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A Cross-Sectional Study on Semen Analysis Patterns: Regarding Age Distribution, Semen Function Parameters and Risk Factors Related to Male Infertility

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ABSTRACT

Objective: The present study aimed at the determination of various patterns of parameter and risk factors of semen analysis related to male infertility.

Material and Methods: It was a cross sectional study, included a total of 150 male individuals between age group (18-50) divided equally in three groups (mild, moderate and severe). The fresh semen sample was collected in sterile container and immediately incubated at 37 degrees Celsius for 20-30 minutes. After incubation of sample, the physical (color) and chemical examination (PH) of semen was carried out then the wet smear of semen was prepared for microscopy. On microscopy, the total count and morphology of spermatozoa were determined.

Result: The prevalence of semen analysis as 54.7% of normal sperm count while 45.3% of abnormal sperm count. The volume categorization of semen analysis was evaluated as Normospermia (2-5ml)was 83.3%, hypospermia (<2ml) included 15.3% and hyperspermia

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(>5ml) was 1.4%. With consideration of sperm concentration,normospermia was found to be 54.7% whereas oligospermiaand azoospermia were 32.7% and12.6% respectively.

Conclusion: This study analyzed, the various patterns of semen analysis in individuals, regarding parameters like total count, volume and sperm concentration. The individuals belong to various age group showed different percentages related abnormal count. It was also found that both smoking and infections are most common risk factors related to male infertility.

Keywords: Semen analysis, Parameters, Age, Infertility.

INTRODUCTION

In the quest of male infertility, semen analysis was the absolute and generally valuable examination. The formation and maturity of sperm was evaluated as well as the knowledge of sperm motility and morphology was revealed by this basic test [1]. It can be distinguishing 9 out of 10 men with any authentic issue by basic semen analysis as it considered 89.6% sensitive. The irregularity in the control system of sperm production at pre-testicular phase, testicular phase or post testicular phase was obsessive reasons for diminished sperm [2]. The low sperm count, poor quality of semen or combination of both conditions was considered main cause of 90% of male infertility. Sexually transmitted diseases (STDs) and urogenital diseases were revealed most leading causes of decrease in semen quality and amount everywhere on over the world. The phenomenon in report (1992), frightened the world about the issue [3].

In Pakistani population, 21.9% couples were suffered from infertility, out of with 3.5% primary and 18.5% secondary infertility. 30% of the cases were due combination of both genders, while 20 to 25% was due to male factor [4]. 10-15% of couples were faced fertility issues in worldwide. Out of which 35% was due to female factor, 45% of male factor and the remaining proportion was may be combination of both or unknown issue [5]. The studies reported on semen analysis carried out in Pakistan, related to semen functional parameters as well as their age distribution [6]. The most of studies on the semen investigation were uncover to identify Caucasian populace of USA [7] and Europe [8].

The various factors like genetic disorders, chromosomal disorder, physical and mental stress, smoking, long term medication, autoimmunity, obesity, malnutrition, cryptorchidism, Sexually

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Transmitted Diseases, life style, malignancies and testicular carcinoma, varicocele and endocrinological disorder were resulted into primary or secondary fertility issues [9].

MATERIALS AND METHODS

This cross-sectional study was carried out in pathology department of Chaudhary Muhammad Akram Teaching and Research hospital, attached with AzraNaheed Medical College, Raiwind Lahore after getting approval from Institutional Review Board. . The study was carried out over 1 year between period of June 2019 to June 2020 including 150 males between 18 to 50 years. Males suffering from any current infections, malignancy and prostate carcinoma were excluded.

The sample of semen was collected in sterile container. The fresh sample taken in sterile container was immediately incubated at 37 degrees Celsius for 20 to 30 minutes. The history form had also been filled by selected individuals for later evaluation of risk factor associated male infertility.

