MATERIALS AND METHODS

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Participants in our study were of two categories

1. Control subjects (N=30) with a Body Mass Index normal for age
2. Obese Subjects (N=30), with a Body mass Index greater than the 95th centile for age.

The subjects were boys between the ages of 12 - 17 years. None of the subjects had past history of any major pulmonary disease. Endocrine disorders, especially hypothyroidism and Cushing's syndrome were ruled out by detailed history and careful relevant clinical examination.

Subjects were selected randomly, fulfilling the above criteria, and they volunteered to participate in the study The examination was carried out in the Department of Physiology, Medical College, Baroda and in the premises of Rosary High School, Pratapgunj, Baroda

Detailed history including name, age, socio-economic status, physical activity, any past/ family history of illness etc was elicited History pertaining to obesity at birth and in childhood, endurance, parental history of overweight or obesity, diet, hours of watching television per day, type of vehicle used, was also noted down The subjects were probed regarding their perception of obesity and associated self-esteem and anxiety

Standard anthropometric measurements: Weight (kg), and Height (cm), were measured on a beam balance. Waist and Hip circumference in cms. were measured with a clinical measuring tape calibrated in inches and centimeters.

The above parameters were used to calculate the Body Mass index and Waist/ Hip Ratio, Body Surface Area was calculated by data of height and weight entered in the computer.

Skinfold thickness was measured at the appropriate sites on the body with vernier calipers The triceps thickness was measured mid-way between the tip of the shoulder and the olecranon process of the elbow; the superior iliac crest thickness was measured by taking a fold of skin above the iliac crest, the chest thickness by a fold of skin at the level of the nipple and the subscapular thickness was measured by taking a fold of skin below the scapula

Spirometric pulmonary function testing: MEDI SPIRO (Medical Equipment and Computer Systems (I) Ltd) Software was employed for the computer aided spirometry Name, age, height, weight, etc. of the subject was entered This enabled calculation of age and height predicted values calibrated to Indian standards

The subjects were demonstrated the maneuvers and were allowed rehersal After enough practice, subjects performed spirometry to record.

(a) Forced Vital Capacity- expiratory and inspiratory (FVC and FIVC and its components)
(b) Maximum Voluntary Ventilation

For recording FVC, the subjects were instructed to take a deep and maximum inspiration and breathe out as forcefully as, as fast as and as complete as possible Graphic records and values of FVC and its components were obtained

For recording MVV, the subject performed as fast as, as deep as, inspiration and expiration for 10 seconds The values of MVV/ minute were computed

The data was obtained through ink-jet printer (All the spirometric values were automatically corrected for BTPS) Computerized spirometry record shows the following parameters

(a) Forced Vital Capacity (FVC)
(b) Forced Expired Volume in 0 5 seconds ($FEV_{0.5}$)
(c) Forced Expiratory Volume at the end of the 1st second (FEV_1)

(d) Ratio of Forced Expiratory Volume in 1 second and Forced Vital Capacity (FEV_1/FVC)

(e) Peak Expiratory and Inspiratory Flow Rate (PEFR and PIFR)

(f) Forced Expiratory Flow (at 25%, 50%, and 75% of expired volume)

(g) $FEF_{25-75\%}$ (formerly known as MMEFR or Maximum Mid- Expiratory flow Rate)

(h) Forced Inspired Volume at the end of the 1st second (FIV_1)

(i) Forced inspired Vital Capacity (FIVC)