*IOSR Journal of Nursing and Health Science (IOSR-JNHS)*
*e-ISSN: 2320–1959.p- ISSN: 2320–1940 Volume 8, Issue 2 Ser. VIII. (Mar. - Apr .2019), PP 25-30*
*www.iosrjournals.org*

# Peak Expiratory Flow Rate Measure among Community Dwelling Elderly Rural Population

Ms. Ashwini Vidyasagar Mishra[1], Dr. Shyam Devidas Ganvir[2]
[1](*Final year, DVVPF'S COPT Ahmednagar/MUHS, INDIA)*
[2](*Principal and HOD in community health sciences, DVVPF'S COPT Ahmednagar/MUHS, INDIA)*
*Corresponding Author: Ms. Ashwini Vidyasagar Mishra*

***Abstract: Title Of Study** : Peak Expiratory Flow Rate Measure Among Community Dwelling Elderly Rural Population*
***Investigator** : Miss. Mishra Ashwini Vidyasagar*
***Guide** : Dr Shyam Ganvir, Principal, DDVPF'S college of physiotherapy*
***Introduction** : PEFR is a widely used ventilatory function test that is defined as the maximum rate at which air is expired by a subject after a deep inspiration. The peak flow meter helps to assess the airflow through the airways and thus help to determine the degree of obstruction among them[1-2]. Normal peak flow rates vary according to age, height, and sex. However, a patient's normal score should be within 20% of a person of the same age, sex, and height who does not have asthma. Peak expiratory flow is also a prognostic indicator in the older patient and a decrease in the peak expiratory flow rate is an important indicator of declining health in the elderly [8,9]. It reflects the strength and condition of respiratory muscles and the degree of airflow limitation in the large airways.*
***Study Design** : Cross sectional study*
***Study Set Up** : In Ahmednagar city*
***Sampling Technique** : Simple random techniques*
***Procedure** : The ethical clearance from ethical committee of college of physiotherapy was obtained. Subjects fulfilling the inclusion and exclusion criteria were included in the study. The entire procedures involved in the study was explained to each subject. After explaining the purpose of the study a written informed consent was obtained from the participants. Intially the demographic data was assessed.Patient should be in upright sitting position. Ask the patient to hold the peak flow meter horizontally in front of mouth. Take a deep breath in and firmly closed the lips around the mouthpiece, making sure that there is no air leak around the lips. Breathe out as hard and as fast as possible. The highest or the best reading of all the three measurements is recorded and is the peak flow at that time.*
***Outcome Measure** : PEFR*
***Result** : The result shows the comparison of PEFR values in relation with the normal values of an individuals and comparison with gender and its relation with height and age in the elderly rural population.*
***Conclusion** : From our study we conclude that, the PEFR value is lower as compared to their individual normal value. The PEFR values is higher in males than in female. It also concludes that PEFR values show the positive corelation with age and height.*
***Keywords:** PEFR, Community dwelling elderly rural population, Height, Age, Gender*

---

Date of Submission: 26-03-2019 Date of acceptance: 11-04-2019

---

## I. Introduction

PEFR is a widely used ventilatory function test that is defined as the maximum rate at which air is expired by a subject after a deep inspiration.

A peak flow meter is a small hand-held device that measures how fast a person inhalation. This measurement is called the 'peak expiratory flow Rate' (PEFR). The peak flow meter helps to assess the airflow through the airways and thus help to determine the degree of obstruction among them [1-2] Ventilatory function tests like PEFR provide a better understanding of the changes in the lungs from a diagnostic viewpoint [3]. This lung function test is useful for screening and monitoring the severity of asthma in a community, especially when the prevalence of asthma and asthma related hospital admissions are rising[4].

Normal peak flow rates vary according to age, height, and sex. However, a patient's normal score should be within 20% of a person of the same age, sex, and height who does not have asthma. The elderly people are subjected to varying levels of insecurity and depression. A stressful lifestyle, along with environmental pollution and respiratory infections, is known to have adverse effects on the lung functions.

