

Effects of dance and movement therapy on physical ability, flexibility and psychological state for individuals under constant stress

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Abstract

Background and Study Aim Dance and movement therapy defined as culturally creative, unique, but at the same time and a universal phenomenon encompassing bodily movements, bodily self-expression, feelings, stories, body interactions with self and others. Aim of the Study was to evaluate the impact of dance and movement therapy on the physical capacity, flexibility and psycho-emotional state of individuals under constant stress.

Material and Methods The study included 18 – 45 years old females (N=20) who has psycho- emotional disorders and came to this facility for rehabilitation treatment procedures. To assess functional physical capacity was used 6 – minute walk test. For flexibility assessment, to determine the mobility of the lumbar cross section of the spine was used Schober's sample. For psycho- emotional state assessment and for setting the symptoms of depression and anxiety in subjects was used Hospital Anxiety and Depression Symptom (HADS) Scale. The fatigue was measured by Fatigue Impact Scale.

Results Positive statistically significant change in the psycho- emotional state of the subjects was in both groups, however in dance and movement therapy group this state improvement is twice large than in physiotherapy group. The mean values of the HADS scale decreased by 3.1 ± 3.981 points in the first group of subjects treated with physiotherapy and by 6.9 ± 4.62 points in the second group treated with dance and movement therapy. During physical capacity assessment it was observed a statistically significant basic change in both groups. In the first study group the average 6 – minute test increased by 35.2 ± 24.89 meters and in the second study group by 27.5 ± 19.44 meters.

Conclusions Dance movement therapy has a positive effect on psycho- emotional state, flexibility and physical ability of people experiencing constant stress. As observed, dance and movement therapy have a positive effect not only on flexibility or physical ability, but also on psycho- emotional state. Dance and movement therapy can be easily applied among different age population. All this makes physiotherapy a highly essential tool to improve person's well – being and quality of life.

Keywords: dance therapy, movement therapy, flexibility, psycho- emotional state, physical capacity.

Introduction

It was already investigated whether dance therapy was more beneficial for individuals under constant stress than dance therapy for cognitive and mood symptoms [1]. Seven randomized controlled trials with cognitive and mood symptoms in patients under constant stress were identified. There were significant differences in executive function after dance therapy, but no effect was observed in cognitive function, depression and apathy. Dance therapy is helpful in improving the executive function of adults under constant stress. However, a positive effect on global cognitive function, depression and apathy has not been established [2]. There is currently

a lack of appropriate rehabilitation programs for individuals experiencing ongoing stress that affects emotion control, flexibility and physical capacity. The potential benefits of dance therapy for balance, flexibility, physical capacity and psychological wellbeing in individuals under constant stress have been explored. Intervention sessions were performed over eight weeks of dance movement training aimed at improving individuals balance, posture, physical capacity, flexibility and psycho-emotional state, as well as emotional control. Individuals demonstrated an improvement in physical capacity, flexibility and psycho-emotional state after dance and movement therapy. In addition, improvements in depressive symptoms and quality of life were observed at the end of the intervention. Dance may be a suitable alternative method of physiotherapy intervention for individuals experiencing constant

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stress or having psycho-emotional disorders [1]. The overall progression of a person's body image is a multifaceted functioning system involved in the development of a personality identity that influences satisfaction with a person's quality of life and emotional stability of the person. It stems from body schematics and changes throughout life. Dance therapy creates a connection between mental and physical self-perception. It affects the cognitive, social and personal aspects of personality. The effects of dance therapy treatment on body image, self-esteem and identity development in individuals experiencing constant stress were evaluated and compared with control groups. Dance and movement therapy improve quality of life, self-esteem, body esteem, and mental representations [3].

The causes of mental and behavioral disorders are the most important of all health disorders (they account for 36.9% of all years of disability in the world among people of working age). In order for society to avoid this burden, comprehensive community and medical assistance to these individuals is a necessity [4]. Dance and movement therapy as an official practice of psychotherapy was formed in the 1940 and spread internationally. Dance and movement specialists work in the rehabilitation of patients and the disabled with people of different ages and genders with various physical, emotional and social problems [5]. Disability in all periods of human development was considered a difference, an abnormality, a deviation from the norm, from what is generally accepted. A person's quality of life is greatly influenced by a person's physical health, psychological state, degree of independence, social relations with the environment. Art therapy directs a person's suffering and psycho-emotional experiences to self-expression, stimulating his or her creative abilities and abilities. The artistic abilities of individuals with mental disorders include not only the expression of intuition and feelings, but also intelligence. Different branches of art develop musical, spatial, movement, communication skills, as well as the aspect of perception is revealed in artistic activities [6].

Psycho-emotional disorders are common problems in modern society. Many patients with these disorders also suffer from gastroesophageal reflux [7]. Sensitivity to interception, especially heartbeat, will play a key role in the pathogenesis of anxiety and anxiety disorders. Clinical trials to assess heart rate in the presence of intercepted susceptibility, heart rate due to anxiety-related symptoms (anxiety, sensitivity state), panic disorder and other anxiety disorders, use neurobiological studies of neuronal activation magnetic resonance imaging (fMRI) or electroencephalography (EEG) techniques. Beta-blockers, biological feedback therapy, cognitive interventions, and interoceptive exposure can be used to increase heart rate as a

consequence of anxiety and anxiety disorders and to potentially reduce interoceptive sensitivity [8, 9].

