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The effect of a proposed educational program using specific exercises to develop motor response, motor satisfaction, and short-term defensive movement skills in handball

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Abstract

This research aims to evaluate the effectiveness of a specific educational program in improving the motor performance of handball players by measuring its effect on motor response speed, increasing motor satisfaction, and improving limited defensive movement skills. The experimental method was used, and the players of the Al-Taawon Sports Club junior category represented the research sample. The researchers used the motor response speed test to measure the motor response time with a visual stimulus, the motor satisfaction scale to identify the degree of individual satisfaction with his movements and motor and physical characteristics, and the short-term defensive movements test to measure the player's speed in short-term defensive movements. After conducting the pre-tests and implementing the educational program, then conducting the post-tests, the data were recorded and organized in specific tables to obtain the test results using the following statistical methods: the arithmetic mean, the standard deviation, and the calculated (t) value. The calculated t-values showed statistically significant differences ($p<0.05$) between the pre- and post-measurements in all variables, indicating a positive effect of the training program on the players' performance. Based on these results, it was concluded that the proposed educational program is effective in improving the motor performance of handball players, and it is recommended to be applied in various training programs.

Introduction

Handball is a team game that is widely practiced and is important among other sports. It is characterized by the diversity of its basic offensive and defensive skills and its various plans, whether in attack or defense. Offensive skills alone are not enough to decide the match, but attention must be paid to defensive skills and work to develop all basic defensive skills through which the team's attacks begin. They must be developed in the early stages of preparing teams using effective and advanced exercises(Abdul Razzaq, 2023). Defensive skills require a quick motor response that enables the player to act and move correctly at the appropriate time in order to disperse and stop the opponent's attack. Recent studies have become interested in the type of exercise used to develop athletic performance to achieve achievement(Hermassi et al., 2010). In order to accomplish this, the concept of motor

satisfaction must be developed among players by enhancing their confidence and then developing their level(Rashid & adbulrazziq, 2022). Short-term defensive movements in handball are among the basic skills that depend largely on the speed of motor response and motor satisfaction among players. The ability to move quickly and effectively in defensive situations is a decisive factor in reducing the opponent's chances of scoring goals and achieving defensive superiority(Adham Ali et al., 2022a). Hence, educational programs that depend on specific exercises targeting the development of this skill are important. The importance of the research lies in preparing a proposed academic program using specific exercises to improve athletic performance by developing the motor response, which is one of the basic factors for success in defensive handball skills, as well as raising the level of motor satisfaction among players, which increases their feeling of confidence and comfort while performing the skill, which leads to improving performance and reducing psychological pressure during competitions(Nebigh et al., 2022). This works to enhance the effectiveness of defense by developing short-term defensive movements.
Through the researchers' experience in handball. In order to keep pace with the development in sports sciences and benefit from them, the researchers decided to improve short-term defensive movements that did not rise to the positive and ideal state in many teams but were irregular movements that led to opening gaps that allowed the competitor to score goals through them by improving the speed of motor response that plays a decisive role in implementing defensive skills efficiently in addition to improving motor satisfaction, which is an important measure of the extent of players' conviction in their performance and their ability to adapt to the requirements of the defensive situation quickly.

Research Objectives

- Measuring the extent of the educational program's impact on improving motor response among handball players
- Knowing the extent of the educational program's impact in enhancing motor satisfaction among players.
- Knowing the extent of the program's effectiveness in improving the skill of limited defensive movements in a small range within the game.

Research Hypotheses

- The proposed educational program, using qualitative exercises, has a positive impact on developing the motor response performed by handball players.
- The proposed educational program contributes to improving the players' motor satisfaction.
- The specific exercises used in the proposed program lead to the development of the skill of short-term defensive movements for handball players.

Material y methods

Research Methodology

The researchers used the experimental method due to its suitability to the research problem(O. Ali et al., 2024).

Research sample

The research sample was chosen intentionally, represented by the players of the Al-Taawon Sports Club, junior category, for the sports season (2023-2024), numbering (18) players.

