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Effect of speed, agility and quickness (SAQ) exercises on the development of physical abilities of soccer referees in Iraq

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ABSTRACT

The aim of this study was to develop exercises specifically designed to enhance the physical and motor abilities of football referees. Additionally, it sought to identify the percentage of development in the studied variables. The researchers deliberately chose to use the experimental method with a single experimental group and conducted two tests before and after, which is more suitable for achieving the objectives of the research. The research sample comprised 20 referees, with 10 being yard referees and 10 assistant referees. The following tests were used: Speed Test for Arena Referees (FIFA), Speed Endurance Test for Arena Referees, Agility Test for Assistant Referees (Coda): (FIFA), Speed Test for Assistant Referees (FIFA), Speed Endurance Test for Assistant Referees (FIFA). The researchers utilized the statistical software package SPSS to extract and analyze the results of the research variables. Statistically significant differences were observed between the pre and post-tests of the research sample, favoring the post-tests, indicating the effectiveness of the training program utilizing SAQ exercises in developing various physical and motor abilities among the individuals. The results clearly demonstrated the positive impact of this training approach. Notably, the referees exhibited a notable level of enthusiasm during the exercises, reflecting their eagerness to engage in a training method that was novel to them, which was evident in the differences observed in the results.

KEYWORDS

SAQ; Exercises; Physical Abilities; Soccer Referees

1. INTRODUCTION

The high level of physical preparation of football referees in proportion to the level of performance of the players during the match, which has become more rapid, can be achieved through

regular training within codified curricula that improve the level of their physical fitness in order to keep pace with the course of the match (Albaladejo Garcia & Cejuela Anta, 2020; Peralta-Geis et al., 2021).

The game of football takes place in a stadium that is the largest in terms of area among team games. The speed of performance in it has become one of the requirements of modern football (Sánchez García et al., 2019; Ridha Ali, 2023). For a football referee, who is one of the pillars of the game, to successfully lead the match, he must have high physical fitness. This fitness enables him to pass the physical tests he undergoes during the sports season. The program must build the physical aspect of judgment according to what the tests require from special physical abilities. Therefore, it is necessary to keep abreast of developments in sports training and employ appropriate training methods to develop the level of physical fitness of referees, ensuring they achieve the highest efficiency in leading matches (López García et al., 2021).

For the referee to remain physically ready, it requires him to exert great effort in physical training. The process of physical preparation is of great importance in developing the level of performance, movement, and correct positioning within the field of play, as well as passing physical fitness tests. This indicates that the referee can lead the match with high efficiency in terms of physicality, enhancing other aspects such as psychological and mental aspects. Attention must also be paid to motor abilities in addition to physical abilities because of their special importance in decision-making speed. Decisions are made in seconds. Therefore, modern and appropriate training methods and approaches must be used to develop the capabilities of the referee (Albaladejo Garcia & Cejuela Anta, 2020; Peralta-Geis et al., 2021).

The importance of this research lies in the preparation of exercises (S.A.Q) to develop some of the physical abilities of referees through diversity in training methods and providing exercises of varying rhythms to simulate the physical situations needed by the referee on the playing field during matches. This study aims to prepare exercises aimed at developing the physical and motor abilities of football referees. Additionally, it seeks to identify the percentage of development in the variables studied.

The study hypothesis was that there would be statistically significant differences between the results of the pre- and post-tests of the effect of exercises (S.A.Q) in the development of some physical abilities of football referees, and in favor of post-tests.

2. METHODS

2.1. Study design and participants

The researchers deliberately chose to use the experimental method with a single experimental group and conducted two tests before and after, which is more suitable for achieving the objectives of the research.

The research community was deliberately determined to represent all first-class referees in Baghdad Governorate, including arena referees and assistant referees, accredited by the Iraqi Central Football Association for the sports season 2021/2022. Their total number was 61 referees. The research sample comprised 20 referees, with 10 being yard referees and 10 assistant referees. They were deliberately selected from those available and able to attend and continue training days. This sample represented 39.18% of the research community. Additionally, 4 referees were selected for the exploratory experiment and were excluded from the main experiment. The study was conducted from July 1, 2022, to December 25, 2022. The spatial field for the study was Martyr Ali Hussein Stadium.

