

THE IMPACT OF THERAPEUTIC EXERCISES AND MASSAGE ON THE PHYSICAL PROGRESS OF PARKINSON PATIENTS

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Abstract

This research aimed to show the effect of therapeutic exercises and massage on the physical progress of Parkinson patients in Ramallah governorate, for the purpose of physically rehabilitation of them, as a try to let them live normally as much as possible.

The researcher used the experimental method, due to its suitability to the nature of the study, the sample of the study consists of 15 Parkinson patients intentionally chosen, and the program period they involved in is 8 weeks, 3 sessions per week, each session is one hour. The results show that there are statically significant differences related to the experimental group of the study in the following variances: (increase of motion dimensions , compatibility , length of walking step, ability, balance and decrease of shiver) in favor of posttest for Parkinson patients.

KEYWORDS: Parkinson. Therapeutic exercises and massage.

1. INTRODUCTION

According to International Parkinson Committee, more than 1.2 million suffer from Parkinson disease in Europe alone, and not less than ten million patients suffer from shivering, and more than 500,000 Europeans suffer from tension, 80 thousand of them suffer from primary tension. Concerning the Middle East the estimated number of Parkinson patients is 2-3 out of thousand, 2-3% of those who are over 60 years old suffer from Parkinson disease, putting into consideration that most of Middle East populations are youth, with approximately 6% over sixty.

Parkinson disease is a gradual nervous disorder accompanied with primary movement diagnosis , the sickness occurred due to the loose of nerve cells, that produces the chemical material called (dopamine) , which causes the disorder of the primary nerve cells , then the patient can't control his/her movement.(Dibble,et,2009).

Crizzle & Newhouse, 2006 refers to the diagnosis of motion disorder related to Parkinson disease is the intransigence, so the muscles remain tense that causes joints intransigence's, especially the neck and the legs, also uncontrolled shivering that seems to be normal shiver in peripherals, head or entire body, and also slow of movements that might develop in many cases to bending status, and slow walking. Sometimes, and after years of such status, the muscles of Parkinson patients might stop their motion, and that causes severe fluctuations in controlling the movement.

There are periods in which the movement functions seem to be normal, and within hours or minutes completely changed to be disordered. (Herman,et,al,2007) sees that, following exercise program helps to safe some Parkinson patients from losing balance and fall down , especially in the late period of sickness, and mostly they will get better by medicine or by severe brain alarm , and the training exercises' might be the suitable for the Parkinson patients' to avoid falling.

Research Problem

The Parkinson disease advancement is among the topics that should not be underestimated, and the effort to decrease the resulted out comes, should not be underestimated as will. The more the disease progresses, the causes of inability increased, which make the routine activities like, bath taking, dressing and eating difficult or impossible without others help. That might lead to patient's inability of self-caring, and that lead to the loose of confidence and depression, and staying home and leaving the daily activities due to the patient's status. So, the rehabilitation program will make the patient more integrated and in line with similar patients through participating in the program, and improves the patients' psychological status , due to going outside and participating in the program that enables to enhance the self-confidence . Knowing the advantages of the program will encourage the patient to practice sports exercises. The researcher believes that this study will benefit the Parkinson patients, and it will also benefits the therapists, and sports rehabilitation actives in dealing with such social community. So, the researcher believes that there should be a scientific rehabilitation program related to the patient's physiology to treat the Parkinson patients , especially after the proven of the importance of rehabilitation program for the Parkinson patients in many previous studies such as: (Herman,et,al,2007) ,(Yea,et,al, 2012) ,(Dibble,et,al,2009). The diversity of rehabilitation programs, and the disparity of their effects, encourages the researcher to design a simple and suitable program for the treatment of Parkinson patients, to achieve the concept of scientific comprehensive cooperation in solving social problems.

Research aim:

This research aims to recognize the impact of therapeutic exercises and massage on some variances (increase of motion dimensions, compatibility, and length of walking, ability, balance and decrease of shiver) of the Parkinson patients.

Research Hypothesis

1. The suggested rehabilitation program has statistical impact on the improvement of some variances (increase of motion dimensions, compatibility length of walking step, capability, balance and decrease of shiver) of the Parkinson patients.
2. There are statistical variances between the members of experimental group and the members of control group on behalf of experimental group.

