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THE IMPACT OF A TRAINING PROGRAM ON SOME ANTHROPOMETRIC AND PHYSIOLOGICAL VARIABLES AMONG THE PLAYERS OF BASKETBALL TEAM AT MU'TAH UNIVERSITY

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ABSTRACT:

This study aimed at identifying the impact of a training program on some anthropometric and physiological variables among the players of basketball team at Mu'tah university. The study sample consisted of (5) players. The researchers used the experimental due to its compatibility to the study nature and objectives. The study used (SPSS) for data analysis. The results revealed that the proposed training program has a positive effect on causing physiological changes in systolic and diastolic blood pressure, heartbeat, and the times of breathing in addition to its role in reducing blood sugar, hematocrit, red blood cells and white blood cells and increasing hemoglobin. The results showed that the training program also contributed to reducing weight and fat ratio in the humerus, abdomen and scapula. The researchers recommended popularizing the program among the coaches of basketball in the various Universities as well as focusing more on the physiological variables that could enhance the performance of players.

Keywords: Training program, physiological variables, anthropometric variables, basketball, Mu'tah university.

INTRODUCTION:

Contemporary communities witnessed a technical and scientific advancement as well as innovations that contributed to establishing an effect in our social life in order to cope with the technical and scientific developments. More attention has been paid to human forced, their competencies and readiness since they are viewed as a basic foundation for the investment of power in the developed and developing communities to promote advancement and prosperity in these countries (Raml, 2010).

The science of sports training has a an effective role in pursuing the development of sports levels throughout the world to ensure progress and distinction at the different sports domains, where most effective sports training programs depend mainly on the various theories of sports training that focus on most sciences relevant to the nature of human body function, such as the science of human anatomy and physiology, kinetics as well as other important sciences that did not allow for random way of training. Regular sports training that is based on scientific bases will lead to various physiological changes in most body systems and that results in an improvement in the level of sports performance by effectively reducing the required effort (Al-Kilani, 2005).

Sports training is a science that derives a big deal of its theories bases and principles in performing its processes from other sciences, including physiology, biochemistry and nutrition, which combine together to promote the athlete's training status; therefore, athletes' levels are positively affected and more distinctive results are achieved.

Modern sports training mainly focuses on promoting the system of energy production and the accompanying functional changes; when the athlete's aerobic and anaerobic capabilities are improved, they will be directly reflected on the level of physical and skilled performance by setting the training programs that are based on scientific bases.

The game of basketball is considered as a team game that require a specific physical preparation in order to promote the athlete's efficiency and ability to practice this game. The player should have a high speed in movement and explosive power in jumping as well as accuracy in scoring, passing and smooth dribbling skills.

Measuring the rate of heartbeat and exerting effort and during the period of recovery is considered as one of the most important indicators that determine the level of effort exerted by the player and it also refers the speed of restoring the resources of aerobic and anaerobic energy during the period of recovery. (Al-Baqqal), referred to (Bernie, 1983) who suggested that using the indicator of heartbeat is considered as one of the most important ways to verify the restoration of the resources of aerobic and anaerobic energy during the recovery stage and during certain periods of time after doing a certain effort (Al-Baqqal, 2003).

Zaidi, Ali and Lamin, 2012 suggested that skilled performance, in any sport, has a prominent role in achieving the best possible outcomes sought by the team, in that skilled performance is necessary to have control over the proceedings of the game which, in turn, leads to winning matches and reaching internationalism. Just like any other game, Basketball is characterized by some skills and requirements that are considered as basic ones; the skills that provide athletes by the ability to play from any position within the court and perform different roles while playing.

THE STUDY PROBLEM:

The science of sports training and sports physiology is viewed as the basic foundation for constant improvement witnessed in the level of physical performance as well as the improvement of sports achievement in the current era. By observing the training processes of this game, researchers noticed that coaches are less concerned about physiological and anthropometric variables among players which, in turn, affected the effective achievement. Therefore, the authors conducted the current study in order to promote the levels of players and improve their performance.

