

## Peak Expiratory Flow Rate Value In Construction Labourers



### Medical Science

**KEYWORDS :** PEFR, construction laborers

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#### ABSTRACT

Laborers are the hard working people engaged in all types of manual activities in agriculture, mining, transport, construction industry etc. In Urban cities like Ahmedabad there is fast growing construction of houses and laborers employed in this are sometimes exposed to silica dust from sand, cement dust etc, As such no studies are available on this subjects, hence peak expiratory flow rate(PEFR) measurement is carried out in 14 male and 36 female subjects

#### Material and method

In building construction work fourteen male and thirty six female are assessed using PEFR as parameter, it is measured by mini peak flow meter. The regression equation is estimated in these all groups of workers. The average values are compared with normal work in twenty to thirty nine age group as majority of the workers falling in this age group are adults that represent physiological maintains groups. Any differences in these value is attributable to the exposure risk in subject exposed to dust and pollutants.

#### RESULTS

In Table—1, the anthropometric findings and PEFR value of male and female laborers' according to age is given. Overall in males the average height is 160.3 cms; weight 41.7 kgs and PEFR 453.2 lit and in females average height 153.6 cms; weight 42.1 kg and PEFR 300.8 lit. The values in different age groups in both males and female showed a physiological trend. The comparison of 20-39 year age group of male and female labourers with clinically normal subjects in Table—2. The results revealed in both male and female labourers weight and PEFR are significantly reduced. The multiple regression equation developed for prediction of PEFR among males and females is given in Table-3. In Table-4, the prevalence of PEFR abnormality is given. Overall, 21.4 percent males and 27.8 percent females demonstrated PEFR abnormality. This abnormality did not differ between age groups both in males and females.

#### DISCUSSION

Urbanisation is one of the emerging crucial problems faced in India and that lead to increasing building construction activities. These building construction workers are from low income group. A study conducted in building construction workers in Bangalore(1) highlighted morbidity status of various diseases in them. In this present study, these workers has slightly significantly low weight and significant reduction in PEFR, compared to clinically normal subjects. This low weight might be due to their low wages associated with high energy consumption activities, such as Mason, Carpenter, Bar Bender, Coolie etc. The reduction in PEFR might be due to respiratory problems in these workers and a study indicated that about 11.7 percentage workers evidenced respiratory morbidity.(1)

Another important point is that these workers are exposed to silica dust; from sand and cement during mixing, loading and unloading. Although the respirable dust and total dust in the working environment may not be very high, but low level of dust exposure for a longer period may produce repercussions on the respiratory tract.

Reports indicated that occupational exposure to silica dust produces obstruction in airways due to irritation of bronchial mucosa.(2,3) It was also reported that prolonged inhalation of dust leads to industrial bronchitis and predominant effect of industrial bronchitis i.e. dust induced bronchitis is larger than smaller airways.(4) As PEFR indicates obstruction in larger airways the reduced PEFR may be due to dust induced bronchitis. This prevalence of PEFR abnormality in this present study is

21.4 percent in males and 13.9 percent in females and a report in silica dust exposed workers PEFR abnormality observed was 15.0 percent which are nearer to this present abnormality (5) Overall this study denotes that PEFR abnormality occurs in building construction workers.

**Table 1**  
Anthropometric findings and PEFR values in construction labourers (Male and Female).

Sex and age group	No. of subjects	Height (cms)	Weight (Kg)	PEFR* (Lit/Min)
<b>MALE</b>				
- 14 (years)	3	135.1 +16.1 -	30.0 +2.0 -	312.6 +84.5 -
15-19 (years)	Nil	-	-	-
20-39 (years)	7	165.5 +10.5	45.3 +7.8	410.4 +97.3
40 (years)	4	162.7 +13.7	44.0 +2.7	448.5 +136.2
Total	14	160.3 +14.3	41.7 +8.4	443.2 +10.7
<b>FEMALES</b>				
- 14 (years)	Nil	-	-	-
15-19 (years)	Nil	-	-	-
20-39 (years)	29	154.0 +18.2	40.6 +11.7	310.5 +61.9
40 (Years)	7	152.0 +21.3	48.0 +9.3	260.9 +56.1
Total	36	153.6 +18.5	42.1 +10.0	300.8 +63.3

**TABLE 2**

Comparison of male and female laborers PEFR values with normal values in 20-39 years age group.

Parameter	MALE		FEMALE	
	Normal N=34	Laborers N=7	Normal N=10	Laborers N=29
Height (cms)	163.5 +3.9 -	145.5 +10.5 -	152.7 +6.7 -	154.0 +12.2 -
Weight (Kg)	52.1 +7.0 -	45.3** +7.8 -	53.5 +8.2 -	40.6** +11.7 -
PEFR Lit/Min	316.0 +92.5 -	410.4** +87.3 -	384.5 +72.9 -	310.6** +61.9 -

N = Number of subjects.

\*\* = Significant at 1% level.

**Table 3**  
Multiple regression equation for prediction of PEFR among laborers (Male and Female)

Sex	Parameter	Regression Equation
Male	PEFR (lit/min)	$2.69H - 0.73A - 0.81W + 92.43$
	PEFR (lit/min)	$-0.09H - 2.08A - 0.24W + 365.7$

H = Height (cm)  
A = Age (Years)  
W = Weight (Kg)

**TABLE-4**  
Prevalence of PEFR abnormality among male and female laborers.

Age Group	Male	Female
Total	N = 14 3 (21.4)	N = 36 10 (27.8)
Up to 14	N = 3 Nil	Nil
15-19	Nil	Nil
20-39	N = 7 2 (28.6)	N = 29 8 (27.6)
40	N = 4 1 (25.0)	N = 7 2 (28.6)

**Conclusion**

A significant reduction in PEFR as compared to clinically normal subjects. Both male and female shows significant lower values as compared to clinically normal subjects. The predicted PEFR show much deviation as compared to predicted PEFR for standard male and female using regression equation. Females show 17.3% and male shows 6.2% . which shows occupational exposure to dust and pollutant produces obstruction in airways leading to lower PEFR. The prevalence of PEFR abnormality is higher in both male and female exposed subjects as compared to clinically normal subjects.

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