The Impact of a Proposed Training Program to Develop Selected Anthropometric Variables among Kick Boxing Players

Omar M. Al-Omer[(1)] **Bassam A. Mismar**[(2)]

Accepted: 22/1/2021 Received: 20/9/2021

Abstract

This study aimed at identifying the impact of a proposed training program to develop selected anthropometric variables among kick boxing players. The sample of the study consisted of (20) players who were chosen by intentional sample method from Al-Burini Self-Defense Academy. The Semi-Experimental technique was used as a research design. The sample of the study was divided into two groups where each one had 10 players, the control group that applies the Conventional Academy Program, while the experimental group applies the proposed training program. After the data collection process, it was treated using descriptive statistics such as means and standard deviation, coefficient of variation, Pearson correlation coefficient, t-test and ANCOVA.

The results of the study showed that the proposed training program exemplifies significant differences in the post measurements of selected anthropometric variables (body mass, chest perimeters, Upper arm perimeters, Upper leg perimeters, Calf perimeters) among the sample of the study, where the experimental group improved better than the control group. The researchers recommend adopting the proposed training program by increasing the training units to improve the anthropometric variables which in turns enhance the performance of players.

Key Words: Training Program; Anthropometrics; Kick Boxing.

1- Introduction:

The sports field is considered one of the most important areas where the extent of development in the sports field in general is observed through the great achievements that have been accomplished in many events and sports competitions. Such accomplishments did not come from pure chance, or perhaps as a result of the moment, but the lines of applied scientific research in the field of modern sports

(1) Jordan University.

(2) Jordan University.

training science, rehabilitation science, measurement and diagnosis science, applied sports psychology, sports physiology, learning and motor control and sports management sciences and other fields, has had a significant impact on this development overall. Kick boxing is among the sports that were affected by this development during the tireless work of the concerned authorities, including academics, researchers, administrators and theorists in this matter, which contributed to the promotion and maturity of this sport until it reached what it reached at the global, continental and even local levels.

The physical structure is one of the important indicators that indicate human health and nutrition, therefore it positively reflects on the health, prosperity, and vitality of society, as well as predicting the physical performance of the person practicing sports activities. Hence, anthropometric measurements are among the important measures by which the structure and characteristics of the body can be recognized, and these measures are important in various sports' fields by conveying them to the highest levels and global achievements with minimal time and effort (Hazzaa, 2009).

The anthropometric variables represent a branch of anthropology that is interested in studying various body measurements and is of great importance in the evaluation of the individual, and also has strong relationships in many vital fields. Physical growth has to do with health, social and emotional harmony, side by side with achievement and intelligence, and regarding the athletic field, anthropometric variables have been linked to many physical abilities and superiority in various activities.

Anthropometric variables have an important role in the sports field, especially that the fitness of the individual when engaging in various sport activities is determined according to the suitability of his body composition for the type of technical, skill and physical performance required, in addition to the lifestyle of the person practicing sports activity. It also plays an important role in the athletic activity selection and coaching process in line with the player's individual differences. Therefore, a close correlation between the anthropometric variables and sport field appears if properly trained on scientific grounds, and the reliance

on references that determine what are the important variables in the type of sports activity is essential and must be focused on their development through advanced training programs to reach the desired goal (Farhat, 2001).

The word (Kick Boxing) is divided into two parts; (Kick), which means kicking with leg, and (Boxing), which means punching by hand, as the end result came as the use of kicking and punching in striking while playing with the opponent within consensual movements that make this game a fine art and gives it a distinctive character than the other combat games (Al- Omar, 2019).

Kick boxing is a combat sport par excellence, in which the hands and legs are used in the process of punching and kicking, so when the athlete practicing this game uses a large number of movements and skills, the physiological and physical requirements shall be large, so the Kick boxing sport is a high-intensity sport that requires complex skills distinct from a tactical point of view to succeed in the training and competitions process (Slimani. Et al, 2017).

Kick boxing game is combined in one game and these sports are Karate, Taekwondo and Boxing combined with each other where the player can practice this sport by using the upper and lower sides to make contact points with the competitor within the physical, psychological capabilities and skills that the player has in playing. (Al- Omar, 2019).

Kick boxing as one of martial arts contains several skills such as footwork, kicking with upper and lower limbs and punching (Santos-Longhurst, 2019). There are many personal and social enhancements associated with this sport (Vertonghen & Theeboom,2010). In addition to some other benefits such as cardiovascular and mental health, muscle strength, balance and weight loss (Santos-Longhurst, 2019). Stickney (2005) recognized more benefits such as entertainment self-recognition and self-esteem. Kick boxing is a game among the sports games the modern combat sports in which It requires the athletes to acquire high thresholds of several fitness components and have well developed muscles mass in addition to have psychological and mental toughness.

