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The relationship of physical work efficiency (PWC 170) with enduring attacking skilled-performance and shooting accuracy of Premier League club handball players for the season 2018-2019

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Abstract
The intentional research sample consisted of students formally registered within the Iraqi Central Handball Federation for the sports season (2018-2019) . And their number reached (14) players who did not represent the players of Baghdad governorate with handball. The two researchers used the descriptive approach (the study of correlational relations) for its relevance and the nature of the research. As this approach is one of the best and most appropriate approaches to solving the current research problem and achieving its objectives. The physical work efficiency test at the pulse was used (170 Capacity physical Working) to detect the level of efficiency of the productivity of the circulatory and respiratory system, blood and muscle efficiency on the oxygen consumption and energy production of players. The researchers used tests (long handling and accurate steering ball from a distance (30) M and test ran distance (30 meters) "with handling ball ended thoroughly test meters with handling ball ended accurately ran distance (107) and the test ran a distance (130) meters (ending with accuracy of correction) to detect and identify the level of attacking skill performance and accuracy of correction of the players.
Keywords: *Physical, work, efficiency, (PWC 170), skill, handball, Iraq.*

Introduction

Modern scientific studies adopt its training programs for various sporting activities, including handball, depending on the study of the physiological responses resulting at the level of application of these programs and their various methods in order to upgrade the degree of development of those sporting activities depending on the theory of physiological normalization of the body's functional organs. **(Muhammad, 2014)** , and based on this, the different training units lead to changes in the different body systems, and the most important of these devices is the circulatory system that is represented by the heart, blood vessels and blood, as well as the respiratory system that is represented by the lungs because of these two systems of great importance in the delivery of blood loaded with oxygen To the muscles to ensure that they continue to work for the duration of the practiced activity , that practicing handball activity , which is one of the sports that is characterized by exerting a high physical effort for a long period of time. It contains high team performance and ideal requirements in order to implement movement sentences, whether physical or skill, at high speed, as well as the ability to highlight the element and competition between players. (**Sandhya, 2009**) This forces them to perform great physical effort and with high efficiency commensurate with those requirements that require the presence of vital organs working at the same level of efficiency in order to meet the body's need of the basic requirements for energy. In order to develop the appropriate physical competence, this will certainly lead to pressure on the athlete's functional apparatus. The athlete must possess sound functional devices that are highly efficient in order to withstand the effort on them during training and field practice of

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the game. The identification of functional indicators of the device - respiratory as well as a special to get to know the level of endurance performance of the technically gifted offensive physical tests and understanding the nature of the relationship between them so important that will have coaches involved in the game impression and a clear perception about the real level of players and on the suitability of playing the game and the representation of clubs and national teams Hand reel. (**Cardinale, 2012**)

Methodology

Materials and methods: The sample was deliberately chosen, as it included the players of the (students) handball club officially registered in the lists of the Iraqi Central Handball Federation for the sports season (2018-2019) and by (14 players) after excluding the goalkeepers to represent (60.9%)) From the community of origin represented by handball clubs in the excellent class of Baghdad Governorate. The organizational method for conducting the functional tests and measurements of the research sample: The tests conducted by the researchers were of two types, which are functional tests represented by testing the efficiency of physical work (PWC170) And physical skills tests for handball players. Therefore, the two researchers were keen to conduct the physical skill tests in a series with the functional tests, meaning that the sample application for the tests was done over two days as follows: On the first day the functional test was applied, followed by the next day the application of the physical skill tests as they were keen to provide the appropriate conditions as possible for That the research results be objective and scientifically accurate.

Literature review

1. **Physical Work Efficiency Test at Pulse (170)physical Working Capacity:**

That efficient physical work (PWC170) It means "efficiency of the productivity of the circulatory and respiratory system, blood and muscle efficiency on oxygen consumption and energy production". In order to measure and know the level of physical competence of the circulatory and respiratory system and blood, this standardized test was used to achieve the desired goal of the study. (**Nabil, 2004**)

This is served as a researcher that Karpman equation to determine the physical efficiency of absolute (PWC170) It is as follows:

Since N2, N1 The value represents the first and second voltage.