Semen Analysis

After incubation of sample, the physical (color) and chemical examination (PH) of semen was carried out then the wet smear of semen was prepared for microscopy. On microscopy, the total spermatozoa were counted. We further categorized the active count on the basis of their motility (sluggish count and inactive count). The pus cells and red cells were also observed. Then morphology of spermatozoa was observed including normal head and tail, double head, tapered head and micro sperm.

Results

The current study considered a total of 150 individuals for semen analysis. The 54.7% of total were reported normal while the 45.3% of total count of spermatozoa were abnormal.it was showed in Table 1, Figure 1.

Table 1. Percentages of type of Total count of Spermatozoa.

	Total number (n)	Percentage of Normal count	Percentage Abnormal Count
Total count of spermatozoa	150	54.7% (82)	45.3% (68)

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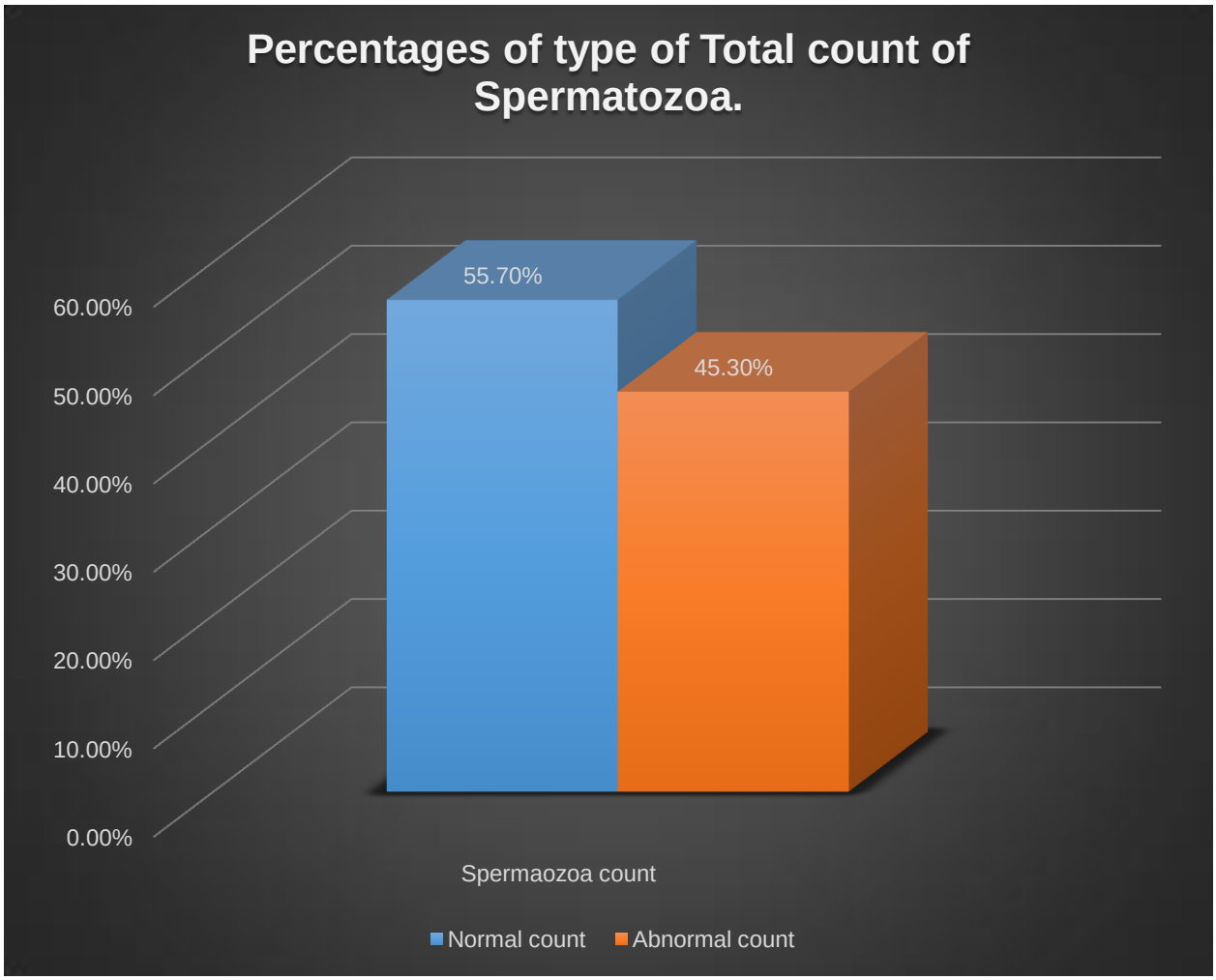

Figure 1. Percentages of type of Total count of Spermatozoa.