Researches fields:

Field of the Human: Parkinson patients in Ramallah governorate, Palestine.

Field of Time: The research is about the period of 7/8/2014 to 7/10/2014.

Field of place: The program was implemented in (Trifitness) club in Ramallah governorate, Palestine, due to the availability of the equipments needed for implementation of the program.

Field of Parkinsonism: It is the slow of nerve function, this is a disease that affect the nerve system, and influences males and females in the middle and old ages. (EL Garem & Daral, 1986).

Parkinson Disease: It is classified as a disorder in the motion system, which occur as a result of losing brain cells that produce dopamine, and it is proven its existence in specific families. The disease is called Parkinson in relation to the name English physician, James Parkinson, who wrote a comprehensive article about the disease titled” an article about uncontrollable shivering” in 1817. (<http://ar.wikipedia.org>).

2. MATERIAL AND METHODS

First: Research methodology: The researcher uses the experimental method, due to its suitability to the research goals and hypothesis, by using pre and post measures on the research groups. Therapeutic exercises and massage has been implemented on the experimental I group members, the following variances has been studied (motion dimensions, compatibility length of walking step, ability, balance and shivering).

Second: Research Community; the study community consists of all Parkinson patients in Ramallah governorate, totaling 43 patients.

Third: The Study Sample: The sample of study has been intentionally chosen from the Parkinson patients, who are reluctant to treatment in patient’s friends committee (patient’s friends committee and Palestinian red crescent committee), fifteen of the male patients agree to participate in the treatment program aged of (40-70) years old convergent in age, weight, tall and the period of disease, and the divided into two groups:

First group: Experimental group totaling 7 Parkinson patients, applying to them training and massage program, and they take medicine.

Second group: Control group totaling 8 Parkinson patients who take medicine only.

Table no. 1 clarify the arithmetical averages, standard deviation and (T) value for the pre measurement on the study variances (age, length, weight and period of sickness) on both groups members.

Table 1: The arithmetical mean, standard deviation and (T) value for the pre measurement on the study variances (age, length, weight and period of sickness) on both groups' members.

No.	Variances	Measurement unit	Empirical group no.7		Control group No.8		T value
			A	SD	A	SD	
1	Age	Year	57.857	10.9762	53.375	12.0468	0.749
2	Length	Cm	175.557	2.9743	175.500	2.7166	0.039
3	Weight	Kg	77.986	5.0815	79.688	4.7188	0.672
4	Period of sickness	Year	2.729	0.6751	2.563	0.6589	0.482

Statistical evidence on level (0.05=α) T value according to table (1) (2.04) free degrees (13).

There is no statistical evidence about moral differences between the experimental group and control group related to age, length, weight and the period of disease, which is an evidence of parity and homogeneity in both samples. Table 1 shows T value, which is counted as it is the table,

Terms of Sampling

1. Sample members should be Parkinson patient.
2. Abe to move and practice daily life activities.

Fourth: the procedures of the experimental research:

The stage of the pre-measurement of tribal

First: Coordination with Trifitness club management. I work there to handle the pre-measurement of tribal and use the available potentials of the club.

Second: The researcher designed a training program after surveying the framework references to the research, by reviewing previous studies, and rehabilitation programs made by physiotherapists and rehabilitation centers.

Third: A questionnaire has been designed for the experts in the physiotherapy. The researcher was able to know the primary and the most suitable methods of Parkinson patients' treatment, and the role of physical therapy and massage, getting use of experts' opinion in scientific bases of designing the suggested program, then choosing the best methods and therapeutic exercises for Parkinson disease therapy.

Proposed Therapeutic Exercises and Massage:

The Proposed Therapeutic Exercises and Massage are designed for two months, divided into two stages, each of which is four weeks, three sessions every week, and the duration of therapy unit is 60 minutes, so the number of sessions are 24 sessions.

The First Stage:

This stage is for one month (four weeks), 12 sessions of therapeutic exercises and massage. This Stage aimed to:

1. Increasing the joints flexibility and non-stiffness by improving the flexibility of working muscles.
2. Working on the early positive function of higher and lower joints muscles, by directed exercises to keep the patient's body fit.
3. Encouraging patient to control the movement while walking.

This stage will be under the researcher, medical and healthy control to regulate the patient's physiological and psychological status.

