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Reports of Semen Parameters Among Male Partners of Infertile Couple Presenting at the Gynecological Clinic of A Tertiary Hospital Southeast, Nigeria.

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Abstract

Background: Study done at Abakaliki, Ebonyi State, Nigeria. To analyze the semen parameters/culture results of male partners of infertile couples that presented for evaluation.
Methods: Ten years review of seminal fluid analyses/culture of male partners of infertile couples at Alex Ekwueme Federal University Teaching Hospital Abakaliki, Ebonyi State, Nigeria from January 2013 to December 2022. Patients' records retrieved from clinic/laboratory registers, and case notes. Results semen analysis and culture extracted and analyzed.
Results: The results of 2491 male partners out of 3022 were retrieved which represent 82.4% of the clients. Secondary infertility was 68.7%, primary infertility 31.3%. Normospermia noted in 62.1%, oligospermia 31.8%, azoospermia 6.1%. Mean age was 40.3 ± 6.3, most were aged 30 – 39 years followed by those of 40 – 49 years. Normal semen volume 79.8%, low volume 20.2%, morphology was 65.4% normal and 28.5% abnormal, normal motility 66.7% abnormal 27.2%. Bacterial cultured in 60.7%. Most cultured (42.3%) organism was Staphylococcus aureus followed by coliforms (11.7%). No growth in 39.3%. Eighty-six percent had significant white cell count.
Conclusion: Male factor infertility is common in our setting with infection as major culprit. Public enlightenment, habits modification, early management of infection will reduce this and the family problems it brings.

1. Introduction

1.1 The first description of spermatozoa in the 17th century was done by Leeuwenhoek and in 1928 the sperm count was associated with fertility.[1] infertility ca be defined as inability to conceive after 12 months or more of unprotected coitus and it involves a couple rather than an individual.[2,3,4] In the African setting, it constitutes a major problem because of the high premium placed on child bearing and most of the time leads to marital disharmony.[5,6] The couple go through a lot of physical, psychological, sociocultural and economical problems.[1,7] The woman surfers the most in this problem in the African setting as most of the men believe that the woman is the cause of the problem especially where there is no sexual dysfunction like erectile dysfunction in the male partner.[8]

1.2 The etiologic factor of infertility could be either male, female or both. The female factor contributes 30% - 40%, while male factor contributes 30% - 40%, both contribute 35% while about 5% is idiopathic.[9,10,11] Male infertility can be as a result of urogenital problem (acquired or congenital), urogenital infections, tumors or malignancies, increased scrotal temperature, immunological, endocrine or genetic abnormalities. It could also be due sexual or ejaculatory dysfunctions.[9,11,12]

1.3 Previous studies in Nigeria reported that male factor infertility associated with abnormal semen parameters constitute 20% - 41%.[13,14,15,16,17] Seminal fluid analysis and culture is a fundamental step to determine the testicular function and help the clinician to make diagnosis. It is an essential tool to evaluate male factor infertility and can as well be used to evaluate improvement after varicocelectomy. In our setting, most of the male partner refuse to show up for semen analysis as shown in previous studies because they believe the problem is with the woman.[16,17]

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Infection of the urogenital tract or sexually transmitted infections like *Neisseria gonorrhea*, *Staphylococcus aureus* and other bacterial organisms are known to affect the testicle function leading to dysfunction and abnormal semen parameters which when diagnosed and well treated on time will prevent some male factor infertility.[16,17,18, 19, 20] The use of tobacco and tobacco products like Cigarette smoking has been associated with male factor infertility as this has deleterious effects on some semen parameters.[21]

2. Materials and Methods

2.1 This was a 10 years retrospective review of seminal fluid analyses and culture of male partners of infertile couples presenting at the gynecological clinic of Alex Ekwueme Federal University Teaching Hospital Abakaliki, Ebonyi State, Nigeria from January 2013 to December 2022. Alex Ekwueme Federal University Teaching Hospital, Abakaliki (AEFUTHA) was created on December 2011, following the acquisition and merger of the defunct Ebonyi State University Teaching Hospital with the Federal Medical Center by the Federal Government. It was then referred to as Federal Teaching Hospital Abakaliki (FETHA). Patients from other hospitals and clinics within the state and the other neighboring states are referred to the center. Abakaliki is the major urban setting as well as the state capital. The population is predominantly Igbos with about 75% of the population rural dwellers and subsistent farming is the major occupation. Christianity, the traditional African traditional religion and animism are the major belief system[22].