Emotional stimulation is very important for person's well-being. Fear, sadness, anger, frustration, high mood, furious, ashamed, disgusted, happy, satisfied, excited, overwhelmed are the terms we use to describe our emotional lives [10]. Psycho-emotional disorders are one of the leading causes of high mortality in individuals. The most common treatment for such disorders is neuroprotective therapy. Indeed, such therapy to some extent facilitates the normalization of the condition and strengthens the physiological tissue activity of the brain. Such treatment can also help repair damage to various types of pathogens in the brain systems shocks (traumatic, inflammatory, vascular, degenerative, etc.) [11]. Research reveals a statistically significant link between physiotherapy and emotional well-being, the nature of which remains little explored. Physical activity changes a person's psycho-emotional state, helps to control negative emotions: anger, resentment, anxiety. Individuals who have difficulty regulating emotions benefit from physiotherapy or other forms of active activity that help regulate neuromuscular processes. Bernstein et al. in a study assessed emotional propensity, mood, and anxiety, and were randomly assigned a 30-minute stretching or dance movement workout. Subjects in both groups then experienced the same positive and negative emotions and named response levers for emotional reactions. The analysis revealed greater difficulties in developing emotion regulation strategies and engaging in behavior-oriented, goal-oriented after induction of negative mood. Respondents who experienced negative emotions predicted a stronger and sustained negative impact in response to stress. The interaction showed that aerobic exercise, dance and movement training attenuated this effect. Moderate aerobic exercise can help alleviate negative emotions in participants who have difficulty regulating emotions [12].

Purpose of the Study. The study purpose was to evaluate the impact of dance and movement therapy on the physical capacity, flexibility and psycho-emotional state of individuals under constant stress.

Materials and Methods

Participants.

The Bio Ethics Committee of Klaipėda University, Faculty of Health Sciences Holistic Medicine and Rehabilitation Department formally approved the research protocol. The study included individuals who has psycho-emotional disorders and came to this facility for rehabilitation treatment procedures. The principle of goodwill was ensured by respectfully informing the patient about future examinations and tests. Subjects were explained that they would

be free to choose whether or not to participate in the study and those who decided to participate could terminate the study at any time during the study. A total number of 20 research subjects participated in the study. The research subject were just females. The initial assessment was performed before the research onset and the second assessment was performed after the research was finished.

Research subject selection criteria: 18 – 45 years old individuals under constant stress, subjects who experienced fatigue, high psychological pressure, diagnosed with anxiety disorder, feeling tired, decreased flexibility, decreased physical capacity, psycho-emotional disorders.

Exclusion criteria: unbearable pain (9 – 10 according to Visual Analog Scale for Pain), spinal surgery, high blood pressure, open wounds, patients with epilepsy, arrhythmias, tumors.

Research Instruments.

To assess physical capacity was used 6 – minute walk test [13]. This walking sample is a simple, easy to repeat test to help assess submaximal functional capacity and response to treatment. It is noted that the results of this sample also have a predictive value. Within 6 minutes, the patient is asked to walk as long a distance as possible. A walking area is prepared for the patient, where the length of one wheel is 84 m. For 80 m + 4 m turns, the turns are marked with a clearly visible marker. The patient, coming in wearing comfortable shoes, walks clockwise. As they go, they can take rest breaks, which will be counted towards the test time. The laps walked are counted aloud so that the subject can hear clearly, and how long the patient is walking and how much time is left is reported. Each lap must be marked in the test report and the distance travelled in a few meters must be calculated. Assessment of physical capacity (based on the results of a six-minute walk sample) Low - <150 meters / 6 min. Medium - 150-425 meters / in 6 minutes. High -> 425 meters / in 6 min. [14].

For flexibility assessment was used Schober's sample [15]. This test is used to determine the mobility of the lumbar cross section of the spine. The modified Schober test is measured by marking three points in the back area of the subject. The patient stands upright. The first point is marked in the middle of the straight line joining the hip wings. The second point is marked 10 cm above the first. The third point is 5 cm below the first. This gives a distance of 15 cm. The subject bends forward, bending only the lumbar spine, without bending the knees and without squatting. The distance between the upper and lower point is measured. The result is recorded in centimetres. The test is negative if the difference is 7 cm or more. This means that the mobility of the lumbar spine is good. If the distance is less than 7 cm, the test is positive, the mobility is limited [14]. Back bending. With the subject standing upright with their hands on their sides,

they are asked to lean forward as low as possible. If the mobility is normal, then the subject reaches the floor with his fingertips. If the floor is not accessible, measure the distance from the floor to the tips of the big toes with a centimetre tape. However, it should be noted that the muscle groups of the back of the hip joints and legs are still involved in this movement. Back building. The subject is placed on his stomach. Relying on your hands, trying to stretch your back as much as possible without lifting your pelvis. The distance is measured in centimetres from the floor to the upper edge of the sternum handle (to the yoke bay). Lateral bending. When determining the lateral mobility of the spine, the distance from the big toes of the right and left hands to the floor is initially measured directly while the subject is standing. The same distance 22 is then measured by bending to the sides. The distance on both sides should be the same [15].

