Chapter - V

Summary, Conclusions and Recommendations
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SUMMARY

5.1 Introduction

Nutrition is the science of the foods, the nutrients and other substances therein, their action, interaction and balance in relationship to health and disease; the processes by which the organism ingests, digests, absorbs, transports and utilizes nutrients and disposes of their end products. In addition, nutrition is concerned with social, economic, cultural and psychological implications of food and eating in short, nutrition science is the area of knowledge regarding the role of food in the maintenance of health.

As a saying goes “Eat to Win” proper nutrition plays a major role maximizing everyone’s ability to maintain higher levels of physical activity. Behind each spectacular performance there is a systematic and careful management of eating habits. Many factors affect nutrient needs and its availability, including the sportsmen’s physical condition, nutritional status, age and genetic background. Diets do not create strong bodies or increase speed, strength, power and endurance but they come
only through training. The diet mostly provides the necessary raw materials that allow the training to build and run the human machine. (Chandra Sekar, 1989). Therefore good, well balanced nutrition plays a vital role to optimal performance of a sportsman.

Protein plays an important role in the diet of a sportsman, nature of protein taken is also important and current emphasis is to include foods rich in leucine, isoleucine, and valine. Athletes who are protein deficient may complain about having fingernails that grows slowly and break easily. Female athlete who eat a protein – poor diet may also have irregular menstrual cycle (Goyal, 2004). The protein needs vary, depending on whether an athlete is growing, rapidly building new muscle, doing endurance exercise or dieting in which case protein requirements of sportsmen are higher than the current RDA of 0.4g of protein per pound of body weight which is based on the needs or non-exercise (Zawadzkl 1992).

5.2 Procedure

The purpose of the study was to find out the effect of protein supplementation on physical, physiological and biochemical variables among sports school athletes, volleyball and basket ball players. To achieve the purpose forty-five sports school students were selected. The
selected subjects were divided into three equal groups, each group consisted of 5 athletes, 5 basket ball and 5 volley ball players. Experimental group I took whey protein and experimental group II took casein protein and group III acted as a control group. The subjects were tested on selected criterion variables such as speed, muscular endurance, muscular strength, cardio respiratory endurance, fat free body weight, blood pressure, vital capacity hemoglobin and serum protein. The Two way analysis of covariance was used to find out the significant difference if any, among the experimental groups and the control group on selected criterion variables separately. F ratios were computed to assess the variation on supplementation groups to assess the variation on game and for the interaction. In all the cases, 0.05 level of confidence was fixed to test the significance which was considered as appropriate. It the ‘F’ ratio was found to be significant Scheffé’s post hoc test was administered to find out which of the paired adjusted mean difference was significant.

5.3 Findings

The result of the study reveal that there is significant difference among the whey protein group, casein protein group and control group irrespective of game in the variable, speed. But there is no significant difference among the volleyball player basketball players and athletes irrespective of group.
The results indicate that the athlete of casein protein group had significant improvement in speed than the basketball player of casein protein group. There is no significant difference existed among the other paired means in speed either in whey protein group or casein protein group. The volley ball players, basketball players, and athletes who took whey protein and casein protein had significant improvement in speed than their control group and also the basketball players who took whey protein had significant improvement than the basketball players who took casein protein in speed.

The result of the study indicates that there is significant difference existed among the whey protein group casein protein group and control group irrespective of the game in muscular endurance. And also significant difference existed among the volleyball players, basketball players and athletes control group irrespective of group.

Volleyball players who took whey protein had significant improvement in muscular endurance than the basketball players and athletes who took whey protein. Volleyball players who took casein protein had significant improvement in muscular endurance than the basketball players and athletes who took casein protein. There is no significant difference between basketball players and athletes either in whey protein group or casein protein group.
Whey protein group volleyball players had significant improvement in muscular endurance, than the casein protein group and control group volleyball players. The casein protein group volleyball players had significant improvement in muscular endurance than the control group.

Whey protein group, basketball player had significant improvement in muscular endurance than the casein protein group and control group basketball players. The casein protein group basketball players had significant improvement than their control group.

Whey protein group athletes had significant improvement in muscular endurance than the casein protein group and control group athletes. The athletes of casein protein group had significant improvement than their control group.