Adults and youngsters participation in martial arts and combat sports such as Karate, Taekwondo, Judo and Kick boxing have universal appeals. It is a high-

intensity sport that requires complex skills and excellence from a tactical point of view in order to succeed in the training and competitions (Slimani et al, 2017) There are many people among countries participated in sports activities in general and martial arts in particular. As far as competitive kick boxing is of concern, Buse and Santana (2008) indicated that kick boxing skills and preparations along with high conditioning level with injury prevention factors, well described nutrition, with good rest and physiological reediness could make a competitive kick boxer.

From this standpoint, kick boxing is one of the sports that requires consideration of the importance of the appropriate anthropometric variables for the player to enable him to reach the goals he seeks, so the availability of these variables along with a suitable training program works to develop performance results and make the player distinguished from others, whether in the shape of his harmonious body or his high physical abilities, in order to facilitate the process of reaching advanced places in this sport. Hence, the anthropometric variables and the process of its development cannot be ignored in any way because they are related to many physical, skill, motor, and other fields, so we have to pay attention to these variables and the development of appropriate and advanced training programs to reach the goal of practicing sports activities.

Therefore, the researchers believe that the process of developing this sport depends mainly on the training programs that are developed by specialists in the sports field, which take into account all the requirements of this game, so the training process to improve the anthropometric variables is very important along with the development of skill performance due to the close link between them, in order to reach the main goal of training, which is to convey the player to the highest possible achievement.

1.1 The problem:

The problem of study emerged when the researchers noted a rarity of completed research according to their scope of knowledge, in addition to the fact that most of the coaches focus in their training on basic skills and competitions only

among players in order to develop performance, as well as the lack of the usage of modern scientific sports methods in training this sport in order to develop the anthropometric variables and complex skill performance as well. Considering that the researchers noticed during their careers as a player and researchers that most coaches did not use modern methods and techniques. In addition to lack of introducing players to use the weightlifting halls and the paucity of using resistors in the training process. In addition to one of the researchers participated as a coach in the World. As researchers perceived it needs more attention to develop all the elements of the game and its requirements, this will positively reflect on the battles, as the gain of largest number of points, so that the opposing player will be prevented from controlling the course of the game and the battle.

1.2 Importance of the study:

The importance of this study:

- As kick boxing sport entering for the first time since it was established on the sidelines of the Olympic Games, which requires attention to training programs for developing all aspects related to this sport to reach advanced places, whether on the sidelines of the Olympic Games or in the local and international championships.
- It comes as an attempt by the researchers to develop the results of some anthropometric variables in kick boxing because of its importance in collecting and gaining points from the opposing player in addition to breaking the routine of the players throughout training process.
- The researchers hope that this study will provide a database and information on this subject among players to benefit researchers in academic institutions and scientific research centers as well as the Jordanian Federation of Kick boxing and its clubs, coaches and those who are in charge of this sport as well as to use this study to develop future training programs.

1.3 Study objectives:

This study aimed to identify:

- The impact of a proposed training program on developing some anthropometric variables among kick boxing players.

1.4 Study hypotheses:

This study aimed to verify the following hypotheses:

1.4.1. There are statistically significant differences at the level of significance **($\alpha \leq 0.05$)** for the impact of the proposed training program on developing some anthropometric variables for kick boxing athletes.

1.5. Study variables:

1.5.1. The independent variable: Control group and Experimental group.

1.5.2. The dependent variable: anthropometric variables.

1.6. Study Terminology:

Anthropometric variables: Variables related to the human body, which are concerned with the study of certain aspects, such as the recognition of heights, weights, perimeters, widths and depths, whether for part of a body or the body as a whole (Abd, 2013).

Complex skill performance: a set of basic skills, rotational technical movements, etc. that the player uses in competitions, which depend on the integration of these movements, tasks, and technical skills with each other to come out with an appropriate movement range. **(Operational definition).**

Kick boxing : an individual sport that is classified as a self-defense sport, some movements were borrowed from those fighting games, which include Karate, Taekwondo and Boxing. Kicking with legs and punching with hands are used within laws, regulations and instructions governing competitions and competitive meetings in these sports. (**Operational definition).**

2. Previous studies:

The researchers refer to some previous researches and studies related to the study variables (training program, anthropometric variables, skill performance), whether in the sports field in general or in the field of kick boxing in particular (despite their rarity in this sport field as far as the researchers know), as these studies were divided into Arab and foreign studies, starting from the oldest to the most recent, as follows:

2.1. The study of Al-Thiabat and Al-Thiabat (2014), which aimed to identify the relationship between some anthropometric and physical measurements with the digital achievement of female iron ball players. This study aimed to identify the impact of some anthropometric measurements and their relationship to the level of digital achievement of iron ball throwing in addition to identifying the most important measurements which contribute to accomplishing the level of achievement. The study sample consisted of (18) students from the Ramtha schools in Northern part of Jordan participating in the Athletics Championship for the year (2010), and their ages ranged between (15-17) years, the descriptive approach was used, and the results of the study showed a correlation between anthropometric measurements (height, weight , Lower limb, upper arm, thigh length and perimeter, leg length) with the digital achievement level for throwing the ball, while there was no statistical significance in each of the measurements (arm length and palm), the results also showed that there was no correlation between the elasticity, strength tolerance and digital achievement characteristics. According to the results of the study, the researchers recommends that the contribution of digital achievement is one of the most important standards to choose players.

2.2. The study of Al- Omar (2019) which aimed to identify the relationship of some anthropometric measurements and physical abilities in the level of skill performance of kick boxing players**.** Where the study sample included some players from the national kick boxing team (12) players, where the anthropometric measurements included (heights, widths and perimeters), and the physical abilities included (elasticity of the thigh joint, maximum speed, maximum strength, muscle strength, agility). The researcher used the descriptive approach due to its appropriateness with the nature of the study. The results of the study showed a statistically significant correlation between anthropometric measurements and physical abilities in the level of skill performance, and the researcher recommends addressing new anthropometric measurements and physical abilities to verify their relationship with the skill level.

3. Methodology and design:

The objective of the current study is to find out the impact of the proposed training program designed by the researchers in developing some anthropometric variables and skill performance in kick boxing players, and what are the related dependent variables that can be developed when applying the program to the experimental sample.

3.1. Study Approach:

The semi-experimental approach was used. The researchers used one of the experimental designs with two groups (experimental and control) due to its compatibility with the nature of the study, its objectives, and hypotheses.

3.2. Study community and sample:

The study community and its sample consisted of all kick boxing athletes / men from those with a black belt and above in the Burini Self-Defense Academy, who are over (20 years) of age. 20 players were chosen intentionally, and they were divided into two groups. Each group consisted of (10) players, and the study sample members were divided as follows:

3.2.1. Experimental group: The group to which the proposed training program has been applied in order to develop some anthropometric variables and skill performance.

3.2.2. Control group: The group that continued to train for the (normal) training program at the Burini Self-Defense Academy.

3.3 Equivalence of the groups

To get to know the equivalence between the study groups (experimental and control) on some anthropometric variables and skill performance of kick boxing players in the pre-measurements, a (t) test was applied for the independent samples and the following tables illustrate this.

3.3.1. Anthropometric Variables

Table (1): Results of the Independent Sample t. Test to detect differences in anthropometric variables between the two groups (experimental, control) in pre-measurements (n = 20)

Variable	Group	Mean	Deviation	T value	Freedom degree	Statistical significance
Body mass	Control	61.04	8.39	.147	18	.884
	Experimental	60.47	8.89			
Chest perimeter	Control	85.06	8.49	.233	18	.818
	Experimental	84.07	10.40			
Abdomen perimeter	Control	74.11	6.36	.423	18	.677
	Experimental	72.96	5.79			
Upper arm perimeter	Control	26.30	2.86	.538	18	.597
	Experimental	25.63	2.71			
Forearm perimeter	Control	24.24	1.43	-.224	18	.826
	Experimental	24.41	1.94			
Thigh perimeter	Control	46.08	3.39	.337	18	.740
	Experimental	45.52	4.02			
Calf perimeter	Control	30.46	5.83	-1.338	18	.198
	Experimental	33.15	2.54			
Shoulder width	Control	44.25	3.20	.479	18	.638
	Experimental	43.55	3.34			
Pelvic width	Control	30.95	1.61	.260	18	.798
	Experimental	30.77	1.48			

Table (1) also shows that there are no statistically significant differences between the two groups (experimental and control) in the pre-measurements of the anthropometric variables of kick boxing players, where the values of (t) did not reach the level of statistical significance and **this indicates the equivalence of the two groups** in the pre-measurements.

3.4. Scientific treatments for study tests:

The researchers verified the scientific treatments of the study tests according to the following:

3.4.1. Credibility of the tests:

The researchers presented a set of tests that measure anthropometric variables and skill performance in addition to the proposed training program on a group of experienced arbitrators specialized in sports training and resistance training, measurement and evaluation, physical diagnosis and kick boxing training in addition to training various martial sports related to kick boxing in the faculties of physical education in Jordanian universities, and the number of arbitrators was (8).