For psycho-emotional state assessment was used *Hospital Anxiety and Depression Symptom Scale* (HAD) [16]. The HAD scale is a scale for assessing the symptoms of depression and anxiety in patients receiving treatment in general (non – psychiatric) settings. Using the HAD scale, the patient answers fourteen questions, rated from 0 to 3, based on their health over the past week. Seven questions assess the symptoms of depression, seven – the symptoms of anxiety. Estimates can range from 0 to 21. Estimates greater than 8 indicate possible depressive or anxiety disorder.

The fatigue was assessed by *Fatigue Impact Scale* (FIS) [17] (Fisk J.D., 1994). This scale consists of 40 covering wide aspect of fatigue questions in 3 criteria: physical, social, cognitive. Each question is scored from 0 to 4 points. 0 points – no fatigue, 4 point – extremely severe fatigue. The maximum score of points is from 0 to 160. More points are total score means higher fatigue level.

The pain was assessed by *Visual Analog Scale for Pain* (VAS) [18]. The respondent is asked to place a line perpendicular to the VAS line at the point that represents their pain intensity. Using a ruler, the score is determined by measuring the distance (mm) on the 10 cm line between the “no pain” anchor and the patient's mark, providing a range of scores from 0–100. A higher score indicates greater pain intensity. the following cut points on the pain VAS have been recommended: no pain (0 – 4 mm), mild pain (5 – 44 mm), moderate pain (45 – 74 mm), and severe pain (75– 100 mm).

Research Design.

The study was conducted at the Lorna Medical Center, Department of Physical Medicine and Rehabilitation. Total research took 2 weeks. All selected patients consisted of two study groups, one group received physiotherapy exercises sessions and other group received dance and movement

therapy sessions. Physical therapy exercises sessions in the gym (10 procedures) and dance and movement therapy sessions (10 procedures) 5 times a week were then started for each patient. The study was conducted in the hospital premises, in the physiotherapy hall, therefore the subjects were provided with a safe, quiet, comfortable environment. The principle of respect for the dignity of the individual was implemented during the study, ensuring conditions that do not degrade the dignity of patients, preserve privacy and freedom of choice. The principle of the right to accurate, complete or any information of interest to the study was ensured by explaining to the subjects the purpose of the study, the method of data collection, the relevance of the study, possible responses to treatment, and answers to pre -, post - and post - study questions. All participants in the study were informed that their anonymity would be ensured, the obtained results and other information related to the patient would not be available to other persons, and the study results would be processed, used for research purposes and published only in research.

The physiotherapy exercises session (Group I): The duration of the exercises was 30 minutes. This program consisted of three parts: introductory, basic, and final. Exercises are performed lying on a mat from various starting positions: lying on your back, lying on your stomach, lying on your side, leaning on your hands and knees, leaning on your forearms and feet. This program includes breathing exercises, torso, upper and lower limb muscle and buttock stretching exercises, stretching exercises aimed at stretching and relaxing shortened muscles, improving psycho-emotional state, flexibility, deep spine muscle activation exercises – local segmental control exercises for muscles kinetic circuit segment control exercises, strength exercises for torso, upper and lower limb muscles using body weight and gravity without aids, dynamic and static spine stability exercises without aids, static endurance training exercises, torso flexors, straight, lateral flexors for static endurance, to improve physical performance using body weight and gravity. Exercise slowly, constantly paying attention to the position of the pelvis (the neutral – middle between bending and stretching the spine must be maintained). During the exercises, the abdominal muscles are kept tense, trying not to hold your breath. The workload was gradually increased, considering the individuals' tolerance to exercise, in an effort to increase physical capacity, flexibility and improve psycho-emotional state. During the program, individuals were trained in proper breathing. Stretching exercises are maintained for 10 – 20 seconds. Strength exercises are repeated 7 – 10 times. Static positions are maintained for 6 – 8 seconds, then – until 10s. Static endurance training strategy – regression pyramid technique: for example, the lateral bridge in support

of the forearm and knee: five times performed from the left side, five times from the right side, resting, then four times from the left side and four times from the right side then resting, and so on. Depending on the patient's physical condition, it can be started from three and reduced to one. This technique is designed to increase physical capacity in individuals who experience constant stress, feel physically weakened and tense, an essential provision: to develop physical capacity, flexibility and improve psycho-emotional state without causing a lack of oxygen in the muscles. Instructor was licensed physiotherapist.

The dance and movement program (Group II): Exercise duration 30 minutes. This program consisted of three parts: introductory, basic, and final. The introductory part included stretching exercises for the muscles of the torso, upper and lower limbs, breathing exercises, pelvic floor control exercises to accustom patients to exercise, relaxing the muscles of the pelvis and lower extremities so that patients could easily extract dance steps after relaxing the pelvis. Stretching exercises are maintained for 10 – 20 seconds without holding your breath and maintaining proper anatomical positions. In the main part, dance-movement therapy was used (choosing the main steps of Bachata dance with bachata music): two steps to one side, two to the other, two steps to one side and the other when crossing, two steps forward and two backwards, turning four squares, steps to one side and the other, a light squat is performed by rotating the bowl in one direction and in 4 movements, this combination of slow pace and 4/4 meter is repeated five times while keeping the bowl in a neutral position, protecting patients from excessive lordosis. tense abdominal and pelvic floor muscles. Upper limb movements were also progressively connected while dancing Bachata. The number and complexity of repetitions of Bachata steps and hand gestures performed were progressively increased according to the band's capacity, and the pace was also slightly accelerated. This program designed to increase physical capacity, flexibility, and psycho – emotional status. In the final part, breathing and stretching exercises performed for the whole-body muscle groups: torso, upper and lower limbs. Instructor was licensed physiotherapist.

