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The Contribution Ratio of Some Physical Abilities in the Performance of Certain Skills with the Apparatus Among Female Students in Rhythmic Gymnastics

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Abstract:

The research problem focused on identifying the extent to which certain physical abilities contribute to the performance of specific skills on an apparatus among a sample of female students. The objectives were summarized as determining the relationship between certain physical abilities and assessing their contribution to the accuracy of performing designated skills on the apparatus. The researcher employed a descriptive method and correlation analysis. The study's main findings revealed a significant correlation between some skills on the apparatus and the physical abilities examined in the research.

Keywords: Physical Abilities, Performance and Rhythmic Gymnastics.

Introduction:

Rhythmic gymnastics is a sport included in the physical education curriculum, distinguished by its complex skills and movements. Due to the advanced skill level required in this sport, it has become essential for female students to possess specific physical abilities to perform the movements accurately. The significance of this research lies in examining the contribution of certain physical abilities and their relationship to the precision of performing specific apparatus-based skills in rhythmic gymnastics. By

doing so, it provides a reliable scientific indicator for teachers regarding the extent of these contributions, enabling specialists to establish scientific foundations to enhance skill performance in this discipline.

Research Problem:

Sports activities differ in several aspects and are similar in others. This similarity and difference arise from the nature of performance and the specific rules of the game. Thus, the influencing abilities vary accordingly. Through the researcher's review of several training curricula, as well as teaching rhythmic gymnastics for many years and reviewing numerous references, sources, and scientific research studies, it became clear that there is a deficiency in performing some skills with the apparatus due to the shortcomings in organizing the training curriculum items. The reason is the focus on certain variables without others, and the lack of interest by many in rhythmic gymnastics in the contribution ratio of each physical ability to some skills with the apparatus.

Hence, the research problem identified by the researcher, which must be studied and analyzed, is to determine the effect of physical abilities on the skillful performance of some skills with the apparatus and to determine the extent of contribution of the influencing variables in the study.

Research Objectives:

1. To identify the current state of physical abilities and some skills with the apparatus that the first-year female students at the College of Physical Education and Sports Sciences, University of Kufa, possess for the academic year 2023-2024 in rhythmic gymnastics.

2. To identify the relationship between some physical abilities and the accuracy of performing some skills with the apparatus.

3. To identify the extent of the contribution of some physical abilities to the accuracy of performing some skills with the apparatus.

Research Hypotheses:

1. There is a significant correlation between the main physical abilities and the accuracy of performing some skills with the apparatus.

2. The possibility of deriving the contribution ratio of performing some skills with the apparatus in rhythmic gymnastics based on the physical abilities of the research sample.

Research Fields:

- **Human Field**: First-year female students at the College of Physical Education and Sports Sciences, University of Kufa, for the academic year 2023-2024 in rhythmic gymnastics.
- **Spatial Field**: The gymnastics hall at the College of Physical Education and Sports Sciences, University of Kufa.
- **Temporal Field**: The period from 5/1/2024 to 22/4/2024.

Research Methodology and Field Procedures

Research Method:

The researcher used correlational relationships, which are within the descriptive survey method.

Research Population and Sample:

The research population was identified as the first-year female students at the College of Physical Education and Sports Sciences, University of Kufa, for the academic year 2023-2024, totaling (35) female students. The comprehensive enumeration method was used to determine the research sample.

Research Steps:

1. Identifying the most important physical abilities related to some skills with the apparatus in rhythmic gymnastics.

The researcher prepared a questionnaire form to determine the most important physical abilities related to rhythmic gymnastics players, presenting it to experts. A total of (15) experts determined the most important physical abilities from (54%), as shown in Table (1).

Table (1): Relative Importance of Physical Abilities

No.	Physical Abilities	Relative Importance	Result
1	Arm and Shoulder Muscle Strength	93.7%	Accepted
2	Hip Joint Flexibility	35.6%	Not Accepted
3	Balance	49.25%	Not Accepted
4	Spine Flexibility	81.47%	Accepted
5	Agility	83.12%	Accepted

Determining the Physical Abilities Tests Selected:

After determining the physical abilities, a set of physical tests was selected. A group of tests representing the chosen abilities was submitted to (15) experts. The percentage of accepted tests was (80%) or higher by using the Chi-square test, as shown in Table (2).

