Effect of Training by Using the Change in the Official Measurements on Some Special Variables and Record Level of 110m Hurdles Competitors

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Abstract: The research aims to identifying the effect of training with the change in the official measurements of the 110m hurdles contest on the time of running between hurdles, that is from the start until stepping over the first hurdle, after stepping over the hurdle until after stepping over the next one and after stepping over the last hurdle until the finish line and on the record level of the 110m hurdles competitors. The researcher has used the experimental method by using the pre/post design of one experimental group, as it suits the nature of the research. The sample of three athletes selected by the purposive method of the 110m hurdles athletes of the technical military college whom participated in the military college's championship of the session 2010/2011. The training program applied during the specific preparation period and competitions, lasted for four months as three training units per week. The results illustrated the improvement of the specific variables with a range from 04.17% to 26.67% and the improvement of the record level with a range from 08.94% to 10.47%.

Key words: Training % Change % Official measurements % 110m hurdles

INTRODUCTION

The 110m hurdles contest is considered one of the most amusing and exciting athletics competitions due to the relay race between the hurdles (10 hurdles) and stepping over the hurdles (each 1.067 m) while maintaining high speed rates during the race. Moreover, the athlete must break the distance between the hurdles in three steps (the distance between each of them is 9.14 m) in the least possible time.

Abd El-Hamid [1] referred to this contest, as it requires a high level of speed, explosive power, flexibility, agility, coordination and speed endurance along with discriminating of power, high speed to step over the hurdle. Guthrie [2003] has considered the 110m hurdles contest as one of the most difficult races; that difficulty represented in the height of the hurdle and thus stepping over it. Moreover, he referred that hurdles contests requires a certain motor timing especially in running between hurdles where motor fluidity between hurdles depends on the success of performing the hurdles step. In addition, Abd El-Hafiz [3] mentioned that high standard technical performance is for stepping over the hurdle and the correct timing of steps between hurdles are of the basic factors that are required to reach good standard in the hurdles contests. Coh [4] confirmed that landing stage of the hurdles is the most important stage to move from stepping over the hurdle to running between hurdles, this transition require a high degree of technical competency and motor abilities such as speed, coordination and timing. Baechle and Earle [5] mentioned that the optimal and effective performance of the combined movements and the most complex skills depends on the ability of the neuromuscular system. Ahmed [6] refers that any sport movement is not limited to the work of muscles, but there are the nervous system that is in charge of sending signals to the muscles, which participate in performing any movement by the body. As long as there is coordination between these two organs, the movement performances are much easier and smooth. Mccomas [7] stresses that the nervous system has a big role in creating the required coordination between muscles and nerves in order to reach the appropriate contractile in the required moment with the needed speed for performing. The nervous system is the organ which orders and organizes every movement of the body, where the individual’s ability to perform the different movements as fast as possible are based on the process of controlling directing the nervous signals. In order to achieve a directed movement addressed to a goal, it requires the nervous signals addressed to the cells causing the movement.
Osman [8] refers to the regular coordination process between the work of each of the two organs -the muscular and the nervous one- as the most important elements of the speed performance. As in the case of targeting the muscular contractile in running, the central nervous system sends successive shipments of provokes according to a certain time and through the motor nerve to the selected muscles. That restricted time activity of both the muscular and nervous systems determines the best ever time relation and the consequence of strides in running reaching out the best positional relation and the length of the stride in running. Thus, Robergs and Robert [9] referred that to obtain neuromuscular activity a path must exist, meaning a connection between receptor and motor cells spread all over the body. Where the nervous and muscular skills grows and develops according to forming a new path, as well as continuous training on performing movements will assist the neuromuscular organs to reach high standard performance of coordination and harmony.

Of the above mentioned the idea of this research of changing the official measurements whether the intermediate distances or the height of the hurdles has revealed. In order to allow the athlete to perform the hurdles contest achieving the required rhythm necessary for the central nervous system that will enable him to achieve a higher technical performance by being as fast as possible between hurdles and during stepping over it, to achieve the speed between and above the hurdles, thus achieving the required time.

The research aims to identify the effect of training with the change in the official measurements of the 110m hurdles contests on:

- The time of running between hurdles (from the start until stepping over the first hurdle, after stepping over the hurdle until after stepping over the next and after stepping over the last hurdle until the finish line).

