International Journal of Psychosocial Rehabilitation, Vol. 24, Issue 08, 2020
ISSN: 1475-7192

The Effect of Free and Back Swimming Practice on Rehabilitation of Thickness of the Rectus Abdominis Muscle, Erectus Spondylosis and Chronic Lower Back Pain for Ages (35-45) Years

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Abstract*--The researchers pointed to the clear and influential role offered by exercising in general and swimming in particular in treating and rehabilitating many diseases and injuries in most of the developed world. Computer for long hours, wrong sitting, lack of movement, and lack of exercise in sports that leads to weak muscles surrounding the spine, which is the reason for back pain, so the researchers decided to study this problem by setting two qualifying programs to practice free swimming And the back to qualify this injury and reduce the chronic pain of the lower back and know which two types of swimming have the advantage in the rehabilitation. The study objective to:*

1. *Preparation of two qualifying programs for the practice of free and back swimming in the rehabilitation of the thickness of the rectus abdominis muscle, the erectus spondylosis, and chronic low back pain for ages (35-45) years.*
2. *Identify the effect of free swimming practice in rehabilitating the thickness of the rectus abdominis muscle, spondylitis, and chronic lower back pain for ages (35-45) years for the first experimental group.*
3. *Identifying the effect of back swimming practice on rehabilitating the thickness of the rectus abdominis muscle, spondylitis, and chronic low back pain for ages (35-45) years for the second experimental group.*
4. *Recognizing the preference of the effect of free and back swimming practice in qualifying the thickness of the rectus abdominis muscle, spondylitis, and chronic lower back pain for ages (35-45) years between the two experimental groups.*

The researcher used the experimental approach, and the research community identified from the employees of the University of Karbala the patients who suffer from chronic low back pain of (26) employees. Therefore, the sample selection came by intentional method by (10) employees and they were divided equally into two experimental groups, each group consisting of (5) Individuals who can swim free and back.

Key words*--Swimming, rehabilitation and lower back pain.*

I. INTRODUCTION

In recent times, the rates of sports injuries and complications have increased, and the human being has become, by his nature, a life of inactivity; and many believe that this may be due to the availability of amenities

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DOI: 10.37200/IJPR/V24I8/PR280471
Received: 21 Jan 2020 | Revised: 08 Feb 2020 | Accepted: 14 Mar 2020

and dependence on the machine greatly as a result of the tremendous scientific and technological progress in various fields and the entry of modern technologies that led to lack of movement and decline The activity of the vital systems and the delaying of their work have become vulnerable to many diseases and injuries and following the wrong habits when sitting for long periods of time or when lifting and carrying things, high voltage, poor physical fitness and body building.

And considering that spinal injuries in general and lower back pain in particular are among the diseases of the times, as these pains are the most prevalent in the world after influenza, especially since the anatomical structure of the back based on the spine, its full length contains four elements which are the vertebrae (back bone)), Superficial joints between vertebrae, disks between vertebral bodies, supporting muscles and ligaments, and 80 percent of back pain is caused by problems with the muscles, disks, and superficial joints .[1]

The research problem is summarized in the large number of employees with back pain, as this group has the responsibility of using the computer for long hours, sitting in a wrong way, lack of movement, and lack of exercise that leads to weak muscles surrounding the column, which is the reason for back pain occurring, and through observation and follow-up to centers Physical therapy was found that there are many methods of treatment, including the use of rehabilitative exercises and the use of infrared and massage and other things, but there is no rehabilitation by swimming. Of the free and back in the rehabilitation of lower back pain, so it felt a researcher studying this problem by placing two programs for swimming free and back this for the rehabilitation of the injury and reduce pain for chronic lower back and find out which types of swimming have a preference in the rehabilitation.