The categorization of semen was carried out on basis of volume into Normospermia (2-5ml), Hypospermia (<2ml) and Hyperspermia (>5ml). The 83.3% of total was Normospermia, 15.3% was fell into Hypospermia and 1.4% was Hyperspermia. It was described in Table 2, Figure 2.

Table 2. Volume categorization of semen analysis

Volume	No. of Patients	Percentage
Normospermia (2-5ml)	125	83.3%
Hypospermia (<2ml)	23	15.3%
Hyperspermia (>5ml)	02	1.4%

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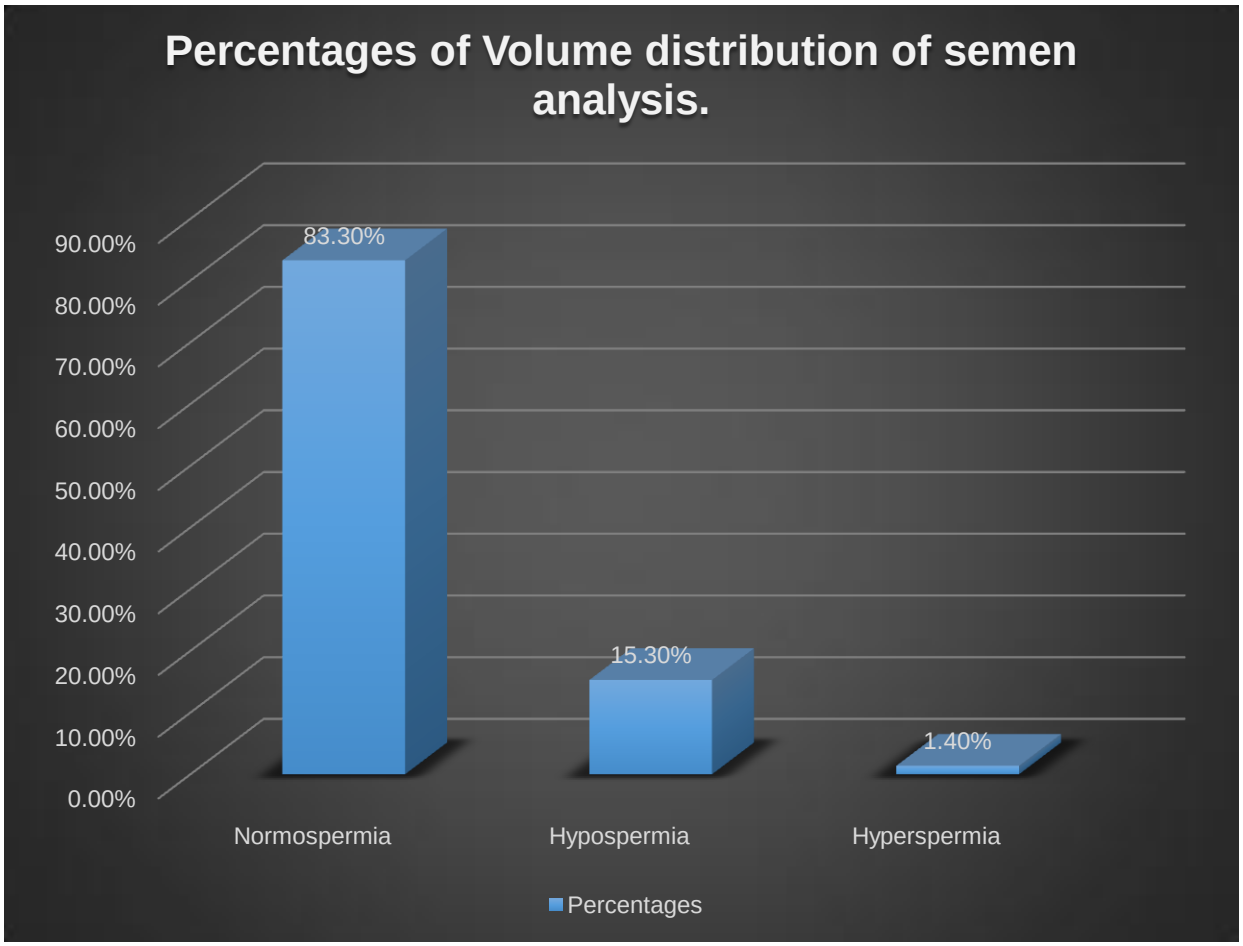

