ISSN: 2576-2842

Research Article

Journal of Gynecology & Reproductive Medicine

Prevalence and Patterns of Male Infertility in Massawa Hospital; Eritrea: Cross-Sectional Study; 2020

Berhe Tesfai[1*], Hailemichael Gebremariam[2], Liwam Abraham[1] and Fitsum Kibreab[3]

[1]*Ministry of Health, Northern Red Sea Zone, Massawa Hospital, Massawa, Eritrea*

[2]*Medical Doctor, Dekemhare Hospital, Ministry of Health, Dekemhare, Eritrea*

[3]*MSc, Statistician, Policy, Planning, Research Resource center Ministry of Health, Asmara, Eritrea*

[*]Corresponding author

Dr. Berhe Tesfai, Medical Doctor, Medical Director of Massawa Hospital, Ministry of Health, Massawa, Eritrea

Submitted: 27 Apr 2022; **Accepted:** 05 May 2022; **Published:** 16 May 2022

Citation: *Berhe Tesfai, Hailemichael Gebremariam, Liwam Abraham and Fitsum Kibreab. (2022). Prevalence and Patterns of Male Infertility in Massawa Hospital; Eritrea: Cross-Sectional Study; 2020, J Gynecol Reprod Med, 6(2), 66-70.*

Abstract

Background: *Semen analysis is the first step to identify male factor infertility. World Health Organization estimates that male factor accounts for 50% of couple sub-fertility. The objective of this study was to determine the prevalence and patterns of the male factor infertility in patients visiting Massawa Hospital with infertility complaints.*

Methods: *Patient's medical records and hospital laboratory register were used to retrieve semen analysis results of patients who did from June 2018 to June 2020 in Massawa Hospital. Ethical approval was obtained from the Ministry of Health Research and Ethical Review Committee. Confidentiality of patient's records was kept secured and data was analyzed as aggregates. Results were presented in frequency, tables and p value < 0.05 was considered significant.*

Results: *A total of 112 patient's data were analyzed with 49.1% aged between 20 to 30 years. The prevalence of male factor infertility in these patients was found to be 42% and 79.5% of them had a primary type of infertility. Of the analyzed data; 63 (56.3%), 72 (64.3%) and 70 (62.5%) had sperm count < 15million sperms/ml, sperm motility < 40 % and morphology of < 60% respectively. Fifteen (13.4%) patients had a semen volume of < 1.5ml/ejaculate, out of which 13(86.7%) had a primary type of infertility. Moreover; 72 (64.3%) patients had a total sperm count/ejaculate of < 39 million and 59 (82%) of these had a primary type of infertility. In addition; 50.8% and 50% of patients aged 20 to 30 years had a sperm count < 15 million/ml and sperm motility of < 40% respectively.*

Conclusion: *The prevalence of male factor infertility was almost similar to other studies and primary infertility was common in the patients. Most patients had lower sperm count and sperm motility compared to other studies. And, majority of patients with abnormal sperm results were aged between 20 to 30 years. Further prospective research to determine the risk factors and prevalence of infertility, and introducing assisted reproductive technology in Eritrea are highly recommended.*

Keywords: Infertility, Male Factor, Primary, Secondary, Sperm

Background

According to the World Health Organization (WHO), infertility is the inability to bear a child for one year or more of having regular sexual intercourses without any contraception. [1] Infertility is considered as primary when the couple has never born a child and secondary when it becomes unable to conceive during a 12-month period of trial after having born at least one child in the past. [1, 2].

There are no reliable figures for global prevalence of infertility; It varies across regions of the world and is estimated to affect 8–12% of couples worldwide. Male infertility refers to a male's inability to result pregnancy in a fertile female and it is commonly due to deficiencies in the semen, and semen quality is used as a surrogate measure of male fecundity [3]. Semen analysis is the first step to identify male factor infertility and population-based references ranges are available for standard semen and sperm parameters [4, 5].

Semen quality has been suggested that low semen quality may be a potential contributing factor in reducing fertility rates and increasing number of children born after use of assisted reproductive technology [6]. Males with sperm parameters below the WHO normal values are considered to have male factor infertility and the most significant of these are low sperm concentration, poor sperm motility, and abnormal sperm morphology [5].

The WHO has revised lower reference limits for semen analyses, derived from a study of over 1900 men whose partners had a time-to-pregnancy of ≤ 12 months. The Volume: 1.5 mL (95% CI: 1.4-1.7), Sperm concentration: 15 million spermatozoa/mL (95% CI: 12-16), Total sperm number: 39 million spermatozoa per ejaculate (95% CI: 33-46), Morphology: 4% normal forms (95% CI: 3-4), and Total (progressive + non-progressive motility): 40% (95% CI: 38-42) [3].