3.4.2. Stability of the tests:

The researchers verified the stability of the tests chosen by the arbitrators using the method of (Test Re. Test), where the tests were applied to an exploratory sample consisting of (10 players) whose age exceeds (20 years). They were chosen from Al-Burini Self-Defense Academy in an intentional manner from the brown belt bearers (the belt closest to the black one) and the nominees to pass the black belt test due to the small number of individuals in the study sample, then the same tests were applied again to the exploratory sample in the same conditions and with a time difference of one week, after that a correlation coefficient of stability was extracted (Test Re. Test) for the measurement tools and table No. (2) show that.

Table (2): Pearson Correlation Coefficient of stability (Test Re. Test) for measuring tools (n = 10) for anthropometric variables

Variable	Re-test Stability / Pearson
Body Mass	0.997**
Chest perimeter	0.998**
Abdomen perimeter	0.749**
Upper arm perimeter	0.982**
Forearm perimeter	0.982**
Thigh perimeter	0.952**
Calf perimeter	0.898**
Shoulder width	0.743**
Pelvic width	0.986**

** Statistically significant at the level of significance (0.01).

Table No. (2) shows that the values of the stability coefficients of re-testing anthropometric variables ranged between (0.743 - 0.998) for the study variables, the most prominent among them was the variable of the chest perimeter, and the lowest was for the shoulder width variable, which are considered high correlation coefficients and indicate a high degree of stability and is acceptable for the purposes of study.

3.5. Study tools:

The study included a set of devices and tools that were used to apply the training program and conduct the tests that were identified, and through the researchers' review of theoretical literature and previous studies in addition to seeking the opinions of experts in the field of sports training and resistance training, measurement and evaluation, physical diagnosis and kick boxing training as well as training various martial sports related to kick boxing , in addition to the researchers' experiences in the field of training. **The study tools were**: The tests used in measuring the anthropometric variables of the study sample members, the proposed training program for the development of these variables, the tools and devices used in applying the tests and the training program, and here is an illustration of them:

3.5.1. Anthropometric variables:

The researchers measured the anthropometric variables of the study sample for the two groups (experimental and control) for the pre and post-tests to identify the differences that occurred as a result of the training process, whether because of the proposed training program that was applied to the experimental group, or the training program followed at the Burini Academy for the control group, and the following is an explanation of the anthropometric variables and unit used in the measurement process, in addition to the devices and tools that the researchers used in the process of taking measurements for this study and Table No. (3) shows that:

Table (3): anthropometric variables, unit, devices, and tools used to measure them

No.	Variable	unit	Tools and devices used
1	Body Mass	Kilogram (kg)	Medical Scale, Joy Care (JC-395G)
2	Chest perimeter	Centimeter (cm)	Measuring tape, salux type
3	Abdomen perimeter	Centimeter (cm)	Measuring tape, salux type
4	Upper arm perimeter	Centimeter (cm)	Measuring tape, salux type
5	Forearm perimeter	Centimeter (cm)	Measuring tape, salux type
6	Thigh perimeter	Centimeter (cm)	Measuring tape, salux type
7	Calf perimeter	Centimeter (cm)	Measuring tape, salux type
8	Shoulder width	Centimeter (cm)	Measuring tape, salux type
9	Pelvic width	Centimeter (cm)	Measuring tape, salux type

With the help of three accredited evaluators, the researchers measured the skill performance of the study sample for the two groups (experimental and control) for pre and post-tests to identify the differences that occurred as a result of the training process, whether it was the proposed training program that was applied to the experimental group, or the training program followed at the Burini Academy for the control group. The following is an illustration of the process of measuring the skill performance variable that the researchers used in the process of taking measurements for this study:

3.6. Proposed training program (design and application):

In order to achieve the goals of the study, the researchers has prepared a training program aimed at developing some anthropometric variables and skill performance, after referring to many previous studies, sources and references specialized in sports training, resistance training, and self-defense sports training. The researchers distributed the training program to (4) training circuits, which are (the use of devices and weights in the training process, whether for the body or in combining them with kick boxing , fitness using kick boxing , skill training in kick boxing , competitions between players in kick boxing).The researchers has used many training tools, instruments and devices within the training units.

To achieve all the goals of the study ideally, the researchers formed the proposed training program for a period of (8) weeks, (3) training units per week, and the training program consisted of (24) training units, each training unit took duration of (90) minutes, and was divided into three-parts as follows:

The introductory part (warm-up): it was 15 minutes long, **the main part (the training content):** it was 60 minutes long, **and finally the closing part (calm down):** which was 10 minutes long. The transitional rest periods between the three training units' parts were two minutes between the introductory part and the main part, and three minutes between the main part and the closing part.

