

The Impact of a Proposed Training Program to Develop Selected Physical Abilities among Kickboxing Players

Bassam A. Mismar^{a*}, O. M. Al-Omer^b, ^aSchool of Physical Education, University of Jordan, Amman, Jordan; ^bMinistry of Education, Amman, Jordan, Email: ^{a*}b.mismar@ju.edu.jo

Identifying the impact of a proposed training program to develop selected physical abilities among kickboxing players. The study consisted of 20 (n=20) players who were chosen intentionally from Al-Burini Academy for Self-Defense in Jordan, the study sample was divided into two groups and each one had 10 players. The experimental group was introduced to the proposed training program developed by the researchers. The proposed training program exemplifies significant differences of impact in the post measurements at p-value of 0.05. The differences were measured for selected physical abilities (legs strength, explosive strength of the lower limbs, one repetition max of hamstring muscles) where the performance of the experimental group was better than the control group.

Keywords: *Training Program; Physical Abilities; Kick-boxing Skills.*

1. Introduction

The participations of adults and youngsters in martial arts and combat sports such as Karate, Taekwondo, Judo and Kickboxing have a universal appeal. 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). Many people from different countries participate in sports activities in general and martial arts in particular. Australia is considered one of the top ten countries that practice such sports (Australian Bureau of statistics, 2009). As far as competitive kickboxing is of concern, Buse and Santana (2008) indicated that kickboxing skills and preparations along with a high conditioning level with injury prevention factors, well described nutrition, with good rest and physiological readiness could make a competitive kickboxer.

Kickboxing as one of the 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 there are some other benefits such as cardiovascular and mental health, muscle strength, balance and weight loss (Santos-Longhurst, 2019). Stickney (2005) recognised more benefits such as entertainment self-recognition and esteem. Kickboxing is a modern combat sports in which it requires the athletes to acquire high thresholds of several fitness components and have well developed muscle mass in addition to having psychological and mental toughness.

1.1 Research problem

Through the researchers' views and observations, beside their experience in professional preparation in sports in general and in kickboxing in particular, the problem emerged when most coaches in the country and the region focus their training programs on kickboxing fundamental skills to develop players performance, in addition to lack of utilising modern sports methods in training to develop the physical abilities and complex skill of their players. They rarely used modern techniques, weightlifting halls or resistors in their training process. The researchers' assumption is that if attention can be given to the development of all elements of the game and its requirements in training their players, this will positively affect the performance in the battles, as the largest number of points could be scored, and the opposing player will be prevented from controlling the game and the battle.

1.2 Significance of research

The significance of this research can be summarised in the following points:

- 1) Since kickboxing is recognised in the Olympic Games, more attention should be given to the requirements of its training programs in order to develop fitness as well other aspects related to this sport to reach advanced levels.
- 2) This research is considered among the scientific endeavours to provide a database on this subject among kickboxing players in order for academic institutions, scientific research centres as well as the local and regional Federation of Kickboxing and its clubs, coaches and those who are in charge of this sport to use this study to develop future training programs.

1.3. Research objective

The objective of this research was to identify the impact of a proposed training program on developing some physical abilities for kickboxing players.

1.4. Research hypothesis

The researchers hypothesised that there are statistically significant differences at the level of significance ($\alpha < 0.05$) for the impact of the proposed training program on developing some physical abilities for kickboxing athletes.

Independent variable: the proposed training program.

Dependent variable: physical abilities.

2. Theoretical Background

Modern sports training is one of the basic sciences that supports the field of applied knowledge in general and the field of upper-level sport in particular. The ultimate goal of the sports training process is to prepare the individual comprehensively to bring him/her to the best level of sports upon his/her abilities, besides preparations in the type of sports activity that he/she specialises in. Physical abilities play an effective role in the level of athletic performance, whether in technical matter or in planning the training process during sports competitions. Thus, it works to assist in performing the technique correctly and more effectively in the process of training and competitions to reach the desired goal which is to accomplish the achievement that the player is seeking (Keshav, Amrinder, Harmandeep & Kamal, 2014).

