

Science, Movement and Health, Vol. XVIII, ISSUE 2, 2018

June 2018, 18 (2): 172-178

Original article

EFFECT OF KETTLEBELLS TRAINING ON CERTAIN PHYSICAL VARIABLES AND PERFORMANCE LEVEL OF HAMMER THROW FOR FEMALE COLLEGE STUDENTS

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Abstract

Purpose. Kettlebells are used centuries ago as a dynamic tool to develop strength and the resistance. Its origin is still uncertain, but there is evidence that they demonstrate its use in Ancient Greece. For example, in the museum Archaeological site of Olympia, in Athens (Greece), there is a kettlebell of 143 kg. The aim of this study was to investigate that Effect of kettlebells exercises on certain physical variables and performance level of Hammer throw for female college students.

Methods. Forty female students from third Grade at the Faculty of Physical Education for girls, Helwan University for the academic year 2017/2018 AD, divided into two groups. The experimental group (n = 20) performed Kettlebells exercises training and control group (n = 20) performed traditional exercise.

Subjects were required to read and complete a health questionnaire and informed consent document; there was no history of injuries, diabetes or recent surgery.

Results. Significant Difference between the experimental group and control group in Standing Long Jump Test, Softball throw test, Hand Grip Strength (lift-right), Static strength test (LS) (BS) and Performance level of Hammer throw for posttest to the experimental group.

Conclusion. Under the condition of our study, Kettlebells exercises intervention for eight weeks has a beneficial effect on certain physical variables and performance level of Hammer throw for female college students.

Key words: Kettlebells exercises, Hammer throw, Strength. Power.

Introduction:

Sports movement has seen in recent decades has made a big leap limit of human capabilities beyond all barriers and elevate to achieve the figures in the past of pure imagination.

Athletics is an Olympic sport that par excellence is based on the natural movements of man and is considered worldwide among the most popular, given by the large number of followers, who admire him for his spectacle.

Multilateral preparation is always part of any plan of specific training of high performance, but in its broadest degree, general and polyvalent is the basis for young people and this preparation multilateral cooperation in the field of resistance must involve the of different means and ways of working.

One of the competitive modalities that won a lot of supporters in both Ancient Greece, as in the modern Olympic Games, is without a doubt "Multiple events", expression of physical, mental and spiritual integrity of the man (stronger, faster, more resistant, more agile). The preparation of athletes is extremely complex and every day increasing in its demand, since, new brands are imposed at a rate cataloged as alarming. (B. Halliwell, & M. Gutteridge, 1999)

The Hammer Throwing is an activity in women's athletics that was previously restricted to men. The hammer was found in the Middle Ages in England. Hammer was wearing a short-sleeved sportswear. The hammer was a stone tool with a wooden handle Long, at present the hammer is characterized as a weight (7.25) kg and a block of iron tied iron wire and hand grip,

Hammer throwing is a combination of Sensitivity, power and speed. Here is a close coordination of these factors necessary to control the hammer and be able to throw far.

Strength training is characterized by 3 fundamental elements:

- 1) the maximum force
- 2) the technique
- 3) the special force.

This last element is the key to passing between the other two, it is the connecting ring. It tends to correlate the work of weights in the gym (general strength) with the technique. In fact, it is important to bear in mind that the classic exercises carried out in the gym have a poor correlation, from the point of view of the dynamic and kinematic structure, with the gesture of competition.

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Received 8 may 2018 / Accepted 15 june 2018

Hence the need for a series of exercises that address this general strengthening in the technical canons of the discipline.

kettlebells are used centuries ago as a dynamic tool to develop strength and the resistance. Its origin is still uncertain, but there is evidence that they demonstrate its use in Ancient Greece. For example, in the museum Archaeological site of Olympia, in Athens (Greece), there is a kettlebell of 143 kg.

It is difficult to locate the origin of the exercises with tools that can be considered similar, but kettlebells as we know them today started to be seen in Russia over the year 1700 and its original use was to weigh grain, although after work the farmers they were raised for their entertainment and demonstration of strength. But it was at the end of the century XIX after the strongmen of the time incorporated them into their shows and trainings when they started to gain popularity as a useful element for the strength training, popularity that little by little was losing in the West but that he kept in present-day Russia, where kettlebells continued to be used in training programs for athletes and especially for the army (P. Tsatsouline, 2006).

Such it was the integration of kettlebells into Russian culture that the rise of these came to considered official Russian sport (Girevoy Sport) and its use was incorporated as part fundamental in a physical activity program aimed at improving the health of the population.

