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Effect of variable-intensity exercise on glycaemic concentration in football players

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ABSTRACT:

The current study aims to shed light on the effect of the type of exercise used in terms of intensity on blood sugar concentration to improve the performance of football players. A sample of 6 players from Meshal Djelfa team underwent pre- and post-measurement. The study relied on the experimental method in this study, where the study addressed the direct relationship between the type of exercise and blood sugar levels and its effect on the performance of football players, where we found that the effect of low-intensity exercise was more effective compared to the other types of exercise.

Keywords: physical effort, variable intensity, concentration, blood sugar, football players

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1.Introduction:

Since football is a multifaceted sport, a player's performance is influenced by the interplay of their tactical, technical, mental, and physical skills. Every position on the field has unique qualities that change based on the coaching staff's requirements and technical-tactical orientations (offensive and defensive organization). Whether it is integrated, dissociated, or connected, physical preparation is crucial in modern football, as many top-level technicians agree. (Dellal Alexandre, Mars 2020, p. 03)

Over the past twenty years, the interest of sports sciences in football has significantly increased. The emergence of studies focused on football in the scientific literature dates back to the 1960 (Buhr, 1965). To this day, many authors have examined the analysis of football from physiological, athletic, psychological, sociological, and economic perspectives. (Grégory Vigne, 2011, p. 08)

Sports training leads to changes in blood as it does for any other body organ, and these changes are two types, including temporary, that is, temporary changes as a response to physical activity and then the blood returns to its state of rest, including relative continuity, which occurs in blood as a result of regular exercise for a certain period, leading to the adaptation of blood to the performance of physical training.

In the mathematical field, the number of red blood cells and hemoglobin are essential to athletes, and they must be taken care of and controlled at any deviation, because they affect the chemistry of muscle energy production, and one of the most important reasons for the rapid formation

of lactic acid that contributes to the rapid occurrence of muscular fatigue. (Hussein Ahmed Hashmat & Nader Mohamed Shelby, 2003, p.135)

One of these changes that occur in the blood is sugar, which is part of the body's response mechanism. The physiological and chemical laws by which functional and chemical changes occur must be recognised in order to help optimise and control the body's response to various sporting events.

Given the lack of focus on the functional and biochemical bases when developing training programmes for football players and its effective and important role in achieving the desired achievement. The researchers decided to study this scientific aspect according to modern principles in order to develop the level of achievement of football players and reach a good level.

Blood sugar is an important indicator to identify the level of physical and functional development as well as to understand the process of developing appropriate training programmes for football players.

By observing the rise and fall of blood sugar in football players, the effect of physical exertion during the training process can be known, which depends on working at different intensities according to energy regimes.

2.general question:

-Is glycaemia affected by the intensity of exercise used in footballers?

2.1.Partial questions:

Are there statistically significant differences between the pre-test and post-test in favour of the post-test?

Are there statistically significant differences between the post-test and the pre-test in favour of the pre-test?

3.General Hypothesis:

Blood sugar is affected by the intensity of exercise used by footballers

3.1.Partial hypotheses:

- Glycaemia is affected by low-intensity exercise in football players.
- Glycaemia is affected by moderate intensity exercise in football players.
- Glycaemia is affected by high intensity exercise in football players.

4.Objectives of the study:

- To know the effect of different exercises on glycaemia in football players.
- To find out the effect of different energy regimes on glycaemia in football players according to the exercises used.

5.Importance of the study:

The study of this research allows us to highlight the impact of the type of exercise used in terms of intensity on the concentration of blood sugar to improve the output of football players, as the study addresses the positive relationship between the type of exercise and blood sugar and its impact on the output of football players in addition to the reasons leading to

fatigue and the multiplication of injuries in football players, this study gives an overview of the biochemical aspect, its importance, fields and role, to provide the concerned and specialised frameworks and readers with information about the relationship between blood sugar and the intensity of exercise used to improve the output of football players.

