

Chapter V

SUMMARY CONCLUSIONS AND RECOMMENDATIONS

Chapter V

SUMMARY CONCLUSION AND RECOMMENDATIONS

5.1. SUMMARY

Time of day effect was noticed among the athletes. It is well known that these athletes differ in their responses to the time of day. Since athletic training held at various times during the day and studies in time of day effect on athletes performances are restricted. Hence, the purpose of this study was to investigate diurnal variation of selected physical and biochemical variables among college athletes (sprinters, jumpers and throwers). To accomplish the purpose of the study, 30 male athletes were selected from the Department of Physical Education and Sports Sciences, Annamalai University, who were classified into three groups as sprinters (10), jumpers (10) and throwers (10). This study was carried out during the academic year 2010-2011.

The investigator referred various relevant literatures, consulted with experts in the field of sports and biochemistry to identify appropriate variables. Then, the investigator selected certain variables that are feasible for data collection and processing for evaluation. The criterion variables selected in this study were physical fitness variables such as speed, strength endurance, explosive power, flexibility, agility, anaerobic power and biochemical such as glucose, total cholesterol, total protein, sodium, calcium, superoxide dismutase, thiobarbituric acid reactive substance.

In the current exploration standardized tests and procedures were used to assess the selected physical fitness components and biochemical variables as presented in table XVII.

Table XVII
Test used for criterion variables

| Sl.No | Variables | Methods/test/ equipment | Unit of measurements |
|------------------------------------|----------------------------|---|----------------------|
| Physical fitness components | | | |
| 1 | Speed | 50m dash | Seconds |
| 2 | Strength endurance | Bent knee sit-ups | Numbers |
| 3 | Explosive power | Standing broad jump | Centimetre |
| 4 | Flexibility | Sit and reach test | Centimetre |
| 5 | Agility | Shuttle run | Seconds |
| 6 | Anaerobic power | Margaria Kalamen Power Test | Kg.m/s |
| Biochemical parameters | | | |
| 7 | Glucose | O-toludine method Fings et al., (1970) | mg/dl |
| 8 | Total cholesterol | Zlatkis et al., (1953) | mg/dl |
| 9 | Total protein | Lowry et al., (1951) | µg/m |
| 10 | Sodium (Na ⁺) | Flame Photometry | mEq/l |
| 11 | Calcium (Ca ⁺) | Lorentz (1982) | Mg |
| 12 | SOD | Kakkar <i>et al.</i> , (1983) | U/mgHb |
| 13 | TBARS | Yagi (1987) | nmolml/dl |

In this investigation standard equipments bought from reputed companies were used. These instruments were calibrated for its accuracy. The stopwatches, whistle, standing jump pit, measuring tape, timing mats for anaerobic power and sit and reach box available in the Department of Physical Education and Sports Sciences, Annamalai University were used to measure speed, strength endurance, explosive power, flexibility, agility and anaerobic power. The blood samples were analysed for glucose, total protein, total cholesterol, sodium, calcium, SOD and TBARS in research laboratory, Department of Biochemistry, Faculty of Science, Annamalai University, using research centrifuge, Photometers, colorimetric and automated batch analyzer. For the blood analysis standard solutions, reagents and chemicals were used. Hence their calibrations were accepted as accurate enough, for the present research work.

The collection of blood specimens on chosen criterion variables were conducted on day 1 and physical fitness variables data was obtained on the day 2. To monitor 12 hours changes in selected physical fitness and biochemical parameters tests were conducted at 06:00, 09:00, 12:00, 15:00, and 18:00 hours.

The phlebotomists were recruited for purpose of obtaining 5 ml of venous blood samples from each subject in seated posture at different times of the day in perspective of experimental conditions. Venous blood was collected through venous puncture by using standard disposable syringe. The blood specimens collected were subjected to centrifuge at 3000 rpm for 10 minutes, so as to separate the plasma and serum. The plasma and serum specimens were labelled and coded, and then stored in a deep freezer at -20° for future analysis.