THE STUDY OBJECTIVES:

The current study aimed at:

1- Identifying the impact of a proposed training program on some physiological variables (systolic and diastolic blood pressure, heartbeat, the times of breathing, hemoglobin, hematocrit, red blood cells and white blood cells) among the players of basketball team at Mu'tah university.
2- Identifying the impact of a proposed training program on some anthropometric variables (weight, fat ratio in the humerus, abdomen and scapula) among the players of basketball team at Mu'tah university.

The Study Hypotheses:

In the light of the study nature and objectives, the researchers cited the following hypotheses:

1- There are statistically significant differences at ($\alpha \leq 0.05$) between the pre and post measurements in the physiological variables among the individuals of the experimental group in favor of the post measurement.
2- There are statistically significant differences at ($\alpha \leq 0.05$) between the pre and post measurements in the anthropometric variables among the individuals of the experimental group in favor of the post measurement.

The Study Terms:

- The training program: it is a set of trainings and exercises that are developed based on scientific foundations and in certain time schedule (Masaad, 2011).

The study domains:

- The human domain: (5) players of basketball team at Mu'tah university.
- Temporal domain: the program was applied to the study sample during (2/10- 14/11/2020).
- The spatial domain: the hall of the military section at Mu'tah university.

The Study Procedures:

The Study Methodology:

The researchers used the experimental due to its compatibility to the study nature and objectives by choosing a sample and applying the training program as well as performing the pre and post measurements.

The Study Population:

The study population consisted of the players of basketball team at Mu'tah university with a total of (18) players.

The Study Sample:

The study sample consisted of (5) players who were chosen intentionally. Table (1) shows the characteristics of the sample individuals in terms of age, weight, height and training age.

Table (1) The characteristics of the sample individuals

Variables	Mean	SD
Age/ year	19.2	0.44721
Weight/ kg	74.4	1.14018
Height/ cm	182.4	2.30217
Training age/ year	4.3	0.7170

*N= 5

The Study Instruments:

The study instruments included a questionnaire to register the test results and the measurements of the sample:

- An electronic medical weight scale to measure the body mass.
- A measurement tape (centimeter)
- Stopwatch .
- A blood pressure monitor.
- Skinfold Caliper.
- Basketballs.

The Study Measurements:

First, the measurement of (systolic and diastolic blood pressure) was taken by measuring it based on the organic artery among the study sample individuals. In order to measure the heartbeat rate, the number of heartbeats was taken by touching the artery by finger for about (10) seconds then the outcome is multiplied by (6) to show the average rate in one minute. The number of breaths is measured by putting the hand on the abdomen for (10) minutes, then the outcome is multiplied by (6) to calculate the average number of breaths in a minute. Weight and skinfold thickness was measured in the humerus, scapula and abdomen. Blood samples were taken by a specialized employee working in the health center at Mu'tah university for the pre and post measurements. Post measurements were taken on 14/11/2019 with the attendance of researchers.

The Study Variables:

The independent variable: the training program that was applied to the study sample individuals.

The dependent variables: (systolic blood pressure, diastolic blood pressure, heartbeat, the times of breathing, hemoglobin, hematocrit, red blood cells and white blood cells, weight and skinfold thickness in the humerus, scapula and abdomen).

The used statistical methods: the study used the statistical methods that included (means, standard deviations, Wilcoxon test) for the physiological variables and the anthropometric measurements to identify the results and verify their validity.

Implementing the proposed training program:

The proposed training program was applied during (1/10/2019- 14/11/2019) over a period of six weeks and four training units a week; therefore, the total number of the training units was (24), with each unit lasting for (90) minutes.

Displaying and discussing the results:

First, testing the first hypothesis, stating " there are statistically significant differences at (α≤0.05) between the pre and post measurements in the physiological variables among the individuals of the experimental group in favor of the post measurement".

The researchers measured the study variables (systolic blood pressure, diastolic blood pressure, heartbeat, the times of breathing, blood sugar, hemoglobin, hematocrit, red blood cells and white blood cell) for the individuals of the experimental sample before and after the application of the program. (Wilcoxon test, Matched Pairs Signed) was used to test the differences between the pre and post applications for the study variables. Table (2) and (3) show the results.