PEFR is the reflection of the functioning of the larger airways and any amount of stress/ infection/ inflammation in these airways causes adverse reactions.

The peak flow meter is useful in that it is small, inexpensive, easy to use, portable, and hand-held, and does not need to be plugged in. Once a patient has been taught how to use it he does not need supervision. It is used as an prognostic tool for asthma. When properly used it can recognise early changes and reveal narrowing of the airways well in advance (hours or even days) of an asthma attack. This helps the patient to take his rescue medications and pre-empt an attack.

Peak expiratory flow rate (PEFR), though a relatively crude measure of lung function, has been found to correlate well with other measures of lung function [5]. PEFR has also been used as a screening tool in surveys as it can be measured on the field by non-medically trained persons with an inexpensive mini-Wright peak flow meter. There is a need for normal ranges of peak expiratory flow rates in the elderly for clinical use. It is a risk assessment tool in older persons [6].

All respiratory symptoms either alone or in combination were associated with lower peak flow values in both men and women . Shortness of breath as a single symptom was also associated with much lower peak flow rates, suggesting that these subjects had significant airways obstruction. Respiratory symptoms have been shown to have adverse health implications and are predictive of overall mortality [7].

A low or variable peak flow may alert the primary care physician to the possibility of an underlying obstructive airway disease with a reversible component. Peak expiratory flow is also a prognostic indicator in the older patient and a decrease in the peak expiratory flow rate is an important indicator of declining health in the elderly [8,9]. It reflects the strength and condition of respiratory muscles and the degree of airflow limitation in the large airways.

There is an reduction in the PEFR of the elderly is expected because this variable is dependent upon expiratory muscle effort, lung elastic recoil and airway size [10] factors which are known to reduce with advancing age .

The diagnosis is often missed out in elderly population and the factors that contribute to this include respiratory changes caused by aging, immunosenescence, lack of symptoms, clinician unawareness, and lack of evidence-based guidelines for diagnosis and management that target this population.

## II. Methodology

***Study design*:** Cross sectional study
***Study set up:***In Ahmednagar city
***Sample size:***100
***Sampling techniques:***Simple random techniques
***Study material:***

1. Peak flow meter
2. Measuring tape
3. Weighing machine
4. Sterilization liquid
5. Cotton

***Inclusion criteria:***

- Age 60-80 years
- Community dwelling elderly

***Exclusion criteria:***

- Any recent surgery
- Cognitive impairment and any psychiatry illness
- Any previously known or diagnosed CVS, neurological condition.

***Procedure:***

The ethical clearance from ethical committee of college of physiotherapy was obtained. Subjects fulfilling the inclusion and exclusion criteria were included in the study. The entire procedures involved in the study was explained to each subject. After explaining the purpose of the study a written informed consent was obtained from the participants. And then the PEFR test was performed as follows:

Procedure for measuring PEFR -

- Patient should be in upright sitting position. Set the cursor to zero. Ask the patient not to touch the cursor while breathing out.
- Ask the patient to hold the peak flow meter horizontally in front of mouth. Take a deep breath in and firmly closed the lips around the mouthpiece, making sure that there is no air leak around the lips.

- Breathe out as hard and as fast as possible. Note the number indicating on the cursor.
- Return cursor to zero and repeat this sequence twice more, thus obtaining three readings. The highest or the best reading of all the three measurements is recorded and is the peak flow at that time.

***Outcome measures:*** PEFR
***Statistical analysis:***
(Statistical analysis will be done by using demographic variable, mean, standard deviation, and variable)
It will be analysed by using descriptive test.