2.2 Patients' records were retrieved from the gynecological clinic registers, case notes and laboratory registers. A total of 3022 cases of infertile couples were seen during this period. Two thousand four hundred and ninety-one (2491) of the male partners presented their semen for analysis. Samples were collected from patients after 3 days or more of abstinence from sexual intercourse by masturbation method. Samples were collected in a sterile container and were transferred to the laboratory for analysis and culture. The Semen samples were examined within 30 minutes to 1 hour of collection. Parameters examined were volume of the seminal fluid (ejaculate), the time of liquefaction, the pH, the viscosity, the total sperm count per mill (using the counting chamber), total motility which was then graded into (active, sluggish and non-motile) expressed in percentages and the sperm morphology. The WHO 2010 criteria for human semen characteristics with the following indices were used. These includes a minimum volume of 1.5 ml, a sperm concentration of >15 × 106 cells/ml, progressive motility >32%, and morphology of >4% normal forms[23].

2.3 Cultures of seminal fluid samples were also done within 30 minutes to 1 hour of the sample collection under aseptic condition using blood agar, chocolate agar and MacConkey Agar at 37°C for 24 to 48 hours. The cultures were examined for growth and antibiotics sensitivity. Data were then fed into the computer and analysis done by using SPSS statistical software (SPSS Incorporated, Chicago, Il, USA). Data were presented using descriptive statistics such as frequencies, percentages and central tendencies such as mean and standard deviation were computed. The association between biodata variables and semen parameters were determined using Pearson's coefficient of correlations and Chi-square test and *P value* < *0.05* was considered statistically significant.

3. Results

A total of 3022 infertile cases were seen in the clinic during the period in review. The results of 2491 male partners were retrieved from the records (folders) and laboratory departments which represent 82.4% of the clients. The remaining were either not found, have no semen parameters/culture results or incomplete results. Majority of the clients presented with secondary infertility (68.7%) while primary infertility was 31.3%. more than halve of the male partners (62.1%) have normal total sperm count while azoospermia was up to 6.1%. Table 1. The mean age of the male partners was 40.3 ± 6.3 and most of them were aged between 30 – 39 years followed by those aged between 40 – 49 years.

Table 1. type of infertility and sperm count distribution

Type of infertility	**Number**	**%**
Primary	779	31.3
Secondary	1712	68.7
Total	2491	100
Sperm count (cells/10^6)		
Normospermia (≥ 15)	1548	62.1
Oligospermia (< 15)	792	31.8
Azoospermia (0)	151	6.1
Toal	2491	100

Table 2. seminal fluid parameters among the male partner of infertile couple

Parameter	Number	%
Volume		
≥ 1.5 ml	1991	79.8
< 1.5 ml	500	20.2
PH		
8	1463	58.7
7	1028	41.3
Morphology (% of normal forms)		
≥ 4	1629	65.4
< 4	710	28.5
Motility (% of active motion)		
≥ 40	1662	66.7
< 40	677	27.2

Almost 80% of the male partners of the infertile couples have normal semen volume, 58.7% had the *Ph* of 8 and 66.7% showed normal active directional movement. Table 2.

Table 3. Semen culture results and white blood cell count

Organisms	Number	%
Staphylococcus aureus	1053	42.3
Coliforms (especially *E. coli*)	289	11.6
Strep pyogenes	105	4.2
Pseudomonas	66	2.6
No growth	978	39.3
Total	2491	100
White blood cell count (cells/10^6)		
>1	2141	86
<1	350	14
Total	2491	100

Greater number of the cultured semen (60.7%) had positive growth of one organism or the other. Most cultured (42.3%) organism is Staphylococcus aureus. The coliforms were also common especially *E. coli* (11.7%). There was however no bacterial growth in 39.3% of the semen samples. Eighty-six percent have significant white blood cell count of >1x10^6. Table 3.

Table 4. Age grouped and semen profile/ culture results of male partners of infertile couple.

Age grouped (years) (intervals of 10 years, 20-29, 30-39 … ≥ 60)	Semen profile/culture results			x^2	*Pv*
	SEMEN VOLUME				
	Normal (≥1.5mi)	**Abnormal (<1.5ml)**			
20 - ≥60	1991(79.8%)	500(20.2%)		3.4289	0.9917
SPERM COUNT					
	Normal	**Abnormal**	**zero**		
20 - ≥60	1548(62.1%)	792(31.8%)	151(6.1%)	53.0845	0.0000
MOTILITY					
	Normal	**Abnormal**	**Zero**		
20 - ≥60	1663(66.7%)	677(27.1%)	151(6.1%)	61.1210	0.0000
MORPHOLOGY					
	Normal	**Abnormal**	**Zero**		
20 - ≥60	1629(65.4%)	711(28.5%)	151(6.1%)	64.0441	0.0000
PH					
	8		**7**		
20 - ≥60	1463(58.7%)		1028(41.3%)	0.2984	0.9899
CULTURE RESULTS					
	Organism grown		**No growth**		
20 - ≥60	1513(60.7%)		978(39.3%)	8.1586	0.9440

Table 4 showed the correlation between age and the semen profile/ culture results of the male partners. There statistically significant correlation between age and sperm count, motility and morphology while there is no significant correlation between age and sperm volume and *PH*.