Figure 2. Percentages of Volume distribution of semen analysis.

The sperm concentration was evaluated by categorization of semen into Normospermia with normal sperm count, Oligospermia with less than normal range and Azoospermia with no sperm at all in the semen. The 54.7% of Normospermia was found, while 32.7% was contributed to Oligospermia. Azoospermia was reported 12.9% of total. The categorization of sperm concentration was shown in Table 3, Figure 3.

Table 3. Distribution of sperm concentration.

Sperm concentration	No of patients	Percentage
Normospermia	82	54.7%
Oligospermia	49	32.7%
Azoospermia	19	12.6%

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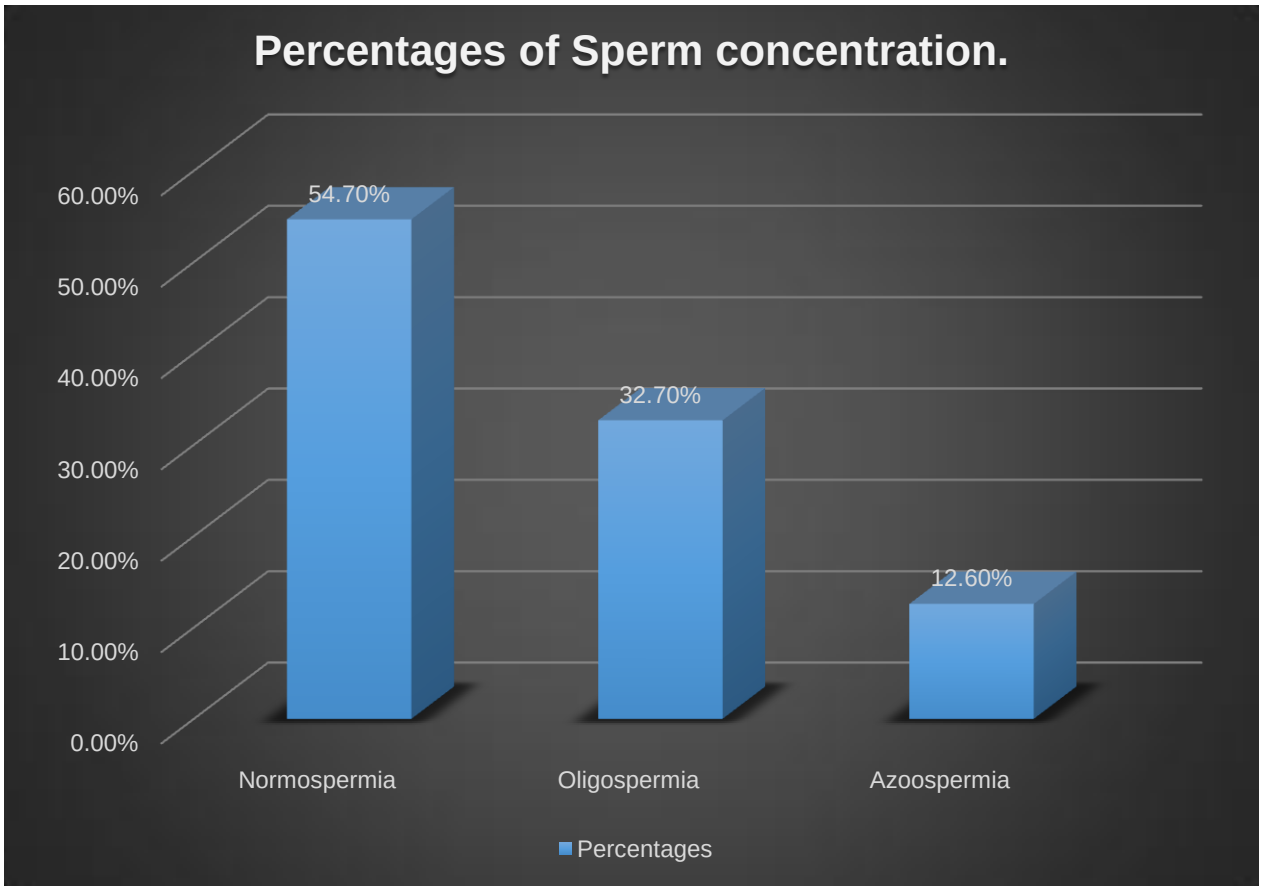