## III. Results

The present study was conducted on 100 healthy elderly population who were in the age group of 60-80 yrs who were found in ahmednagar city.
The mean PEFR in women was (180.96±75.34) and the mean PEFR in men was (234.36±94.46)

| STUDY OF SUBJECTS | RANGE OF PEFR | MEAN±SD OF PEFR |
|---|---|---|
| 100 | 50-400 | 206.7±88.75 |

The mean PEFR values is 206.7± 88.75
And the normal mean predicted PEFR values according to age and height is 405±59.68
Peak flow variability,% = 50.86%

| AGE | NO.OF SUBJECTS | MEAN±SD OF PEFR |
|---|---|---|
| 60-70 | 70 | 222.43±93.44 |
| 71-80 | 30 | 170±65.13 |

**Table no.1**
The table no.1 show the subjects is grouped according to their age and the mean PEFR is calculated and we observe a gradual trend of decrease in PEFR with increase in age.

| HEIGHT(CM) | MEAN HEIGHT | NO.OF SUBJECTS | MEAN±SD OF PEFR |
|---|---|---|---|
| 131-140 | 138.2 | 5 | 126±48.79 |
| 141-150 | 146.53 | 15 | 180±79.10 |
| 151-160 | 155.73 | 44 | 195.91±86.81 |
| 161-170 | 164.55 | 29 | 238.28±82.51 |
| 171-180 | 172.71 | 7 | 257.14±110.41 |

**Table no.2**
The table no.2 show that the subject is grouped according to their height and the mean PEFR value is recorded in each group and we observe a gradual trend of increase in PEFR with respect to increase in height.

| SUBJECTS | HEIGHT | PEFR(MEAN±SD) |
|---|---|---|
| MALES(N=48) | 162.13±7.11 | 234.36±94.46 |
| FEMALES(N=52) | 152.69±7.73 | 180.96±75.34 |

**Table no.3**
Table no.3 show the total no.of male and female subjects and their mean height and mean PEFR values.
In males the mean PEFR values is greater than in females.

**CORELATION OF PEFR VALUES WITH AGE, HEIGHT AND GENDER**

| PARAMETERS | COEFFICIENT OF CORELATION (r) | p- VALUES |
|---|---|---|
| AGE | -0.2960 | 0.0028* |
| HEIGHT | +0.3829 | <0.0001** |
| GENDER | -0.3021 | 0.0022* |

*****highly significant, **extremely significant
A p-value of of less than or equal to 0.05 was taken as statistically significant.

**PEFR AND AGE**

This study showed that the PEFR decreased with the increase in age and the corelation was found to be negative and was highly significant (p value 0.0028)

**PEFR AND HEIGHT**

This study showed that PEFR increased with the increase in height and the corelation was found to be positive and was extremely significant ($p<0.0001$)

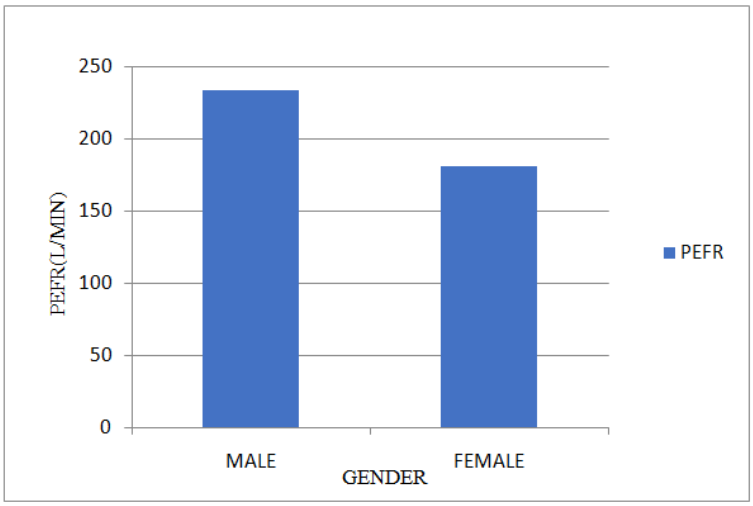
**PEFR AND GENDER**

This study shows comparison of PEFR values between male and female and was highly significant (p value 0.0022)

This study basically describes the comparison of PEFR values in relation with the normal values of an individuals and comparison with gender and its relation with height and age. This study was togetherly carried out for the first time to know the PEFR values of the community dwelling elderly rural population in the city.