As Russian culture sees force as a highly honorable quality, During the festivals and fairs, the vendors began to swing and lifting these weights to show their strength.

In Russia, kettlebells are considered a national pride and a symbol of force. " While other countries waste time testing their soldiers with flex-arm extensions, in Russia they test the amount of repetitions of kettlebell snatches with a weight of 53 pounds (P. Tsatsouline, 2006).

From 1870 to 1880, Russian Dr. Vladislav Kraevsky (who is considered the father of the Olympic uprising in Russia), travelled through Europe gathering information about physical culture and sports with the intention of new ways of improve health, well-being and Physical Education. Upon returning to Russia, introduces exercises with kettlebells and bars to the Russian Athletic Community. On August 1885, under his direction, a room was opened Weight training. This day is considered by many as the birth of weightlifting in Russia. The main objective of training was muscle development, for this, the athletes trained 3 every week, doing 1 and 2 arm presses, snatch (or start) and clean & jerk (or 1st and 2nd clean-up time). Kraevsky gave great

importance to the sequence of the load, the correct development of skills for an optimal lifting, correct breathing technique and methods to avoid exhaustion.

The aim of this study was to investigate that Effect of Kettlebells exercises on certain physical variables and performance level of Hammer throw for female college students.

Material and Methods

Experimental Approach to the Problem

Two groups (experimental and control) performed a pre and post - training designed intervention in which Standing Long Jump Test, Test, Softball throw test Handgrip Strength (lift), Handgrip Strength (right), Static strength test (LS), Static strength test (BS), and Performance level of Hammer throw. The experimental group (EG) (20 female students) trained 1 hour per day 3 times a week on Kettlebells exercises for eight weeks. The control group (20 female students) continued their normal training, while the experimental group completed Kettlebells exercises program to see whether this type of training modality would have a positive or negative or no effect on physical variables and performance level of Hammer throw among colleague students.

Samples

Forty female students from third Grade at the Faculty of Physical Education for girls, Helwan University for the academic year 2017/2018 AD, divided into two groups. The experimental group (n = 20) performed Kettlebells exercises training and control group (n = 20) performed traditional exercise.

Subjects were required to read and complete a health questionnaire and informed consent document; there was no history of injuries, diabetes or recent surgery.

Conditions of sample selection :

- Do not chronological age for at least 19 years and not more than 22 years .
- Have a desire to participate in the search and regularity until the end of the experiment .
- Did not have a previous history of patients or their injuries predecessor .
- Is enrolled in a school that people are taught by the researcher.

Reasons for selecting community and the research sample:

- Hammer last contest is taught in core courses of the second semester of the third-year students at the Faculty of Physical Education for girls– Helwan University.
- Student's research community have no previous experience of competition Hammer (beginners).
- Possibility of the availability of stadiums, as well as hardware and tools within the college,

and used by researchers to achieve the objectives of the research.

Testing Procedures

Subjects were assessed before and after eight weeks of functional strength training program all measurements were taken one week before and after training at the same time of day. Tests followed a general warm-up that consisted of running, calisthenics, and stretching.

Static strength test (LS) (BS)

A Takei leg and back dynamometer was used to measure the static leg strength. The subjects stood on the dynamometer platform and crouched to the desired leg bend position, while strapped around the waist to the dynamometer. At a prescribed time, they exerted a maximum force straight upward by extending their legs. They kept their backs straight, head erect and chest high. 3 trials were allowed to the subjects and the best score was taken. Subjects had a rest between the trials (Jensen & Fisher).

Hand Grip Strength Test

The purpose of this test is to measure the maximum isometric strength of the hand and forearm muscles.

The subject holds the dynamometer in the hand to be tested, with the arm at right angles and the elbow by the side of the body. The handle of the dynamometer is adjusted if required - the base should rest on first metacarpal (the heel of the

Results.

Table 1. Anthropometric Characteristics of the Groups (Mean \pm SD)

| Group | N | Age [years] | Weight [kg] | Height [cm] |
|--------------|----|-----------------|--------------|----------------|
| Experimental | 20 | 20.17 \pm 0.4 | 75 \pm 2.9 | 172 \pm 3.98 |
| Control | 20 | 20.09 \pm 0.6 | 74 \pm 3.1 | 171 \pm 4.12 |

Table 1 shows no significant differences were observed in the anthropometric characteristics for the subjects in the different groups.