In approximately half of all cases, infertility is caused by male-related factors. In 50% of childless couples, abnormal sperm parameters are the male infertility factor [7]. However, in 30% to 40% of infertile couples, male infertility factors are absent. Over the past 20 years, approximately 30% to 50% of cases of infertility are due to male factors, and 20% of cases are due to a combination of both male and female factors [7].

During a period of military conflict towards the end of the 1990s, Eritrea experienced a remarkable decline in fertility [8]. An important issue of concern has been whether the decline is driven primarily by the recent border conflict with Ethiopia or by changes in other factors including delay in age at marriage, improvements in child survival and socio-cultural factors that pre-dated the conflict [8].

To the knowledge of the researchers, the prevalence of infertility in general and the male factor in particular is not determined in Eritrea. Moreover; the patterns and severity of male factor infertility is not identified. Thus, the objective of this study was to determine the prevalence and patterns of male factor infertility on these who have infertility complaint based on their semen analysis in Massawa Hospital.

Materials and Methods

Study design and study population

This study was a retrospective descriptive, cross-sectional hospital-based study. Patient's medical records were reviewed and their semen analysis results were retrieved from their clinical cards and laboratory register of Massawa Hospital. All patients who come to Massawa Hospital outpatient department with a complaint of infertility from June 2018 to June 2020 and did semen analysis were the study population of this research.

Data collection and analysis

Data collection was conducted from June to July, 2020. After retrieving the semen analysis results, the patterns of their semen results were documented and grouped. Other necessary background characteristics were also recorded from their medical records. Finally, the data was encoded in word Excel and analyzed by SPSS software. Statistical analysis results were presented in frequency distribution, tables and p-value < 0.05 was considered significant. Patients were grouped according to their sperm analysis results based on sperm count/ml, total sperm count/ejaculate, sperm motility and sperm morphology. They were also grouped on their age and type of infertility.

Data interpretation

Based on the WHO reference values of 2010, the lower limits of the sperm analysis parameters were used as reference values in this research. Sperm count < 15milliom/ml and sperm motility < 40% was used to assess the semen analysis results and to determine the prevalence of the male factor infertility. Thus; patients with semen analyze results below the WHO lower reference values of sperm count and motility (sperm count of <15,000,000spermatozoa/ml and sperm motility<40%) was considered infertile.

The WHO criteria for the sperm morphology of strict criteria of only 4% normal was not used to analysis the sperm morphology results as the procedure of strict criteria were not used during the interpretation by the laboratory technicians. Thus; 60% sperm morphology was used based on previous national references without using the strict criteria.

Ethical consideration

Ethical approval was obtained from the Research and Ethical Review Committee of Ministry of Health, Eritrea on 15/06/2020. The medical records and semen results of the patients was kept secured and information was used as aggregates.

Results

Background of study participants

A total of 112 medical records and semen analysis results of patients were analyzed. Their age distribution was 20 -30 years (49.1%), 21-39 years (33.9%) and > 40 years (17%). The prevalence of male factor infertility based on semen analysis on these patients in the hospital was 42% with primary type of infertility predominance (79.5%). (Table: 1)

Table 1: Characterization of study population

Fertility of respondents	Frequency (N)	Percent (%)
Fertile	65	58.0
Infertile	47	42.0
Type of infertility		
Primary	89	79.5
Secondary	23	20.5
Age of respondents (years)		
20-30	55	49.1
31-39	38	33.9
>40	19	17.0
Total	112	100.0

Association of sperm analysis with type of infertility

The study revealed that, 63 (56.3%) had a sperm count of < 15 million sperms/ml and 84.1% of them had a primary type of infertility. Generally; 72 (64.3%) patients had a sperm count of < 20,000,000 spermatozoa/ml and 14(12.5 %) patients had azoospermia (no single sperm). A total of 76(67.9%) of patients with semen volume of >1.5ml/ejaculate had a primary type of infertility and 15 (13.4%) patients had a semen volume of < 1.5ml/ejaculate. Two third of the study participants, 72 (64.3%) had a total sperm count of <39 million/ejaculate. Even though the primary type of male infertility was predominant with 79.5%, sperm count doesn't show statistically significant association to the type of infertility. Moreover, 72 (64.3%) of the patients had a sperm motility of < 40% and 17.5% of patients with sperm motility of > 40% had secondary type of infertility. Most patients, 70 (62.5%) had sperm morphology of < 60% from which 75.7% had primary type of infertility. Sperm motility and morphology doesn't show significant association to their type of infertility (Table 2).