Table 5: Occupation and semen profile of male partners of infertile couple.

Occupation Semen profile														
	Volume		**Sperm count**			**motility**			**Morphology**			***PH***	
	N	**Abn**	**N**	**Abn**	**0**	**N**	**Abn**	**0**	**N**	**Abn**	**0**	**8**	**7**
Civil Servants	620	220	585	240	15	596	229	15	599	225	16	415	425
Artisans	313	04	100	195	22	151	144	22	128	167	22	166	151
Drivers	397	79	294	103	61	312	85	61	311	86	61	364	94
Traders	541	183	503	190	31	529	164	31	515	177	31	392	332
Farmers	101	05	65	22	19	73	14	19	73	14	19	96	10
Clergy	36	10	1	42	3	2	41	3	3	40	3	30	16
X^2	124.1918		348.1026			278.1981			312.9079			168.1700	
Pv	0.0000		0.0000			0.0000			0.0000			0.0000	
Habits													
Alcohol only	306	28	314	18	2	320	12	2	319	13	2	207	127
Tobacco only	61	44	84	21	-	84	21	-	84	21	-	84	21
Both	1157	257	795	533	86	880	448	86	845	483	86	735	679
None	465	172	353	220	64	377	196	64	379	194	64	436	201
X^2	83.8122		207.3371			179.0398			193.4245			73.1420	
Pv	0.0000		0.0000			0.0000			0.0000			0.0000	

N = Normal value, Abn = Abnormal value, 0 = Zero (azoospermia)

Table 5 showed the correlation between occupation and habits and semen profile of the male partners. These had statistically significant relationship with the semen profile.

Table 6 showed the correlation between culture results, sperm count and PH which were all statistically significant.

Table 6: Culture results, Sperm count, *PH* and White Blood Cell COUNT.

Culture result	**Sperm Count**			**WBC Count**			***PH***
	N	**Abn**	**0**	**Signficant**	**Nonsignificant**	**8**	**7**
Staph. aureus	659	327	67	811	238	488	565
Streptococcus spp	90	2	13	104	1	97	8
Pseudomonas	51	2	13	62	4	51	15
Coliform bacteria	255	21	13	289	-	273	16
No growth	493	440	45	868	107	554	424
X^2	252.2094			143.0870		279.0754	
Pv	0.0000			0.0000		0.0000	

N = Normal, Abn = Abnormal, 0 = Zero(azoospermia)

4. Discussion

4.1 Previous studies in the country had shown that male factor infertility as shown by poor semen profile is an important contributor to infertility our country Nigeria. Studies had reported between 20% – 40% of infertile couple had poor semen profile as a cause.[13-15] This study showed that 82.4% of male partners of the infertile couples presented for semen analysis and culture. This is similar to previous report of 756/922 (82%) in the center.[17] This is much higher than the report of 20.5% presentation in a study in Jigawa State.[16] This difference may be due to levels of education and enlightenment in the two regions where the studies were carried out. An earlier study in our center also reported a lesser presentation of 56/83 (67.5%) of the male partners.[25]This shows that more male partners are presenting now than before even in our center though the sample size of that study was small. Initially male partners of infertile couple believe they cannot be responsible especially when there is intact erectile function.[8] This to be changing now as more male partners are presenting for themselves for Seminal Fluid Analysis and culture.

4.2 The mean age of this study was 40.3 ± 6.3 years. This is similar to the previous study in the center that reported a mean age of 40.1 ± 10.23 years[17] but different from the study in Jigawa which reported mean age of 34.1 ± 5.8 years.[16] In this study most of the male partners were aged between 30 – 39 years followed by those aged between 40 – 49 years. The study in Jigawa showed most of them were aged between 25 – 30 years followed by those aged between 36 – 40 years. The difference in the most common age group in the two studies may be explained by the fact the those in the North are more likely to marry earlier than those in the Southeast.