Physical abilities with all their multiple elements are considered a cornerstone in upgrading and developing motor skills for athletic performance. Physical abilities are the most important pillar of motor skills that help in reaching successful performance (Buse & Santana, 2008), and that the components of physical abilities are a prerequisite for the achievement in this sport.

Kickboxing is classified as one of the combat sports, it represents a mixture of combat games such as karate, taekwondo and boxing combined with each other where the player can practice this sport by using the upper and lower limbs to make contact points with the competitor within physical, psychological capabilities and skills that the player has in playing the game. It is important that the kickboxing player possesses a lot of physical and harmonic abilities that distinguishes him/her from other sports, such as muscle strength, speed, agility, flexibility, and other elements. So, the

bottom line confirms that kickboxing is not only a sport that helps a person to defend himself/herself from dangers, but rather is a new way to promote various concepts, including physical, harmonic and skill abilities, whether associated with health or achievement (Ouergui, Hssin, Franchini, Gmada and Bouhleb, 2013).

The kickboxing training process is well-thought-out as one basic rule to get high results. The thing that determines and distinguishes the development of physical conditioning variables, related to kickboxing players is the veracity of the individuals and their abilities to work and develop during training processes.

Since kickboxing is a combat sport, it requires a great effort in advanced training, which must be organised and based on modern foundations, strategies, and methods to reach excellent technical and tactical demonstration during the training process and the competitions.

The researchers refer to previous research and studies related to the research variables such as training program, physical abilities in the field of kickboxing in particular, despite their rarity in this sport field as far as the researchers know:

Tasiopoulos & Nikolaidis (2013) conducted a study which aimed to identify the effect of kickboxing on the strength of the hand muscles. Where the study sample consisted of 31 kickboxing players, a test was made for the strength of the most used hand muscles and the least used hand muscles before and after the player practiced a three-minute combat battle for a period of two minutes with a one-minute break between each round and testing the winner against the loser. The two researchers concluded that there was a decrease in the strength of the most used hand by 1.9 kg, and the least used hand by 1.6 kg where it was observed that the decreases were among the winners more than the losers. The researchers recommend the necessity of using this study in order to evaluate the training loads and determine the neuromuscular loads, which are required by this game.

The study of Ouergui et al. (2014) which aimed to verify the impact of five weeks of training in kickboxing on the fitness level. The study sample included 30 people divided into 2 groups of 15 players practicing kickboxing and 15 players practicing sports in general. Each group trained one hour per day 3 times a week. The researchers used the muscle strength tests for the upper and lower parts of the body in addition to some physical abilities. The researchers also used a descriptive approach due to its appropriateness with the nature of the study. The researchers reached a conclusion confirming that the group that used to practice kickboxing showed a significant improvement in all tests compared to the group that practiced sports in general. The researchers recommended kickboxing for those who want to increase their fitness level.

Ouergui et al. (2015) conducted his research which aimed to verify whether circular training leads to hormonal, physiological, and physical responses among elite athletes in the kickboxing sport. The study sample consisted of 20 kickboxing players at the national level in the United Kingdom. The descriptive approach was used in conducting the study by taking some measurements from the players before and after training. A conclusion was reached confirming that there was an increase in the rate of cortisol production after the training process, while the rest of the measurements were not affected after the training process. The researchers recommend applying this study in kickboxing competitions to identify the hormonal, physiological and physical aspects of the players.

The study by Karadag Gür, Kargün, Savucu, Eskiyecek & (2018) aimed at analysing and evaluating the physiological properties of athletes in kickboxing. The sample of the study consisted of 50 kickboxing players divided as follows: 39 males and 11 females. The following measurements were taken from the study sample: body mass index, blood samples include glutamic, cystine and glycine. These measurements were taken before and after the training process. The researchers used the descriptive approach due to its suitability with the nature of the study. The results showed that the analysis resulting from men in kickboxing before and after training at the amateur level differ significantly from the analysis of women. The researchers recommend the necessity to analyse the athletes' abilities well in the metabolism process in response to the stress that may result from strenuous exercises, and the exercise should improve performance by detecting biochemical changes.

