

# Semen Characteristics of Fertile Pakistani Men

Pages with reference to book, From 62 To 64

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## Abstract

Semen characteristics were studied among 200 fertile Pakistani men aged 24 to 48 years. Each subject had fathered atleast two children. The mean $\pm$ SD values of volume, sperm density, motility percentage, grade of motility and percentage of oval sperms were 3.11 $\pm$ 1.2 ml, 58.21 $\pm$ 26.41 million/ml, 61.2 $\pm$ 21.3%, 3.01 $\pm$ 0.94 and 70.2 $\pm$ 15.36% respectively. There was no deteriorating effect of age on semen quality except some decrease in semen volume. The comparison has been made with studies from other countries (JPMA44:62, 1994).

## Introduction

Semen analysis is the most important test to assess the fertility potential of a male. The decision to institute any therapeutic intervention hinges on the result of semen analysis. Unless reference values are available for the population being dealt with, the interpretation of results becomes difficult. A perusal of pertinent literature reveals that the maximum number of studies on the semen analysis relate to Caucasian population of USA<sup>1-4</sup>. Through there are certain reports from Europe<sup>5-7</sup> and South America<sup>8</sup>, yet there is a paucity of studies outlining the reference values for oriental and African populations. The present study is the first report to define reference values of semen parameters of fertile Pakistani males.

## Subjects and Methods

The study is based on the semen analysis of 200 Pakistani males of proven fertility, who voluntarily participated in the study. Each individual has fathered atleast two children. The semen specimens were collected by masturbation after a minimum abstinence of 3 days and analyzed within 2 hours of production according to WHO's standardized methods<sup>9</sup>.

## Results

The age of the study population ranged from 24 to 48 years with a mean ( $\pm$  SD) of 33.17 $\pm$ 4.96 years. The age distribution of the subjects is shown in Table I.

**Table I. Distribution of subjects according to age groups.**

Age (Years)	Number	Percent
<25	3	1.5
26-30	62	31
31-35	84	42
36-40	36	18
41-45	9	4.5
45	6	3
Total	200	100

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The mean longitudinal diameter of testes was  $4.35 \pm 0.43$  cm for left testes and  $4.37 \pm 0.42$  cm for right testes, whereas the corresponding figures for transverse diameter were  $2.47 \pm 0.50$  cm and  $2.52 \pm 0.14$  cm respectively (Table II).

**Table II. Size of testes among various age groups.**

Age group (years)	No. of subjects	Longitudinal diameter (cm)		Transverse diameter (cm)	
		Left	Right	Left	Right
26-30	62	$4.40 \pm 0.31$	$4.45 \pm 0.46$	$2.51 \pm 0.51$	$2.55 \pm 0.37$
31-35	84	$4.35 \pm 0.52$	$4.42 \pm 0.38$	$2.50 \pm 0.38$	$2.51 \pm 0.41$
36-40	36	$4.29 \pm 0.42$	$4.33 \pm 0.38$	$2.47 \pm 0.41$	$2.52 \pm 0.29$
41-45	9	$4.26 \pm 0.36$	$4.31 \pm 0.41$	$2.49 \pm 0.62$	$2.48 \pm 0.43$
45	6	$4.26 \pm 0.38$	$4.34 \pm 0.68$	$2.48 \pm 0.48$	$2.49 \pm 0.32$
Total	200	$4.35 \pm 0.45$	$4.34 \pm 0.42$	$2.47 \pm 0.50$	$2.52 \pm 0.11$