F2, F1 The value represents the velocity of the first and second pulse.

To find the values of this equation, the researcher conducted a step test (STEP TEST) And that is through the performance of two loads whose intensity is not high, and the second pregnancy is greater than the first and the first and second physical load is represented by the steps of going up and down on a floor (Bench) With a height of (40) cm, prepared for this purpose, as the test is conducted in the following manner:

1- The pulse rate is calculated at rest and in the sitting position by palpation (palpation) and by the carotid artery (Carotid Artery) Located in the neck next to the throat.
2- After that, the player performs warm-up exercises.
2. Then the player begins the test by performing two three-minute physical loads.
3. The rate of steps up and down on the bench in the first pregnancy is about (30) times per minute, while in the second physical pregnancy it is about (40) times per minute.
4. One set is calculated by placing the player one foot on the bench and then placing the other foot so that the player takes a full standing position on the mast without bending the knees, then descending with the first foot and the second for example (left, right, left, and right) is calculated by one. As in the figure (1)
5. At the end of the three minutes for each of the first and second voltages, the average velocity of the first and second pulse is calculated to extract a value of (F2, F1).

7- A value is extracted (With regard to the first and second physical exertion according to the following equation:

$$N = 1.5 \times W \times H \times (\frac{n}{3})$$

Since N= Voltage

1.5 = constant value

W = Weight of the player

H = the height of the bench
n= the number of times going up and down
3 = represents the time spent in performing the effort, which is (3) minutes, and it is divided (n) on the number (3) to extract the number of up and down times per minute
And to measure the relative physical work efficiency (R-PWC170) the researcher has divided (PWC170) the absolute weight of the player (W) and as follows:

$$R - PWC_{170} = \frac{PWC_{170}}{W}$$

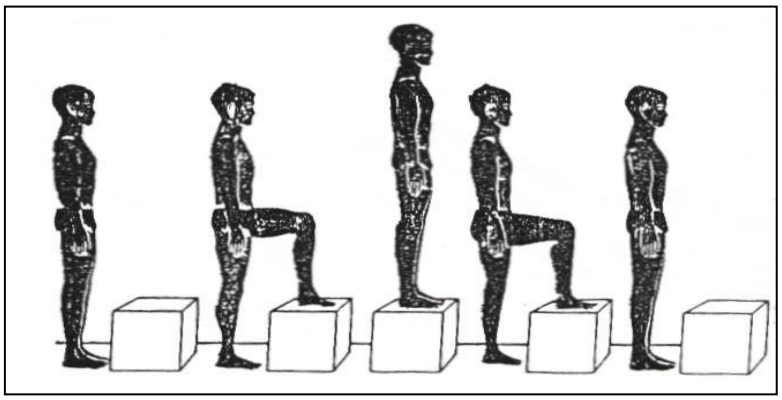

Figure (1) shows how a player rises and descends from the bench with four reps in the physical aptitude test

2. Special tests used to identify the level of bearing offensive performance and accuracy of correction

In order to identify the level of tolerance for offensive performance and accuracy of correction in order to achieve the objectives of the research, a set of tests were applied to the sample of players under study as follows: (**Ammar, 2003**) Test of long handling and ball steering accuracy from a distance of (30) m.
Objective of the test: To measure the precision of long handling skill.
Equipment: legal handball court (40 x 20 m), five legal balls
Performance specifications: The player stands inside a square (4 x 4) m drawn from either of the two halves of the stadium and the side of the square farthest from the goal facing the throwing process and parallel to it is at a distance of (5) m from the center line and after each of the other two sides parallel to the side line and placed inside the square Five legal handballs The laboratory takes, while inside the square, the five balls to direct them one after the other to the opposite goal.
Test conditions:

1- The player is allowed to take three steps from walking or running before throwing the ball to the goal facing him, provided that he is touching the ground the moment the ball comes out of his hand.
2- The tester is not allowed to go outside the boundaries of the square the moment the ball is released from his hand.
3- The laboratory is allowed two trial attempts before the test begins.
4. Register:
5. The number of throws in which the ball enters the goal is to be projected only and is not rolled on the ground or rebounded from inside the goal area.
6. The number of balls entering the goal directly constitutes the player's final score as in Figure (2), which shows the test chart.

