Effect of different training loads to develop speed endurance, adapt heart rate and achieve 400m hurdles under 20 years

Lina Ali Sheerkhan[(1)], Assist. Prof. Dr. Liza RustumYaqoob[(2)]

[(1)]Master. Student. Faculty of Physical Education and Sports Sciences for Woman / University of Baghdad, Iraq.
[(2)]Faculty of Physical Education and Sports Sciences for Woman / University of Baghdad, Iraq.

Lena.ali1204a@copew.uobaghdad.edu.iq , Leza@copew.uobaghdad.edu.iq

Abstract

The purpose of this paper isto preparing different training loads to develop speed endurance, adapt heart rate and achieving 400-meter hurdles under 20 years, and recognizing the effect of different training loads on developing speed endurance, adapting heart rate, and achieving 400-meter hurdles under 20 years.The researchers used the experimental method with an experimental design with a pre and post-test for the two equal groups (experimental and control) for its suitability to the nature of the research.The research community was determined for the players of the Babylon Governorate clubs (Al-Hilla Club 2 players), (Al-Kifl Club 2 players), (Al-Mahaweel Club 2 players), Al-Masharou Sports Club 2 players), (Al-Musayyib Sports Club 2 players) in the 2022 sports season, and their number is (10 players), as the research sample was chosen in a comprehensive inventory method, and the sample was divided into two groups, the experimental group and the control group, with (5 players) for each group.

Introduction:

Athletics is one of those games in which the activities vary from throwing, running and jumping, and each of them has special functional requirements, as well as the educational and training aspect, which have a direct impact on the functional aspect according to the specificity of its performance, distance, time and energy systems, and running activities are divided into (short and medium) And each of them has what distinguishes it from the other in terms of different training methods on the one hand, and the physical and functional qualities that must be developed on the other hand, and from short-distance running competitions, with a distance of 400 meters, hurdles. In the physical aspect, the endurance of speed is one of the most important physical abilities used in its training to match the intensity of its performance with the performance of running 400 meters hurdles, where the heart rate is one of the most important indicators used to monitor the intensity of performance and to regulate the periods of rest between exercises according to the goal of training and the amount and direction of its load in a manner appropriate to the nature of the age group. It is important by providing successful solutions in an economical manner in terms of time and effort and know their positive impact in bringing about the required development and improving the level of players in a better way.

Research problem:

Despite the development and progress in the field of sports training in the world, most sports in the country still suffer from some obstacles that hinder their progress, especially the arena and field competitions, especially the 400-meter hurdles competition under 20 years, where the research problem is determined that the achievement of these players The competition is not up to acceptable standards, As a result of a weak endurance of speed, an adaptation of heart rate and achievement, it has become impossible to develop except through organized training, that is, practicing for the competition according to a coordinated training curriculum. Therefore, the researchers decided to develop a training program according to different training loads to develop the endurance of speed, adapt the heart rate, and obtain high results that contribute to the development of the digital level of this game.

Research objective:

- Preparing different training loads to develop speed endurance, adapt heart rate and achieving 400-meter hurdles under 20 years
- Recognizing the effect of different training loads on developing speed endurance, adapting heart rate, and achieving 400-meter hurdles under 20 years

Research hypotheses:

- Different training loads are used to develop speed endurance, adapt heart rate and achieve 400-meter hurdles under 20 years

Research fields:

- Human field: 400m hurdles players under 20 years for the 2022 sports season Al
- Time field: (9/1/2022) to (16/3/2022)
- Spatial field: Kifl Sports Club Stadium / Babylon Governorate

Research methodology and field procedures:

Research Methodology:

The researchers used the experimental method with an experimental design with a pre and post-test for the two equal groups (experimental and control) for its suitability to the nature of the research.

Community and sample research:

The research community was determined for the players of the Babylon Governorate clubs (Al-Hilla Club 2 players), (Al-Kifl Club 2 players), (Al-Mahaweel Club 2 players), Al-Masharou Sports Club 2 players), (Al-Musayyib Sports Club 2 players) in the 2022 sports season, and their number is (10 players), as the research sample was chosen in a comprehensive inventory method, and the sample was divided into two groups, the experimental group and the control group, with (5 players) for each group.

Sample homogeneity and equivalence:

Table (1) Homogeneity of the research sample members

Variables	Measuring unit	Mean	Median	Std. Deviations	Skew ness
Length	m	172.134	170.000	1.675	0.222
Mass	Kg	72.285	70.000	1.321	0.187
Age	Year	17.138	17.000	1.699	0.369

The value of the skewness ranges between ± 3, which indicates a moderate distribution of the population

Table (2)shows the results of the tribal tests in the tests of endurance of speed, an adaptation of heart rate and achievement of 400 meters hurdles for the control and experimental groups.

Physicalvariables	Experimental		Control		T value	Level sig	Type sig
	Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
speed endurance	41.654	3.174	42.234	5.284	0.783	0.891	Non sig
heart rate	182.453	4.458	185.123	8.455	0.982	0.662	Non sig
achieve 400m hurdles	55.432	6.339	56.521	6.457	0.459	0.434	Non sig
Significant when the significance value ≤ 0.05 under degree of freedom of 8							

Means of collecting information: (observation, tests and measurements, Arab and foreign sources and references).

Devices Tools used in the research:

Athletics stadium, 60 legal barriers, Japanese-made electronic timing clocks, (6) tape measure, Sony video camera with a frequency (24 images), (1) Dell laptop computer, electronic medical scale. (1).