6.Previous studies:

A study entitled: ‘The effect of repeated high-intensity physical exertion on some physiological and biochemical variables’. Some blood components, blood pressure and blood sugar levels (in football players) A field study of the U20 Civil Protection Amateur Sports Clubby the student Boukhalfa Ahmed at the University of Djelfa in 2016 , and to achieve this, the study was conducted on a random sample of (18) players from the Civil Protection Amateur Sports Club team under 20 years old. Using the experimental method by designing the control and experimental groups, the programme was applied with 20 sessions over 10 weeks, and after conducting post-analyses and collecting data, the statistical package software *spss* was used to analyse the results.

A *t test* was used to analyse the results.

The study came up with a set of results:

High-intensity physical exertion (*repetitive*) Repeated) increased some blood components such as red and white blood cells as well as the percentage of haemoglobin in the blood.

- High-intensity physical exertion (repetitive) repetitive (increased blood sugar levels) .

- High-intensity physical exertion (repetitive) Repeated high intensity physical exertion increases blood pressure.

A study entitled: ‘The effect of aerobic physical effort on some physiological and biomechanical variables in the elderly’ by Dr Mokhtar Kassem, Khaled Hamida and Ruqaya Huda Al Akkoun, a study presented in the form of a scientific article in the Professional Journal of Sports Sciences, Humanities and Social Sciences at Ziane Achour University in Jelfa, Volume 08 Issue 03, 2021.

This study aimed to :

- To find out the effect of aerobic physical effort on resting heart rate in the elderly.
- To find out the effect of aerobic physical exertion on blood pressure in the elderly.
- Find out the effect of aerobic physical exertion on the obesity index in the elderly.
- Find out the effect of aerobic physical exertion on blood sugar in the elderly.
- The effect of aerobic physical exertion on haemoglobin in the elderly.

The study population consisted of 40 female trainees and a sample of 10 female trainees ranging in age from 50 to 60 years.

The study found that aerobic physical exertion has an impact on some physiological variables (resting heart rate, blood pressure, obesity index and weight) and biochemical variables (blood sugar and haemoglobin)

where it was found that there is an improvement at the level of all targeted physiological and biochemical variables.

7.Methodological procedures:

Research methodology: The researchers used the experimental approach to suit the nature of the research.

7.1.Research sample: The research sample consisted of 6 players from the sports team of Mashaal bin Jarmah, and the student researcher tried to ensure that the research sample has the same characteristics, i.e. the sample was selected intentionally and in a way that serves the research.

8.Statistical methods used:

- Arithmetic mean.
- Standard deviation.
- *T-test* .
- K-squared test.

9.Present, analyse and discuss the results:

Present, analyse and discuss the results of the first hypothesis:

Hypothesis one: ‘There are statistically significant differences between the pretest and posttest in favour of the posttest’

Question 1: Is glycaemia affected by low intensity exercise?

Table 1: Differences between post-test and pre-test of low-intensity exercise on glycaemia in football players.

Arithmetic mean		Standard Deviation	T test	Df	Sig	Significance level	Statistical Decision
Pre-test	104.5	15.20	4.747	5	0.005	0.01	Statistically significant
Post-test	107.66	11.07					

Analysis of the results: We can see from Table1 that the arithmetic mean of the sample in the pre-measurement of blood sugar in football players in low-intensity exercise was 104.5x= and the standard deviation was 15.20s= while in the post-measurement of blood sugar in football players the arithmetic mean was 107.6x= and the standard deviation was 11.07s= witht value = 4.747 and degree of freedom 5df= at significance level 0.01 which is greater than significance level value sig=0.005 which is greater than significance level value sig=0.005.

Hence, **there are statistically significant differences between the pre and post test in favour of the post test.**

Discussion of the hypothesis:

From the results of the statistical treatment, we explain that these results are in favour of the post-test due to the fact that the values of the results of the post-test are greater than the values of the pre-test, and attribute this to the fact that blood sugar increases when performing physical effort, as (Bahaeddin Ibrahim) states that blood sugar increases after running long distances and marathon and as a result of physical effort

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there is an increase in the concentration of blood components, as (Qasim Hassan) indicates that the reasons for the increase in blood concentration resulting from sports training lies in increasing the number of white and red blood cells and hemoglobin concentration for a certain volume of blood.

