

## CHAPTER-V

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 SUMMARY

The treadmill running helps to improve the physical fitness. The energy cost of running on a treadmill higher while running than walking **(Bunc and Dlouha, 1997)**. Aquatic treadmill running was running is as effective as treadmill running on the floor for aerobic conditioning, resting heart rate, and breathing frequency in fit individuals **(Silvers, Rutledge, and Dolny, 2007)**. Treadmill running at an inclination of 1% to 2% is equal to over ground running. Treadmill running at an inclination above 3% resembles uphill running.

The athletes run on various surfaces to improve their physical fitness. Countries like India, particularly in Chennai metropolitan city, college athletes practice in their college track/play fields to improve their physical fitness. During rainy season, unlike developed countries, a very few synthetic track and indoor play fields are available in Chennai. The available synthetic track and indoor play fields are restricted only to elite athletes. The treadmill running is the only weapon for the athletes during rainy season to improve and sustain their physical fitness. There is a very few research studies conducted in the area of effect of treadmill running on the physiological, biochemical, cardiopulmonary variables and neuromuscular indices among long distance athletes. Hence, the investigator was interested to find out the effect of treadmill training under varied inclinations on the physiological, biochemical,

cardiopulmonary variables and neuromuscular indices among long distance athletes.

The purpose of the study was to find out effect of treadmill training under varied inclinations on the selected physiological variables namely, resting heart rate, breath holding time, systolic and diastolic blood pressure and on the selected biochemical variables namely, blood glucose, blood cholesterol, total protein, and low density lipoprotein and on the selected cardiopulmonary variables namely,  $VO_2$  max, vital capacity, inspiratory capacity, and total lung capacity and on the selected neuromuscular indices namely, speed, shoulder strength, explosive power, and coordination, and 5000m running performance among intercollegiate long distance athletes.

To achieve the purpose of the study, 60 college men who represented their college in the inter collegiate athletic meet in the long distance events were selected at random from Chennai. The subjects were selected from various colleges in Chennai, India. The age of the subjects ranged between 18 and 28 years.

The research design of the study was random group design. Sixty (N=60) college male long distance runners who represented their college in the intercollegiate athletic meet were selected at random. The selected subjects were randomly assigned into experimental group-I (Varied Inclinations Group under Constant Pace Group-TVICPG), experimental group - II (Varied Pace Group under Constant Inclination Group-TVPCPG) and Group-III as Control Group (CG). Each group consisted of 20 subjects. The training period was 12 weeks and three sessions a

week on alternative days. The pre and post were conducted on all the three groups on the selected criterion variables. The experimental group – I underwent treadmill training under varied inclinations at constant pace from grade 2, 3, and 4 inclinations (30 minutes in each grade with 3-5 minutes recovery at grade 1 inclination) during 1<sup>st</sup> week to 4<sup>th</sup> week, and 5, 6, 7 grade inclinations during 5<sup>th</sup> week to 8<sup>th</sup> week, and 8,9,10 grade inclinations during 9<sup>th</sup> week to 12<sup>th</sup> week. The experimental group – II underwent treadmill training under varied pace at constant inclination (3,4,5 mph during week 1-4, 6,7,8 mph during week 5-8, 9,10,11 mph during week 9-12). The control group did not undergo any form of training. The intensity of the training was increased once in four weeks. The level of significance was fixed at 0.05. The collected data were analysed with ANCOVA statistical procedure and Scheffe's test was used as a post hoc test wherever the F value was found significant.

## **5.2 CONCLUSIONS**

1. There was a significant difference among the experimental group-I, experimental group-II and control group on the selected physiological variables namely, resting heart rate, breath holding time, and biochemical variable namely, low density lipoprotein, and Cardiopulmonary variables namely, VO<sub>2</sub> max., vital capacity, inspiratory capacity, total lung capacity, and neuromuscular indices namely, speed, explosive power, and coordination, and 5000m running performance.

2. There was no significant difference among the experimental group-I, experimental group-II and control group on the selected physiological variables namely, systolic blood pressure, diastolic blood pressure, and biochemical variable namely, blood glucose, blood cholesterol, and total protein, and neuromuscular index namely, shoulder strength.
3. Experimental group-I was better than experimental group – II and control group on resting heart rate, breath holding time, low density lipoprotein, VO<sub>2</sub> max, vital capacity, inspiratory capacity, total lung capacity explosive power, and 5000m running performance. Experimental group-II was better than control group on resting heart rate, breath holding time, low density lipoprotein, VO<sub>2</sub> max, vital capacity, inspiratory capacity, speed, explosive power, coordination and 5000m running performance.
4. There was no significant difference between experimental group-I and experimental group-II on speed and coordination.
5. There was no significant difference between experimental group-II and control group on total lung capacity.

### **5.3 RECOMMENDATIONS**

1. It is recommended that treadmill training under varied inclinations is most important for improving cardiopulmonary variables among long distance runners.
2. The treadmill training under varied inclinations is recommended for other field sports athletes to improve their aerobic fitness level.

3. The treadmill training may be designed and adapted by the coaches for improving the long distance athlete's performance.
4. This training is strongly recommended to the athletes during inclement weather conditions.

#### **5.4 SUGGESTIONS FOR FURTHER RESEARCH**

1. It was recommended that a similar study may be conducted with larger samples, which would support the findings of this study.
2. A similar study may be conducted on women athletes.
3. It was suggested that a similar study may be conducted in different higher inclinations and pace.