

REHABILITATION

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Attempts to assess the impact of Taiji Quan and Qigong exercises on emotional states

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Short abstract

Stress is an inseparable part of life. Its potentially negative impact can be reduced by using various relaxation techniques. Exercise systems derived from Eastern martial arts systems are increasingly used for relaxation. Taiji Quan is a crystallization of Chinese knowledge and experience in the field of human bodily health. All over the world millions of people devote themselves to this system of exercise for a variety of health reasons. These exercises are also successfully used in rehabilitation clinics. Taiji Quan is also increasingly becoming the subject of scientific research in many countries. This publication is an overview of scientific research contained in online databases and the authors' research into the importance of the impact of Taiji Quan & Qigong forms on people's psycho-emotional state. The aim of this paper is to analyze the potential impact of the Taiji Quan and Qigong system of techniques on the regulation of emotional state, based on instrumental, survey and theoretical research contained in the available literature on the subject.

Extended abstract

Problem and Aim. The main topic of modern psychology, as well as psychopathology, becomes the possibility of influencing the regulation of emotions in such a way that they are not dysfunctional for the human being and, on the other hand, that they retain their informative and adaptive aspect. Understanding the basics of the mechanisms of emotional regulation at an early stage of their occurrence, or experiencing them in a way that does not knock the body out of the broadly understood balance, becomes one of the main tasks.

Methods. The review, retrospective collective analysis of the results of many studies (randomized non-randomized, observational, psychological and complex studies) contained in several Internet databases (Scopus, Science Direct, KlinkalKey, Web of Science) was undertaken to synthesize them and conducted to 2020. The data were extracted and verified by two reviewers. The terms used for the review are “Tai Chi”, “Chi Kung”, “Taiji Quan”, “Qigong”, “Tai Chi Chuan”, “Ta'i chi”, “tai ji”, “Tai Ji Quan”, and “taijiquan”. 65 scientific articles related to the research topic have been included. The statistical analysis was performed with the Statistica 13.1 software by StatSoft. The analysis used the Lilliefors test to assess the normality of the distributions of the obtained results. In this way, an attempt was made to determine whether the frequency of research into a given area was higher or lower than in other areas. The level of statistical significance was considered to be $p < 0.05$.

Results. The practice of Taji Quan and Qigong forms is associated with the improvement in the quality of psychosocial life and mental well-being, including the reduction in stress, anxiety, depression, mood and sleep disorders. The final conclusions from the analyses of the available studies are limited due to differences in research construction affecting the comparative sphere. Further randomized studies are needed to obtain additional clinical information.

The strengths of the review were a comprehensive literature search and data quality assessment. The limitation came from the fact that qualitative data synthesis was often based on the statistical significance of results in studies with small sample sizes.

Conclusions. Taiji Quan and Qigong exercises have a potential impact on the ability of healthy people to relax; They have an impact on the activation of positive mental states of people exercising; They have an impact on the reduction of everyday stress, they can be performed regardless of age, fitness level or health condition. For healthy people, they will be preventive exercises, and for peo-

ple with ailments, effective therapy. It is worth spreading this kind of exercises as a good system, useful in the process of prevention of lifestyle diseases. The clinical significance of Taiji & Qigong exercises in terms of size and long-term sustainability of its results should be tested in future studies with larger samples. Future systematic reviews should be carried out by properly reporting methodological details and following the guidelines for carrying out such reviews.

Introduction

The main topic of modern psychology, as well as psychopathology, becomes the possibility of influencing the regulation of emotions in such a way that they are not dysfunctional for the human being and, on the other hand, that they retain their informative and adaptive aspect. Understanding the basics of the mechanisms of emotional regulation at an early stage of their occurrence, or experiencing them in a way that does not knock the body out of the broadly understood balance, becomes one of the main tasks.

For the first time, the presentation of traditional exercises and meditation techniques took place in the West during a conference entitled The Parliament of World Religion in 1893 in Chicago [Simpkins 2010]. New research methods such as electroencephalography (EEG), PET scans (Position Emission Tomography) or nuclear magnetic resonance imaging (NMR) allowed obtaining more information on the impact of meditation exercises.

According to specialists, the first fully scientific research was conducted in 1931 by Kovoov Behanan, a graduate in psychology from Yale University. He studied the influence of breathing techniques on the amount of oxygen consumed by the body. He proved that there are significant differences between people practicing relaxation techniques and those not practicing. Another scientist studying meditation techniques was Brosse, a French cardiologist, who performed electrocardiographic examinations in India of people claiming to be able to stop the heartbeat. Brosse discovered that in the examined people the electrical potential generated by the heart and heart rate was close to zero and remained very low for several seconds [Brosse 1946; Simpkins 2010]. Later studies also carried out with the use of electroencephalograms confirmed that those who perform meditation techniques (compared to those who do not perform exercises) have increased beta activity, relaxation and attention [Bhatia *et al.* 2003; Snyder, Wills 1989]. At the same time, it was shown that while performing meditation techniques, the coherence of brain waves increases both between two hemispheres and within each hemisphere of the brain. The increase in the value of the coherence coefficient is characteristic for synchronization of brain waves in larger areas of the brain (at its high value a much larger area of the brain is used, which indicates increased attention). Interestingly, the high value of this coefficient continued after the completion of exercises [Badawi *et al.* 1984].

