COMPARATIVE STUDY OF SIMULATED AND OFFICIAL BASKETBALL MATCHES ON SELECTED PHYSIOLOGICAL PARAMETERS

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ABSTRACT

The purpose of this study was to compare the physiological responses between simulated and official basketball matches. The physiological parameters chosen were heart-rate measured by counting beats at the radial artery(beats/min), blood-pressure by sphygmomanometer(mm Hg), peak flow rate by peak flow meter (lit/min) and blood glucose level was measured by glucometer respectively. Five female basketball players of L.N.U.P.E. team were purposively selected as the subjects for study. The measurements of Physiological Variables were first taken in Simulated Matches during their practice session and then in Official Matches during their west zone inter-varsity competition. Pre data were collected after pre match warm-up and post after the end of match. The data collected in the different simulated and official basketball matches were analysed by ANCOVA for each variable separately. The results from ANCOVA showed significant differences for Heart-rate, Systolic blood pressure, and Blood Glucose level whereas no significant differences were found in Diastolic blood pressure and Peak flow rate between Simulated and Official Matches.The results of this study showed a greater magnitude of Heart-rate, Systolic blood pressure and Blood Glucose response after Official Matches as compared with that after Simulated Matches confirming the hypothesis that a real competition generates a greater response than a training condition.

Keywords: Simulated Match, Heart Rate, Peak flow rate and Blood Glucose Level.

INTRODUCTION:

Basketball has gained worldwide popularity and fascinated players and spectators with its dynamic characteristics as a team sport (Hoffman & Maresh, 2000). In this sport, players cover about 4500–5000m during a 40-min game with a variety of multidirectional movements such as running, dribbling, and shuffling at variable velocities and jumping (Crisafulli et al., 2002) with respect to whole body movement, or the associated physiological response to offensive and

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defensive drills, and game play. Heart rate, blood pressure and blood lactate concentration have been the main focus of investigations into physiological demands.

OBJECTIVES:

- The objective of the study was to compare the selected physiological parameters between simulated and official basketball matches.
- The evaluation of whether team practice sessions provide enough stimuli to prepare players for matches.

METHODOLOGY:

Selection of subjects-

5 players of L.N.U.P.E female basketball university team of 18-23 years of age were selected as the subject for the study on the basis of purposive sampling.

Variables-

The researcher has taken following variables

- Heart- rate
- Blood-pressure
- Peak flow-rate
- Blood Glucose Level

The physiological parameters chosen were heart-rate measured by counting beats at the radial artery(beats/min), blood-pressure by sphygmomanometer(mm Hg), peak flow rate by peak flow meter (lit/min) and blood glucose level was measured by glucometer respectively in both Simulated and Official Basketball Matches. Pre data were collected after pre match warm-up and post after the end of match.

To determine the differences in selected physiological parameters of basketball players between simulated and official basketball matches ANCOVA was used at 0.05 level of significance, and the findings are cited below.

RESULTS AND FINDINGS:

TABLE-1

Descriptive Statistics for Heart-rate

Dependent Variable: heart rate post

treatment group	Mean	Std. Deviation	N
Simulated	100.2667	6.63081	5
Official	147.9997	9.36604	5
Total	124.1332	26.29503	10

Table-1 reveals the descriptive statistics of mean and standard deviation for Simulated Matches were 100.2667± 6.63081 and for Official Matches were 147.9997±9.36604 respectively.

TABLE-2

Tests of Between-Subjects Effects

Dependent Variable: heart rate post

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Heart rate pre	162.184	1	162.184	3.114	.121
Tg	3797.501	1	3797.501	72.913	.000
Error	364.577	7	52.082		
Total	160313.472	10			
Corrected Total	6222.859	9			

Table-2 shows that there was significance difference found between Simulated Matches and Official Matches in case of heart rate as the calculated value (72.913) was greater than tabulated value (5.12) at .05 level of significance with 1, 9 degree of freedom.

TABLE-3

Descriptive Statistics for Systolic Blood Pressure

Dependent Variable: systolic post

treatment group	Mean	Std. Deviation	N
Simulated	121.9999	2.81867	5
Official	151.8001	5.43963	5
Total	136.9000	16.22842	10

Table-3 reveals the descriptive statistics of mean and standard deviation for Simulated Matches were 121.9999± 2.81867 and for Official Matches were 151.8001±5.43963 respectively.