The result of the study indicates there is significant difference among the whey protein group, casein protein group and control group irrespective of the game in cardiovascular endurance. Also there is significant difference among the volleyball players, basketball players and athletes irrespective of the game.

Volleyball players and athletes who took whey protein had significant improvement in cardiovascular endurance than the basketball
group. There is no significant difference among the other paired means in whey protein, casein protein and control group.

Whey protein group volleyball player had significant improvement in cardiovascular endurance than the casein protein group and control group. And the casein protein group volleyball player had significant difference between whey protein and casein protein group.

Whey protein group athletes had significant improvement then the control group. Also the whey protein group athletes are better than the casein protein group basketball player in cardiovascular endurance.

The result of the study indicates that there is significant difference existed among the whey protein group casein protein group and control group irrespective of the game in diastolic blood pressure. And there is no significant difference existed among the volleyball player, basketball player and athletes irrespective of group.

Volleyball players who took casein protein had significant reduction in diastolic pressure than the athletes. There is no significant difference among the volleyball player, basketball player and athlete in whey protein group and control group and between basketball player and athlete and between basketball player and athletes in casein protein group.
Whey protein group volleyball players and casein protein group volleyball players had significant reduction in diastolic blood pressure than control group.

Whey protein basketball group had significant reduction in diastolic blood pressure than the control group. There is no significant difference between the other group basketball players and among the three groups athletes.

**Systolic Blood Pressure**

The result of the study indicates that there is significant difference among the paired means of whey protein group, casein protein group and control group irrespective of the game in systolic blood pressure. There is no significant difference among the volleyball players, basketball players and athletes irrespective of group in systolic blood pressure. Also there is no significant difference among the volleyball players, basketball players and athletes irrespective of group in systolic blood pressure. Also there is no significant difference among the paired means of group and game interaction.
Serum Protein

The result of the study indicates that there is no significant difference in serum protein among the whey protein group, casein and control group irrespective of game. There is no significant difference among the volleyball players, basketball players and athletes who took whey protein.

In casein protein group volleyball players, basketball players and athletes had equal level in the improvement in serum protein.

Whey protein group volleyball players and casein protein group volleyball players had significantly improved than the control group in serum protein. Also whey protein group volleyball players had significant improvement than the control group.

Whey protein group basketball players and casein protein group basketball players had significant improvement in serum protein than the control group.

Whey protein group athletes and casein protein group athletes had significant improvement in serum protein than control group. But both whey protein group athlete and casein athletes had similar improvement in serum protein.
Strength

The result of the study indicates, that there is significant difference among the whey protein group, casein protein group and control group in strength irrespective of game. There is also significant difference among the volleyball players, basketball players and athletes in strength irrespective of group. Volleyball players who took whey protein had significant improvement than the basketball players in strength and athletes who took casein protein had significant improvement than the basketball player. There is no significant improvement in strength among the paired means in control group. Whey protein group volleyball players, basketball players and athletes had significant improvement than the casein protein and control group. Volleyball players, basketball players and athletes. Also whey protein group volleyball players, basketball players and athletes are better than casein protein group volleyball players, basketball players and athletes respectively.
Hemoglobin and Fat Free Body Weight

The result of the study indicate that there is significant difference among the whey protein group casein protein group and control group in hemoglobin and fat free body weight irrespective of game.

There is no significant difference among the volleyball player, basketball player and athlete irrespective of group in hemoglobin and fat free body weight. There is also no significant difference among the paired means of group and game interaction in hemoglobin and fat free body weight.

Vital Capacity

The result of the study indicates that there is no significant difference in vital capacity among the whey protein group casein protein group and control group irrespective of game. There is no significant difference among the volleyball players basketball players and athletes irrespective of group.

Athletes who took whey protein had significant improvement than the volleyball players in vital capacity. There is no significant
difference between volleyball players and basketball players and between basketball players and athletes who took whey protein.

Whey protein volleyball player and casein protein volleyball players had significant improvement than the control group volleyball players in vital capacity. There is no significant difference between volleyball players and basketball players and between basketball players and athletes who took whey protein.

Whey protein group volleyball player and casein protein group volleyball player had significant improved than the control group in vital capacity.

Whey protein group basketball players and casein protein group basketball players had significant improvement than control group. There is no significant difference between casein protein group basketball group and control group.

