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# Analysis of Semen Parameters in Male Partners of Infertile Couples

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**Abstract**

Approximately 10-15% of couples suffer from infertility all over the world and male factor is responsible in 45%of cases. Determining the possible etiology of male infertility is very important. The aim of this study was to analyze the seminal fluid parameters of the male partner of infertile couples and to try to identify the abnormalities present and to determine the possible contribution of male factors. A total of 406 consenting male partners of women attending the infertility clinics were recruited and their semen analysis was performed for volume, pH, liquefaction, viscosity, sperm concentration, motility and morphology. Maximum number of patients (34.5%) were in the age group 30-35 years, 15.8% had hypospermia while 84.2% had normal semen volume. 8.4% had motile sperms, 36% had motility less than 50% and 55.7 % had motility more than 50%.In our study 7.9% had azoospermia, 37.5% had count less than 20 million /ml and 54.7% had count more than 20 million/ml. 11.8% had abnormal morphology and 88.2% had normal morphology. Semen analysis is the cornerstone of the laboratory evaluation of the infertile male and helps us to define the severity of the male factor. It is very important to recognize the contribution of the male partner to infertility and to reduce the stigma attached to the female partner alone.

**Keywords**: Male Infertility; Semen Analysis; Semen Parameters.

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## Introduction

Infertility is defined as the inability of a couple to conceive even after 12 months of regular unprotected intercourse [1]. Approximately about 10-15% of couples suffer from infertility all over the world. Female factor is responsible in 35% and male factor in 45% of cases while the rest of the couples either have combination of factors or unexplained infertility [2]. In Indian couples seeking treatment, the male factor is the cause in approximately 23% [3]. Male infertility is a very devastating problem. It may severely affect the couple's psychological harmony, sexual and social life. Hence, determining the possible etiology is very important [4]. Semen analysis remains the single most useful and fundamental investigation in the search for the cause of male infertility. It is a simple test that assesses the formation and maturity of sperms as well as how the sperm interacts with the seminal fluid,thereby providing insight not only on sperm production (count) but also on sperm quality (motility, morphology)as well [5]. Semen has two major quantifiable attributes. (a)- The total number of spermatozoa which reflects sperm production by the testes and the patency of the post-testicular duct system and (b)- the total fluid volume contributed by the various accessory glands which reflects the secretory activity of the glands [6]. 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 leaving the pipette

as discrete droplets. Semen volume of greater or equal to 2 ml and a pH greater or equal to 7.2.Other normal parameters include a concentration greater or equal to 20 million sperm cells per ml, a motility of 50% or more with forward progression and a morphology of 30% or more normal forms [6]. The aim of this study was to analyze the seminal fluid parameters of the male partners of the infertile couples and to try and identify the abnormalities present and to determine the possible contribution of male factors.

## Materials and Methods

This was a prospective study conducted in the infertility clinic under the department of obstetrics and gynecology in a tertiary care teaching hospital over a period of one year. A total of 406 consenting male partners of women attending the infertility clinics were recruited .These men were referred for semen analysis to the laboratory. Detailed instructions were given before semen collection .They were asked to abstain from intercourse for 3-4 days, samples were collected aseptically by masturbation into a sterile wide mouthed bottle in the laboratory itself. Semen analysis was performed within 30 minutes of collection. Analysis was performed for volume, pH, liquefaction, viscosity, sperm concentration, motility and morphology according to WHO guidelines 2010 on semen analysis. Data was analyzed by using SPSS software. Descriptive statistics like frequency and percentage were calculated.

## Results

Total of 406 patients were included in the study. Their age varied from 22-47 years

Table 1 shows the age frequency and percentage of patients in the different age groups. There were 64 patients (15.8%) in the age group 20-25 years, 140 patients (34.5%) in the age group 25-30 years, 108 patients (26.6%) in the age group 30-35 years, 72 patients (17.7%) in the age group 35-40 years, and 22 patients (5.4%) above 40 years

Table 2 shows the volume of semen and pH of semen. Out of the 406 patients, 64 patients (15.8%) had semen volume less than 1.5 ml and 342 patients (84.2%) had semen volume more than 1.5 ml .Of the 406 patients, 8 patients (2%) had pH less than 7.2 while 398 patients(98%)had pH more than 7.2.