2.2. Instruments and materials

The researchers used personal interviews, self-observation and research-related tests and measurements. The materials used in this study were football field, siren, 3 stopwatches, pencils, recording papers, tape measure, coloured slicing strip for selection, 8 plastic rings, cones, signs, and two arbitration banners. Also, the researchers used the following tests:

Speed Test for Arena Referees (FIFA)

The purpose of the test is to measure the speed of the referees of the football arena. For this test it is necessary a track football field, a registration form, a laser time gate, 6 signs, and a banner to indicate the beginning of the test.

Regarding the test description, the referee stands at a distance of 1.5 m from the starting line and after giving the start signal, the referee starts at the maximum speed for a distance of 40 m and by 6 repetitions as one attempt must not exceed 6:00 s, and the rest between each repetition is 1 minute, and in the event that the referee does not pass the specified distance and for the specified time itself, it is an unsuccessful attempt and the attempt is repeated only once, and then the referee is excluded from the test in the event that the test distance is not completed by the time specified in the attempt The second is as shown in the test form in Figure 1.

Figure 1. The speed test for the arena referees

Speed Endurance Test for Arena Referees

The purpose of the test is to measure the speed endurance of football arena referees. The tools used were: 36 signs, calculator without a laptop with the test program installed, speaker device and sound pickup, registration form, 4 banners of ruler number, and metric measuring wheel. In the beginning, the referees are distributed in the form of one or two groups according to the number of referees to facilitate the performance of the test, as the referees must stand behind the installed signs and after hearing the tone of preparation, the electronic whistle is launched, so the referees go for a distance of 75 meters with a time of 15 seconds and a rest of 18 seconds and a repetition ranging between 40-48 repetitions, in order to succeed because less than that the referee is not passing the tests, and if the referee cannot cut 75 meters in 15 seconds, or in the case of running without firing the electronic whistle, a first warning is given to the referee and if the same mistake is repeated a second time, the referee is directed to the red card and then he is excluded from the test. Figure 2 shows the speed endurance test for arena referees.

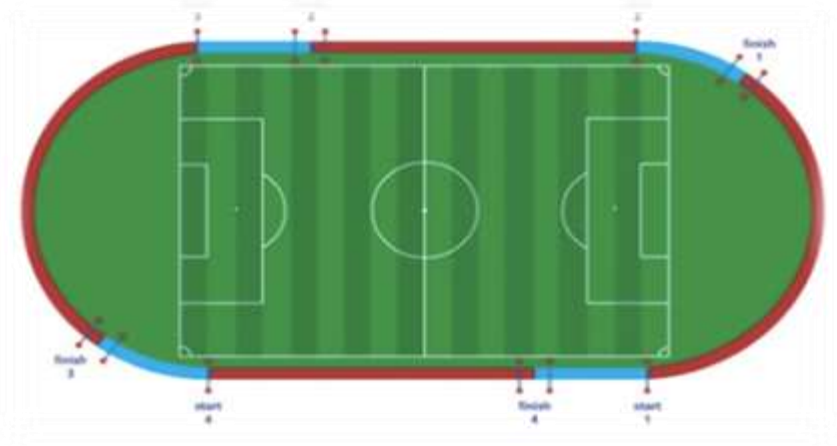

Figure 2. Speed endurance test for arena referees

Agility Test for Assistant Referees (Coda): (FIFA)

It is one of the physical tests adopted by FIFA to measure the ability to change direction of assistant referees, and it must be completed in a time not exceeding 10:000 seconds, and is performed only once. The purpose of the test is to measure the ability of change of direction (agility) of assistant football referees. The tools used are: 8 signs, laser time gate, whistle, metric measuring wheel, and registration form.

The assistant referee stands at a distance of 50 cm from the starting line and prepares for the purpose of the test and, after hearing the whistle, he starts at full speed, runs forward for a distance of 10 meters, then moves to the left side for a distance of 8 meters, then moves to the right side also for a distance of 8 meters, then starts at full speed for a distance of 10 meters, as shown in Figure 3.

