities (asthenozoospermia) were the most common in 80 (20.9%) of the subjects. Other Multiple abnormalities such as oligoteratozoospermia, asthenoteratozoospermia and oligoasthenozoospermia were seen in 11 (2.9%), 15 (3.9%) and 15 (3.9%) of subjects, respectively.

Our study showed a higher proportion of azoospermia among rig workers and a statistically significant association between oligozoospermia and businessmen (Table 1).

Oligospermia and severe oligospermia were significantly higher in business men (58.78%) [*P* <0.05]. Abnormal semen quality was most prevalent between the ages of 40 and 49 and this was statistically significant as stated in Table 2. Table 3 shows an association between

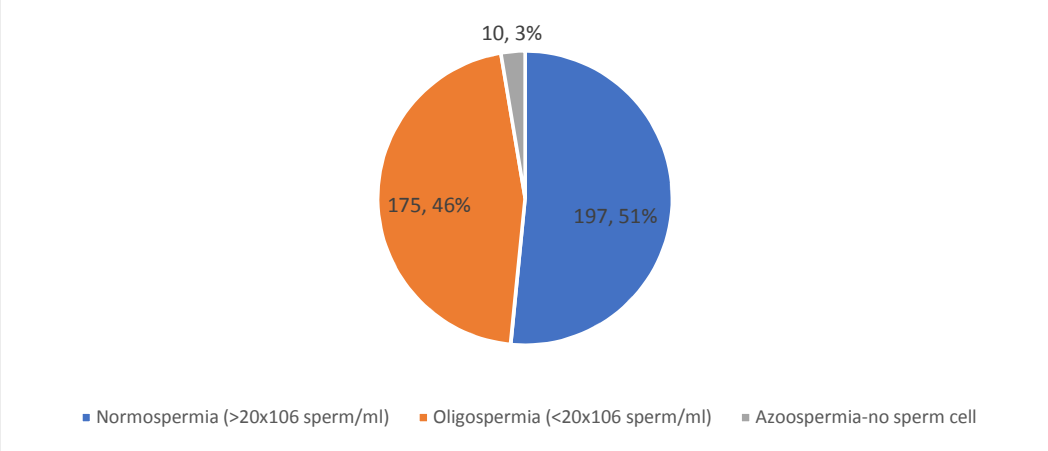

Fig. 1. Pattern of semen density

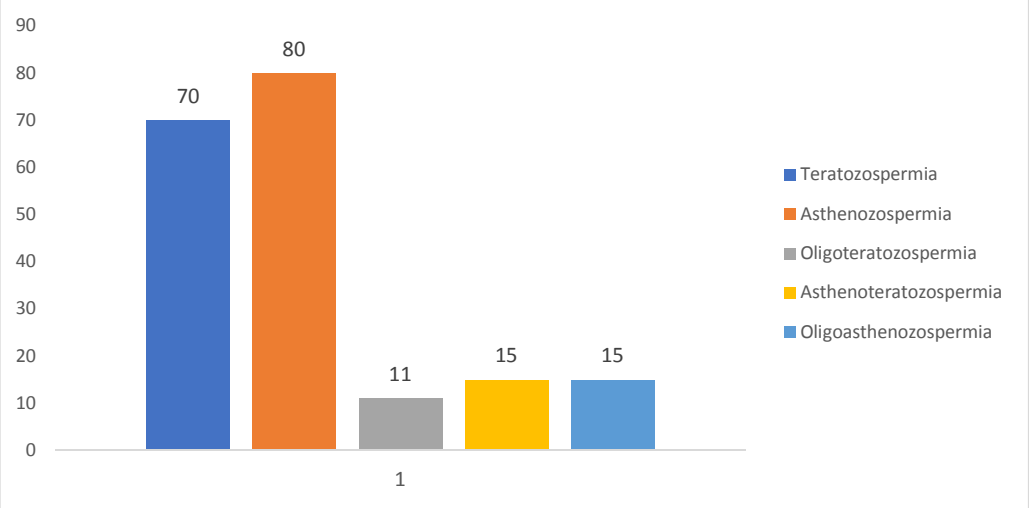

Fig. 2. Semen abnormalities

bacteriological findings and semen density. Azoospermia was significantly higher in subjects with *Bacteroides* spp (33.33%) [*P* <0.05], and severe oligospermia amongst those that have both *E. coli* + Staph (50.0%) [*P* <0.05].

Table 4 shows an association between Motility and Semen Density. Azoospermia (5.19%), Oligospermia (36.36%) and Severe Oligospermia (37.66%) were all statistically significantly higher in subjects with Abnormal motility [*P* <0.05], whereas Normospermia (59.34%) was statistically significantly higher in subjects with normal motility [*P* <0.05].