3. Methodology and Design

The objective of the study was to test the impact of the proposed training program designed by the researchers in developing some physical abilities in kickboxing. The semi-experimental approach was used to achieve the objective with two groups (experimental and control) due to its compatibility with the nature of the research.

3.1. Population and sample

The study population and its sample consisted of all male kickboxing athletes from those with a black belt in the Burini Self-Defense Academy in Jordan, who were over 20 years of age. Twenty players were chosen intentionally as purposive sample. They were divided into two groups, each group consisted of 10 players.

Experimental group: The group to which the proposed training program has been applied in order to develop some physical abilities for the sample.

Control group: The group that continued to train for the normal training program at the same academy.

3.3. Scientific Coefficients of the tests

The researchers verified the scientific coefficients of the study tests as follows:

3.3.1. Validity of the tests

The researchers presented a set of tests that measure physical abilities in addition to the proposed training program on a group of experienced arbitrators specialised in sports training and resistance training, measurement and evaluation, physical diagnosis and kickboxing training in addition to training various martial sports related to kickboxing in the faculties of physical education in Jordanian universities. The number of experts was 9.

3.3.2. Stability of the tests

The researchers verified the stability of the tests by using the method of Test-Re-Test, where the tests were applied to an exploratory sample consisting of 10 whose age exceeds 20 years. They were chosen from Al-Burini Self-Defense Academy within an intentional protocol from the black belt holders, then the same tests were re-applied to the exploratory sample in the same conditions with one week apart, after that a correlation coefficient of stability was extracted for the measurement tools as in Table 1.

Table 1. Pearson Correlation Coefficient of stability (Test- Re-Test) for measuring tools (n = 10) for Physical abilities

Variable	Test-Re-test Stability
Heart rate	0.976**
Elasticity of the thigh joint	0.757**
Maximum grip power/right	0.731**
Maximum grip power/left	0.746**
Strength of the trunk	0.754**
Strength of both legs	0.789**
The explosive power of the upper part	0.759**
The explosive power of the lower part	0.747**
Muscular strength endurance	0.531**
Agility	0.774**
Speed	0.712**
Respiratory periodic endurance	0.930**
(1RM) for the chest muscle	0.963**
(1RM) for the back muscle	0.748**
(1RM) for the quadriceps muscle	0.693**
(1RM) for the hamstring muscle	0.815**

** Statistically significant at the level of significance.

Table 1 showed that the values of the stability coefficients of re-testing physical abilities range between 0.531 - 0.976 for the study variables. The most prominent among them was the variable of the heart rate, and the lowest was for the muscle strength endurance variable, which are high correlation coefficients and indicate a high degree of stability. It is acceptable for the purposes of the study.

3.4. Study tools and apparatuses

3.4.1. Contents of Physical abilities

Physical abilities have been measured 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 Al-Burini Academy for the control group. The following is an explanation of the physical abilities and unit used in the measurement process, in addition to the devices and tools that the researcher used in the process of taking measurements for this study. Table 2 showed that:

Table 2. Physical abilities, unit, devices, and tools used for measurement.