Statistical Analysis.

The research data was processed with SPSS 21.0.0.0 package version, the mean (X), standard deviation (SD) and significance level ($p < 0.05$) were used to calculate the results. Microsoft Office Excel 2007 computer program.

Results

Assessment of psycho-emotional state (HAD scale). From the presented results we can see that HAD scale

scores in group I decreased, it is a positive progress, the lower the scores mean the better the psycho-emotional state. After calculating the correlations in the first group, it can be summarized that the visible expression of the correlation strength is 0.969, which indicates the existing strong relationship between the variables and the applied test. The resulting $p = 0.00$ is less than <0.05 , indicating current statistical significance. After calculating the correlations in the second group, it can be summarized that the visible expression of the correlation strength is 0.96, which indicates the existing strong relationship between the variables and the applied test. The resulting $p = 0.00$ is less than <0.05 , indicating current statistical significance. There was a statistically significant change in both groups. From the presented results, we can see that the mean values of the HAD scale decreased by 3.1 ± 3.981 points in the first group of subjects treated with physiotherapy and by 6.9 ± 4.62 points in the second group treated with dance and movement therapy. We can assume that in the dance and movement therapy group, the positive change in the psycho-emotional state of the subjects is twice as large than in physiotherapy group (Fig. 1).

Assessment of physical capacity (6 - minute walking test). After calculating the correlations in the first group, it can be summarized that the visible expression of the correlation strength is 0.94, which indicates the existing strong relationship between the variables and the applied test. The resulting $p = 0.00$ is less than <0.05 , indicating the current statistical baseline. In the second group of computational correlations, it can be summarized that the visible expression of the correlation strength is 0.581, which indicates the current mean strength relationship between the variables and the

applied test. The resulting $p = 0.05$ is equal to 0.05, which indicates the current statistical baseline. In both groups the statistically basic change. From the presented data, we can see that in the 1st study group, who received physiotherapy, the average 6 - minute test increased by 35.2 ± 24.89 meters, and in the 2nd study group, who received dance and movement therapy, by 27.5 ± 19.44 meters. From the obtained data, it can be assumed that in first group, with the application of physiotherapy, the physical capacity increased more than in the second group, which applied a dance-movement program (Fig. 2).

Flexibility Assessment (Schober Test). After calculating the correlations in the first group, it can be summarized that the visible expression of the correlation strength is 0.961, which indicates the existing strong relationship between the variables and the applied test. The resulting $p = 0.00$ is less than <0.05 , indicating current statistical significance. After calculating the correlations in the second group, it can be summarized that the visible expression of the correlation strength is 0.925, which indicates the existing strong relationship between the variables and the applied test. The resulting $p = 0.00$ is less than <0.05 , indicating current statistical significance. There was a statistically significant change in both groups. From the presented results, we can see that in first group, who received physiotherapy, the average flexibility in the bending direction increased by 1.7 ± 0.6 centimetres, and in the second group, who received dance and movement therapy, by 2.4 ± 0.4 centimetres. From these data, we can assume that a greater change in the mean of the flexion direction between groups was observed in the second group (Fig. 3).

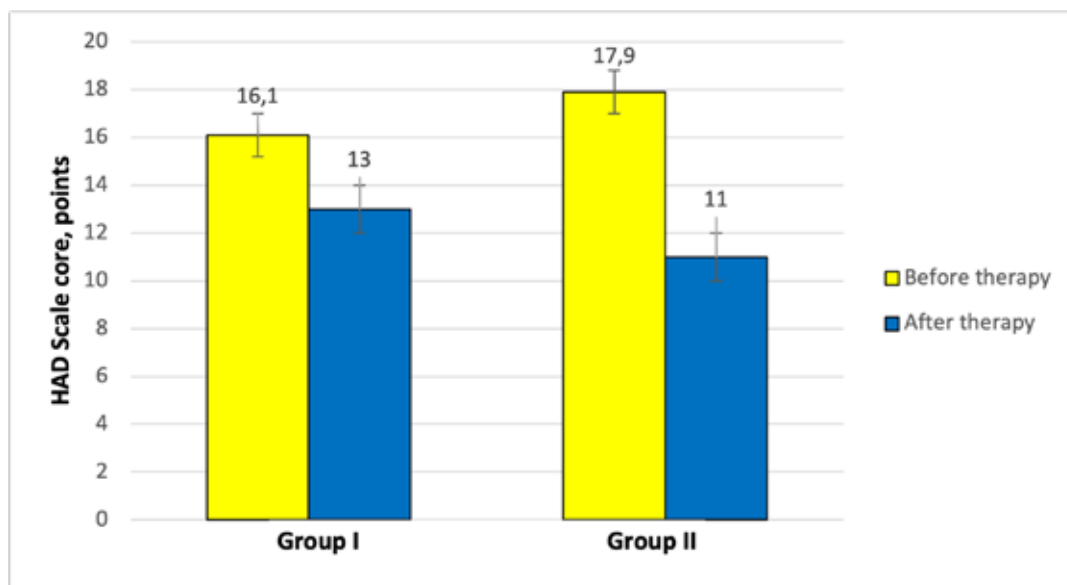


Figure 1. Changes in the HAD scale between group I subjects treated with physiotherapy and group II subjects treated with dance and movement therapy. Statistical significance * $p < 0.05$