Table 3 shows sperm motility Out of the 406 patients, 34 patients (8.4%) had immotile sperms while 146 patients (36 %) had motile sperms less than 50% and 226 patients (55.7%) had more than 50% motile sperms.

Table4 shows sperm count. Outofthe406 patients, 32 patients (7.9%) had azoospermia. 62 patients (15.3%) had count less than 5 millions /ml, 32 patients (7.9%) had count 5- 10 millions/ml, 58 patients (14.3%) had count of 10-20 millions /ml, 222 patients (54.7%) had count of more than 20 millions/ml.

Table 5 shows sperm morphology: Out of the 406 patients, 48 patients (11.8%) had abnormal morphology and the rest 358 patients (88.2%) had normal morphology.

**Table 1:** Age frequency of male partners among infertile couples

| Age Group (years) | Frequency | Percentage |
|---|---|---|
| 20-25 | 64 | 15.8 |
| 25-30 | 140 | 34.5 |
| 30-35 | 108 | 26.6 |
| 35-40 | 72 | 17.7 |
| Above 40 | 22 | 5.4 |
| **Total** | **406** | **100.0** |

**Table 2:** Volume and pH of semen samples

| Volume | Volume of semen Frequency | Percentage |
|---|---|---|
| <1.5ml | 64 | 15.8 |
| >1.5ml | 342 | 84.2 |
| **Total** | **406** | **100.0** |
| **PH** | **Ph of semen Frequency** | **Percentage** |
| <7.2 | 8 | 2.0 |
| >7.2 | 398 | 98 |
| **Total** | **406** | **100.0** |

**Table 3:** Motility of sperms

| Motility | Frequency | Percentage |
|---|---|---|
| Nil | 34 | 8.4 |
| <50% | 146 | 36.0 |
| >50% | 226 | 55.7 |
| Total | 406 | 100.0 |

**Table 4:** Sperm count

| Sperm Count | Frequency | Percentage |
|---|---|---|
| Nil | 32 | 7.9 |
| <5 million/ml | 62 | 15.3 |
| 5-10 million/ml | 32 | 7.9 |
| 10-20 million/ml | 58 | 14.3 |
| >20 million/ml | 222 | 54.7 |
| **Total** | **406** | **100.0** |

**Table 5:** Morphology of sperms

| Morphology | Frequency | Percentage |
|---|---|---|
| Normal | 358 | 88.2 |
| Abnormal | 48 | 11.8 |
| Total | 406 | 100 |

## Discussion

Infertility is a very sensitive and complex issue and has lot of implications on the couple's personal and social life. Male factor contributes to around 30% of the cases and therefore semen analysis is an indispensable investigation in a couple with infertility [7]. The present study was done to analyze the different semen parameters in male partners of infertile couple. In the present study, the maximum numbers of patients, 140 patients (34.5%) were in the age group 25-30 years and there were 76.9% patients in the age group 20-35 years. Joshi P et al found 72% of patients in the age group 20-35 years [7]while Kulkarni S N et al found 78.2 % in the age group 26-35years [4].

