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Comparative study of sodium concentration in the blood of different level football players in Haryana

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Abstract

Background: For serious competitive athlete concerns about energy go beyond health or desirable physical activity. It is imperative that energy intake supports the training and competitive schedule which will allow the athlete to achieve his personal best. Maintaining adequate energy levels, weight loss and weight gain can have profound consequence and significance. Coaches, athletes and sports scientists are all interested in fulfilling the energy requirement of athlete more adequately. The purpose in the present study had made an attempt to find out the concentration of sodium (important serum electrolyte) in the blood of districts, states and national level footballers in Haryana state.

Material and Method: To fulfill the purpose of study total blood sample of 120 at different level footballers (age 17 ± 2 year, range 15-19 years) has been collected. For the collection of blood sample the investigator has visited various tournaments i.e. district level football competition (open & school), state level football competition (Haryana senior state & school sports), and Haryana senior national coaching camp & Haryana Olympic championship with the help of trained technician. Statistical technique "t" was used to compare the data. Level of significance was at 0.01 level.

Results: After analysis the data no significant difference between concentration of sodium present in the blood of district level and state level football players. Where a significant difference was found between district level and national level players as in the both groups, the mean difference is in favor of national level players. Similarly a significant difference was found in the concentration of sodium in between state level and national level football players. Again the mean difference is in favor of national level players. So we can conclude that football players participating at national level are having significantly better concentration of sodium in their blood as compare to district level and state level football players. We can also conclude that as the level of performance improve the concentration of sodium also improve in their blood serum.

Keywords: sodium concentration, level of participation, football players.

Introduction

Numerous diet surveys have been carried out throughout India on different games and sports, which suggest the need of adopting systematic approach of diet intake and training of athletes. For adopting this systematic approach; there is a need to find the nutritional status of our player which can be well judged with the analysis of blood constituent of athletes. Blood is the medium in our body which transport oxygen, carbon dioxide, nutrition's, hormones and metabolic waste products from one part to another. These blood constituents like vitamins, protein, minerals, glucose and hemoglobin play vital role in the performance of an athlete; where minerals are organic substances that neither supply energy nor contribute to the body's mass but that serve crucial functions in almost all body process. Whereas about 4% of the body's weight is composed of 22 elements called minerals.

Minerals are a part of enzymes, hormones and vitamins; they are found in muscles, connective tissues and in all body fluids. Among these minerals K^+ , Na^{++} and Ca^{++} play much vital role in our body. The primary function of these minerals is in metabolism, where they serve as important part of regulatory enzymes. Different studies suggest that concentration of these minerals in the blood of sportsman is much higher than non-sportsman.

Football is a team game, in which participants compete with each other in various aspects. It is a matter of great challenge among the coaches and both the teams that how to maintain balance between training and diet. Till now lots of work has been done on the psychological and

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physical aspect but rare work is done on the nutritional status present in the blood.

Sodium

Sodium is an element which was firstly isolated by an English chemist in 1807 with the help of method called electrolytes from sodium hydroxide. Sodium is found in adult human body in extra cellular fluid, tissue, cells and bones. Human bodies contain about 100g of sodium ion. This quantity is found 50% in extra cellular fluid and remaining 50% in tissue, cell and bones. Chloride, bicarbonate, phosphate, lactate and protein ate are some ions anions that sodium ion exists in body association. It regulates the acid base balance in the body. Osmotic pressure of tissue fluids and plasma, protect the body against excessive fluid loss initiation and maintenance of heart beat, conduct of nerve impulse, muscle contraction and absorption of amino acids from the small intestines.

Sodium is absorbed from the intestine and carried out to the kidney because kidney filters out and recalculate in the amount to maintain proper level. A mineral corticoid secreted by the adrenal cortex is aldosterone that controls sodium balance and regulates it in the body. When hyper secretion or sodium level raises the thrust receptor in the hypothalamus stimulate the thrust sensation. When hypo secretion or sodium level is lower the exertion of sodium through the urine is decreased.

Football

Football is an art of tackling the task with ball and main objective is doing the score on opponent team. Proficiency in the game demands very high level of physical fitness. Excellent co-ordination in leg muscles, eyes with mind and strong psychological conditioning. Physical fitness can be presented in two aspects static (medical) and dynamic (physiological performance). Medical examination is the pre – requisite for the analysis of physical fitness. Medical examination as blood provides a medium in which various nutrients, hormone, waste products of metabolic reaction, etc. are carried out from one part to another.

Objectives

- To find out the concentration of selective electrolyte (sodium) in the blood of football players participating at different levels in Haryana.
- To find out difference in the concentration of selective electrolyte (sodium) in the blood of football players participating at different levels in Haryana.

Hypothesis

There exists a significant difference in the concentration of selective electrolyte in the blood of football players participating at different tournaments at various levels.

Delimitations

The study was confined to 120 football players aged between 15-19 yrs and further delimited to blood electrolytes (Na).

