

ASSESSMENT OF BLOOD GLUCOSE WITH THE PROGRESSION OF A SIMULATED VOLLEYBALL MATCH.

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Abstract

The purpose of the study was to describe and quantify the changes in blood glucose concentrations with the progression of a simulated volleyball match in the university level volleyball players. Twelve highly trained male volleyball players (age 21.3 +/- 3.0, mean +/- SD) from Viswa-Bharati University, West Bengal, India were selected as subjects, and divided into two team. The selected dependent variable: Blood glucose was assessed by performing 3 simulated sets of volleyball match. Both the teams were balanced in the sense of skill and performance. Data as blood sample were collected at the beginning of the match that is prior to the warm-up, after completion of first set, second set and after third set of the match. Blood samples were taken by pricking the finger. Accu-Chek blood glucose monitor was used to take the reading of blood glucose in the unit mg/dl. Results of current study revealed that there is significant change in the concentration of blood glucose with the progression of a simulated volleyball match. Blood glucose concentration increases from pre set value to post set-2 and decreases after post set-3. (pre set-105.58 +/- 10.130, mean +/- SD), (post set-1, 119.75 +/- 12.17), (post set-2, 129.25 +/- 8.72), (post set-3, 123.42 +/- 10.07). From the results of this study it revealed that there is a significant change in the concentration of blood glucose with the progression of a simulated volleyball match.

Keywords: Simulated Volleyball match, Blood Glucose

INTRODUCTION

Playing style of volleyball requires players to execute short bursts of high intensity exercise with period of rest or moderate-intensity activities for a long period. At present there is relatively little information available on physiological demand of glucose while playing volleyball at university level. When we engage in physical activity we need to be especially aware of changes in blood glucose levels as our body burns extra glucose for energy. This can help us to avoid problems like low blood glucose (hypoglycemia). Being aware of changes in blood glucose during physical activity is especially important if anyone takes certain diabetes medications that increase risk for hypoglycemia. Physical activities of prolonged duration and low intensity typically cause blood glucose to decrease, but not to a problematic level. Monitoring before, during and after training several times so that we can understand and anticipate exercise-related changes in blood glucose. Physical activity can affect blood glucose levels long after the physical activity is finished. In fact, blood glucose may continue to decrease up to 16 to 24 hours after one has finished exercising, depending on how long one has exercised and intensity level. This is because the glucose stored in our muscles is used first for energy when we exercise. After the exercise, body will take glucose out of bloodstream to replenish these glucose stores, resulting in lower levels of blood glucose. There are activities and exercise that may increase the blood sugar. This is because the activity may release glucose counter-regulatory hormones, such as epinephrine (adrenaline) that opposes the action of insulin and raises the blood sugar. A classic example of this is bench- pressing free weights. It's difficult to generalize, though, since other anaerobic activities will still lower blood sugar.

Methodology

Selection of subject

For the purpose of the study 12 university level volleyball players from Department of Physical Education, Vinay Bhavana, Visva-Bharati University, Santiniketan, Birbhum, West Bengal, India were taken. Age of players were ranging between 19 to 26 years. The subjects were thoroughly acquainted with the testing procedure as well as the purpose and significance of the stud. A thorough orientation of requirements during the testing procedures and blood glucose test through glucose monitor were made for successful completion of study.

Collection of data

The data on selected physiological variable- blood glucose were collected by employing the standard testing procedures available in the literature with the help of Accu-Chek blood glucose monitor. Blood sample as data were taken four times(pre set, post set1, post set2 and post set 3) in a 3 sets game, blood was taken by pricking the fingers of players and inserted in the glucose monitor, and reading shown in mg/dl is recorded as data. This data was collected on the volleyball court of Department of Physical Education, Vinay Bhavana, Visva-Bharati University, Santiniketan, Birbhum, and West Bengal, India

Selection of variable and it's criterion measures

Table 1 represents the blood glucose which was selected for this study.

