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Assessment of some medical conditions responsible for male infertility and treatment offered in general hospital, Calabar, Nigeria

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Abstract

Introduction: Male infertility remains a bottle neck in reproductive health. Globally, 8-12% of couples experience some form of infertility during their reproductive years, affecting approximately 50-80 million couples. This issue is particularly prevalent in Africa, including Nigeria, where an estimated 20-35 million couples are impacted, with 3-4 million in Nigeria alone. This study aims to assess the medical conditions leading to male infertility and the corresponding treatment outcomes within General Hospital Calabar over a five-year period (2019-2023).

Methodology: A retrospective case study design was used; data was collected from the medical records department in general hospital Calabar, Nigeria. The medical conditions leading to infertility in the study population was noted and the treatment given to ameliorate the individual medical conditions was equally documented. Data obtained were subjected to statistical analysis using SPSS 20.0 version and a descriptive and quantitative statistical analysis was done considering a five-year interval (2019-2023) to analyze the prevalence of male infertility cases and the distribution of underlying medical conditions contributing to infertility.

Results: Findings revealed variations in male infertility incidence across the study years, with varicose veins, erectile dysfunction, and low sperm count emerging as predominant factors accounting for %. Treatment modalities primarily included pharmacological, hormonal, surgical interventions, and assisted reproductive technology (ART), with ART serving as a predominant treatment option.

Conclusion: ED, Varicose veins and Low sperm counts are the leading cause of male infertility with hormonal therapy and surgical interventions being the popular treatment options. Therefore, increased public awareness, comprehensive diagnostic evaluations, multidisciplinary approaches and organized data documentation will improve reproductive health outcomes.

Keywords: Infertility; Reproduction; Varicose veins; Erectile dysfunction; Low sperm count

1. Introduction

Male infertility is a significant reproductive health issue globally, accounting for 40-50% of infertility cases. Despite advancements in medical science, the etiology and management of male infertility remain complex and multifactorial. This study aims to assess the medical conditions leading to male infertility and treatment outcomes in General Hospital Calabar, Nigeria, over a five-year period (2019-2023).

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Infertility is commonly defined as the inability of a couple to conceive even after engaging in unprotected and frequent sexual intercourse for a duration of one year³. Male infertility is specifically defined as the inability of a male to impregnate a fertile female through at least one year of unprotected intercourse⁸. This condition can be categorized as primary, indicating the absence of any prior successful pregnancy, or secondary, if at least one prior pregnancy has been achieved⁷.

The global impact of infertility is substantial, affecting millions of individuals of reproductive age. It is estimated that around 48 million couples and 186 million individuals worldwide are affected by infertility (WHO, 2022), with approximately 15% of couples unable to conceive after one year of unprotected sex³. In a 1991 report, the World Health Organization (WHO) estimated that globally, 8-12% of couples experience some form of infertility during their reproductive years, affecting approximately 50-80 million couples. This issue is particularly prevalent in Africa, including Nigeria, where an estimated 20-35 million couples are impacted, with 3-4 million in Nigeria alone¹¹.

Despite the prevalence of male infertility, there is a lack of comprehensive studies examining the medical conditions contributing to male infertility and treatment outcomes in Hospitals within Calabar metropolis in Nigeria. This gap in knowledge hinders the development of targeted interventions and optimized clinical management strategies for male infertility cases.

1.1. Rationale

Male infertility constitutes one of the commonest health challenges in Nigeria and sub-Saharan Africa with a significant prevalence in Nigeria. Despite its prevalence, male infertility remains poorly understood, particularly in low-resource settings. The lack of comprehensive data on the medical conditions leading to male infertility and treatment outcomes hinders the development of effective diagnostic and treatment protocols, resulting in suboptimal patient care.

The outcome of this study will contribute valuable data to the existing body of research, facilitating further studies and advancements in the field of clinical and reproductive health.

2. Literature review

Male infertility is a complex and multifaceted reproductive health concern that affects approximately 40-50% of infertile couples worldwide¹. In Nigeria, male infertility is reported to be an important but neglected reproductive health issue, with the male factor responsible for 40-50% of all infertility cases¹².

Among the multiple of factors contributing to overall infertility, male infertility plays a crucial role, arising from a diverse range of causes such as age, genetic, environmental, lifestyle and medical factors⁸. Notably within this line of thoughts, anatomical abnormalities in the male reproductive system have been recognized as a critical factor influencing male infertility. These anatomical issues can involve the testes, vas deferens, epididymis, seminal vesicles and other reproductive structures, thereby ultimately decreases fertility^{6,10}. Certain surgical procedures such as vasectomy, scrotal or testicular surgery, prostate surgery and big abdominal surgeries for testicular and rectal malignancies can also lead to male infertility¹⁴.