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Methods of collecting information, devices, and tools used in the research.
The researchers used the necessary methods and tools to solve the research problem.
Methods of collecting information (- Arab and foreign sources- The International Information Network (Internet)- Personal interviews with experienced and specialized people- Assistant work team- Tests and measurements)(Adham Ali et al., 2022b).
Research devices and tools (- Electronic stopwatch, number (2). Made in Korea- An electronic watch is used to measure the pulse number (1). Made in Korea- Handheld electronic calculator, made in China- Video camera, number (1). Made in Korea- (Falcon) device to measure the speed of motor response.
As for the research tools, they were: - Handballs, number (12)- Measuring tape, length (50 m)- Colored adhesive tape- Whistle, number (2)- Indicators - Cones.
Tests used in the research
1 Motor response speed test. (Al-Taie, 2015)
Test name: Saqr test.
Objective of the test: Assess the motor reaction latency to a visual stimulus.
Performance Methodology: The tester positions themselves in front of the device, approximately 30-40 cm to the side. Upon hearing a whistle or instruction from the test administrator, they activate the device, which deactivates the light sensitivity, providing a visual signal in one of four colors. The tester then touches the corresponding color using the stop press, which is aligned with the target color indicated on the cone. After this, the tester steps back from the device and repeats the procedure six times, with each repetition timed separately by an electronic timer that commences counting from the moment the instruction is given and ceases when the cone is touched. The motor response time for each tester is determined by recording the duration of the best effort from three trials, with the distance between the device and the cones, as well as between each cone, being 2 meters.
Performance conditions: The tester positions themselves in front of the gadget and directs their attention towards the individual administering the test, who will provide the initial instructions.
The individual administering the test documents the duration of each touch to determine the total time taken for six touches.
- The tester is only retested following an injury or fall after an adequate recuperation interval.
Recording method: The duration of each of the six touches is measured individually, and the time of the most successful attempt is recorded.

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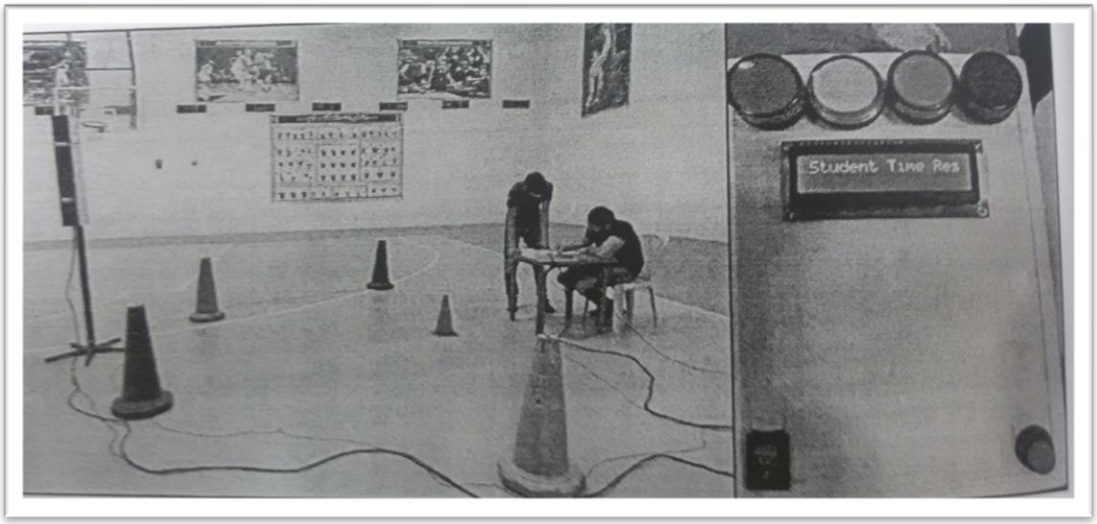

Figure 1.