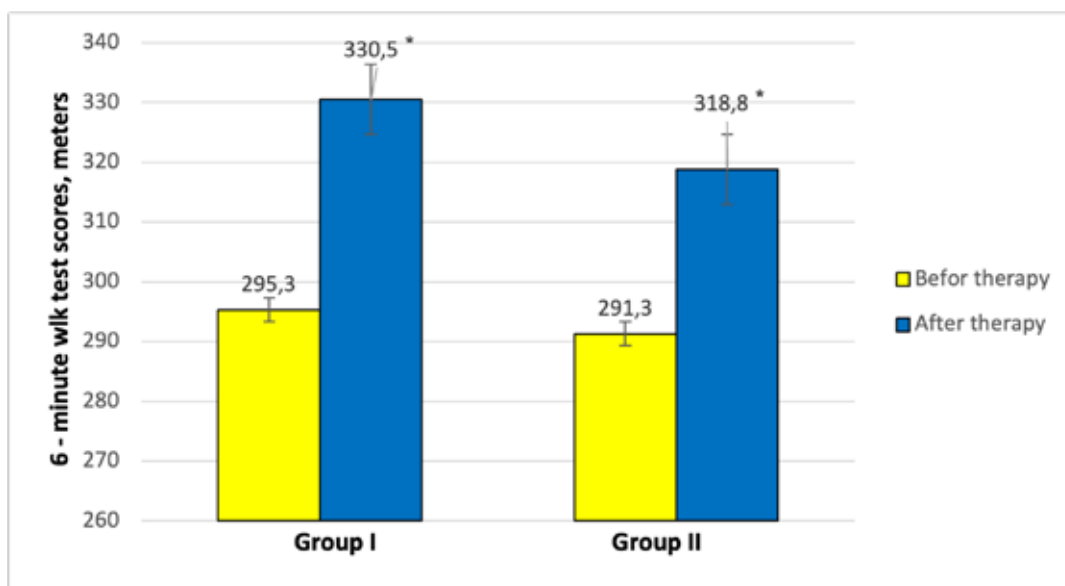


Figure 2. Changes in 6 – minute walk test scores in group I treated with physiotherapy and in group II subjects treated with dance and movement therapy. Statistical significance * $p < 0.05$

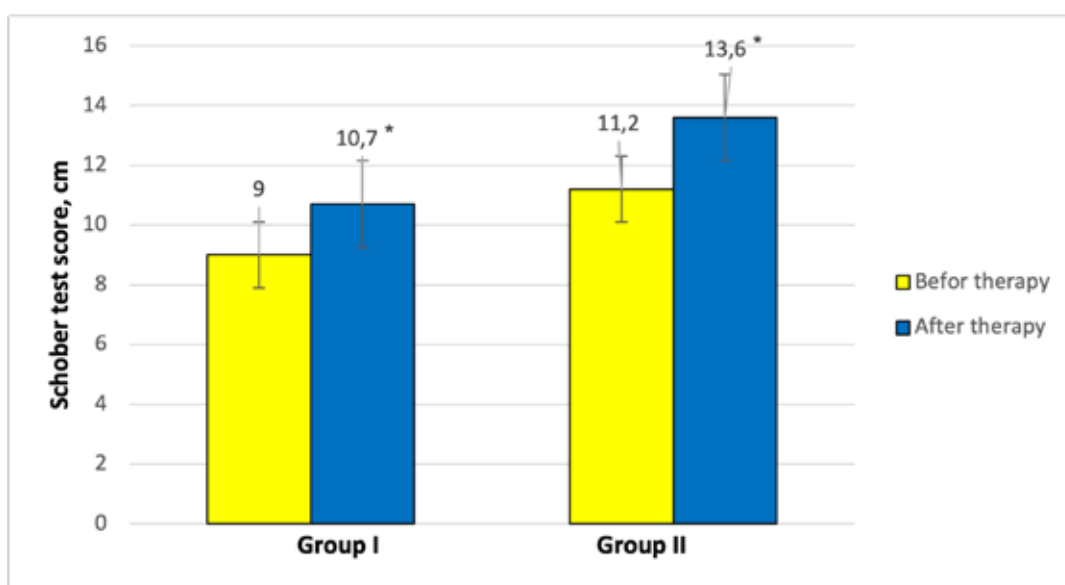


Figure 3. Changes in mean estimates of Schober sample in the direction of bending in groups I (subjects treated with physiotherapy) and in group II (subjects treated with dance and movement therapy) before and after therapy. Statistical significance * $p < 0.05$.