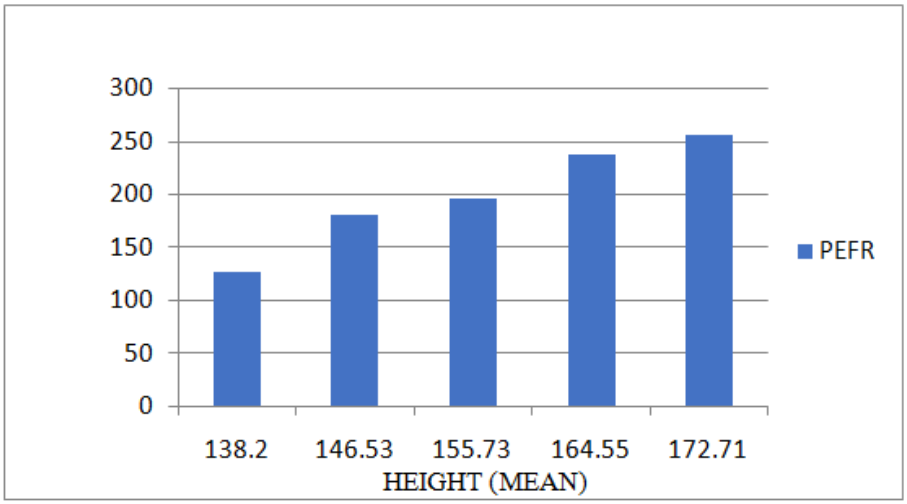
**GRAPH NO.1** COMPARISON OF PEFR VALUES BETWEEN MALES AND FEMALES

| GENDER | MALES | FEMALES |
|---|---|---|
| PEFR | 234.36 | 180.96 |



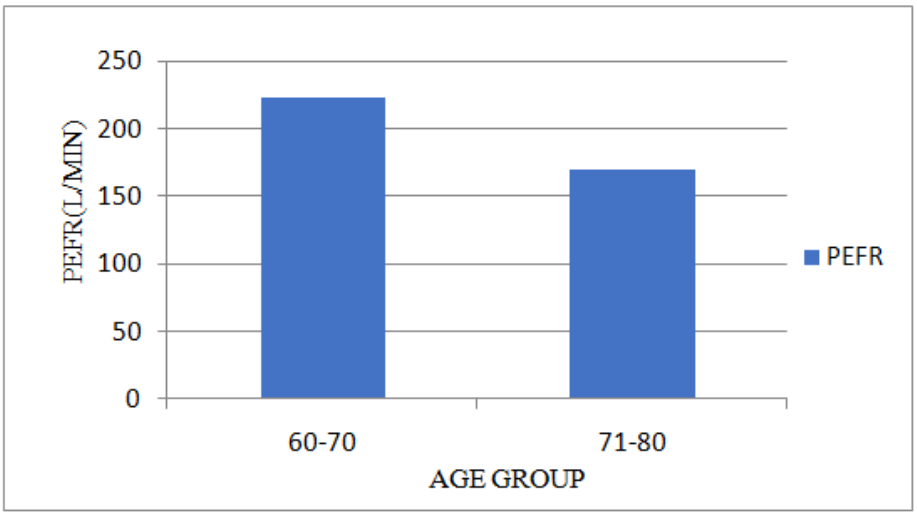

**GRAPH NO 2.** PEFR VALUES INCREASES WITH INCREASE IN HEIGHT

| HEIGHT(MEAN) | 138.2 | 146.53 | 155.73 | 164.55 | 172.71 |
|---|---|---|---|---|---|
| PEFR | 126 | 180 | 195.91 | 238.28 | 257.14 |




**GRAPH NO 3.** COMPARISON OF PEFR VALUES IN RELATION TO AGE

| AGE GROUP | 60-70 | 71-80 |
|---|---|---|
| PEFR | 222.43 | 170 |




## IV. Discussion

A number of factors influence PEFR in normal subjects. Age and height are the common one.
PEFR is best co-related with height an age.
PEFR is one of the indicator of health status of an individual and used as a tool in general health assessment.
In this study-there show a positive association of PEFR with age and height.

