



THE MOST COMMON SEMINAL PARAMETER WHICH COULD BE AFFECTED IN THE MALES WITH FERTILITY ISSUES

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AUTHORS' CONTRIBUTIONS

This work was carried out in collaboration among all authors. Author DALM designed the study, performed the statistical analysis, literature survey, wrote the protocol and wrote the first draft of the manuscript. Authors MKBW, JAL and HPW managed the supervision of the study. All authors read and approved the final manuscript.

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ABSTRACT

A cross sectional study was carried out in the fertility clinic of the Gampaha Wickramarachchi Ayurveda Hospital in Sri Lanka (August 2014 to May 2017) to screen the seminal parameter which is most liable to be affected in the males with fertility issues. The male infertility is increasing in the modern society. The poor quality semen can cause to male infertility. The quality of semen is decided by four main seminal parameters naming semen volume, sperm count, sperm motility and morphology. Thus, the defective seminal parameters lead to poor quality semen hence male infertility. Most of the causes for defective seminal parameters are unknown. Due to the fact that the male fertility is increasing day by day, it is important to find out the seminal parameter which is most liable to be subnormal/defective for the treating purposes of male infertility. The study which was carried out with 100 males with fertility issues disclosed that the seminal volume is the most liable seminal parameter which is to be affected easily. Thus, under the outcome of the study, it is better to pay the attention on seminal volume in the event of treating male infertility.

Keywords: Male infertility; defective seminal parameter; semen volume; male fertility.

1. INTRODUCTION

Infertility is defined as the “inability of the female partner of the couple to conceive a child after having regular sexual intercourse with non-contraception” [1]. Though previously it was thought that the infertility was basically a fault of women, in the modern society, the concept has been changed. Thus, it is considered that the both male and female should

equally be responsible for the issues. Thus, about 40% of the issues is responsible by the male and another 40% is by the female [2]. The rest is by both. However, the reason for most of the infertile cases is unidentified. This is true nearly 30-40% cases of male infertilities as well [3]. Anyway, the male factor infertility has increased in the modern society. This could be due to the change of environmental as well as biological conditions which affect the quality of

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semen badly. A study of Damke et al. [4] determine the prevalence of human papillomavirus in the semen of randomized male partners of couples seeking fertility evaluation. In addition, the possibility that human papillomavirus infection could affect seminal parameters, and thus fertility, was assessed.

The quality of semen is decided mainly by four main seminal parameters such as semen count, sperm morphology, and sperm volume as well as sperm motility. From all, the seminal count and motility are the most important factors which determine the quality of semen hence the fertility.

In the present study it was aimed to detect the most liable seminal parameter to be subnormal/defective in the male with fertility issues. Thus, the finding would be helpful to identify the most defective seminal parameter and discover the treatment to alleviate the problem.

2. METHODS AND METHODOLOGY

The calculation of sample size [5]

$$\text{Sample size} = 4 Z_{\alpha}^2 P (1-P) / D^2$$

Z_{α} = Standard normal deviate (at 95% confidence interval = 1.96)

P = Prevalence of male infertility (8%) [6]

D = Total width of confidence (0.125)

Thus, the sample size at 95% of confidence interval = $4 (1.96)^2 \times 0.08 \times 0.92 / 0.015625 = 72$

Design: Cross sectional study.

2.1 Methods

The male partner of infertile couples who visited the fertility clinic of Gampaha Wickramarachchi Ayurveda Institute of Sri Lanka during the period of August 2014 – May 2017 was made involve in the study. The individuals who wished to take part in the study were evaluated on exclusive and inclusive criteria on the consent. The exclusive criteria were strictly adhered as they can effect indirectly on seminal parameter [7].

Inclusive Criteria

- (1) All the male, who were over 18 years old and wished to participate the study

Exclusive Criteria [7]

- (1) Individuals, who had been lesser than 18 years old.

- (2) Individuals, who had been suffering from systemic diseases such as diabetes, hypertension, cancer, arthritis during the period.
- (3) Individuals, who had been on drugs relevant to above disease conditions.
- (4) Individuals, who had addicted to recreational drugs such as marijuana, abin and ganja.
- (5) Individuals, who had been on anti-gastric drugs such as cimetidine or any steroidal drugs.
- (6) Individuals, who were with pathological issues in reproductive system (varicocele, testicular problems).
- (7) Individuals, who were unable to communicate (dumb, deaf and mentally handicapped).
- (8) Individuals, who were on fertility treatment at the time.
- (9) Individuals, who were unwilling to participate in the study.

The subjects who were satisfactory according to the criteria were selected for the study and were interviewed first to gather the demographic data such as age, residence.

Eventually, the subject was given a clean dry wide mouth glass container with advices to collect the semen by ejaculation (on the occasion, the subject must be three days of abstinence from ejaculation of semen).

The semen sample received from the individual was analyzed at the laboratory as follows.

The materials required

The semen sample
Measuring cylinder
Sahli pipette
Neubauer counting chamber
Micropipette
Microscopic slide
Cover slip

The methods

2.1.1 Analysis of semen volume [8]

After the liquefaction was taken place, the volume of semen was measured with 10 ml of measuring cylinder.

2.1.2 Analysis of sperm count

The liquefied semen mixture was gently shaken to mix the specimen and using a Sahli pipette semen was drawn up to 0.5 micro liter mark. Then the semen

diluting fluid was placed up to 11 micro liter mark and placed the pipette on a rotator to mix the interior contents well.

