CHAPTER III

PROCEDURE

In this chapter selection of subjects, selection of variables, criterion measures, collection of data, reliability of data administration of test and statistical technique for the analysis of data has been described.

Selection of the subjects

The subject for this study was from Lakshmibai National Institute of Physical education, Gwalior (MP). Those subjects were selected for the studies who have participated in All India inter university football championship for a number of times. These subjects underwent a similar training, diet in institute mess and resided in the institute boy’s hostel. A total of five subjects were selected. The age of the subjects ranged from 18 to 25 years.

Selection of variables

Based on literary evidence, correspondence with the expert and the scholar’s own understanding lactic acid which was one of the important factors in determining the performance of the players was selected for this study.
Criterion Measures

The selected lactic acid level was measured by the analysis of the blood samples by a professional biochemist. The obtained score was recorded in mg/100 ml.

The age of the subjects was obtained from the subjects information and recorded in years.

The resting heart beat of the subject was recorded in beats per minute by a manual method over a period of one minute. The Heart beat during the working zone was also recorded in beats per minute by a manual method over a period of 10 seconds. The obtained score was multiplied by 6 in order to convert in minute.

Collection of data

As it is known that Lakshmibai National Institute of Physical Education, Gwalior (Deemed University) (MP) comprises football players from all over the India. Players could be seen from Northeast, South, and West and from North. Thus the coach and subjects were consulted personally and their sincere co-operation was solicited. Data was taken at Institute laboratory when they were not busy and have enough time to spare for
testing. Necessary instruction was passed on to the subject before the administration of each test. Confidentiality of response was guaranteed.

Five days were utilized for conducting the tests to ensure uniform testing condition. The subjects were tested only during morning session. The first day Resting Heart Rate was recorded in beats per minute. The age of the subjects were collected as mentioned by the subjects. The maximum heart rate was calculated by using the Algebraic formula of (220-age). The algebraic analysis of heart was performed in order to avoid mental exhaustion of the subjects. It was realized that the subjects often avoided those situations which provide them total fatigue.

The blood lactate at resting condition was collected on the first day itself. Moreover, on the second day, blood lactate at 25% intensity of maximum heart rate was collected. With 50% intensity of maximum heart rate blood lactate was collected on third day. On the fourth day 75% of maximum heart rate and lastly on fifth day 90% of maximum heart rate the blood lactate was recorded. Confidentiality of response was guaranteed.

**Reliability of Data**

In order to ensure that the investigator was well versed with the technique of conducting the test, the investigator had a number of practice sessions in testing. The selected blood lactate variable was
analyzed by a professional biochemist. Thus the data was considered reliable.

**Calculation of Maximum Heart rate**

Studies have shown that Maximum Heart rate on a treadmill was consistently 5-6 beats higher than on bicycle ergometer and 2-3 beats higher on a rowing ergometer. To determine the maximum heart rate $217 - (0.85 \times \text{age})$ which combines the Miller formula with the research from Londeree and Moeschberger was used. Three beat was subtracted for elite football players under 30.

**Calculation of zone value (intensities)**

The calculation of a zone value, $X\%$ was performed in the following way:

1. Subtract Resting Heart rate (RHR) from the Maximum Heart rate (MHR) for Working Heart rate (WHR)
2. Calculate the required $X\%$ on the WHR giving “$Z$”
3. Add “$Z$” and the RHR together to give the final value.

For example: The subjects MHR was 180 and RHR was 60-

determine the 75 % value.

- $\text{MHR-RHR}=180-60=120$
- $75\%$ of 120 = 90
• 90+RHR=90+60=150 bpm

Training Zone

1. 25% of maximum Heart rate
2. 50% of maximum Heart rate
3. 75% of maximum Heart rate
4. 90% of maximum Heart rate

Thus when the heart rate of the subjects reached a value of 25%, 50%, 75% and 90% of maximum Heart rate the blood samples were collected from the cubital vein near the anticubital space.

Procedure for administration of Test

Lactic acid

All the data for lactic acid was measured by the analysis of the blood samples by a professional biochemist. The blood samples were collected from the cubital vein near the anticubital space with the help of disposal syringes. The samples were collected at rest (0% intensity), 25%, 50%, 75% and 90% of maximum effort. The analysis of the sample was being done in the clinic of a biochemist.
Resting heart rate

The resting heart rate of each of the subject was recorded between 6.00 and 8.00 am. Before recording the resting heart rate, the subjects were instructed to remain lying on their beds. To record the heart rate, the pulse was palpated at the radial artery for one full minute. The score was expressed in terms of number of pulse beats per minute.

Statistical Techniques Employed for the Analysis of Data

To determine the lactic acid kinetic during a standardized exercise the mean and standard deviation was used. To compare lactic acid levels at different levels of maximum effort, one way analysis of variance (F- ratio) was applied at .05 level of significance.