All figures represent mean  $\pm$ SD

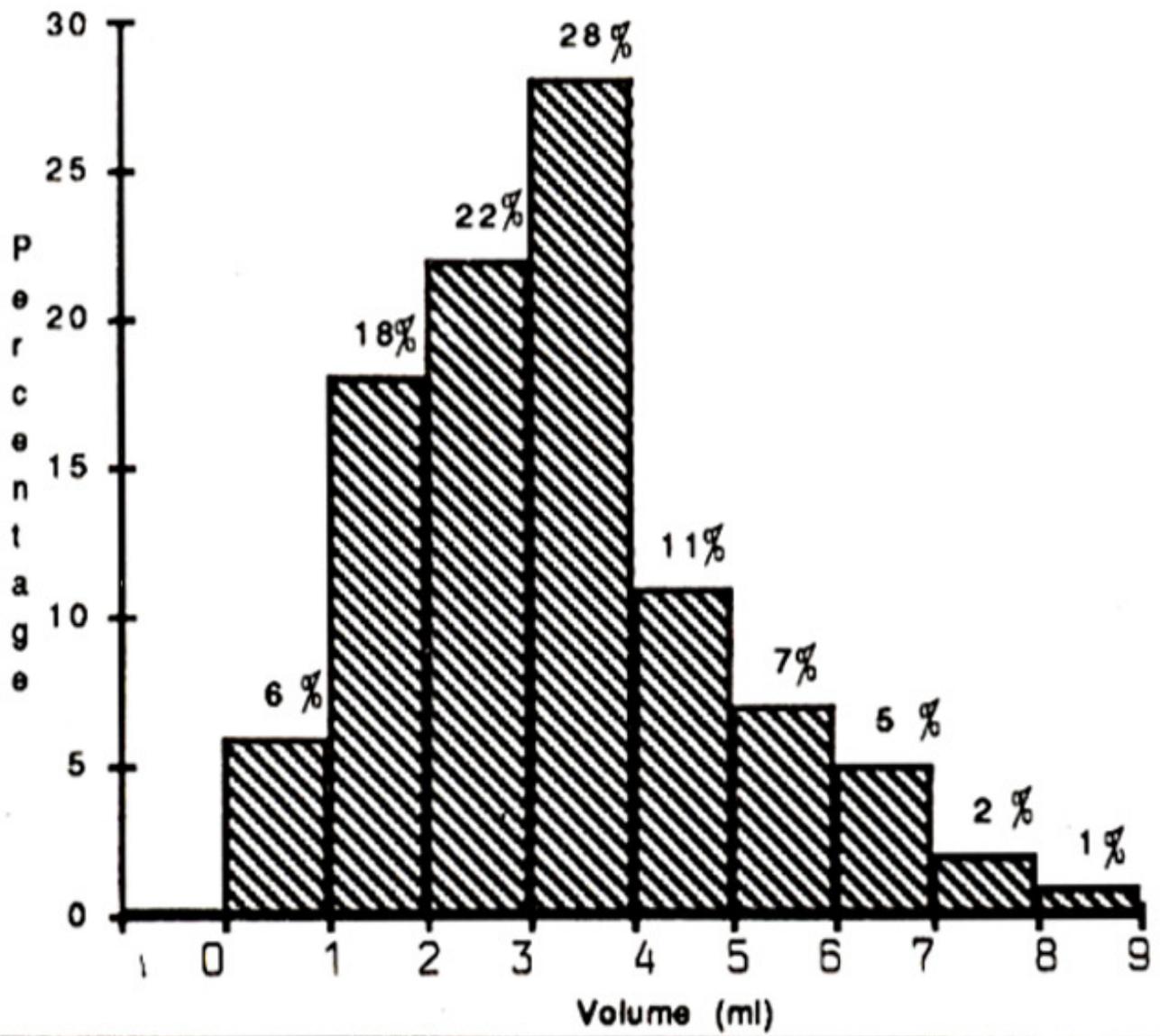
The results of semen analysis are summarized in Table III.

**Table III. Semen characteristics of 200 fertile men.**

Parameter (years)	Volume (ml)	Sperm density (millions.ml)	Motility (%)	Motility grade	Morphology (%)
Range	1-8.2	13-184	11-92	1-4	46-93
Mean	3.11	79.48*	61.20	3.01	72.20
SD	1.20	58.21** 33.8*	21.34	0.94	15.36
		26.41**			