Tools and devices used in the application of the training program: The researchers used a set of tools and devices to apply the proposed training program for this study and Table No. (4) shows that.

Table (4) : Tools and devices used in the training program.

No.	Name of the used tool	Tool type	Number	Purpose from the tool used
1	Weightlifting devices	Life Fitness (made in USA)	6	- Training players using weights for the muscle groups supported by each device.
2	Hands, legs, and head protectors	COMBAT (Made in Pakistan)	10	- Protect players from any expected injuries. - Training on punching bag. - Training with a colleague.
3	Electronic stopwatch	CASIO	2	- Measuring exercise periods. - Measuring rest-intervals during application.
4	Whistle	Fox 40	2	- Instruction to start and end the exercises within the proposed program.
5	Medical balls	Adidas	10	- Apply part of the proposed training program.

6	TRX	Life Fitness (Made in USA)	2	- Apply part of the proposed training program.
7	Round-shaped training cones	Nike	25	- Apply some of the proposed training program exercises.
8	Training ladder (3) meters of length	Relefree	2	- Apply some of the proposed training program exercises.
9	Dumbbells	Life Fitness (Made in USA)	10 (pairs)	- Apply some of the proposed training program exercises.
10	Punching bag	COMBAT (Made in Pakistan)	5	- Apply some of the proposed training program exercises.
11	Bar	Life Fitness (Made in USA)	3	- Apply some of the proposed training program exercises.
12	Training ropes	-	10	- Apply some of the proposed training program exercises.
13	Training ball	-	10	- Apply some of the proposed training program exercises.
14	Rubber training ropes	-	10	- Apply some of the proposed training program exercises.
15	Kettle Bell	Life Fitness (Made in USA)	5	- Apply some of the proposed training program exercises.
16	Step	-	10	- Apply some of the proposed training program exercises.

3.7.The statistics used in the study:

To achieve the goals of the study and test its hypotheses, the following statistical methods were used:

- The arithmetic means and standard deviations for all study variables.
- Pearson Correlation Coefficient for stability (Test Re. Test) for measuring tools that were applied to the survey sample.
- Applying independent samples t. test to detect the differences in the study variables between the two groups (experimental and control) in the pre-measurements.
- ANCOVA test to detect differences between the experimental and control groups on all study variables.

4- Presentation and discussion of the results:

Includes the presentation and discussion of the results of the study, which aims to identify the effect of a proposed training program to develop some anthropometric variables and skill performance for kick boxing players. Following are the results according to the sequence of the study hypotheses:

4.1. The first hypothesis: There are statistically significant differences at the level of significance ($\alpha \leq 0.05$) related to the effect of the proposed training program to develop some anthropometric variables for kick boxing players.

To test this hypothesis and to validate it, appropriate statistical treatment was applied to extract the arithmetic means and the standard deviations of the anthropometric variables of the study sample members from kick boxing players on the pre and post measurements of the experimental and control groups, in addition to the associated mono-variance analysis (ANCOVA) for each variable separately according to the group, the results are presented below.

Table (5): arithmetic means and standard deviations for anthropometric among kick boxing athletes, in the pre and post measurements according to the group variable

Group	Control				Experimental			
Measurement	Pre		Post		pre		Post	
Variable	Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation
Body Mass	61.04	8.39	61.79	8.41	60.47	8.89	62.45	8.77
Chest perimeter	85.06	8.49	85.25	8.55	84.07	10.40	86.91	10.35
Abdomen perimeter	74.11	6.36	74.67	6.45	72.96	5.79	73.71	5.67
Upper arm perimeter	26.30	2.86	27.06	2.88	25.63	2.71	27.64	2.62
Forearm perimeter	24.24	1.43	24.46	1.39	24.41	1.94	24.80	1.90
Thigh perimeter	46.08	3.39	47.08	3.35	45.52	4.02	47.27	4.14
Calf perimeter	30.46	5.83	30.79	5.59	33.15	2.54	33.80	2.52
Shoulder width	44.25	3.20	44.28	3.20	43.55	3.34	43.61	3.37
Pelvic width	30.95	1.61	30.99	1.60	30.77	1.48	30.84	1.49

Table (5) shows that there are apparent differences between the arithmetic means of the anthropometric variables of the kick boxing athletes in the pre and post measurements according to the group variable, where the associated mono-variance analysis (ANCOVA) was performed for each variable separately

according to the group after determining the effect of their pre-measurement, This is as shown in Table No. (6).

