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Ahmed Farooq Tawfeeq
Ministry of Higher Education & Scientific Research AL-Iraqia University, Baghdad, Iraq

Corresponding Author:
Ahmed Farooq Tawfeeq
Ministry of Higher Education & Scientific Research AL-Iraqia University, Baghdad, Iraq

The effect of specific endurance exercises on developing certain physical and functional abilities of Al-Adhamiya Club youth athletes in freestyle wrestling

Ahmed Farooq Tawfeeq

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Abstract
The study will seek to frame certain endurance activities that are aligned with the capabilities of the research sample, and to determine the impact of the certain endurance activities on the acquisition of particular physical and functional skills of the research sample.
Research Method: The scholar employed the experimental approach because of the nature and issues of the study.
Population and Sample: The original population comprised of (60) freestyle wrestling athletes of Al-Adhamiya Club, in Baghdad, and was used to pick the research sample. The groups were selected randomly by draw to carry out the exploratory experiment which consisted of (10) athletes who were randomly selected with a total of (50) of the young athletes being given the exploratory experiment. The participants were segmented into two groups which were the control group and experimental group with (25) athletes in each group. The researcher was using the specific endurance exercises during 10 weeks.
The researcher came to a few conclusions, the most significant of which were the following: successfulness of the training program that entailed the exercises that were prepared by the researcher and included in the training program; and superiority of the experimental group in all the post physical tests proving the success of the training program that was incorporated with the exercises that were prepared by the researcher. Some of the most valuable suggestions of the study are the recommendation of implementing the exercises designed by the researcher to train the physical and functional capabilities of young freestyle wrestling athletes.

Keywords: Exercises, specific endurance, physical abilities, functional, freestyle wrestling

Introduction
It is believed that physical fitness is one of the key issues, which competently prepares and trains young freestyle wrestling athletes and guarantees their capability to further enhance the degree of technical execution. Physical training is considered one of the key elements to prepare young freestyle wrestlers to be ready to all circumstances with maximum efficiency. The topic of special physical training deserves attention because it is directly connected with physical and skills-related tasks of young freestyle wrestlers as it is effective in increasing the degree of their productive performance.
It is based on this that the significance of the study evolves in equipping specific endurance training to achieve some physical and functional capacity of young freestyle wrestling athletes. The intended research about the impact of definite endurance activities in the formation of physical and functional capabilities of the youth division in the Al-Adhamiya Club of the freestyle wrestling receives critical significance that adds substantive value to the performance and sports discipline. Specific endurance is the one that helps to continue the long combat rounds, the specific and general muscular strength, and the capacity to preserve wrestling technique during fatigue. It also helps in enhancing muscular recovery, improves injury risks attributed to exhaustion as well as psychological and athletic adaptation among sports people. In such a way, self-confidence and competitiveness are raised which raises the level of the club and negatively impacts their educational and athletic development.

Research Problem

In the efforts of the researcher in the sports coaching and wrestling discipline, one noted that the training of young freestyle wrestling athletes remains based on the traditional exercises, which include running, certain Swedish games, and other forms of exercises that are quite old. Therefore, the research problem will be to create a program based on the recent training techniques that will help to improve and elevate the performance of the athletes within this area so that they could be more enduring and could be more resilient so that they could meet the more difficult conditions than they did.

Research Objectives

The research aims to:

1. Develop specific endurance exercises that correspond to the abilities of the research sample.
2. Identify the effect of specific endurance exercises on developing certain physical and functional abilities of the research sample.

Research Hypotheses

1. There are statistically significant differences between the pre-tests and post-tests of the control and experimental groups in some physical abilities of the research sample.
2. There are statistically significant differences between the pre-tests and post-tests of the control and experimental groups in some functional abilities of the research sample.
3. There are statistically significant differences between the post-tests of the control and experimental groups in some physical abilities of the research sample.
4. There are statistically significant differences between the post-tests of the control and experimental groups in some functional abilities of the research sample.