Figure 3. Percentages of Sperm concentration.

The age distribution of semen analysis on basis of total count of spermatozoa was evaluated into three groups like 18-20 years comprised of peak values as 27.4% of normal count and 26% of abnormal count. The individuals belonged to 29-39years were consisted of 24% normal and 16.7% of abnormal count, while in age group (40-50) showed 3.3% normal and 2.6% abnormal. It was described in Table 4, Figure 4.

Table 4. Age distribution of semen analysis on basis of total count of spermatozoa.

Age groups	Percentage of Normal count	Percentage Abnormal Count
18-28	27.4%	26%
29-39	24%	16.7%
40-50	3.3%	2.6%

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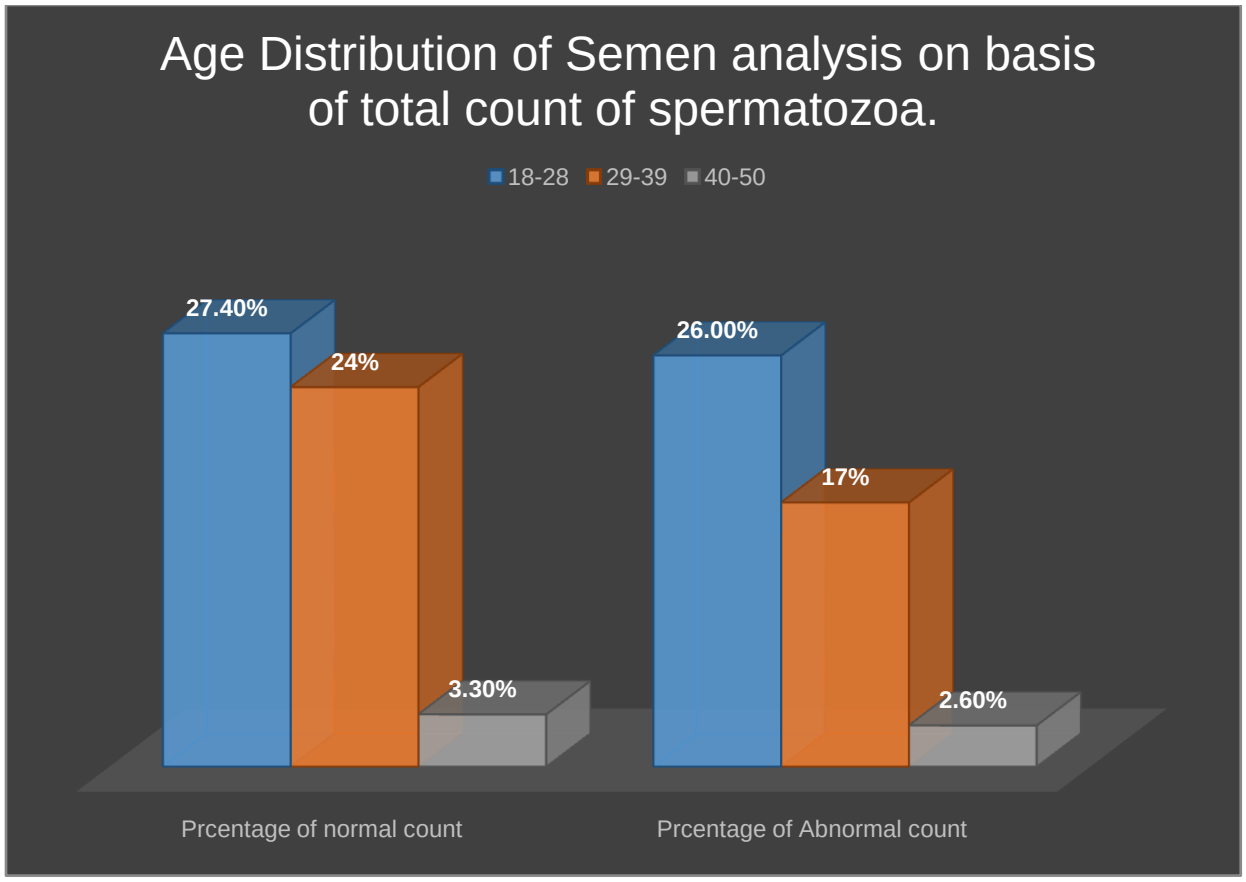