Table 1. Association between subjects occupation and semen density

Occupation	Azoospermia	Normospermia (>20x10^6 sperm/ml)	Oligospermia (<20x10^6 sperm/ml)	Total	Chi-square (χ2)	*p-value*
Business	0 (0.0)	47 (41.23)	67 (58.78)	114 (100.0)		
Civil servant	6 (2.91)	118 (57.28)	82 (39.81)	206 (100.0)		
Rig worker	4 (6.45)	32 (51.61)	26 (41.94)	62 (100.0)		
Total	10	197	175	382	18.02	*0.01**

**Statistically significant (P<0.05)*

Table 2. Association between subjects age and semen density

Age	Azoospermia-no sperm cell	Normospermia (>20x10^6 sperm/ml)	Oligospermia (<20x10^6 sperm/ml)	Total	Chi-square (χ2)	*p-value*
30-39	2 (2.06)	40 (41.24)	55 (56.7)	97 (100.0)		
40-49	6 (2.49)	129 (53.53)	106 (43.99)	241 (100.0)		
50-59	2 (4.55)	28 (63.64)	14 (31.82)	44 (100.0)		
Total	10	197	175	382	12.78	*0.05**

**Statistically significant (P<0.05)*

Table 3. Association between bacteriological findings and semen density

Bacteriological findings	Azoospermia	Normospermia (>20x10^6 sperm/ml)	Oligospermia (<20x10^6 sperm/ml)	Total	Chi-square (χ2)	*p-value*
Bacteriod spp	2 (33.33)	2 (33.33)	2 (33.33)	6 (100.0)		
coliform spp	0 (0.0)	16 (47.06)	18 (52.94)	34 (100.0)		
E. coli	0 (0.0)	8 (66.67)	4 (33.33)	12 (100.0)		
E. coli + staph aureus	0 (0.0)	2 (50.0)	2 (50.0)	4 (100.0)		
kleibsiella spp	0 (0.0)	4 (50.0)	4 (50.0)	8 (100.0)		
Staph aureus	2 (1.67)	64 (53.33)	44 (45.0)	120 (100.0)	39.78	*0.002**
No significant Growth	4 (2.56)	87 (55.77)	65 (41.67)	156 (100.0)		
Total	8	183	139	340		

**Statistically significant (P<0.05)*

Table 4. Association between motility and semen density

Motility	Semen density			Total	Chi-square (χ2)	*p-value*
	Azoospermia	Normospermia (>20x10^6 sperm/ml)	Oligospermia (<20x10^6 sperm/ml)			
Abnormal	4 (5.19)	44 (20.78)	57 (74.02)	77 (100.0)		
Normal	6 (1.97)	181 (59.34)	118 (38.69)	305 (100.0)		
Total	10	197	175	382	63.32	*0.001**

**Statistically significant (P<0.05)*

3.1 Discussion

Spermatogenesis is a complex process in which spermatogonia give rise to motile spermatozoa. Such process occurs inside the seminiferous tubules of the testis. These primordial germ cells reach the developing testis at the early stages of embryonic development from the wall of the yolk sac along the dorsal mesentery of the gut [14]. Moreover, apoptosis in the testis which is a physiological mechanism could regulate the process of spermatogenesis. High apoptosis rates might result in azospermia and male infertility [15].

In the current study, multiple abnormalities of semen quality OATS (oligoasthenoteratozoospermia) syndrome were reportedly as high as 21.9% in Abakaliki by Ugboma et al. [7]; however majority of the study population were farmers. Semen analysis is similar to findings from studies in Abakaliki, South Eastern Nigeria by Ugwuja et al. [16] but more than that of Adeniji et al. [17] in Ibadan in South Western Nigeria.

Civil servants had the highest prevalence of oligozoospermia (39.8%); similar to findings in Ile-Ife by Owolabi et al. [18]. There appears to be a relationship between the occupations of male partners of infertile couples and the pattern of semen abnormalities. Further evaluation is needed to ascertain the cause of these associations.

Table 1 shows a statistically significant difference ($P < 0.05$) in the distribution of the semen findings according to the occupations of the subjects with Rig workers having the highest percentage of azospermia (6.45%) [$P < 0.05$].

Our finding is similar to that of Ugboma et al. [7] in Abakaliki, Ebonyi state (41-45 years), it is however different from the most prevalent age group of 31-35 quoted from the study in Ekiti state and 31-40 years quoted in Ile-Ife [19].

Oligozoospermia (46%) and asthenozoospermia (20.9%) were the leading abnormal factors in semen quality among the male partners. This was similar to findings in Ekiti state by Peter et al. [19] and in Benue state by Nwadioha et al. [20], but slightly different from studies in Abakaliki by Ugboma et al. [7], where oligozoospermia and aspermia were the leading abnormal factors.

Staphylococcus aureus was the commonest organism cultured from semen samples as seen in Table 3. This was supported by studies by Owolabi et al, Peter et al., and Nwadioha et al. [18-20]. There was a significant association between a culture of Bacteriodes spp and azoospermia. Severe oligozoospermia was significantly associated with a culture of Escherichia coli and *Staphylococcus aureus* combined in a semen sample.

