

A Comparative Study of PEFr in Children and Adolescents

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Abstract

Introduction: Pulmonary Function Tests are used to measure baseline status of respiratory function, to monitor treatment and to estimate prognosis. The present study was aimed to determine PEFr and compare in children and adolescents. **Materials and Methods:** A cross sectional study was conducted to determine the PEFr in selected children and adolescents, belonging to rural area of Guntur district. Fifty male subjects were considered for the study and divided them into two groups based on the age, who are in good health and without any signs and symptoms of disease. PEFr is done with the help of Computerized Spirometer. **Results and Discussion:** Increase of PEFr of 45.18% was observed in adolescents, when compared to children. Statistical significance was obtained by using t test ($P < 0.001$). It is important to understand the improvement of Pulmonary function test values with age among adolescents, in interpretation of PEFr variations in different clinical settings.

Keywords: Adolescents, Children, Pulmonary Function Tests, Spirometry.

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Introduction

Several studies on lung functions were carried out in children of different age groups in different parts of India.[1-6]. The present study was aimed to determine PEFr values in children (7-12 yrs) and adolescents (13-18 yrs), belonging to rural area of Krishna district and to compare PEFr[7]. Individual values vary with subject's age, sex, height and race[8]. These tests are used to measure baseline status, to monitor treatment and to estimate prognosis[9] Spirometry is a simple bedside test that can provide great insight into significant respiratory impairment[10].

Materials and Methods

A cross sectional study was conducted to determine the pulmonary function tests in selected children and adolescents, belonging to rural area of Guntur district. Fifty male subjects were considered for the study and divided them into two groups (children with age 8 to 12 years and adolescents with age 14 to 18 years) who are in good health and without any signs and symptoms of disease. The purpose and objectives of the study were explained to the subjects and parents and their consent was obtained. The ethical committee of the Institute approved the design and study protocol. Age was taken as completed years as per the school records. The height and weight were measured by using height and weight scale. The heights were measured to the nearest mm. Weight was measured with minimal clothing to the nearest 100 g. Body surface area (BSA) was calculated from height and weight. Pulmonary function tests were done with the help of Computerized Spirometer P.K.MORGAN Model no. SPIRO-TM-232[11,12]. Each boy was explained and demonstrated the technique of the lung function test and was given three trials prior to the actual measurement. Considerable physical effort and attentiveness are required for accurate results.

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Reproducibility of several test attempts (at least three and the best value was recorded as the test result) is important and is a criterion for valid interpretation of test results[11,12]. Subjects with medical problems like pulmonary congestion, coughing, thyroid dysfunction, neurologic illness, poor nutrition and corticosteroid associated muscle weakness were excluded from the study, as they can confuse spirometric testing[9].

Definitions

Peak expiratory flow rate (PEFr): Maximum velocity with which air is forced out of the lungs. [13]

Results and Discussion

Mean age, weight, height & body surface area in children and adolescents were depicted in figure 2. The mean peak expiratory flow rate (PEFr) in the children was 278.28 L/min when compared with the mean peak expiratory flow rate in the adolescents which was 410.16 L/min, showed an increase of 45.18%.

Various national and international studies have shown the variability of PEFr with age, sex, height and BMI[13]. Pande et al conducted a comparative study in 783 children (aged 6-17 years) from a school in urban Delhi and 523 children (aged 6-15 years) from another school in Nellore, Andhra Pradesh. (14) Age, sex, height and weight were independent predictors of PEFr in children from Nellore. Age, sex and height, were independent predictors of PEFr in boys from Delhi while height alone was an independent predictor of PEFr in Delhi girls. Common prediction equations for predicting PEFr in boys and girls have been developed for both regions based on age and height. For the same height and age, boys had higher PEFr than girls. The PEFrs of children from both parts of the country were similar, but were lower than those reported for American white children.

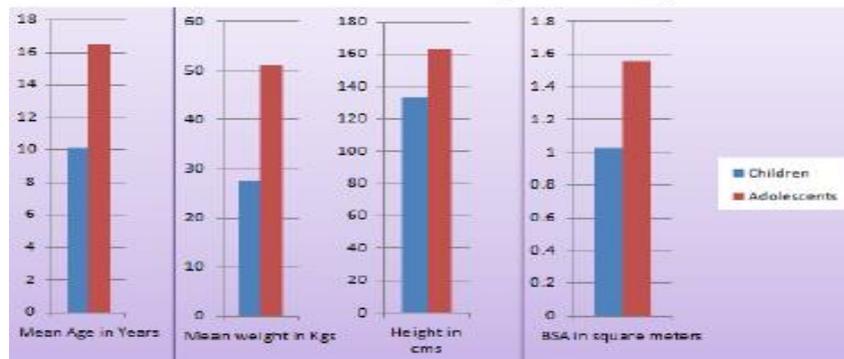


Fig 1: Age, Weight, height and Body Surface Area comparison between children (8-12 years) and adolescent (14-18 years)

Chowgule et al did a study on children between age range 6 years to 15 years.[1] The pulmonary function data was separated by sex, and classified on the basis of height and age. The mean and standard deviation was calculated for every such variable. The PEFR showed a linear positive correlation with height and age. Height explained the maximum variance in lung function parameters. For clinical evaluation of child's lung function, height is the most significant

independent parameter in comparison to age and weight. Lung function first increases with weight (muscularity effect) and decreases with further increase in weight (obesity effect)[15]. This study was conducted with an idea to compare the Pulmonary Function Tests in children and adolescents of Guntur rural area.

Table 1: Comparison of Pulmonary Function Test values between children and adolescents

Pulmonary Function Tests	Children(7-12 yrs) MEAN \pm SD	Adolescents(13-18 yrs) MEAN \pm SD	P-value
PEFR (Lit/min)	278.28 \pm 42.23	410.16 \pm 20.74	0.001

Limitations of the study

1. Only male subjects were included, 2. Spirometric measurements are effort dependent and cannot be done reliably by children[13].

Conclusion

In the current study, Pulmonary function test values of children and adolescents, a marked increase was observed in PEFR from childhood to adolescence as per the body needs of oxygen. It is important to understand the improvement of Pulmonary function test values with age among adolescents, in interpretation of PFT variations in different clinical settings.

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