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Comparison of Serum Protein Levels Between Inter-University Soccer Players and Non-Sports Persons of Punjab

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ABSTRACT

The human body undergoes a variety of physiological and biochemical changes as a result of regular exercise and competitive sports engagement. Blood biochemical markers are frequently utilized to evaluate an individual's physiological state and to comprehend the impact of consistent exercise and sports involvement. Serum proteins are crucial markers of nutritional status, fluid balance, protein metabolism, and various physiological processes related to tissue growth, repair, transport, and immunological function. Albumin and globulins make up the majority of total serum protein and are crucial for preserving proper bodily balance. The study aimed to diagnose the Serum Protein level of soccer players in comparison to non-sports persons who are an inter-university player of Punjab. A random sampling method was used to select forty (N = 40) male participants. The sample consists of soccer players (n =20) and non-sports person (n = 20). The serum protein was

assessed among the group by using the Erbachem Manheim Chem 5 Plus V2 semi auto Biochemistry analyser. An independent samples t-test was performed to compare serum protein levels between Soccer Players and Non-Sports Persons. The analysis revealed that the comparison of serum protein levels between soccer players and non-sports persons. The soccer players (n = 20) had a higher mean serum protein level (M = 7.095, SD = 0.629, SEM = 0.141) than the non-sports persons (n = 20), who had a mean serum protein level of 6.700 (SD = 0.467, SEM = 0.104). Although the mean value was higher among soccer players, the independent-samples *t*-test indicated that the difference between the two groups was **not statistically significant** ($t = 2.25$, $p = 0.125$; $p > 0.05$). The higher mean serum protein concentration observed in soccer players may be attributed to regular physical training, improved nutritional status, and physiological adaptations associated with athletic activity. Additionally, the relatively low standard deviation and standard error in both groups indicate that the serum protein values were fairly consistent within each group.

Introduction

Protein is a class of nitrogen-containing compounds formed by amino acids (**Wilmore & Costil, 2004).** A total protein test measures the amount of protein in your blood. Nutrition plays a significant role as a major donor to an athlete's overall sports performance. The foremost role of sports nutrition is to "support" the training program. So, eating good amount as well as good type of nutritious food will enhance performance and change as the training regimen changes. Poor nutrition can lead to injury, fatigue and poor recovery, all three of which can hinder how well an athlete performs. A healthy diet and a performance diet are not that different from one another. Protein is needed for nutrient allocation in the blood, connective tissue support and the reparation of tissue in response to periods of exercise **(Kaur, 2020)**.

According to **(Wilmore & Costil, 2004)** Protein unlike carbohydrates and fats contains nitrogenous in summation to carbon, oxygen and hydrogen. Each and every cell require protein factually; Proteins are found throughout the body with muscle tissue being the major location. Protein don't liberate energy but instead they are considered to be construction blocks of the tissue. Proteins provide the elementary material

that is essential for muscle functioning. The normal range is 6.0 to 8.3 grams per deciliter (g/dL) or 60 to 83 g/L. Range: The normal range for total protein is between 6 and 8.3 grams per deciliter (g/dL).

Exercise and proper amount of Protein is considered to be a protective factor that can lower the chances of osteoporosis, (**Bellver *et al.,* 2019).** Non-sportspersons or sedentary lifestyle individuals shows lower protein levels and bone mineral density due to the absence of mechanical bone loading. Inactivity reduces the stimulation of osteoblasts, leading to bone resorption exceeding formation **(Kohrt et al., 2004)**. Consequently, non-active individuals are more prone to osteopenia and osteoporosis compared to physically active populations.

Material and Methods

Study Participants

In this study, Total forty (N = 40) male university-level participants from Punjabi University, Patiala, India, were selected using a random sampling technique. The participants included (n = 20 soccer Players, and (n = 20) non-sports person. All aged ranging between 18 and 25 years and all participants are national as well as interuniversity players in their respective sports

Operational Definitions

Protein: Protein is a class of nitrogen-containing compounds formed by amino acids. (**Wilmore & Costil, 2004)**

Non-Sports Persons: A non-sportsperson refers to a person who does not take part in regular sports or athletic activities and leads a comparatively inactive lifestyle. **(Singh & Verma, 2021)**

Soccer: soccer is a team sport that is played in an outdoor field and requires a high standard of preparation through the development of physical performance skills, as well as tactical and technical expertise, in order to complete 90 minutes of competitive play. (**Joksimovic et al. 2015)**

Inclusive and exclusive criteria

The participants included in the study were apparently healthy and free from any musculoskeletal problems. This study included only those athletes who had participated in interuniversity level competition in their respective sports