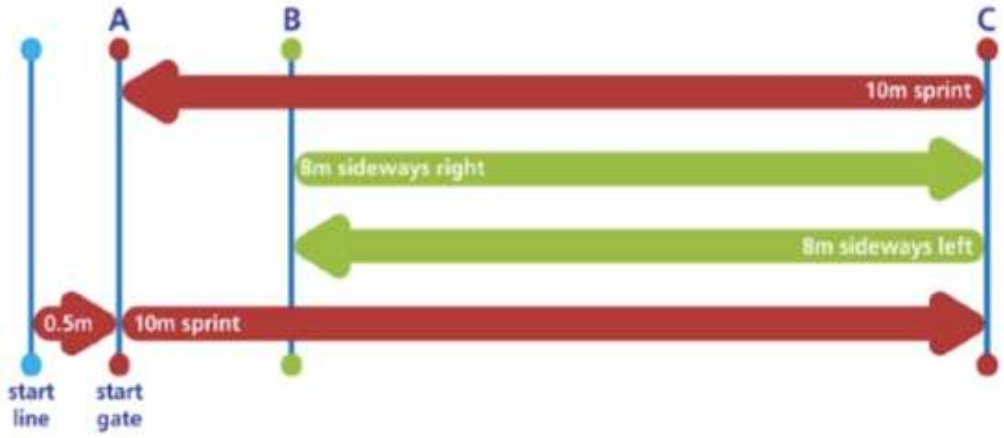

Figure 3. Agility Test (Coda) for Assistant Referees

Speed Test for Assistant Referees (FIFA)

The purpose of the test is to measure the speed of assistant football referees. The tools used are: 6 signs, registration form, laser time gate, metric measuring wheel, and banner. Regarding the test description, the referee stands at a distance of 1.5 m from the starting line, and after hearing the whistle, he starts at full speed for a distance of 30 m, and by 5 repetitions, as one attempt should not exceed 4:70 seconds, and the rest between each repetition is 30 seconds, and in the event that the assistant referee does not pass the specified time, it is an unsuccessful attempt and the attempt is repeated a second time, and if the assistant referee commits a second error, it is considered not passing the test, as shown in Figure 4.

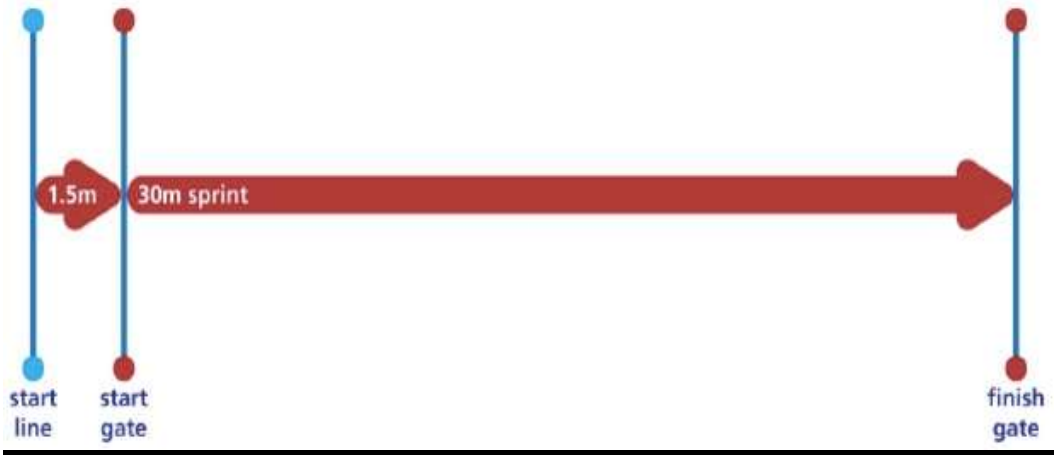

Figure 4. Speed test for assistant referees

Speed Endurance Test for Assistant Referees (FIFA)

The purpose of the test is to measure the speed endurance of assistant football referees. The tools used are: 36 signs, calculator without a laptop with the test program installed, speaker device and sound pickup, registration form, and 4 banners.

