Original Article

Pattern of seminal fluid analysis in a male partner of infertile couple presented in infertility clinic of Patan hospital

Dipti Gautam[1], Manisha Shrestha[1], Shiva Raj KC[1]

[1]Department of Pathology, Patan Academy of Health Sciences, Lalitpur, Nepal.

ABSTRACT

Background: Infertility is defined as the failure of a couple to conceive after one year of regular sexual intercourse. The malefactor is responsible for at least 50% of cases of failure to conceive. Semen analysis remains the cornerstone in the preliminary investigation of male factor infertility. This study aimed to evaluate seminal fluid parameters in the male partners of infertile couples.

Materials and Methods: This retrospective study was conducted in the Department of Pathology, Patan Academy of Health Sciences, Patan hospital, Nepal between December 2019 and January 2020. All the 243 specimens were processed and analyzed according to WHO guidelines on semen analysis.

Results: Present study included a total of 243 semen samples, aged between 20-63 years with a mean age of 32.0 years. Normozoospermia was observed in (26.3%). The most common abnormalities found in this study were asthenozoospermia (25.5%), oligospermia (19.3%), azoospermia (6.5%), and teratozoospermia.

Conclusion: Semen analysis remains a keystone in assessing male factor infertility in developing countries like Nepal. However, needs further evaluation to establish possible etiologies of male infertility.

Correspondence:

Dr. Dipti Gautam, MD
Department of Pathology, Patan Academy of Health Sciences,
Lalitpur, Nepal
ORCID ID: 0000-0003-0887-0775
Email: gdipsy@gmail.com

INTRODUCTION

According to the International Committee for Monitoring Assisted Reproductive Technology, World Health Organization (WHO), infertility is a disease of the reproductive system defined by the failure to achieve a clinical pregnancy after 12 months or more of regular unprotected sexual intercourse.[1] Infertility is a major clinical and public problem affecting the life of the couple. Infertility remains a very sensitive issue worldwide and social stigma persists in Nepal. The average prevalence of infertility in developed countries is 3.5-16.7% and in developing countries is 6.9-9.3%.[2] Of all infertility cases, about 40-50 % is due to infertility of the male component.[3] Semen analysis plays a

critical role in the assessment of male factor infertility and usually forms part of the initial investigation undertaken by an infertile couple.[4] World Health Organization (WHO) had defined normal values for semen analysis, which includes complete liquefaction within 60 minutes at room temperature, homogenous, gray, and opalescent appearance. A good sperm consistency is demonstrated by semen living the pipette as discrete droplets, semen volume greater or equal to 2 ml, and a pH greater or equal to 7.2. Other normal parameters include a concentration of greater or equal to 20 million sperm cells per ml, motility of 50% or more with forwarding progression, and a morphology of 30% or more normal forms.[5] This study aimed to evaluate seminal fluid parameters in the male partners of the infertile couples presenting to the infertility clinic of Patan Hospital.

MATERIALS AND METHODS

All the patients who attended the infertility clinic of Patan hospital and whose semen were sent to the laboratory for analysis. This retrospective study was conducted in the Department of Pathology, Patan Academy of Health Sciences between December 2019 and January 2020. Data were extracted from the Medical Record sections and hospital information management system. Permission was obtained from the institutional review committee to conduct the study. The variables considered in the study are patient demographic data, clinical diagnosis, and relevant microscopic findings of semen. The data was uploaded and analyzed using Microsoft Excel and SPSS version 23.0. Normally distributed data are expressed as mean ± standard deviation (SD).

The samples were obtained from the patients who had 3 days of abstinence from sexual intercourse. All the samples were incubated at 37 0C and analyzed within one hour of collection by manual method. Based on WHO guidelines (5th edition) of standard procedure, semen analysis was carried out by determining initial macroscopic examination (semen liquefaction, viscosity, appearance, volume, and pH); the wet preparation was made to determine the concentration sperm motility, sperm vitality, sperm numbers, concentration, motility, morphology, viability, and the presence of WBC or RBC. Motility of the sperm is graded as follows: Forward progressive motility (PR), non-progressive motility (NP), and immotile (IM). Sperm vitality was determined by mixing one drop of eosin solution with one drop fresh sample and was examined at 400x under the microscope. The test is based on the principle that dead cells with damaged plasma membranes take stains.

RESULTS

During the study period, 243 males visited the infertility clinic. The mean age in this study was 32.0 years with the maximum being 63 years and the minimum being 20 years. Most of the patients were between the age group of

Table 1: Distribution of cases on basis of semen defects

Semen pattern	No. of cases	%
Normozoospermia	64	26.3
Oligospermia	47	19.3
Vitality (<58%)	50	20.5
Azoospermia	16	6.5
Asthenozoospermia	62	25.5
Teratozoospermia	2	0.8
Oligoasthenoteratozoospermia	2	0.8
Total	243	100

20-35 years (n=184; 75.5%). Among the study population, the mean semen volume, sperm concentration, progressive motility, and vitality of the semen were 2.87 ml, 49.6 million/ml, and 34.7% respectively (Table1). Semen volume was decreased in 21 males (7.4%). Using WHO standard for semen normality, 243 samples were analyzed, out of these 243 (26.3%) had normozoospermic. An abnormal seminogram was seen in 161 (66.2%). According to age-wise distribution maximum cases of oligospermia (15.6%) were between the age group of 20-35 years (Table 2).

Single-factor abnormalities were observed in 216 (88.8%) cases and 27 (11.1%) had combined factor abnormalities. Oligoasthenozoospermia was observed in 13(5.3%) cases, which is highest among the combined abnormalities followed by oligospermia with vitality<58% in 12(4.9%) cases. Asthenozoospermia was the main single abnormality found followed by vitality <58%. Azoospermia was detected in 16 (6.5%) cases with the highest incidence between 20-35 years (Table 3). Haemospermia was found in 7 (2.8%) cases.