The data collected from the sprinters, jumpers and throwers at five different time of the day were statistically analysed to examine the changes on selected physical fitness and biochemical variables. The experimental design used for the present investigation was 3 x 5 ANOVA with repeated measures on last factors. In which, the first factor denotes athletes (sprinters, jumpers and throwers) and the second factor indicated different times (06:00, 09:00, 12:00, 15:00, and 18:00 hours) of a day whenever the interaction is significant, simple effect was used as a follow up test. Then, the Scheffe's test was applied as post hoc test to determine the significant paired mean differences. The level of confidence was fixed at 0.05 to test the significance. The data was analysed in computer system by using statistical package for social science (SPSS) version 17.

5.2. CONCLUSIONS

Within the limitations of the present study, the following conclusions may be drawn.

5.2.1 SPEED

The speed of the sprinters, jumpers and throwers recorded peak performance at 18:00 hours. Interaction was found to be significant at 0.05 level of confidence. Scheffe's post hoc test between the groups clearly showed that sprinters outclassed jumpers and throwers at 06:00, 09:00, 12:00, 15:00 and 18:00 hours. In Scheffe's post hoc test within sprinters, jumpers and throwers at different times of the day showed no significant difference speed.

It is concluded that among athletes differences in speed was noticed at different times of the day. However, speed performance during daytime remained unaltered, since significant difference was not detected at different times of the day.

5.2.2 STRENGTH ENDURANCE

The abdominal strength endurance of the sprinters, jumpers and throwers recorded peak performance at 15:00 hours. Interaction was not found to be significant at 0.05 level of confidence. However, different times of the day showed significant difference irrespective of groups.

5.2.3 EXPLOSIVE POWER

The explosive power of the sprinters, jumpers and throwers recorded peak performance at 18:00 hours. Interaction was found to be significant at

0.05 level of confidence. Scheffe's post hoc test between the groups clearly showed that sprinters outclassed jumpers and throwers at 09:00 and 12:00 but jumpers performed better than sprinters at 15:00 and 18:00 hours. In Scheffe's post hoc test within sprinters and jumpers at different times of the day showed a significant difference on explosive power.

It is concluded that among athletes differences in explosive power was noticed at different times of the day. However, explosive power during daytime fluctuates in sprinter and jumpers, since significant difference was detected at different times of the day.

5.2.4 FLEXIBILITY

The flexibility of the sprinters, jumpers and throwers recorded peak performance at 18:00 hours. Interaction was found to be significant at 0.05 level of confidence. Scheffe's post hoc test between the groups clearly showed that jumpers surpass sprinters and throwers at 06:00, 09:00, 12:00, 15:00 and 18:00 hours. In Scheffe's post hoc test within jumpers at different times of the day showed no significant difference.

It is concluded that among athletes differences in hamstring flexibility was noticed at different times of the day. However, flexibility during daytime remained unaltered in jumpers, since significant difference was not detected at different times of the day.

5.2.5 AGILITY

The agility of the sprinters, jumpers and throwers recorded peak performance at 18:00 hours. Interaction was found to be significant at 0.05 level of confidence. Scheffe's post hoc test between the groups clearly showed that

sprinters outclass jumpers and throwers at 06:00, 09:00, 12:00, 15:00 and 18:00 hours. In Scheffe's post hoc test within sprinters, jumpers and throwers at different times of the day showed no significant difference agility.

It is concluded that among athletes differences in agility was noticed at different times of the day. However, agility performance during daytime remained unaltered, since significant difference was not detected at different times of the day.

5.2.6 ANAEROBIC POWER

The anaerobic power of the sprinters, jumpers and throwers recorded peak performance at 18:00 hours. Interaction was found to be significant at 0.05 level of confidence. Scheffe's post hoc test between the groups clearly showed that sprinters outclassed jumpers and throwers at 06:00, 09:00, 12:00, 15:00 and 18:00 hours. In Scheffe's post hoc test 2 within sprinters and jumpers at different times of the day showed a significant difference anaerobic power.