Table (6): The results of the associated mono-variance analysis (ANCOVA) to detect differences in the post measurement of the anthropometric variables of the kick boxing athletes according to the group variable.

variables	Variable	Total squares	Freedom degrees	Average squares	F value	Statistical F significance	Eta Value η
Group	Body Mass	4.579	1	4.579	57.031	.000	.864
	Chest perimeter	20.699	1	20.699	107.645	.000	.923
	Abdomen perimeter	.082	1	.082	.845	.382	.086
	Upper arm perimeter	6.002	1	6.002	45.685	.000	.835
	Forearm perimeter	.052	1	.052	4.171	.071	.317
	Thigh perimeter	1.009	1	1.009	7.101	.026	.441
	Calf perimeter	.438	1	.438	15.876	.003	.638
	Shoulder width	.005	1	.005	1.738	.220	.162
	Pelvic width	.002	1	.002	.495	.499	.052
	Body Mass	57.278	1	57.278	713.311	.000	.988
	Chest perimeter	113.189	1	113.189	588.634	.000	.985
	Abdomen perimeter	5.282	1	5.282	54.365	.000	.858

variables	Variable	Total squares	Freedom degrees	Average squares	F value	Statistical F significance	Eta Value η
Pre (associated)	Upper arm perimeter	13.423	1	13.423	102.163	.000	.919
	Forearm perimeter	.946	1	.946	75.815	.000	.894
	Thigh perimeter	11.321	1	11.321	79.666	.000	.898
	Calf perimeter	28.329	1	28.329	1027.303	.000	.991
	Shoulder width	21.867	1	21.867	8159.065	.000	.999
	Pelvic width	3.442	1	3.442	959.507	.000	.991
Error	Body Mass	.723	9	.080	-	-	-
	Chest perimeter	1.731	9	.192	-	-	-
	Abdomen perimeter	.875	9	.097	-	-	-
	Upper arm perimeter	1.182	9	.131	-	-	-
	Forearm perimeter	.112	9	.012	-	-	-
	Thigh perimeter	1.279	9	.142	-	-	-
	Calf perimeter	.248	9	.028	-	-	-
	Shoulder width	.024	9	.003	-	-	-
	Pelvic	.032	9	.004	-	-	-

variables	Variable	Total squares	Freedom degrees	Average squares	F value	Statistical F significance	Eta Value η
	width						
Correct total	Body Mass	1331.272	19	-	-	-	-
	Chest perimeter	1636.292	19	-	-	-	-
	Abdomen perimeter	669.138	19	-	-	-	-
	Upper arm perimeter	138.070	19	-	-	-	-
	Forearm perimeter	50.602	19	-	-	-	-
	Thigh perimeter	255.157	19	-	-	-	-
	Calf perimeter	382.970	19	-	-	-	-
	Shoulder width	196.670	19	-	-	-	-
	Pelvic width	43.286	19	-	-	-	-

Table (6) shows the following:

There **are no** statistically significant differences in the pre-measurement on all variables of anthropometric variables as the (f) values did not reach the level of statistical significance ($\alpha \leq 0.05$) and this confirms **the equivalence of the two groups in the pre-measurement.**

Results related to this hypothesis showed that there is a statistically significant effect of the proposed training program for developing some anthropometric variables at the level of significance ($\alpha \leq 0.05$) on the following anthropometric variables: (body mass, chest perimeter, upper arm perimeter, thigh perimeter, calf perimeter) in

the post measurement and in favor of the experimental group that received the training program. **The researchers attribute this result** to the fact that the training program contained training units appropriate for the physical structure of kick boxing athletes, and this helped to develop these variables, therefore the training process using resistors and weights that were used within the training units in the proposed training program led to an improvement in the structure of the player's muscles who practices these exercises. Lunardoni (2010) confirmed that the training process based on the use of resistors and weights will give two types of muscle inflation, which are, transitional and chronic or permanent inflation. The temporary results from training come through direct physiological responses that result from the performance of these exercises, but they soon disappear after performing the muscular work in a short period of time as a result of the accumulation of fluids in the muscular spaces and the return of these fluids to the blood within hours after training and thus the return of the muscle to its normal size after the exercise ends with a short period of time, and this is called the process of transition inflation. As for the process of chronic or (permanent) inflation, it is an ongoing process with training for long periods in addition to the availability of adequate nutrition and body comfort, and this occurs due to an increase in the size of the muscle fibers. It is worth noting that the proposed training program prepared by the researchers contained (5) training units that included training using weights devices and free weights as well as using free resistors and weights training in all training units, which lasted for two months, which gave chronic (permanent) results in the process of muscle inflation, which led to the impact of the proposed training program on the development of anthropometric variables.