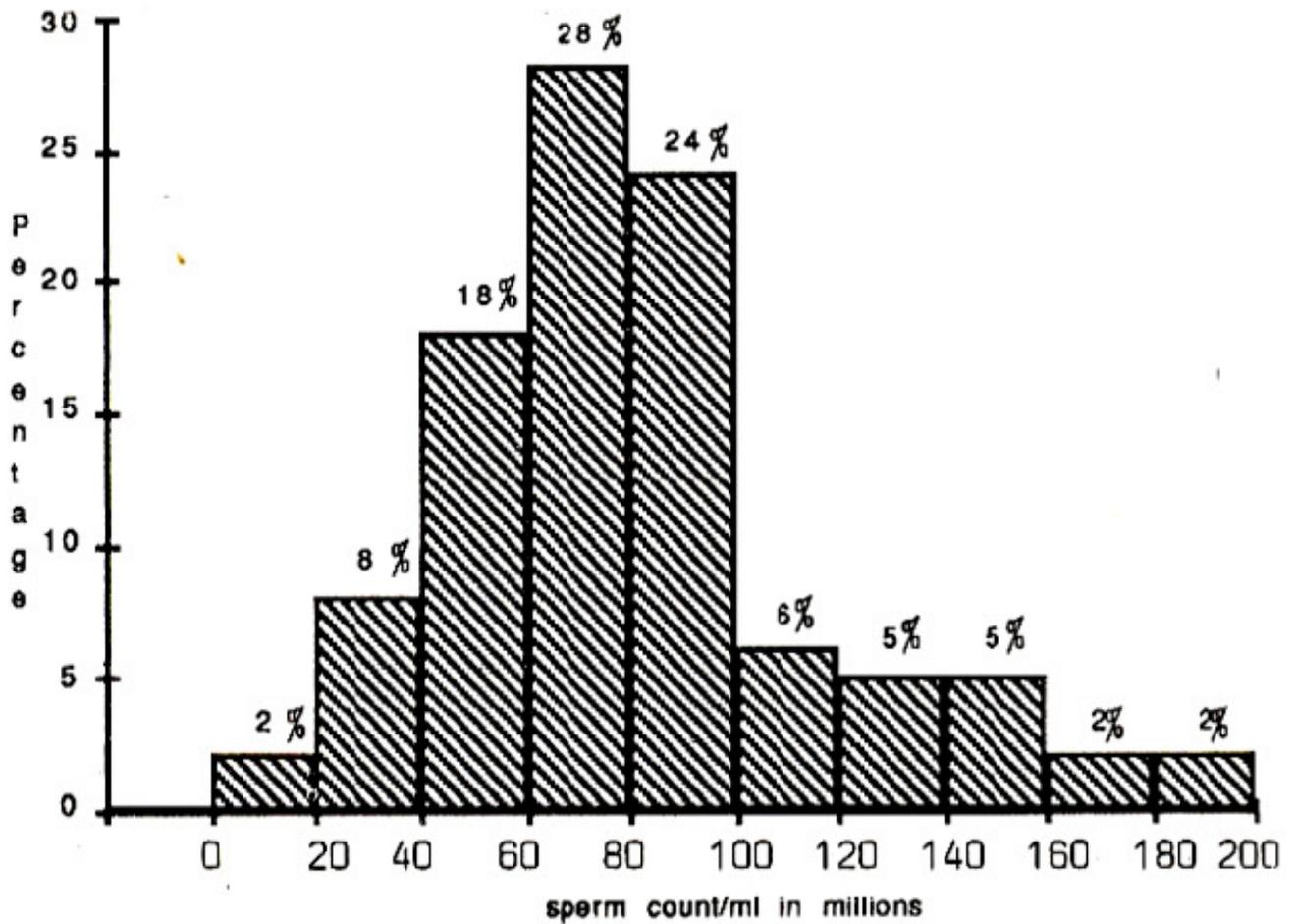
\*Arithmetic; \*\*Geometric

The volume of the semen ranged from 1 ml to 8.2 ml. The frequency distribution is shown in Figure 1.