No.	variable	Unit	Tools and devices used
1	Heart rate	Pulse*minute	The iProven Pulse device, Model (OXI-27BL)
2	Elasticity of the thigh joint	Degree	Elasticity box
3	Maximum grip power	Kilogram (kg)	Dynamometer
4	Maximum strength of the trunk	Kilogram (kg)	Dynamometer
5	Maximum strength of both legs	Kilogram (kg)	Dynamometer
6	The explosive power of the upper part	Meter (m)	Salux measuring tape, medical ball (5 kg) of weight
7	The explosive power of the lower part	Meter (m)	Measuring tape, salux type
8	Muscular strength endurance	Repetition	*****
9	Agility	Second (s)	Digital stopwatch, cones
10	Speed	Meter/second	Digital stopwatch, cones
11	Respiratory periodic endurance	Meter (m)	Digital stopwatch, cones
12	(1RM) for the chest muscle	Kilogram (kg)	Bench Press Par
13	(1RM) for the back muscle	Kilogram (kg)	Lat Pull Down Machine
14	(1RM) for the quadriceps muscle	Kilogram (kg)	Leg Extension Machine
15	(1RM) for the hamstring muscle	Kilogram (kg)	Leg Cur Machine

3.4.2. Proposed training program (design and application):

In order to achieve the goals of the study, the researchers have prepared a training program aimed at developing some physical abilities, after referring to many previous studies, sources and references specialised in sports training, resistance training, and self-defence 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 kickboxing; fitness using kickboxing; skill training in kickboxing; and competitions between players in kickboxing. The researchers have 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 of 90 minutes each, 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 (cool 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.

3.4.3. 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 as in Table 3.

Table 3. 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	6	- Training players using weights for the muscle groups supported by each device.
2	Hands, legs, and head protectors	COMBAT	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	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	10 pairs	- Apply some of the proposed training program exercises.
10	Punching bag	COMBAT	5	- Apply some of the proposed training program exercises.
11	Bar	Life Fitness	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	5	- Apply some of the proposed training program exercises.
16	Step	-	10	- Apply some of the proposed training program exercises.

3.5. 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. Results

4.1. The first hypothesis:

The first hypothesis states that there were statistically significant differences at the level of significance ($\alpha \leq 0.05$) related to the effect of the proposed training program to develop some physical abilities for kickboxing players.

To test this hypothesis, appropriate statistical treatment was applied to extract the arithmetic means and the standard deviations of the physical abilities of the study sample members from kickboxing players on the pre- and post-measurements of the experimental and control groups, in addition to the ANCOVA for each variable separately according to the group, the results are presented below.

Table 4. Means and SD for physical abilities among kickboxers in the pre- and post-measurements according to the group variable

Group	Control				Experimental			
	pre		post		pre		post	
Measurement	Arithmetic mean	Standard deviation						
Heart rate	65.40	2.37	64.40	1.84	66.20	2.90	64.60	2.50
Elasticity	39.70	3.30	42.00	3.92	35.70	7.12	45.70	3.20
Maximum grip power/right	45.40	6.90	47.70	6.00	40.90	8.25	54.40	5.700
Maximum grip power/left	43.60	6.70	45.20	6.18	39.50	7.53	50.80	5.59
Strength of the trunk	132.90	20.98	135.60	20.23	129.60	24.76	156.20	16.63
Strength of both legs	151.70	23.92	154.40	23.87	149.50	34.68	176.50	22.39
The explosive power of the upper part	2.42	0.17	2.47	0.170	2.43	0.28	2.61	0.32
The explosive power of the lower part	2.24	0.13	2.29	0.13	2.22	0.21	2.42	0.20
Muscular strength endurance	48.10	7.88	51.50	7.12	52.10	11.33	64.60	9.72
Agility	15.97	0.10	15.96	0.09	15.96	0.09	15.95	0.09
Speed	5.55	0.22	5.52	0.21	5.49	0.23	5.36	0.22
Respiratory periodic endurance	2190.20	73.29	2196.30	73.02	2195.30	95.12	2262.70	48.30
(1RM) for the chest muscle	81.90	8.23	82.20	9.21	76.20	11.49	86.60	11.51
(1RM) for the back muscle	81.60	8.92	82.80	7.19	78.00	10.87	92.60	9.04
(1RM) for the quadriceps muscle	68.30	3.86	69.40	4.81	65.80	4.47	74.20	5.37
(1RM) for the hamstring muscle	62.90	5.47	64.10	2.23	61.10	2.81	71.20	3.42

Table 4 showed that there are apparent differences between the arithmetic means of the physical abilities of the kickboxing athletes in the pre- and post-measurements according to the group variable, where the ANCOVA was performed for each variable separately according to the group after determining the effect of their pre-measurement.