Table (2) Wilcoxon test, Matched Pairs Signed to test the differences in the performance of the individuals of the experimental sample (n=5) between the pre and post applications

Variable	Measurement unit	Application	Mean	SD	Rank distribution	Numbers in ranks	Average ranks	Total ranks	z- value	Sig. level
systolic blood pressure	Mm/Hg	Pre	121.40	.89443	Negative	5[a]	3.00	15.00	-2.041	.041
		Post	117.6	.54772	Positive	0[b]	.00	.00		
					Equality	0[c]				
diastolic blood pressure	Mm/Hg	Pre	78.00	.70711	Negative	0[d]	3.00	.00	-2.121	.034
		Post	80.20	.83666	Positive	5[e]	.00	15.00		
					Equality	0[f]				
heartbeat	Beat/ minute	Pre	72.60	1.14018	Negative	5[a]	3.00	15.00	-2.121	.034
		Post	69.80	1.30384	Positive	0[b]	.00	.00		
					Equality	0[c]				
the times of breathing	Breath/ minute	Pre	23.20	1.92354	Negative	5[a]	3.00	15.00	-2.041	.041
		Post	21.00	1.22474	Positive	0[b]	.00	.00		
					Equality	0[c]				

*statistically significant at (α≤0.05)

The results in the previous table revealed that there are statistically significant differences at (α≤0.05) based on the (z-value) and the accompanying significance level concerning the performance level of the individuals of the experimental group in the pre and post application. The results revealed that there are differences between the pre and post applications in the physiological variables, where the systolic blood pressure declined from (121.40) mm/Hg to (117.60) mm/Hg, while the diastolic blood pressure increased from (78.00) mm/Hg to (80.20) mm/Hg. The researcher attributes that to the fact

that physical effort contributes to increasing the impulse of the blood; since the used training is continuous and regular, it will result in a dilation in blood vessels, so that the amount of impulse blood inside arteries and veins is high, leading to a reduction in systolic blood pressure with a slight change in diastolic blood pressure. The results revealed that a decline in heartbeat from (72.60) beat/ minute to (69.80) beat/ minute. This could be attributed to the regularity of the training system that contributes to improving the function of the heart as it increases the amount of the impulse which transmits blood with the least number of beats; this finding agrees with (Al-Baz, 2009). The results revealed that there is a reduction in the rates of breath at rest time from (23.20) breath/ minute to (21.00) breath / minute. This could be attributed to the fact that regular training causes changes in the respiratory system which enable it to adapt with the load with the least number of breath times; this finding agrees with (Darwish, 2004).

Table (3) Wilcoxon test, Matched Pairs Signed to test the differences in the performance of the individuals of the experimental sample (n=5) between the pre and post applications

Variable	Measurement unit	Application	Mean	SD	Rank distribution	Numbers in ranks	Average ranks	Total ranks	z- value	Sig. level
Blood sugar	Mg	Pre	79.62	.47645	Negative	5[a]	3.00	15.00	-2.023	.043
		Post	78.08	.71554	Positive	0[b]	.00	.00		
					Equality	0[c]				
hemoglobin,	g	Pre	14.62	.37683	Negative	0[d]	3.00	15.00	-2.023	.043
		Post	15.34	.21909	Positive	5[e]	.00	.00		
					Equality	0[f]				
hematocrit,	%	Pre	47.30	.76158	Negative	5[g]	3.00	15.00	-2.023	.043
		Post	45.56	.40373	Positive	0[h]	.00	.00		
					Equality	0[i]				
red blood cells	Million/ mm3	Pre	4.99	.09284	Negative	0[m]	3.00	15.00	-2.023	.043
		Post	5.44	.15572	Positive	5[n]	.00	.00		
					Equality	0[o]				
white blood cells	Thousand / mm3	Pre	8.30	.15811	Negative	0[m]	3.00	15.00	-2.032	.042
		Post	9.14	.18166	Positive	5[n]	.00	.00		
					Equality	0[o]				

*statistically significant at ($\alpha \leq 0.05$)