S. No.	variable	units	Criterion measures
1	Blood Glucose	Mg/dl	Accu-Chek Glucose Monitor

Findings & Discussion

Table: 2 Descriptive Statistics

Mean & SD of the Subjects in Pre Test, Post Test 1, Post Test 2 and Post Test 3 in case of Blood Glucose

UNIT		MEAN	STD. DEVIATION	N
mg/dl	Pre Test	105.5833	10.13059	12
	Post Test 1	119.7500	12.17393	12
	Post Test 2	129.2500	8.71910	12
	Post Test 3	123.4167	10.06757	12

In the table no. 1 means of the subjects in Pre Test, Post Test 1, Post Test 2 and Post Test 3 in case of Blood Glucose are 105.5833, 119.7500, 129.2500 and 123.4167 respectively, whereas SD are 10.13059, 12.17393, 8.71910 and 10.06757.

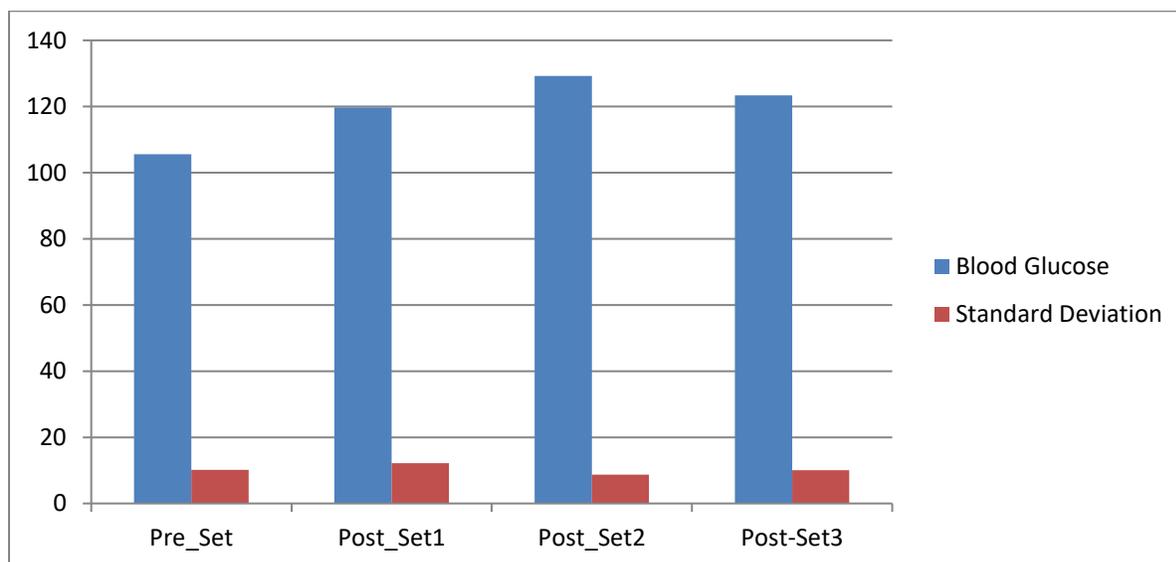


FIGURE 1

GRAPHICAL REPRESENTATIONS OF MEAN AND STANDARD DEVIATION SCORES OF BLOOD GLUCOSE AT PRE TEST, POST SET 1, POST SET 2 & POST SET 3.

Table: 3
Mauchly's Test of Sphericity

Within Subjects Effect	Approx. Chi-Square	df	Sig.	Greenhouse-Geisser	Huynh-Feldt	Lower-bound
Blood Glucose	.722	5	.982	.955	1.000	.333

FINDINGS

In the above table no. 2 (Mauchly's Test of Sphericity) the p-value or significance value is .982 which is greater than 0.05 ($P > 0.05$), so we do not accept the hypothesis that the variances of the differences between levels were not significantly different. In other words the assumption of sphericity has not been violated. If it would be violated then we would have to use Greenhouse-Geisser or Huynh-Feldt or Lower-bound for making an adjustment to the degrees of freedom of the repeated measures ANOVA.

