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Original Article

Dynamic Lung volumes and capacities in marriage band party musicians

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ABSTRACT

Introduction:-The main objective of our cross-sectional study was to observe the effect of wind instrument blowing on dynamic lung volumes and capacities of marriage band party musicians. Materials and Methods:-100 b and party musicians (Group A) and 100 non-blowers (Group B) were examined by an computerized spirometer (RMS medspiror).Result:-Group A subjects showed a statistically significant(P<0.05)higher % predicted Forced Vital capacity (FVC), Forced expiratory volume in the 1st second (FEV1), Forced expiratory flow rate between 25% and 75% of FVC (FEF 25-75%) and Maximum Voluntary Ventilation (MVV) than Group B. However % predicted values of FEV1/FVC in Group A was found to be slightly less than Group B but it was not statistically significant (P>0.05).Conclusion:-Thus wind instrument blowing increases the dynamic lung volumes and capacities in marriage band

1. Introduction

Voluntary breath control training is essential for wind instrument blowing and glass blowing. So probably some investigators assumed that these professional blowers may have exceptional pulmonary functions, a physiological benefit of training; however studies have been equivocal [21]. Study by Bouhuy's [3] has reported greater pulmonary function test (PFT) values in the trained blowers. Studies on similar professionals of glass blowing by Munn et al [17] and Zuskin et al [21] also revealed similar results.

On the other hand, studies by Lesnicket al [15],Fiz et al [8] and Fuhrmanna et al [7] experienced no significant differences in blowers & non blowers. In contrast, Deniz et al [5] found significantly diminished PFT values in wind instrument blowers. Thus various studies showed variable effectsof blowing on pulmonary functions. In the light of these variable findings, the current study was performed to observe the effect ofwind instrument blowing on dynamic lung volumes and capacities in marriage band party musicians.

2.Materials and Methods

The present study included 100 male marriage band party blowers (cases) in Group A who performed blowing marriage on occasions and 100 non-blowers in Group B as controls. After obtaining the approval from the institutional ethical committee, we conducted the present study at various local marriage band party centers at Mahal & LMH, Nagpur (M.S).

Inclusion criteria-

Healthy male non- smoker subjects with age range 20-50years.

Nonsmoker was either an ex-smoker (who has ceased smoking for more than a month ago) of testing [2,6,15].

Exclusion criteria-

A smoker is defined as a regular cigarette or bidi or pipe smoker up to the day of study testing[2,6,15].

History of acute and chronic illness including respiratory and cardiac illness.

Examination and spirometric findings suggestive of respiratory or cardiac illness.

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For evaluating the dynamic lung volumes and capacities, RMS Medspiror, a computerized, flow sensing turbine type was used with an internal correction of BTPS [16].

The data of the subject as regards to name, age, height, weight, sex, date of performing the test, atmospheric temperature was fed to the computer.Live demonstration were shown prior to the testing so that all the subjects were made familiar with the instrument and the procedure [18,20]. While sitting, the subject was asked to take full inspiration which was followed by as much rapid and forceful expiration as possible in the mouthpiece of RMS medspiror.

Dynamic Lung capacities like Forced Vital capacity (FVC),Forced expiratory volume in the 1st second(FEV1), FEV1/FVC%, Forced Expiratory Flow during 25% to 75% of FVC (FEF25-75)and volume such as Maximum Voluntary Ventilation (MVV) were recorded for three times & the best of the three was noted. The percentage predicted values rather than the actual values were used for analyzing the data.

The data was collected, tabulated and analyzed by using unpaired 't' test. 'P' value of 0.05 was taken as cut off value for the measure of significance. Statistical analysis was done using graph pad prism5 software.

3.Results

The results of the present study are presented in the following tables.