Accurate diagnosis and treatment of male infertility require a comprehensive evaluation by a specialist in male reproductive health². The goals of a male infertility evaluation include identifying and correcting reversible causes to enable natural conception, recognizing irreversible conditions treatable with assisted reproductive technology (ART), addressing situations where the man's sperm is unavailable, managing associated medical diseases, and identifying genetic factors that could impact offspring⁹.

Surgical management of male factor infertility has expanded significantly over the past 15 years, with advances in diagnostic techniques, surgical modalities, microsurgery, reproductive technology, and the introduction of intracytoplasmic sperm injection (ICSI)⁹. Surgical procedures such as Transurethral Resection of Ejaculatory Duct, varicocelectomy, vasovasostomy, Microsurgical testicular sperm extraction, and Epididymal sperm aspiration are employed to correct male infertility⁵.

3. Material and method

- **Method of data collection:** This study utilized a retrospective study design, focusing on the analysis of existing medical records and patient files within General Hospital Calabar's archives. The primary source of data was the medical records stored within General Hospital Calabar's records department. These records include

detailed information on male infertility cases, such as patient demographics, identified medical conditions leading to infertility, and treatments administered. Data extraction will involve documenting key variables, including patient age, identified medical conditions (e.g., varicocele, infections), and treatments received (e.g., medication, surgical interventions).

- **Study area and period:** This study was conducted at General Hospital Calabar, located in Calabar South Local Government Area, Cross River State, Nigeria. The study focused on male infertility cases treated at the hospital over a five-year period, from January 2019 to December 2023. The study period was selected to provide a comprehensive understanding of the prevalence, causes, and management of male infertility in this hospital.
- **Study population:** The study population for this study comprise of men who have been diagnosed with male infertility and received treatment at General Hospital, Calabar, over a five-year period (2019-2023).
- **Inclusion criteria:** Men diagnosed with male infertility and have received treatment for male infertility at General Hospital, Calabar with detailed medical records available in the hospital archives for the period of 2019-2023.
- **Sample size:** A total of 1129 data of patients that met with the inclusion criteria was selected and analyzed.
- **Exclusion Criteria:** Men without a confirmed diagnosis of male infertility and not received treatment for male infertility at General Hospital, Calabar whose medical records were not available or were incomplete in the hospital archives.
- **Method of Data Analysis:** The collected data in this research project was analyzed using the statistical software SPSS (Statistical Package for Social Sciences) version 20.0. The data was imputed into SPSS and cleaned to ensure accuracy. Descriptive statistics was employed to summarize and present key characteristics of the data, including demographic information, frequency and percentage of respondent. Chi-square statistical test was employed.

4. Results

Table 1 Prevalence of medical conditions leading to infertility from 2019 to 2023

Year	No.of cases	Rank
2019	168	392.75
2020	237	563.00
2021	251	645.38
2022	254	661.18
2023	219	495.62
Total	1129	-

Kruskal-Wallis test = 94.935; p<0.01

Shows significant difference in the yearly incidence of medical conditions leading to infertility

Table 2 Yearly distribution of medical conditions leading to infertility

No	Condition	2019	2020	2021	2022	2023	Total	%
1	Enlarge Veins	0	0	45	15	0	60	5.31
2	Erectile Dysfunction/Low Sperm Count	0	0	0	50	0	50	4.43
3	Chronic Condition/Disease	0	0	48	0	0	48	4.25
4	Chronic Disease Condition / Genetic Disorder	0	0	0	48	0	48	4.25
5	Erectile Dysfunction	0	18	30	0	0	48	4.25
6	STI, Eating Disorder	0	45	0	0	0	45	3.99
7	Exposed Radiation/Use Of Tobacco	0	0	0	0	44	44	3.90
8	Injury To Scrotum Or Testicles	0	40	0	0	0	40	3.54

9	Trauma To Testes	0	0	0	0	40	40	3.54
10	Excessive Alcohol Consumption	0	0	15	20	0	35	3.10
11	Radiation Injury	31	0	0	0	0	31	2.75
12	Vasectomy /Over Exercising	0	31	0	0	0	31	2.75
13	Aging/Erectile Dysfunction	0	0	30	0	0	30	2.66
14	Depression/Cancer Of The Testis	30	0	0	0	0	30	2.66
15	Low Sex Drive	0	0	0	30	0	30	2.66
16	Over Exercising/Smoking	0	0	30	0	0	30	2.66
17	Vasectomy	0	0	0	30	0	30	2.66
18	Low Testosterone, Smoking, Erectile Dysfunction	0	28	0	0	0	28	2.48
19	Oligospermia/Use Of Tobacco	0	0	0	0	28	28	2.48
20	Sti/Eating Disorder	0	0	0	28	0	28	2.48
21	Enlarge Veins (Varicocele)	0	25	0	0	0	25	2.21
22	Low Sperm Count/STI	0	0	25	0	0	25	2.21
23	Testicular Cancer	25	0	0	0	0	25	2.21
24	Varicoceles/Genetic Disorder	0	0	0	0	22	22	1.95
25	Hormonal imbalance	0	0	0	0	20	20	1.77
26	Oligospermia/Varicocele	20	0	0	0	0	20	1.77
27	Poor Eating/Low Testosterone	0	20	0	0	0	20	1.77
28	Variocele	20	0	0	0	0	20	1.77
29	Cancer/Medication And Supplement	0	0	0	0	19	19	1.68
30	Excessive Alcohol Consumption /Smoking, Chronic Disease	0	0	0	0	18	18	1.59
31	Smoking/Over Exercising	0	0	0	16	0	16	1.42
32	Others (<16%)	42	30	28	17	28	145	12.84
	Total	168	237	251	254	219	1129	100 %
		14.9 %	21.0 %	22.2 %	22.5 %	19.4 %		