Discussion

Our study showed that dance and movement therapy significantly improved subjects' psycho-emotional state, physical capacity, and flexibility. A slow bachata dance was chosen for the study. Many authors choose different dance styles used in dance and movement therapy and different dance methodologies: bachata [19], slow dance [20], graceful dance [21], salsa [22] and freestyle dance [23]. Dance is part of a socio-psycho-emotional physical activity program created by Ilse Tutt in Germany in 1974 [24]. It has emerged among therapeutic resources as a preventive strategy to improve quality of life, increase physical activity,

and psycho-emotional status. Dancing in different countries is based on different cultures, aspects of music, a game specifically tailored to the capabilities and needs of individuals. Dance can be performed while standing, choosing a fast or slow pace, increasing flexibility, amplitude of joint movements, and agility [25]. Dance therapy has a direct meaning in life. It is defined as integration, development, and existential renovation focused on the expression and exploration of physical and psycho-emotional possibilities brought about by music and dance through group bodily communication exercises and integrative experiences [26]. Graceful dance, characterized by the complexity of fun and

relaxing dance exercises, is especially popular with younger people. For this dance mode it is characteristic that it can be done separately [22]. Dance therapy, according to the American Dance Therapy Association is the psychotherapeutic use of movement and dance to support intellectual, emotional, and motor functions of the body. As a modality of the creative arts therapies, dance and movement therapy looks at the correlation between movement and emotion [27]. This means that dance therapy is multifaceted and affects the physical and mental realms [28]. Given the conceptualizations of each dance nomenclature/methodology presented, it is understood that they must all be influenced by the development of physical performance, psycho-emotional, and social aspects during dance.

Kattenstroth et al. found that cardiovascular and respiratory system indicators did not show changes with dance intervention. It should be noted that the protocol adopted by the authors was used once a week [22]. According to Matsudo et al., physical activity is sufficient to describe an individual as physically active, requiring at least 150 minutes per week of at least moderate-intensity physical activity [29]. In contrast, the authors demonstrated significant attention and response time for physical-motor, tactile, and postural parameters and cognitive-sensory parameters involving intelligence.

Our study showed an improvement in the physical ability of the subjects. Similarly, Berbel and Silva found that dancing had a positive effect on mobility, strength, and human coordination [19]. Complementing this idea, Mierzwa et al. showed a significant improvement in spinal rotation and body weight transfer strategies during ankle movements [23]. In addition, the study by Oliveira et al. participants introduced greater physical mood and enjoyment by performing movements and reported less fatigue and greater energy, always requiring more time to train. This study found an improvement in laterality, spatial orientation, and body perception, an improvement in psycho-emotional state [20]. Also, in our study, the psycho-emotional state improved significantly in the dance and movement therapy group. According to D'Alencar et al. reports revealed an increase in physical capacity and a feeling that you are still "strong," as well as a decrease in complaints and an improvement in psycho-emotional status. In addition, D'Alencar et al. noted that physical progress was associated with strong motivation to become more active [21]. Berbel and Silva observed that the decline decreased as balance and skills emerged in a change in situation, as well as improved stability [19]. The results of a Mierzwa et al. study showed a significant improvement in equilibrium skills and stability thresholds, which correlate with a strong reduction in fall risk [23]. In the same sense, Kattenstroth et al. found an improvement in posture

and an improvement in balance [22].

We also found in our study that there was a significant improvement in patient flexibility. Therefore, good evidence of equilibrium, stability, and reduced risk of falling was observed in the studies analyzed, which have a positive effect on the results, considering the individual condition of each individual. As a larger number of studies confirm that dance and movement therapy can provide different benefits for physiological and psychosocial functioning in people under stress, appropriate therapy programs need to be defined in terms of appropriate session structure, intervention topic, technique, tools, and tactics. Levine et al. conducted a semi-structured study and examined key elements of therapy related to patient individuality [30]. The study concludes that each session should start with a warm-up, followed by a main part based on the movement theme expressed during the warm – up, and end with an oral therapy to help explain in more detail how the patients felt during the dance and movement therapy. A dance movement therapy guide should include music, dance, and communication so that patients can master the process of movement and exercises by seeing themselves in a mirror, including breathing. Empowerment, confidence, and self-care were also selected as important aspects of dance movement therapy that should be developed in the program. The end of the session focuses on the discussion of feelings experienced, the connections between sensations, insights, and change during therapy. After analyzing the results of the research and comparing them with other authors, we can state that dance and movement therapy has all the benefits for individuals' physical capacity, flexibility and psycho-emotional state.

Conclusions

1. After evaluating the results of the study groups after physiotherapy and dance and movement therapy, it was found that the psycho-emotional state according to the HAD scale improved statistically significantly in both groups ($p < 0.05$).
2. After evaluating the results of the study groups after physiotherapy and dance and movement therapy, it was found that the physical capacity according to the 6 – minute walk test improved statistically significantly in both groups ($p < 0.05$).
3. After evaluating the results of the study groups after physiotherapy and dance and movement therapy, it was found that the flexibility according to the Schober sample in the bending direction improved statistically significantly ($p < 0.05$), and in the construction direction it was not statistically significant.
4. Dance movement therapy has a positive

effect on psycho-emotional state, flexibility and physical ability of people experiencing constant stress. As observed, dance and movement therapy have a positive effect not only on flexibility or physical ability, but also on psycho-emotional state.