Table 5. The results of ANCOVA in the post measurement of the physical abilities of the kickboxers according to the group variable.

Variables	Variable	Total squares	Freedom degrees	Average squares	F value	Statistical F significance	Eta Value η
Group	Heart rate	.003	1	.003	.007	.940	.004
	Elasticity	21.050	1	21.050	3.782	.191	.654
	Maximum grip power/right	26.863	1	26.863	4.167	.178	.676
	Maximum grip power/left	4.333	1	4.333	1.772	.315	.470
	Strength of the trunk	546.635	1	546.635	9.582	.090	.827
	Strength of both legs	1060.917	1	1060.917	29.096	.033	.936
	The explosive power of the upper part	.004	1	.004	5.226	.150	.723
	The explosive power of the lower part	.004	1	.004	182.417	.005	.989
	Muscular strength endurance	4.105	1	4.105	1.587	.335	.442
	Agility	.00002	1	.00002	5.006	.155	.715
	Speed	.003	1	.003	16.076	.057	.889
	Respiratory periodic endurance	45.733	1	45.733	.117	.765	.055
	Heart rate	1.037	1	1.037	2.379	.263	.543
	Elasticity	.00003	1	.00003	.000	.998	.000
	Maximum grip power/right	10.159	1	10.159	1.576	.336	.441
	Maximum grip power/left	41.263	1	41.263	16.873	.054	.894

Pre (associated)	Strength of the trunk	101.718	1	101.718	1.783	.313	.471
	Strength of both legs	334.260	1	334.260	9.167	.094	.821
	The explosive power of the upper part	.022	1	.022	29.676	.032	.937
	The explosive power of the lower part	.006	1	.006	318.721	.003	.994
	Muscular strength endurance	62.191	1	62.191	24.039	.039	.923
	Agility	.016	1	.016	4698.226	.000	1.000
	Speed	.093	1	.093	445.696	.002	.996
	Respiratory periodic endurance	5992.849	1	5992.849	15.306	.060	.884
Error	Heart rate	.872	2	.436	-	-	-
	Elasticity	11.133	2	5.566	-	-	-
	Maximum grip power/right	12.894	2	6.447	-	-	-
	Maximum grip power/left	4.891	2	2.446	-	-	-
	Strength of the trunk	114.092	2	57.046	-	-	-
	Strength of both legs	72.926	2	36.463	-	-	-
	The explosive power of the upper part	.002	2	.001	-	-	-
	The explosive power of the lower part	.00004	2	.00002	-	-	-
	Muscular strength endurance	5.174	2	2.587	-	-	-
	Agility	.00001	2	.00000350	-	-	-
	Speed	.000	2	.000	-	-	-
Respiratory periodic endurance	783.055	2	391.528	-	-	-	
	Heart rate	86.800	19	-	-	-	-
	Elasticity	298.550	19	-	-	-	-

Corrected Total	Maximum grip power/right	840.950	19	-	-	-	-
	Maximum grip power/left	782.000	19	-	-	-	-
	Strength of the trunk	8293.800	19	-	-	-	-
	Strength of both legs	12080.950	19	-	-	-	-
	The explosive power of the upper part	1.257	19	-	-	-	-
	The explosive power of the lower part	.578	19	-	-	-	-
	Muscular strength endurance	2164.950	19	-	-	-	-
	Agility	.146	19	-	-	-	-
	Speed	.972	19	-	-	-	-
	Respiratory periodic endurance	91019.000	19	-	-	-	-

5. Discussion

Table 5 showed the following:

- There is no statistically significant impact of the proposed training program for developing some physical abilities at the level of significance ($\alpha > 0.05$) on the group variable (pulse) in the post measurement where the F-value reached 0.007 with 0.940 statistical significance, and the effect size reached 0.4%, which represents the value of the η square (0.004).

