SPERM MORPHOLOGY STUDY BY CONVENTIONAL SEMEN ANALYSIS METHOD IN KHYBER PAKHTUNKHWA POPULATION

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ABSTRACT

Objective: To determined the frequency of various infertile male population by conventional method.

Methods: Conventional semen analysis method was used according to the world health organization guidelines. Statistical Package for social sciences version 21.0 was used for statistical analysis.

Results: Out of 1103 specimen, 88 (7.97%) were azoospermic, 108 (9.79%) were oligozoospermic and 406 (36.8%) were asthenozoospermic.

Conclusion: Comparatively the azoospermic population was decreased approximately 50% with reference to the previous studies, oligozoospermia was slightly decreased and asthenozoospermia was slightly increased. New technique for the measurements of sperm motility should be accurate and more precise. Need a molecular study regarding the infertility level of male population.

Key Words: Sperm, morphology, semen, analysis

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INTRODUCTION

Infertility is a common gynecological disorder defined as the inability of a man and woman to reproduce.[1] Infertility prevalence and incidence is different among different regions all over the world.[2] In entire world about 10-15% of couples are suffering from infertility disorders (sub-Saharan Africa 15-45% and Nigeria 20-30%.[3] About 35% female and 45% male is responsible of infertility whereas the remaining 20% are idiopathic in nature.[4] Male has an important contribution in infertility.[5] Male infertility is an alarming situation in Pakistan as well as globally. In Pakistan, population growth rate currently is approximately 2%. Approximately infertility rate in Pakistan is 21.9% where 3.5% and 18.4% is primary and secondary infertility respectively.[1]In 90% male infertile cases mainly either due to poor semen quality or quantity or low sperm amount or its combination. Recently reported data confirm that the low amount of semen quantity and quality have significant association with the urogenital infections and sexually transmitted diseases (STDs).[4]

Male infertility occur mostly due to defect in sperm but there are many other etiological factors involved e.g. bilateral castration, AZF gene deletion (y-deletion), testicular cancer, impaired sperm production, hypogonadotropic hypogonadism (cryptorchidism), absence of testicular tissues, genitourinary infection, age >55 years, blockage of sperm transport system and environmental agents like irradiation, drugs (marijuana, steroids and salazopyrin), alcohol, extremes of temperature, tobacco abuse, occupational exposure, nutritional deficiency like trace elements e.g. zinc, selenium and vitamins.[5,6] Sperm parameters also affected by presence of hydroceles, varococeles, stress and excessive exercise.[5,7] These entire factors can impairs quality of spermatozoa and responsible for male infertility. Oligozoospermia (low sperms count) and asthenozoospermia (low motility of sperm) are the common causes of male infertility.[8]

Semen analysis remains the useful primary and gold standard for investigation and examination of male infertility. The use of standard procedures can provide important information about the sperm quality (morphology, motility) and sperm concentration (count) of semen specimen.[4,9]

There are two methods to evaluate the human semen; one is latest automated method while the other is manual conventional method. Conventional (manual) method of semen analysis is popular and widely used technique in most of the laboratories because it provides information both qualitative and quantitative, defect in morphology and determined with certainty the causative factors.[10] Conventional method is also simple and inexpensive technique. However, variation in results may occur due to lack of standardization.[11] To keep in mind these factors, this study was design to provide data of the prevalence of infertility in male population of Peshawar, Khyber Pakhtunkhwa, Pakistan.

METHODS

Samples were collected from March, 2018 to February, 2019 for semen analysis referred from different private clinics. The history of all these patients was infertile. Informed consent Performa were completed from all patients. Those entire patients were included in study who failed to achieve pregnancy in last two years and no female infertility factor was involved. The exclusion criteria was tuberculosis, secondary infertility,

orchitis, mumps, vericoceole, any chronic debilitating illness, sexually transmitted diseases, any drug affecting male fertility e.g. antineoplastic agents, beta blockers etc.

A sterile plastic container was used for semen collection by masturbation after three days of abstinence. Semen specimen was delivered to laboratory within 30 minutes and semen analysis was carried out by manual method. After liquefaction, a thin smear was made and stained by Giemsa stain to assess sperm morphology. According to WHO guidelines, the specimens were analyzed for viscosity, volume, motility, sperm concentration and morphology. For statistical analysis, SPSS version 16.0 was used.

RESULTS

Total of 1,100 male patient semen samples were analyzed by conventional semen analysis. Samples were analyzed for pH, volume, sperm count, liquification time, morphology, viscosity, pus cell count and for growth C/S. Highest percentage of patients were observed in age of 20-30 years (60.09%) while lowest were found in age of 50 or above years (0.90%) (Table 1).