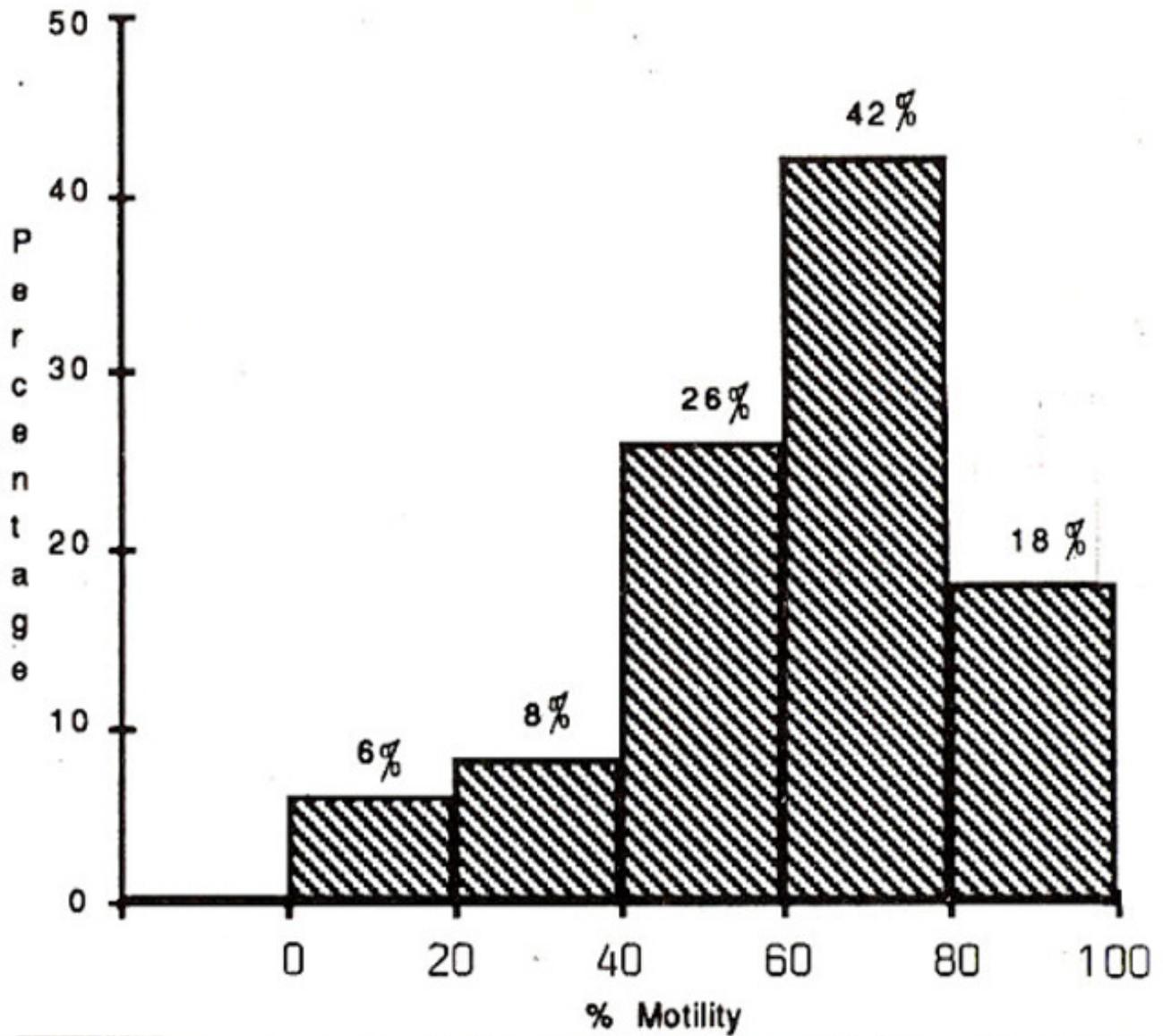
**Figure 1. Frequency distribution of volume.**

The mean volume was  $3.1 \pm 1.2$  ml. In 76% cases the volume ranged between 1 ml and 5 ml. The sperm density, i.e., sperm count/mi ranged from 13 to 184 millions. The mean sperm density was  $79.48 \pm 33.8$  millions when arithmetic mean was calculated and  $58.21 \pm 26.41$  millions according to geometric mean (Figure 2).



**Figure 2. Frequency distribution of sperm density.**

The percentage of actively motile sperms varied from 11 to 92%. The mean motility was  $61.2 \pm 21.3\%$ . The relative frequency distribution is shown in Figure 3.



**Figure 3. Frequency distribution of motility.**

The grade of motility ranged from 1 to 4 with a mean value of  $3.01 \pm 0.94$ . The percentage of sperms with oval forms ranged from 46 to 93% with a mean value of  $70.2 \pm 15.36\%$  (Figure 4).