Also, there is no statistically significant impact of the proposed training program for developing some physical abilities at the level of significance ($\alpha > 0.05$) on the group variable: pulse, elasticity, grip power / right, grip power / left, trunk strength, legs strength, explosive power of the upper part, explosive power of the lower part, muscle strength endurance, agility, speed, and respiratory periodic endurance.

- There is statistically significant impact of the proposed training program for developing some physical abilities at the level of significance ($\alpha \leq 0.05$) on the group variable (strength of the legs)

in the post measurement where the F-value reached 29.096 with 0.033 statistical significance, and the effect size reached 93.6% which represents the value of the η square (0.936).

- Also, there is a statistically significant impact of the proposed training program for developing some physical abilities at the level of significance ($\alpha \leq 0.05$) on the group variable: strength of the legs and explosive strength of the lower parts.

Table 6: The results of ANCOVA of physical abilities of the kickboxers according to the group variable.

Variables	variable	Total squares	Freedom degrees	Average squares	F value	Statistical F significance	Eta Value η
Group	(1RM) for the chest muscle	37.829	1	37.829	12.235	.073	.859
	(1RM) for the back muscle	31.957	1	31.957	17.481	.053	.897
	(1RM) for the quadriceps muscle	9.119	1	9.119	4.991	.155	.714
	(1RM) for the hamstring muscle	19.609	1	19.609	69.172	.014	.972
Pre (associated)	(1RM) for the chest muscle	9.953	1	9.953	3.219	.215	.617
	(1RM) for the back muscle	6.303	1	6.303	3.448	.204	.633
	(1RM) for the quadriceps muscle	37.806	1	37.806	20.694	.045	.912
	(1RM) for the hamstring muscle	5.656	1	5.656	19.952	.047	.909

Error	(1RM) for the chest muscle	6.184	2	3.092	-	-	-
	(1RM) for the back muscle	3.656	2	1.828	-	-	-
	(1RM) for the quadriceps muscle	3.654	2	1.827	-	-	-
	(1RM) for the hamstring muscle	.567	2	.283	-	-	-
Corrected total	(1RM) for the chest muscle	2052.800	19	-	-	-	-
	(1RM) for the back muscle	1682.200	19	-	-	-	-
	(1RM) for the quadriceps muscle	583.200	19	-	-	-	-
	(1RM) for the hamstring muscle	402.550	19	-	-	-	-

Table 6 showed the following:

- There is no statistically significant impact of the proposed training program for developing some physical abilities at the level of significance ($\alpha > 0.05$) on the group variable 1RM for the chest muscle in the post measurement where the F-value reached 12.235 with 0.073 statistical significance, and the effect size reached 85.9%, which represents the value of the η square (0.859).
- Also, there is no statistically significant impact of the proposed training program for developing some physical at the level of significance ($\alpha > 0.05$) on the group variable back muscles, (1RM) for the quadriceps muscle, in the post measurement where the (F) value reached 17.481 with 0.053

statistical significance, and the effect size reached 89.7%, which represents the value of the η square (0.897).

- There is statistically significant impact of the proposed training program for developing some physical abilities at the level of significance ($\alpha \leq 0.05$) on the group variable 1RM for the hamstring muscle in the post measurement where the (F) value reached 19.609 with 0.014 statistical significance, and the effect size reached 97.2% which represents the value of the η square (0.972).

The researchers attribute this result to the fact that the training program contained a variety of important physical and skill exercises through which many physical abilities were characterised by the diversity and frequency of exercises. It focused on high-intensity exercises with appropriate breaks to develop physical performance along with the introduction of kickboxing skills in fitness training, which led to the development of physical abilities in general, in addition to the introduction of modern sports tools and instruments in the training process to lead the players to reach the maximum abilities that any player practicing kickboxing can possess. The results of the current study were consistent with the results of Hoffman & Kang (2003), Ouergui et al. 2013, Chelley, Hermassi, Aouadi, & Shephard (2014).