TABLE-4

Tests of Between-Subjects Effects

Dependent Variable: systolic post

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Systolic pre	30.731	1	30.731	1.802	.221
Tg	1721.709	1	1721.709	100.932	.000
Error	119.407	7	17.058		
Total	189786.356	10			
Corrected Total	2370.256	9			

Table-4 shows that there was significance difference between found Simulated Matches and Official Matches in case of systolic blood pressure as the calculated value (100.932) was greater than tabulated value (5.12) at .05 level of significance with 1, 9 degree of freedom.

TABLE-5

Descriptive Statistics for Diastolic Blood Pressure

Dependent Variable: diastolic post

treatment group	Mean	Std. Deviation	N
Simulated	75.0666	5.80901	5
Official	82.8000	3.61016	5
Total	78.9333	6.11579	10

Table-5 reveals the descriptive statistics of mean and standard deviation for Simulated Matches were 75.0666± 5.80901 and for Official Matches were 82.8000±3.61016 respectively.

TABLE-6

Tests of Between-Subjects Effects

Dependent Variable: diastolic post

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Diastolic pre	21.377	1	21.377	.903	.374
Tg	115.740	1	115.740	4.888	.063
Error	165.735	7	23.676		
Total	62641.300	10			
Corrected Total	336.626	9			

Table-6 shows that there was no significance difference between found Simulated Matches and Official Matches in case of diastolic blood pressure as the tabulated value (5.12) was greater than calculated value (4.888) at .05 level of significance with 1, 9 degree of freedom.

TABLE-7

Descriptive Statistics for Peak flow rate

Dependent Variable: peak flow post

treatment group	Mean	Std. Deviation	N
Simulated	451.8666	40.69799	5
Official	456.6667	43.46154	5
Total	454.2666	39.77510	10

Table-7 reveals the descriptive statistics of mean and standard deviation for Simulated Matches were 451.8666±40.69799 and for Official Matches were 456.6667±43.46154 respectively.

TABLE-8

Tests of Between-Subjects Effects

Dependent Variable: peak flow post

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Peak flow pre	12150.916	1	12150.916	41.899	.000
Tg	1.044	1	1.044	.004	.954
Error	2030.011	7	290.002		
Total	2077820.330	10			
Corrected Total	14238.528	9			

Table-8 shows that there was no significance difference between found Simulated Matches and Official Matches in case of peak flow rate as the tabulated value (5.12) was greater than calculated value (0.004) at .05 level of significance with 1, 9 degree of freedom.

TABLE-9

Descriptive Statistics for Blood Glucose level

Dependent Variable: glucose post

treatment groups	Mean	Std. Deviation	N
Simulated	113.4665	5.70378	5
Official	160.6666	20.63041	5
Total	137.0666	28.67868	10

Table-9 reveals the descriptive statistics of mean and standard deviation for Simulated Matches were 113.4665± 5.70378 and for Official Matches were 160.6666±20.63041 respectively.
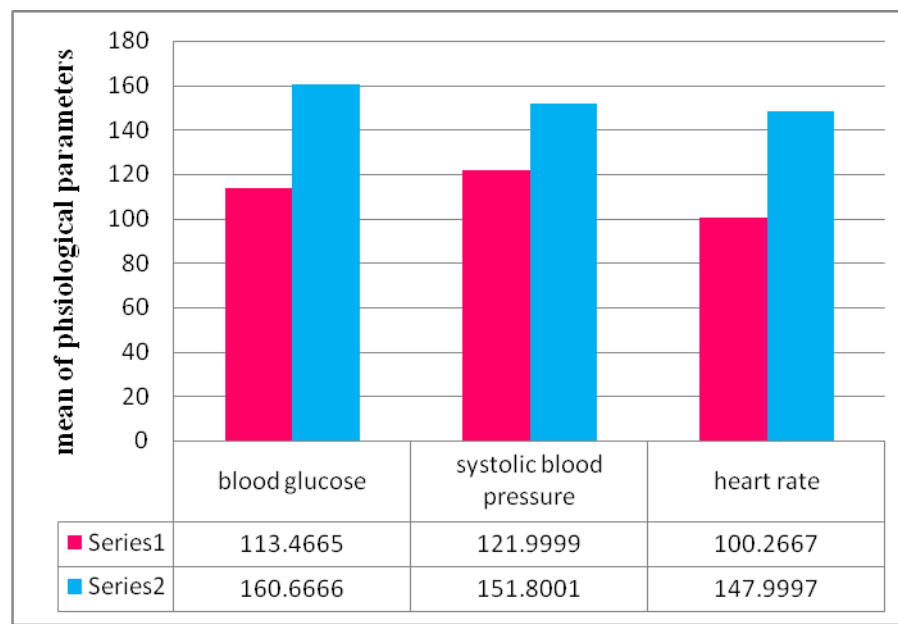
TABLE-10