Limitations

The nutritional intake, heredity, lifestyle, training, and psychological traits of the subjects were beyond the control of research workers.

Definition of the terms used

Selective Electrolytes: It refers to sodium present in the blood.

Level of Participation: Football players participating at district, state and national level in Haryana state.

Significance of the study

The result of the study will provide guidelines for assessing the physical fitness of football players on the basis of concentration of electrolyte.

Result will provide knowledge about the effect of exercise on the electrolyte concentration present in the blood of football players.

Method and procedure

In the present study purposive sample method had been used for the collection of data. To fulfill the purpose of study total blood sample of 120 football players participating at different levels has been collected.

S. No.	Level of participation	No. of subjects
1	District level	40
2	State level	40
3	National level	40
	Total	120

Collection of data

For the collection of blood sample the investigator has visited various tournaments

1. District level football competition (open & school).
2. State level football competition (Haryana senior state & school sports).
3. Haryana senior national coaching camp & Haryana Olympic championship.

Statistical technique used

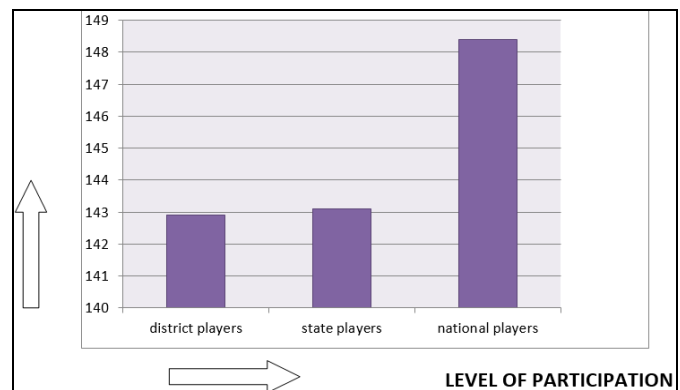
In order to analysis the data in the present study software of following statistically technique were used in computer.

- 1 Mean
- 2 Standard deviation
- 3 Standard error deviation (S.E.D)
- 4 T-test

Analysis of data

Mean concentration of serum sodium present in different categories.

S. No.	Categories	No. of subject	Sodium
1	District level	40	142.9 Eq/L
2	State level	40	143.1 Eq/L
3	National level	40	148.4 Eq/L



Significance of difference in the mean concentration of serum sodium between District level & State level football players.

Serum Electrolyte	No. of district level players	No. of state level players	Mean of 1 st group	Mean of 2 nd group	Mean Diff.	SD of 1 st group	SD of 2 nd group	S.E.D	T
sodium(Eq/L)	40	40	142.9	143.1	0.21	4.12	4.43	0.92	0.21

Not significant at any level

Significance of difference in the mean concentration of serum sodium between State level & National level football players.

Serum Electrolyte	No. of district level players	No. of state level players	Mean of 1 st group	Mean of 2 nd group	Mean Diff.	SD of 1 st group	SD of 2 nd group	S.E.D	T
sodium(Eq/L)	40	40	143.1	148.4	5.3	4.43	3.9	0.959	5.52*

*significant at 0.01 level

Significance of difference in the mean concentration of serum sodium between District level & National level football players.

Serum Electrolyte	No. of district level players	No. of state level players	Mean of 1 st group	Mean of 2 nd group	Mean Diff.	SD of 1 st group	SD of 2 nd group	S.E.D	T
sodium(Eq/L)	40	40	142.9	148.4	5.50	4.12	3.9	0.916	6.00*

*significant at 0.01 level

Discussion of result

On the basis of analysis of data no significant difference in the concentration of sodium present in the blood was found in between district level players and state level football players are having almost similar concentration of sodium in their blood as the t-value is not significant at any level. But the data was further compared for district level and national level football players the t-value was found to be significant and as the mean difference is in favor of national level players. It is concluded that football players participating at national level are having significantly better concentration of sodium in their blood when compared with district level players. Results of study show that concentration of sodium present in the blood of footballers improves when the level of performance is raised from district to national level. It has been found that vigorous exercise triggers a rapid and co-ordinate release of the hormones vasopressin, rennin and aldosterone, which reduce sodium and water loss through kidney. Sodium in our body regulates the acid-based balance in the body, osmotic pressure of plasma and tissue fluids, protect the body against excessive fluid loss, absorption of monosaccharide's and amino acid from the small intestines, initiation and maintenance of heart beat, conduction of nerves impulses, and muscle contraction. All these function in our body plays vital role during exercise hence sodium. Finding of present study is supported by Mohr *et al* (1977), Sohal *et al* (1987) [7]. Kaur (1992) [3], Gerth *et al* (2002) [1], Malik (2003) [4].

Conclusions

1. Football players who had represented their state in national tournament are having better concentration of sodium as compare to district and state level players.
2. Football players participating at district and state level are having almost same concentration of sodium in their blood.
3. As the level of performance and participation improve, the concentrations of sodium in Haryana state football player's blood also improve.

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