Research Scope

- **Human Scope:** Youth freestyle wrestling athletes, totaling (50) players for the 2025 sports season, registered in the club's records.
- **Temporal Scope:** From 9/10/2025 to 25/12/2025.
- **Spatial Scope:** The specialized sports hall of Al-Adhamiya Club for freestyle wrestling in Baghdad.
- **Research Methodology:** The researcher employed the experimental method due to its suitability for the nature and problem of the study.

Research Population and Sample

The research sample was selected from the original population, which consisted of (60) freestyle wrestling athletes from Al-Adhamiya Club in Baghdad. A total of (50) young athletes were randomly chosen through a draw among the groups to conduct the exploratory experiment, which included (10) athletes. The sample was then divided into two groups: a control group and an experimental group, with (25) athletes in each group, representing 25% of the original population. The researcher also ensured homogeneity among the sample members according to the variables of height, weight, and age by calculating the coefficient of skewness, as shown in Table (1).

Table 1: Illustrates the homogeneity of the sample according to the variables of height, age, and weight.

Variables	Unit of Measurement	Sample	Mean	Standard Deviation	Median	Skewness Coefficient
Age	Years	50	20.08	0.94	20	-0.619
Height	cm	50	176.5	5.39	176	0.134
Body Mass	kg	50	73.7	11.31	71.25	0.745

Skewness coefficient value ±3

The researcher then randomly divided the research sample into two groups, experimental and control, by drawing names through a lottery to ensure the equivalence of the sample in the research tests.

Equipment, Tools, and Data Collection Methods

Data Collection Methods

1. Arab and foreign sources.
2. Information networks and the Internet.
3. Personal interviews.
4. Observation and experimentation.
5. Measurements and tests used.
6. Research support team.
7. Test results recording forms.
8. Questionnaire forms to survey the opinions of experts and specialists in the field of sports and military training.

Equipment and Tools Used

1. Video camera (1), Sony type.
2. Metal measuring tape.
3. Medical scale (Japanese).
4. Stopwatches (5).
5. Dibi stands (2) + paper tape.
6. Whistles (2).
7. Devices for measuring heart rate and systolic/diastolic blood pressure (5).
8. Platform with a height of 51 cm.
9. Markers (10).
10. Measuring tape (50 m) for running distance.

Determination of Research Tests

The researcher prepared a questionnaire to identify the most important physical and functional abilities and presented it to the experts and specialists in the field of sports training science. After collecting the forms and processing the data, and following statistical analysis, any variable that achieved an agreement rate of 80% or higher was accepted. After extracting the approved percentages from the questionnaire, the selection of the tests was finalized, as shown in the following two tables:

Table 2: Shows the tests that achieved an agreement rate of 80% or higher for physical abilities and physical tests.

Test Name	Purpose of the Test	Score Achieved
1500 m Run	Strength Endurance	100%
200 m Run	Speed Endurance	80%
Push-ups from the front support until exhaustion	Arm Strength Endurance	100%
Sit-ups from lying on the back until exhaustion	Abdominal Muscle Endurance	80%
Zigzag run in the shape of figure 8	Agility	80%

Table 3: Shows the tests that achieved an agreement rate of 80% or higher for functional abilities and functional tests.

Test Name	Purpose of the Test	Score Achieved
Harvard Step Test	Physical Fitness	80%
Brash Index Test	Cardiac Energy	100%

Research Tests

Physical Tests

- 200 m Speed Endurance Test.
- Figure-8 Run Test.
- Push-ups from the Front Support Position until Exhaustion Test.
- Sit-ups from Lying on the Back until Exhaustion Test.
- 1500 m Run Test.

Functional Tests

- Barash Test.
- Harvard Test.