Table 2. Mean \pm SD and "T" Test and improvement rate between the pre and posttests for experimental group in Standing Long Jump Test, Softball throw test, Hand Grip Strength (lift-right), Static strength test (LS) (BS) and Performance level of Hammer throw

| Variables | Experimental group | | T | Sign. |
|---------------------------|--------------------|-------------------|-------|-------|
| | Before | After | | |
| Standing Long Jump Test | 2.11 \pm 0.23 | 2.35 \pm 0.31 | 11.37 | S |
| Softball throw test | 38.56 \pm 1.12 | 41.25 \pm 1.14 | 6.98 | S |
| Handgrip Strength (lift) | 24.38 \pm 1.68 | 27.48 \pm 1.79 | 12.72 | S |
| Handgrip Strength (right) | 29.77 \pm 2.30 | 31.80 \pm 2.50 | 6.82 | S |
| Static strength test (BS) | 78.56 \pm 4.23 | 83.32 \pm 4.49 | 6.06 | S |
| Static strength test (LS) | 92.74 \pm 5.63 | 101.79 \pm 5.42 | 9.76 | S |
| Performance level | 14.19 \pm 1.73 | 17.35 \pm 1.81 | 22.27 | S |

Table 2 shows that:

1. Significant Difference between the pre and posttests for experimental group in Standing Long Jump Test, Softball throw test, Hand Grip Strength (lift-right), Static strength test (LS) (BS) and Performance level of Hammer throw for posttest to the experimental group.
2. Improvement rate between the pre and posttests for experimental group from 6.06% to 22.27%.

palm), while the handle should rest on middle of four fingers. When ready the subject squeezes the dynamometer with maximum isometric effort, which is maintained for about 5 seconds. No other body movement is allowed. The subject should be strongly encouraged to give a maximum effort.

Softball throw test

The softball throw is a track and field event used as a substitute for more technical throwing events in competitions involving Youth, Paralympic, Special Olympics and senior competitors.

The general rules for the softball throw parallel those of the Hammer throw when conducted in a formal environment. but the implement being thrown is a standard softball, which resembles the size of a standard shot put but is considerably lighter.

Statistical analysis

All statistical analyses were calculated by the SPSS statistical package. The results are reported as means and standard deviations (SD). Differences between two groups were reported as mean difference \pm 95% confidence intervals (meandiff \pm 95% CI). Student's t-test for independent samples was used to determine the differences in fitness parameters between the two groups. The $p < 0.05$ was considered as statistically significant.

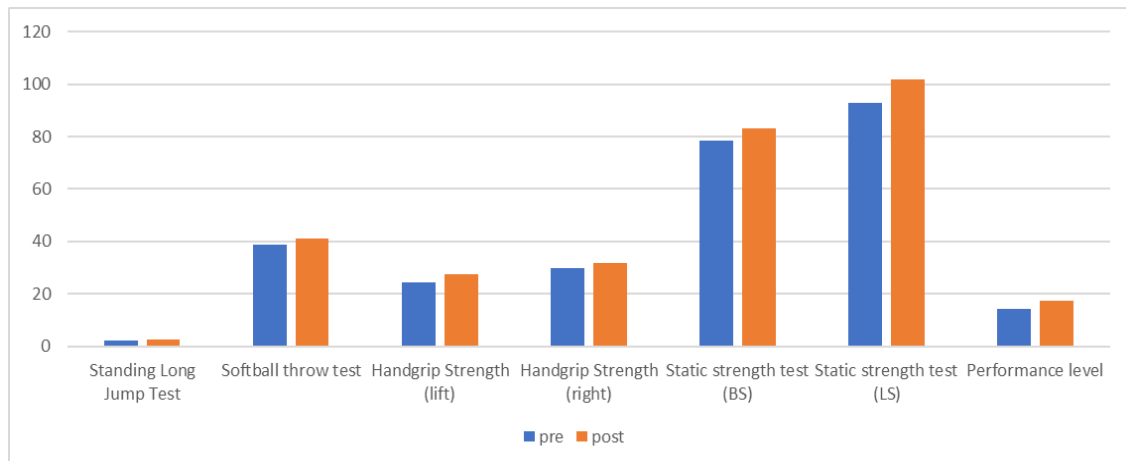


Fig. 1- show the Difference between the pre and posttests for experimental group

Table 3. Mean \pm SD and "T" Test and improvement rate between the pre and posttests for control group in Standing Long Jump Test, Softball throw test, Hand Grip Strength (lift-right), Static strength test (LS) (BS) and Performance level of Hammer throw

| Variables | Control group | | T | Sign. |
|---------------------------|------------------|------------------|------|-------|
| | Before | After | | |
| Standing Long Jump Test | 2.09 \pm 0.21 | 2.16 \pm 0.29 | 3.35 | S |
| Softball throw test | 37.53 \pm 1.04 | 38.21 \pm 1.11 | 1.81 | NS |
| Handgrip Strength (lift) | 23.71 \pm 1.48 | 24.12 \pm 1.15 | 1.73 | NS |
| Handgrip Strength (right) | 29.00 \pm 2.18 | 29.65 \pm 2.21 | 2.24 | NS |
| Static strength test (BS) | 79.18 \pm 4.54 | 80.42 \pm 4.53 | 1.66 | NS |
| Static strength test (LS) | 91.63 \pm 5.16 | 94.46 \pm 5.34 | 3.09 | NS |
| Performance level | 14.37 \pm 1.74 | 15.17 \pm 1.82 | 5.57 | S |

