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THE EFFECT OF THERAPEUTIC EXERCISES IN REDUCING PAIN, DORSAL CONVEXITY AND ELASTICITY OF THE SPINE MUSCLES OF WOMEN WITH OSTEOPOROSIS

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Abstract

The research problem lies in that most women in the age of 40 suffer from osteoporosis, which results in many complications, which prompted the researcher to study this problem and reduce the severity of the symptoms resulting from it. Reducing dorsal pain and humping and increasing flexibility of muscles working on spinal movement. As for the research hypotheses, they were: The presence of statistically significant differences in the degree of pain and dorsal hunchback between the pre and post-tests of the research sample and in favor of the post test. As well as the existence of statistically significant differences between the pre and post-tests in the flexibility of the spinal muscles of the research sample. The researcher used the experimental method and the main sample of the experiment consisted of 13 women with osteoporosis, aged between (45-55). The experiment was conducted, and then the results were statistically treated in order to clarify the differences between the pre and post-tests. The researcher concluded several conclusions, including: Therapeutic exercises have a positive effect on the eye. The researcher also recommended several recommendations, including: the use of therapeutic exercises prepared by the researcher in particular and physical activity in general in reducing the symptoms associated with osteoporosis.

Introduction & Importance of the Research

Osteoporosis is a systemic skeletal disorder characterized by low bone mass, micro-architectural deterioration of bone tissue leading to bone fragility, and consequent increase in fracture risk. It is a condition that affects half of the women and a third of men over the age of forty. It is accompanied by severe pain, and makes them vulnerable to fractures. It can occur in both sexes at all ages, but it often occurs in women after the age of menstruation, and it occurs at a later age in men, in comparison.

Growth in bone size and strength occurs during childhood, but bone accumulation is not complete until the third decade of life. Bone mass gained in early life is perhaps the most important determinant of bone health throughout

life. Genetic factors show a strong influence that may have been dominant in determining peak bone mass, but physiological, environmental and modifiable lifestyle factors may also play an important role. Among these modifiable factors are: adequate nutrition, body weight, exposure to sex hormones in puberty,physical activity,smoking. A balanced diet with adequate calories from adequate nutrients forms the basis for the development of all body tissues, including bone tissue. Proper and adequate nutrition is important for all individuals, but not all individuals adhere to an ideal diet that fits bone health. Therefore, food support with calcium and vitamin D may be necessary. The hectic race to get in shape is considered one of the best factors that helps in achieving good health and bone health.

Bone Structure (Kassem, 514,1997)

Bones consist of a solid outer layer called the periosteum, and this layer consists mainly of calcium and phosphorous, and inside the periosteum there is the hard and compact layer of bone that gives the bone its rigidity and strength, and it contains a network of blood vessels that transport food and oxygen to the bones in addition to the transport of red blood cells made Inside some bones, the last layer of bone components is the soft or spongy bone layer. It is worth noting that some bones in the body contain a layer called the marrow and make blood cells. As for the chemical composition of the bones, it is an inorganic substance, of which the salts represent 66%, and the rest are organic materials represented by proteins (bone collagen), the rate of which is 34%. Bones are considered solid and strong due to the deposition of mineral salts in the organic matter found in osteoclasts.

The stage of osteoporosis is characterized by the emergence of some symptoms such as severe pain in the back, as well as weight loss over time with curvature of stature and the occurrence of fractures in the vertebrae and in the joints of the hands of the hands and in the rest of the body's bones, and fractures that affect the vertebrae of the spine specifically make the back strongly curved and convex. (Ali Nawaz, 24,2004).

The spine is one of the most important parts of the skeleton and has great importance in maintaining an erection of stature as it represents the measurement by which we judge the shape of the body and thus plays a fundamental role in influencing the motor and orthopedic functions in general, and accordingly, the correct posture as well as the other main functions that it performs depend on. It has protection for the spinal cord and connects the upper limb to the lower limb, thus transferring the weight of most parts of the body and distributing it evenly over the lower limbs (Abd al-Rahman Mahmoud, Hani Taha, 1983, 114).