Abnormal seminal fluid analysis results are responsible for the poor outcome following conventional methods of infertility treatment in our environment; hence the current advocacy for the use of assisted reproductive technology to solve the problem of male factor infertility in Nigeria [3].

Semen analysis is the cornerstone of the laboratory evaluation of the infertile male and helps to define the severity of the male factor; it gives indications of testicular function and of the integrity of the male genital tract which may facilitate treatment plans.

4. CONCLUSION

This study showed a high rate of abnormal semen parameters in men attending an infertility clinic in Port Harcourt. It brings for the contribution of the male to these all-important challenges in our environment. Increased awareness should be created amongst men in our society and they should be encouraged to seek appropriate care early.

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. Moreover, future studies are recommended to investigate the possible causes of increased abnormal semen qualities noticed in the region of Port Harcourt.

CONSENT

It is not applicable.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Umeora OU, Mbazor JO, Okpere EE. Tubal factor infertility in Benin City, Nigeria - Sociodemographics of patients and aetiopathogenic factors. Trop Doct. 2007;37(2):92-4.
2. Otubu JA, Sagay AS, Dauda S. Hysterosalpingography, laparoscopy and hysteroscopy in the assessment of the infertile Nigeria female. East Afr Med J. 1990;67:370-2.
3. Orhue A, Aziken M. Experience with a comprehensive university hospital based infertility program in Nigeria. Int J Gynaecol Obstet. 2008;101:11-5.
4. Inhorn MC. Global infertility and the globalization of new reproductive technologies: Illustrations from Egypt. Soc Sci Med. 2003;56(9):1837-51.
5. Mehta RH, Makwana S, Ranga GM, Srinivasan RJ, Virk SS. Prevalences of oligozoospermia and azoospermia in male partners of infertile couples from different parts of India. Asian J Androl. 2006;8:89-93.
6. Ojiyi EC, Dike EI, Anolue BU, Okeudo C, Uzoma OI, Uzoma JI. Male factor subfertility at the Imo state university teaching hospital, Orlu. The Internet Journal of Gynecology and Obstetrics. 2012;16(1):1-6.
7. Ugboma HAA, Obuna JA, Ugboma EW. Pattern of seminal fluid analysis among infertile couples in a secondary health facility in South Eastern Nigeria. Research in Obstetrics and Gynecology. 2012;1(2):15-18.
8. Mandong BM. Histological pattern of testicular biopsies in Nigerian men (undergoing investigations for infertility in Jos, Nigeria). Highland Med Research Journ. 2002;1(1):7-8.
9. Ibekwe PC, Mbazor JO. Semen evaluation of infertile couples in Abakaliki, Nigeria. Ebonyi Med Journ. 2002;1(1):33-37.
10. Ekwere PD, Archibong EI, Bassey EE, Ekabua JE, Ekanem EI, Feyi-Waboso P. Infertility among Nigerian couples as seen in Calabar. Port. Med. Journ. 2007;2(1):35-40.
11. Olatunji AO, Sule-Odu AO. Pattern of infertility cases at a University hospital. West Afri J. Med. 2003;22(3):205-207.
12. Silverberg KM, Turner T. Evaluation of Sperm. In: Gardner DK, Weissman A., Howles C.M. and Shoham Z, editors. Textbook of assisted reproductive techniques. 2nd edition. London: Taylor and Francis. 2004;65-78.
13. WHO laboratory manual for the examination and processing of human semen. 5th ed. WHO Press, World Health Organization, 20 Avenue Appia, 1211 Geneva 27, Switzerland. 2010;7-113.
14. Hegazy A. Clinical Embryology for medical students and postgraduate doctors. LAP Lambert Academic Publishing, Berlin; 2014.
15. Hegazy R, Hegazy A, Ammar M, Salem E. Immunohistochemical measurement and expression of Mcl-1 in infertile testes. Front. Med. 2015;9(3):361–367.
16. Ugwuja EI, Ugwu NC, Ejikeme BN. Prevalence of low sperm count and abnormal semen parameters in male partners of women consulting at infertility clinic in Abakaliki, Nigeria. Afr J Reprod Health. 2008;12:67-73.
17. Adeniji RA, Olayemi O, Okunlola MA, Aimakhu CO. Pattern of semen analysis of male partners of infertile couples at the University College Hospital, Ibadan. West Afr J Med. 2003;22:243-5.
18. Owolabi AT, Fasubaa OB, Ogunniyi SO. Semen quality of male partners of infertile couples in Ile-Ife, Nigeria. Niger J Clin Pract. 2013;16:37-40.
19. Peter AO, Temi AP. Pattern of semen parameters and factors associated with infertility in male partners of infertile couples in Nigeria. Andrology (Los Angel). 2016;5:162. DOI:10.4172/2167-0250.1000162.
20. Nwadioha SI, Odimayo MS, Jombo GTA. Microbiologic review of seminal fluids in a Nigerian tertiary health center. Arch Clin Microbiol. 2016;7:4.

Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sciencedomain.org/review-history/23681