

SHORT COMMUNICATION

A COMPARISON OF VENTILATORY PULMONARY FUNCTIONS BETWEEN THE NATIONAL CADET CORPS (N.C.C.) OF HILLY AND PLAIN AREAS

A.K. DE.* P.K. DAS GUPTA* B.K. PANDA** AND A.K. BHATTACHARYA**

**Unit of Sports Medicine and Pulmonary Physiology,
Department of Physiology and **Department of Biophysics,
Institute of Medical Sciences, B.H.U., Varanasi-221 005*

(Received on July 26, 1980)

Summary : National Cadet Corps (N.C.C.) were tested for assessing their physical efficiency level with special reference to respiratory performances. The height and weight of the cadets from hilly and plain areas were noted to be similar indicating alike attainment of growth. The mean values of all pulmonary function tests (FVC, IC, ERV+TV, FEV₁, MEF₅₀) except MVV were observed to be similar in both the group of subjects. The mean value of MVV was significantly higher in subjects from hilly area than that in those from plain area.

Key words: National Cadet Corps physical efficiency ventilatory pulmonary function test

INTRODUCTION

Pulmonary function tests (PFT) is one of the important tools to measure the level of physical efficiency of a population with special reference to athletes, as well as for the diagnosis and prognosis in the cases of cardiorespiratory ailments.

The data on various PFT related to average normal Indian population were reported earlier (1,4, 5, 6, 7, 8, 9, 11). But the results on young persons who are involved in regular physical training are still very scanty (2, 3). Moreover, the study on the population of hilly and plain areas are not available separately for comparison. The present investigation was therefore, undertaken to evaluate the effects of regular National Cadet Corps (N.C.C.) training on physical efficiency of the students from hilly and plain areas.

MATERIALS AND METHODS

All the subjects selected for this study were from the N.C.C. of Naval section of Uttar Pradesh State. The cadets were all male students. They were divided into two groups according to their living in hilly area at altitudes varying between 4,000–6,000 ft. above sea level (H) and plain area (P). The number of subjects of H and P were 23 and 30 respectively. The students were in N.C.C. for 2–4 years and were undergoing training for 4–5 hours in a week except during their vacations. The tests on H cadets were conducted after 8 days of stay in the camp at Varanasi. The tests conducted on them were inspiratory capacity (IC), tidal volume (TV), expiratory reserve volume (ERV), forced vital capacity (FVC), and forced expiratory volume in 1 sec (FEV_1) maximum midexpiratory flow rate (MEFR) and maximum voluntary ventilation (MVV).

All the tests were performed in sitting posture with the help of a pen recording wet type of expirograph. All the values of the ventilatory PFT were presented at BTPS. The height and weight of the subjects were noted as well as dietary history and socioeconomic status were assessed by standard questionnaire method. For conducting all these experiments a temporary laboratory was set up in the field of Banaras Hindu University.

RESULTS AND DISCUSSION

The results are summarised in Tables I, II and III. The similar height and weight of the subjects of both the groups H & P portray an alike attainment of growth. The subjects of both the groups were from a similar socio-economic status (middle class family) as revealed

TABLE I : Showing the age, height and weight of the subjects.

	Hilly area (23)	Plain area (30)
	Mean \pm S.D. (range)	
Age (year)	17.9 \pm 1.27 (15–20)	18.1 \pm 1.29 (16–20)
Height (cm)	166.15 \pm 5.27 (152–175)	165.39 \pm 5.78 (154–174)
Weight (kg)	51.76 \pm 6.07 (37.5–61.5)	49.53 \pm 5.09 (40–62.5)

The figures in the parenthesis indicate the total number of subjects studied in each group.

TABLE II : Showing the results of static ventilatory lung function tests.