In the spine, there are four natural curves that maintain the symmetry and moderation of the body and take their final shape in the succession of the stages of growth and development, as they are evident in the human standing and moderation. (Muhammad Al-Sayed, Hayat Ayyad, 5, 1992).

There is a strong relationship between physical activity and bone health for all ages, as it is important for building and maintaining strong bones and preventing muscle deterioration. Also, exercise during childhood and adolescence helps in developing and strengthening bones, thus, reducing the risk of developing osteoporosis in a later stage.

Exercising is especially important for older women who have the highest rate of bone tissue loss after menopause. Exercises build muscles and strengthen bones, and therapeutic exercises are a regular physical activity that is regulated for a specific disease or injury.

Therapeutic exercises are a selection of exercises intended to correct a deviation from the normal state or treat an injury that impedes the full function of a muscle in order to help it to return to its normal state to perform its full function. (Saleh Bashir, 2013, 92).

The importance of the research lies in the utilization of therapeutic exercises in the treatment of some symptoms resulting from osteoporosis, which carries with it the reduction of pain, dorsal convexity and elasticity of the spine muscles of women with osteoporosis.

Problem of the Research

The research problem lies in that most women after the age of 40 suffer from osteoporosis and many symptoms that accompany this disease, which prompted the researcher to pay attention to this case and use it in the therapeutic aspect associated with reducing pain and dorsal hunch and increasing the flexibility of the spine.

Purpose of the Research

- Preparing therapeutic exercises suitable for the research sample and its injury.

- Identifying the effect of therapeutic exercises designed to reduce pain and dorsal convexity, and increase the flexibility of the spine muscles.

Research Hypothesis

- The presence of statistically significant differences in the degree of pain and dorsal hunchback between the pre and post-tests of the research sample and in favor of the post test.

- There were statistically significant differences between the pre and post-tests in the flexibility of the spinal muscles of the research sample.

Research Domains

Human Domain: A sample of women with osteoporosis, aged between (45-55).

Time Domain: - for the period from 3/3/2019 to 30/7/2019.

Spatial Domain: - Al-Reem Center for Fitness and Physiotherapy.

Research methodology and field procedures

Research Methodology

The researcher chose the experimental method because of its suitability and the problem of the research. "The experimental method is one of the closest methods of scientific research to solve the problem by the experimental scientific method" (Ahmad Badr, 1979,256).

Research community and sample

The research population consisted of women attending Al-Wasiti Hospital who suffer from osteoporosis, while the research sample was chosen from among the research community by the deliberate method and there are (13) who suffer from osteoporosis, and they all had the same symptoms (pain and spinal curvature).

Harmony of the Sample

In order to verify the homogeneity of the sample, the researcher resorted to finding the coefficient of torsion in the variables (height, weight, and age). She indicated that all measurements met the equilibrium curve, which shows that they range between (± 3), which indicates the good distribution and homogeneity of the members of the research sample.

Table No. (1)shows the values of the arithmetic mean, standard deviations, the mean, and the value of the coefficient of skewness.

Variables	Values	Arithmetic Mean	Standard Deviation	The Mean	Coefficient of Skewness
Height	cm	158.923	1.037	159	0.354
Weight	kg	78.615	0.869	79	0.032
Age	year	48.846	3.236	48	2.847

Devices, tools and means of data collection

1- Medical Scale

2- Stopwatch

3- Tape Measure

4- Personal Interview

5- Questionnaire

6- Testing and Measurement

The scientific Basis of the Tests

Tests Validation

The test is considered valid "if it only measures what it was prepared to measure" (Salih bin Hamad, 1995,422). To ensure the validity of the tests, a method of self-validation was followed, which is equal to the square root of the reliability coefficient.