Table (2). Show Chi-square test

No.	Physical Ability	Tests	Measurement Unit	Alternatives	Percentage
1	Arm and Shoulder Muscle Strength	Pull-up test in flexed arm hang position	Meters	12	80%
2	Spine Flexibility	Backward bending from lying prone	Seconds	12	80%
3	Agility	Shuttle run (4 x 10 meters)	Seconds	14	86%

Tests and Measurements Used in the Research

1. **First Test: Pull-up in flexed arm hang position**
   - **Purpose**: To measure arm and shoulder muscle strength.
   - **Tools Used**: Stopwatch, chair without backrest, bar or crossbar (2-4 cm thick), chalk powder.
   - **Performance Specifications**: The subject holds onto the bar from a chair with palms facing forward and elbows bent.
   - **Scoring Method**: The time during which the subject maintains the position is recorded.
2. **Second Test: Backward bending**
   - **Purpose**: To measure spine flexibility.
   - **Tools Used**: Measuring tape.
   - **Performance Specifications**: From the lying prone position, the arms are extended forward while the hips remain on the ground.
   - **Scoring Method**: The distance from the chin to the ground is measured.
3. **Third Test: Shuttle run (4 x 10 meters)**
   - **Purpose**: To measure agility.
   - **Tools Used**: Stopwatch, two parallel lines 10 meters apart.

- **Performance Specifications**: The subject runs between the two lines as quickly as possible.

Skills with the Apparatus Identified:

The researcher relied on the basic skills of rhythmic gymnastics as outlined in the curriculum for first-year students in physical education colleges. A questionnaire was distributed to experts, and the skills that received an agreement percentage of 57% or higher were:

1. Spinning the apparatus in figure 8 around the body behind the head.
2. Spinning the apparatus around the wrist while walking forward and then backward.
3. Throwing the apparatus from below the swinging leg and catching it with the throwing hand while walking forward.

Performance Evaluation of Skills with the Apparatus:

The researcher converted the filmed tests into a digital format for evaluation by experts. The skills were assessed by a panel of four judges, and the score for each skill was averaged to provide a final evaluation.

Scientific Procedures:

Reliability:

The test-retest method was used to determine the reliability of the tests.

Validity:

The validity of the content was confirmed through experts in the fields of testing, measurement, and rhythmic gymnastics.

Exploratory Experiment:

An exploratory experiment was conducted on February 9, 2024, involving a sample of five female students. The experiment was repeated on February 16, 2024.

Results, Analysis, and Discussion

Table (3): Statistical Estimates of the Variables Studied

No.	Variable		Measurement Unit	Mean	Standard Deviation
1	Physical Abilities	Arm and Shoulder Muscle Strength	Seconds	4.54	0.86
2		Spine Flexibility	Centimeters	12.45	3.36
3		Agility	Seconds	32.17	4.22
1	Skill Abilities	Figure-8 Twirling of the Baton in Front of the Body and Behind the Head.	degree	5.52	1.74
2		Wrist Twirling of the Baton While Taking Three Steps Forward and Then Backward.	degree	5.87	1.36
3		Throwing the Baton from Under the Swinging Leg to Catch It with the Throwing Hand While Taking Three Steps.	degree	6.21	1.54

Table (4): Correlation between the Sample's Results in Performing Certain Skills with the Apparatus and Physical Abilities

No.	Variable	Figure 8 Spin	Wrist Spin	Leg Swing and Throw
1	Arm and Shoulder Muscle Strength	0.75	0.71	0.69
2	Spine Flexibility	0.77	0.79	0.81
3	Agility	0.72	0.70	0.68

The discussion of these tables indicates significant correlations between the physical abilities and the accuracy of performing the mentioned skills with the apparatus. The researcher concludes that these abilities, particularly muscle strength, flexibility, and agility, play a key role in the performance of rhythmic gymnastics skills.

Discussion of Correlational Relationships Between the Sample Results in the Accuracy of Performing Certain Skills with the Apparatus in Rhythmic Gymnastics and the Physical Abilities Studied

Based on the results shown in Table (4), which compares the physical ability tests and the sample's performance accuracy in certain skills with the apparatus, significant relationships were found. This confirms that the research sample requires continuous monitoring of their physical fitness levels. The results reflected that the individuals in the sample, when performing certain skills with the apparatus, had a significant relationship with the physical preparation of some of the physical variables under study. These are crucial capabilities for preparing a player comprehensively for defensive tasks. Performing some of the skills with the apparatus in rhythmic gymnastics requires specific physical abilities, as confirmed by (Mohammad Tawfiq): "The most important characteristics that rhythmic gymnastics players must have to perform various skills include speed in changing position and direction, muscle strength for high jumps and strong strikes, in addition to having sufficient flexibility, which reduces the likelihood of injury, helps maintain good posture, and leads to better performance of athletic skills."

Thus, the researcher believes that explosive strength is one of the essential physical abilities that players need to complete the requirements for performing defensive skills effectively. Having this ability enables the player to execute certain skills with the

apparatus well and impactfully. Most successful athletes possess a considerable amount of strength and speed, and they can integrate these two components to create explosive power to achieve better performance. From the perspective of a specialist in measurement in physical education, "Explosive power is a composite ability that represents the primary components of strength and speed, which are the most important physical abilities for performing skills in sports activities and competitions at the championship level."

