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Study of Semen Analysis Patterns in Male Partner of Infertile Couple Attending Tertiary Level Hospital of Nepal

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ABSTRACT

Aims: The aim of this study is to analyze the pattern of semen abnormality in male partner of infertile couple in Nepal.

Methods: A retrospective study of semen sample of male partner of infertile couple analyzed in Department of pathology, Dhulikhel Hospital from January 2014 to December 2018. All semen samples were processed and analyzed according to methods and standards outlined by World Health Organization laboratory manual for the examination and processing of human semen 2010.

Results: A total of 520 semen samples were analyzed. Our study shows 221 (44%) abnormal for different semen parameters and asthenozoospermia (39.3%) is the most common abnormality followed by azoospermia (28.8 %), Oligoasthenozoospermia (17.9 %), Oligozoospermia (8.7 %), Oligoasthenoteratozoospermia (3.5 %) and teratozoospermia (1.8 %).

Conclusions: Abnormal semen parameters remain significant causes in overall infertility in our set up with asthenozoospermia and azoospermia were common abnormalities in male partner. Semen analysis is an inevitable tool for evaluation of infertility in male partner. Further study is required to find out the possible etiologies of male infertility for holistic management of infertility.

Keywords: azoospermia; infertility; oligospermia; semen

INTRODUCTION

Infertility is inability to conceive even after one year of regular and adequate sexual intercourse without use of any contraceptive tools.¹ Prevalence of infertility is about 8-12% in world and 40-50% of cases of infertility are due to male partner in infertile couple.^{2,3} Infertility is very sensitive issue in country with patriarchal society. Most of the time female partner is blamed and punished for it; and male partners are not usually evaluated during infertility evaluation thus underestimating male factor infertility.⁴ Actually male factors are also equally responsible for infertility and semen analysis is an indispensable investigation in a couple with infertility. Semen analysis considered as primary and standard technique to assess male infertility.^{5,6} So, a proper interpretation of semen parameters can be effective tool in managing the male factor infertility.⁷

Most of the time, the exact etiology of male infertility is unknown. Few known factors for the male infertility are sexually transmitted disease, reproductive tract infection, endocrine disturbance, immunological problem, sexual dysfunction and ejaculatory problem. Oligozoospermia is associated with environment and lifestyle factors like chemical exposures, pesticide exposures, smoking,^{8,9} alcoholism, stress and obesity.^{8,9} This study will help in finding out the prevalence of male factor and nature of abnormal semen analysis pattern in infertile couple attending tertiary level hospital of Nepal.

METHODS

This is a retrospective study of seminal fluid of infertile couple attending Obstetrics & Gynecology Department of Dhulikhel Hospital from January 2014 to December

2018. Ethical approval was obtained from Institutional Review Committee (IRC) of Kathmandu University School of Medical Sciences (KUSMS).

Semen samples were collected in a sterile universal plastic container by masturbation after 3 days of sexual abstinence and the samples were delivered within one hour of semen collection. Semen analysis was done in the Department of Pathology, Dhulikhel Hospital. All semen samples were processed and performed according to methods and standards outlined by World Health Organization laboratory manual for the examination and processing of human semen 2010.

Different parameters like volume, pH, viscosity, liquefaction, sperm concentration, motility and morphology were assessed. Results of Semen analysis were analyzed based on reference value of World Health Organization (WHO), 2010. Data were analyzed using SPSS16.0 version. The data were analyzed for frequency and mean \pm Standard deviation calculated for total sperm concentration, volume, progressive motility, immotility and age of male partner. 95% confidence interval was calculated for proportions and for means. Mean value were compared for statistical significant using t-test with the level of significance set at $p < 0.05$.

RESULTS

A total of 520 semen samples were studied with 78.5% primary and 21.5% secondary infertility; 291 (56%) were normozoospermia and 221 (44 %) abnormal for different semen parameters.

Age range was 19-59 (30.3 \pm 5.3) years and majority (55.6%) at 21-30 years age group. By ethnicity, 36.9% were Brahmin-Chhetris followed by Newars (32.1%) and other janajati (21.5%) [Table-1].

Table-1: Demographic characteristics of male infertile partners (N=520)

	Parameters	N	(%)
Types of infertility	Primary infertility	408	78.5
	Secondary infertility	112	21.5
Age group in years	<20	8	1.5
	21-30	289	55.6
	31-40	200	38.5
	41-50	20	3.8
	>50	3	0.6
Ethnicity	Brahmin Chhetri	192	36.9
	Madhesi	19	3.7
	Dalit	30	5.8
	Newar	167	32.1
	Other Janajati	112	21.5

Mean volume of semen was 2.48 \pm 0.917 (ranges 0.2 - 6.0) ml; 36 (6.9%) had hypospermia; and mean sperm concentration was 35.45 \pm 26.68 (range = 0 - 150) $\times 10^6$ per ml. The most common abnormality

was asthenozoospermia followed by azoospermia and oligoasthenozoospermia; and leukocytospermia was in 58 (11.1%) of semen sample. [Table-2]