Analysis and Interpretation

Test procedure

To assess the participant's biochemical profile. Prior to blood collection, all participants were instructed to maintain an overnight fast of approximately 10-12 hours and to avoid strenuous physical activity for at least 24 hours. Blood samples were collected between 9:30 a.m. And 2:00 p.m. (**Ramezani et al. 2026**). Data was collected from 40 male athletes of Punjab. All the subjects were male athletes who were associated with different sports domain. The necessary data was collected through the administration of standardized instruments for the measurement of chosen variables. The test was conducted at the physiology lab in the Department of Physical Education, Punjabi University, Patiala. All the queries of the participant were answered and test administration was clearly defined to the participants before proceeding for the blood sampling. In Blood sampling, First of all, investigator advised an athlete to sit in a comfortable position on the chair. The phlebotomist cleans the site with an antiseptic to kill germs. After that phlebotomist places a tourniquet or elastic band around the upper arm to squeeze the vein and make it swell with blood (**Nikolaidis et al. 2003)** Venous blood is collected via venipuncture, Venous blood samples will be collecting into plain evacuated tubes from a forearm vein with minimal stasis after approximately10 min of rest in a sitting position. And the sample is processed in a clinical laboratory with appropriate quality control procedures **(Mathew et al. 2026)** An aliquot of each sample was immediately mixed with EDTA solution to prevent clotting for hematology. The rest of the sample was left to coagulate for 30 min at room temperature and was centrifuge it at 3000 rpm for 10 minutes and then separate the serum. The serum was stored at ±20 Degree Celsius **(Joksimovic, A et al., 2015) (Trinder P, 1969) , (Marakala et al., 2012)**

Procedure

Administration of the test:

Objective: To measure Serum protein of Soccer players and non-sports persons.

Equipment required: Erba Chem – 5 V_2 Plus Analyzer, Incubator, Centrifuge Machine, Needle Cutter, Test Tubes (Ria vials), Disposable Syringes, Cotton, Spirit, Test tube Stands, Distilled water, Hypochlorite Solution (HCL), Tourniquet, Auto Pipettes, Micro tips, Pen, Copy.

Reagents: 1. Biochemical Reagent
2. Biochemical Standard.

Procedure

1. Approximately 3–5 ml of venous blood was collected under aseptic conditions into a plain blood

collection tube.

2. The blood sample was allowed to incubate in incubator machine for at least 10 minutes
3. The clotted blood sample was centrifuged at approximately 3000 rpm for 10 minutes (or according to the laboratory's standard operating procedure) to separate the serum from the blood clot.
4. The clear serum was carefully transferred into a clean sample tube or sample cup for biochemical analysis.
5. Three clean, dry test tubes were labelled as Blank (B), Standard (S), and Test (T).
6. The working reagent was added to each tube according to the manufacturer's instructions.
7. Distilled water was added to the Blank, biochemical standard to the Standard, and the separated serum sample to the Test tube.
8. The contents of each tube were mixed gently and incubated at 37°C for 10 minutes (or as recommended in the reagent kit insert).
9. The reaction mixture was analyzed using the **Erba Chem-5 V2 Plus Fully Automated Clinical Chemistry Analyzer**. The analyzer measured the absorbance at **505 nm** and automatically calculated the glucose concentration.
10. The result was displayed by the analyzer in **mg/dl** and recorded for statistical analysis. **(Trinder P, 1969) , (Marakala et al., 2012) (Schumann et al. 2002) (Burstein et al. 1970) ,(Lippi & Plebani, 2020**

Analysis and interpretation

The data was carefully recorded and descriptive statistical technique t test was employed to analyze the difference between the groups; the level of significance was set at 0.05. The study found that there exists a Statically insignificant difference in protein content between soccer players and non-sports persons.

Table 1. Comparison of Serum Protein Levels Between Soccer Players and Non-Sports Persons

Variable	Group	n	Mean (M)	SD	SEM	t-value	p-value

Serum Protein	Soccer Players	20	7.095	0.629	0.141	2.25	0.125
	Non-Sports Persons	20	6.700	0.467	0.104		

Table 1. represents the comparison of serum protein levels between soccer players and non-sports persons. The soccer players (n = 20) had a higher mean serum protein level (M = 7.095, SD = 0.629, SEM = 0.141) than the non-sports persons (n = 20), who had a mean serum protein level of 6.700 (SD = 0.467, SEM = 0.104). Although the mean value was higher among soccer players, the independent-samples *t*-test indicated that the difference between the two groups was **not statistically significant** ($t = 2.25$, $p = 0.125$; $p > 0.05$). This is to be found that there was no significant difference in serum protein levels between soccer players and non-sports persons.

