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Prevalence of Normozoospermic, Oligozoospermic, Asthenozoospermic, Oligoasthenoteratozoospermic and Azoospermia Disorder in 394 Semen Samples

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ABSTRACT

Objective: this study aimed to evaluate the prevalence normozoospermia compared to other abnormal sperm parameters included oligozoospermia, asthenozoospermia, oligoasthenoteratozoospermia for patients who attended a fertility center in al Najaf city in Iraq.
Methods: The study was conducted in the laboratories of the Fertility Center of Al-Sadr Teaching Hospital in Al-Najaf Governorate - Iraq. The age of the patients ranged from 20 to 44 and the marriage period ranged from 1 to 8 years. The results of the semen analysis of the samples were recorded and a categories of male infertility factor were determined based on the World Health Organization's guideline. normozoospermia had sperm concentration > 15 million, progressive motility > 32 %, normal morphology > 14 %. oligozoospermia had sperm concentration < 15 million. asthenozoospermia had progressive motility < 32 %. oligoasthenoteratozoospermia had sperm concentration< 15 million, progressive motility < 32 %, normal morphology < 14 %. Azoospermia had sperm concentration zero /ml.
Results: The results showed that normozoospermia had higher prevalence (27.92) compared to other groups in study, oligozoospermia had (4.31), asthenozoospermia had (27.66), Oligoastheno had 25.63, Oligoasthenoterato had (6.09) and azoo had (8.38).
Conclusion: from our finding we concluded that Normozoospermia has higher prevalence than other abnormal sperm parameters.
Recommendation: study of prevalence of abnormal sperm parameters in the months of the years.

ARTICLE DETAILS

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INTRODUCTION

As male factors contribute to between 30% and 50% of cases of infertility1, 2, the examination of semen quality is a standard element in a male fertility assessment. Sperm quality not only in uences natural conception but also in uences the outcome of intrauterine inseminations (IUI) and in vitro fertilization (IVF)/ intracytoplasmic sperm injection (ICSI). Of particular importance are sperm concentration, the percentage of motile spermatozoa, and the percentage of morphologically normal spermatozoa3–4.

Normozoospermia relates to the amount, motility, and shape of sperm. Total number (or concentration, based on the stated outcome) of spermatozoa, as well as percentages of progressively motile (PR) and morphologically normal spermatozoa, at or above the lowest reference limits (5) (WHO, 2010). Oligozoospermia is defined as a decrease in sperm count of less than 15x10.6 per 1 milliliter of ejaculate 6 (WHO, 2000). Oligozoospermia is one of the worst idiopathic forms of male infertility 7 (Xu *et al*, 2013). Oligozoospermia is caused by a number of reasons, including aberrant hormonal swings, pituitary gland dysfunction, and sperm production dysfunction 8 (Mocarelli *et.al*, 2008). Total of spermatozoa below the lower reference limit (or concentration, depending on outcome stated) 5 (WHO, 2010).

A low sperm count (oligozoospermia) is frequently accompanied by poor motility and morphology, which reflects qualitative and quantitative abnormalities in spermatogenesis 9 (McLachlan, 2013).

Asthenozoospermia is one of the most common causes of male infertility and is characterized by low sperm motility due to a variety of etiologies including physiological, anatomical, medicinal, genetic, and nutritional variables 10 (Shen, 2013). Asthenozoospermia, a condition characterized by low sperm motility, is regarded as one of the primary contributors to male infertility 11(Shahrokhi *et al*, 2020). Asthenozoospermia is characterized by overall motility 40% and progressive motility 32% in a sperm sample 5 (WHO, 2010). Below the lower reference limit, the proportion of morphologically normal spermatozoa5 (WHO, 2010). A typical sperm has a well-defined oval head with an acrosomal cap occupying a major portion of the sperm head region. The sperm's midsection is a cylinder with well-defined boundaries, and its tail is straight and cylindrical 12 (Auger *et al*, 2016).