Thereafter, the Improved Neubauer counting chamber was loaded with the mixture and allowed the sperm to settle in. Eventually, the number of sperms in four corner squares was counted.

$$\text{Number of sperm/ml} = n \times 10 \times 20 \times 1000 / 4$$

n = number of sperm counted in all four corner squares

2.1.3 Analysis of sperm motility

A drop of liquefied semen (10 µl) was placed on a clean slide and covered with a coverslip and rimmed the edge with petroleum jelly to prevent evaporation. It was observed the proportion of motile to non-motile sperms under high power field (X 40) in several microscopic field to obtain the average percentage of motile sperm.

2.1.4 Analysis of sperm morphology

A drop of liquefied semen (10 µl) was placed on a clean slide and made a thin smear and the smear was air dried. The dried smear was washed thoroughly with semen diluting fluid to remove the mucous. Then the smear was covered around 8 mins with the diluted Leishman stain which was prepared by mixing

10 ml of stain and 20 ml of distilled water. Thereafter the stain was washed off well with buffered distilled water. Finally, the slide with stained smear was kept to dry. The slide was observed for morphology under high power field and the ration of normal to abnormal spermatozoa was observed in different microscopic fields to have the final average percentage of normal spermatozoa.

2.2 Data Processing and Statistical Methods

All the data fed into an EXCEL sheet and the individuals with defective seminal parameters were categorized. Then the prevalent of each category was detected.

3. RESULTS AND DISCUSSION

3.1 The Highest Prevalent Defective (Subnormal) Seminal Parameter Category in the Study

Out of all (n = 105), 50 individuals (47%) were having subnormal semen volumes which was the most defective seminal parameter according to the study. Among the others, 20% represented oligoasthenozoospermia. The prevalence of oligoasthenozoospermia, asthenozoospermia and the group which showed the finding of all four defective parameters was equal and 6% as a percentage.

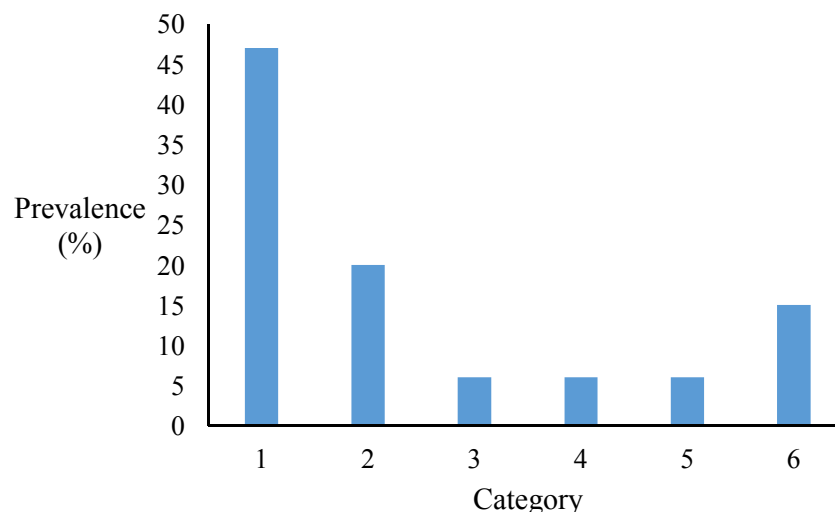


Fig. 1. Prevalence of subnormal semen parameters in the study group

1 - Subnormal seminal volume (subjects only with subnormal seminal volume); 2 -Oligoasthenozoospermia (subjects with subnormal count, motility & morphology); 3 - Oligoasthenozoospermia (subjects with both subnormal count & motility); 4 - Asthenozoospermia (subjects only with subnormal motility); 5 - All parameters (subjects with all four subnormal seminal parameter); 6 - Other (subjects who are exterior to above groups)

The individuals/subjects with subnormal or normal seminal parameters, yet can't be included in the mentioned groups were comparatively less and were 15% as a collective figure. No individual was found only with subnormal count or subnormal morphology.

Thus, on the outcome of the study, the most prevalent seminal parameter of Sri Lankans which could be affected highly was the seminal volume. This could be a pleasurable news for the society, due to the fact that the seminal volume plays a lesser role in male fertility comparison to the other parameters such as seminal count and motility.

Nevertheless, among the ranks of defective seminal parameters the group with three subnormal seminal parameters (oligoasthenoteratozoospermic group) had occupied the second place. Anyway it had been recognized that the count of sperm as well as motility of them plays a major role in the fertility of male partner. Thus, the possessing of second highest rank by a group with three simultaneously defective parameters, has to be considered as a unfavorable trend though the percentage of group is comparatively low as 20%.

Anyway, in the studies of Das et al. [9], Shamsi et al. [10], Atig et al. [11], Pahune et al. [12] and Kothari et al. [13] which was carried out with Indian, Tunisian as well as middle east populations, it had been found that the oligoasthenozoospermic and oligoasthenoteratozoospermic were the most prevalent groups while it was pertained to subnormal volume among Sri Lankans.

4. CONCLUSION

According to the result of the study, the seminal parameter which is liable to be affected mostly is seminal volume. Though, it's said that the most important seminal parameters which decide male fertility are seminal count and motility, seminal volume also plays a role regarding the fact. The most prevalent seminal parameter of Sri Lankans which could be affected highly was the seminal volume. This could be a pleasurable news for the society, due to the fact that the seminal volume plays a lesser role in male fertility comparison to the other parameters such as seminal count and motility. Anyway, under the finding of the study, it implies the scientist to discover new treatment to improve the quality of seminal volume hence male fertility. Further its fine to perform more and more similar studies in various provinces of the country to localize the most liable seminal parameter in them so as the whole country.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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