Table: 4
Tests of Within-Subjects Effects

Repeated Measures ANOVA Among the Subjects in Pre Test, Post Test 1, Post Test 2 and Post Test 3 in case of Blood Glucose

Unit	Source	Type III Sum of Squares	df	Mean Square	F	p-value (Sig.)
mg/dl	Blood Glucose	3649.667	3	1216.556	18.545*	.000*
	Error (Blood Glucose)	2164.833	33	65.601		

*Significant at 0.05 level, $F_{0.05}(3,27) = 2.96$, or $p \leq 0.05$

FINDINGS

In the above table no. 3 (Repeated Measures ANOVA) it has been found that 'F' value and 'P' value are 18.545 and .000 with 3/33 degrees of freedom in Pre Test, Post Test 1, Post Test 2 and Post Test 3 in case of Blood Glucose which clearly indicates that 'P' value (.000) is less than 0.05 level of significance ($P < 0.05$). So there is significant difference on blood glucose within the subjects.

Table: 5

Bonferroni Post-Hoc Test Among Pre Test, Post Test 1, Post Test 2 and Post Test 3 in case of Blood Glucose

VARIABLE	GROUP				SEM	Mean Difference	p- value (Sig.)
	Pre Test	Post Test 1	Post Test 2	Post Test 3			
Unit: mg/dl	105.5833			123.4167	2.910	-17.833	.000*
		119.75		123.4167	3.151	-3.667	1.000
			129.25	123.4167	3.321	5.833	.640
	105.5833	119.75			3.529	-14.167	.012*
	105.5833		129.25		3.562	-23.667	.000*
		119.75	129.25		3.322	-9.500	.093

*Significant at 0.05 level or $p \leq 0.05$

FINDINGS

From the table no. 4 (Bonferroni Post-Hoc Test) it has been evident that there is significant difference between Pre Test and Post Test 1, Pre Test and Post Test 2 & Pre Test and Post Test 3. Whereas there is difference but not statistically significant difference between Post Test 1 and Post Test 2, Post Test 1 and Post Test 3 & Post Test 2 and Post Test 3.

Discussion of findings

The purpose of the study was to investigate the effect of simulated volleyball match on the blood glucose with the progression of match on university level volleyball players at prior to the match, after completion of first set, after completion of second set and after completion of third set. From the findings it has been found that there is significant change in the concentration of blood glucose with the progression of a simulated volleyball match. Blood glucose concentration increases from pre set value to post set-2 and decreases after post set-3. (pre set-105.58 +/- 10.130, mean +/- SD), (post set-1, 119.75 +/- 12.17), (post set-2, 129.25 +/- 8.72), (post set-3, 123.42 +/- 10.07). From the results of this study it revealed that there is a significant change in the concentration of blood glucose with the progression of a simulated volleyball match. More clearly is to be said that there is significant effect of simulated tennis match on blood glucose of university level volleyball players. The reason behind significant effect may be the following facts.

Physical activity can cause blood glucose levels to rise. This can happen when body has an insufficient amount of available insulin and one performs intensive exercises. During vigorous exercise, the body drives a signal to the liver to release glucose that is being stored. In the lack of sufficient insulin, this flood of glucose can cause an instant rise in blood glucose.

There are activities and exercise that may increase the blood sugar. This is because the activity may release glucose counter-regulatory hormones, such as epinephrine (adrenaline) that opposes the action of insulin and raises the blood sugar. A classic example of this is bench-pressing free weights. It's difficult to generalize, though, since other anaerobic activities will still lower blood sugar. In another example, competitive activities will often raise the blood sugar. Someone about to run a race gets an epinephrine (adrenaline) surge that is part of the competitive drive, which may result in an elevated blood sugar during the race. In contrast, the blood sugar can drop during practice. <https://dte.ucsf.edu/living-with-diabetes/activity-and-exercise/exercise-blood-sugar/> **Exercise & Blood Sugar:: Diabetes Education Online-2020.** Many studies

which directly or indirectly support the present study like Johnwahren, Philipfelig et al 1971, Rodrigo V. Gomes et al 2011, Donovan, Casey M. et al 21997, Yoshio Suzuki et al 2015 etc.

CONCLUSIONS

It is concluded that there is a significant variation in the blood glucose with the progression of a simulated volleyball match of university level volleyball players.

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