Low ejaculated volume can reflect abnormality in accessory sex gland fluid synthesis (i.e.) seminal vesicles, as 70% of seminal plasma contribution is from seminal vesicles. It can also be indicative of a physical obstruction somewhere in the reproductive tract or incomplete retrograde ejaculation [5].In our study, 342 patients (84.2%) had normospermia and 64 patients (15.8%) had hypospermia. The results were comparable to a study in Sudan, where majority of subjects (89.7%) had adequate semen volume, while 10.3% had abnormal semen volume [8] and in a study in Nigeria, where majority of patients (91%) had normospermia, while only 7.3% had hypospermia [9]. Kulkarni SN et al reported semen volume less than 1.5 ml in 13.6% of cases [4] while Bhaduri et al found 7.45% of cases had volume less than 1.5 ml [10]. In our study, 8 patients (2%) had pH less than 7.2, while 398 patients (98%) had pH more than 7.2. In a study by Kulkarni SN et al, pH more than 8 was found in 9.1% case associated with leucocytospermia [4]. In our study, 34 patients (8.4%) had immotile sperms while 146 patients (36%) had motile sperms less than 50% and 226 patients (55.7%) had more than 50% motile sperms.Abnormal sperm motility (asthenospermia) was seen in 26% cases in a study by Joshi P et al [7] as opposed to 60% and 54% reported by Olatunji et al [11] and Adetayo et al [12] respectively. In a study by Butt F et al, asthenospermia was observed in 25 % of samples [5] and in a study conducted at the National Institute of Health, Islamabad, the prevalence was around 21.24% [13]. In another study, the prevalence of asthenospermia was 18% [14] and it was 11.5% in a study by owalabi et al [15]. On the other hand, Diallo MS et al found a very high incidence of 74.4% with low motility [16]. In our study, azoospermia was seen in 32 patients (7.9%), 62 patients (15.3%) had count less than 5 millions /ml, 32 patients (7.9%) had count 5- 10 millions/ml, 58 patients (14.3%) had count of 10-20 millions /ml, 222 patients (54.7%) had count of more than 20 millions/ml.In a study by Joshi et al, incidence of azoospermia was 11% [7], Butt et al found azoospermia in 2% of general male population and between 10-20% of men undergoing fertility treatment [5] while Shoaib et al found azoospermia in 14.28% [17]. Similar incidence of 14.5% was reported by Diallo MS et al [16]. Kulkarni SN et al [4], Bhaduri et al [10], Aqu et al [18] and in a study in Nigeria by Owalabi et al [15]

reported azoospermia in 10.9%, 12.42%, 14.2% and 6.2% of patients respectively. Prevalence of oligospermia in a study by Joshi et al is 36%. Kulkarni SN et al [4], Bhaduri et al [10] and Shoaib et al [11] reported oligospermia in 18.6%, 19.87%and 21.43% respectively. Similar incidence of 25% cases had sperm count less than 20 millions/ml in a study in central India by Jajoo S et al [19].

Owalabi et al from Nigeria found 25.6% had oligospermia [15]. Diallo MS et al found oligospermia in more than one third of patients and the sperm count was under 5 million in 27.7% of patients [16]. The cut-off value of 20 X $10^6$/ ml below which male fertility seemed to be diminished was based on a study showing that above this value the time required to become pregnant no longer depended on sperm concentration [20,21]. In our study, normal morphology was found in 88.2% of patients and abnormal morphology in 11.8% of patients. Sperm morphology is recognized as a semen parameter that mostly correlates with in vivo and in vitro fertilizing ability [22,23]. Joshi et al found altered morphology in 28% of patients [7].

Kulkarni et al found teratozoospermia in 8.7% of cases [4]. In the Nigerian study by Owalabi et al, they found that terataozoospermia was the most common abnormality in 18.5% of patients [15]. Recently the WHO changed the cut-off value for normality from 50 to 30% [24]. In a study by W. Ombelett et al, they found sperm morphology was the most significant indicator for subfertility with a cut off value of 10% according to ROC analysis and 5% using the $10^{th}$ percentile of the fertile population [24].

## Conclusion

Abnormal semen analysis results contribute to male infertility to a large extent. Semen analysis is the cornerstone of the laboratory evaluation of the infertile male and helps us to define the severity of the male factor. It gives indications of testicular function and of the integrity of the male genital tract which may facilitate treatment plans. It is now recognized that it is a guide to fertility and not an absolute proof of fertility of an individual except in cases of azoospermia where the cumulative conception rate is reduced to zero [26,27]. Other newer studies including genetic study may identify various other causes of infertility in the future. It is very important that the contribution of male factor in infertility be recognized and men should accept responsibility for their contribution to infertility and the stigma and blame attached to the female partner alone for infertility should be reduced and prevented .

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