Agility also contributes significantly to acquiring and mastering skills. It is an important requirement for performing certain skills with the apparatus and is an indicator of the beauty of movement, coordinating the performance movements, and helping economize effort. Agility translates to the beauty of movement, as "the beauty of rhythmic gymnastics players' performance depends on their agility. The more agile the player, the faster they can improve their level, playing a fundamental role in applying artistic principles to performance." Therefore, the researcher emphasizes the need for agility in students because the sport requires movement and changes in direction.

In light of the above, the researcher stresses the importance of training that addresses the physical aspects related to performing certain skills with the apparatus. To develop these abilities, it is essential to implement a scientific program with well-designed training units practiced continuously to achieve an advanced level of physical ability that aligns with the motor skills required under difficult conditions. This is confirmed by (Mohammad Kazim), who said: "Proper and organized training based on correct scientific principles, using training methods suited to the physical abilities, helps in their development. Therefore, organized preparation for rhythmic gymnastics players plays an effective role in raising the performance level in this sport."

The Relationship Between the Sample Results in the Accuracy of Performing Certain Skills with the Apparatus and the Physical Abilities Studied

Table (5).Shows the relationship between the skill of certain apparatus-based movements and the physical abilities studied.

Variables Studied	Correlation Coefficient (r)	Determination Coefficient (Contribution)	Proximity Coefficient	Error Value	Statistical Significance
Maximum Oxygen Consumption (VO2 max)	0.587	0.344	0.809	0.203	Significant

The correlation coefficients between the sample results in the accuracy of performing certain skills with the apparatus and the results of the maximum oxygen consumption test show that the relationship between the sample's skill performance and the test results reached (0.587). This coefficient indicates a significant relationship, as the determination coefficient value (0.344), being less than (0.05), confirms the significance of the relationship.

Conclusions:

1. A significant correlation was found between the performance of certain apparatus-based skills and the physical abilities studied.
2. The contribution ratio of key physical abilities to the accuracy of performing specific skills with the apparatus was high, indicating a strong influence of these abilities on skill performance.
3. There is a notable correlation between the skill performance of certain apparatus-based movements in rhythmic gymnastics and the physical abilities examined.

4. The contribution ratio of agility to the accuracy of performing specific apparatus-based skills was favorable, highlighting the effectiveness of this ability in executing the skills accurately.

Recommendations:

1. Emphasize the importance of the physical abilities that showed significant correlations and high contribution ratios to the skill performance of certain apparatus-based movements in rhythmic gymnastics when training female students.
2. Focus on regular, continuous physical testing to assess students' performance levels, which will provide a clear picture and contribute to the development of training curricula.
3. Pay attention to implementing training programs focused on physical variables using modern training methods.
4. It is crucial to focus on physical abilities when selecting female students for all sports, especially rhythmic gymnastics.

References:

1. Diebold, B. V. (1985). *Research methods in education and psychology* (M. Nabeel et al., Trans.). Anglo-Egyptian Library.
2. Al-Jubali, O. (2000). *Sports training: Theory and application* (1st ed.). S. M. G. Publishing.
3. Al-Mandalawi, Q. H., & Others. (1989). *Tests, measurement, and evaluation in physical education*. Higher Education Printing Press.
4. Farhat, L. A. (2007). *Measurement and testing in physical education* (4th ed.). Center for Book Publishing.
5. Arabic Language Academy. (1984). *Dictionary of psychology and education* (Vol. 1). General Authority for Printing Press Affairs.
6. Tawfiq, M. (2000). *Competitive training* (1st ed.). S. M. G. Publishing.
7. Allawi, M. H., & Ridwan, M. N. (1981). *Tests of motor performance in sports training* (4th ed.). Dar Al-Fikr Al-Arabi.
8. Al-Rubaie, M. K. (2005). *A training program based on energy systems and its impact on developing some physical abilities and biochemical indicators and the process of motor nerve transmission in rhythmic gymnastics players* (PhD dissertation). University of Baghdad, College of Physical Education.

9. Ridwan, M. N., & Mansour, A. A. (1999). *99 exercises for muscle strength and flexibility for all sports activities* (1st ed.). Center for Book Publishing.
10. Ridwan, M. N. (1998). *Methods of measuring physical effort in sports*. Center for Book Publishing.
11. Bahy, M. (1999). *Scientific transactions between theory and application*. Center for Book Publishing.
12. Mahjoub, W. (2002). *Scientific research and its methods*. Directorate of Book Printing and Publishing.
13. Barrow, H. M., & McGee, R. (1973). *A practical approach to measurements in physical education*. Lea & Fibiger.
14. Corbin, C. B., & Lindsey, R. (1997). *Concept of physical fitness*. Brown Benchmark Publishing.