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PRELIMANARY STUDY OF LUNG FUNCTIONS IN ATHLETES AND NONATHLETES IN MARATHWADA REGION

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ABSTRACT

Aim:-The aim of this study was to compare the effect of running training on lung functions of runners and nonrunners and whether the regular exercise and training given to the runners improve the lung functions or not. **Methods**:-The subjects selected for this study were 40 runners and 40 nonrunners of aged 18-21 years.The mean value of Ht & Wt of runners were 167.52+_6.449 (cm), 56.55+_6.97 (kg) and that of nonrunners were 161.87+_6.44 (cm), 57.17+_9.129 (kg). Mean value of Ht in runners was more than that of nonrunners due to regular physical activity and training. There was no difference in wt in both groups.The mean values of Forced vital capacity (FVC), Forced expiratory volume (FEV1) at one second & Maximum voluntary ventiliation (MVV) in runners were 3.73+_0.78(L) 3.39+_0.78(L) & 120.09+_25.8(L/MIN) respectively and in nonrunners were 3.16+_0.59(L),2.98+_0.53(L) & 88.74+_28.74(L/MIN). **Results:-**There were significant increased in FVC, FEV1and MVV in runners than nonrunners may be due to training there is improvement in the lung functions and strengthing of respiratory of muscles

Keywords:-Athletes Nonathletes
FVC FEV1
MVV

INTRODUCTION

Athletics is a great fun & people of all ages can enjoy it.Running is the most natural of athletics movements & common aerobic exercise. And have a profound effect on lung functions.Several factors like Age, Height Weight, heredity, environment, diet, training, hormone status etc also contribute to the performance of sportsman(1,2).There have been many studies documenting pulmonary change following training.Wasserman et al 1995,Twisk et al 1998 who showed that following exercise athletes tend to have an increase in pulmonary capacity when compared to nonexercising individuals especially when the exercise is strenuous.This ventilatory adaptation to exercise may differ in different populations such as Black &Caucasian subjects suggested by Cerny 1987 particularly under different climatic conditions that is it may be related to ethnic and environmental factors.

Lung function test provide quantitative and qualitative evaluation of pulmonary function and are therefore of definitive value in the diagnosis and therapy of patients with cardiopulmonary disorders as well as those with obstructive and restrictive lung diseases shown by Belman &Mittman 1980,Robinson & kjeldgaard 1982.

The parameters used to describe lung function are the lung volumes and capacities.while the various lung volumes reflect the individuals ability to increase the depth of breathing the capacities is simply a combination of two or more lung volumes.

The aim of present study was to compare the values of lung functions in runners & nonrunners & whether the regular training in the form of running improves the lung functions in runners.

MATERIALS AND METHODS

The present Study was conducted on 40 Runners &40 nonrunners Aged-18-21 years .Runners selected were taking training under Sports Authority of India ,Krida prabhodini Hostel,Aurangabad for short & middle distance running event .Runners selected for this study were training themselves by running a distance of 2-3 km,two times a day for 45-60 min, 7 days a week Nonrunners selected for this study were 1st & 2nd MBBS students.They were not practicing any athletics event .Informed consent was obtained from all participants.Clinically examined to rule out any respiratory diseases **.**The study was conducted in Dept of Physiology, GMC, Aurangabad**.**

The lung functions were recorded in Pulmonary function test laboratory by Body Plethysmograph (MEDGRAPHICS)USA,Elite DX-Model.Forced vital capacity(L),Forced expiratory volume at one second(L),& Maximum voluntary ventilation(L/MIN) were recorded.Statistical analysis was done for all parameters 'p' value was determined p> o.o5-nonsignificant,p<0.01-significant & p<o.oo1-Highly significant 'z' test was applied for comparison between two groups

RESULTS

Resuls are expressed as Mean+_Standard Devitation. statistical significance was determined by' Z' Test .The mean value of significance was evaluated with'p' values .The differences were considered significance at p<0.001.