Hypothesis of the Research: There are significant statistical differences between the pre- and post-measurement in favor of the post-measurement in:

- The time of running between hurdles (from the start until stepping over the first hurdle, after stepping over the hurdle until after stepping over the next and after stepping over the last hurdle until the finish line).

C The record of the 110m hurdles contests.

MATERIALS AND METHODS

The researcher has used the experimental method by using the pre/post design of one experimental group, as it suits the nature of the research.

The sample of three athletes selected by the purposive method of the 110m hurdles athletes of the technical military college whom participated in the military college's championship of the session 2010/2011.

Statistical coherence between the samples of the research was conducted in height, weight, age, training period and record level.

The results of Table 1 illustrates the Arithmetic mean, Standard deviation and Skeweness coefficient of the height, weight, age, training period, time of 50m hurdles and record level variables in the pre-measurements.

Steps of Implementing the Research

Pre-measurement: The pre-measurement conducted on Wed.17thNov.2010 in the technical military college stadium. Where the 110m hurdles record level was measured along with the running time between hurdles (from the start until stepping over the first hurdle, after stepping over the hurdle until after stepping over the next and after stepping over the last hurdle until the finish line). Through the assistance of 06 coaches, three for the time between hurdles and three for selecting the record level, the time manually selected and medium time was calculated.

Applying the Training Program: After reviewing scientific references and previous studies and through the researcher experience in the training field, the researcher has determined the proposed training program to improve the running speed between hurdles, the speed of stepping over the hurdle and the specific physical fitness elements and therefore improve the 110m hurdles record level.

The training program applied during the specific preparation period and competitions, lasted for four months as three training units per week.

The Fundamentals of Conducting the Program:

- Graduate from simple to complex and from easy to be difficult.
- The distance between hurdles graduates from the less official intermediate distances to the official ones.
Table 1: Describing the research sample

<table>
<thead>
<tr>
<th>Variables</th>
<th>Arithmetic mean</th>
<th>Standard deviation</th>
<th>Skeweness coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>180.6667</td>
<td>5.13160</td>
<td>-1.090</td>
</tr>
<tr>
<td>Weight</td>
<td>73.0000</td>
<td>3.46410</td>
<td>-1.732</td>
</tr>
<tr>
<td>Age</td>
<td>22.3333</td>
<td>1.15470</td>
<td>-1.732</td>
</tr>
<tr>
<td>Training period</td>
<td>2.6667</td>
<td>0.57735</td>
<td>-1.732</td>
</tr>
<tr>
<td>Time of 50m hurdles</td>
<td>8.0333</td>
<td>0.05774</td>
<td>1.732</td>
</tr>
<tr>
<td>Record level</td>
<td>16.9333</td>
<td>0.25166</td>
<td>0.586</td>
</tr>
</tbody>
</table>

C Training athletes should start with a distance between hurdles of 8.50m, which increases monthly by 20cm until the fourth month to reach the official distances of 9.14m.

C The hurdle height graduates from low to the official height.

C Training athletes' starts on hurdles of 94cm height for a month and a half, then increases to 01m for two months and then increases until it reaches 1.067m, while training on the official measurements will continue for two weeks. The athlete must consider performing the three steps between hurdles and stepping over the hurdle as fast as possible, through using the less than official intermediate distances and gradually increases to reach the official heights and distances of the 110m hurdles.

Designing the Training Unit: The application period of the training unit ranges between 1.30 to 02 hours, including the following:

C Warming up: includes jogging, stretches and specific flexibility exercises and speed exercises.

C The main part: includes skills training and physical exercises, as follows:

C Skills part: included improving the technical performance when stepping over the hurdle and speeding rhythm between and above the hurdle exercises

C Physical part: included developing the specific physical fitness elements exercises

C Cooling down: includes jogging and relaxation exercises, to return the body to its normal state

Post-Measurement: The post-measurement conducted on Wed.19th Mar.2011 in the technical military college stadium. Where the 110m hurdles record level was measured along with the running time between hurdles (from the start until stepping over the first hurdle, after stepping over the hurdle until after stepping over the next and after stepping over the last hurdle until the finish line). Through the assistance of 06 coaches, three for the time between hurdles and three for selecting the record level, the time manually selected and medium time was calculated.

