The pattern of abnormalities on sperm analysis: A study of 1186 infertile male in Yasmin IVF clinic Jakarta

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Abstract. A declined in semen quality resulted an increase of male infertility has been reported. The pattern of abnormalities differs from one country to another. Conflicting results from different studies may be influenced by many factor. The aims are to evaluate the pattern of semen analysis of male partners of infertile couples and identify the current status of the contribution of male factor towards the infertility in our environment. The study is a descriptive analysis of the semen analysis of male partners in infertile couples, who were present at Yasmin IVF Clinic, infertility clinic of a Tertiary Care University Teaching Hospital between 1st January 2012 and 31st December 2015. A total of 1186 consenting male partners of infertile couple were recruited into the study. According to 2010 WHO normal reference values for semen parameters, 795 (67%) of patients were normozoospermia which had normal semen parameters and 391 (33%) patients had abnormal semen parameters. Oligozoospermia was evident in 155 (39.5%) patients, being the most common disorder observed. It is followed by azoospermia (24.4%), oligoasthenozoospermia (17.8%), asthenozoospermia (5.9%), oligoasthenoteratozoospermia (5.7%), teratozoospermia (2.6%), asthenoteratozoospermia (2.8%), cryptozoospermia (0.8%), necrozoospermia (0.3%), and oligoteratozoospermia (0.3%). Abnormal semen quality remains a significant contribution to the overall infertility with oligozoospermia being the most common semen quality abnormality. This condition is an indication for the need to focus on the prevention and management of male infertility. In addition, further studies are needed to address possible etiologies and treatment in order to improve fertility rates.

1. Introduction

Infertility has been an on-going concern through the ages and it remains a major clinical problem today, affecting 12 to 15% sexually active couples worldwide. According to the International Committee for Monitoring Assisted Reproductive Technology, World Health Organization (WHO), infertility is a disease of reproductive system defined by failure to achieve the clinical pregnancy after 12 months or more of regular unprotected sexual intercourse. It can also be defined as failure of couple to conceive after 12 months of regular intercourse without the use of contraception in women <35 years; and after six months of regular intercourse without the use of contraception in women ≥35 years [1].

In Indonesia, it is estimated that infertility rates sits at 10-15% of the reproductive aged population [2]. Of all infertility cases, male factor plays a role in up to 50% of cases and as few as 15% of men presented with infertility currently have recognizable abnormalities on their semen analysis [3].
The root cause of this can be one or a combination of the following: low sperm concentration, poor sperm motility, or abnormal morphology [4]. The major causes of male infertility are treatable and preventable [3]. Therefore, understanding these conditions is foremost. The present study was undertaken to evaluate the pattern of semen analysis of male partners of infertile couples and identify the current status of the contribution of male factor towards the infertility in our environment. Besides, to establish the prevalence and help future identification of male infertility etiologies and possible treatments.

2. Materials and Methods

The study is analyzed the semen of male partners in infertile couples, who were present at Yasmin IVF Clinic, an infertility clinic of a Tertiary Care University Teaching Hospital. A total of 1186 consenting male partners of infertile couple were recruited into the study. The study was approved by the medical ethics committee of Faculty of Medicine Universitas Indonesia. Informed consent was obtained from all the study participants. The samples were collected and processed using WHO laboratory manual for the examination and processing of human semen. Before sample collection begin, the medical worker already given clear written and spoken instructions concerning the collection of the semen sample. Sample collection was done following abstinence from ejaculation for two-seven days by masturbation and ejaculated into a clean, wide-mouthed container made of glass or plastic, from a batch that has been confirmed to be non-toxic for spermatozoa, transported to the laboratory within less than one hour at 20–37 °C, and the specimen container is placed on the bench or in an incubator (37 °C) while these men liquefies. Some subjects who did not follow the WHO standard criteria were not included in the analysis. Based on WHO standard procedure, semen analysis was carried out by determining initial macroscopic examination (semen liquefaction, viscosity, appearance of the ejaculate, volume, pH), sperm motility, sperm vitality, sperm numbers, concentration, motility, morphology, viability, and the presence of WBC or RBC [5]. After semen analysis done, semen analysis results were classified according to 2010 World Health Organization (WHO) normal reference values for semen parameters. The following one-sided lower reference limits, the fifth centiles (with 95th percent confidence intervals), were generated from 1953 men whose partners had time-to-pregnancy TTP ≤ 12 months [6]:

- Volume: 1.5 ml (95% CI: 1.4–1.7)
- Sperm concentration: 15 million spermatozoa/ml (95% CI: 12–16)
- Totals per number: 39 million spermatozoa per ejaculate (95% CI: 33–46)
- Morphology: 4% normal forms (95% CI: 3–4)
- Vitality: 58% live (95% CI: 55–63)
- Progressive motility: 32% (95% CI: 31–34)
- Total (progressive + nonprogressive motility): 40% (95% CI: 38–42)

Data were analyzed using SPSS Statistics® for Mac version 20.0.