As a result of the clear and influential role that exercise in general in general, and swimming in particular, play in treating and rehabilitating many diseases and injuries in most developed countries, as a result of what the researcher discussed, the scientific significance of this study is highlighted, as it is a scientific attempt that contributes to knowing the effect of the practice of free swimming and back on the thickness of the rectus abdominal muscle and spine erectus muscle and rehabilitation of chronic lower back pain.[2]

II. RESEARCH OBJECTIVES

1. Preparation of two qualifying programs for the practice of free and back swimming in the rehabilitation of the thickness of the rectus abdominis muscle, the erectus spondylosis, and chronic low back pain for ages (35-45) years.
2. Identify the effect of free swimming practice in rehabilitating the thickness of the rectus abdominis muscle, spondylitis, and chronic lower back pain for ages (35-45) years for the first experimental group.
3. Identifying the effect of back swimming practice on rehabilitating the thickness of the rectus abdominis muscle, spondylitis, and chronic low back pain for ages (35-45) years for the second experimental group.
4. Recognizing the preference of the effect of free and back swimming practice in qualifying the thickness of the rectus abdominis muscle, spondylitis, and chronic lower back pain for ages (35-45) years between the two experimental groups.

DOI: 10.37200/IJPR/V24I8/PR280471
Received: 21 Jan 2020 | Revised: 08 Feb 2020 | Accepted: 14 Mar 2020

Research hypotheses

1. There is a positive effect of the practice of free swimming in the rehabilitation of the thickness of the rectus abdominis muscle, the spine erectus muscle, and chronic lower back pain for ages (35-45) years for the first experimental group.
2. There is a positive effect of the practice of back swimming in the rehabilitation of the thickness of the rectus abdominis muscle, the spine erectus muscle, and chronic lower back pain for ages (35-45) years for the second experimental group.
3. There is an advantage in the effect of the practice of free and back swimming in the rehabilitation of the thickness of the rectus abdominal muscle and the spine erectus muscle and chronic lower back pain for ages (35-45) years between the two experimental groups.

Research fields

- The human field: People with chronic low back pain for employees of Karbala University, ages (35-45) years.
- Temporal field: for the period from 11/8/2018 to 6/22/2019.
- Spatial field: Al-Hussein (peace be upon him) recreation pool and resort.

Community and research sample

The research community identified the employees of Karbala University who suffer from chronic low back pain and who are (26) employees without those who suffer from cartilage disc damage or damage or other conditions, and this according to the diagnosis by the specialist in the Hussein Hospital (peace be upon him) educational - Consultant joint diseases and treatment It is normal for the holy city of Karbala, and accordingly, the sample selection was made in the intention style by (10) employees who suffer from chronic low back pain and who can swim free and back. They were divided equally into two experimental groups, each group consisting of (5) individuals.

Homogeneity of the sample

For the purpose of verifying the homogeneity of the research sample and the correctness of the normal distribution, the researcher used the coefficient of torsion in the measurements of age, height and weight as well as in the variable of the pain level. As shown in Table (1) the following:

Table 1. Shows the homogeneity of the sample in the research variables

Variables	Units	Mean	SD	Median	Skewness
Age	Year	39	3.695	38.00	0.243
Length	Cm	176.100	1.524	176.00	0.196
Weight	Kg	88.900	5.228	87.500	0.803
Degree of pain	Degree	3.400	1.516	3.00	0.792

DOI: 10.37200/IJPR/V24I8/PR280471
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It is clear from Table (1) that all the values of the torsional coefficient of the variables (age, length, weight, degree of pain) range between (± 1), which indicates the homogeneity of the members of the research sample in these variables, the moderation of the normal distribution.

Equivalence of the two research groups

In order for both groups to start from one initiation point, the researcher conducted the process of equivalence of the two groups in light of statistically testing the differences between them, the researcher used a test (t) to find out the significance of the statistical differences between the two groups in the pretests of all research variables where he found that there were no significant differences between the tests for all variables This means the equivalence of the two experimental groups, as shown in Table (2).

Table 2. Parity between the two experimental groups is shown in the studied research variables

Variables	**Units**	**The first experimental**		**The second experimental**		**Calculated value (t)***	**Significant level of differences**	**Indication of differences**
		Mean	**SD**	**Mean**	**SD**			
Thickness Rectus Abdominis Muscles(RT)	Mm	14.460	0.555	14.140	0.805	0.732	0.485	No sig.
Thickness Rectus Abdominis Muscles(LT)	Mm	13.500	0.644	13.700	0.905	0.402-	0.698	No sig.
Thickness Erector spinae muscles(RT)	Mm	16.000	0.765	15.520	0.536	1.149	0.284	No sig.
Thickness Erector spinae muscles(LT)	Mm	15.020	1.279	14.920	0.626	0.157	0.879	No sig.