7. The skill test to measure the speed with the stroke of the ball ending with correction accuracy

*The test***:** a test that ran a distance of (30) meters with the pad of the ball ending with the accuracy of correction. The aim of the test: to measure the velocity with the ball stroke for a distance of (30) meters, ending with the accuracy of correction.
Tools: a handball court, a stopwatch, a legal handball, four plastic signs, and iron squares measuring (60 x 60) cm attached to the upper corners of the goal.

Performance specification: the tester stands at the point) A * (Which is (3) meters away from one of the goal lines and 2 meters away from the side line and the goalkeeper stands at the goal near the laboratory and has a handball and upon the signal, the goalkeeper handles the ball to the laboratory, and from the moment he receives the ball, the tester starts quickly with the ball, heading towards the point) B (Installed in the middle of the 7-meter throw line of the opposite target, passing between two signs between them at a distance of (150) cm, placed on the center line, and the nearby person is 5 m away from the same side line of a point.A)And the moment it reaches the point)B) He jumps forward and shoots on one of the two suspended squares in the two upper corners of the target, as shown in Figure (3).

Test conditions:

1- Run fast with the ball puck from the point (A) and up to a point (B).
2- It is preferable to allocate a running area 150 cm wide so that the laboratory does not go outside during the run.
3- Comply with what was explained in the performance specifications.
4- Not to touch the signs.
5- Hang two iron squares measuring (60 x 60) cm in the two upper corners of the target.

Register:

1- It records the time from the moment the tester launched after catching the ball to the moment his foot left the ground while jumping to shoot to the nearest 1/10 second.
2- Give the laboratory two attempts:
3- Give the laboratory sufficient rest between attempts.
4- The tester is deducted 2 seconds from the time he scored upon his successful scoring goal from within the two squares.
5- Two seconds are added to the tester on the time he recorded in the event that his foot touches the 6-meter line or fails to score a goal or if he scores a goal "in the offending square or touches one of the signs

8. The skill test for measuring speed endurance with the medicine tapping the ball ending with precision aiming

The name of the test: a test that ran 107 meters with the ball, ending with the accuracy of correction.

The aim of the test: to measure the velocity tolerance with the chuck of the ball that has finished accurately shooting.

Tools: legal handball court, stopwatch, legal handballs, plastic signs, and iron squares measuring (60 x 60) cm. (Performance specification: the tester stands at the starting point)A(Determined in the middle of the 6-meter area line for one of the goals with a handball in hand, and when he hears the start signal, he starts off quickly with the pads towards a point)B(Specified on the line of implementation of the 7-meter throw to the opposite goal and turns around it to return to the point)A(and around it, too, "turns back" quickly with the plump to a point)B(Once again, then he rotates around it back "quickly to shoot by jumping forward" from the 7-meter throw line near a point)A) On one of the two suspended squares in the two upper target corners, as shown in Figure (4). **(Dania, 1999)**

*Test conditions***:**

1- Jogging fast with the ball chuck.
2- It is preferable to allocate a running area 150 cm wide so that the laboratory does not go outside during the run.
3- Adhere to what has been clarified in the performance specifications.
4- Not touching or dropping the signs.-5 Hang two squares measuring (60 x 60) cm at the top corners of the target.

*Register***:**

1- Records time from the moment the tester launches to the moment it leaves the ground for aiming, to the nearest 1/10 second.
2- Give the laboratory two attempts:
3- Try on the hanging box on the top right.
4- Try on the hanging box on the upper left.
5- Give the laboratory sufficient rest between attempts.
6- The tester is deducted 2 seconds from the time he scored upon his successful scoring goal from within the two squares.

7- The tester shall have two seconds added to the time he scored in the event that the player's foot touches the 6-meter area line or does not score a goal or score a goal "in the offending square.