Exploratory Experiment

The researcher conducted the exploratory experiment on the first group by selecting (10) players. The tests were conducted on Tuesday and Wednesday, 9-10/6/2025, at 3:00 PM, at the Youth College for Freestyle Wrestling / Youth Rehabilitation Center for Freestyle Wrestling. The objectives of conducting the exploratory experiment were:

1. To ensure the suitability of the location where the tests would be conducted.
2. To ensure the validity of the equipment used in the tests.
3. To determine the duration of each test as well as the sufficient time for the tests.
4. To verify the validity of the tests and analyze them.
5. To ensure the competence of the supporting research team.
6. To identify potential obstacles that the researcher might face in order to avoid them during the main experiment.

Scientific Conditions and Principles of the Test

The researcher sought to adopt scientific principles in the standardization of the tests, acknowledging that they are standardized tests, in order to determine their practical applicability, i.e., to assess their validity, reliability, and objectivity.

Test Reliability

The reliability coefficient of the test was calculated using the test-retest method. The researcher first applied the tests in the exploratory experiment by selecting (10) players on 9-10/6/2025, on Tuesday and Wednesday at 3:00 PM. After (5) days, the tests were repeated on the same sample under the same conditions on 14-15/6/2025. By processing the data obtained from the tests, the Spearman rank correlation coefficient between the results of the first and second tests was extracted. The results showed that the correlation coefficient between the first and second tests was very high. It is known that the correlation coefficient ranges between (-1, 1), and the closer the coefficient is to (1), the better the indication of the correlation, as shown in Table (5).

Test Validity

The researcher used the intrinsic validity coefficient, which refers to the validity of the experimental test scores in relation to the true scores derived after removing measurement errors. Thus, the true scores of the tests serve as the benchmark for validity. Intrinsic validity is measured by calculating the square root of the test reliability coefficient.

Test Objectivity

Since standardized, clear, and understandable tests were used, and the evaluators were experienced professors in the relevant field of specialization, the researcher considers the tests employed in this study to have a high level of objectivity.

Table 4: Shows the reliability coefficients, intrinsic validity, and objectivity of the research tests.

S	Variable	Test	Reliability Score	Intrinsic Validity
1	Functional	Barash	0.98	0.99
2		Harvard	0.94	0.96
3	Physical	200 m Speed Endurance	0.98	0.96
4		Figure-8 Run	0.93	0.94
5		Push-ups from Lying Position	0.94	0.93
6		Sit-ups from Lying Position until Exhaustion	0.91	0.95
7		1500 m Run Endurance	0.95	0.96

Field Research Procedures

Pre-Tests for the Research Sample

The researcher conducted a set of tests on 16-17/6/2025 on youth freestyle wrestling athletes. The researcher ensured equivalence between the two groups to guarantee that they started from the same baseline, as shown in Table (5).

Table 5: Shows the equivalence of the sample for the pre-tests of the research using the (t-test).

S	Test Name		Experimental Group		Control Group		Calculated t Value	Tabulated t Value	Significance of Differences
	Physical Tests	Unit	Mean-	S±D	Mean-	S±D			
1	200 m Run	S	37.44	8.41	38.34	6.51	0.427	2.021	Not Significant
2	Figure-8 Run	S	15.77	0.85	15.77	0.86	0.005		Not Significant
3	Abdominal Test	rep	57.7	10.5	57	12.63	0.219		Not Significant
4	Front Support Test	rep	25.28	5.73	22.12	6.14	1.88		Not Significant
5	1500 m Run	MIN	7.87	0.69	8.15	0.78	-1.33		Not Significant
Functional Tests									
7	Harvard Test	د	36.62	14.25	34.95	10.09	0.476	2.021	Not Significant
8	Barash Test	ض	179.36	29.44	163.56	30.54	1.862		Not Significant

At degrees of freedom (n-2) and significance level (0.05)

Specific Endurance Exercises

The researcher prepared specific endurance exercises for youth freestyle wrestling athletes based on Arab and foreign sources, as well as the opinions of specialists in freestyle wrestling regarding the implementation of these exercises within the evening training sessions, as follows:

- The evening training sessions start at 3:00 PM and end at 5:00 PM.
- The specific exercises were applied within the training program for a duration of 10 weeks, with 4 training sessions per week (Sunday, Monday, Tuesday, Wednesday).
- The total duration of each training session was 120 minutes, with 60 minutes allocated to physical exercises and 60 minutes to theoretical lectures. The execution time of the exercises was 30 minutes per session, equivalent to 120 minutes per week, and over the 10-week period, a total of 1200 minutes, equivalent to 20 hours, was dedicated to specific physical abilities.
- Different specific endurance exercises were prepared to develop speed endurance, strength endurance, and performance endurance. These exercises serve as an appropriate training method to develop the circulatory and respiratory systems, in addition to enhancing the previously mentioned physical abilities. Physical training is designed to improve the level of physical traits, which requires integrating all three components (strength, speed, and endurance).
- The researcher used the interval training method with low and high intensity, which relies on monitoring the pulse during work and rest periods. The work intervals ranged from 15 seconds to 3 minutes, and sometimes longer; they could last from a few seconds to several minutes. The sequence of these components determines the physiological quality to be achieved, thereby improving or maintaining it, as well as the difficulty level of the training session. Therefore, the researcher controlled the number of repetitions in each exercise and ensured that the pulse returned to 120 bpm during rest.
- The researcher also relied on scientific principles regarding the relationship between training volume and intensity when designing the exercises, as a basis for gradually increasing endurance.

All training sessions were conducted according to the orders and instructions issued by the Youth Academy for Freestyle Wrestling, particularly the daily physical training hours allocated to youth freestyle wrestling athletes.

Post-Tests

After applying the proposed training program for a duration of ten weeks, the post-tests for the research sample were conducted for both the experimental and control groups on 25-26/8/2025. The researcher ensured that the conditions for conducting the tests were the same as those of the pre-tests in terms of the supporting research team, timing, location, and the necessary tools and equipment, in order to prevent any changes that could affect the research results.

3.11 Statistical Methods

The researcher used the Statistical Package for the Social Sciences (SPSS).

Presentation and Discussion of Results

Presentation of Pre- and Post-Test Results for Functional and Physical Tests (Experimental Group)

4.1.1.1 Presentation of Pre- and Post-Test Results for Physical Tests (Experimental Group)

Table 6: Shows the mean, standard deviation, calculated and tabulated (T) values for the experimental group, and the significance level for the pre- and post-tests of the physical tests.

Test	Unit of Measurement	Mean		Standard Deviation				Calculated T Value	Tabulated T Value	Significance Level	Percentage of Improvement
		Pre	Post	Pre	Post	F-	F-H				
200 m Run Test	min	37,91	31,85	8,61	4,62	6,06	4,94	6,36	2,064	Significant	3.7%
Figure-8 Run	min	15,77	15,10	0,85	0,76	0,30	0,07	10,906		Significant	1.4%
Sit-ups from Lying on Back until Exhaustion	rep	58,63	68,52	10,75	10,76	10,16	2,82	17,991		Significant	6.7%
Push-ups from Front Support until Exhaustion	rep	25,6	36,24	3,47	4,28	10,64	0,57	18,44		Significant	3.5%
1500 m Run	min	7,18	6,66	1,12	0,83	0,52	0,07	6,627		Significant	6.2%

Presentation and Analysis of Pre- and Post-Test Results for Functional Tests (Experimental Group)

The functional tests applied to the research sample, represented by the Harvard and Barash tests, were conducted on the experimental group. The results are shown in Table (7):

Table 7: Shows the mean, standard deviation, calculated and tabulated (T) values for the experimental group for the pre- and post-tests.

Tests	Mean		Standard Deviation		F-	FH	Calculated T-value	Tabulated T-value	Significance level	Rate of improvement
	Pre-test	Post-test	Pre-test	Post-test						
Harvard	36.62	44.72	14.25	15.34	8.10	0.62	12.923	2.064	Significant	4.3%
Barash	179.36	163.84	29.44	22.35	15.52	6.23	2.488		Significant	1.7%

At degrees of freedom (n-1) and significance level (0.05).