Practical Recommendations

Dance and movement therapy can be easily applied among different age population. Because of severe pandemic situation all over the world the applied physiotherapy methods must be complexed, creative, adaptive and flexible. Such physiotherapy method can be used not just for older people but different researches are showing that movement and complex physiotherapy is essential for a person psychological state, physical and emotional health. The essential need for person is to be able

independent and to have ability to walk. All this makes physiotherapy a highly essential tool to improve person's well-being and quality of life.

Limitations

The main limitation of the study is that men were not included in the study, so the study was conducted only with women. One man participated in only one session, after which the study was discontinued due to discomfort among women. It would be useful to have a study with both genders.

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Conflict of interest

The authors declare no conflict of interest.

References

1. Song YG, Ryu YU, Im SJ, Lee YS, Park JH. Effects of dance – based movement therapy on balance, gait, and psychological functions in severe cerebellar ataxia: A case study. *Physiotherapy Theory and Practice*, 2019;35(8):756–763. <https://doi.org/10.1080/09593985.2018.1457119>
2. Zhang Q, Hu J, Wei L, Jia Y, Jin Y. Effects of dance therapy on cognitive and mood symptoms in people with Parkinson's disease: A systematic review and meta – analysis. *Complementary Therapies in Clinical Practice*, 2019; 36:12–17. <https://doi.org/10.1016/j.ctcp.2019.04.005>
3. Müller Pinget S, Golay A. To improve body image with dance therapy. *Revue medicale suisse*. *Northoff*, 2019;15(643):640–642. <https://doi.org/10.53738/REVMED.2019.15.643.0640>
4. Cesar A. Arango-Dávila and Hernán G. Rincón-Hoyos. Depressive disorder, anxiety disorder and chronic pain: Multiple manifestations of a common clinical and pathophysiological core. *Revista Colombiana de Psiquiatría*, 2018; 47(1):46–55. <https://doi.org/10.1016/j.rcpeng.2017.12.003>
5. Bogner S, DeFaria AM, O'Dwyer C, Pankiw E, Simic Bogler J, Teixeira S, Nyhof-Young J, Evans C. More than just dancing: experiences of people with Parkinson's disease in a therapeutic dance program. *Disabil Rehabil*. 2017;39(11):1073–1078. <https://doi.org/10.1080/09638288.2016.1175037>
6. Duboleva Ž, Mačiulaitis R. Meno terapija kaip gydymo metodas asmenims, turintiems specialiųjų poreikių (psichikos sutrikimų). [Art therapy as a treatment method for persons with special needs (mental disorders)]. *Sveikatos Mokslo*, 2012;22(4):23–28.
7. Velanovich V. The Effect of Chronic Pain Syndromes and Psychoemotional Disorders on Symptomatic and Quality-of-Life Outcomes of Antireflux Surgery. *Journal of Gastrointestinal Surgery*. 2003;7(1): 53–58. [https://doi.org/10.1016/S1091-255X\(02\)00136-1](https://doi.org/10.1016/S1091-255X(02)00136-1)
8. Domschke K, Stevens S, Pfeleiderer B, Gerlach AL. Interoceptive sensitivity in anxiety and anxiety disorders: An overview and integration of neurobiological findings. *Clinical Psychology Review*, 2010; 1:1–11. <https://doi.org/10.1016/j.cpr.2009.08.008>
9. Cortes-Salim P, Gonzalez-Barron M, Romero-Gutierrez G. Psycho – emotional disorders in women with unplanned pregnancies. *American Journal of Health Research*, 2014; 2(1): 27–32. <https://doi.org/10.11648/j.ajhr.20140201.15>
10. Gazzaniga MS, Ivry RB, Mangun GR. *Cognitive neuroscience: the biology of the mind*. Fourth edition. New York, N.Y: W. W. Norton & Company, Inc; 2014.
11. P. Danilov Y, S. Kublanov V, Ju Retjanskij K, S. Petrenko T, V. Babich M. Non-invasive Multi-channel Neuro-stimulators in Treatment of the Nervous System Disorders: In: *Proceedings of the International Conference on Biomedical Electronics and Devices*. Lisbon, Portugal: SCITEPRESS - Science and Technology Publications; 2015. p. 88–94. <https://doi.org/10.5220/0005200000880094>
12. Bernstein E, McNally R. Acute aerobic exercise helps overcome emotion regulation deficits. *Cognition & Emotion*, 2017;31(4):834–843. <https://doi.org/10.1080/02699931.2016.1168284>
13. Steffen TM, Hacker TA, Mollinger L. Age- and gender-related test performance in community-dwelling elderly people: Six-Minute Walk Test, Berg Balance Scale, Timed Up & Go Test, and gait speeds. *Phys Ther*. 2002 Feb;82(2):128–37. <https://doi.org/10.1093/ptj/82.2.128>
14. Pocienė M. *Kineziterapijoje taikomi funkciniai testai*. [Functional tests in physiotherapy]. Leidykla: Vitae Litera; 2013. (In Lithuanian).
15. Magee DJ, Manske RC. *Orthopedic physical assessment*. 7th ed. Philadelphia: Elsevier, Inc; 2020.
16. Mykletun A, Stordal E, Dahl AA. Hospital Anxiety and Depression (HAD) scale: Factor structure, item analyses and internal consistency in a large population. *British Journal of Psychiatry*, 2001;179(6): 540–544.