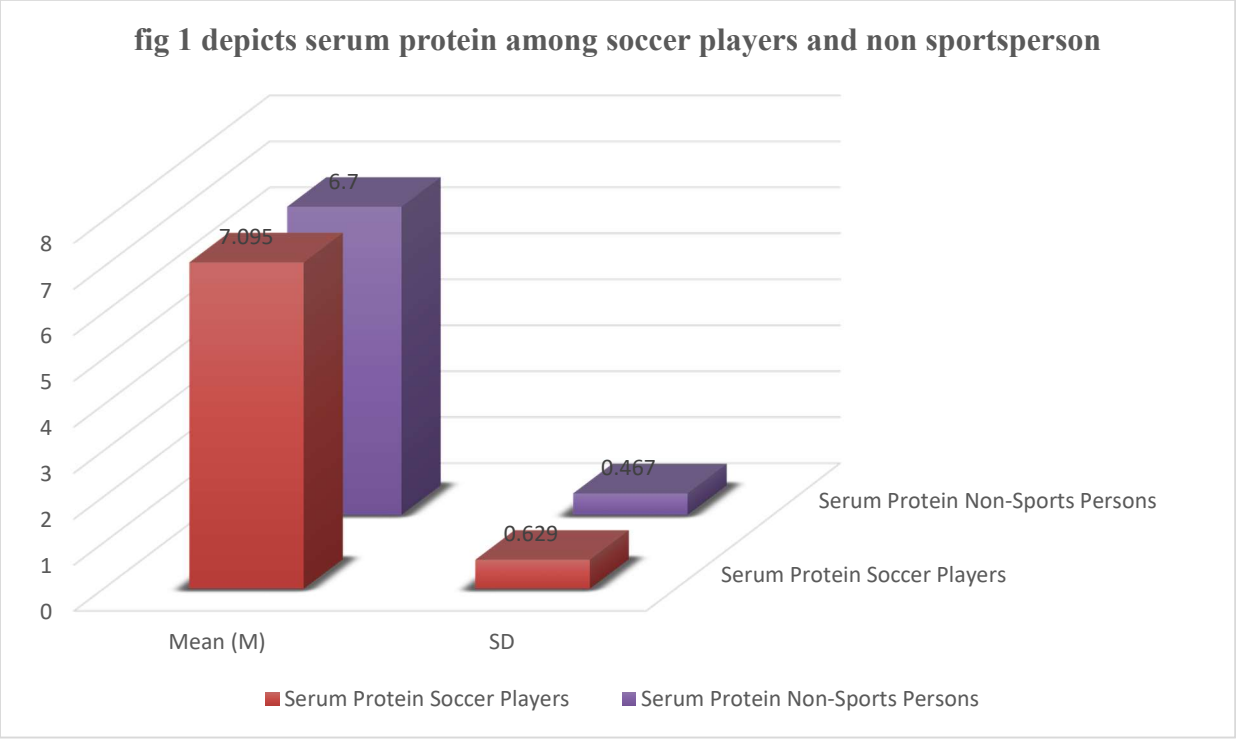

Figure:1 Depicts the comparison of serum protein levels between soccer players and non-sports persons

Discussion of the finding

It is found statistically insignificant difference in the serum protein level among soccer players and non-sports person

These findings of **(Maughan & Shirreffs, 2007; McKenzie, 2010).** Suggested that total protein levels may be maintained within a relatively stable range irrespective of the type of physical activity, aligning with previous evidence that serum total protein is more strongly influenced by hydration status and nutritional intake rather than the specific sports discipline. **The study conducted by Siahkouhian & Esmaeilzadeh, 2011) also supported my study. The results are aligning with** no significant difference in blood markers (including serum protein, CRP, uric acid, WBC, etc.) between soccer players and non-athletes overall — despite soccer players having significantly higher VO2max (fitness) and significantly lower body fat percentage.

In addition, soccer players generally have healthier dietary habits and higher nutrient intake than sedentary individuals because of greater awareness of sports nutrition. Adequate protein intake is essential for muscle contraction, nerve conduction, bone mineralization, and recovery from training. Consequently, physically active individuals are more likely to maintain optimal protein status than non-sports persons, especially when nutritional intake is sufficient **(Thomas, Erdman, & Burke, 2016).**

On the other hand, because they lead sedentary lives, non-athletes may have lower amounts of mechanical stimulation to the skeleton. Over time, reduced physical activity may lead to less favorable protein metabolism and is associated with poorer bone remodeling activity..

Overall, the results indicate that, in contrast to a sedentary lifestyle, regular soccer involvement, along with a healthy diet and weight-bearing exercise, may promote protein metabolism, muscle recovery in addition to bone health.

Conflict of interest

The authors declare no conflicts of interest.

Acknowledgement

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