

## EVALUATING THE EFFECT OF CLOTHING ON PEAK EXPIRATORY FLOW RATE IN HEALTHY SOUTH INDIAN FEMALES

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### Abstract

**Background:** PEFR is used as a screening tool for asthma and to monitor the severity of asthma. This study aims at studying the effect of tight clothing on the performance and thereby the value of PEFR. The objective of this study is to record and compare the peak expiratory flow rate values in healthy females with and without their tight innerwears. **Materials and Methods:** 100 healthy girls of age 18 to residing in hostel in Government Thoothukudi Medical College were recruited and the Peak Expiratory Flow Rate was assessed in their regular dress and also in a night gown without tight innerwears, using a mini Wright's Peak flow meter. The data collected was consolidated and compared for assessing the variations. **Result:** The results showed a statistically significant increase in PEFR values in subjects who performed the test in a gown without the tight innerwears compared to the test performed in regular dress with tight innerwears. **Conclusion:** Thus the study shows that clothing has effect on the PEFR values and there is increase in PEFR values when measured without tight innerwears compared to regular dress in the same individuals. With the results of this test, we recommend the PFT lab to perform this test after asking the female patients to change to a gown without tight innerwears, so that their values are not skewed.

## INTRODUCTION

Lung function test like PEFR (Peak Expiratory Flow Rate) gives us an assessment of the functioning of the lungs and has a very good diagnostic and prognostic value. PEFR is used as a screening tool for asthma and to monitor the severity of asthma.<sup>[1,2]</sup> PEFR is the maximum flow rate produced during a forceful expiration after a maximum inspiration.<sup>[3]</sup> It is measured in liters per minute. It reflects the caliber of airway, muscle strength and voluntary effort.<sup>[4,5]</sup> It is well known that the PEFR value is affected by various factors like age, gender, height, weight and body surface area.<sup>[6-12]</sup> But the cultural way of dressing by the woman population also seems to affect this value. Women wear tight blouses and tight bras which can restrict their performance while doing this PEFR test. Hence this study aims at studying the effect of tight clothing on the performance and thereby the value of PEFR. This will be of great help to the pulmonologist in interpreting the result of PEFR test. With the results of this test, we can recommend the PFT lab to perform this test after asking the female patients to change to a gown without tight innerwears, so that

their values are not skewed. **MATERIALS AND METHODS**

### Setting:

Thoothukudi Medical College, Thoothukudi

### Study design:

Cross sectional study

### Study Population:

100 Female MBBS students residing in hostel.

### Inclusion criteria:

Healthy female girls of age 18 to 25

### Exclusion criteria:

Girls having history of asthma or any recent upper and lower respiratory tract infections

### Ethical committee approval:

Institutional research ethics committee approval was obtained and consent was taken from the participants. 100 healthy girls of age 18 to 25 residing in hostel in Government Thoothukudi Medical College were recruited and the Peak Expiratory Flow Rate was assessed by using a mini Wright's Peak flow meter. All the 100 subjects were grouped into two by random allocation. One group of girls were asked to perform the test initially in their regular dress with their tight innerwears and

then again in a night gown without the tight innerwears and the other group, first in the night gown without the tight innerwears followed by the usual dress with the tight innerwears. This categorization was done in order to rule out the possibility of the effect of practice and repetition on the PEFR value. The data collected was consolidated and compared for assessing the variations.

### Data Analysis

Data entry was done using Microsoft Excel. Data analysis was done using SPSS 23 Version. Frequencies and proportions were calculated as appropriate. Quantitative variables were expressed in terms of Mean and Standard deviation. Difference between the means of pre and post-test results were compared using paired t-test. P value of less than 0.05 was considered as significant.

## RESULTS

A total of 100 female students in the age group of 18 to 25 were included in the study and their height, weight, age and PEFR values were collected.

The mean age of the subjects was  $20.08 \pm 0.88$ . The mean weight of the subjects was  $58.59 \pm 8.4$ . The mean height of the subjects was  $157.12 \pm 5.9$ . Their mean BMI was  $23.52 \pm 3.7$ . Three PEFR readings were collected from this 100 subjects in their regular dress and in gown without tight innerwears and they were entered in an excel sheet. The best of the 3 readings were take as the final value. The results with and without the tight innerwears were consolidated and compared using SPSS software. The results showed a significant increase in PEFR values in subjects who performed the test in a gown without the tight innerwears compared to the test performed in regular dress with tight innerwears as shown in figure 2, 3 and 4 with a t value of 8.526 in Group 1, a t value of -6.887 in group 2 and a t value of 10.78 for all together. Table 1, table 2 and table 3 shows the mean, standard deviation, mean difference, t value and p value of group1, group 2 and both groups together respectively.