Table 3 shows that:

1. Significant Difference between the pre and posttests for control group in Standing Long and Performance level of Hammer throw for posttest to the control group.
2. No Significant Difference between the between the pre and posttests for control group in Softball throw test, Hand Grip Strength (lift-right) and Static strength test (LS) (BS).
3. Improvement rate between the pre and posttests for control group from 1.66% to 5.57%.

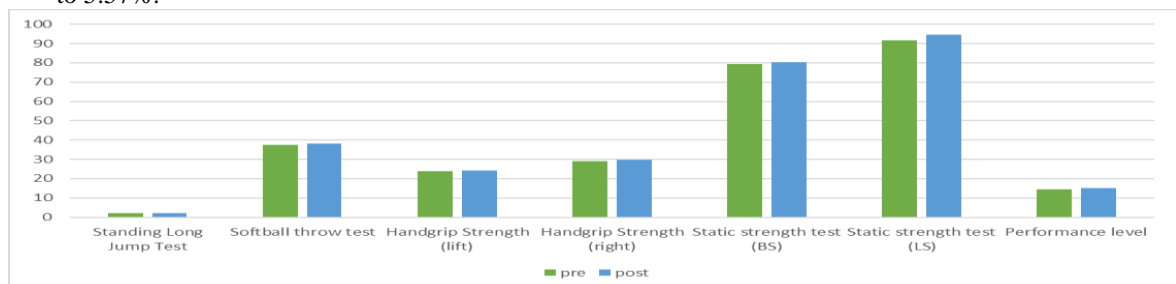


Fig. 2- show the Difference between the pre and posttests for control group

Table 4. Mean \pm SD and "T" Test between the two Groups (experimental and control) in Standing Long Jump Test, Softball throw test, Hand Grip Strength (lift-right), Static strength test (LS) (BS) and Performance level of Hammer throw

| Variables | Experimental group | Control group | Sign. |
|-------------------------|--------------------|------------------|-------|
| | After | After | |
| Standing Long Jump Test | 2.35 \pm 0.31 | 2.16 \pm 0.29 | S |
| Softball throw test | 41.25 \pm 1.14 | 38.21 \pm 1.11 | S |

| | | | |
|----------------------------------|-------------|-------------|---|
| Handgrip Strength (lift) | 27.48 ±1.79 | 24.12 ±1.15 | S |
| Handgrip Strength (right) | 31.80 ±2.50 | 29.65 ±2.21 | S |
| Static strength test (BS) | 83.32±4.49 | 80.42±4.53 | S |
| Static strength test (LS) | 101.79±5.42 | 94.46±5.34 | S |
| Performance level | 17.35 ±1.81 | 15.17 ±1.82 | S |

Table 4 shows that:

1. Significant Difference between the experimental group and control group in Standing Long Jump Test, Softball throw test, Hand Grip Strength (lift-right), Static strength test (LS) (BS) and Performance level of Hammer throw for posttest to the experimental group.

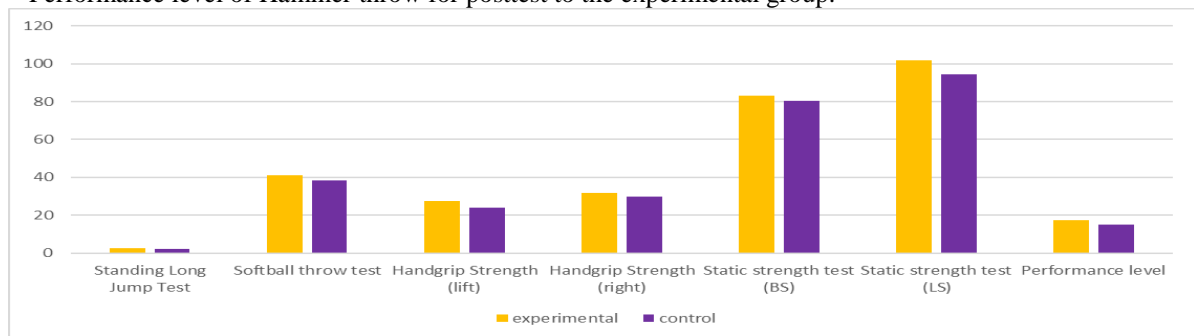


Fig. 3- show the difference between the posttests for the experimental and control groups

Discussion.