RESULT : Standard statistical analysis tests were applied in terms of mean & SD, For comparison 'Z' test applied

Table 1: Comparison of age in runner and non runner group

Parameter	Runner	Non runner	Z Value	P Value
	Mean ± SD (n=40)	Mean ± SD (n=40)		
Age (Yrs)	19.07 ± 0.99	19.12 ± 0.96	0.22	>0.05

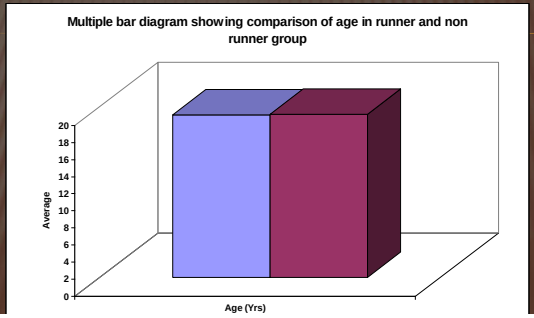


Table 2: Comparison of FVC in runner and non runner group

Parameter	Runner	Non runner	Z Value	P Value
	Mean ± SD (n=40)	Mean ± SD (n=40)		
FVC (Lit)	3.73 ± 0.78	3.16 ± 0.59	3.65	<0.001*

*- significant

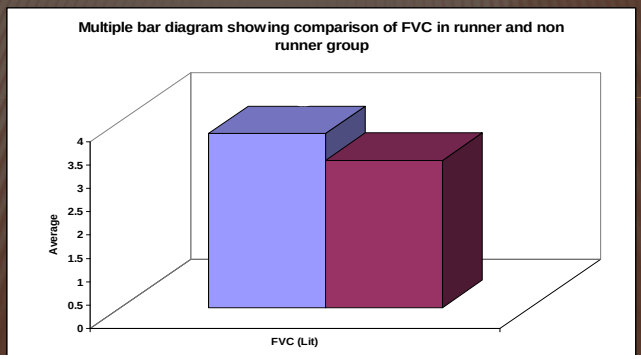
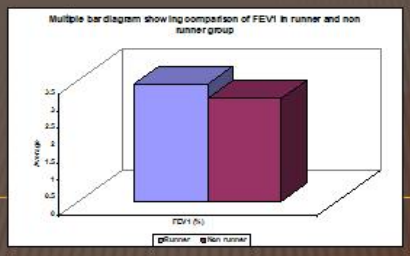


Table 3: Comparison of FEV1 in runner and non runner group



Parameter	Runner	Non runner	Z Value	P Value
	Mean ± SD (n=40)	Mean ± SD (n=40)		
FEV1 (L)	3.39 ± 0.78	2.98 ± 0.53	2.74	<0.01*

*-significant

Table 4: Comparison of MVV in runner and non runner group

Parameter	Runner	Non runner	Z Value	P Value
	Mean ± SD (n=40)	Mean ± SD (n=40)		
MVV (Lit/min)	120.09 ± 25.8	88.74 ± 28.74	5.13	<0.0001 **

**-Highly significant

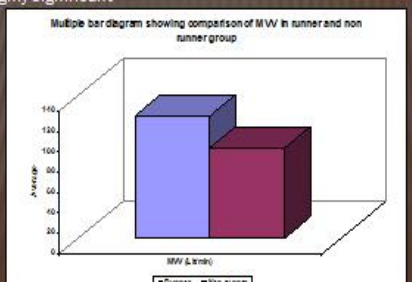


Table 5: Comparison of height in runner and non runner group

Parameter	Runner	Non runner	Z Value	P Value
	Mean ± SD (n=40)	Mean ± SD (n=40)		
Height	167.52 ± 6.44	161.87 ± 7.04	3.75	<0.001*