Azoospermia, which is characterized by the absence of sperm in ejaculated, is the most severe form of male-factor infertility. It affects around 5% of males and accounts for 30% of male-factor infertility cases 13 (Irvine, 1998). There are numerous causes of azoospermia, including duct obstruction, pituitary gland malfunction, and testicular malignancy 14 (Coll and Mosul, 2013).

LITERATURE REVIEW

Infertility:

Infertility is a condition of the male or female reproductive system characterized by the inability to conceive after 12 months or more of unprotected sexual activity 15 (WHO 2018). Male infertility accounts for around 40% of all instances, and it is known that disorders such as varicocele, cryptorchidism, hypogonadism, and hereditary factors can result in male infertility. In roughly 25% of couples, no underlying cause can be found for primary or secondary infertility; this is known as idiopathic infertility 16 (Alahmar, 2017).

Causes of male infertility

Numerous underlying disorders and/or risk factors contribute to the development of male infertility. A significant increase in the risk of infertility is primarily observed in the male population 17 (Havrylyuk *et al*, 2015).

Immunological causes:

5-15 percent of male infertility issues, such as cryptorchidism, primary testicular failure, testicular trauma, epididymitis, varicocele, idiopathic infertility, and infections, may have an immunological origin. Immunologic variables are regarded as a significant factor in infertility 18 (Lu *et al*, 2008).

Hormonal causes:

Changes in normal thyroid function led to decreased sexual activity and fertility 19 (Sengupta, 2013). Hypogonadism results in trophic hypogonadism, which is the most common cause of male infertility, whether acquired or congenital. Testosterone is the primary hormone responsible for spermatogenesis and sperm maturation. Testosterone fluctuations in the blood indicate hypogonadism, which affects the genital gland secretions 20 (Yu *et al*, 2018). Changes in FSH and LH hormones can be the primary cause of aberrant sperm production. Prolactin, FSH, LH, testosterone, and inhibin levels influence sperm concentration in ejaculate 21 (Gordetsky *et al*, 2012).

Genetic causes:

The quality of sperm may be impacted by aging, and men aged 45 and older are more likely to have DNA damage 22 (Infertility Network UK, 2016). 13.7 percent of infertile men with aspermia and 4.6% of those with oligzoospermia have a concomitant chromosomal issue. It could be a Y chromosomal loss 23 (Polishchuk *et al*, 1991). Approximately 1 in 650 men are affected by Klinefelter Syndrome (KS), a chromosomal disease involving the X chromosome. It is the most common hereditary cause of male infertility, and nearly all affected men are azoospermic 24 (de Marqui, 2021).

MATERIALS AND METHODS

The participants:

The study was conducted in the laboratories of the Fertility Center of Al-Sadr Teaching Hospital in Al-Najaf Governorate – Iraq between 2022 to 2023. The age of the patients ranged from 20 to 44 and the marriage period ranged from 1 to 8 years. The number of samples was (394). According to WHO guidelines 2010,2021, the study samples included normozoospermia, sperm concentration > 15 million, progressive motility > 32 %, normal morphology > 14 %. oligozoospermia had sperm concentration < 15 million .asthenozoospermia had progressive motility < 32 %.oligoasthenoteratozoospermia had sperm concentration< 15 million ,progressive motility < 32 % ,normal morphology < 14 % .azoospermia had sperm concentration zero /ml .

Semen analysis:

Infertile men were instructed to provide sperm samples via masturbation and a sexual abstinence period ranging from 2 to 7 days. The semen samples were collected in a clean container and placed in an incubator for 1 hour to complete liquefaction. Semen samples were mixed gently and well, then semen parameters were examined.

Semen volume was recorded by a graduated cylinder. sperm concentration was estimated by the Makler chamber ,progressive motility was estimated by wet preparation and

recorded under a light microscope (40x),sperm morphology was estimated by sperm morphology was estimated by eosin

Makler counting chamber method (25,26)

A drop from a well-mixed specimen of semen was placed on the chamber and covered. The microscope with a x20 objective and x10 eyepiece was used. Counting sperm heads contained within a strip of 10 squares, a number describing sperm concentration in millions per milliliter was obtained.

