

Original article:

Study of establishment of normal value of peak expiratory flow rate in children

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Abstract:

Introduction: Peak expiratory flow rate (PEFR) is an important parameter in the management of bronchial asthma. Measurement of PEFR in bronchial asthma is similar to measurement of blood pressure in managing hypertension and measurement of blood glucose in managing diabetes mellitus.

Material and methods: The present study was conducted on children between the age group of 6-12 years of age. A total of 200 children were subjected to peak expiratory flow rate estimation.. Cases were selected from patients attending Out Patient Department {OPD} of Paediatrics , Patna Medical College &Hospital ,Patna .This shall include patients with as well as without symptoms of asthma.

Results : The mean peak expiratory flow rate in boys (240.74 L/min.) was higher than girls (219.24 L/min.) It may be due to lower physical activity. Kashyap et al. ⁴²(1990) observed similar fact and attributed to lesser physical activity in girls.

Conclusion: Peak expiratory flow rate provide a simple, quantitative and reproducible measures of resistance and severity of airflow obstruction. Peak expiratory flow can be measure with inexpensive and portable peak expiratory flow meter.

Keywords: Peak expiratory flow rate , diabetes mellitus.

Introduction:

Peak expiratory flow rate (PEFR) is an important parameter in the management of bronchial asthma. Measurement of PEFR in bronchial asthma is similar to measurement of blood pressure in managing hypertension and measurement of blood glucose in managing diabetes mellitus.¹ Peak expiratory flow provides a simple quantitative and reproducible measure of resistance and severity of airflow obstruction. Peak expiratory flow can be measured with inexpensive and portable peak expiratory flow meter. Peak flow meter records peak expiratory flow rate (PEFR) which correlates with FEV₁ in measurement of airflow obstruction and carrying out reversibility tests. ² However, Peak expiratory flow rate is underutilized and still we depends on clinical judgment for assessment of severity of asthma which is not sensitive as the correlation between symptoms and airflow obstruction is extremely variable. This emphasizes the use of objective measures for assessment of asthma severity and management by

various national and international asthma consensus guidelines.³ The normal value of peak expiratory flow rate varies widely and depends upon several factors, but height is the most closely related parameter which gives more accurate idea about predicted peak expiratory flow rate.

In addition to height, age, sex & weight are other parameter which is related to peak expiratory flow rate but less than height. Girls with the same height as boys have more peak expiratory flow rate. The reason is that height age of corresponding boys was less as compared to girls and weight was little more equal.

Material and methods:

The present study was conducted on children between the age group of 6-12 years of age. A total of 200 children were subjected to peak expiratory flow rate estimation.. Cases were selected from patients attending Out Patient Department {OPD} of Paediatrics , Patna Medical College &Hospital ,Patna .This shall include patients with as well as without symptoms of asthma.

Inclusion Criteria:-

- All children between age group of 6-12 years were included as study subjects who could perform this test freely on individual basis after proper demonstration.
- Those who were interested to participate in this study voluntarily.
- It included asthmatics as well as children with normal respiratory symptoms

Exclusion Criteria:-

- Children below 6 years and above 12 years.
- Those who were extremely sick and not able to perform the test properly.
- Those who did not participated voluntarily.

Children were divided into two groups:-

Group I : Consisted of healthy children with no symptoms of respiratory diseases.

Group II: Consisted of children with respiratory symptoms/signs suggestive of asthma .

The purpose and objectives of this study were explained to subjects, parents and their verbal consent were obtained. Recording of peak expiratory flow rate was done with the help of low range Wright's peak flow meter (clement Clarke).

Results:

The present study was conducted in children of age group 6-12 years.

A total of 200 children were subjected to PEFr measurement. Subjects were selected from Out Patient Department [OPD] of Patna Medical College & Hospital, Patna .

Table 1) Showing Mean and Range of Physical Parameters and PEFR in Group I

Parameters	Boys (n=107)	Girls (n=73)
Age (Years)	8.84 (6-12)	8.61 (6-12)
Height (cm)	128.18 (108-145)	125.34 (106-142)
Weight (kg)	27.05 (14-40)	25.1 (13-35)
PEFR (L/min)	240.74 (145-345)	219.24 (130-310)

The data was analyzed separately for boys and girls. The above table shows mean and range of age (in year), height (in cm), weight (in kg) and PEFR (in L/min.) in group I

Table 2) Showing Means and range of physical parameters and PEFR in Group II

Parameters	Boys (n=12)	Girls (n=8)
Age (years)	8.91 (6-12)	9 (7-11)
Height (cm)	125.5 (110-141)	123.87 (115-131)
Weight (kg)	24.5 (19-36)	22 (14-32)
PEFR (L/min.)	168.33 (100-225)	164.37 (130-200)

The above table shows mean and range of Age (in years), Height (in cm), Weight (in kg) and PEFR (in L/min) in children of Group II.

Discussion:

The present study has been carried out in children between age group of 6 to 12 years. A total of 200 children were selected from Out Patient Department [OPD] Of Patna Medical College & Hospital, Patna for evaluation of peak expiratory flow rate. The study included healthy children as well as those with respiratory symptoms/signs suggestive of asthma to be subjected for detailed pulmonary function tests.

The aim of present study was to establish the normal value of peak expiratory flow rate peak expiratory flow rate with height, weight, age and sex and to identify the children suffering from bronchial asthma . Information collected during this study have been analysed.

The mean peak expiratory flow rate in boys (240.74 L/min.) was higher than girls (219.24 L/min.) It may be due to lower physical activity. Kashyap et al. ⁴(1990) observed similar fact and attributed to lesser physical activity in girls.

Mean peak expiratory flow rate values and its standard deviation in boys and girls both in relation to age in group I. It was found that peak expiratory flow rate increases in linear relationship with age in both boys and girls. The coefficient of correlation between peak expiratory flow rate and age ($r=0.91$ for boys and $r=0.83$ for girls) was significant ($P<0.001$). Verma et al. ⁵(2000) found that correlation between peak expiratory flow rate and age ($r=0.81$, $P<0.001$) was significant. Similarly Pande et al. ⁶(1997) in his study with 1257 children in urban Delhi and Nellore found significant linear relationship ($r=0.80$ for boys and $r=0.86$ for girls, $P<0.001$) between age and peak expiratory flow rate. Swaminathan ⁷(1993) ($r=0.79$, $P<0.001$), Singh & Peri ⁸(1978) ($r=0.87$ for boys and $r=0.89$ for girls) and Kashyap et al. ⁴(1990). These findings are similar to the findings of our studies.

Conclusion:

Peak expiratory flow rate provide a simple, quantitative and reproducible measures of resistance and severity of airflow obstruction. Peak expiratory flow can be measure with inexpensive and portable peak expiratory flow meter. Peak flow monitoring can be used for self management plans of asthma at home by children itself as well as on outdoor basis for diagnosis of asthma chiefly in rural areas where facility for detailed pulmonary function tests is not available.

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For any images presented appropriate consent has been obtained from the subjects: NA

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