*- significant

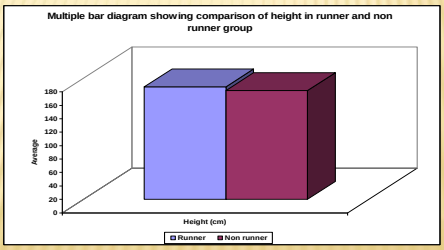
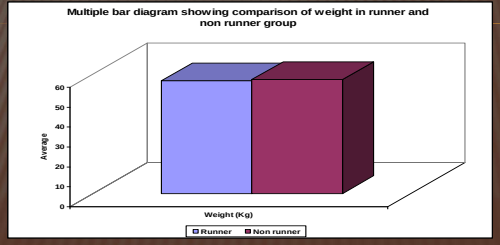


Table 6: Comparison of weight in runner and non runner group

Parameter	Runner	Non runner	Z Value	P Value
	Mean ± SD (n=40)	Mean ± SD (n=40)		
Weight (Kg)	56.55 ± 6.97	57.17 ± 9.12	0.34	>0.05

>0.05-Not significant



DISCUSSION

Respiratory system is important system of human body where gaseous exchange takes place with diffusion of enormous amounts of oxygen into the blood during physical activity.It is first and furthermost organ in the body responding to change during exertional activities such as running, cycling, swimming etc.Increase in lung volumes and capacities depends upon workloads or the intensity of training programme.

Many studies conducted on respiratory system following training shows linear relationship with different level of exercise programme.Odunuga et al reported that among male athletes only male shot putters had a significantly higher vital capacity than male nonathletes suggesting that intensity of sports engaged in by the athletes determines the extent of strengthening of respiratory muscles with resultant increase in lung volume and chronic exercise cause an increase in respiratory function which could be due to increased development of respiratory musculature incidental to physical training.

Hagberg reported that values for static lung volume of accomplished marathoners and other endurance trained athletes were no different from those of untrained controls of comparable body size.However Cordain 1990 reported larger than normal static lung volume in swimmers and drivers when compared to normal nonathletes.This was attributed to strengthening of the inspiratory muscles as they were against additional resistance caused by weight of water that compresses the thoracic cage.Reports from other workers Onadeko et al 1976,Bjorstorm 1987 also indicates a significantly higher vital capacity in athletes compared with nonathletes.

The conflicting finding may be due to genetic and ethnic factors as suggested by Lakhera and Klain 1995 who compared pulmonary function amongst athletes in different Indian populations.The lung function parameters were found to vary in different settings with results suggesting that the size of lung is governed by genetic, environmental and nutritional factors.

In our study spirometric measurements i.e FEV1,FVC &MVV were found significantly high in athletes than nonathletes.The proable reason for observation could be that following training there is increased requirement of oxygen in the working muscles which stimulates the chemosensitive area located bilaterally in the medulla in turn stimulating the dorsal group of nucleus tractus solitaries which send strong signals to inspiratory group of muscles which cause forceful inspiration and expiration .Repeated forceful inspiration and expiration cause increased secretion of surfactant which decreases tension in alveoli and decreases physiological dead space this in turn manifest increased lung volume and capacities in athletes.

The purpose of this study is to investigate the possibility of change/adaption of lung function in athletes who have regular exercise/trained for 2-3 hrs a day a 7 day a week and involved in sports for more than 3-4 yrs .Hence results from the present study suggest that the intensity or severity of sports engaged by athlete probably determines the extent of strengthening of respiratory muscles with resultant increase in lung volume and capacities

CONCLUSION

The study validates the physiological adaptions in spirometric functions of respiratory system to regular training programme.The effect of strengthening of respiratory muscles resultant increase in lung volume and capacities with improved endurance of the body following regular training is evident in a significantly increased in FVC, FEV1& MVV in athletes than nonathletes. Highlighting the importance of regular training on respiratory functions and endurance of the body

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MEDGRAPHICS BODY PLETHYSMOGRAPH MACHJNE