Tests of Between-Subjects Effects

Dependent Variable: glucose post

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Glucose pre	294.631	1	294.631	1.341	.285
Tg	5823.346	1	5823.346	26.505	.001
Error	1537.956	7	219.708		
Total	195274.648	10			
Corrected Total	7402.202	9			

Table-10 shows that there was significance difference between found Simulated Matches and Official Matches in case of blood glucose level as the calculated value (26.505) was greater than tabulated value (5.12) at .05 level of significance with 1, 9 degree of freedom.

Mean Scores of Physiological Parameters for Simulated and Official Basketball Matches

	blood glucose	systolic blood pressure	heart rate
Series1	113.4665	121.9999	100.2667
Series2	160.6666	151.8001	147.9997

DISCUSSION OF FINDINGS:

The results of this study revealed that significant statistical differences were found between mean heart-rate in simulated and official basketball matches. These differences can be due to individuality and individual effort given during the matches. These differences can further be explained due to factors that influence performance in a match, such as game tactics that is applied and motivation to win the match (Bouhle et al., 2006). A study by Lambert et al. (1998) on long distance runners indicated that the heart rates of athletes responded differently during competition than in training. There was significant difference in relation to Hear-rate between Simulated Matches and Official Matches. This statement has been supported by RF Smit in his study of Physiological demands during rugby union match and practice session.

There was a significance difference between Simulated Match and Official Match in relation to Systolic Blood Pressure. It might be due to the competitive situation in sports that are anxious to a certain degree which eventually affect athlete's performance and also due to more demand of oxygen as it is depleted more in competitive situation because of high intensive match compare to Simulated Match as there is a high will to win the match. This result has been also supported by Sharma1, R. K. , Nigam2, A. K. in Relationship between Competitive Performance and Selected Physiological Parameters of Elite Male and Female Gymnasts.

In case of Diastolic Blood Pressure there was no significance difference found between Simulated Match and Official Match because during aerobic exercises Diastolic Blood Pressure remains unchanged or decrease slightly.

There was no significance difference found in relation to Peak flow rate between Simulated Match and Official Match it might be because Peak flow rate will not have much weightage to Cardio-Vascular Endurance specific to Basketball as it is an intermittent kind of sport or activity. This component is not having much/direct contribution to the playing ability of Basketball Players and other reason could be that basketball game do not resembles to the peak flow rate conditions which might be the reason that significant differences was not found in relation to Peak flow rate between Simulated Matches and Official Matches.

Lastly there was a significance difference between Simulated Matches and Official Matches in relation to Blood Glucose Level which might be attributed to the vigorous exercise or competitive activities which may raise glucose levels. This is because the liver is stimulated to release extra glucose into the bloodstream in response to an increase in adrenaline. Strenuous exertion requires high energy expenditure, and the sympathetic nervous system helps achieve this by exciting endocrine organs such as the adrenal gland. The adrenal gland releases the stress hormones adrenaline and noradrenalin into the blood, which then stimulate the liver to release glucose at a faster rate than normal. When this rate exceeds the rate at which glucose is absorbed by active muscle tissue, Blood Glucose rises.

So it can be concluded that Systolic Blood Pressure, Blood Glucose Level and Heart-rate can be the contributing factor for the coaches to plan appropriate loads maximizing recovery and performance.

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