The results related to this hypothesis also showed that there is no statistically significant effect of the proposed training program for developing some anthropometric variables at the level of significance ($\alpha \leq 0.05$) on the following anthropometric variables: (Abdominal perimeter, forearm perimeter, shoulder width, pelvic width) in the post measurement of the experimental group that applied the training program**. The researchers attribute this result to the fact that** the abdominal perimeter variable and the forearm perimeter variable contain slow-acting muscle fibers, and need a stress training system that plays an important role in the emergence and growth of these muscles, in addition to the

presence of genetic factors that limit their appearance, and finally, the nutrition factor that plays a key role in the process of building muscles in general As for the shoulder width variable and the pelvic width variable, these two variables, as the researchers sees, can be treated as the height variable, so no training program, whatever the number of its training units and the degree of endurance per unit and its duration, can affect the height variable same for the width variable, and the researchers has taken these two variables as an attempt to verify whether the muscles surrounding the shoulders and pelvis can affect the measurement of the shoulder width and pelvic width variable when the muscle building process occurs as a result accompanying the training process.

5. Conclusions:

5.1. The proposed training program was effective in distinguishing of some anthropometric variables under study where the experimental group improved more than the control group.

5.2. The effect size of the training program varied in the variables under study of the anthropometric variables, the highest effect size of the proposed training program was in favor of the chest perimeter variable with (92.3%) and the lowest was in favor of the thigh perimeter variable with (44.1%).

5.3. The training program showed progress for study members from the experimental group of kick boxing players as a result of differences between the arithmetic means of all relevant study variables and this indicates the possible improvement experienced by the sample members.

5.2. Recommendations:

- The necessity of keeping pace with the training process in kick boxing sport with an emphasis on anthropometric variables which in turn may guarantee a performance increase for players in tournaments and competitions.
- Conducting a correlational study to uncover the relationship between anthropometric variables in the level of skill performance of kick boxing players based on the existing database.

- Carrying out similar studies to this study and employing different variables taking into consideration increasing the number of members in the samples and studying the difference of gender and different taxonomic groups.

References:

- Abd, Ali "Some Anthropometric Measurements and Biomechanical Variables and their Relationship with Jumping Skills Performance", *Journal of Physical Education Sciences*, Iraq, 2013, 6 (3), 119-155
- Al-Kurdi, Ziad and Al-Zo'ubi, Fayez. Physical abilities and anthropometric measurements of karate players in Jordan. *Journal of Educational and Psychological Sciences*, Bahrain, 2006, 7(2), 155-174.
- Al-Omar, Omar (2019). Relationship of some anthropometric measurements and physical abilities in the level of skill performance of kick boxing athletes, (accepted for publication), *Derasat Journal for Research and Development of Sports Science Activities*, Dubai, 2019, 5 (2), 142 164 .
- Al-Thiabat, Najeh and Al-Thiabat, Inaam (2014). The relationship of some anthropometric and physical measurements with the digital achievement of female iron ball players. *Al-Aqsa University Journal (Humanities Series)*, Gaza, 2014, 8 (12), 90 – 107.
- Bou-Hafs, Khawla and Bou-Koffa, Khawla and Aidir, Hassan. **Developing a training program in squat exercises and jumping on some physical measurements for students of the sports association**, unpublished master's thesis, Institute of Science of Technology, physical and sports activities, University of Messila - Algeria, 2017.
- Buse, G. & Santana, J. (2008). **Conditioning strategies for competitive kick boxing . Strength and Conditioning**, California, 2008, 42-48.
- Farhat, Layla. **Measurement and testing in physical education**, 1st edition, The Book Publishing Center, Cairo, 2001, 92-103.
- Hazza, Hazza. **Physical effort physiology, foundations, theory and scientific procedures for physiological measurements**, King Saud University House for Academic Publication and Press, Saudi Arabia, 2009, 71-112.