Presentation and Analysis of Pre- and Post-Test Results for Functional and Physical Tests (Control Group)

4.1.2.1 Presentation, Analysis, and Discussion of Pre- and Post-Test Results for Physical Tests (Control Group)

Table 8: Shows the mean, standard deviation, calculated and tabulated (T) values for the control group, and the significance level for the pre- and post-tests.

Tests	Mean		Standard Deviation				Calculated T-value	Tabulated T-value	Significance Level	Percentage of Improvement
	Pre-test	Post-test	Pre-test	Post-test	F-	FH				
200 m Run Test	38,34	37,57	6,51	5,92	0,77	1,22	3,169	2,064	Significant	3.7%
Figure-8 Run	15,95	15,56	1,07	1,06	0,08	0,45	0,928		Not Significant	-1.4%
Sit-ups from Lying on Back until Exhaustion	56,63	67,16	12,35	12,32	10,8	3,17	17,006		Significant	6.6%
Push-ups from Front Support until Exhaustion	21,4	29,2	6,58	6,23	7,8	3,14	12,385		Significant	2.8%
1500 m Run	8,27	7,95	0,94	0‹84	0,31	0,37	4,248		Significant	7.3%

Presentation, Analysis, and Discussion of Pre- and Post-Test Results for Functional Tests (Control Group)

Table 9: Shows the mean, standard deviation, calculated and tabulated (T) values for the control group, and the significance level for the pre- and post-tests.

Tests	Mean		Standard Deviation				Calculated T-value	Tabulated T-value	Significance Level	Percentage of Improvement
	Pre-test	Post-test	Pre-test	Post-test	F-	F H				
Harvard	34,15	33,99	10,44	9,81	0,16	1,77	0,462	2,064	**Not Significant**	-3.3%
Barash	163,56	170,56	30,54	17,84	16,57	2,31	2,112		**Significant**	1.6%

4.2 Discussion of the Results

By examining Tables (6 and 7) related to the functional and physical tests, it is evident that the experimental group achieved statistically significant results in all the administered tests. The researcher attributes this to the effectiveness of the endurance-based exercises designed for the study, as these exercises contributed to enhancing the efficiency of both the circulatory and respiratory systems, in addition to developing the physical abilities under investigation.

In the case of the enhancement of the Harvard Step Test, it was attributed to the type of endurance exercises used by the researcher, which induced cardiac adaptation because of the constant and gradually increasing training. This, in its turn, increased the cardiac capacity to satisfy the needs of the body in blood bearing oxygen and was accompanied by a reduction in resting heart rate. According to Nasir Abbas, using the aerobic capacity test like the Harvard Step Test to determine the condition of the cardiac and respiratory functions can be used to regulate the training loads based on the energy systems and consequently the adequacy of the participants and the degree of their development as a result of training taking place on a regular basis.

As for the Barach test of cardiac energy index, the researcher attributes the improvement to the low- and moderate-intensity exercises employed, which enhance cardiac efficiency and circulatory function. This aligns with the findings of Amjad Abdul-Hamid, who concluded that improvement in this index reflects the heart's ability to meet its demands, and that regular participation in aerobic exercises contributes to better cardiac function as a result of engaging in various physical and athletic activities, particularly aerobic training.

In contrast, the control group did not achieve statistical significance in the Harvard Test, although it did demonstrate significant improvement in the Barach Test. This is because the control group focused on general exercises, which led to improvement in the Barach Test, while insufficient emphasis on endurance, strength, and speed exercises resulted in the absence of significant differences in the Harvard Test.

By examining Table (7), we observe that the physical tests achieved statistically significant results in favor of the post-tests of the experimental group across all tests. The researcher attributes this to the exercises he designed, which aimed to develop endurance-related components of physical fitness, including speed endurance, strength endurance, agility, and general endurance.