**PEFR AND GENDER:** This study showed that PEFR value was higher in males as compared to females as shown in graph no.1 and shows comparison of PEFR values between male and female and was highly significant (p value 0.0022) and similar observation was made by other authors.And it is influenced by body built, muscle strength and nutritional status, increase in height and a good muscle power in males as compared to females.

**PEFR AND AGE**: This study showed that PEFR decreases with an increase in age and this result were found to be positive as shown in graph no.3 and the corelation was found to be negative and was highly significant (p value 0.0028). The decrease in PEFR with an increase in age is probably due to degenerative changes in musculoskeletal system leading to decrease in respiratory muscle strength. This variable was dependent on the expiratory efforts and elastic recoil of lungs and the airway size are the factors which are known to reduce with advancing age.

**PEFR AND HEIGHT**: There was positive corelation of PEFR with height in study subjects as shown in graph no.2 .This showed that there was an increase in PEFR of subject with an increase in their height and the corelation was found to be positive and was extremelysignificant ($p<0.0001$). This observation was consistent with the findings of the studies which was conducted by other author. This was probably because of greater chest volume in the taller subjects. The growth of airway paasage and the expiratory muscle effort also increase with an increase in height.

Most studies show that increasing age was associated with a steady decline in PEFR. Similar association with age and height was made by many other authors.
The study made by author parminder kaur sandhu showed similar association with the age and height i.e. the mean PEFR value of taller subject were more than shorter subject and also showed that PEFR decreases with the increase in age.

## V. Conclusion

This study show that among elderly rural population in Ahmednagar city the PEFR value is lower as compared to their individual normal value. The PEFR values is higher in males than in female. It also concludes that PEFR values show the positive corelation with age and height.

## Acknowledgement

I take this wonderful opportunity to thank all the "Hands" who haved joined together to make this project successful.

It is a proud privilege to express my overwhelming sense of gratitude to my esteemed, learned teacher and Guide **Dr. Shyam Ganvir**, Professor and Principal, DVVPF'S College of Physiotherapy, Ahmednagar, for his initiation, blessings, able guidance, constant encouragement and continuous supervision, without which it would not have been possible for me to take up this task. His academic insight, deep personal interest in patient

care are a source of inspiration to all those who have had the privilege to work with him. His constant endeavor to strive for the best is a source of inspiration to all of us.

I thank all teachers of COPT, who immensely helped and rendered their valuable advice, precious time, knowledge and relevant information regarding my study.

Also, I would like to appreciate the help of my classmates of Fourth B.P.Th and My Junior Friends, who provided me useful suggestion for successful completion of my study.

I would like to thank my study participants without whom this project could not have been possible.

Last but not the least I bow down to my parents whose blessings, love, affection, and encouragement has always been a catalyst in all walks of my life and without whose support, I would not have been where I am today.