Table 2: Characterization of study population based on sperm analysis and type of infertility

Variables	Type of infertility		P value
	Primary N (%)	Secondary N (%)	
Sperm count of respondents/ml			
<15,000,000/mL	53 (84.1)	10(15.9)	0.168
≥15,000,000/mL	36(73.5)	13(26.5)	
Absolute (total sperm count)/ ejaculate			
<39,000,000/ejaculate	59 (82)	13 (18)	0.443
>39,000,000/ejaculate	30 (75)	10 (25)	
Motility percentage of respondents			
<40%	56 (77.8)	16 (22.2)	0.550
≥40 %	33(82.5)	7(17.5)	
Morphology percentage of respondents			
<60 %	53(75.7)	17(24.3)	0.196
≥60 %	36(85.7)	6(14.3)	
Semen volume			
<1.5 ml/ ejaculate	13(86.7)	2(13.3)	0.458
≥1.5ml/ ejaculate	76 (78.4)	21(21.6)	
Total	89(79.5)	23(20.5)	112(100.0)

Association of sperm analysis results with age of respondents

The age distribution of the patients who had a sperm count of < 15,000,000spermatozoa/ml was 20-30 years (50.8%), 31-39 (38.1%) and > 40 years (11.1%). Majority (64.3%) of patients had an absolute sperm count of < 39 million spermatozoa/ejaculate; more predominant on patients 20- 30 years (30.4%). Only 6(40%) patients aged 20-30 years had a semen volume of < 1.5ml/ejaculate and 48(49.5%) patients had semen volume of ≥1.5ml/ejaculate on the same age group. sperm count doesn't show significant association with the age of patients.

Patients aged 20-30 years (50%), 31-39 years (30.6%) and > 40 years (19.4%) had a sperm motility of < 40. Moreover, 48.6% of patients aged 20 to 30 years had sperms with morphology of < 60%. Sperm motility and morphology doesn't show significant association to the age of the study participants (Table 3).

Table 3: Characteristics of sperm analysis and age of respondents

Variables	Age of respondents (years)			P-value
	20-30 N (%)	31-39 N (%)	>40 N (%)	
Sperm count /ml				
<15,000,000/ml	32(50.8)	24(38.1)	7(11.1)	0.156
≥15,000,000/ml	23(46.9)	14(28.6)	12(24.5)	
Total Sperm count/ejaculate				
<39,000,000	34(47.2)	21(29.2)	17(23.6)	0.698
≥39,000,000	21(52.5)	11(27.5)	8(20)	
Sperm Motility				
<40 %	36(50.0)	22(30.6)	14(19.4)	0.550
≥40%	19(47.5)	16(40.0)	5(12.5)	
Sperm Morphology				
<60 %	34(48.6)	20(28.6)	16(22.9)	0.052
≥60 %	21(50.0)	18(42.9)	3(7.1)	
Semen volume/ ejaculate				
<1.5ml	6(40)	5(33.3)	4(26.7)	0.534
≥1.5ml	48(49.5)	27(27.8)	22(22.7)	
Total	55(49.1)	38(33.9)	19(17.0)	112(100.0)

Discussion

Determining the prevalence of infertility in general and male factor infertility in particular is vital. This study was aimed to determine the prevalence and patterns of male infertility in patients visiting Massawa Hospital outpatient department from June 2018 to June 2020.

The prevalence of male factor infertility on patients visiting Massawa Hospital with infertility problems was found to be 42%. This result was almost similar to other studies, 40–50% 45.6% and 50% [4, 7, 9, 14]. Besides, this was higher to 35.7% [10]. This higher prevalence could be mainly due to different social, environmental and psychological risk factors among the study participants which need detailed analysis and evaluation of the problem.

The majority (79.5%) of the study participants had primary type of male infertility and was common in patients aged < 30 years. This was almost similar to other study showing that primary infertility was 77.3% and higher to other study that reported primary infertility of 52.3% [7]. The higher prevalence of primary type of infertility in the young group of the population could have different causes as social factors, smoking and working environment which need further prospective research to identify the determinants of infertility [10].

This research showed that majority of patients (56.3%) had low sperm count of < 15million sperms/ml and 12.5% had azoospermia. This was lower to other study that prevalence of azoospermia was 37.3% and (35%) [11]. But this result was higher than other studies in that 10.3% and 5.85%) of males were azoospermic [7, 12, 13]. The prevalence of azoospermia needs further extensive prospective research to determine the causes and general prevalence in the country.

Most patients (64.3%) had sperm motility of < 40% and highly pronounced on those aged 20 to 30 years and commonly associated with primary type of infertility. This was higher to other study that showed low sperm motility in 30.09%. Although the detailed risk factors were not determined, smoking and environmental risk factors could contribute for the lower sperm count [14]. Even though most patients had a semen volume above 1.5ml, they had relatively low sperm count and the absolute sperm count was reduced. Most patients aged 20 to 30 years had relatively reduced sperm count and motility, but higher semen volume compared to the other age groups. The young age group could have social habits like tobacco use could affect the quality and quantity of their sperm.