* The tabular value at the significance level (0.05) and the degree of freedom (8) = 2.306

Research methods, devices and tools used in the research

It is the method, method, or mechanism used by the researcher to collect data and evidence and the way to analyze them, or it is the method for implementing the methodology and methodology chosen by the researcher. The type of tools used by the researcher in his research is determined by the number, shape, and shape of the research according to the type of material and the nature of the subject of the research .[3]

- Arab and foreign sources and references.
- Test and measurement.
- The questionnaire.
- Note.

DOI: 10.37200/IJPR/V24I8/PR280471
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- Personal interviews.
- Results registration form.
- The kinetic range tape measure.
- Lenovo laptop calculator.
- Sony camera type.
- CASLO electronic clock (2).
- Whistle (2).
- Tape measure length.
- A scale to measure weight.
- Chinese (10) upholstery.
- Indoor swimming pool.

Field experiment procedures

Characterization of the thickness of the rectus abdominal muscle

Rectus Abdominis Muscles

For the purpose of determining the thickness of the rectus abdominal muscle by medical examination by ultrasound device and by scanning the area by the aforementioned device a mark was established to measure the thickness of the navel to the right and to the left, and the survey in this region on each side showed the thickness of the muscle The flat stomach is on the left and right side, clearly.

Characterization of spondylolinus muscle thickness:

Erector spinae muscles

For the purpose of determining the thickness of the spondylitis muscle by medical examination by ultrasound device and by scanning the area by the aforementioned device a mark was established to measure the thickness on the right and left side, and the survey in this region on each side showed the thickness of the spondylitis in the spondylitis muscle in The left and right side are clearly visible.

The degree of pain[4]

The researcher sought to design a questionnaire form to determine the degree of pain for the injured person, as it included a special test to determine the degree of pain experienced by the members of the research sample. It was presented to a group of experts and specialists in the field of general medicine and sports medicine, and they unanimously confirmed the validity of the vocabulary of this form.

The divisions of the kinetic range of the stem bending test were as follows:

- Pain when the torso is folded forward (distance +2 cm), 5 degrees.
- Pain when the torso is folded forward (a distance of +4 cm) is given 4 degrees.
- Pain when the torso is folded forward and a distance (+6 cm) is given 3 degrees.
- Pain when the torso is folded forward and a distance of (+8 cm) is given 2 degrees.
- Pain when the torso is folded forward with a distance (+10 cm) given 1 degree.

DOI: 10.37200/IJPR/V24I8/PR280471
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Stump Bending Test Characterization [5]

The purpose of the test: to measure the kinematic distance of the torso of the torso in front of the bottom.

Tools: tape measure, registration form

The location of the measuring tape: The person with a standing position stands open with the width of the shoulders as the measuring tape extends a distance from the seventh cervical vertebra to the second sacral vertebra.

Performance description: The person with a standing position is standing open and the feet are shoulder width wide, and upon hearing the instruction of the test operator, the person with the torso bends the torso to the lower front to limit movement and hands touching the ground.

Measurement: an increase in the measurement of the distance in cm (cm) between the seventh cervical vertebra and the sacral second vertebra at full flexion.

Normal range: 10 (cm).

Recording: the value is calculated by reading the increase in the distance determined by the tape measure, as it is given to him two attempts are taken the best.

Pilot study

The Pilot study is one of the necessary procedures that the researcher adopts before the main experiment in order to ensure the research tools and the adequacy and possibility of the assisting team in the use of tools and devices, and get rid of the obstacles that the researcher may face during the application of the main experiment so the researcher conducted an exploratory experiment on Thursday, 15 / 3/2018 on the poll sample, which number (5), are among the study sample individuals. Although the tests and measurements were codified and were mentioned in previous Arab and local studies, the researcher sought to re-apply the tests and extract the scientific foundations for them and for the purpose of benefiting from their results in extracting the consistency and objectivity of the measurements used in the research, as the tests and measurements were re-applied on Tuesday 20/3/2018.

Scientific foundations of the tests

In order to complete the achievement of the objective and purpose of the test for which it was designed and in order to rely on it and trust its health and honesty, it must meet the conditions and specifications, the most important of which are the scientific transactions of (Validity, consistency and objectivity) in the results.