- Karadag, M et. al. Examination of Changes in Certain Biochemical Parameters before and after Acute Training in Kick boxers. *Journal of Education and Training Studies*, New York, 2018, 12 (6), 235-238.
- Keshav, K; Amrinder, S; Harmandeep, S; Kamal, S. A Comparative Study of Physical Fitness Variables of Male Volley ballplayers and Football Players. *Journal of Physical Education Sciences*, India 2014, 2(1), 5-7.
- Nikolaidis, PT; Tasiopoulos, I. Acute effect of official kick boxing game on handgrip muscle strength: winners vs. losers. *Journal of Physical Education and Sport*. New York, 2013, 13(2),266 – 269.
- Ouergui, I et. al. Technical and tactical analysis of high-level kick boxing matches. *International J. of Performance Analysis and Sports*. United Kingdom, 2013,13(2) 294-309.
- Santos-Longhurst, A. **What are the benefits of kick boxing**? https://www.healthline.com/health/kick boxing -benefits, 2019.
- Slimani, M et al. Kick boxing review: anthropometric, psychophysiological and activity profiles and injury epidemiology. *Journal of Biol Sport*, USA, 2017,34(2), 185–196.
- Stickney J. **Discourses of Empowerment: Female martial artists on the martial arts**. Book of Abstract of the Annual Meeting of the American Sociological Association, Philadelphia PA, 2005, 16-25.
- Vertonghen, J & Theeboom, M .The social-psychological outcomes of martial arts practice among youth. *J. of Sports Science Med*. USA, 2010, 9(4) 528-537.
- Volodchenko, et. al. The Usefulness of Performing Biochemical Tests in the Saliva of Kick boxing Athletes in the Dynamic of Training. *Biomed Research International*. USA, 2019,(5):1-7.

Appendix (1): Some anthropometric measurements of kick boxing sport

variables	The variable and how to measure it	Notes
mass	body mass Use a medical scale unit (kg)	○ Agree: ○ Disagree:……
circumferences	chest circumference Use a metric tape measure unit (cm)	○ Agree: ○ Disagree:……
	Abdominal circumference Use a metric tape measure unit (cm)	○ Agree: ○ Disagree:……
	humerus circumference Use a metric tape measure unit (cm)	○ Agree: ○ Disagree:……
	Forearm circumference Use a metric tape measure unit (cm)	○ Agree: ○ Disagree:……

	thigh circumference Use a metric tape measure unit (cm)	○ **Agree:** ○ **Disagree:……**
	calf circumference Use a metric tape measure unit (cm)	○ **Agree:** ○ **Disagree:……**
Width	**shoulder width Use a metric tape measure unit (cm)**	○ **Agree:** ○ **Disagree:……**
	pelvic width Use a metric tape measure unit (cm)	○ **Agree:** ○ **Disagree:……**

Appendix (2): Names of arbitrators tests for some anthropometric measurements

The number	The name	Specialization	Workplace
1	Prof. arabi hamuwdah almaghribiu	Measurement and calendar in physical education	University of Jordan
2	Dr. akif Muhammad tifur	Measurement and physical diagnosis in fitness and training	The Hashemite University
3	Dr. Ibrahim Muhammad harafisha	Physiology of physical activity/science of exercise training	The Hashemite University
4	Dr. Samir qasim	Modified physical education / self-defense	Yarmouk University

أثر برنامج تدريبي مقترح لتطوير متغيرات أنثروبومترية مختارة بين لاعبي الملاكمة

عمر مصطفى العمر[١]　　بسام عبد الله مسمار[٢]

تاريخ تسلم البحث: ٢٠٢١/١/٢٢م　　تاريخ قبوله للنشر: ٢٠٢١/٩/٢٠م

ملخص

هدفت هذه الدراسة إلى تحديد تأثير برنامج تدريبي مقترح لتطوير متغيرات بشرية مختارة بين لاعبي الملاكمة. تكونت عينة الدراسة من (٢٠) لاعباً تم اختيارهم بطريقة العينة المقصودة من أكاديمية البوريني للدفاع عن النفس. تم استخدام التقنية شبه التجريبية كتصميم بحثي. تم تقسيم عينة الدراسة إلى مجموعتين حيث تضم كل واحدة ١٠ لاعبين، المجموعة الضابطة التي تطبق برنامج الأكاديمية التقليدية، بينما تطبق المجموعة التجريبية البرنامج التدريبي المقترح. بعد عملية جمع البيانات تمت معالجتها باستخدام الإحصاء الوصفي مثل المتوسطات والانحراف المعياري ومعامل الاختلاف ومعامل ارتباط بيرسون واختبار t و ANCOVA.

أوضحت نتائج الدراسة أن البرنامج التدريبي المقترح يجسد فروق ذات دلالة إحصائية في القياسات البعدية للمتغيرات البشرية المختارة (كتلة الجسم، محيط الصدر، محيط العضد، محيط أعلى الساق، محيط ربلة الساق) بين عينة الدراسة، حيث تم إجراء التجربة التجريبية. تحسنت المجموعة أفضل من المجموعة الضابطة. يوصي الباحثون بتبني البرنامج التدريبي المقترح من خلال زيادة الوحدات التدريبية لتحسين المتغيرات الأنثروبومترية والتي بدورها تعزز أداء اللاعبين.

الكلمات المفتاحية: برنامج تدريبي؛ الأنثروبومترية. الملاكمة.

(١) الجامعة الأردنية.
(٢) الجامعة الأردنية.