

## Comparative Study of Ventilator Function among the Allied Health Sciences students of Brainware University

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### Abstract

Peak Expiratory flow rate (PEFR) is one of the important parameter for measuring the ventilator function of the lungs. In recent years air pollution becomes a serious issue which creates respiratory problems in growing population. This value is measured by using peak flow meter. PEFR is directly correlated with sex, height and age. In this present study, a general nomogram has been developed for college students of (20±2 yrs) age group in Brainware University. PEFR values are correlated with height and sex. Our analysis has generated a nomogram from which we can easily predict the PEFR values with different height. This data will help to screen different respiratory disorders like Asthma, COPD and other chronic respiratory problems in future.

Keywords: PEFR, lung function, peak flow meter, nomogram, ventilator function

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### Introduction

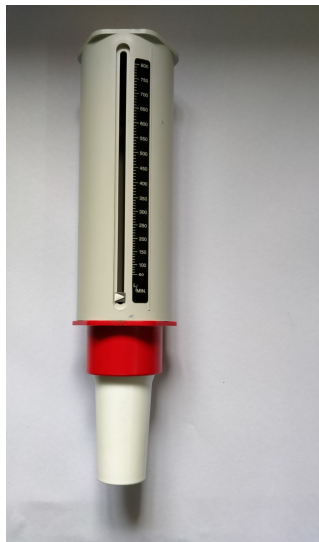
Effect of pollution on pulmonary function is a serious issue now a days. According to Health report by Government of West Bengal (2015-16), 136846, 184737, 202798 persons are affected in acute respiratory infection in North 24- Parganas in the year 2014, 2015 and 2016 respectively. Among them, an increased number of deaths have been reported. Simple physiological measurements are useful for measurement of health status in populations. Those also have prognostic implications for individual. To assess respiratory problems, lung function tests are essential. For the study of ventilator functions, several investigations can be performed. Among different parameters, Peak Expiratory Flow Rate (PEFR) is a useful parameter to monitor airway obstruction [1]. The result would help to assess severity and variation in lungs. PEFR is the amount of maximum amount of exhaled air during forceful expiration after complete inspiration [2]. PEFR result primarily reflects maximum airway flow and depends on the muscular strength during voluntary effort of the subject. PEFR is measured by Peak Flow Meter machine which gives reading of PEFR in Litre per minute. This parameter is used for persons with higher physical disability. Low PEFR indicates poor health (cancer, heart disease, and stroke) [3]. As a lung function test, it can be differentiated in terms of obstructive airway diseases such as asthma, COPD (chronic obstructive pulmonary diseases). PEFR is commonly used to diagnosis asthma. [4]

### Materials and Methods

In this study for PEFR measurements, 52 students (Age 20±2 yrs) have been selected from Allied Health Sciences Department, Brainware University. Among them 32 are male and 20

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female. After routine clinical examination, PEFr has been determined by Wright's Peak Flow meter (Celement Clarke International Ltd.). After three consecutive measurements for 30 seconds apart, the highest reading has been taken for individual subject. Height is also noted for those subjects.



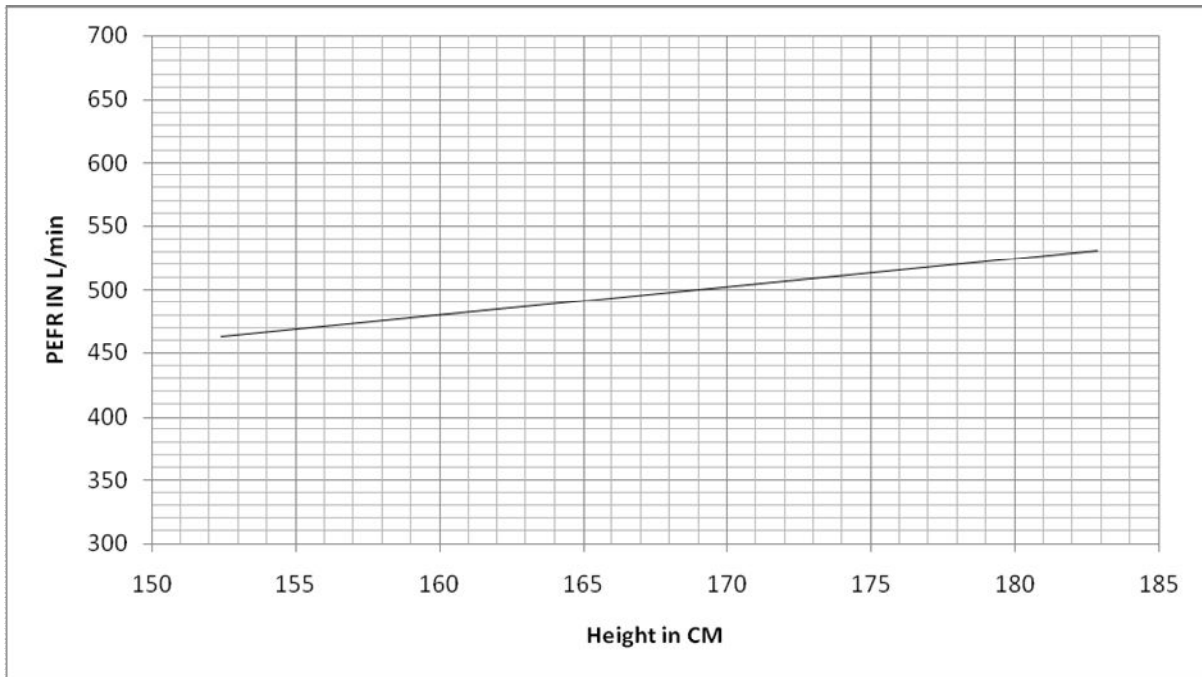
**Fig 1: Peak Flow meter for the determination of PEFr**

### **Results**

PEFr determination is considered as useful parameter for assessing any type of respiratory disorders. It is also related to health impact of air pollution. After recording of PEFr, the scores are tabulated in a table. Males and female recordings are separated. A graphical correlation has been made by plotting the values of Height with respect to PEFr values.