shows the motor response speed device

2 Motor satisfaction scale (Allawi, 1998)

The motor satisfaction scale was originally designed by (Nelson and Allen), believing that somebody image scales or self-concept scales do not give clear attention to the human motor aspect. The scale attempts to identify the degree of satisfaction of the individual with his movements and motor and physical characteristics. Mohamed Hassan Alawi adapted this scale, and the original scale includes (50) phrases. In light of the studies conducted on the original phrases, some phrases were deleted, and other phrases were replaced to suit the procedure in the Egyptian environment. For example, phrases such as "I can keep up with music when dancing" and "I can kick a fixed ball for a long distance" were deleted due to the inappropriateness of the phrase to be conducted on female students. Thus, the scale now consists of (30) phrases. The individual answers the scale statements on a five-point scale (applies: very much, to a great extent, to a medium extent, to a small extent, to a very small extent). The scale is suitable for use on secondary school students and university students, i.e., in the age group of 14-22 years.

Correction:

The scores determined by the examinee for all the scale statements are collected, and the closer they are to the maximum score of (150) degrees, the more this indicates an increase in the individual's motor satisfaction.

Instructions:

Note: The scale instructions are mentioned in Appendix (1).

Short-range defensive movements test (Fathi, 2009)

Test name: Short-range defensive movements forward and backward at an angle.

Test objective: Measure the player's speed in short-range defensive movements.

Necessary tools: Stopwatch, preferably a spare watch, handball number (3).

Draw on the ground above the six-meter line, as shown in (Figure 1) according to the following:

A circle with a diameter of (20) cm is drawn in the middle of the six-meter line.

From the center of the previous circle, two circles of the same size are drawn on both sides, right and left, and at a distance of (1.5) meters on the six-meter line.

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Three handballs are also placed in front of each circle on the nine-meter line, and the distance between each ball is also (1.5) meters.
Performance specifications: The player stands inside the small circle with a visual signal. The player moves from the circle towards the balls according to the following: From the small circle to ball No. (1) and bounces using forward movements and backward movements with an inclination to circle No. (2).
From the small circle No. (2) to ball No. (2) and bounces using forward movements and backward movements with an inclination to circle No. (1) again.
From the small circle to ball No. (1) and bounces using forward movements and backward movements with an inclination to circle No. (3).
From the small circle No. (3) to the ball No. (3) and bounce using forward movements and backward with an inclination to circle No. (1) again.
It is taken into account every time during his movements from the small circle to any of the balls (3, 2, 1) that the player touches the ball he reaches with the hand near the ball before bouncing.
Evaluation: The time taken by the player from the moment the visual signal is given until the moment he reaches the circle after bouncing from touching the ball (3) and reaching the circle or point where the test began is recorded

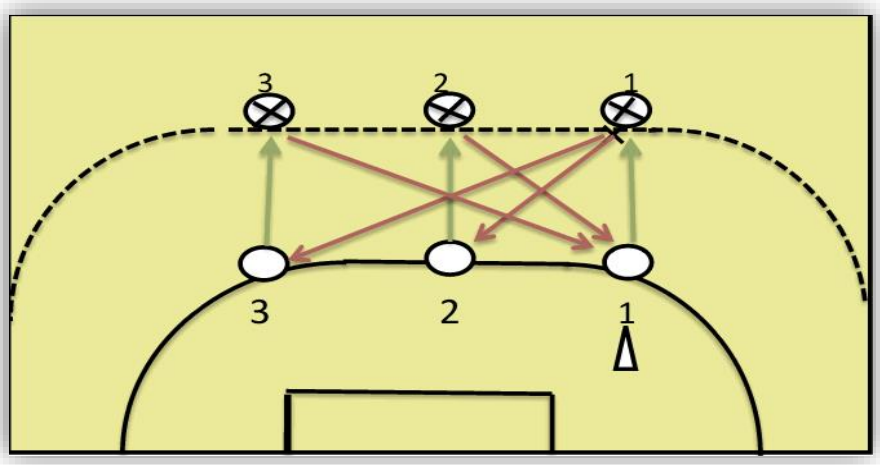

Figure 2.
Explains how to conduct the defensive movements test

Exploratory experiment

The exploratory experiment was conducted on 10/13/2024 on a sample of (4) players with the aim of achieving the following: Verifying the validity of the tools and devices used under study(Saeed et al., 2024). Knowing the assistant work team's duties while conducting the tests for the variables under study. Try the proposed qualitative exercises and know their suitability for the research sample.