9. The skill test to measure the endurance of speed with the accuracy of aiming.

Test name: He ran a distance of (130) meters, ending with correction.

The aim of the test: to measure the endurance of speed with accuracy.

The tools used: a legal handball court, a stopwatch, legal handballs, signs, legal handballs, a whistle, iron squares measuring (60 x 60) cm, count (2).

Performance specifications: The laboratory stops at the starting point (1) * which is 6 meters away from one of the goals line and at a distance of (2) two meters from the left side line. When the start signal is heard, the tester will go quickly towards "towards point (3) ** passing through" from Behind point (2) fixed on the center line and at a distance of (2) two meters from the left side line and upon reaching point (3) he receives a ball from the coach *** then returns it directly to him and sets off quickly back "from behind point (4) specified at a distance (8) meters in front of the left post of the opposite goal and behind point (5) fixed on the center line and at a distance of (6) meters from the right side line towards point (6) fixed on the 6-meter line in front of the left post of the target close to the starting point and then moves A sideways movement towards point (7) which is 3 meters to the left of point (6), then it moves in front of the side towards point (8) that is (1) meter away from the 9-meter line, and in front of the left post of the goal near the starting point, then Backward movement to point (6) and then quickly set off to point (1) to rotate around it heading "to point (3) once" again "passing" from behind point (2) and upon reaching point (3)) He receives a ball from the coach and takes approximate steps and from the 7-meter throw line, he shoots by jumping in front of one of the two suspended squares in the upper two corners of the goal. 6 meters in front of the right post of the goalkeeper, as shown in Figure (5). **(Dania, 1999)**

Test conditions:

1- Running at full speed to the end of the test at point (9.(
2- Adhere to the paths specified in the signs.
3- The laboratory must pass behind the signs and not touch them.
4- Shooting by jumping forward.

Register:

1- It records the time from the moment of launch until the laboratory reaches a point (9) to the nearest 1/10 second.
2- Give the laboratory two attempts:
3- Try on the hanging box on the top right.
4- Try on the hanging box on the upper left.
5- Give the laboratory sufficient rest between attempts.
6- Two seconds shall be deducted from the total time scored by the laboratory if he scored a goal "in one of the two squares".
7- Two seconds are added to the total time if the tester does not score a goal, or if the ball falls from it or his foot touches the 6-meter area line, or scores a goal, in the offending square or touches one of the signs. **(Allerheiligen , 1994)**

Results

Table (1) shows the results of the arithmetic mean and standard deviation of the functional tests of the research sample

standard deviation	measuring unit	Arithmetic mean	Milestones Statistic Functional indicators	
3.562	**Kg m / min**	1133.019	**The absolute**	**PWC170**

1.473	**Kg m / min / kg**	19.163	**Relative**	

Table (2) shows the arithmetic mean and standard deviation of the results of the tests of bearing the offensive performance and the accuracy of correction of the research sample

T	Statistical parameters Offensive performance tests	Arithmetic mean	measuring unit	standard deviation
-1	**Test of long handling and ball steering accuracy from a distance of (30) m**	4.287	**How often**	0.432
-2	**A test run (30 m) with the ball, ending with the accuracy of correction**	3.654	**a second**	0.853
-3	**A test run (107 m) with the ball, ending with the accuracy of correction.**	20.618	**a second**	1.386
-4	**A test run (130 m) ended with correction**	33.441	**a second**	3.727

Table (3) shows the simple correlation matrix between the functional indicators of the circulatory system - respiratory system and the tests to withstand the offensive performance, where the tabular value (t) was (0.444), below the significance level (0,0 5) and the degree of freedom (18)

Skill performance tests Functional indicators		Test of long handling and ball steering accuracy from a distance of (30) m	A test run (30 m) with the ball, ending with the accuracy of correction	A test run (107 m) with the ball, ending with the accuracy of correction	A test run (130 m) ended with correction
PWC 170	**The absolute**	0.105	0.561	0.468	0.185
	Relative	0.612	0.133	0.587	0.692

Discussion:

Table (1) shows the results of the test) PWC 170) Absolute and relative, reaching the arithmetic mean of a test) PWC 170(Absolute (1133,019 kg m / min) and standard deviation (3.562), as for)PWC170The relative mean was (19.163 kg m / min / kg) and its standard deviation was (1.473), which is a good result for the research sample in this test because it shows that there is an improvement in the level of physical work efficiency at the pulse (170) from the normal level of people. Healthy people are not trained, but did not reach the required level for handball players, as the sources indicate that the value) PWC 170 The absolute range in untrained persons ranges between (700 - 1100) kg m / min and value) PWC 170 The relative value is within (12-15) kg. M/min/kg For athletes, the value is) PWC 170 (It will vary according to the type of sports specialization as it reaches a value)PWC170The absolute limit for advanced handball players is up to (1452) kg m / min, and the value (PWC 170)The proportional reaches up to (22) kg m / min / kg, while the value may reach) PWC 170The absolute value for athletes applicants is (2500) kg.meter/minute, and the value) PWC 170) The relative amount (30) Kgm.m/min / kg (28 : 125) When balancing these results with the results of the previously mentioned sample individuals a back t results that the proportion (50%) of the sample value ranges) PWC 170) Absolute have between (831.1- 1092.29) , which is a level acceptable somewhat because they fall within the limits of the normal level of people healthy untrained yen , as seen from the results that the proportion (40%) of the sample ranging findings between (1102.5- 1332.8 It is a good level for the research sample because there is an evolution from the normal level, except that it did not reach the required level for handball players, while it appears that only (10%) of the research sample is at an excellent level, as their results range between (1584-1687.5), which are A very small percentage, as it represents only excellent players and have high physical competence, out of a total of (14) players.) PWC 170 Relative, it also represents a percentage (10%) of the research sample appeared at an excellent level, where their results ranged between (22.5-24) kg m / min / kg, and the percentage (80%) of the research sample was at a good level, where their results ranged between (16.7 - 19.6)

kg m / min / kg, and the percentage (10%) is an acceptable level, as their results ranged between (12.9-13.2) kg m / min / kg. The researcher attributes that the reason for the lack of development in the level of physical work efficiency (PWC170) To the level required by most of the players due to the small period of general preparation, as well as the interruptions that occurred in the march of the Premier League handball for the aforementioned season, which negatively affected the result of this test.