## References

[1]. Erhabor GE. Pulmonary function tests: spirometry and peak flow in clinical practice. Ile-Ife, Nigeria: Published by Asthma and chest care foundation. 2010:11-32.
[2]. Dekker FW, Schrier AC, Sterk PJ, Dijkman JH. Validity of peak expiratory flow measurement in assessing reversibility of airflow obstruction. Thorax. 1992 Mar 1;47(3):162-6.
[3]. Quanjer P, Lebowitz MD, Gregg I, Miller MR, Pedersen OF. Peak expiratory flow: conclusions and recommendations of a Working Party of the European Respiratory Society. European respiratory journal. 1997 Feb 1;10(24):2s.
[4]. Kashyap S, Malik SK. Peak expiratory flow rates of healthy school boys from Himachal Pradesh (north India). The Indian journal of chest diseases & allied sciences. 1987;29(4):216.
[5]. Vaughan TR, Weber RW, Tipton WR, Nelson HS. Comparison of PEFR and FEV1 in patients with varying degrees of airway obstruction: effect of modest altitude. Chest. 1989 Mar 1;95(3):558-62.
[6]. Vollmer WM, McCAMANT LE, Johnson LR, Buist AS. Respiratory symptoms, lung function, and mortality in a screening center cohort. American journal of epidemiology. 1989 Jun 1;129(6):1157-69.
[7]. Cook NR, Evans DA, Scherr PA, Speizer FE, Taylor JO, Hennekens CH. Peak expiratory flow rate and 5-year mortality in an elderly population. American Journal of Epidemiology. 1991 Apr 15;133(8):784-94.
[8]. Tilvis R, Valvanne J, Sairanen S, Sovijärvi A. Peak expiratory flow is a prognostic indicator in elderly people. BMJ: British Medical Journal. 1997 Feb 22;314(7080):605.
[9]. Woolcock AJ, Colman MH, Blackburn CR. Factors affecting normal values for ventilatory lung function. American Review of Respiratory Disease. 1972 Nov;106(5):692-709.
[10]. Dikshit MB, Prasad BA, Jog NV. Peak expiratory flow rates in elderly Indians. Indian J Physiol Pharmacol. 1991 Jan;35(1):39-43.
[11]. Srinivas P, Chia YC, Poi PJ, Ebrahim S. Peak expiratory flow rate in elderly Malaysians. The Medical journal of Malaysia. 1999 Mar;54(1):11-21.
[12]. Sandhu PK, Bajaj D, Mehta K. Correlation of peak expiratory flow rate with age and anthropometric parameters in elderly (> 65 years). National Journal of Physiology, Pharmacy and Pharmacology. 2016;6(1):89.
[13]. Dikshit MB, Prasad BA, Jog NV. Peak expiratory flow rates in elderly Indians. Indian J Physiol Pharmacol. 1991 Jan;35(1):39-43.
[14]. Thaman RG, Girgla KK, Arora GP. Circadian peak expiratory flow rate variability in healthy north Indian geriatric population. J Indian Acad Clin Med. 2010 Jul;11(3):195-208.
[15]. McCoy EK, Thomas JL, Sowell RS, George C, Finch CK, Tolley EA, Self TH. An evaluation of peak expiratory flow monitoring: a comparison of sitting versus standing measurements. The Journal of the American Board of Family Medicine. 2010 Mar 1;23(2):166-70.
[16]. Shimwela M, Mwita JC, Mwandri M, Rwegerera GM, Mashalla Y, Mugusi F. Asthma prevalence, knowledge, and perceptions among secondary school pupils in rural and urban coastal districts in Tanzania. BMC public health. 2014 Dec;14(1):387.
[17]. Mishra J, Mishra S, Satpathy S, Manjareeka M, Nayak PK, Mohanty P. Variations in PEFR among males and females with respect to anthropometric parameters. IOSR Journal of Dental and Medical Sciences (IOS JDMS). 2013 Mar;5:47-50.
[18]. Kaur H, Singh J, Makkar M, Singh K, Garg R. Variations in the peak expiratory flow rate with various factors in a population of healthy women of the malwa region of Punjab, India. Journal of clinical and diagnostic research: JCDR. 2013 Jun;7(6):1000.

Ms. Ashwini Vidyasagar Mishra. "Peak Expiratory Flow Rate Measure among Community Dwelling Elderly Rural Population." IOSR Journal of Nursing and Health Science (IOSR-JNHS), vol. 8, no.02 , 2019, pp. 25-30.