Validity of the test

The researcher used the sincerity of the content that is called apparent honesty, as it depends on the opinions of experts and specialists to challenge the validity of the measure of the degree of pain in the research sample, and after collecting the forms and emptying the data and statistically processing them by extracting the value of (square Kay) according to the opinion of the experts and specialists, the results came from acceptance (7) Experts out of (7), as the calculated square value of Kay was (7), which is greater than the tabular value at the level of significance (0.05) and degree of freedom (1) of (3.84), which indicates the validity of the test.

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Consistency test

The researcher used the test and re-test method to find the coefficient of stability. The test (pain scale measure) was conducted on the survey sample of (5) injured, then the test used in the research was re-applied after (5) days have passed, taking into account the fixing of the same conditions. The simple correlation coefficient (Pearson) law was used between the results of the first and second tests. The calculated stability coefficient value was greater than the tabular value (critical) of the correlation coefficient. Pearson is at the significance level (0.05) and the degree of freedom n = 3, which is (0.878), which indicates that the test has a high degree of stability, as shown in table (3).

Objectivity of the test

In order to extract the objectivity of the test (measure of the degree of pain), the researcher relied on assessing the degrees of two arbitrators when the test was re-applied in the exploratory experiment after which he sought to extract the value of the simple correlation coefficient (Pearson) between the evaluation of the first judgment and the evaluation of the second judgment and the calculated objective value of the test was greater Of the tabular value (critical) of the Pearson correlation coefficient at the significance level (0.05) and the degree of freedom n = 3 and the amount (0.878), which indicates that the test has a high degree of objectivity as shown in table (3).

Table 3. Show the consistency actor and the objective of the test are shown

Test	**Unit**	**Consistency Coefficient**	**Objective Coefficient**	**The tabular value of Pearson**	**Statistical significance**
Pain scale measure	Degree	0.895	0.918	0.878	Sig.

Pre-test

The researcher carried out the pre measurement on Thursday and Friday, 22-23 / 3 / 2018AD, at eleven in the morning in the hall of the College of Physical Education and Sports Science - University of Karbala.

The main experience

In order to achieve the goals of the research and after informing the researcher about the most available scientific sources and conducting personal interviews with some experts and specialists in the field of sports and general medicine in order to benefit from their opinions and directions, the researcher prepared two rehabilitation programs using free swimming and back in order to qualify chronic lower back pain and know the impact Freestyle and back in the thickness of the rectus abdominal muscle and spine erectus muscle, where the program was implemented on Saturday, 34/3/2018 until Wednesday 9/5/2018, at five in the evening, where the first group takes free swimming, while the second group Back swimming and the two programs continued to be implemented for a period of (7) weeks, at the rate of (3) rehabilitative units per week. These rehabilitative units were applied on Saturday, Monday and Wednesday of each week as the number of actual rehabilitative units reached (21) units, and the rehabilitative unit time since the two programs began to last from (15D - 41.16D) for free swimming, and (15.4D - 41.32D) for back swimming, while the warm-up period was (5) minutes for the

DOI: 10.37200/IJPR/V24I8/PR280471
Received: 21 Jan 2020 | Revised: 08 Feb 2020 | Accepted: 14 Mar 2020

preparatory segment in order to create muscles and body systems and included light jog and stretching, as well as allocating (5) minutes to the part Concluding to do calming exercises and taking a shower. The researcher followed the principle of gradation from easy to difficult, taking into account the use of free swimming and the back should not be accompanied by feeling pain in the injured.

Post-test

The researcher made the dimensional measurements on the individuals of the research sample on Thursday and Friday, 10-11 / 5/2018 AD The researcher was keen to provide the same spatial and temporal conditions and procedures in the pre measurements.

Statistical methods used

The researcher used the Statistical Package for Social Sciences (SPSS) to process the data.

III. RESULTS AND DISCUSSIONS

Table 4. Shows the mean, the standard deviations, the calculated value (t) and the difference significance level for the two research groups in the pre and posttests