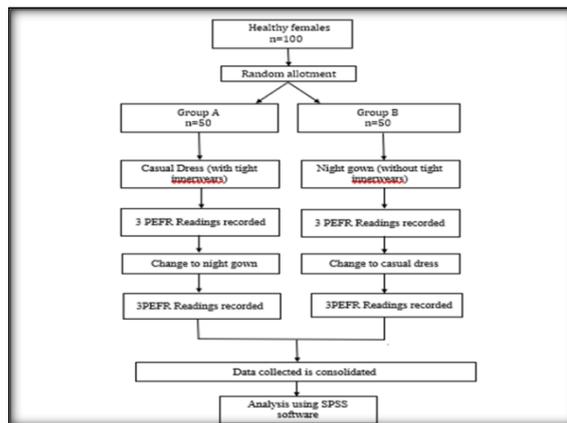


Figure 1: Diagrammatic Algorithm of the study

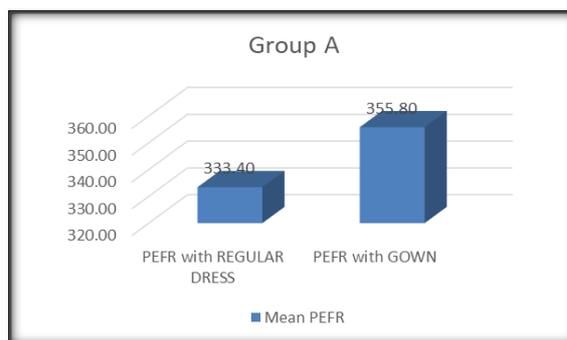


Figure 2: Comparison of PEFR values of Group A subjects

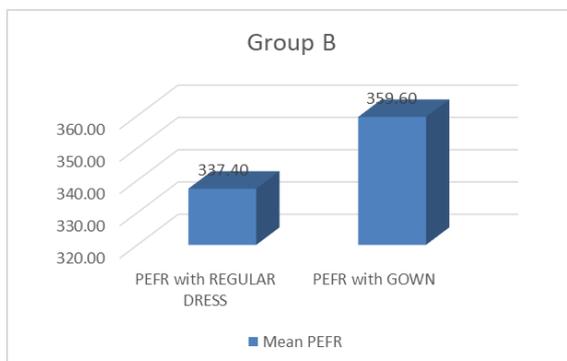


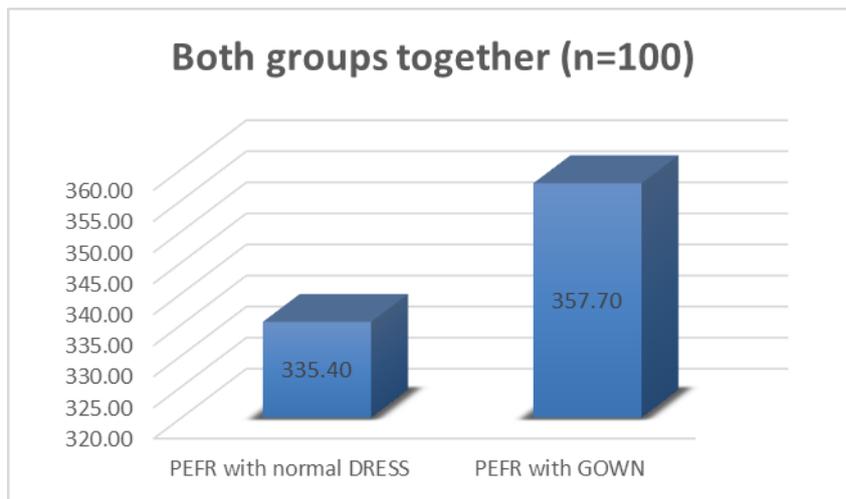
Figure 3: Comparison of PEFR values of Group B subjects

Table 1: Comparing the PEFR values of Group A subjects in regular dress and in gown

Group A n = 50	Mean PEFR	Std. Deviation	Mean difference	Lower	Upper	t	df	Sig. (2-tailed)
PEFR with REGULAR DRESS	333.40	64.162	-22.400	-27.680	-17.120	-8.526	49	0.000
PEFR with GOWN	355.80	64.495						

Table 2: Comparing the PEFR values of Group B subjects in regular dress and in gown

Group B n = 50	Mean PEFR	Std. Deviation	Mean difference	Lower	Upper	t	df	Sig. (2-tailed)
PEFR with REGULAR DRESS	337.40	60.569	-22.200	-28.678	-15.722	-6.887	49	0.000
PEFR with GOWN	359.60	61.709						



**Figure 4: Comparison of PEFR values of both groups together**

**Table 3: Comparing the PEFR values of both groups together in regular dress and in gown**

ALL n=100	Mean PEFR	Std. Deviation	Mean difference	Lower	Upper	t	df	Sig. (2-tailed)
PEFR with REGULAR DRESS	335.40	62.108	-22.300	-26.405	-18.195	-10.779	99	0.000
PEFR with GOWN	357.70	62.827						

## DISCUSSION

PEFR measured using a handy and cost-effective instrument like wright's peak flow meter is very useful in assessing patients with obstructive lung disease.<sup>[1,13,14]</sup> Especially it is useful in assessing the degree of airway obstruction,<sup>[15]</sup> response of airway to inhaled allergens,<sup>[16]</sup> chemicals or exercise,<sup>[17,18]</sup> and also to evaluate the response to therapeutic agents.<sup>[19,20]</sup> Many prior studies have shown the influence of many factors such as age, height, weight, sex on the PEFR values,<sup>[9,21,22]</sup> But the effect of clothing such as tight innerwears especially in women is not studied yet. Hence we conducted this study to see if there is a difference in the PEFR value in a healthy female subject with and without the tight clothing.

Our study showed a significant increase in the PEFR value without the tight innerwears compared to the regular dress. This increase in PEFR was statistically significant with a t value of 10.78 and a p value of 0.00. In order to rule out the possibility of the effect of practice and repetition on the PEFR value, this test was done in two groups – one group did the PEFR first in regular dress followed by the gown and the other group did the PEFR first in the gown and then in their regular dress. Both the groups showed an increase in PEFR values without the tight innerwears with a significant p and t values.

## CONCLUSION

This study has shown that clothing also affects the PEFR values in individuals. Hence it should be considered while using the measured PEFR values for diagnostic or prognostic purpose. A uniform gown with no tight innerwears can be used while

measuring PEFR values to prevent this variation in PEFR values.

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