Second Stage:

This stage will start in the second month of the program for one month (4) weeks, twelve sessions, it includes therapeutic exercises and massage, and aimed to:

1. Working on continuity and increasing of various body parts activation, especially thigh, leg and arm muscles, and the flexibility of body joints.
2. Increasing the therapeutic exercises gradually, by increasing the load, the frequency and the groups in this stage.
3. Giving exercises to increase body flexibility without using machines and tools.

This stage will be under the researcher, medical and healthy control to regulate the patient's physiological and psychological status.

Fourth: A questionnaire for sample members have been prepared, that consists of their data and the related results.

Fifth: choosing a specialized team work to assist the researcher in implementing the therapeutic program, and to handle the measures, totaling 2 in addition to the researcher.

Sixth: The researcher has made an experimental questionnaire to choose the measurement tools, and to specify the time and place of measure. A study of scoping has been made for the pre measurement on a sample of 4 Parkinson patients on 14/7/2014, then they have been excluded.

The stage of pre measurement

A group of appropriate tests and measures have been used in the study that fits the study variances:

motion dimension test (flexibility): joints flexibility is measured by Goniometer machine, this machine is adopted to measure the flexibility and movement dimension of body joints, after using this machine by many researchers, the whole natural motion dimension angles have been documented for body joints, and the flexibility of many parts of the body, such as shoulders, elbows and arms were measured, by bending the arm of the patient to the highest extent, then the calf was measured by lowering and raising the foot, then take the measurement from the degree appeared in the machine each time the intended part is measured. Each time three measures should be taken.

1. Balance Tests:

- The patient's position: (standing blindfolded) walking straight forward on a drawn line in the ground, with length of 3m and width 20cm.

Records: The test time, and the number of deviations should be recorded.

- Walking test inside a cycle with 1.5m diameter and 10cm width.

Records: The number of windings done by the patient on the drawn cycle should be recorded, as well as the test time and the number of deviation from the cycle diameter.

1. Length of walking step: making a test of walking straight forward for 5m in the lowest possible time. For the purpose of this study, the number of steps on the ground in 5m, and the consumed time as well was recorded by timing clock, and the speed was measured by using time.

(Speed = distance/time) (Ad, et, 2003).

2. Test of Compatibility: standing with face to the wall, and putting the hands on the two cycles drawn on the wall, and the legs on the drawn cycles on the ground, and walking in the place, then test the hand raising on the wall, and the leg putting on ground within 15 seconds. The distance between the circles on the wall is 15cm and the diameter is 15cm, and the distance between the circle down in the ground 10cm, and the diameter is 20cm.

Records: The number of correct movements within 15 seconds is recorded.

3. Test of Ability:

- Vertical jump from stability.
 - The test of long sitting from lie down in 30 seconds.
4. Test of shivering: the patient puts hand straight forward to catch the medical cup pointed with lines of cm, which is full of water within 10 seconds.

Records: reading the lines on the cup to the nearest cubic centimeter. The test repeated three times and the best will be recorded.

Finding Statistical reliability coefficient for Tests:

The researcher verifies the factors of truthfulness, using the truth of context by displaying the tests on five arbitrators who are holding phd degree in physiotherapy and physical rehabilitation, in order to, verify the veracity of the test used for the study sample. The percentage of their agreement on those tests is 100%.

The researcher has verified the reliability coefficient of the test by calculating the efficient of tests, in the manner of applying the test. And re-applied it to a similar random sample of the study technique, related to the type and duration of the infection totaled (4), table 2 shows the reliability coefficient.

Table 2: The stability of compatibility test, length of walking step, ability, balance and shiver for Parkinson patients by re-test.