In the beginning, the referees are distributed in one or two groups according to the number of referees, the referees must stand behind the installed signs and after hearing the tone of preparation, the electronic starting whistle is launched, so that the referees go for a distance of 75 meters, and with a frequency ranging from 40-48 repetitions in order to succeed, because less than that the assistant referee is not passing the tests, and any assistant referee must travel the specified distance with a time of ability (15 seconds) and rest (20 seconds) and if the referee cannot cut 75 meters in 15s, and if the error is repeated again, the referee is excluded from the test and is considered unparsed, as shown in Figure 5.

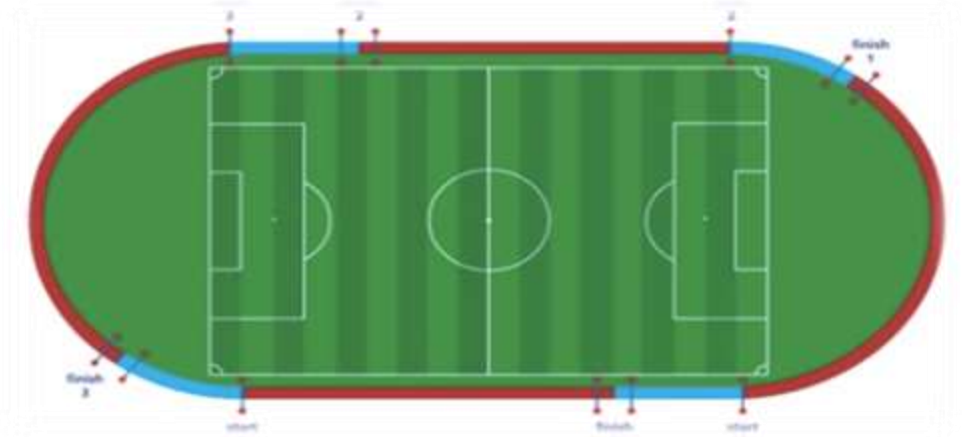

Figure 5. Speed endurance test for assistant referees

2.3. Exploratory experiments

First Exploratory Experiment

The conduct of the exploratory experiment is a necessity of scientific research, as "it is to explore the circumstances surrounding the phenomenon that the researcher wishes to study" (Al-Kazemi). The first exploratory experiment for physical tests was conducted on Sunday, 1/4/2022 at Ali Hussein Stadium in the Ministry of Youth and Sports / Baghdad on a sample of 4 referees, whose percentage was 7.19 from the research community. Then the second exploratory experiment was conducted after a week corresponding to 6/4/2022, and under the same conditions to ensure the possibility of applying the selected exercises, and to ensure that the tools used, and the time required to apply the exercises, excluded the judges who participated in the exploratory experiment from the main experiment, and from this experiment the researchers were able to diagnose the following things: know the time it takes to take the tests; ensure the adequacy of the tools used in the research; knowing how easy or difficult the exercises are, as well as their validity and trying to overcome the errors that may appear when implementing the main experiment; identify the adequacy and organization of the assistant team.

Second Exploratory Experiment

To reach the required intensity of the exercises used by finding the maximum pulse of the sample members, the researchers conducted a second exploratory experiment on the research sample, as this experiment was carried out on 6/4/2022 at the Martyr Ali Hussein Stadium for the purpose of controlling the intensity of the exercises during the training units. The pulse of rest was measured for each referee before starting the maximum exercises and immediately after completion "through the carotid artery during the first 6 seconds and multiplying the result ×10 to have the result of the pulse per minute.

The researchers, in coordination with the training staff, conducted an exploratory training unit on the research sample before starting the main experiment, the purpose of which was to: 1) Determine the number of exercises used for each physical ability in the training unit. 2) Ensure the time of implementation of the training unit. 3) The extent to which the referees accept and absorb the exercises prepared by the researchers. 4) Ensure the safety, validity and suitability of the tools used.

2.4. Pre-tests

The pre-test was conducted for the sample members to perform physical tests under the supervision of the researchers, and with the assistance of the work team over two days at Ali Hussein Stadium, Ministry of Youth and Sports, Baghdad, as physical fitness tests were conducted for the arena referees on Thursday, 20/4/2022, and special tests for assistant referees were conducted on Friday, 21/4/2022.