This study assessed the effects of an eight weeks kettlebells training program, on the powerful, complex movement performances, Experimental results indicated that all variables were significantly increased in the experimental group only after the kettlebells training program.

Due researcher's occurrence of these changes to good Kettlebells planning exercise program and rationing training loads in a scientific manner appropriate to the stage of the Sunni and training for research sample. Where the patron researchers training loads graded during the application of the program by training muscle groups different, especially the muscles of the centre, arms and legs and the concentration of the researchers on the muscle groups working during the throw spear, causing it to improve the physical abilities under discussion.

This is confirmed by (M. Richard, 2010) of the exercises Mace is working on raising spinners muscle resulting in a high tension in motor units liberated and exciting for other receptors are working on increasing the number of motor units active and which are the reason for the increased power output.

This is consistent with (A. Essam, 2005) that the physical setting affects the development of physical abilities and motor of muscle strength and endurance, speed, agility, flexibility, and vehicles such as power characteristic speed and carrying power.

It is noteworthy (E. Abdul Aziz & A. Nariman, 1996) that the transfers of Kettlebell

training can improve performance in sports and exercises of maximum force, force-power and strength-resistance. The data that they obtained suggest that training with kettlebells can be an effective alternative to optimize the performance in lifting weights.

This confirms (A. Hassan, 2002) that muscle strength is that it is based and individual access to the highest levels of the tournament, as they affect a large extent on the development of some physical attributes such as speeding, endurance and agility.

In the opinion of the authors that these exercises work on the occurrence of prolongation involuntary muscle material to the joints, which would generate daytime systolic intramuscularly involuntary works to raise the sensory organs other and thus increasing the number of motor units in the working muscles on these joints, which are necessary to increase muscle strength, as well as to match the Kettlebells exercises with movements that performed in competition

This is consistent with the findings of the both of the important Hassanein (2013), Seyed, et al. (2010), (S. Amr, 2013) where these researchers found that the exercises Mace has a positive impact on the ability of muscle and level digital Hammer

In this regard mentions (H. James, 1999) that in athletics is not important to the size of the force produced by the muscle to make the effort, but the most important is the time required for this effort and in many competitions do not have the player, but a very short time for the performance.



In addition, reinforces that (R. Abeer, 2005), (M. Ramzi & J. Imam 2006) where these researchers agree that the training programs offered to have a positive impact on the digital level.

In addition, is consistent with the findings of (R. Abeer, 2005) that the proposed training program, which was designed according to the analysis of drill-like locomotors. Performance led to the development of explosive power and level digital.

This is confirmed by (M. Marwan 2003) of that training on skill alone is not enough to improve this skill and get fruitful results, as it is next to the development of the skill to be the development of motor skills for the skill itself.

And sees (H. Amr, 2008) that the distance traveled by the instrument in the four shooting activities depends on the speed, angle and height of the throwing. The moving air forces play an important role in the effectiveness of the disk and shaft, the participation of the entire body during the completion of the range of the effectiveness of the effectiveness of the goal is to throw the whole-body forces across the largest distance possible and a longer period of time. It is good to move each part faster than the part that preceded the move of the lever more than the movement of the lever that precedes the direction of throwing and to get that high speed it is important to use the bigger and stronger muscles, but slower at first (thighs) followed by smaller and smaller muscle groups, The faster the muscles of the arms, hands, feet and lower part of the two men. Although this series must follow, it is important to shed all the forces in sequence as possible, the various forces of the body must be shed in a known sequence and at a suitable time, throwing these forces in the direction of throwing.

As a general rule in throwing events, there are a lot of horizontal forces compared to the lifting forces in the primary movements, but in throwing there are forces of lifting more than the momentum and the athlete fully control between these two forces during the power in the right direction.

This is confirmed by (A. Kamal & H. Subhi, 2001) that success in any essential skill defensive or offensive needs to develop components of the physical necessary contribute to the dramatic performance is perfect and that all essential skill contributes to their performance according to their nature more than one ingredient workout.

The results of this study are consistent with a study of all (S. Amr, 2008), (M. Marwan, 2003)

that the improvement in physical variables contributes to the improved level of performance skills.

Acknowledgments

Thank you to all of subjects who participated in this study.

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