HEIGHT (Cm)	PEFR (L/Min)
152.4	460
154.94	540
157.48	470
157.48	530
162.56	450
165.1	460
167.64	580
167.64	500
170.18	520
170.18	360
170.18	460
170.18	480
170.18	450
172.72	510
172.72	530
172.72	400
172.72	580
172.72	530
172.72	380
172.72	500
175.26	540
175.26	450
175.26	560
175.26	550
177.8	450
177.8	510
177.8	450
177.8	600
177.8	600
177.8	600
180.34	650
182.88	500

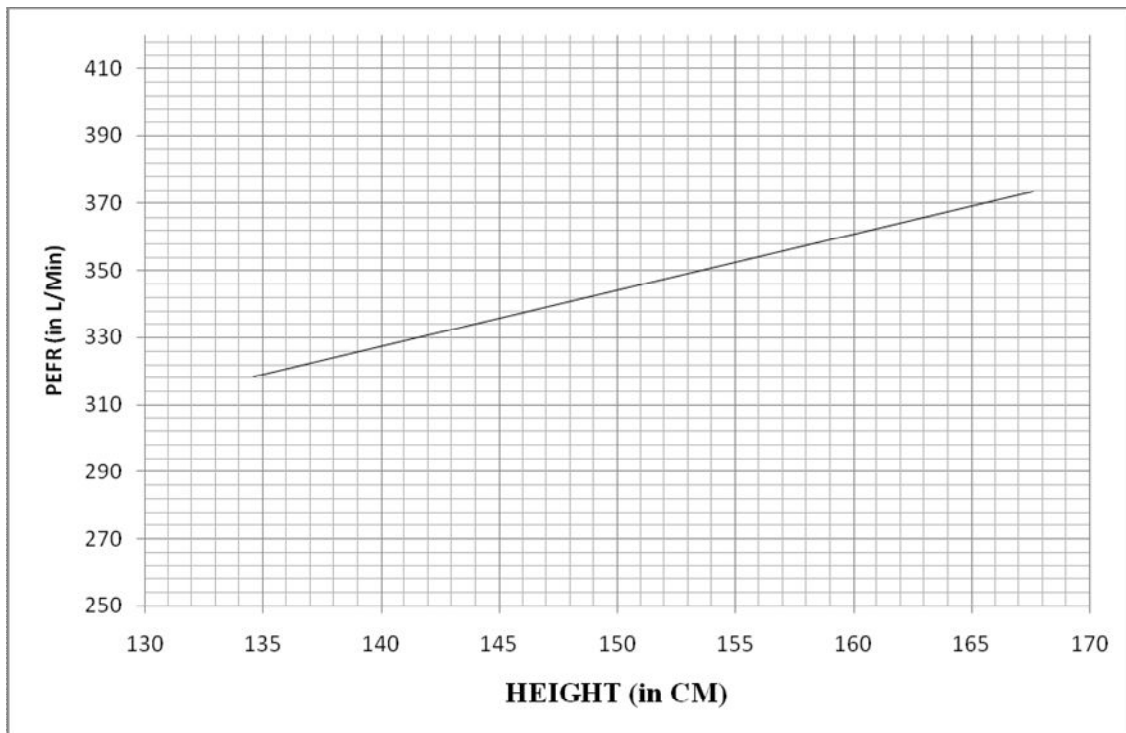
**Table 1: PEFr readings vs Height of 32 male students (20Yrs  $\pm$ 2) of Allied Health Sciences Department, Brainware University.**



**Fig: 3- Nomogram results from PEFR test carried out on 32 male college students(20Yrs  $\pm$ 2) of Allied Health Sciences Department, Brainware University.**

HEIGHT (CM)	PEFR(L/Min)
134.62	300
147.32	320
152.4	370
152.4	370
152.4	400
154.94	330
157.48	400
157.48	350
157.48	360
157.48	360
160.02	300
160.02	360
160.02	450
160.02	280
160.02	360
160.02	380
162.56	300
165.1	360
165.1	360
167.64	410

**Table 2: PEFR readings vs Height of 20 female students (20Yrs  $\pm$ 2) of AHS department, Brainware University.**



**Fig 4: Nomogram results from PEFR test carried out on 20 female college students (20Yrs  $\pm$ 2) of AHS department, Brainware University**

## Discussion

Normal PEFR value depends on several factors like age, sex, height, weight, etc [5]. So the PEFR value varies in normal individuals and a nomogram is utilized as a scale. In obstructive airways diseases, normal value of PEFR is reduced corresponding to above factors. In this study we want to show a correlation between PEFR values with the height. PEFR value is correlated with height and sex. Our analysis has generated a nomogram from which we can easily predict the PEFR values with different Height. PEFR is also correlated with other standard measures of health status like asthma. The present study surfaces respiratory conditions for students of Allied Health Sciences department. The results also show that man has bigger lungs than woman. The degree of impairment and number of affected subjects have been small. But, respiratory challenges such as frequent infections under the background of malnutrition, low socio economic status, tobacco smoking, occupational exposure etc. have altered effects on PEFR[6].

## Conclusion

Our study showed that a variation in normal PEFR data among college students (20Yrs  $\pm$ 2) of Brainware University. PEFR value depends on sex and height. Also this value is variable in different conditions (age, medication use, and respiratory problems). Peak flow meter is primarily helpful to screen subjects with more unstable respiratory disorders.

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