Chapter – 5  
Summary and Conclusion

Total one hundred twenty (120) healthy male subjects of age group of 18 to 24 years were selected for this study. Subjects were grouped into 4 different groups namely sedentary, anaerobic, intermittent and aerobic. Each group consists of 30 subjects. The physical variables included age, height and body weight. Physiological variable include maximum oxygen consumption (VO2 max). Nutritional variable include dietary vitamin C, vitamin E, retinol & beta-carotene. Biochemical variable include serum uric acid, triglycerides, cholesterol, HDL-cholesterol, C/H ratio, malondialdehyde, catalase and superoxide dismutase. The instruments used for the measurements of the above tests were readily available in Exercise Biochemistry, Exercise Physiology laboratory and Anthropometry laboratory at Sports Authority of India, Netaji Subhas National Institute of Sports, Patiala. Instruments used for measurement of physical variables were stadiometer and weighing machine. Instruments used for measurement of physiological variable were done by metabolic gas analyser (K4, Cosmed Srl- Italy), computerized bicycle ergometer (Erich Jaeger, Germany) and polar heart rate monitor. For nutritional assessment Nutritrust pro software was used. Instruments used for biochemical variables were semi autoanalyser, ELISA reader and high speed cooling centrifuge.

The data obtained on physical, physiological, nutritional and biochemical variables have been analyzed by Statistical Package of Social Sciences (SPSS) version 10 in order to compare the physical, physiological, nutritional and biochemical variables of the subject’s of all the four groups.
The results related to the physical parameters revealed that the mean age of aerobic group exhibit higher value followed by sedentary, intermittent and anaerobic groups. Whereas the mean height and weight of sedentary group is highest followed by intermittent, anaerobic and aerobic groups.

The results of physiological parameter revealed that the athletes exhibit higher values than sedentary. But aerobic group possess higher mean value of VO$_2$ max followed by intermittent, anaerobic and sedentary groups.

The results of nutritional parameters i.e. dietary intake of exogenous vitamin antioxidants were higher in the athletes as compare to their sedentary counterparts, further it was found that the mean values of dietary vitamin C and retinol of intermittent group was highest followed by anaerobic, aerobic, and sedentary groups. The mean values of dietary vitamin E of aerobic group was highest followed by intermittent, anaerobic and sedentary groups. The mean values of dietary carotene of intermittent group was highest followed by aerobic, anaerobic, and sedentary groups.

The results of lipid profile revealed that the aerobic group has the better lipid profile as compare to the other groups, further the mean value of serum triglycerides and VLDL- cholesterol level of anaerobic group was highest followed by intermittent, aerobic and sedentary groups. The mean level of serum cholesterol, LDL-Cholesterol and C/H ratio level of sedentary group was highest followed by anaerobic, intermittent and aerobic groups. The mean serum HDL- cholesterol level of aerobic group was highest followed by intermittent, anaerobic, and sedentary groups.

The results of oxidative stress marker i.e. malondialdehyde (MDA) shows that subjects of athlete groups have more oxidative stress as compare to sedentary group,
further, it was observed that the mean value of serum MDA of aerobic group was highest followed by intermittent, anaerobic and sedentary groups.

The results of antioxidants revealed that athlete groups have better antioxidant status than the sedentary group, further, the subjects of intermittent group has better antioxidant status than the subjects of other groups, further it was found that the intermittent group has highest mean value of uric acid followed by anaerobic, aerobic and sedentary groups. The mean serum catalase of aerobic group was highest followed by intermittent, anaerobic, and sedentary groups. The mean serum superoxide dismutase of intermittent & aerobic groups were highest followed by anaerobic and sedentary groups.

Analysis of Variance (ANOVA) and Scheffe’s post hoc test has been used to identify the location of significant differences of physiological, nutritional and biochemical variables among various groups. Significant differences were found when sedentary group was compared with different groups of athletes for above mentioned variables.

The results point to the fact that athletes exhibit more oxidative stress and better antioxidant status as compare to sedentary population. The regular and competitive physical training programme particularly aerobic in nature has resulted in more oxidative stress and the regular and competitive physical training programme particularly intermittent in nature has resulted in better antioxidant status of athletes.

The results also point to the fact that the athletes involve in regular physical training and whose activity is dominated aerobically have better lipid profile as compare to the other groups.
In the light of the findings drawn, the following conclusions are made:

- In the present study an attempt was made to evaluate the oxidative stress and antioxidant status of athletes of different sports categories in comparison to age and sex matched sedentary counter parts.

- The results of this study shows that a further research work will be needed to carry on a large number of elite athletes of other sports with additional variables of oxidative stress and antioxidant status.

- The physical, physiological, nutritional and biochemical variables of the athletes engaged in various sports need to be analyzed at regular intervals and prompt counseling of the results; will enable the athletes to achieve higher level of sporting excellence.

- Very few studies have done on oxidative stress and antioxidants of Indian athletic population so far. Therefore the results of this study will serve as guidelines for coaches, trainers, physicians, dietician and other scientists working with athletes for monitoring of sports training and recovery.