Tests	Hilly area (23)	Plain area (30)
	Mean \pm S.D. (range)	
IC (Lit)	2.08 \pm 0.48 (1.23—2.9)	2.27 \pm 0.44 (1.33—3.01)
ERV+TV (Lit)	2.03 \pm 0.62 (1.19—2.94)	1.82 \pm 0.46 (1.19—2.94)
FVC (Lit)	3.81 \pm 0.64 (2.83—5.55)	3.81 \pm 0.45 (2.86—4.5)
FVC (ml/cm Ht)	22.84 \pm 3.21 (16.87—28.42)	22.49 \pm 3.15 (17.99—27.79)
FVC (ml/yrs Age)	212.00 \pm 3.36 (116—271)	210.6 \pm 33.1 (148—261)
FVC (ml/kg Wt)	72.00 \pm 16.92 (60—100)	63.56 \pm 29.46 (60—100)
FVC (Lit/m ² SA)	2.41 \pm 0.36 (1.31—3.38)	2.49 \pm 0.278 (2.03—3.14)

TABLE III : Data showing the results of dynamic ventilatory lung function tests.

	Hilly area (23)	Plain area (30)
	Mean \pm S.D. (range)	
FEV ₁ %	84.73 \pm 11.8 (68.6—97.2)	82.10 \pm 6.65 (63.21—95.4)
MEFR (Lit/min)	256.68 \pm 60.88 (156.04—365.78)	237.36 \pm 44.55 (155.53—332.19)
MVV (Lit/min)	122.08 \pm 15.14* (101.41—149.47)	105.08 \pm 25.51 (77.16—130.47)

*p < 0.01

by questionnaire method. The mean values of the tests viz. FVC, IC, ERV+TV, FEV₁ and MEFR were observed to be similar in both the group of subjects. These values were quite similar to those reported by other workers for average Indian population (1, 5, 6, 8). This shows that the N.C.C. training does not have any significant effect on the PFT values. However, the mean value of MVV, a dynamic lung function test, was observed to be significantly higher in the subjects ($P < 0.01$) from hilly place than that from the plain area. More strenuous work by going ups and downs during the regular course of daily activities, thereby undergoing more breathing exercise by the inhabitants of the hilly place than the subjects of plain areas could be a probable reason for higher values of MVV.

ACKNOWLEDGEMENTS

We are very much thankful to the N.C.C. officers (Naval Unit) of U.P. State for allowing us to conduct this study.

REFERENCES

1. Bhargava, R.P., S.M. Misra and N.K. Gupta. Ventilatory tests and lung volume studies in Madhya Pradesh Physiological norms. *Ind. J. Physiol. Pharmac.*, **17** : 267-272, 1973.
2. De, A.K. Pulmonary function Tests of the students of physical Education. *SNIPES Jour.*, **1** : 74-79, 1978.
3. De, A.K., P.K. Debnath, S.C. Roy and J. Nagchaudhuri. A comparison of physical efficiency between Indian Physical education and medical students. *Brit. J. Sports Med.*, **12** : 93-96, 1978.
4. Gupta, S., M.B. Puri and S.I. Singh. Pulmonary function tests in health. *Jr. Assoc. Phys. Ind.*, **23** : 247-252, 1975.
5. Jain, S.K. and T.J. Ramaiah. Normal standards of pulmonary function tests for healthy Indian men 15-40 years old: comparison of different regression equations (Prediction formulae). *Ind. Jour. Med. Res.*, **57** : 1453-1466, 1969.
6. Kasliwal, R.M., V.S. Baldwa and P.R. Sharma. Ventilatory tests and lung volume studies in health. *Jour. Ind. Med. Association*, **43** : 49-54, 1964.
7. Khandare, S.S. Pulmonary function tests in healthy young Indian males (Ventilatory studies only). *Ind. Jour. Med. Res.*, **49** : 498-502, 1961.
8. Mathur, K.S., D.K. Nigam and R.R. Garg. Pulmonary function studies in normal healthy persons. *Ind. J. of Chest Dis.*, **10** : 80-89, 1968.
9. Mazumdar, B.N., C.A. Desai and N.C. Shah. A comparative study of a few tests of dynamic lung function. *Ind. J. Physiol. Pharmac.*, **20** : 22-26, 1976.
10. Singh, H.D. Ventilatory function tests : Normal standards in male adults. *Jour. Ind. Med. Prof.*, **5** : 2483-2486, 1959.
11. Talsania, H.C., E.G. Phadia and T.P. Goal. Vital Capacity and maximum breathing capacity in Gujratis. *Ind. J. Physiol. Pharmac.*, **9** : 67-74, 1965.