Figure 4. Age Distribution of Semen analysis on basis of total count of spermatozoa.

The categorization of abnormal count of Semen analysis in different age groups as Mild, Moderate and Severe. The Mild group had 5.3% in both age groups of (18-28) and (29-39), while 1% in age group (40-50). The Moderate group comprised of 4.6% in individuals belongs to 18-28 years, 6% in age group 29-39years and 0% in 40-50 years. The Severe group showed peak of 16% in age group (18-28), 4.6% in age group in 29-39years and 2.5% belongs to 40-50 year. It was shown in Table 5, Figure 5.

Table 5. Categorization of abnormal count of Semen analysis in different age groups.

Age groups	Percentage of Abnormal count of semen analysis		
	Mild	Moderate	Severe
18-28	5.3%	4.6%	16%
29-39	5.3%	6%	4.6%
40-50	1%	0%	2.5%

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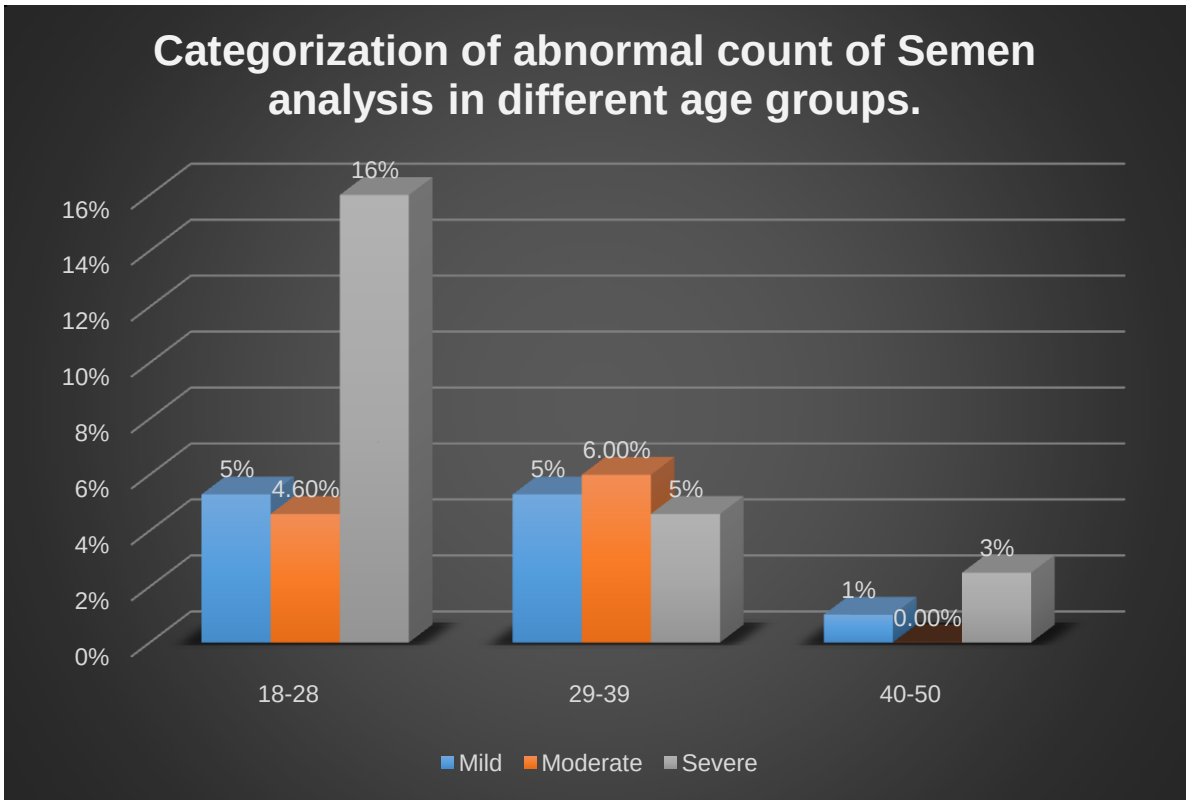