Assessment of sperm mophology

For the determination of sperm morphology, a smear of semen is prepared on a glass slide, air-dried, and stained with eosin/nigrosin. The slide is mounted with a coverslip and examined using a light microscope. Approximately, 200 spermatozoa per replicate are examined for normal and abnormal forms (50). (World Health Organization WHO laboratory manual for the examination and processing of human semen; 2010).

Statistical Analysis

Data of the present study was analyzed by using SPSS Statistics Version 23.0 (IBM SPSS Statistics for Windows, Version 23.0. IBM Corp). Comparison of differences between continuous variables was done by using the Paired t-Test when compared two means and One Way ANOVA test to compare three variables; Multiple Pairwise Comparisons were performed by using least significant differences (L.S.D). Chi squared test was performed to analyze categorized data; Pearson's correlation analysis was used to determine the relationship between variables. P values ≤ 0.05 and ≤ 0.01 considered as significant and highly significant.

RESULTS

The results showed that normozoospermia had higher prevalence (27.92) compared to other groups in study ,oligozoospermia had (4.31),asthenozoospermia had (27.66), Oligoastheno had 25.63, Oligoasthenoterato had (6.09) and azoo had(8.38).table 1.table 2 had results of comparison of sperm parameters between normozoospermia and other groups .normozoospermia had increasing of sperm concentration , progressive motility and normal morphology compared with other groups.

Table 1. prevalence of abnormalities of sperm parametrs in 394 samples of semen.

Groups	No	%
Normo	110	27.92
Oligo	17	4.31
Astheno	109	27.66
Oligoastheno	101	25.63
Oligoasthenoterato	24	6.09
Azoo	33	8.38
TOTAL	394	100.00

Table 2. sperm parameters in normozoospermia compared to abnormal sperm parameters.
Means with the same small letters in each row have no-significant differences in respect to (L.S.D) Multiple Comparison. By using One Way ANOVA test.

Parameters	normo	oligo	astheno	oligoastheno	azoo	P value
sperm volume	2.26±1.57 a	3.21±1.30 b	2.30±1.11 a	2.51±1.03 a	2.01±1.32 a	**0.076**
sperm concentration	45.80±21.87 c	7.81±3.71 a	28.65±15.40 b	5.68±5.30 a	0.00±0.00 a	**<0.01**
progressive motility	54.15±12.92 d	44.15±5.74 c	15.05±5.40 b	12.70±8.82 b	0.00±0.00 a	**<0.01**
normal Sperm Morphology	58.75±7.48 d	49.80±6.29 c	42.05±8.43 b	36.55±12.07 b	0.00±0.00 a	**<0.01**

DISCUSSION

To provide an insight into the prevalence of abnormal semen parameters in najaf city iraq, this study was conducted. Moreover, there are very few studies in this area as far as infertility is now becoming a health problem. the results showed that normozoospermia had higher prevalence (27.92) compared to other groups in study ,oligozoospermia had (4.31),asthenozoospermia had (27.66), Oligoastheno had 25.63, Oligoasthenoterato had (6.09) and azoo had(8.38).our finding of this study agred with one of studies which reported there is a higher prevalence of abnormal semen parameters 86.8 % (sperm count 14.9% - sperm motility 0.7% - morphology 40.7% and 30.5% is a combination of two or more abnormal sperm counts). Sperm motility and morphology and only 13.2% showed normal semen parameters according to WHO criteria. (27)**.** this result demonstrated prevalence of normozoospermia has higher percent compared to percentage of abnormal semen parameters. according to WHO 2010 guidelines(**World Health Organization. WHO laboratory manual for the examination and processing of human semen; 2010).** the normozoospermia has sperm concentration equal or more than 15 million per ml, progressive motility has equal or more 32 % and, normal sperm morphology has equal or more than

4 %, thus results of this study revealed increase in sperm parametrs in normozoospermia group compared with other abnormal semen parameters. the current study agred with the results of other studies auch as al-Fahham, 2011 (28)**.**

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