Casein protein athletes had significant improvement than the control group athletes in vital capacity. There is no significant difference between whey protein athletes and casein protein athletes and between whey protein athletes and casein protein athletes and between whey protein athletes and carbon starch.
5.4 Conclusions

From the results of the study the following conclusions were drawn.

1. Significant difference was found among the paired means of whey protein group, casein protein group and control group irrespective of the game in physical variables of speed, cardiovascular endurance, muscular endurance, strength, fat free body weight, in physiological variables of systolic blood pressure, diastolic blood pressure and vital capacity and biochemical variables of hemoglobin.

But there was no significant difference in the variable serum protein.

2. Significant difference was found among the paired means of volleyball players, basketball players and athletes irrespective of group in the physical variables of cardiovascular endurance, muscular endurance and strength and biochemical variables of serum protein. However there was no significant difference in the physical variables of speed and fat free body weight, in the physiological variables of systolic and diastolic blood pressure and biochemical variables of hemoglobin.
3. Significant difference was found among the paired means of groups and games interaction in the physical variable of speed, muscular endurance, cardiovascular endurance, vital capacity, strength, diastolic blood pressure and serum protein. There was no significant difference in the variables of systolic blood pressure, hemoglobin and fat free body weight.

4. Volleyball players, basketball players, and athletes had equal level of improvement due to whey protein supplementation in speed, and equal level of reduction in diastolic blood pressure. Volleyball players had significant improvement than athlete and basket ball players in muscular endurance and strength. They had significant improvement than basketball players in cardiovascular endurance also. Athletes had significant improvement than the basketball players in cardiovascular endurance and strength and than volleyball players in serum protein and strength. Basketball players had significant improvement than volleyball players in vital capacity.

5. Volleyball players, basketball players and athletes had equal level of improvement due to casein protein supplementation in cardiovascular endurance, serum protein and vital capacity. Volleyball players had significant improvement than the athletes in
muscular endurance and diastolic blood pressure. Basketball players had significant improvement than athletes in strength. Volleyball players had significant improvement than basketball players in muscular endurance and strength. The athletes had significant improvement than basketball players in speed.

6. The whey protein supplementation volleyball group had significant improvement than the control group in speed, cardiovascular endurance, muscular endurance, strength, vital capacity, and serum protein and significant reduction in diastolic blood pressure. It had significant improvement than the casein protein group in muscular endurance, cardiovascular endurance and strength. The casein protein supplementation volleyball group had significant improvement than the control group in speed, vital capacity, cardiovascular endurance, strength and serum protein and significant reduction in diastolic blood pressure. The Casein protein volleyball group had significant improvement than whey protein group in serum protein.

Whey protein group had no significant improvement than the casein protein group in speed, diastolic blood pressure, vital capacity and serum protein. The casein protein group had no significant improvement than the control group in muscular endurance and
cardiovascular endurance and no significant reduction in systolic blood pressure and fat free body weight.

7. The whey protein supplementation basketball group had significant improvement than the control group in speed, cardiovascular endurance, muscular endurance, strength, vital capacity and serum protein and significant reduction in diastolic blood pressure. It had significant improvement than the casein protein supplementation group in speed, strength, vital capacity and muscular endurance.

The casein protein supplementation basketball group had significant improvement than the control group in cardiovascular endurance, muscular endurance, serum protein and strength and had no significant improvement in speed and diastolic blood pressure.

8. The whey protein athletes had significant improvement than the control group in cardiovascular endurance, muscular endurance, strength, speed and serum protein but had no significant improvement in speed, and no significant reduction in diastolic blood pressure. The whey protein group had significant improvement than the casein protein group athletes in muscular endurance and cardiovascular endurance and strength, but had no
significant difference in speed, vital capacity diastolic blood pressure and serum protein.

The casein protein supplementation athletes had significant improvement than the control group in speed, serum protein cardiovascular endurance, muscular endurance, strength and vital capacity but had no significant reduction in diastolic blood pressure.

5.5 Recommendations

Further studies could be done still more elaborately with the following recommendations in mind.

1. The present study can be carried out for a long period to achieve better biochemical and physiological results.

2. Similar ventures with other age group events, and sex can be done to find out the efficiency of this supplementation.

3. An indepth analysis can be carried out in the field of performance test, where the efficiency of the supplements on specific event could be found out.

4. Nutrition education should be included in the training of coaches and players, which is essential for better stamina and performance in the players.