Variables	Groups	Pretest		Posttest		Mean diff.	SD diff.	Calculated value (t)*	Significantlevelof differences	Indicationof differences
		Mean	SD	Mean	SD					
Thickness Rectus Abdominis Muscles(RT)	GRP1	14.460	0.555	18.56	0.365	4.1	0.164	24.952	0.000	Sig.
	GRP2	14.140	0.805	16.2	0.758	2.060	0.117	17.664	0.000	Sig.
Thickness Rectus Abdominis Muscles(LT)	GRP1	13.500	0.644	17.78	0.389	4.28	0.139	30.729	0.000	Sig.
	GRP2	13.700	0.905	15.88	0.618	2.18	0.153	14.251	0.000	Sig.
Thickness Erector spinae muscles(RT)	GRP1	16.000	0.765	19	0.863	3	0.063	47.434	0.000	Sig.
	GRP2	15.520	0.536	17.22	0.572	1.7	0.095	17.920	0.000	Sig.
Thickness Erector spinae muscles(LT)	GRP1	15.020	1.279	18.12	1.094	3.1	0.105	29.557	0.000	Sig.
	GRP2	14.920	0.626	16.84	0.541	1.92	0.116	16.586	0.000	Sig.
Degree of pain	GRP1	3.400	0.548	1.2	0.447	2.2	0.200	11.000	0.000	Sig.
	GRP2	3.400	0.548	2.2	0.447	1.2	0.200	6.000	0.004	Sig.

*GRP=Group.

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The tabular value at the significance level (0.05) and the degree of freedom (4) = 2.776

The results showed that the values of the mean for all variables were higher in the post test than the pre-test, and a significant change occurred between the two tests and in favor of the dimension as the greater the mean, the better the level, except for a variable (the degree of pain degree), as the values of the mean were lower In the post-test on the pre-test, a significant change occurred between the two tests and in favor of the post-fact that these variables are inverse value, i.e. the lower the mean, the better the level, because it deals with levels of significance of differences to obtain a greater range and the amount of pain perceived, and this is what it indicated levels indication. It was less than the significance level (0.05) for all research variables, which indicates that there were significant differences between the two tests for both groups of research, and this is consistent with what was stated in the first hypothesis of the research.

The researcher attributes the reason for the development of the variable thickness of the rectus abdominis muscle and the erectus spondyllic muscle is that free swimming and back swimming had a positive effect on the improvement in the thickness of the rectus abdominal muscle and the erectus spondylosis muscle of both experimental groups after these muscles were less thick due to the lack of physical activity The musculoskeletal, and thus the muscles and the area surrounding the muscles are exposed to various injuries and pains, especially lower back pain, as the increase in the thickness of these muscles to reach their normal or near normal levels gives them strength that helps them to perform their functions in an integrated manner and reduce From lower back pain. This is consistent with what he indicates.[6]

The lack of movement and activity leads to changes in the cell, tissue and organ levels in terms of physiological and anatomical aspects, and the most affected devices are the muscular and articular system. As an inevitable result of the lack of physical and motor activity, many scientific studies indicate that the individual loses the equivalent of 4% of the muscle size Every 10 years between the ages of 25-50 years and 10% after this age. This exposes the muscles to the possibility of injury easily.[7] The researcher also attributes the reason for the development occurring in the degree of pain variable and for both experimental groups to the nature of the qualifying approach prepared by the researcher, as free swimming and back have had a positive impact in reducing the degree of pain by taking advantage of the buoyancy feature in the water that makes the body lightweight and can perform The movements of the legs and arms without pressure on the spine, thereby making the muscles bigger and stronger and this is confirmed. One of the appropriate exercises for your back and joints is swimming is the first among them as the buoyancy feature in the water prevents pressure on the joints and on the spine and prevents from sudden movements, and the buoyancy belts and breasts can further reduce the stress of your joints when you start swimming or when There is pain in the back and leg joints.[8]

DOI: 10.37200/IJPR/V24I8/PR280471
Received: 21 Jan 2020 | Revised: 08 Feb 2020 | Accepted: 14 Mar 2020

Table 5. Shows the mean, the standard deviations, the calculated value (t) and the level of significance of the differences between the results of measuring the dimensional tests for the two experimental groups

Variables	Units	Groups	Mean	SD	Calculated value (t)*	Significant level of differences	Indication of differences
Thickness Rectus Abdominis Muscles(RT)	Mm	GRP1	18.560	0.365	6.272	0.000	Sig.
		GRP2	16.200	0.758			
Thickness Rectus Abdominis Muscles(LT)	Mm	GRP1	17.780	0.389	5.814	0.000	Sig.
		GRP2	15.880	0.618			
Thickness Erector spinae muscles(RT)	Mm	GRP1	19.000	0.863	3.844	0.005	Sig.
		GRP2	17.220	0.572			
Thickness Erector spinae muscles(LT)	Mm	GRP1	18.120	1.094	2.345	0.047	Sig.
		GRP2	16.840	0.541			
		GRP1	8.000	1.225			
Degree of pain	Degree	GRP2	1.200	0.447	3.536-	0.008	Sig.