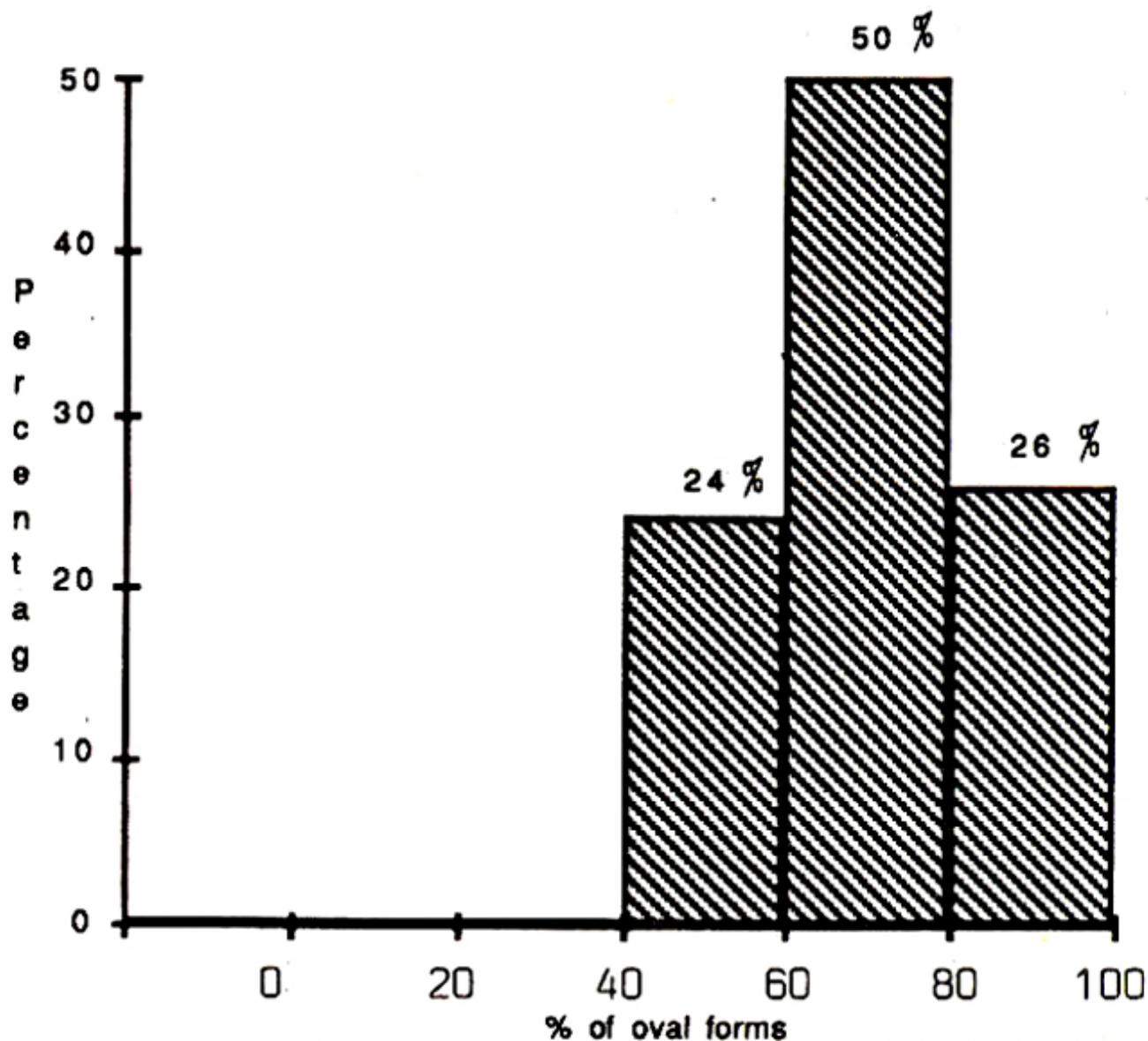


Figure 4. Frequency distribution of morphology.

Table IV. Semen characteristics according to age.