Stability Tests

The consistency of the tests means "that if the test is re-applied to the individuals themselves, it will give the same results or similar results under similar circumstances." (Marwan Abdul Majeed, 1999,61).

Therefore, the method of testing and re-testing was adopted to find the coefficient of stability of the tests with a time interval of (5) days, as the tests were applied and the tests were repeated for the same sample with fixing all the conditions in which the first application was applied, then the researchers calculated the simple correlation coefficient (Pearson) between Scores of the two tests.

Objectivity of the Tests

Objectivity means “the lack of influence of self-judgment by the experimenter or if objectivity is provided without bias and self-interference by the experimenter.” (Wajih Mahjoub, 1993,225).

Since the approved tests are clear and understandable and far from self-evaluation and diligence of the evaluator, so is the registration is done using units of time: second, and degrees: number of sets and repetitions.

Table (2) shows the parameters of consistency, honesty and objectivity

T	Tests	Consistency	Validity	Subjectivity
1	Degree of Pain	0.94	0.97	0.89
2	Degree of Dorsal Convexity	0.88	0.94	0.87
3	Bending to the Right	0.91	0.95	0.92
4	Bending to the Left	0.89	0.94	0.86

Exploratory Experiments

The First Exploratory Experience

This experiment was conducted on Thursday 7/3/2019 on 5 women from the same research sample, with the aim of identifying the method of conducting pre-tests for research variables.

The Second Exploratory Experiment

This experiment was conducted on Sunday 10/3/2019 on the same sample of the first exploratory experiment, and the purpose of this experiment was to determine the rest periods between repetitions and groups as well as to identify the suitability of the exercises prepared for the research sample.

Pre-Tests

The pre-tests were conducted on (Tuesday - Wednesday - Thursday) corresponding to 12-14 / 3/2019.

Rehabilitation Program

The main experiment was carried out on 3/17/2019 at a rate of three days a week for a period of 12 weeks, and thus the number of treatment units as a whole is 36. And the time of the therapeutic unit is according to the repetitions of the exercises.

There will also be a warm-up in order to prepare the muscles and organs of the body within the unit time, as well as allocating 5 minutes for the conclusion for the work of calming exercises, giving breaks between exercises as long as one exercise. Also give a rest between exercises for 20 seconds.

Post-Tests

The post-tests were conducted on 9-11 / 6/2019 corresponding to (Sunday - Monday - Tuesday), and the researcher took care to conduct these tests under the same circumstances in which the pre-tests were conducted in terms of place, time, tools used in the measurement, and the auxiliary work team.

Statistical Tools

1- The arithmetic mean.

2- Standard Deviation.

3- T-Test for cross-linked samples.

Presenting, Analyzing and Discussing the Results

Presenting and analyzing the results of the pre and post tests for the variables in question.

Table (3)

Shows the arithmetic mean, standard deviations, and the calculated (t) value of the search variables in the pre and post-tests.

Under 12 degrees of freedom, and 0.05 level of significance.

The Test	Pre-Test		Post-Test		Calculated T-Value	Sig	Level of Significance
	From	A±	From	A±			
Degree of Pain	7.692	1.031	2.000	0.707	14.900	0.00	0.05
Degree of Dorsal Convexity	14.461	0.967	4.769	0.926	26.563	0.00	0.05
Bending to the Right	58.230	1.165	47.307	1.250	27.328	0.00	0.05
Bending to the Left	57.076	1.497	42.076	0.954	28.909	0.00	0.05

DISCUSSING THE RESULTS OF THE PRE AND POST TESTS FOR THE VARIABLES UNDER CONSIDERATION

By presenting and analyzing the results of the pre and post-tests of the variables under investigation, which were presented in Table (3), it appeared to us that there are significant differences in the research variables, and the researcher attributes the development of the pain degree variable to the research sample to the effectiveness of therapeutic exercises prepared by her, which had a positive effect. In increasing blood flow to the working muscles and reducing the degree of pain, "regular exercises lead to increased joint flexibility and flexibility leads to less pain." (Mufti Ibrahim, 1998,56).