No.	Variance	First measure	Second measure	Difference between averages	Correlation coefficient
1.	Walking duration on the drawn circle on ground 1.5m diameter.	95.7000	275.7619	-180.017	0,99
2.	Leg deviation from the vicinity of the circle drawn on the ground	13.4900	54.6829	-41.1929	0.99
3.	Number of laps of the patient on the diameter of the circle drawn in the ground	7.5312	27.8200	-20.2888	0.99
4	Long sitting from lie in 30 seconds	5.8750	14.8571	-8.9821	0.98
5	Vertical jump from stability	13.1513	25.7971	-12.6458	0.98
6	Number of steps straight forward in 5 m	11.5000	8.1429	3.3571	0.94
7	Walking straight forward duration for 5m	12.3463	9.7229	2.6234	0.91
8	Standing facing the wall, walk in the place, with the feet touching the two lower circles while the hands on the wall.	2.3750	8.4286	-6.0536	0.98
9	The volume of water spilled from the cup inscribed in 10 seconds.	1.7675	0.5700	1.1975	0.99

Table two shows the arithmetic mean and deviation values, and Pearson correlation coefficient between the first two applications. The second is for the tests in question and read through correlation coefficient values. We found that the range is between (0.91-0.99). This indicates a high correlation between the two applications, and thus infer stability.

The First and second stage of the application of the program last for two months (8) weeks of (24) sessions , in the period from 7/8/2014 to 7/10/2014 , three therapeutic units per week , the duration of therapeutic treatment unit is 60 minutes, included therapeutic exercises and massage.

Stage of final dimensional measurement

This is the last stage of the research that lasted for two months, and that will be after the 8th week. Where the final dimensional measurement is taken, in the same terms as tribal.

Statistical Treatments

Arithmetic means, standard deviation and T test have been used, in order to reach the goals of the research, and to answer the hypothesis.

3. RESULTS AND DISCUSSION

Research hypothesis

First hypothesis: proposed rehabilitation program has a significant effect on the improvement of some of the variables (motion dimension, compatibility, length of walking step, ability, balance and shiver), as an indicator of progress on the physical level of the Parkinson disease patients.

To examine this hypothesis, arithmetic mean, standard deviation and T test value for the study sample has been tested, on two measurements pre and post experimental, on the experimental group and on control group, as shown in table 3 and 4 respectively:

Table 3: Arithmetic mean, standard deviation and T test value calculated in compiling (the pre and post) experimental

No	Variance	Tribal Measure N=7		Posterior measure N=7		T Value	Indicator level
		A	SD	A	SD		

1.	Bending wrist joint	127.642	1.8301	42.3686	1.37342	97.734	0.000
2.	Extending wrist joint	106.171	1.9276	172.921	1.67189	-70.56	
3.	Bending knee joints	62.0371	3.5046	42.2486	1.18664	13.619	0.000
4.	Extending knee joint	112.971	0.8400	169.825	11.9555	-12.50	0.000
5.	Bending shoulders joint	52.0714	0.8693	165.707	1.54334	-187.90	0.000
6.	Extending shoulder joint	154.785	2.5268	85.6057	1.72007	49.109	0.000
7.	Bending wrest joint	133.128	1.9796	94.6243	1.76390	35.083	0.000
8.	Extending wrist joint	144.757	3.5739	103.298	1.57927	26.072	0.000
9.	Bending the ankle	63.0714	0.8750	147.400	1.04067	-134.31	0.000
10.	Extending the ankle	163.100	1.9165	93.6886	1.48481	76.178	0.000
11.	Duration of walking straight forward on of drawn circle, its diameter is 1.5m	83.1086	4.5240	275.716	2.57047	-92.520	0.000
12.	Leg deviation from the diameter of the circle drawn	13.7029	0.6364	54.6829	1.39429	-87.766	0.000
13.	Number of laps of the patient on the diameter of the circle drawn in the ground	5.7857	0.9063	27.8200	1.54556	-31.592	0.000
14.	Long sitting from lie in 30 seconds	5.4286	0.9759	14.8571	0.89974	-19.605	0.000
15.	Vertical jump from stability	12.1857	1.4135	25.7971	1.30941	-21.388	0.000
16.	Number of steps straight forward in 5 m	11.4286	1.4135	25.7971	1.30941	-21388	0.00
17.	Walking straight forward for 5m	14.9071	0.8700	9.7229	0.79227	13.806	0.000
18.	Standing facing the wall, walk in the place, with the feet touching the two lower circles while the hands on the wall.	2.7143	0.4879	8.4286	0.53452	-20.000	0.000
19.	The volume of water spilled from the cup inscribed in 10 seconds.	2.0143	0.2561	0.5700	0.01915	14.447	0.000

Statistical indicator on level (0.05=a) table T (2.14) free degree (6)