Table 1. Baseline features

Baseline Parameters	Group A (n = 100)	Group B (n =100)	P value
Age (years)	35.5 ± 7.74	33.65 ± 8.14	>0.05
BMI (Kg/m^2)	22.44 ± 2.82	22.21 ± 2.18	>0.05
Period of blowing in yrs.	14.08 ± 7.78	-	

Values are in Mean±SD
P value > 0.05 is taken as statistically insignificant

Table 2. Dynamic lung volumes and capacities

Dynamic lung volumes & capacities	Group A (n = 100) Mean ± SD	Group B (n =100) Mean ± SD	P value
FVC (Lits)	104.17 ± 13.03	98.2 ± 10.87	<0.05
FEV1 (Lits)	105.89 ± 11.53	100.6 ± 10.92	<0.05
FEV1/FVC %	102.03 ± 4.75	102.59 ± 4.16	>0.05
FEF 25-75(Lits)	73.55 ± 9.08	71.49 ± 7.45	<0.05
MVV (L/m)	79.93 ± 10.09	76.08 ± 9.91	<0.05

Values are in Mean±SD
P value < 0.05 is taken as statistically significant
P value > 0.05 is taken as statistically insignificant

From the above observations it was found that

1) Age and BMI were matched in both the groups.
2) The mean percentage predicted values of FVC, FEV1, FEF25-75%, and MVV in Group A (musicians) were found to be statistically more than the Group B(non-blowers).
3) The mean percentage predicted values of FEV1/FVC in Group A (musicians) was found to be slightly less than the Group B(non-blowers) but it was not statistically significant.

4.Discussion

In our present study we were expecting higher spirometric values in musicians than the non-blowers because the professional wind instrumentalists undergo continuous ventilatory muscle training which is essential for playing wind instruments [6]. Such training is also acquired during glass blowing [21].

The expected higher FVC value in our musicians was correlated with the study conducted by Bouhuys [3] on different types of wind instrument players where the vital capacity (VC) and mouth pressure were greater than expected in all brass players. In a similar study on 80 glass blowers, Zuskin et al. [21]showed significantly higher FVC values in glass blowers across the work shift.

Another expected result of FEV1 in our musicians were correlated with the result of the study conducted on 87 glass factory workers, wherein the % predicted FEV1 were significantly more in full time glass blowers than part time and non-glass blowers{17}.Our result of insignificantly lower FEV1/FVC in musicians was also supported by the study by Fizet al [8].

However there were no significant differences in FVC, FEV1& FEV1/FVC in 12 male non-smoker trumpet players as compared to their non-blower cohorts [8].Fuhrmanna et al [7] concluded that there were no differences in lung volumes of wind/brass musicians and non-blowers.

In contrast, Deniz O et al5 found significantly diminished FEV1, FVC, & FEV1/FVC values in 34 male non-smoker military band wind instrument players when compared to healthy non-smoker controls.

When we observed correspondingly higher % predicted values of FEF 25-75% and MVV in musicians, Lesnick et al [15] and Munn et al17 found no significant differences in % predicted values of FEF 25-75% and MVV between the blowers and the controls.While Deniz O et al [5], in contrast to our finding, found significantly diminished % predicted value of FEF 25-75% in military band wind instrument blowers.

Overall results of our study might be due to professionally acquired training effect of blowing [3,8,15].There appeared to be some association between increased lung volumes and capacities and high levels of habitual respiratory muscle activity that mightbe true for our musicians, who performed blowing during various occasion [1-4,9,10,-13] .

An explanation for higher FVC values in our musicians might be their unique breathing pattern of using the whole vital capacity skillfully during the play with deep inspiration followed by prolonged expiration through the instrument. The higher FEV1

and FEF25-75 might be due to higher FVC in musicians. The insignificantly lowered FEV1/FVC in musicians might probably also due to their higher FVC percentage predicted value than their FEV1 value. The higher MVV in our musicians might be related to their blowing occupation that might have strengthen ventilatory muscle [3,8,12,14,17,19].

5. Conclusion

Thus we came to a conclusion that the musicians had higher dynamic lung volumes and capacities, which might be a physiologic advantage due to wind instrument blowing.

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