Table 1: Age wise distribution of participants

Age	Normal	Abnormal	Number of patients
20-30	279	382	661 (60.09%)
31-40	167	171	338 (30.72%)
41-50	47	44	91 (8.27%)
51 & above	5	5	10 (0.90%)
Total	498(45.27%)	602(54.73%)	1100

Mean age of all patients were 30.56±7.08 years (range 20-56yeaars) while his partner mean age were 28.12±8.19 (range 18-51 years). mean volume of sample were 2.05±1.05ml (range 0.15-6.6ml). Mean liquification time were 21.34±2.61 (range 15-60 mints). All specimens were alkaline in nature and mean pH were 8.00±0.8 (range 6.5-8.5 pH) (Table 2).

Table 2: Distribution of patients according to age, partner age, volume, liquification time and pH

Parameters	Range	Mean±SD
Age	20-56 years	30.56±7.08 years
Mean Age Of Partner	18-51 years	28.12±8.19
Volume	0.15-6.6ml	2.05±1.05
Liquafication Time	15-60 mints	21.34±2.61
pH	7.5-8.5	8.00±0.8

Mostly specimen has 6 to 8 pus cells but 25 (2.27%) samples have numerous pus cells while 31 (5.15%) patients have yielded positive culture on semen culture and sensitivity. Hypospermic (volume <1.5ml) samples were 13 (1.18%). All samples were Gray/white in color. Additionally, maximum samples were thin (99.17%) in consistency while 5 (0.83%) samples were thick in viscosity (Table 3).

Table 3: Frequency of patients according to different parameters

Parameters	Frequency
Pus Cells	06-08/HPF
Growth C/S	31/602 (5.15%)
Viscosity (Thick)	5/602 (0.83%)
Viscosity (Thin)	597//602 (99.17%)
Colour	Grey/White

Out of 1,100 specimen, 88 (8.00%) were azoospermic, 108 (9.81%) were oligozoospermic and 406 (36.90%) were asthenozoospermic while the remaining 498 (45.27%) samples were normospermic (Table.4). As a control, 100 samples were taken of proven father who have normal morphology along with count, consistency and pH. Sperm count and motility of proven fathers was significantly higher ($p<0.001$) than the patients (Table 4).

Table 4: Frequency of semen concentration

Parameters	**Frequency**	**Percentage**
Normospermia	498	45.27%
Azoospermia	88	8.00%
Oligospermia	108	9.81%
Asthenozoospermia	406	36.90%

DISCUSSION

In present study, 1100 infertile semen specimens were analyzed in which 8.00 % (88/1100) were azoospermic, 9.81% (108/1100) were oligozoospermic and 36.90% (408/1103) were asthenozoospermic while the 45.27% (498/1100) were normospermia. Similar studies were conducted by Shoaib et. Al and Fauzia and Nishat.[4,13] Comparative results are shown in table 5.

Table 5. A comparative results of three studies

Shoaib et al. (2011)			**Fauzia and Nishat (2013)**			**Present study (2014)**		
AS*	OS**	AZS***	AS	OS	AZS	AS	OS	AZS
13.3%	23.2%	35.2%	14.89%	11.1%	25.81%	8.00%	9.81%	36.90%

AS*= Azoospermia, OS**= Oligozoospermia, AZS***= Asthenozoospermia

It is clear from above comparative table that azoospermia and oligozoospermia prevalence is decreased in present studies as compared to other previous studies while the prevalence of asthenozoospermia is increased from the previous reports.[4,13] The variation among the studies may be due to different geological regions because Shoaib et al. study was conducted in Islamabad while Fauzia and Nishat study was conducted in Karachi.[4,13] Shoaib et. al. reported that prevalence of oligozoospermia was 23.2% which is to high as compared to present study (9.81%), may be due to the variation in study population but present study is similar to that reported by Fauzia and Nishat.[4,13]

Azoospermia in Pakistan is not to different then USA (10%), South Africa (9%) and Kenya (11.35%) as such found in present study (8.00%) whereas prevalence of azoospermia was high in Turkey (21.5%) and Zimbabwe (24.3%).[10]

A study from India revealed that prevalence of azoospermia, oligozoospermia and asthenozoospermia is 11.1%, 18.2% and 14.2% respectively. The variation between result of present study and study conducted at India may be due to different geological location and sample size variability.[9]Jequier AM. reported that prevalence of oligozoospermic is 33.17%, azoospermic is 9.89% and asthenozoospermic is 1.83%.[15]Report revealed from Nigeria that prevalence of azoospermia, oligozoospermia and asthenozoospermia is 3.5%, 34.9% and 26.6% respectively which is slightly different with the results of present but may due to small sample size of Nigerian study (n=433).[3]