Tests used in the research:

- 300m speed endurance test (Joseph L. 2000)
- Heart rate test after stress(Qasim Hassan Hussein. 1999)
- Achievement 400m hurdles: (Peter. L. Thompson. 2009)

Pre-tests:
The two researchers conducted the tribal tests on 9/1/2022 at Al-Kifl Sports Club Stadium / Babylon Governorate

Main experience:

- The sample began carrying out exercises on 11/1/2022 until 3/13/2022.
- Duration of the training program: (8) weeks.
- Total number of training units: (24) training units.
- Number of weekly training units: (3) units.
- Weekly training days: (Sunday - Tuesday - Thursday).
- The training method used: is high-intensity interval training. and iterative
- Training intensity used: (80 - 100%).

Post-tests:
Post-tests were conducted on 16/3/2022 Al-Kifl Sports Club Stadium / Babylon Governorate**.**

Statistical methods: The search data was processed through the Statistical Package for the Social Sciences (SPSS).

Presentation, analysis and discussion of results:
Presentation and analysis of the results of the differences between the two research groups (experimental - control) for the variables under research

Table (3)shows the results of the pre and post-tests for the experimental group in the variables endurance speed, heart rate adaptation, and achievement of 400 meters hurdles

Physical variables	Pre-test		Post-test		deviation of differences	T value	Level sig	Type sig
	Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation				
Speed endurance	41.654	0.238	41.003	0.668	0.334	8.554	0.001	sig
heart rate	182.453	0.675	180.021	0.456	0.654	5.897	0.004	sig
achieve 400m hurdles	55.432	4.667	55.001	0.432	0.784	8.445	0.003	Sig
Significant when the significance value ≤ 0.05 under degree of freedom of 5								

Presentation of the results of the pre and post-tests for the variables endurancespeed, adapting heart rate, and achieving 400 meters hurdles for the control group, as well as analyzing and discussing them.

Table (4) shows the results of the pre and post-tests for the variables endurance speed, adapting heart rate, and achieving 400 meters hurdles for the control group

Physical variables	Pre-test		Post-test		deviation of differences	T value	Level sig	Type sig
	Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation				
Speed endurance	42.234	0.2341	42.003	0.657	0.556	7.078	0.000	sig
heart rate	185.123	0.765	182.004	0.887	0.562	5.667	0.000	sig
achieve 400m hurdles	56.521	0.334	56.000	0.443	0.235	8.789	0.000	Sig

Presentation, analysis and discussion of the results of the post-tests in the tests of endurance of speed, adaptation of heart rate and achievement of 400 meters hurdles for the control and experimental groups

Table (5) shows the results of the post-tests in the tests of endurance of speed, adaptation of heart rate and achievement of 400 meters hurdles for the control and experimental groups

Physical variables	Experimental		Control		T value	Level sig	Type sig
	Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
Speed endurance	40.213	0.1356	41.236	0.236	7.675	0.001	sig

heart rate	176.212	0.5677	180.321	0.765	4.876	0.002	sig
achieve 400m hurdles	54.123	0.1237	55.453	0.653	6.432	0.000	Sig
Significant when the significance value ≤ 0.05 under degree of freedom of 10							

Discuss the results:

The tables of the tribal and remote tests show the results of the variables investigated for the research sample, and the results showed that there were significant differences in the post-test in favor of the two groups. The athletes first and the goal of training second (Moneim and Moghni. 1999), The intensity that was used was high, and ranged from (80-100%) with the training load that took (8) weeks, and was sufficient to cause these effects, and the high intensity is commensurate with the nature of the performance of 400-meter hurdles and speeds endurance training, and this type of intensity It leads to fatigue, which is a healthy indicator in sports training, as it leads to adaptation (Gajes. B.C and et al, .2010), The use of heart rate in training is one of the most important indicators that can be used to ration the rest period between exercises. Which gives an indication of the athlete is training status and the effort exerted (Fattah and Hassanein. 2009),In addition, the training curriculum that used the method of high-intensity interval training and rationing the rest period on the pulse rate led to the development of special speed endurance. In addition using the method of high-intensity interval training contributed to improving the level of achievement (400 meters hurdles) (Robert A. 2000),Because intensity is one of the basic components on which the training process is based, especially for activities whose performance is characterized by high intensity (Hammad.2002).

Conclusions and Recommendations:

Conclusions:

- The results showed a marked superiority between the pre and post-tests, different load exercises to develop speed endurance and heart rate adaptation for the experimental group and in favor of the post-test.
- The results showed a noticeable superiority between the pre and post-tests of different load exercises to develop the achievement of 400 meters hurdles for the experimental group and in favor of the post-test.

Recommendations:

- Paying attention to different load exercises to develop speed endurance, adapt heart rate, and complete 400-meter hurdles under 20 years
- Conducting similar studies and research on different age groups.

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Appendix (1)
The model of the exercises used
First week

Training unit	Exercise	Intensity %	Repetition	Sets	Rest between	
					Repetition (pulse per minute)	Sets (pulse per minute)
Sunday	Running 3 meter hurdles from standing means the distance covered is 125 metres	85	4	3	60	120
Tuesday	Running a distance of 5 hurdles means the distance covered is 200 meters from standing	85	4	2	120	180
Thursday	300m run from standing on 7 hurdles	85	4	2	120	180