Table-2: Distribution of abnormal semen parameters

Semen abnormalities	N	%
Asthenozoospermia	90	39.3
Azoospermia	66	28.8
Oligoasthenozoospermia	41	17.9
Oligozoospermia	20	8.7
Oligoasthenoteratozoospermia	8	3.5
Teratozoospermia	4	1.8

After excluding 66 cases of azoospermia, we analyzed and compared normozoospermic and oligozoospermic male partners with different semen parameters. There were statistical differences in parameters like mean age of infertile male partners, total sperm concentration, progressive motility and total immotility of oligozoospermic male partners and normozoospermic male partners, which was significant ($p < 0.005$). But there were no significant differences in total semen volume of both group [Table-3].

Table-3: Comparison of semen parameters between normozoospermia and oligozoospermia

	Normospermia Mean \pm SD (95% CI)	Oligospermia Mean \pm SD (95% CI)	P-value
Volume	2.5 \pm 0.9 (2.4-2.6)	2.4 \pm 1.0 (2.1-2.6)	0.34
Total count	46.6 \pm 21.7 (44.4-48.8)	7.0 \pm 3.8 (6.1-7.9)	0.00
Progressive motility	47.2 \pm 23.5 (44.8-49.5)	19.4 \pm 22.4 (14.0-24.8)	0.00
Immotility	32.7 \pm 20.2 (30.7-34.8)	55.5 \pm 26.9 (49.0-69.0)	0.00
Age	30.3 \pm 5.2 (29.8-30.9)	28.9 \pm 4.4 (27.9-30.0)	0.04

$p < 0.05$; Confidence Interval (CI)

DISCUSSION

This study showed the prevalence of primary infertility as 78.5%. In a study done by SN Aulia et al⁶ showed 88.7% of men with primary infertility and 11.3% of men with secondary infertility but a Nepalese study by Subedi et al¹⁰ showed predominance of secondary infertility (56.56%).

We found abnormal semen parameter in 229 (44 %) with most common abnormality as asthenozoospermia (39.3%) followed by azoospermia (28.8 %) and oligoasthenozoospermia (17.9%). Adeniji RA et al.¹¹ also found common abnormality of asthenozoospermia (27.8 %), followed by oligospermia (18.9%) and azoospermia (6.7%). Azoosp-

ermia (28.8%) was an important finding in our study and this finding was almost double to the study findings of Diallo MS et al.¹² in Senegal (14.5%) but lesser to the study findings of Pant PR in Nepal (38.9%).¹³

Azoospermia may be related to obstruction of male reproductive tract or defective production. Sperm concentration may not be an only responsible parameter in male infertility, other parameters like motility, semen viscosity, semen volume, and morphology may also be the important parameters for male factor infertility.

The mean sperm concentration for normozoospermic and oligozoospermic group was 46.6 ± 21.7 and 7.0 ± 3.8 respectively while the mean percentage of progressive motility is 47.2 ± 23.5 in normozoospermia and 19.4 ± 22.4 in oligozoospermia. Both these results were comparable to the the study findings of Abimibola N in Nigeria.⁹

The mean ejaculated semen volume for normozoospermic and oligozoospermic group was 2.5 ± 0.9 and 2.4 ± 1.0 respectively. In both normozoospermic and oligospermic group, semen volume was normal. Out of 520 male partner of infertile couple, 92.1% had normospermia, 6.9% had hypospermia and 1% had hyperspermia. In a study done by Butt F¹⁴ in Pakistan also showed normal semen volume for both group with 2.9 ± 1.35 for normoazoopsermia and 2.05 ± 2.0 for oligozoospermic group.

In our study, majority of semen abnormality was observed in Brahmin-Chhetri ethnic group (35.8%) followed by that in Newar ethnic (29.3%). Though the percentage was little different, study done by Pant PR¹³ also showed half of the male factor infertility in Brahmin-chhetri (50%) followed by that in Newar ethnic (18.2%). But this finding may have sampling bias because of non-uniform demographic representation.

Results from different studies on semen parameters in infertile couple were conflicting and it may be due to studies carried out in different geographical set up. These variations could also be due to environmental, cultural and socio-economic status of the people, mostly in developing countries.¹⁵ Hence, further study is required to explain the semen parameters abnormalities in infertile male and its causes in Nepalese context. Study done by Lamichhane B et al¹⁶ also concluded that semen parameters of fertile male were lower than that stated in WHO reference value, 2010.⁷

Limitation of study: This study only demonstrated the abnormality in semen parameters of male factor infertility and did not explain the possible etiologies and/or risk factors for these semen abnormalities. Hence, further study is required to explain the causes of male factor infertility which will ultimately

help in managing the male infertility cases. Proportionate representation was not assured for ethnic group distribution.

CONCLUSIONS

Asthenzoospermia, azoospermia and oligoasthenzoospermia are major factors for contributing male infertility.

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