4.3 This study showed that most of the male partners (67.7%) had secondary infertility while 31.3% presented with primary infertility. This is similar to 66% secondary infertility reported previously in the center[17] but different from the findings in a different center in the Southeast which reported 65% primary infertility and 35% secondary infertility.[26] This high rate of secondary infertility in the study may be due to high incidence of untreated or poorly treated sexually transmitted infections as a result of quackery, ignorance, poor health seeking behavior and poverty. The study reported 61.2% normospermia, 31.8% oligospermia and 6.1% azoospermia among the male partners. The previous studies in our center reported 41%[17] and 40.7%[24] abnormal semen profile which is higher than in this study. This difference could be attributed to more of the male partners now presenting for proper evaluation and treatment of especially sexually transmitted infection. Our finding is however similar to the 38.2% abnormal semen profile reported from Ado, Ekiti State.[27] The study from Jigawa also reported different findings of 52.38% normospermia, 20.64% oligospermia and 26.98% azoospermia.[16]

The study also showed that 79.8% of them had normal semen volume, while 20.2% had low volume. Morphology showed 65.4% normal forms and 28.5% abnormal forms. Motility showed 66.7% active directional motion while 27.2% was sluggish. The high percentage of normal semen volume, motility and morphology in this study make it seem to have little or no effect on fertility. The *PH* of 8 was 58.7% while that of 7 was 41.3%. Further analysis showed no correlation between age and semen volume*, PH* and culture results. The study however showed strong correlation between age and sperm count, motility and morphology. Previous studies suggested that age may be associated with low semen volume, motility and morphology,[28] but others suggested that sperm count is insignificantly affected.[29-31] the study in Jigawa also suggests weak correlation between age and all the semen profile.[16]

The study also demonstrated strong correlation between semen profile and occupation. This showed that some occupation may likely lead to abnormal semen profile than others. There is also strong correlation between habits (like alcohol/tobacco consumption) and abnormal semen profile. Those that consume alcohol and or tobacco or both are more likely to have abnormal semen profile. This had been demonstrated in other studies.[24]

4.4 Organisms were culture in 60.7% of the semen. This is higher than 13.6%[16] and 30%[18] reported elsewhere. This is however similar to the previous report 59.3%[17] from our center. The commonest organism cultured was Staph. Aureus 42.3% followed by the coliform bacteria 11.6%. This is similar to previous report of 43.4%[17] in our center but these were however much higher than a much earlier study in the center which reported 25.6% of Staph. Arues.[24] this shows that infection has continued to be a major contributor to abnormal semen profile leading to male factor infertility in our setting. There was very high prevalence of white blood cell count (86%) in the study even in most of the semen with negative culture results. This may show that even those with negative culture may not be free from infection but may have abused antibiotics prior to presentation. Other studies both in the center and elsewhere had similar reports of white blood cells. Further analysis showed statistically significant correlation between the culture result and sperm count, white blood cell count and PH. Some of the organism like Staph. Aureus seem to grow better in the neutral PH while the other organisms did better in the alkaline PH. This was also statistically significant. Unlike the study at Jigawa that showed good sensitivity to commonly used antibiotics the organisms in our study showed reasonable resistance to commonly used antibiotics in our setting. This may also point to antibiotic abuse by our clients prior to presentation.

5. Conclusion

Male factor infertility is still common in our setting with infection playing a major role. Public enlightenment, habits or life style modification, early diagnosis and treatment of infection will reduce this and the family problems it brings.

6. Funding
None received

7. Conflict of Interest
None declared.

8. Ethical Approval
This was gotten from the hospital ethical committee

References

yala C, Steinberger E, Smith DP. (1996). The influence of semen analysis parameters on the fertility potential of infertile couples. J. Androl. Nov; 17(6):718-725.

Abebe MS, Afework M and Abaynew Y. Primary and secondary infertility in Africa: systematic review with meta-analysis. Fertil Res Pract 2020; 6(1): 20.

Barratt CLR, Björndahl L, De Jonge CJ, et al. The diagnosis of male infertility: an analysis of the evidence to support the development of global WHO guidance—challenges and future research opportunities. Hum Reprod Update 2017; 23(6): 660–680.

Practice Committee of the American Society for Reproductive Medicine. Definitions of infertility and recurrent pregnancy loss. Fertil Steril 2008; 90: 560.

Abari CA, Audu DT. A study of street children in Kaduna metropolis, Nigeria. IOSR J Hum Soc Sci 2013; 15: 44-9.

Guz H, Ozkan A, Sarisoy G, Yanik F, Yanik A. Psychiatric symptoms in Turkish infertile women. J Psychosom Obstet Gynecol 2003; 24: 267-71.

Mahadeen A, Mansour A, Al-Halabi J, et al. Psychosocial wellbeing of infertile couples in Jordan. East Mediterr Health J 2018; 24(2): 169–176.