Figure 5. Categorization of abnormal count of Semen analysis in different age groups.

The percentages of risk factor associated male infertility was evaluated in current study, the risk factor including smoking, infection, long term medication, congenital defects and others involving endocrinological disorder, testicular surgery, varicocele, diabetes, herniopathy , lifestyle, carcinoma and environmental factors. The peak showed by smoking as 24%, 22% was due to infection, 15% was due to long term medication, 5% of congenital defects and others factors collectively as 34%. It was shown in Table 6, Figure 6.

Table 6. Percentages of Risk factor associated male infertility.

S.No	Risk factors	Percentages
1.	Smoking	24%
2.	Infection	22%
3.	Long term medication	15%
4.	Congenital defect	5%
5.	Others	34%

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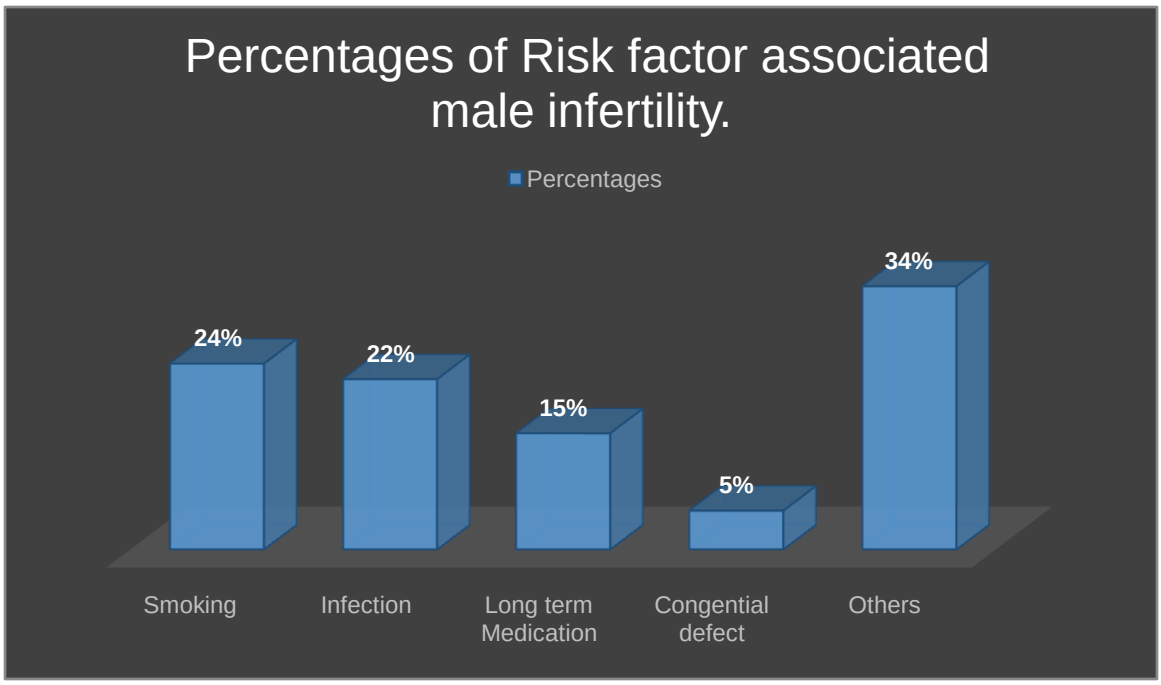

