

PREDICTION OF MAXIMUM BREATHING CAPACITY IN THE FEMALES OF GUJARAT

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Assessment of ventilatory capacity of the lungs is an important aspect of testing pulmonary function. The overall integrated and co-ordinated function of the ventilatory apparatus can be judged by Maximum Breathing Capacity. The normal M.B.C. depends upon various factors such as freely mobile thoracic cage; patency of tracheo bronchial tree and co-ordinated respiration.

As a repetitive test of the function of the respiratory muscles in patients with myasthenia gravis, M.B.C. holds a unique position.

There are only very few studies on healthy Indian female subjects. It was aimed to study the relationship of M.B.C. with physical characteristics like age, height weight and body surface area in a larger sample of female subjects in order to evolve a prediction formula suitable for the females of Gujrat. However Thomspson Wells (9) and Bhargav and Somnath (4) have already observed that Baldwins' equation give values too low for M.B.C.

Baldwins' prediction formula of M.B.C. is found to be more suitable for the women of Western countries. Singh (8) has presented prediction formula of M.B.C. suitable for women of Southern India. So we have made an attempt to evolve a formula for prediction of M.B.C. in the females of Gujrat. Such data have not been worked out in Gujarat (Western India) till now.

MATERIALS AND METHODS

Fifty women medical students of M.P. Shah Medical College and Irwin group of Hospital, Jamnagar, between the ages of 17-21 years formed the present sample for the study. They were selected after a thorough clinical check up. Their height, weight, and body surface area (read from the nomogram constructed on Du Bois formula were measured).

A Benedict-Roth spirometer was used to obtain the graphic records of Maximum Breathing Capacity. For Maximum Breathing measurements, the subjects were asked to breathe deeply and rapidly for about 15 seconds. From the steepest portion of the Ventilogram the Maximum Breathing Capacity was calculated in lit./min. Only expiratory spiograms are used in calculating Maximum Breathing Capacity. Three readings were taken in each subject and the best one out of all the three records was utilised for spiographic analysis in each subject.

RESULTS AND DISCUSSION

Table No. 1 summarises the data regarding age, height, weight body surface area and Maximum Breathing Capacity of 50 subjects examined.

TABLE I

Showing age, height, weight, body surface area and Maximum Breathing Capacity of 50 subjects examined

Age (Years)	
Mean	19.5
Range;	17.21
Height (cms)	
Mean	155.1
Range	143—168
Weight (Kg)	
Mean	46.1
Range	37.2—55.8
B.S.A. (Sq. m.)	
Mean	1.42
Range	1.22—1.63
M.B.C. (lit./min.)	
Mean	105.1
Range;	70.5—140.5

The correlation coefficient between M.B.C. and physical characteristics obtained in the present investigation and as observed by Singh (8) for the females of Southern India are Summarised in Table II.

TABLE II

Comparison of correlation coefficient between M.B.C. and physical characteristics

Author	No. of cases	Age group in years	Correlation of M.B.C. with			
			Age	Height	Weight	Body Surface Area
Singh (8)	70	17.29	..	+0.363	..	+0.266
Tal Dania 10 et al (1)	20	17.29	..	+0.04	+0.22	+0.26
Present Study	50	17.21	0.0912	+0.1649	+0.4328**	0.3988**

**Significant at 1% level of Significance

The study of correlation coefficient of M.B.C. with Physical characteristics obtained in the present investigation revealed a non-significant correlation with age, non-significant positive correlation with height and highly significant positive correlation with weight and B.S.A. on the basis of this the following two regression equations have been obtained.

1. M.B.C. (Lit./Min.)=(1.5 Weight in Kg.)+35
2. M.B.C. (Lit/Min.)=(82×B.S.A. in sq. m.)—11

The prediction formulæ obtained here will be useful in calculating expected M.B. C. value in the females of Gujarat (Western India) The present findings are in agreement with Singh (8)

as he in his findings also obtained correlation of M. B. C. with physical attributes.

On the basis of this; Singh (8) has presented some the prediction formulae suitable for expected value of M. B. C. in the women of South India.

The data for prediction of M. B. C. in the females of Northern Central and Eastern India are not available in literature for comparison.

The values of M. B. C. reported by various observers in healthy female subjects are presented in Table III.

TABLE III

Comparative values of Mean M.B.C. as reported by various authors on female subjects

<i>Author</i>	<i>No. of cases</i>	<i>Age group</i>	<i>Mean M.B.C. (lt.m³/in)</i>	<i>Region</i>
Comroe <i>et al</i> (5)	15	16.34	93.7	..
	10	35.49	89.3	..
	13	50.59	73.5	..
Benawari <i>et al</i> (3)	16	young adults	86.35	..
Bajaj and Mullick (2)	17	--	87.44	.
Singh and Prabhakaran (7)	70	17.29	102	Madras
Kasliwal <i>et al</i> (6)	50	19.6	74.14	Rajasthan
		(Mean age)		
Tulsania <i>et al</i> (10)	20	17.29	98	Gujarat
Present Study	50	17.21	105.1	Gujarat

SUMMARY

1. Data for Maximum Breathing Capacity obtained in 50 healthy Gujarati Women between 17-21 years were statistically analysed and correlated with physical measurements.
2. A highly significant positive correlation of Maximum Breathing Capacity with body surface area was observed.
3. A Prediction equation which may be more useful to calculate expected normal value of M.B.C. in Gujarati women has been evolved and presented.
4. M.B.C. (lit. min.)=(82 body surface area in sq. meters.)—11

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