VITAL CAPACITY IN YOUNG INDIAN ADULTS'

By

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Several workers have carried on investigations on vital capacity in Indian population. Bhatia (1), Mukherji and Gupta (10), De & De (2), Telang and Bhagwat (13) and more recently Talsania, Phadia and Goel (14) have studied vital capacity of medical students. Krishnan and Vareed (6;7), Reddy and Sastry (11), Lundgren, Sengupta and Saha (8), Gupta (3), Industrial Health Research Unit (4), Singh and Prabhakaran (12) and Rao (5) have reported observations on vital capacity of adult male population. Mason (9), Krishnan and Vareed (7) and Singh and Prabhakaran (12) have determined vital capacity of female subjects of India.

Students and staff of Mahatma Gandhi Memorial Medical College, Jamshedpur come from almost all over the country. Studies were, therefore, conducted on students and staff of this institution with a view to (*i*) determine average values for vital capacity in young Indian adults, and (*ii*) find out regional effect, if any.

MATERIAL AND METHODS

Only healthy subjects were selected for investigation. Vital capacity (maximum of the values out of three consecutive observations with 2 minutes rest) was determined in the standing posture 2-3 hours after breakfast, by means of a Benedict-Roth Recording Spirometer. Values were expressed in terms of body temperature (37°C), standard pressure (760 m.m.Hg.) and saturated aqueous tension (B.T.P.S.). Body surface area was calculated from height and weight by DuBois formula.

States were grouped into regions as shown in Table.

RESULTS

194 subjects of both sexes were studied. 161 were students of 17-27 years of age, and 33 were male members of staff, of age group 18-34 years.

Results are summarised in Tables I and II below :

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TABLE I

Vital capcity at B.T.P.S. in persons of various age groups and its relation to body surface area

A. MALE

Age group	Number of observation	Range in litres	Mean in litres	Standard deviation	Standard error	Coefficient of variation per cent	Vital capacity B.S. in sq. mete
15—19*	36	2.1—5.1	3.17	0.62	0.10	19.55	1.98
20—24	110	2.0—5.0	3.29	0.47	0.04	14.28	2.03
25—29	12	2.0—4.3	2.94	0.71	0.22	24.15	1.91
30—34	12	1.9—4.1	2.67	0.78	0.23	29.21	1.84
			B. FEMALE				
15—19*	12	2.1—3.0	2.49	0.26	0.07	10.44	1.78
20—24	12	2.0—3.2	2.67	0.42	0.12	15.73	1.85

*all subjects were 17 years and above.
B.S.A. —Body surface area.

DISCUSSION

Table I shows the values of vital capacity obtained in young Indian adults of the various age groups of both sexes. Highest value is obtainable in age group 20-24 years. However in Western region the values for vital capacity in this age group is lower (Table II). No plausible explanation is forwarded for this aberrant observation. The lowering of the values beyond 25 years and markedly so after 30 years has been observed by others and may be due to a tendency towards more sedentary habit after that age. Values for women in similar age groups are lower than men—a fact observed by all workers in this country and outside.

Table II presents the break-up of figures regionwise. Comment has been confined to age groups 15-19 years (there was no subject below the age of 17 years in this series) and 20-24 years only where number of observations are adequate for comparison. These figures vary significantly from region to region (P is <0.05), when compared with each other and also if comparison is made with the highest. Highest mean value (3.54 litres) is obtainable from the Northern region in the age group 20-24 years.

As higher values may be due to larger size (leading to a larger body surface area) per se, of the individuals of the region, the values for vital capacity per square metre of body surface area have been subjected to analysis. The figures for different regions show significant vari-

TABLE II

Vital capacity at B.T.P.S. in men of various age groups and its relation to body surface area regionwise.

Age group	Number of observation	Range in litres	Mean in litres	Standard deviation	Standard error	Coefficeient variation p.c.	Vital capacity/B.S.A.
A. *Eastern Region* (Assam, Bihar, West Bengal, Orissa and Eastern U.P.) :							
15—19	12	2.2—5.1	3.15*	0.72	0.22	22.85	1.87@
20—24	26	2.4—4.4	3.27**	0.51	0.09	15.89	2.02 ($)
25—29	9	2.0—3.7	2.86	0.62	0.21	21.67	1.88
30—34	11	1.9—4.1	2.71	0.81	0.24	29.14	1.89
B. *Western Region* (Maharashtra, Gujrat, Rajasthan and Madhya Pradesh) :							
15—19	12	2.4—4.4	3.38*	0.60	0.17	17.76	2.09@
20—24	43	2.0—4.4	3.13**	0.49	0.07	15.65	1.91 ($)
25—29	1	4.3	..	..	..	..	2.30
30—34	1	2.3	..	..	..	..	1.69
C. *Northern Region* (Delhi, Punjab, Himachal Pradesh and Jammu & Kashmir) :							
15—19	12	2.1—4.3	3.26*	0.55	0.15	16.38	2.06@
20—24	23	2.9—5.0	3.54**	0.48	0.10	13.56	2.14 ($)
25—29	..	..	..	..	..	..	..
30—34	..	..	..	..	..	..	..
D. *Southern Region* (Madras, Mysore, Kerala and Andhra Pradesh) :							
15—19	..	..	..	..	..	..	..
20—24	18	2.7—4.0	3.23**	0.38	0.09	11.76	2.01 ($)
25—29	2	2.3—3.3	2.80	1.00	0.71	35.71	1.87
30—34	..	..	..	..	..	..	...

*Not significant (P=0.20) variation
(@) Significant variation (P is>0.05)
**Significant variation (P is>0.05).
($) Significant variation (P is>0.05)

Note : There was no subject below 17 years.

(Calculations based on Hill, B.A. Principles of Medical Statistics, 7th Ed., The Lancet. 1961).

ation amongst each other (P is<0.05) and significantly higher value is presented by the Nor thern Region again. A regional effect on vital capacity is thus indicated.

SUMMARY

1. Vital capacity has been determined in 194 young Indian adults of both sexes bet ween the ages of 17 and 34 years; and the values have been related to body surfac area.
2. Mean values of vital capacity and also the vital capacity per square metre of body surface area was found to show singnificant variation in subjects coming from diffe rent regions.

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