2.5. Intervention

The start of the implementation of the exercises was on 22/4/2022 to 23/6/2022 on the research sample. According to the recommendations of Fatima et al (2010), the training intensity used was 75-100%, and its time is 60 minutes. The number of training units within the training curriculum for the sample was 24 training units distributed over 8 weeks by 3 training units per week, which were in the days Sunday, Tuesday and Thursday. The intensity was determined and measured on the basis of the maximum pulse, as well as the use of breaks between one exercise and another and between each group and another. The training intensity was based on the maximum pulse rate of each referee according to the equation: 220 – age = maximum heart rate. The pulse index is one of the important physiological indicators and easy to use in the applied field, and can determine the level of intensity of the load, as it gives the coach positive and quick information for the reactions of the functional organs in play.

2.6. Post-tests

The post-tests were conducted over a period of two days after the completion of the application of the exercises, as the post-tests were conducted for the arena referees on 25/6/2022, while the assistant referees were tested on 26/6/2022 at Ali Hussein Stadium, Ministry of Youth and Sports, Baghdad, to find out the extent of development of the research sample regarding passing the physical fitness tests for football referees, and the researchers were keen that the conditions of the post-tests be similar to the conditions of the pre-tests in the nature of the place, time and the assistant work team, in order to achieve accurate results.

2.7. Statistical analyses

The researchers utilized the statistical software package SPSS to extract and analyze the results of the research variables. The statistical methods used were arithmetic mean, standard deviation, and t tests. The significance level was $p<0.05$.

3. RESULTS

Table 1 presents the comparison of pre tests and post tests in the five tests: 1) Speed Test for Arena Referees, 2) Speed Endurance Test for Arena Referees, 3) Speed Test for Assistant Referees, 4) Speed Endurance Test for Assistant Referees, 5) Agility Test for Assistant Referees. We found that, in these five tests, the results of the post tests were significantly better ($p<0.05$) than those of the pre tests.

Table 1. Comparison of pre tests and post tests

Test	Unit	Pre tests		Post tests		t	p
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation		
Speed Test for Arena Referees	Second	5.9213	0.03733	5.6350	0.17160	7.183	0.000
Speed Endurance Test for Arena Referees	Repetition	35.8667	2.55974	46.6668	2.89497	12.435	0.000
Speed Test for Assistant Referees	Second	4.6318	0.05422	4.413	0.13200	6.645	0.000
Speed Endurance Test for Assistant Referees	Repetition	35.8667	3.41565	46.4	4.4849	8.061	0.000
Agility Test for Assistant Referees	Second	10.0373	0.22811	9.6820	0.25095	5.932	0.000

4. DISCUSSION

The differences in the arithmetic mean observed in the above table indicate the presence of statistically significant differences between the results of the pre- and post-tests in the research variables of the research sample (arena referees - assistant referees), favoring the post-tests. The researchers attribute these differences to the effectiveness of the exercises in developing some of the physical and motor abilities targeted by the training program. Additionally, the focus on developing speed and endurance during the exercises on the field of play contributed to these improvements.

According to Al-Ela (1994), athletes must regularly engage in continuous training for a period of no less than 8-12 weeks to achieve significant physiological adaptations. The researchers applied this principle in designing the training program, ensuring consistency and duration to induce meaningful improvements.

Furthermore, the use of competitive exercises characterized by diversity played a crucial role in developing the targeted qualities of football referees. Incorporating various auxiliary tools and exercises during the training sessions helped to eliminate boredom among the referees and increase

their excitement and motivation. As noted by Fawzy (2008), diversity in training tools and exercises stimulates athletes and enhances their motivation to improve their performance levels.

In conclusion, sstatistically significant differences were observed between the pre and post-tests of the research sample, favouring the post-tests, indicating the effectiveness of the training program utilizing SAQ exercises in developing various physical and motor abilities among the referees. The results clearly demonstrated the positive impact of this training approach. Notably, the referees exhibited a notable level of enthusiasm during the exercises, reflecting their eagerness to engage in a training method that was novel to them, which was evident in the differences observed in the results.

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AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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