The improvement observed in speed endurance is attributed to the specific exercises employed by the researcher, which had a considerable impact on enhancing this capability among young freestyle wrestlers. Hara indicates that speed endurance refers to the ability to resist fatigue under loads performed at near-maximal or maximal intensity.

As for the agility test, the researcher attributes this improvement to the proposed exercises he developed, which positively influenced the increase in the motor repertoire of young freestyle wrestlers. This is because "developing agility requires a large number of motor skills and performing acquired skills in diverse ways, bearing in mind that motor skills mastered by the individual and performed under fixed conditions do not sufficiently contribute to developing and enhancing agility".

Regarding the abdominal muscle test (sit-up test), Table (8) shows that the experimental group achieved statistically significant results in favor of the post-test.

The researcher attributes this to the program's effect in developing the major muscle groups of the body particularly the abdominal muscles as well as to the structured distribution and gradual progression of training load, along with the variety of exercises employed in the implementation of physical training programs to ensure that each exercise achieves its intended overall objective.

Theories of sports training emphasize the importance of abdominal muscle strength and the need for continuous strengthening and training of these muscles due to their significant influence on enhancing an individual's efficiency in other physical abilities, especially speed and strength and endurance, and these components are essential for enhancing the efficiency of young freestyle wrestlers and preparing them to perform their tasks in an optimal manner.

As for the front-support (push-up) test, the results in Table (6) indicate a statistically significant difference between the pre- and post-tests in favor of the post-test. The researcher explains that this improvement is due to the effect of the specific endurance exercises he designed, which significantly contributed to developing the arm muscles, as these exercises directly targeted them.

Mohamed Hassan Allawi and Mohamed Nasreddin note that when the muscular strength of the muscle group performing the movement greatly exceeds the resistance that must be overcome as is the case when performing against relatively low resistance individuals with high levels of muscular strength are able to exhibit levels of muscular endurance comparable to those who inherently possess high muscular endurance.

By examining Table (6), we observe that the differences between the pre- and post-tests are statistically significant in favor of the post-test. The researcher attributes this to the effect of the specific exercises that included long-distance running (the 1500 m test), which effectively contributed to developing this attribute. Through the influence of the proposed training exercises, implemented using modern scientific methods and according to the distribution of physical fitness components, these differences emerged as an indicator of improved internal endurance, reflected in the functional performance of the body's systems such as the heart, lungs, circulatory system, and respiration.

Moreover, endurance is reliant on the level of mastering motor performance in good coordination, thus it makes it economical to the amount of effort needed to perform it. The researcher, therefore, conflicts that the endurance capacity is the key to every young freestyle wrestler because the various things and responsibilities that are involved in the freestyle wrestling need stamina to withstand fatigue in long durations.

4.3 Presentation, Analysis, and Discussion of the Post-Test Results for the Experimental and Control Groups

4.3.1. Presentation and Analysis of the Post-Test Results between the Experimental and Control Groups for the Functional Tests

When comparing the post-test results of the study sample between the control and experimental groups using the independent-samples t-test for the functional tests, the results were as shown in Table (10).

Table 10: Shows the mean, standard deviation, and the calculated and tabulated *t*-values for the experimental and control groups for the post functional tests.

Tests	Experimental Group		Control Group		Calculated t-Value	Tabulated t-Value	Significance of Differences	Percentage of Improvement
	Mean-	S±D	Mean-	S±D				
Harvard	44,72	14,34	33,99	9,81	3,088	2,021	Significant	4.3%
Barach	163,84	22,35	170,56	17,84	1,175		Not Significant	-1.6%

Presentation and Analysis of the Post-Test Results for the Experimental and Control Groups for the Physical Tests: When comparing the post-test results of the study sample between the control and experimental groups using the independent-samples t-test for the physical tests, the results were as shown in Table (11).

Table 11: Shows the mean, standard deviation, and the calculated and tabulated *t*-values for the experimental and control groups for the post physical tests.