*The tabular value at the significance level (0.05) and the degree of freedom (8) = 2.306

When reviewing the results of the tests that were reached by presenting the results in Table (5) for the two experimental groups, it becomes clear to us that there are significant differences between the measurement of the dimensional tests and in the interest of the first experimental group that used free swimming in the qualification process, and this is consistent with what came in the third hypothesis of the research .

From the previous review of the results of the tests for the post measurement and for the first and second experimental groups, it was found through Table (5) that there were significant differences in the results of the tests and in favor of the first experimental group that used free swimming.

The reason for the emergence of these differences and the greatest development of the members of the first experimental group is due to the researcher's observation of the injured when performing the free swimming practice compared to the back swimming where in the back swimming the arms rotation is to the opposite side to the back because the position of the body in it is on the back extending on the surface of the water Horizontally, since we are dealing with an injured person, then the type of easy swimming that performs the same purpose as the movement of the legs and arms will surely have the best results. If your back hurts very much or if you are elderly, you should practice crawling swimming on the abdomen by preparing an

DOI: 10.37200/IJPR/V24I8/PR280471
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appropriately designed rehabilitation program, this is especially useful because carrying water makes the body weight decrease significantly and reduces pressure on the spine during swimming and strengthens The muscles supporting the lumbar spine, which helps the individual to comply with recovery.[9]

IV. CONCLUSION

1. There has been a clear development of the two research groups in the variables under study, whether by free swimming or back swimming.
2. The practice of free swimming helped in the process of rehabilitation of chronic lower back pain through the improvement in the thickness of the rectus abdominal muscle and the erectus spondylosis.
3. The practice of back swimming helped in the process of rehabilitation of chronic lower back pain through improvement in the thickness of the rectus abdominal muscle and the erectile spine muscle.
4. The preference for development was in the variables of thickness of the rectus abdominis muscle, the erectus muscle and the degree of chronic lower back pain for the group that practiced free swimming compared to the second experimental group that practiced back swimming.

REFERENCES

1. Alsayigh, H. A., & Athab, N. A. (2016). The Study of Rectus Femoris Activity after Knee Joint Rehabilitation. International Journal of Pharm Tech Research, 9(9), 360-365.
2. Zainab Abdel Hamid Al-Alem: Sports Massage and Sports Injury, 1st Floor, Dar Al-Fikr Al-Arabi, 1983, p. 35.
3. Muhammad Shia: Thinking Approaches and Research Bases, 2nd edition, Beirut, The Glory of the University Foundation for Studies, Publishing and Distribution, 2008, p. 168.
4. Sandra J. Shultz, Peggy A: Examination of Musculoskeletal Injuries, Second edition, America, Human kinetics, 2005, P363.
5. Aid Fadel Melhem: Physiological Sports Medicine, Contemporary Issues and Problems, 1st floor, Amman, Hamada Foundation for University Studies, Publishing and Distribution, 2011, p. 39.
6. Athab, N. A., Hussein, W. R., & Ali, A. A. M. (2019). A Comparative Study for Movement of Sword Fencing Stabbed According to the Technical Programming in the Game of Fencing Wheelchairs Class B. Indian Journal of Public Health Research & Development, 10(5), 1344-1347.
7. Athab, N. A. (2019). An Analytical Study of Cervical Spine Pain According to the Mechanical Indicators of the Administrative Work Staff. Indian Journal of Public Health Research & Development, 10(5), 1348-1354.
8. Alsayigh, H. A., Athab, N. A., & Firas, M. (2017). The Study of Electrical Activity of the Triceps Brachia Muscle according to the Chemical Changes of Water Loss during Spike in Volleyball. Journal of Global Pharma Technology, 57-62.
9. Athab, N. A. K., & Hassan, A. A. Analysis Study To The Joint Pain Of Knee With Indication Of Loading Mechanics For Players The researchers.

DOI: 10.37200/IJPR/V24I8/PR280471
Received: 21 Jan 2020 | Revised: 08 Feb 2020 | Accepted: 14 Mar 2020