Table 4: Arithmetic mean, standard deviation and T test value calculated in compiling (the pre and post) control group

No	Variance	Tribal Measure N=7		Posteriori Measure N=7		T Value	Indicator level
		A	SD	A	SD		
1.	Bending wrist joint	129.00	1.471	54.022	1.571	388.865	0.000
2.	Extending wrist joint	106.03	1.018	158.64	1.211	-90.86	0.000
3.	Bending knee joints	63.117	1.502	62.770	1.524	0.716	0.497
4.	Extending knee joint	112.82	1.127	163.52	1.051	-88.983	0.000
5.	Bending shoulders joint	52.062	1.237	112.90	1.336	-80.170	0.000
6.	Extending shoulder joint	154.52	1.219	61.081	1.894	131.483	0.000
7.	Bending wrest joint	131.18	1.888	14.048	1.714	121.912	0.000
8.	Extending wrist joint	144.30	3.428	142.86	1.707	0.934	0.381
9.	Bending the ankle	62.287	1.284	128.51	1.144	-350.49	0.000
10.	Extending the ankle	162.95	1.477	108.45	1.259	74.829	0.000
11.	Duration of walking straight forward on of drawn circle, its diameter is 1.5m	84.012	4.899	95.700	1.725	-7.560	0.000
12.	Leg deviation from the diameter of the circle drawn	13.193	1.052	13.490	0.783	-0.535	0.610
13.	Number of laps of the patient on the diameter of the circle drawn in the ground	5.2500	0.886	7.5312	0.234	-6.542	0.000
14.	Long sitting from lie in 30 seconds	5.6250	0.916	5.8750	0.640	-0.552	0.598
15.	Vertical jump from stability	12.106	1.301	13.151	1.310	-1.560	0.163
16.	Number of steps straight forward in 5 m	10.750	1.035	11.500	0.534	-1.655	0.142
17.	Walking straight forward for 5m	15.480	0.993	12.346	0.440	9.241	0.000
18.	Standing facing the wall, walk in the place, with the feet touching the two lower circles while the hands on the wall.	2.6250	0.517	2.3750	0.517	1.000	0.351
19.	The volume of water spilled from the cup inscribed in 10 seconds.	2.0250	0.361	1.7675	0.070	2.053	0.079

Table 3 shows arithmetic mean, deviation standard and T test value between pre and post experimental group of variables (motion dimension, compatibility, length of walking step, ability, balance, and shiver), it shows that the T value is the existence of significant

statistical differences between the two measurements pre and post, due to the indicator value which is below 0.05, so these differences were an indicator on behalf of post measurement in variables. The previous results reflects the existence of positive effects of rehabilitation program on the experimental group, it has worked on increasing the flexibility of joints where the program contains of prolongation exercises, kinetic exercises and massage, and this has helped to raise the muscles temperature and decryption muscle adhesive, resulted in increase of joints flexibility, increase in movement dimension and reduces the shiver. Kenyon, 2004, indicates that the motion dimension (flexibility) is one of basic physical factors either for general health, or physical flexibility, the availability of a certain limit of the motion dimension or flexibility is essential requirement of every human being. The previous results reflects the positive effects of the proposed program, on the experimental group the resulted a reduction of stiffness, and improves nerve and muscles compatibility, and increases the speed of contraction of muscle fibers, that led to the creation of the muscles to work to reduce the shiver. This study agrees with ; (Herman,et,al,2007), (yea,et,al,2012), (Crizzle& Newhouse, 2006), (Hirsch,et,al,2003) ,(Dibble,et,al,2009) that the rehabilitation programs work on improving ; walking ,balance and movement.

Table 4 shows the arithmetic mean, standard deviation and T test results between the two measurements, pre and post control group in the variables; motion dimension, compatibility, length of walking step, ability, balance and shiver. The calculated T value shows no statistical differences between the two measurements pre and post, except in some variances, that has improvements such as walking and joints flexibility, shoulder joint, and the reason for that might be due to the life style of some patients, such as walking using hands continuously and using drugs therapy.

Second hypothesis:

A significant statistical differences between the experimental group and the control group on behalf of experimental group. To examine this hypothesis the arithmetic mean, standard deviation and T test, calculated to measure the significant differences between the two groups; experimental group and control group as it appears in table 5.