Figure 6. Percentages of Risk factor associated male infertility.

DISCUSSION

The present study related to male infertility, evaluated the different patterns of semen analysis out of which 54.7% showed normal count while 45.3% showed abnormality. The present study showed the prevalence of normospermia was 54.7%, Oligospermia was 32.7% and Azoospermia was 12.6%. The results of present study were related to number of other studies reported in past like one of study had given prevalence of Oligospermia was 21.43% and Azoospermia was 14.28% [10]. One more study evaluated as approximately 33% of each Oligospermia and Azoospermia [11] . Similar scenario reported in Pakistan 2013, as Oligospermia 11.11% as well as Azoospermia was 14.89% [12]. Another study conducted in Pakistan revealed prevalence as Oligospermia showed 37% and Azoospermia showed 14%[13] , regarding the percentage of Azoospermia was in accordance to USA as 10%and Kenya as 11.35% [14].

There was a vital role of volume of seminal fluid related to etiology of male infertility.The percentages of categorization of semen on basis of volume as Normospermia (2-5ml) showed 83.3% Hypospermia (<2ml) showed 15.3% and Hyperspermia (>5ml) showed 1.4%, in current study. These percentages were related to other study in Pakistan as Normospermia was 74.24%, Hypospermia was 22% and Hyperspermia was 3.53% [12]. A study

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in Sudan reported 89.7% of normal semen volume while 10.3% of abnormal semen volume [15]. Another study in Nigeria revealed Normospermia as 91%, Hypospermia as 7.3% and Hyperspermia as 1.7% [16].

The percentages of Risk factor associated male infertility was evaluated in current study, the risk factor including smoking, infection, long term medication, congenital defects and others involving endocrinological disorder, testicular surgery, varicocele, diabetes, herniopathy, lifestyle, carcinoma and environmental factors. The peak showed by smoking as 24%, 22% was due to infection, 15% was due to long term medication, 5% of congenital defects and others factors collectively as 34%. These were related to past researches as smoking 25.97% and infection 23.85% [17,18,19]. It included urinary tract infections as 25.88%, mumps as 8.96%, tuberculosis as 2.11% and semen culture had showed positive growth, including 2.4% of Neisseria gonorrhea, 1.2% of E. coli, while Proteus spp and Providencia spp each in infertile men showed 0.59% [17,18,19] drug addiction 8.36%, congenital defect 17.41% [17]. The risk factors associated to male infertility were previously reported as physical occupational activity, smoking, infection, drug addiction, trauma, congenital defect, varicocele and deletion of Y chromosome region related to Azoospermia [20].

CONCLUSION

This study analyzed, the various patterns of semen analysis in individuals, regarding parameters like total count, volume and sperm concentration. The individuals belong to various age group showed different percentages related abnormal count. It was also found that both smoking and infections are most common risk factors related to male infertility.

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