Chukwudebelu WO. The Role of Nigerian Males in Infertility and Subfertility in Africa. Adedovoh BK, editor. Ibadan: Caxton Press; 1974. p. 85-7.

. Li WN, Jia MM, Peng YQ, et al. Semen quality pattern and age threshold: a retrospective cross-sectional study of 71,623 infertile men in China, between 2011 and 2017. Reprod Biol Endocrinol 2019; 17: 107.

Kumar N and Singh AK. Trends of male factor infertility, an important cause of infertility: a review of the literature. J Hum Reprod Sci 2015; 8(4): 191–196.

Peter AO, Temi AP, Olufemi AP, et al. Pattern of semen parameters and factors associated with infertility in male partners of infertile couples in Nigeria. Andrology 2016; 5(1): 1–7.

Koju S, Tamrakar SR and Shankhadev R. Study of semen analysis patterns in male partner infertile couple attending tertiary level hospital of Nepal. Nepal J Obstet Gynecol 2021; 16: 57–60.

Ajabor LN, Ezimokhai M, Kadiri A. Male contribution to subfertility in Benin city. Trop J Obstet Gynecol 1981; 1: 53

Anate M. The infertile couple problem; Role of family planning clinics. Niger Med Pract 1991; 3: 26-32

Ladipo OA. Seminal analysis in fertile and infertile Nigerian men. J Natl Med Assoc 1980; 72: 785-9

Ugwa EA, Ashimi A, Abubakar M, Obadire S. Poor semen parameters among infertile couples presenting at a gynecological clinic of Federal Medical Centre Birnin Kudu Northwest Nigeria. Niger Med J 2015; 56: 283-6.

Onyebuchi AK, Ekwunife CI, Mamah J, Iwe B, Afogu E, Obi VO. Seminal fluid analysis of male partners of infertile couples in Abakaliki, Ebonyi State, Nigeria. Trop J Obstet Gynecol 2018; 35: 261-5

Ramesh ST, Girish Babu RJ, Srikrishna R, Vinay Kumar K. Semen analysis and culture in men undergoing fertility evaluation. J Pharm Biomed Sci 2013; 34: 1699-703.

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

Aulia SN, Lestari SW, Pratama G, et al. The pattern of abnormalities on sperm analysis: a study of 1186 infertile male in Yasmin IVF clinic Jakarta. J Phys: Conf Ser 2017; 884(1): 012138

Meri ZB, Irshid IB, Migdadi M, Irshid AB, Mhanna SA. Does cigarette smoking affect seminal fluid parameters? A comparative study. Oman Med J. 2013; 28(1): 12-5.

Umeora OUJ, and Egwuatu VE. The role of unorthodox and traditional birth care in maternal mortality. Trop Doct. 2010; 40(1): 13- 17.

World Health Organization. Department of Reproductive Health and Research. WHO Laboratory Manual for the Examination and Processing of Human Semen. 5th ed. Geneva: World Health Organization; 2010. p. 1-287.

Ajah LO, Ozumba BC, Onoh RC, Ezeonu PO, Iyoke CA, Ezeome IV. Seminal fluid features of male partners of infertility patients in Southeast Nigeria. Afr J Med Health Sci 2016; 15: 86-91.

Olatunji AO, Sule-Odu AO. The pattern of infertility cases at a university hospital. West Afr J Med 2003; 22: 205-7.

Ikechebelu JI, Adinma JI, Orie EF, Ikegwuonu SO. High prevalence of male infertility in southeastern Nigeria. J Obstet Gynecol 2003; 23: 657-9.

Aduloju OP, Adegun PT. Pattern of semen parameters and factors associated with infertility in male partners of infertile couples in Nigeria. Open Access J 2016; 5: 57-60.

Kidd SA, Eskenazi B, Wyrobek AJ. Effects of male age on semen quality and fertility: A review of the literature. Fertil Steril 2001; 75: 237-48.

Berling S, Wölner-Hanssen P. No evidence of deteriorating semen quality among men in infertile relationships during the last decade: A study of males from Southern Sweden. Hum Reprod 1997; 12: 1002-5.

Lemcke B, Behre HM, Nieschlag E. Frequently subnormal semen profiles of normal volunteers recruited over 17 years. Int J Androl 1997; 20: 144-52.

Spandorfer SD, Avrech OM, Colombero LT, Palermo GD, Rosenwaks Z. Effect of parental age on fertilization and pregnancy characteristics in couples treated by intracytoplasmic sperm injection. Hum Reprod 1998; 13: 334-8.