- <https://doi.org/10.1192/bjp.179.6.540>
17. Fisk JD, Ritvo PG, Ross L, Haase DA, Marrie TJ, Schlech WF. Measuring the Functional Impact of Fatigue: Initial Validation of the Fatigue Impact Scale. *Clinical Infectious Diseases*. 1994;18(Supplement 1): S79–S83. https://doi.org/10.1093/clinids/18.Supplement_1.S79
 18. Delgado DA, Lambert BS, Boutris N, McCulloch PC, Robbins AB, Moreno MR, et al. Validation of Digital Visual Analog Scale Pain Scoring With a Traditional Paper-based Visual Analog Scale in Adults. *JAAOS: Global Research and Reviews*. 2018;2(3): e088. <https://doi.org/10.5435/JAAOSGlobal-D-17-00088>
 19. Silva AFG da, Berbel AM. O benefício da dança sênior em relação ao equilíbrio e às atividades de vida diárias no idoso [The benefit of senior dance in relation to balance and daily life activities in the elderly]. *ABCS Health Sciences*. 2015;40(1). (In Portuguese). <https://doi.org/10.7322/abcshs.v40i1.698>
 20. Oliveira, LC, Pivoto EA, Vianna PCP. Análise dos resultados de qualidade de vida em idosos praticantes de dança sênior através do SF-36. [Analysis of quality of life results by using the SF-36 among elderly persons practicing senior dance]. *Acta Fisiátrica*, 2009;16(3):101–104. <https://doi.org/10.11606/issn.2317-0190.v16i3a103184>
 21. D'Alencar BP, Mendes MMR, Jorge MSB, Guimarães JMX. Biodança como processo de renovação existencial do idoso. [Biodance as an existential renovation process of the elderly: an ethnographic analysis]. *Revista Brasileira de Enfermagem*, 2008; 61(5): 608–614. (In Portuguese). <https://doi.org/10.1590/S0034-71672008000500013>
 22. Kattenstroth JC, Kalisch T, Holt S, Tegenthoff M, Dinse HR. Six months of dance intervention enhances postural, sensorimotor, and cognitive performance in elderly without affecting cardio-respiratory functions. *Frontiers in Aging Neuroscience*. 2013;5. <https://doi.org/10.3389/fnagi.2013.00005>
 23. Mierzwa K, Długosz M, Marchewka A, Dąbrowski D, Poznańska A. The effect of dance therapy on the balance of women over 60 years of age: The influence of dance therapy for the elderly, *Journal of Women & Aging*, 2017;29(4): 348–355. <https://doi.org/10.1080/08952841.2016.1194689>
 24. Santos DPMA, Queiroz AC de CM, Menezes RL, Bachion MM. Effectiveness of senior dance in the health of adults and elderly people: An integrative literature review. *Geriatric Nursing*. 2020;41(5): 589–599. <https://doi.org/10.1016/j.gerinurse.2020.03.013>
 25. Carvalho P. Avaliação da qualidade de vida antes e após terapia com dança sênior em pacientes hemiparéticos pós – AVE. [Evaluation of quality of life of post-stroke hemiparetic patients before and after dance therapy for seniors]. *ConScientiae Saúde*, 2012;11(4):573–579. (In Portuguese). <https://doi.org/10.5585/conssaude.v11n4.3284>
 26. Toro R. *Coletânea de textos de Biodanza* [Collection of Biodanza texts]. Fortaleza, Ceará (Brasil). ALAB; 1991. (In Portuguese).
 27. American Dance Therapy Association (ADTA). *What Is Dance/Movement Therapy? ADTA defines dance/movement therapy as the psychotherapeutic use of movement to promote emotional, social, cognitive and physical integration of the individual* [Internet]; 2022 [cited 2012 Oct 01]. Available from: <https://www.adta.org/>
 28. Kozłowski T.T. Physiological ecology of natural regeneration of harvested and disturbed forest stands: Implications for forest management. *Forest Ecology and Management*. 2002; 158: 195–221. [https://doi.org/10.1016/S0378-1127\(00\)00712-X](https://doi.org/10.1016/S0378-1127(00)00712-X)
 29. Matsudo, Sandra Mahecha; Matsudo, Victor Keihan Rodrigues; Barros Neto, Turíbio Leite. Atividade física e envelhecimento: aspectos epidemiológicos. [Physical activity and aging: epidemiological aspects]. *Revista Brasileira de Medicina do Esporte*, 2001; 7: 2–13. (In Portuguese). <https://doi.org/10.1590/S1517-86922001000100002>
 30. Levine B, Land HM. A Meta-Synthesis of Qualitative Findings About Dance/Movement Therapy for Individuals with Trauma. *Qualitative Health Research*. 2016;26(3):330–344. <https://doi.org/10.1177/1049732315589920>

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