Table 5: Arithmetic mean, standard deviation and T test value calculated in compiling (the pre and post) control group

No	Variance	Tribal Measure N=7		posteriori N=7		T Value	Indicator level
		A	SD	A	SD		
1.	Bending wrist joint	42.368	1.373	54.022	1.571	15.177	0.000
2	Bending knee joints	42.248	1.186	62.770	1.524	28.760	0.000
3.	Extending knee joint	169.82	11.95	163.52	1.051	1.492	0.159
4.	Bending shoulders joint	165.70	1.543	112.90	1.336	71.072	0.000
5.	Extending shoulder joint	85.605	1.720	61.081	1.894	26.092	0.000
6.	Bending wrest joint	94.624	1.763	14.048	1.714	89.595	0.000
7	Extending wrist joint	103.29	1.579	142.86	1.707	46.340	0.000
8	Bending the ankle	147.40	1.040	128.51	1.144	33.235	0.000
9	Extending the ankle	93.688	1.484	108.45	1.259	20.855	0.000
10	Duration of walking straight forward on of drawn circle, its vicinity 1.5m	275.71	2.570	95.700	1.725	161.248	0.000
11	Leg deviation from the diameter of the circle drawn	54.682	1.394	13.490	0.783	71.836	0.000
12	Number of laps of the patient on the diameter of the circle drawn in the ground	27.820	1.545	7.5312	0.234	36.844	0.000
13	Long sitting from lie in 30 seconds	14.857	0.899	5.8750	0.640	22.504	0.000
14	Vertical jump from stability	25.797	1.309	13.151	1.310	18.650	0.000
15	Number of steps straight forward in 5 m	8.1429	0.690	11.500	0.534	10.612	0.000
16	Walking straight forward for 5m	9.7229	0.792	12.346	0.440	8.074	0.000
17	Standing facing the wall, walk in the place, with the feet touching the two lower circles while the hands on the wall.	8.4286	0.534	2.3750	0.517	22.260	0.000
18	The volume of water spilled from the cup inscribed in 10 seconds.	0.5700	0.019	1.7675	0.070	43.167	0.000

Statistical indicator on level (0.05=a) table T (2.04) free degree (12)

Table 5 shows arithmetic mean, standard deviation and T test value of the post measurement to denote the differences between the two groups; experimental group and control group in the variables; motion dimension, compatibility, length of walking step, ability, balance and shiver. T calculated value shows significant statistical differences for the post measure , due to the indicator value which is 0.05, so these differences were indicators in favor of the post measurement, and the previous results reflects the existence of positive effects of the therapeutic program on experimental group, and this led to increase of dimensional motion , due to physical training and therapeutically massage, that reduces muscle stiffness, and prevents stiffness cause by Parkinson disease ,and thus

stimulate blood circulation and increase nutrition in the muscles, and this increases the movement efficiency and walking . The following studies;

(Herman, et, al, 2007) ,(Yea,et,al, 2012), (Crizzle& Newhouse, 2006) (Hirsch,et,al,2003), (Dibble,et, al,2009) indicate that the rehabilitation programs improve the physical elements, and thus improve muscles flexibility and improves their temperature.

4. CONCLUSION

Due to the research results, in the range of research sample, the research reached the following conclusions:

1. The proposed therapeutic program improves the physical ability of the Parkinson patients, and improves (motion dimension, compatibility, length of walking step, ability, balance and shiver) in the research sample.
2. The proposed therapeutic program helps the advancement of experimental group that takes training in addition to medical drugs on the control group who takes medical drugs only, in all percentage differences of the post measurement than the pre measurement , of the research variables of the Parkinson patients.
3. Work on the early start of therapeutic exercises and medical massage improve the physical level quickly.

5. RECOMMENDATIONS

According to the reached results the researcher recommended the followings:

1. Use the therapeutic exercises and massage mentioned in the research, in addition to medical drugs after the diagnosis of Parkinson disease.
2. Early care of Parkinson patient's treatment, using therapeutic exercises even after they improved.
3. Work on designing and constructing other similar programs, which help to improve the physical level of Parkinson patients.
4. Care of practicing some exercises related to; strengthening, flexibility and walking in the house, in the days of not practicing the program training of the Parkinson patients.

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