Field research procedures

Pre-tests

Pre-tests were conducted for the experimental research group to measure the speed of motor response, motor satisfaction, and short-term defensive movement skills in handball on 10/14/2024. After that, the data was recorded and organized in specific tables to obtain the results of the pre-test. The researchers took into account the circumstances surrounding the pre-tests in terms of time, place, tools used, method of

implementation, and the assistant work team to ensure their availability in the post-tests.

Implementation of the educational program

The proposed educational program was implemented on the experimental research group for (60) days from 10/15/2024 to 12/15/2024 with the help of the assistant work team at a rate of two educational lessons per week, noting that the duration of the academic unit is (90) minutes, where qualitative exercises were used that depend on sudden movements with quick reaction.

Post-tests

The post-tests were implemented for the experimental research group on the research variables under study on 12/16/2024, applying the same order and conditions used in the previous tests.

Statistical methods

The following statistical methods were used (Percentage- Arithmetic mean- Standard deviation- Law of differences for related samples- Calculated (t) value)(O. A. Ali, 2022).

Results

Presentation and analysis of the results of motor response speed, motor satisfaction, and short-term defensive movements in handball

Table1.

shows the arithmetic means, standard deviations, calculated and tabular (t) value for the research variables

Variables	Unit of measure	Pre-test		Post-test		Media teams	AF	Calculated value(t)	Significance of differences
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation				
Motor response speed	second	1,66	0,31	1,09	0,14	0,45	Moral	15	Moral
Motor satisfaction	degree	104.2	4.12	138	4.15	33.8	Moral	4.90	Moral
Short-range defensive movements	second	9,34	0,58	7,95	0,28	0,74	Moral	4,11	Moral

The tabular (t) value is (2.042) at a degree of freedom (17) and a significance level of (0.05).

It is clear from Table (1) that there are statistically significant differences between the pre-and post-measurements of the experimental research group in motor response speed, motor satisfaction, and short-term defensive movement skills in handball in favor of the post-measurement.

Discussion

The researchers attribute the improvement in the level of the sample individuals to the effectiveness of the proposed educational program, which contained organized and integrated qualitative exercises in which individual differences between students were taken into account.

Progress was achieved in motor response speed thanks to the educational program, which relied on qualitative exercises that focus on the interaction between the nervous system and muscles, which leads to an increase in the speed of response to the required movements. This includes improving coordination between the mind and body and immediate response to external influences, which contributes to raising the level of performance of short-term defensive movements. This is confirmed by (Akbar et al., 2024) that the speed of motor response requires integration between the nervous and muscular systems, as athletic performance depends on the body's immediate interaction with external influences. This interaction is improved through specific exercises that work to enhance the compatibility between the central nervous system and the skeletal muscles(Sahli et al., 2024). Through repetition and directed education, the athlete can reduce response time and improve performance efficiency in different sports situations. The results of the development of motor satisfaction among students are related to the effect of the educational program, which includes specific exercises with several factors, which highlights the importance of this type of program in the educational process(KHALID Abdulrazzaq, n.d.). Specific exercises lead to improved motor performance and increased self-satisfaction among students, which reflects an enhancement of their confidence in their motor abilities. Specific exercises contribute to significantly improving students' skills. According to a study (Smith & Jones, 2020), students who participated in educational programs that included specific exercises indicated higher levels of satisfaction compared to their peers in traditional programs. This link between skill and satisfaction reinforces the idea that the feeling of accomplishment in physical activity motivates students to continue participating. Studies (Davis & Lee, 2021) indicate that programs that include diverse and engaging exercises enhance students' motivation to participate. This dynamic helps create a positive learning environment, which contributes to the development of motor satisfaction.

The results indicate that the development of short-range defensive moves in handball can be significantly improved through an educational program that includes specific exercises. Specific exercises contribute to enhancing students' ability to execute defensive moves faster and more efficiently. A study conducted by (El-Baz, 2018) confirmed that implementing specific defense exercises led to a significant improvement in students' movement speed and defensive response.