The results related to this hypothesis also showed that there was no statistically significant impact of the proposed training program to develop some physical abilities at the level of significance ($\alpha \leq 0.05$) on the following physical abilities: pulse, elasticity, grip strength, trunk strength, explosive strength of the upper part, strength muscle endurance, agility, speed, periodic respiratory endurance, 1RM for the chest muscle, 1RM for the back muscle, and 1RM for the quadriceps muscle in the post measurement of the experimental group that received the training program. The researchers attribute this result to the fact that the proposed training program has clearly affected these variables without statistical significance, by observing the differences between the arithmetic means between the pre and post-tests of the two groups and comparing them with each other, when calculating the difference between the arithmetic mean for each variable separately we notice an apparent difference in favour of the experimental group. The reason for not showing any statistical significance for these variables is that all the pre-tests for the control sample were high in the pre-test, as the training program used in Al-Burini Academy did not effectively affect the post results of the control sample, but these results remained high compared to the results of the experimental group. The most important factor here is that the number of the sample members was very small for both groups, so no statistical significance has emerged for these variables, noting that there has been a significant evolution in them, as mentioned earlier. These results in the current study did not conform with the results of the study of Hoffman & Kang (2003), or Stickney (2005).

The modified arithmetic means, and standard errors of dimensions were calculated according to the groups, as shown in Table 7.

Table 7: Modified arithmetic means, and standard errors for post measurement of some physical abilities among kickboxers

Dependent variable	Group	Modified arithmetic mean	Standard error
Heart rate	Experimental	64.536	.764
	Control	64.664	.764
Elasticity	Experimental	49.060	2.731
	Control	38.640	2.731
Grip power/ right	Experimental	56.936	2.939
	Control	45.164	2.939
Grip power/ left	Experimental	50.364	1.810
	Control	45.636	1.810
Strength of the trunk	Experimental	172.451	8.742
	Control	119.349	8.742
Strength of both legs	Experimental	202.439	6.989
	Control	128.461	6.989
Explosive power of the upper part	Experimental	2.609	.032
	Control	2.466	.032
Explosive power of the lower part	Experimental	2.423	.005
	Control	2.289	.005
Muscle strength endurance	Experimental	60.351	1.862
	Control	55.749	1.862
Agility	Experimental	15.957	.002
	Control	15.948	.002
Speed	Experimental	5.370	.017
	Control	5.501	.017
Respiratory periodic endurance	Experimental	2221.820	22.902
	Control	2237.180	22.902
1RM for the chest muscle	Experimental	91.385	2.035
	Control	77.415	2.035
1RM for the back muscle	Experimental	94.120	1.565
	Control	81.280	1.565
1RM for the quadriceps muscle	Experimental	75.229	1.564
	Control	68.371	1.564
1RM for the hamstring muscle	Experimental	72.679	.616
	Control	62.621	.616

It is clear from Table 7. that the fundamental differences between the modified means for the post measurement of some physical abilities of kickboxing in favour of the experimental group, in the



leg strength, explosive strength of the lower part, and 1RM of the hamstring muscle variables, who were exposed to the proposed training program in order to develop some physical abilities among kickboxing players compared to the control group. Note that the effect size ranged between 0.4% - 98.9% for both heart rate and the explosive strength of the upper part, as in tables 5 and 6.

6. Declaration of Interest Statement

B. A. Mismar and O. Al-Omer declare that they have no competing interests. All procedures performed in studies involving human participant are in accordance with the ethical standards of the institutional and/or national research committee and with the 1975 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

7. Conclusions

The proposed training program distinguished in developing some of the physical abilities under study of the sample, as the experimental group improved more than the control group.

The effect size of the training program varied in the variables under study. In the physical abilities, the highest effect size of the proposed training program was in favour of the explosive strength variable of the lower part with 98.9% and the lowest was in favour of the leg strength variable by 93.6%.

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

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