Limitations

As the study was retrospective based on semen analysis results, the determinants of infertility were not evaluated. It was difficult to retrieve further back ground characteristics of the male patient as their type of work, duration of infertility and other social factors from their medical records to associate with their semen analysis results. This prevalence of male factor infertility in Massawa Hospital can't generalize the general male factor prevalence in the country.

Conclusion

The prevalence of male factor infertility was relatively similar comparative to other studies and it was dominated with primary type of infertility. It was common in patients aged 20 to 30 years. Even though most patients had higher semen volume, the sperm analysis parameters (sperm count, motility and sperm morphology) were markedly decreased in majority of patients.

Recommendations

Based on the findings, further prospective researches that determine the risk factors for male factor infertility, Comparative

studies with different environmental and lifestyle factors, and determining the general prevalence of infertility in the country are highly recommended. Public awareness and health education on the potential lifestyle risks of male factor infertility are important to protect the community from the modifiable life style factors which could have direct or indirect effect on infertility. Based on the higher prevalence of male factor infertility, it is also time to announce assisted fertility in our country and to familiarize a specialized care of infertility or incorporate the comprehensive care to other existed programs.

Acknowledgment

Authors acknowledges the data collectors of Massawa Hospital laboratory staffs and patients who participate in the study.

References

1. Sarac, M., & Koc, I. (2018). Prevalence and risk factors of infertility in turkey: Evidence from demographic and health surveys, 1993–2013. Journal of biosocial science, 50(4), 472-490.
2. Aston, K. I., Krausz, C., Laface, I., Ruiz-Castane, E., & Carrell, D. T. (2010). Evaluation of 172 candidate polymorphisms for association with oligozoospermia or azoospermia in a large cohort of men of European descent. Human reproduction, 25(6), 1383-1397.
3. Sharma, A. (2017). Male infertility; evidences, risk factors, causes, diagnosis and management in human. Annals of Clinical and Laboratory Research, 5(3), 0-0.
4. Cooper, T. G., Noonan, E., Von Eckardstein, S., Auger, J., Baker, H. W., Behre, H. M., ... & Vogelsong, K. M. (2010). World Health Organization reference values for human semen characteristics. Human reproduction update, 16(3), 231-245.
5. Sabra, S. M., & Al-Harbi, M. S. (2014). An influential relationship of seminal fluid microbial infections and infertility, Taif Region, KSA. World J Med Sci, 10(1), 32-37.
6. Li, W. N., Jia, M. M., Peng, Y. Q., Ding, R., Fan, L. Q., & Liu, G. (2019). Semen quality pattern and age threshold: a retrospective cross-sectional study of 71,623 infertile men in China, between 2011 and 2017. Reproductive Biology and Endocrinology, 17(1), 1-8.
7. Öztekin, Ü., Caniklioğlu, M., Sarı, S., Selmi, V., Gürel, A., & Işıkay, L. (2019). Evaluation of male infertility prevalence with clinical outcomes in middle Anatolian region. Cureus, 11(7).
8. Woldemicael, G. (2008). Recent fertility decline in Eritrea: Is it a conflict-led transition?. Demographic Research, 18, 27-58.
9. Boivin, J., Bunting, L., Collins, J. A., & Nygren, K. G. (2007). International estimates of infertility prevalence and treatment-seeking: potential need and demand for infertility medical care. Human reproduction, 22(6), 1506-1512.
10. Tesfai, B., Kibreab, F., Gebremariam, H., & Abraham, L. (2021). Prevalence and Patterns of Male Infertility Based on Semen Analysis in Patients Visiting Massawa Hospital; Eritrea: Cross-Sectional Study; 2020.
11. Mehta, R. H., Makwana, S., Ranga, G. M., Srinivasan, R. J., & Virk, S. S. (2006). Prevalences of oligozoospermia and azoospermia in male partners of infertile couples from different parts of India. Asian journal of andrology, 8(1), 89-93.
12. Asha, A. (2014). Impact of age, verified occupation and lifestyle on semen parameters of infertile males in Jaipur: A preliminary study. International Journal of Health & Allied Sciences, 3(4), 278-278.
13. Rajan R .(1981). Male infertility. J ObstGynaecol India 804-809.
14. Toragall, M. M., Satapathy, S. K., Kadadevaru, G. G., & Hiremath, M. B. (2019). Association of demographic and lifestyle factors with semen quality of men with fertility problems attending infertility center in North Karnataka. Indian Journal of Medical Specialities, 10(2), 79.