Tests	Experimental Group		Control Group		Calculated t-Value	Tabulated t-Value	Significance of Differences	Percentage of Improvement
	Mean -	S±D	Mean -	S±D				
200 m Run	31,85	4,62	37,57	5,92	3,805	2,021	Significant	3.6%
Agility Run in a Figure-8 Pattern	15,01	0,76	15,56	1,06	2,121		Significant	1.4%
Sit-Up Test from Supine Position to Exhaustion	68,52	10,75	67,16	12,32	0,416		Not Significant	-1.6%
Push-Up Test from Front-Support Position to Exhaustion	36,24	4,28	29,2	6,23	4,665		Significant	3.5%
1500 m Run	6,66	0,83	7,95	0,84	5,445		Significant	7.1%

4.4 Discussion of the Results

From Table (10) related to the functional tests, there are statistically significant differences between the experimental and control groups in the Harvard Step Test, in favor of the experimental group, while no significant differences were observed in the Barach Test. This can be attributed to the impact of the exercises that the researcher used, which contributed to enhancement of the physical fitness of the experimental group. According to Nasir Abbas, the aerobic capacity test, in this case, the Harvard Step Test, is the determination of cardiac and respiratory functions, which allows to control the training loads in accordance with systems of the energy, and it is this that will help determine the sufficiency of the athletes and the degree to which they can develop with regular training.

As for the Barach Test, no significant differences were observed between the two groups. The researcher attributes this to the fact that the cardiac energy index includes heart rate as well as systolic and diastolic blood pressures, which did not show substantial changes. The resting heart rate for

an adult typically ranges between 50-80 beats per minute. Although many factors can influence increases or decreases in heart rate, the nature of physical effort and the level of physical fitness are the most important determinants. Heart rate serves as a physiological, objective, and reliable indicator of cardiac condition and the degree of adaptation during rest and after physical exertion.

Furthermore, blood pressure does not change significantly during training, as it remains relatively constant between athletes and non-athletes, typically within the normal range of 120-140 mmHg, as indicated by medical sources.

From Table (11), it is observed that all physical tests showed improvement in favor of the experimental group, except for the sit-up test from the supine position

This is attributed to the effect of the exercises employed by the researcher, as well as the regulated structuring of the training, which significantly contributed to the improvement of the experimental group compared to the control group. Risan Khuraybit indicates that regular and programmed training, using controlled intensity levels and optimal rest periods between repetitions, leads to performance development. The training process aims to elevate performance levels through exposure to training programs based on scientific methods and adherence to fundamental principles, including the principle of progressive training and the principle of matching training load with individual capabilities.

The reason for the absence of significant differences in the sit-up test from the supine position is attributed by the researcher to the particular importance of the abdominal muscles for young freestyle wrestlers. These muscles are part of the specific tests for young wrestlers and are consistently emphasized by coaches and instructors, especially when this exercise is performed after morning or evening training sessions.

5. Conclusions and Recommendations

5.1 Conclusions

1. The training program, which included the specific endurance exercises designed by the researcher, was successful.
2. The experimental group outperformed the control group in all post-test physical tests, confirming the effectiveness of the researcher-designed training program.
3. The control group did not show superiority in the functional tests (Harvard Step Test) but demonstrated improvement in the Barach Test in the post-tests.
4. The control group did not show superiority in the agility run test, while the results of the other physical tests varied.
5. The experimental group outperformed the control group in the Harvard Step Test for functional tests, indicating the success of the researcher-designed exercises, while no significant differences were observed in the post-tests of the Barach Test.
6. The experimental group outperformed the control group in all physical tests except for the sit-up test from the supine position in the post-tests.

6. Recommendations

1. Adopt the exercises designed by the researcher to develop the physical and functional abilities of young freestyle wrestlers.
2. Adhere to the full duration of the training program, which lasted for 10 weeks.
3. Conduct similar studies that address psychological aspects.
4. Conduct similar studies that examine throwing accuracy following intense physical exertion.

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