RESULTS AND DISCUSSION

The results of Table 2 illustrates the Pre and post-measurements, changing rate of each athlete concerning time after stepping over each hurdle, 50m hurdles time and the record level.

The results of the first athlete refer that improvement rates ranged between 4.17% to 26.67%, the best improvement rate in the fifth stage by 26.67%, followed by the seventh stage by 15.38%, then the third, fourth and eighth stages by the rate of 14.29%. The improvement included eight stages of the contest, where lack of improvement included the second, tenth and final stages. The 50m hurdles improvement rate was 11.25%, while the improvement rate of the record level was 8.98%.

The results of the second athlete refer that improvement rates ranged between 7.14% to 21.43%, the best improvement rate in the fourth and fifth stages by 21.43% and the sixth stage by 20.00% and the least improvement rate was the eighth stages by the rate of 7.14%. The improvement included eight stages of the contest, where lack of improvement included the third and seventh stages. The 50m hurdles improvement rate was 11.25%, while the improvement rate of the record level was 10.06%.

The results of the third athlete refer that improvement rates ranged between 3.85% to 26.67%, the best improvement rate in the ninth stage by 26.67% and the second and the sixth by 21.43%, while the least improvement rate was in the first stage by 3.85%. The improvement included nine stages of the contest, where lack of improvement included the seventh stage. The 50m hurdles improvement rate was 11.11%, while the improvement rate of the record level was 10.47%.

These results commensurate with the results of Masoud[10] that rhythm exercises improve the record level of the 400m/hurdles, Hemdan [11] where he reached that distances progressively increase in the intermediate distances lead to the speed of the hurdles female athlete as well as the rise and stability of the rhythm.

Moreover, that commensurate with Hassan et al. [12] that the reduction in the contest races helps in developing speed. Also commensurate with the study of Atwa and Orabi [13] that standardizing the official measurements of the 110m hurdles contest during training may improve the record level. Also with the results of Hua [14] that female
athletes having speed can control the rhythm of the three steps. In addition, with Stein [15] that motor timing plays a vital role in the technical performance of 110m hurdles contest and when correctly considering the running time between hurdles, the athlete can step over the hurdles in the less possible time with the highest motor performance level.

CONCLUSION

In limits of the research sample, the suggested program and the statistical program on topics, the researcher has reached the following conclusions:

C The improvement rate of the three athletes ranged from 03.85% to 26.67% in the specific variables.
C The improvement rate of the three athletes ranged from 11.11% to 11.25% in running 50m hurdles.
C The improvement rate of the three athletes ranged from 08.98% to 10.47% in the record level.
C The improvement included from eight to nine stages out of eleven stages of the 110m hurdles contest.

C The lack improvement included from one to three stages of the 110m hurdles contest stages.
C The training program of decreasing the intermediate distances and lowering the hurdles height lead to improving the athlete's speed between and above hurdles.
C The training program of decreasing the intermediate distances and lowering the hurdles height lead to improving the athlete's running speed in the 50m hurdles.
C The training program of decreasing the intermediate distances and lowering the hurdles height lead to improving the athlete's record level.

Recommendation:
C Applying the on topics training program and the recent study to the junior hurdlers
C Applying the on topics training program and the recent study to the junior female hurdlers
C Applying the on topics training program and the recent study to the senior first-degree hurdlers whom have higher records

C Applying the on topics training program and the recent study to the male and female combination competitors

REFERENCES

1. Mahmoud, M.A., 2010. The impact of a training program using bolometric exercises on some specific physical abilities and record level in the 100m hurdles competitors. The Scientific Magazine of Sports Science and Arts, Faculty of Physical Education for Girls, Alexandria University, 41: 322.


3. Abdelhafiz, I.M., 1990. The impact of a suggested training program for developing the neuromuscular coordination on the skillful and record progress in the 100m hurdles contest. The Scientific Magazine Specialized in Sports Science and Arts, Faculty of Physical Education, Helwan University, 2: 45.


10. Masoud, H.M.A., 2010. The impact of a suggested training program for developing the physical variables related to improving rhythm between hurdles and the record level in the 400m hurdles competitors. Master thesis, Faculty of Physical Education for Boys, Helwan University, Egypt, pp: 45.