Present, analyse and discuss the results of the second hypothesis:

The text of the second hypothesis: ‘There are statistically significant differences between the pretest and posttest in favour of the pretest’.

Question 2:Is glycaemia affected by moderate intensity exercise?

Table 2: Differences between post and pre-test with moderate-intensity exercise on glycaemia in football players.

Arithmetic mean		Standard Deviation	T test	Df	Sig	Significance level	Statistical Decision
Pre-test	104.5	15.20	2.369	5	0.064	0.01	Statistically significant
Post-test	109.33	12.73					

Analysis of the results:

We can see from Table 2 that the arithmetic mean of the sample in the pre-measurement of blood sugar in football players in medium intensity

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exercise was $104.5x=$ and the standard deviation was $15.20s=$, while in the post-measurement of blood sugar in football players the arithmetic mean was $109.33x=$ and the standard deviation was $12.73s=$ with t value $=2.369$ and degree of freedom $5df=$ at significance level 0.01 which is greater than significant level value $sig=0.005$.

Therefore, **there are statistically significant differences between the pre-test and post-test in favour of the pre-test.**

Discussion of the hypothesis:

From the results of the statistical treatment, we interpret these results in favour of the post-test due to the fact that the values of the results of the post-test are greater than the values of the pre-test and this is attributed to the fact that blood sugar increases when performing physical effort, but this increase in medium intensity exercise was not the same as the increase in low intensity exercise and this is due to the intensity of the exercise used as it increased than in low intensity exercise and the energy system used.

Present, analyse and discuss the results of the third hypothesis:

The third hypothesis states: ‘There are statistically significant differences between the post-test and pre-test’.

Question 3: Is glycaemia affected by high intensity exercise?

Table 3: represents the differences between post and pre-test with high intensity exercise on glycaemia in football players.

Arithmetic	Standard	T test	Df	Sig	Significance	Statistical
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mean		Deviation				level	Decision
Pre-test	104.5	15.20	0.145	5	0.695	0.01	Statistically significant
Post-test	105.33	13.77					

Analysis of the results:

From Table 9, we can see that the mean of the sample in the pre-measurement of blood sugar in football players in high-intensity exercise was $104.5 \bar{x}$ and the standard deviation $s=15.20$, while in the post-measurement of blood sugar in football players in high-intensity exercise the mean was $105.33 \bar{x}$ and the standard deviation $s=13.77$. In the post-measurement of blood sugar in football players, the arithmetic mean was $105.33 \bar{x}$ and standard deviation $s=13.77$ and the calculated t value = 0.415 and degree of freedom $df=5$ at the significance level of 0.01 , which is less than the value of the significant significance level $sig=0.695$

Therefore, **there are no statistically significant differences between the post-test and the pre-test.**

10.Discussion of the hypothesis:

From the results of the statistical treatment, we interpret these results in favour of the post-test due to the fact that the values of the results of the post-test are greater than the values of the pre-test and this is attributed to the fact that blood sugar increases when performing physical effort, but this increase in high intensity exercise was not the same as the increase in

low and medium intensity exercise and this is due to the intensity of exercise used as it increased than in low and medium intensity exercise and the energy system used.

11.General conclusion:

From the previous results at the level of the specific hypotheses, we observe that:

- **From the first hypothesis:** There is a clear difference between the statistically significant differences between the pre- and post-measurement at the level of low-intensity exercise, which confirms the first hypothesis that we proposed at the beginning of this study, and therefore we accept the hypothesis that indicates that blood sugar is affected by low-intensity exercise.
- **From the second hypothesis:** There is a statistically significant difference between the pre- and post-measurement at the level of moderate-intensity exercise, which confirms the first hypothesis we proposed at the beginning of this study and therefore we accept the hypothesis that glycaemia is affected by moderate-intensity exercise.
- **From the third hypothesis:** There is no statistically significant difference between the pre- and post-measurement at the level of high-intensity exercise, which contradicts the third hypothesis we proposed at the beginning of this study and therefore we do not accept the hypothesis that glycaemia is affected by high-intensity exercise.

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