We also note from the results obtained in the variable dorsal convex deformation that there are significant differences between the pre and post-tests in measuring the degree of simple dorsal convexity and in favor of the post test, meaning that there is a clear development in the values of the dorsal convex angles and approaching the normal angle value of (155.04 Degree, which was set by JumboTsif. (Muhammad Subhi: Muhammad Abd al-Salam, 375,1995). The researcher attributes this improvement to the therapeutic exercises prepared by her, which led to the correction and repair of this deformation in the sample by working to lengthen the muscles and improve the muscle tone in the dorsal muscles by following the rule of increase in the frequency of exercises.

Continuing with regular resilience training will preserve and develop the acquired value of flexibility (Wadih Yassin, 1986, 119).

The researcher also attributes the cause of the development in flexibility to prepared therapeutic exercises and their effect on lengthening the muscles of the spine and thus helping the sample to perform various movements easily. Flexibility develops through therapeutic exercises that are specially prepared for this purpose, and this is what Ibrahim Salama confirmed that “flexibility helps Economy in making the effort”, (Ibrahim Salama, 1980,280).

Conclusions

The researcher reached the following conclusions:

1- The use of therapeutic exercises has an important role in increasing the flexibility of the muscles of the spine.

2- The use of therapeutic exercises had a role in increasing blood flow and relieving pain.

3- The use of therapeutic exercises led to a reduction in spinal curvature.

Recommendations

According to the findings of the researchers, he recommends the following:

1. To be given therapeutic exercises for a period of not less than three months to six months.

2. It is preferable to use therapeutic sports as a daily routine to get rid of pain and get better results in spinal convexity and flexibility.

3. Using therapeutic exercises to treat other symptoms of osteoporosis.

Therapeutic Exercises

1- From a sitting position on the floor: resting on the knees with hands interlacing behind the head and bending the torso forward and then down until the head touches the ground, then raising the torso, straightening and gradually returning back (repeat the exercise).

2- From a sitting position on the ground: make the back straight, then put the arms on either side of the body and bring the right foot forward with the torso bending down, raise the arms up to touch the front of the toes, then return to the sitting position, and bend the torso back with the arms pressed back, and repeat the exercise Left foot (repeat the exercise).

3- From the sitting position: kneeling on the knees and holding hands behind the head, such as in the ready position in sitting, bending the torso forward and down by touching the head to the ground, then lifting the torso up to reach the ready position, bending the torso back with a slight tilt and then returning (repeat the exercise).

4- From the sitting position: kneeling down and placing the arms aside while keeping the right leg extended, bending the torso forward downwards, lifting the arm up and touching the leg's comb forward. Return to the ready position, tilt your torso back and press your arms back. Return to the ready position with repeating the exercise with the left leg (repeat the exercise).

5- From the standing position: Stand up straight and leave a space between the feet, then bend the torso from the front to the bottom until the hands touch the ground, then raise the torso from the front to the top, then raise the hands up and bend the back backward with the torso tilted to the right and then to the north with the hands lowering from the sides of the body Down and return to the first position (repeat the exercise).

6- From the standing position, the "ready position" raises the hand up with the right foot advancing forward and the back bending backward in an arched way and bending the torso forward with touching the ends of the palm with the toes once and behind the leg again. Then extend the torso up and join the leg from back to front and return to the standing-stiffposition. (Exercise repeat).

7- From the kneeling position: placing hands on the waist and standing in the ready position. Putting the right leg aside, raising the hands with the torso tilting to the north from the side of the outstretched leg aside, then returning to the ready position, and repeating the exercise with the left side (repeat the exercise).

8- From the standing position: put the arms aside and bend the forearms high in the ready position. Turn your torso to the right and press your arms back. Turn your torso to the left and press your arms backwards (repeat the exercise).

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