Research shows that specific exercises improve coordination and flexibility, which are two essential elements of defensive performance. According to a study (Al-Qasim, 2019), students who underwent specific defense training were better able to move smoothly on the field, which helped them confront attacks more effectively(jasim et al., 2022).

Conclusion

- The research showed that the proposed educational program using specific exercises led to an improvement in the speed of motor response in students.

- This contributed to accelerating their field decisions and movements in defensive situations.
- A significant increase in the level of motor satisfaction was recorded among the players after the implementation of the program, as they felt improved in their body control while executing precise defensive movements.
- This improved their performance and self-confidence.
- The qualitative exercises resulted in a significant development in the skill of short-term defensive movements, which was reflected in the overall performance of the players in the matches.

In light of the findings, the researchers recommend the following:
Apply the proposed program more widely in different clubs due to its effectiveness in developing motor response and the skill of short-term defensive movements with handball. Attention to specific exercises

Conflict of Interest:

The authors declare that there are no conflicts of interest.

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Appendix (1)

Shows motor satisfaction scale Help:
- Here are some phrases by which you can describe yourself and your motor abilities.
- Read each phrase and draw a circle around the degree that matches your description of yourself and your description of your motor ability.
- If the phrase applies to you too much, draw a circle around the number 5.

- If the phrase applies to you to a large degree, draw a circle around the number 4.
- If the phrase applies to you to an average degree, draw a circle around the number 3.
- And if the phrase applies to you to a small degree, draw a circle around the number 2.
- If the phrase applies to you to a very small degree, draw a circle around the number 1.
- Note that there are no correct and wrong answers because each individual differs from the other individual in describing himself and describing his motor abilities. It is required to determine the degree that suits your condition honestly and honestly.
- Do not leave any phrase unanswered.
- Write your name and age in years at the bottom of the motor satisfaction scale.

Motor satisfaction scale Designed by: Nelson and Allen Quote: Mohammed Hassan Allawi

	Phrases	Degrees				
		1	2	3	4	5
1	My colleagues think my mobility is good.	1	2	3	4	5
2	I can learn motor skills easily.	1	2	3	4	5
3	I can maintain my body balance while performing some skills.	1	2	3	4	5
4	I can jump high to a suitable height.	1	2	3	4	5
5	I can run fast.	1	2	3	4	5
6	I can do movements that require agility.	1	2	3	4	5
7	I have a good ability to learn fine motor skills.	1	2	3	4	5
8	I can keep my balance from being stationary.	1	2	3	4	5
9	I can move lightly and gracefully.	1	2	3	4	5
10	I can throw a tennis ball a very long distance.	1	2	3	4	5
11	I can maintain my balance by standing on one foot for a reasonable period.	1	2	3	4	5
12	I can move quickly around some obstacles or barriers.	1	2	3	4	5
13	I can participate in some motor activities without fear of falling to the ground.	1	2	3	4	5
14	I can bend and extend my body easily.	1	2	3	4	5
15	I can perform physical movements better than most of my peers.	1	2	3	4	5
16	I can perform violent physical movements.	1	2	3	4	5
17	I can swim long distance	1	2	3	4	5
18	I can participate in some physical activities that require a high level of motor skills.	1	2	3	4	5
19	I can engage in physical activity for extended periods of time without feeling tired.	1	2	3	4	5
20	I can move my body efficiently in different directions.	1	2	3	4	5
21	I have clear confidence in my motor abilities.	1	2	3	4	5
22	I am completely satisfied with my motor abilities.	1	2	3	4	5
23	I can keep my balance while walking.	1	2	3	4	5
24	I can move gracefully to the beat of the music.	1	2	3	4	5

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25	I can make some nimble moves when I want to.	1	2	3	4	5
26	I can estimate the distances between myself and other colleagues while moving.	1	2	3	4	5
27	I can relax my body when I want to.	1	2	3	4	5
28	I can use both arms and legs at the same time when needed.	1	2	3	4	5
29	I can jump forward a reasonable distance.	1	2	3	4	5
30	I can make continuous physical efforts for a long time.	1	2	3	4	5