The table shows (2) the results of tests carrying offensive and accuracy of performance correction of the research sample a T which have been identified at the level of physical qualities of skill and special accuracy correction of the research sample, the results showed the presence of variation in the level of testing among the sample members search through circles calculations and deviations values Standardized test results for the research sample. The arithmetic mean of the long handling and ball steering accuracy test from a distance of (30) m reached 4.287 (And once with a standard deviation of (0.432) , and the researchers believe that the results are good because the error of the recorder are very few. The researchers attribute the reason to the players' mastery of basic skills well, especially since the test was applied as quickly as possible. Mufti Ibrahim states that, “As the players’ performance of basic skills increased, the level of planning could increase for them, given that the players in this case will perform the skills automatically, which gives them a greater opportunity to focus on implementing the game plans adequately and effectively without a drop in the level of performance during the match . (**Mufti, 1994**) and the arithmetic mean of a running test of (30) meters with the paddles of the ball ending with accuracy of correction is (3.654) seconds and a standard deviation of (0.853) and based on a previous study of (**Hammoudi, 2008**) it was found that the results of the research group were satisfactory. (**Muhammad, 2014**) attributed the researchers reason to master players of skills essential straighten and move the ball with speed and accuracy of performance and desertification Web, on the other hand , and through the follow - up exercises the difference participating Premier league handball show that the skills training and different great conditions similar to the competition led To developing (shifting speed, patience and correction) as confirmed by (Clark) by saying, " Modern handball is characterized by speed, movement and constant change of positions among players, so all players must" train on Performing strong correction with great frequency, focusing on the main points of each type and trying to correct mistakes to reach perfect performance. The player can also take advantage of opportunities and shoot from any of the different playing centers. (**Clark, 2010**) As for the test of running (107) meters with the ball that ends with the accuracy of correction , the arithmetic mean was (20.618) seconds and a standard deviation (1.386) as well as the test run (130) meters ending with the accuracy of correction , the results showed that the arithmetic mean was (33.441) seconds with a standard deviation Its value is (3.727) . The researchers believe that the results were good based on the results of the same previous study (**Dania, 1999**). The researchers attribute the quality of performance and results to the effectiveness and impact of the exercises used in the training units of the research sample, as they included exercises that endure speed with the chucks, the use of different stresses, and link between the churning, fast jogging and correction. which carry speed influential factor "different exercises distances, including the T. befitted and the possibilities of players which led to the increase in the adequacy of the second system for the production of energy (lactic acid system), which in turn positively reflected on the development of bearing medium speed, which has had a significant role in improving the results of the speed handling and accuracy Aiming. (**Sherzad, 2011**) The nature of the performance in the game of handball requires the player to move continuously with the change of direction, changing the player's movement by moving from a defensive state to a sudden offensive state by cutting the ball and heading to the opponent's goal to score a goal and the effort that is made in such an attack differs from a direct attack as it requires The player has his speed as a beer. Someone refers to "the necessity of developing the endurance trait from the early years to train young people in various games, including handball, as it is a physiological characteristic that needs a long time to develop in order to delay the phenomenon of fatigue that negatively affects" in the form of motor performance (**Bastwissi, 1999**) The correlation matrix P through the results of a matrix link shown in the table (3) a back of T results and the presence of significant correlation was weak to average between a moral test (physical efficiency170 PWC Absolute and relative) and the tests under study. As indicated by the results relationship is significant correlation of the test (170 PWC Absolute) and test (handling long and accurate steering ball from a distance of 30 m. It was (0.105). While the T. relationship moral medium between them in the physical efficiency test relative reaching (0.612). And it showed the results of the test (physical efficiency170 PWC The absolute correlation) and the test of running (30) m with the ball ending with the accuracy of correction with a weak moral correlation, reaching (0.561). While the results indicated as a non-significant correlation between them in the relative physical aptitude test, reaching (0.133). While the results of the tests showed a non-significant

correlation between the physical aptitude test170 PWC The absolute) and between the test of running (107) m with the ball, which ended with the accuracy of correction, as it reached (0.468), while the results indicated a weak moral correlation between them in the test of relative physical aptitude, reaching (0.587). And the results showed a correlation between non - moral test (physical efficiency170 PWC The absolute) and he ran (130 m ending with the accuracy of correction) as it reached (0.185), while the results indicated a significant relationship between the two in the relative aptitude test, as it reached (0.692). While the results showed a significant correlation between the physical aptitude test170 PWC The relativity) and all the tests under study, except for the 30-meter run test with the ball pads, which ends with accurate correction. The researchers believe that there is a great relationship between the efficiency of the work for physical exercises that characterized by the t load skill, as the high level of players have worked to raise the work efficiency of the physical (PWC 170 Thus, both mention that the physical efficiency of work PWC 170It is considered a measure of the extent to which the body's systems adapt and its training state under the influence of training programs . Also known as physical aptitude (PWC 170It indicates the human ability to perform high-intensity muscular work for a long time, and there is a direct relationship between physical competence and elongation. (**Abu Al - Ela, 1997**) ,For this reason, the significant relationship between (PWC 170) The tests that are characterized by endurance, while the relationship appeared weak and moderate with him, and the tests that are characterized by speed without prolongation.

Conclusions

1- There is a variation in the level of functional indicators of the circulatory system - Respiratory, as well as in the level of performance of offensive endurance tests among players (research sample)
2- Through the physical aptitude test $_{170}$ PWC The absolute and relative) show the presence of significant and non-significant correlations between functional indicators of the circulatory system-Respiratory and some special physical characteristics of the research sample. This means that there is an evolution of the players in the level of functional indicators of the circulatory-respiratory system and the level of some physical characteristics under study .However, he did not reach the required level, which corresponds to the level reached by the global handball game.

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