3. Results and Discussion

3.1 Results

The results of the semen analysis of 1186 male partners in infertile couples were retrieved and analyzed. In this study, 88.7% men had primary infertility and the other 11.3% had secondary infertility. According to 2010 WHO normal reference values for semen parameters, 797 (67.3%) of patients were normozoospermia which had normal semen parameters and 389 (32.8%) patients had abnormal semen parameters. Oligozoospermia was evident in 157 (39.7%) patients, this being the most common disorder observed. It is followed by azoospermia (24.4%), oligoasthenozoospermia (17.8%), asthenozoospermia (5.9%), oligoasthenoteratozoospermia (5.7%), teratozoospermia (2.6%), asthenoteratozoospermia (2.8%), cryptozoospermia (0.8%), necrozoospermia (0.3%), and oligoteratozoospermia (0.3%).
Table 1. Distribution of abnormal semen parameters

| Categories                      | Frequency (n) | Percentage (%) |
|---------------------------------|---------------|---------------|
| Oligospermia                    | 157           | 39.7          |
| Azoospermia                     | 95            | 24.4          |
| Oligoasthenozospermia           | 64            | 17.8          |
| Asthenospermia                  | 23            | 5.9           |
| Oligoasthenoteratozoospermia    | 21            | 5.6           |
| Asthenoteratozoospermia         | 14            | 2.8           |
| Teratozoospermia                | 10            | 2.6           |
| Cryptozoospermia                | 3             | 0.8           |
| Necrozoospermia                 | 1             | 0.3           |
| Oligoteratozoospermia           | 1             | 0.3           |
| **Total**                       | **389**       | **100**       |

3.2 Discussion
This study demonstrated abnormal semen quality in about one-third (32.8%) of male partners of couples seeking remedy for their inability to conceive in our environment. This study result is similar to the study done by Owolabi et al. [7] that showed from 661 male partners of infertile couples, 31.8% had abnormal semen quality. Study done by Ugwa et al. [8] also showed similar results that poor semen quality is responsible for 20-40% of the infertile couple problem. In this study, 88.7% men had primary infertility and the 11.3% had secondary infertility. This study showed that primary infertility was more common than secondary infertility. Study done by Seno et al. [9] conducted in Urology Clinic, Dr. Cipto Mangunkusumo Hospital showed similar results that there were 89.4% of men with primary infertility and 10.6% of men with secondary infertility. This finding is also similar to the findings at Iran that showed from 1200 infertility cases, the prevalence of primary and secondary infertility was 69.5% and 30.5% respectively [10].

The most common results of semen analysis in this study were oligospermia (39.7%), followed by azoospermia (24.4%), oligoasthenospermia (17.8%), asthenospermia (5.9%), oligoasthenoteratozoospermia (5.7%), teratozoospermia (2.6%), asthenoteratozoospermia (2.8%), cryptozoospermia (0.8%), necrozoospermia (0.3%), and oligoteratozoospermia (0.3%). In the report by Chukwunyere et al. [11] showed similar result that oligospermia being the most common (28%) contributor to abnormal semen quality in 212 subjects. Study done by Adenji et al. [12], show that asthenozoospermia being the most common (27.8%) of the disorders observed in 824 male partners. Another study done by AlEnezi et al. [13], showed that nearly half of the sample being teratozoospermia. Conflicting results from different studies may be influenced by many factors. Several studies analyzed the influence of environmental to semen quality [14]. In fact, the substantial geographical variations in sperm consentration were reported between Europe and North America [15]. Another studies showed that specific factors that influenced sperm quality are present in specific geographic areas [15,16]. Besides environmental, conflicting results from different studies could be due to different cultural, social, and economic each country that are affected by the epidemiologic characterization of infertility [17-19]. Therefore, further studies are necessary in this environment to elucidate and classify role played by the various causes of male factor infertility such as varicocele, infection (eg: gonococci), endocrine disorders, and disturbances of hypothalamic-pituitary-testicular axis. Others include smoking, alcohol intake, body mass index (BMI), cryptorchidism, ductal obstruction, stress, systemic granulomatous infections, trauma, testicular torsion, hormonal, congenital, and the use of medical treatments including chemotherapeutic drugs [7,20-23].

Semen analysis is the fundamental of the laboratory evaluation of the infertile male and helps the physician to define the severity of the male factor and gives indications on testicular function and of the integrity of the male genital tract which may facilitate treatment plans. The results of this study
establish that measurements of sperm concentration, motility, and morphology provide a useful information in order to diagnosing male infertility. Nonetheless, to assess the diagnosis of the infertile male, a systematic approach must be implemented [24]. Therefore, none of the measures, alone or in combination, can be used as diagnostic of infertility. This study has some limitations. The present study is only demonstrated the sperm analysis result and did not observed the possible etiologies and risk factor. Therefore, future research to analyze the major causes of male infertility should be conducted to find out the major causes of male infertility and can work in that direction to reduce such factors which can affect the future fertility of males. In addition, the collaboration researches are needed to improve the global fertility rates.

4. Conclusion
In conclusion, abnormal semen quality remains a significant contribution to the overall infertility in our environment with oligozoospermia being the most common semen quality abnormality. This condition is an indication for the need to focus on the prevention and management of male infertility. In addition, further studies are needed to address possible etiologies and treatments and attempts should be made to control such factors in near future.

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