DISCUSSION

Globally, the male is considered to be a factor in nearly one-third of couples affected by infertility. It has just recently been recognized as a substantial cause of infertility.[6] Male infertility is not a single entity, but rather the result of a multitude of pathogenetic pathways.[7]

Semen analysis is one of the basic investigations in the process of identifying the cause of primary or secondary infertility. The present study was conducted to evaluate seminal fluid parameters in our population and to find out the frequency and type of abnormal semen parameters. Commonly, patients visit the fertility clinic after not being able to conceive within a few years of marriage. In our context, the high age for family planning is in the mid-20s and 30s. In concordance with this social norm, 75.5% of our patients comprised of 20-35 years age-group with a mean age of 32 years. This coincides with other studies done in this region with similar social norms.[10] The present study expressed more than two-thirds of the male partner had

Table2: Age-wise distribution of semen volume, concentration, and vitality among the study population (n=243)

Age	Vol. <1.5ml	Vol.≥1.5ml	Conc.<15 ml	Conc.≥15 ml	Vitality<58%	Vitaliy>58%
20-35	18	170	38	146	29	154
36-50	3	50	7	50	8	45
51-65	0	2	0	2	1	2
Total	21(8.6%)	222(91.3%)	45(18.5%)	198(81.4%)	54(22.2%)	189(77.7%)

Vol.- Volume; Conc.- Concentration

Table 3: Age-wise distribution of semen parameters

Age	Oligospermia	Teratozoospermia	Azoospermia	Asthenozoospermia	Oligoasthenoteratozoospermia
20-35	21	2	14	20	1
36-50	3	0	2	4	1
51-65	0	0	0	1	0
Total	24(9.8%)	2(0.8%)	16(6.5%)	25(10.2%)	2(0.8%)

abnormal seminogram.

Semen volume less than 1.5 ml was observed in 8.6% of cases. This is similar to the study done by Bhaduri N et al[11] (7.45%) and Prashant Joshi et al[9] (6%). Low semen volume results from the ejaculatory duct obstruction or congenital bilateral vas deferens absence, as well as collection problems, incomplete retrograde ejaculation, and androgen deficit. Among the 243 cases, the present study had found normal vitality in more than two-thirds of the cases.

Sperm concentrations are often proposed to be predictors of fertility potential[12]. In recent years there have been reports of declining sperm concentration in men around the world[13]. In this study, cases of oligospermia were found in 19.3% of cases. Similar findings were reported by Bhaduri et al[11] and KalakondaM et al.[12] While the study conducted by Kumar et al (34%)[13], is in contrast to the present study. This high percentage might be due to the large sample size. According to the authors, low sperm counts are one of the most common causes of male infertility.[14,15] Association of oligospermia with increased morphological abnormalities has been suggested by Butt et.al.[16]

Poor motility (Asthenozoospermia) was the single factor common abnormality found in this study constituting 25.5% which was in concordance with the study was conducted by Garg J et al[17], Bodal et al[18], Ugbaoja et al[19] and that reported the prevalence of asthenozoospermia 14.3%,17%, and 16.5 %respectively. However, a low percentage of asthenozoospermia was found in a study conducted by Aulia et al (5.9%)[20] and Diallo et al (10%).[21] The total number of progressively motile spermatozoa in the ejaculate is of biological significance.[14,15] However, the motility of the spermatozoa could be affected by environmental factors, lifestyle, and pollution which explains these differences.

Among the subject in this study, azoospermia was recorded in 6.5% of subjects. This study was similar to the study conducted by Jairajpuri et al (8.6%).[22] This was lower than previous studies' findings conducted by Butt F et al (14.8%)[16], Emma-Okon et al. (12.3%)[23], and Bakhtawar Gul

Wazir et al (28.6 %).[24] A difficulty with sperm production or transport is assumed to be the cause of azoospermia.

Morphology of the sperm is the function of the testes as well as the epididymis. Teratozoospermia and Oligoasthenoteratozoospermia were found in 0.8% of cases each. Butt and Akram reported it 9.09%.[16] Aulia et al. reported 11.6% cases 20 and Kulkarni et al 7.3% 25 of cases. Teratozoospermia has a negative impact on fertilization rates.[26] Idiopathic factors also contribute to infertility. A study in Poland trying to investigate the pattern of infertility reported that 16% of male infertility was due to idiopathic causes.[26]

The presence of pus cells in the male genital tract, red blood cells, as well as agglutination of the sperms, are all morbidity factors. It may have an impact on seminal quality by acting directly on spermatozoa or their surroundings.

The present study only illustrates an abnormal pattern of seminal fluid analysis of malefactors. The presumptive causative factors/risk factors account for these aberrant semen patterns, which were not discussed in this study, also the types of infertility were not explained. As a result, further research is needed to understand the causes of male factor infertility, which will eventually aid in the management of male infertility situations.

CONCLUSIONS

Routine semen analysis is still the gold standard for assessing male factor infertility in developing countries like Nepal, but it is vital to recognize its limitations in terms of collection, processing, and interpretation, as well as biological variance in the parameters and a lack of information on sperm activity. In the present study asthenospermia is the most common abnormality followed by oligospermia. Our findings suggest that poor sperm quality continues to play a significant role in overall infertility in our environment and that men are coming to terms with the fact that they may potentially be a contributing factor. The causal issues must be identified, and artificial insemination should be promoted

in cases when therapeutic recovery is not possible.

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Conflict of interest: None

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