Mama Sy. Diallo and his colleague reported 14.5% prevalence of azoospermia while prevalence of oligozoospermia is 27.7%.[14]A study conducted in Islamabad showed that prevalence of asthenozoospermia is 21.42% while another study conducted by Curi SM and his colleague revealed that asthenozoospermia rate is 18%.[16,17]

CONCLUSION

Comparatively infertility levels less in current study besides the asthenozoospermia level. As with conventional sperm motility and morphology assessment is related to large number of bias. New technique for the measurements of sperm motility should be accurate and more precise.

REFERENCES

1. Khan T, Qureshi MS. Prevalence of infertility. In: Pakistan lactation and fertility survey. National Research Institute of Fertility Control, Ministry of Population Welfare, Government of Pakistan, Karachi, Pakistan. 2011 Mar 1;23(1):84-8.
2. Nanna A, Unuajohwofia O. Semen Quality of Male Partners of Infertile Couples Attending Fertility Clinics in Delta State University Teaching Hospital, Oghara, Delta State, Nigeria. J Androl Gynaecol. 2017;5(1):4.
3. Peter AO, Temi AP, Olufemi AP, Simidele OM, Adeniran AS. Pattern of semen parameters and factors associated with infertility in male partners of infertile couples in Nigeria. Andrology (Los Angel). 2016;5(161):2167-0250.
4. Butt F, Akram N. Semen analysis parameters: Experiences and insight into male infertility at a tertiary care hospital in Punjab. J Pak Med Assoc. 2013 May 1;63(5):558-62.
5. Khan MA, Shah S, Akhtar N, Sajid MA, Naeem M, Anwar K. Spectrum of patients presented in male infertility clinic. KMU Journal. 2012 Jan 1;4(1);13-18.
6. Wong WY, Thomas CM, Merkus JM, Zielhuis GA, Steegers-Theunissen RP. Male factor subfertility: possible causes and the impact of nutritional factors. Fertility and sterility. 2000 Mar 1;73(3):435-42.
7. Kazmi K, Kauser M, Zafar S, Baqi Z. The potential effect of stress factors on male fertility in Pakistani population. J. Baqi Med Univ. 1999; 2:6-8.
8. Aslam M, Masulul Hassan J, Naseema MA, Khan A. The concentration of semen N-acetyl. B-B glyucoaminidze Mar. Pak. J. Med Res. 2000; 39(4)-135-137.
9. Nallella KP, Sharma RK, Aziz N, Agarwal A. Significance of sperm characteristics in the evaluation of male infertility. Fertility and sterility. 2006 Mar 1;85(3):629-34.
10. Chaurasia AK, Sinha AK, Upahdyay P. Comparison of semen analysis by manual and automated method. Journal of Pathology of Nepal. 2016 Sep 24;6(12):990-3.
11. Komori K, Tsujimura A, Ishijima S, Tanjapatkul P, Fujita K, Matsuoka Y, Takao T, Miyagawa Y, Takada S, Okuyama A. Comparative study of sperm motility analysis system and conventional microscopic semen analysis. Repro med and bio. 2006 Sep;5(3):195-200.
12. Shaikh AH, Khalique K, Tariq GS, Soomro N. Pattern of semen abnormalities in couples with male factor Infertility. Pak J Surg. 2011; 27(3): 204-208.
13. Khan MS, Deepa F, Ahmed Z, Tahir F, Khan MA. Assessment of male reproductive health by conventional

method of semen analysis. JAMC Abbottabad. 2011 Mar 1;23(1):84-8.

14. Mama Sy Diallo, Abdoulaye Séga Diallo, Pyrrhus Fotso, Yoro Diallo, Babacar Diao, Oumar Faye: Semen Abnormality Patterns and Parameters in Male Partners of Infertile Couples in Dakar (Senegal): Open J. Urol. 2015, 5, 155-160.

15. Jequier AM. Semen analysis: a new manual and its application to the understanding of semen and its pathology. Asian J Androl. 2010;12(1):11-3.

16. Subhan F, Tahir, F, Alam W, Sultan S, Shahab M. Seminal and hormonal profiles of fertile and subfertile Pakistani men -a study of infertility cases. Pak J Med Res. 2000; 39(3): 42-5.

1. Curi SM, Ariagno JI, Chenlo PH, Mendeluk GR, Pugliese MN, Sardisegovia LM, et al. Asthenozoospermia: analysis of a large population. Arch Androl. 2003; 49(5): 343-9.