Chi cal. = 4206.345; df = 172; p<0.001

The medical conditions differed significantly across the years

Table 3 Yearly distribution of treatment for infertility

No.	Treatment	2019	2020	2021	2022	2023	Total	%
1	Fertility Drugs/ testosterone /exercise	0	63	43	66	0	172	15.23
2	Sugery/Sperm Injection, hormonal therapy	57	40	0	0	70	167	14.79
3	Hormonal Therapy/ Genetic counseling /IVF	80	0	0	30	47	157	13.91
4	IVF/Assisted Hatching, insemination, topical gel	0	0	40	63	40	143	12.67
5	Assisted Reproductive Technique /hatching	0	49	0	50	0	99	8.77

6	Treated With Antibiotics/Fertility Drugs	0	45	30	0	18	93	8.24
7	Varicocele Surgery	0	25	0	45	0	70	6.20
8	Penis Pump/Exercise	0	0	48	0	0	48	4.25
9	Vein Stripping/Sclerotherapy	0	0	45	0	0	45	3.99
10	Tropical Gel For Low Testosterone	0	0	0	0	44	44	3.90
11	Tropical Hormonal Gel	31	0	0	0	0	31	2.75
12	Implants/Surgery	0	0	30	0	0	30	2.66
13	Intracytoplasmic Sperm Injection	0	0	15	0	0	15	1.33
14	Intrauterine Insemination (IUI)	0	15	0	0	0	15	1.33
	Total (n)	168	237	251	254	219	1129	
	%	14.9	21.0	22.2	22.5	19.4		

Chi cal. = 3540.423; df = 52; p<0.001

The treatment differed significantly across the years.

5. Discussion

Male infertility is a complex and multifaceted issue that affects a significant proportion of couples worldwide. Our study aimed to investigate the medical conditions that cause male infertility at General Hospital Calabar over a 5-year period (2019-2023). Findings indicate that the highest number of male infertility cases occurred in 2022, with a total of 254 cases (22.5%).

Also, our study revealed that enlarged or varicose veins were the most common medical condition causing male infertility, accounting for 5.31% of cases. This was followed by erectile dysfunction and low sperm count, which both accounted for 4.43% of cases. Chronic diseases and genetic disorders also played a significant role, accounting for 4.25% of cases each. Smoking was the least common cause, accounting for only 1.42% of cases.

These findings are consistent with previous studies conducted by Fang et al. (2021), which identified semen and varicocele disorders as common factors associated with male infertility. Our study further showed that identifying the causes of medical conditions leading to infertility in males enhances proper and accurate management of male infertility cases.

Regarding treatment options, we discovered that fertility drugs, hormonal therapy, surgery, genetic counseling, and assisted reproductive technology (ART/IVF) were the most commonly employed interventions. In most cases, a combination of one or more interventions are employed to treat diagnosed cases. However, intrauterine insemination and intracytoplasmic sperm injection were used in only a small proportion of cases (1.33%).

Overall, our study underscores the need for a comprehensive approach to addressing male infertility, one that takes into account the complex interplay of medical, lifestyle, and environmental factors that contribute to this condition. By better understanding the causes of male infertility, we can develop more effective treatment strategies and improve reproductive health outcomes for individuals and couples worldwide.

6. Conclusion

Conclusively, this study points out the significant burden of male infertility within General Hospital Calabar, with varicose veins emerging as a predominant contributing factor. Treatment strategies primarily involve a combination of pharmacological, hormonal, surgical, and ART interventions, with ART serving as a prevalent treatment option used.

Compliance with ethical standards

Acknowledgement

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Disclosure of conflict of interest

All authors declare that there is no conflict of interest.

Statement of ethical approval

The study was carried out using human male data domiciled in the health records unit of the radiology department of general hospital Calabar who had presented for infertility screening. Our ethical approval was obtained from the Cross-river State ministry of health, Calabar. Approval number is: CRSMOH/RP/REC/2023/914.

Statement of informed consent

Informed consent wasn't obtained since there was no direct contact with the patient. However, before data was obtained the ethical clearance was obtained.

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