The results in table (3) revealed that there are statistically significant differences at ($\alpha \leq 0.05$) based on the (z-value) and the accompanying significance level concerning the performance level of the individuals of the experimental group in the pre and post application. The results revealed that blood sugar declined from (79.62 mg) to (78.08 mg). The researcher attributes that decline to the effectiveness of the sports exercise used by the researchers in the proposed training program, where the ratio of blood sugar decreases due to the conversion of **glycogen** to Glucose in order to supply muscles with the needed energy. This finding agreed with (Al-Wreikat, 2012) which revealed that practicing the physical effort leads to a reduction in the blood sugar. The researcher also attributed the increase in hemoglobin from (14.62) grams to (15.34) grams, the decrease in hematocrit from (47.30%) to (45.56%), the increase of red blood cells from (4.99) million/mm3 to (5.44) million/mm3, and the increase of white blood cells from (8.30) thousand/mm3 to (9.14) thousand/mm3 to the effectiveness of the sports exercise used by the researchers in the proposed training program, where they increase the amount of blood and hemoglobin in body; this finding

agrees with (Rowland, 2000) and (Bani Melhem, 2003) which revealed that an improvement in hemoglobin, white blood cells and red blood cells due to the physical effort.

Second, testing the second hypothesis, stating " There are statistically significant differences at (α≤0.05) between the pre and post measurements in the anthropometric variables among the individuals of the experimental group in favor of the post measurement."

The researcher measured the anthropometric variables (weight and skinfold thickness in the humerus, scapula and abdomen) for the individuals of the experimental group before and after applying the program. (Wilcoxon test, Matched Pairs Signed) was used to test the differences between the pre and post applications for the study anthropometric variables. Table (4) shows the results

Table (4) Wilcoxon test, Matched Pairs Signed to test the differences in the anthropometric variables of the individuals of the experimental sample (n=5) in the pre and post applications

Variable	Measurement unit	Application	Mean	SD	Rank distribution	Numbers in ranks	Average ranks	Total ranks	z- value	Sig. level
Weight	Kg	Pre	74.40	1.14018	Negative	5[a]	3.00	15.00	-2.032	.042
		Post	72.20	1.48324	Positive	0[b]	.00	.00		
					Equality	0[c]				
skinfold thickness in the humerus	Mm	Pre	9.74	.18166	Negative	5[a]	3.00	.00	-2.032	.042
		Post	7.88	.13038	Positive	0[b]	.00	15.00		
					Equality	0[c]				
skinfold thickness in the abdomen	Mm	Pre	19.28	1.22147	Negative	5[a]	3.00	15.00	-2.032	.042
		Post	16.82	1.12339	Positive	0[b]	.00	.00		
					Equality	0[c]				
skinfold thickness in scapula	Mm	Pre	16.28	.61400	Negative	5[a]	3.00	15.00	-2.032	.042
		Post	13.10	.66708	Positive	0[b]	.00	.00		
					Equality	0[c]				

*statistically significant at (α≤0.05)

The results in table (4) revealed that there are statistically significant differences at (α≤0.05) based on the (z-value) and the accompanying significance level concerning anthropometric variables among the individuals of the experimental group in the pre and post application. The results revealed that the differences were in favor of the post measurement, where the body weight decreased from (74.40) kg to (72.20) kg, the skin fold thickness in the humerus also decreased from (9.74) mm to (7.88) mm, while the skin fold in the abdomen decreased from (19.28) mm to (13.10) mm ,and finally the skin fold in scapula decreased from (16.28) mm to (12.65) mm .These findings agreed with (Rowland, 2002n Al-Wereikat, 2012; BaniMelhem, 2003), which revealed that there is a decline in these variables. The researchers attribute the success of the proposed training program to including exercises that contribute to consuming calories which, in turn, leads to a burning of body fat that were accumulated under skin folds, and thus a reduction in fat ratio in the body as a whole.

CONCLUSIONS:

In the light of the results, the study concluded the following:

1- The proposed training program has a positive effect on causing physiological changes in systolic and diastolic blood
2- pressure, heartbeat, breath times and reducing blood sugar, hematocrit, red blood cells and white blood cells.

3- The proposed training program has a positive effect on reducing weight and fat in humerus, abdomen and scapula.

RECOMMENDATIONS:

In the light of the results, the study recommended the following:

1) Generalizing the program to the coaches of basketball in the different universities and emphasizing the physiological variables that could enhance the performance of players.
2) Paying more attention to physiological and anthropometric variables while training in order to reach the best performance of players.

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