It is concluded that among athletes differences in anaerobic power was noticed at different times of the day. However, anaerobic power performance during daytime fluctuated, since significant difference was detected at different times of the day.

5.2.7 GLUCOSE

The glucose level of the sprinters, jumpers and throwers recorded peak performance at 15:00 hours. Interaction was not found to be significant at 0.05 level of confidence. However, different times of the day showed significant difference irrespective of groups.

5.2.8 TOTAL CHOLESTEROL

The total cholesterol level of the sprinters, jumpers and throwers recorded peak performance at 15:00 hours. Interaction was not found to be significant at 0.05 level of confidence. However, different times of the day showed significant difference irrespective of groups.

5.2.9 TOTAL PROTEIN

The total protein level of the sprinters, jumpers and throwers recorded peak performance at 18:00 hours. Interaction was not found to be significant at 0.05 level of confidence. However, different times of the day showed significant difference irrespective of groups.

5.2.10 SODIUM

The level of sodium in the sprinters, jumpers and throwers recorded peak performance at 18:00 hours. Interaction was found to be significant at 0.05 level of confidence. Scheffe's post hoc test between the groups clearly showed that jumpers had greater sodium level at 12:00 and throwers had greater level 18:00. In Scheffe's post hoc test within sprinters, jumpers and throwers at different times of the day showed a significant difference on sodium.

It is concluded that among athletes differences in sodium was noticed at 12:00 and 18:00 hours. However, sodium during daytime fluctuates in sprinter, jumpers and thrower, since significant difference was detected at different times of the day.

5.2.11 CALCIUM

The level of calcium in the sprinters, jumpers and throwers recorded peak performance at 15:00 hours. Interaction was found to be significant at 0.05 level of confidence. Scheffe's post hoc test between the groups clearly showed that sprinters had greater calcium level at 15:00 hour. In Scheffe's post hoc test within sprinters and throwers at different times of the day showed a significant difference on calcium.

It is concluded that among athletes differences in calcium was noticed only at 15:00 hour. However, calcium during daytime fluctuates in sprinter and thrower, since significant difference was detected at different times of the day.

5.2.12 SOD

The SOD level of the sprinters, jumpers and throwers recorded peak performance at 18:00 hours. Interaction was not found to be significant at 0.05 level of confidence. However, different times of the day showed significant difference irrespective of groups.

5.2.13 TBARS

The level of TBARS in the sprinters, jumpers and throwers recorded peak performance at 15:00 hours. Interaction was found to be significant at 0.05 level of confidence. Scheffe's post hoc test between the groups clearly showed that sprinters had greater TBARS level at 18:00 hour. In Scheffe's post hoc test within sprinters, jumpers and throwers at different times of the day showed a significant difference on TBARS.

It is concluded that among athletes differences in TBARS was noticed only at 18:00 hour. However, TBARS during daytime fluctuates in sprinter,

jumpers and thrower, since significant difference was detected at different times of the day.

5.3. RECOMMENDATIONS

The outcome of the present investigation may gratify to the demands for augmentation of sports performance and health by suggesting the following recommendations.

1. Sports performance is mostly correlated with core temperature. Measuring the magnitude of alteration in core temperature during daytime would have made the results more meaningful.
2. The heart rate has to be measured 24 hr continuously to assess the training status of athletes.
3. Maximum oxygen consumption of athletes has to be measured since its impact on biochemical variables is greater.

The following are the suggestions made by the present investigator for further research in this area:

1. Same study may be repeated by employing large sample of students.
2. Similar study may be conducted by selecting other physiological variables.
3. Same type of study may be done in other area such as national level players.
4. Similar study may also be conducted on various age groups.
5. Similar study may also be conducted on female athletes.