Chapter V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The purpose of this study was to find out the effect of Bhastrika and Ujjayi Pranayama on selected physiological and coordinative abilities among engineering students.

Ninety students, with age ranging between 17 to 22 years studying in Bachelor of Engineering at Madhav Institute of Technology and Science, Gwalior were randomly selected as subjects for the study.

All subjects were then randomly assigned to two experimental groups (A & B) and one control group (C), each group consisted of 30 subjects, the experimental treatments were also assigned to the groups at random. The groups A & B were treated as experimental groups and were given training programme of Bhastrika Pranayama and Ujjayi Pranayama respectively. The group C served as a control group and continued participating in the normal programme of the college.

For the purpose of the study eight physiological variables and five coordinative abilities were selected. The selected physiological variables were anaerobic power, vital capacity, resting heart rate, resting respiratory rate, total body fat percentage, lean body weight, positive breath holding
capacity and negative breath holding capacity. The selected coordinative abilities were reaction ability, orientation ability, differentiation ability, balance ability and rhythmic ability.

Random group design was adopted for this study as all the subjects were randomly selected and randomly divided into three groups. Further the experimental treatments also were assigned at random to the two experimental groups and the third group served as a control group. The experimental groups participated in two training programme i.e. group A (Bhastrika Pranayama), group B (Ujjayi Pranayama). The training programme was conducted for six days a week for ten weeks.

The data were collected before the commencement of experimental treatment (pre-test) and at the conclusion of training period (post-test).

All the tests used were explained in details to the subjects prior to the administration. The subjects were also provided chance to practice the tests so as to get familiarized with the test items.

To find out the effect of Bhastrika Pranayama and Ujjayi Pranayama on selected physiological variables and coordinative abilities among engineering students, analysis of co-variance (ANCOVA) was employed at 0.05 level of significance.

The necessary data on coordinative abilities was collected by administering various coordinative ability tests as suggested by Peter Hirtz.
such as Reaction ability was measured by ball reaction exercise tests, Orientation ability was measured by numbered medicine ball run test, Differentiation ability was measured by backward medicine ball throw test, Balance ability was measured by long nose test and Rhythmic ability was measured by sprint at given rhythm test. Similar way the data on physiological variables was calculated by employing appropriate tests such as Anaerobic powers was calculated in Kg/m/sec. by Sargent jump test, Vital capacity was measured in litres by dry Spriometer, Resting respiratory rate was measured in numbers by seeing the movements of abdomen in a single minute, Resting heart rate was measured beats per minute, Total body fat percentage was calculated by Sloan weir nomogram, Positive breath holding capacity was measured by taking time by subjects after maximum inhalation and Negative breath holding capacity was measured by taking time by subjects after maximum exhalation.

Conclusions

On the basis of findings, the following conclusions were drawn:

1. The Bhashrika Pranayama and Ujjayi Pranayama were found effective (6.74) in improving anaerobic power performance among experimental group as compared to the control group.

2. In case of Vital capacity, Bhashrika Pranayama and Ujjayi Pranayama had shown significant (5.38) change in comparison to the control group.
3. With regard to Resting Heart rate, Bhastrika Pranayama and Ujjayi Pranayama were found to be effective (10.96) in improving performance as compared to the control group.

4. In case of Resting Respiratory rate, Bhastrika Pranayama and Ujjayi Pranayama had shown significant (37.73) change in comparison to control group.

5. In case of Total body fat percentage performance, Bhastrika Pranayama and Ujjayi Pranayama had improved significantly (9.39) in comparison to the control group.

6. In case of lean body weight performance, Bhastrika Pranayama and Ujjayi Pranayama did not improve performance significantly (0.44) in comparison to the control group.

7. In case of positive breath holding capacity, Bhastrika Pranayama and Ujjayi Pranayama had shown insignificant change (3.08) in comparison to control group.

8. In case of negative breath holding capacity, Bhastrika Pranayama and Ujjayi Pranayama had not shown significant (1.32) improvement among experimental groups as compared to the control group.

9. In case of reaction ability, Bhastrika Pranayama and Ujjayi Pranayama had shown significant (7.24) change in comparison to control group.
10. In case of orientation ability, Bhashrika Pranayama and Ujjayi Pranayama groups did not show any improvement (2.46) in comparison to control group.

11. The Bhashrika Pranayama and Ujjayi Pranayama were found effective (46.82) in enhancing differentiation ability performance as compared to control group.

12. Significant (7.87) changes were observed in case of balance ability, Bhashrika Pranayama and Ujjayi Pranayama groups had shown significant effect in comparison to control group.

13. Both experimental groups were effective and as a result the rhythmic ability improved significantly (4.05) as compared to control group.

14. In relation to anaerobic power, the sequence of performance of all groups was Bhashrika Pranayama (74.15) > Ujjayi Pranayama (73.71) > Control (71.90).

15. In case of vital capacity, the sequence of performance among all groups was Ujjayi Pranayama (3.57) > Bhashrika Pranayama (3.77) > Control (3.33).

16. In relation to resting heart rate the sequence of performance among all groups was Ujjayi Pranayama (62.87) > Bhashrika Pranayama (62.67 > Control Group (64.92) (Lower resting heart rate indicated better efficiency).
17. In case of resting respiratory rate, the sequence of performance among all groups was: Bawareka Pranayama (16.48) > Ujjiayi Pranayama (16.66) > Control Group (18.95) (lower resting respiratory rate indicated better efficiency).

18. In case of total body fat percentage, the sequence of performance among all groups was: Bawareka Pranayama (12.03) > Ujjiayi Pranayama (12.19) > Control (12.31) (Lower body fat percentage indicated better score).

19. In relation to reaction ability, the sequence of performance among all groups was: Bawareka Pranayama (93.87) > Ujjiayi Pranayama (92.94) > Control (91.71).

20. In case of differentiation ability, the sequence of performance among all groups was: Ujjiayi Pranayama (10.32) > Bawareka Pranayama (10.08) > Control (7.62).

21. In case of balance ability sequence of performance among all groups was: Bawareka Pranayama (9.59) > Ujjiayi Pranayama (9.56) > Control (9.47).

22. In relation to rhythmic ability performance, the sequence of performance among all groups was: Ujjiayi Pranayama (1.53) > Bawareka Pranayama (1.50) > Control (1.48).
Recommendations

On the basis of findings, the following recommendations are made:

1. The sample size in this study was large enough, however the similar study may be conducted on a larger sample of subjects.

2. The similar study may be conducted on variables other than chosen for this study.

3. In this study the age range was between 17 and 22 years, so another study may be conducted on various age groups.

4. The female subjects may be taken and similar study be conducted.

5. Different durations of Pranayama practice may be taken up in another study.

6. The similar study may also be conducted on various Pranayama such as Surya Bhedan, Sheetal, Seetkari, Bhramani etc.

7. Similar study may be taken up having comparative effects of various Pranayamas.

8. Similar study may also be conducted by increasing treatment duration.