Age group (years)	No. of subjects	Volume (ml)	Sperm density (millions/ml)	Motility (%)	Morphology (%)
<25	3	3.46 ± 0.91	78.54 ± 14.21	63.41 ± 23.42	73.41 17.03
26-30	62	3.34 ± 1.23	82.98 ± 24.62	62.24 ± 12.46	68.98 21.14
31-35	84	3.26 ± 1.07	78.91 ± 19.82	60.17 ± 18.32	71.12 ± 19.08
36-40	36	3.17 ± 1.11	80.12 ± 23.17	59.36 ± 17.92	70.96 ± 11.68
41-45	9	3.07 ± 1.41	84.28 ± 34.53	62.36 ± 21.42	68.12 ± 14.46
45	6	2.96 ± 0.68	81.78 ± 27.32	64.13 ± 24.13	69.92 ± 13.19
<b>Total</b>	<b>200</b>	<b>3.11 ± 1.20</b>	<b>79.48 ± 33.81</b>	<b>61.20 ± 21.34</b>	<b>70.20 ± 15.36</b>

Table IV shows the semen characteristics among different age groups. Except a progressive decrease in

semen volume with advancing age, there was no significant change in other parameters.

## Discussion

The mean testicular size of fertile Pakistani males is the same as reported for Caucasian population. According to Williams and Warwick<sup>10</sup>, the average dimensions of testes ranged from 4 to 5 cm in length, 2.5 cm in breadth and 3 cm in antero posterior diameter. In fact there is a dearth of studies on this aspect of andrology. The few studies, which exist, have not used uniform scales of measurements and as such the comparison becomes difficult.

Table V. Comparison of semen parameters of various studies.

Author's name	Country of study	Year of study	No. of subjects	Volume (ml)	Count/ml (million)	Motility (%)	Morphology (%)	Ref. No.
MacLeod and Gold	USA	1950	800	3.3	107	58	79	1
Rehan and Sobrero	USA	1975	1300	3.20	79 (65)	65	-	2
Sobrero and Rehan	USA	1975	100	3.31	81 (68)	63	73	3
Smith and Steinberger	USA	1977	2000	2.50	70	-	-	4
Schwartz et al.	France	1979	36	4.1	99	-	-	5
Abyholm	Norway	1981	51	3.90	89	53	40	6
Freischem et al.	Germany	1982	100	4.00	81	65	58	7
Bahamondes et al.	Brazil	1979	185	3.08	78	66	86	8
Obwaka et al.	Kenya	1972	44	2.1	81	51	81	11
Wang et al.	Hong Kong	1985	1239	2.86	83 (61)	56	66	12
Rajan	India	1981	194	-	50	64	-	13
Rehan	Pakistan	1993	200	3.11	79 (58)	61	70	-

The figures in parenthesis indicate geometric mean.

Table V shows the comparisons of our findings with other reports<sup>1-8, 11-13</sup>. Although the findings of the present study are similar to other studies from various continents of the world, yet there were few noteworthy differences. In our series, the percentage of fertile men with a sperm density of less than 20 million/ml was lower (2%) as compared to various studies from West<sup>1-7</sup>. MacLeod and Gold<sup>1</sup> reported that only 5% of his patients had a sperm density of less than 20 million/ml. Rehan and Sobrero has put this figure at 7%<sup>2</sup>. In the studies of Nelson and Bunge<sup>14</sup> and Smith and Steinberger<sup>4</sup>, corresponding values are 20.12% and 18.35% respectively, while the researchers from Kenya<sup>11</sup> found that 4% African population has a sperm density of less than 20 million/ml. Wang et al<sup>12</sup> in their study of 1239 Chinese men found that 8% had a sperm of less than 20 million/ml. No case of polyzoospermia, i.e., sperm density of more than 250 million/ml was seen in the present study. The frequency distribution of motile and oval sperms in the present series was similar to that observed among Caucasians and Chinese. The mean sperms density in our series (58 million/ml) is in total agreement with the findings of Rajan from India<sup>13</sup>, who also reported in mean sperm density of 58 million/ml Our figures also agree with the observations of Akhtar<sup>15</sup>. Our findings agree with other reported series<sup>4,6,14</sup> that with advancing age the parameter most likely to suffer is semen volume. These findings however differ from the results reported by Schwartz et al<sup>5</sup> who noted decreased motility and morphology. In spite of these differences, all andrologists agree that the fertilizing capacity of spermatozoa per se, does not deteriorate with age.

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