Nowadays, great interest in the theory and practice of Chinese prophylactic and therapeutic techniques among

the societies of Western European countries, for which stress becomes an inseparable part of life, results, among other things, from the fact that commonly used forms of physical activity (jogging, stretching, aerobics, callanetics) have become impossible to be performed systematically in adulthood and old age and even caused iatrogenic damage to the locomotor apparatus, without any relaxation effect. For this reason, there was an interest in less harmful exercises, available regardless of age, gender or health condition. Such a form of movement is Taiji Quan and Qigong exercises, which are part of TCM (Traditional Chinese Medicine), focused, among other things, on improving the flow of Chi/Qi energy in the patient's body. Due to the potential therapeutic impact of Taiji Quan exercises, they have been identified as one of the alternative treatments to meet the growing demand for non-pharmacological ways to achieve bio-psychosocial health for people suffering from anxiety, stress and neurosis [Pop, Wlodyka 2012].

Research on Taiji Quan and Qigong shows that systematic performance of these exercises has a positive and comprehensive effect on both mental and physical health. Leung and Singhal [2004] conducted the study using the Eysenck Personality Questionnaire (EPI) to compare eighty people practicing these exercise techniques with seventy-four non-experienced people. The research showed that people who practiced these exercises had much fewer neurotic characteristics than people who did not practice them.

Taiji Quan is increasingly becoming a subject of scientific research in various countries [Leung, Singhal 2004; Maciaszek *et al.* 2006; Sufinowicz *et al.* 2006; Wang *et al.* 2010; Maciaszek, Osinski 2012; Cynarski, Sieber 2015; Raimondo, Lunardini 2019]. Adverse brain structural changes that occur with age, especially grey matter atrophy, are inevitable in the aging process. Fortunately, the human brain is malleable throughout life. A cross-sectional study by Sijia Liu *et al.* [2019] shows that long-term Taiji Quan exercises can play a protective role, slow down the disappearance of the grey matter in the brain and improve emotional stability for successful ageing of the elderly.

The aim of the study was to analyze the available literature on the impact of Taiji Quan and Qigong exercises on the emotional state of the subjects.

Method

The review, retrospective collective analysis (systematic review towards a meta-analysis) of the results of many

studies (randomized non-randomized, observational, psychological and complex studies) contained in several Internet databases (Scopus, Science Direct, ClinicalKey, Web of Science) was undertaken to synthesize them and conducted to 2020. The data were extracted and verified by two reviewers. The terms used for the review are “Tai Chi”, “Chi Kung”, “Taiji Quan”, “Qigong”, “Tai Chi Chuan”, “Tai chi”, “tai ji”, “Tai Ji Quan”, and “taijiquan”. 65 scientific articles related to the research topic have been included. The statistical analysis was performed with the Statistica 13.1 software by StatSoft. The analysis used the Lilliefors test to assess the normality of the distributions of the obtained results. In this way, an attempt was made to determine whether the frequency of research in a given area was higher or lower than in other areas. The level of statistical significance was considered to be $p < 0.05$.

Results

Let us start the review of thematic publications with Reid-Arndt *et al.* [2012]. Its aim was to determine the impact of the 10-week Taiji (TJ) program on the neuropsychological, mental and physical health of women who have undergone cancer. Twenty-three women with cancer history attended 60-minute classes (TJ) twice a week for 10 weeks. Before and after the intervention the participants performed neuropsychological tests (memory, executive functioning, language and attention) and 5 balance tests. In addition, they completed self-descriptive questionnaires on neuropsychological ailments, stress, mood and fatigue. After a 10-week session, participants demonstrated less neuropsychological ailments and better neuropsychological functioning. They also showed better balance and reported better mental well-being.

The aim of subsequent studies [Nedeljkovic *et al.* 2012] was to determine the impact of regular Taiji practice on the psychobiological response to stress in healthy men and women. This is the first randomized study to examine the effects of Taiji Quan on the magnitude of adrenal cortex, autonomic nervous system and psyche responses to normalised and confirmed psychosocial stress induction in healthy beginners of Taiji Quan. Stress-induced characteristic physiological changes in Taiji practitioners compared to the control group showed significantly lower cortisol reactivity to stress ($p = 0.028$), heart rate ($p = 0.028$) and lower levels of α -amylase ($p = 0.049$). They reported a lower increase in perceived stress ($p = 0.006$) and maintained a higher level of calm ($p = 0.019$) in response to psychosocial stress.

Sleep disorders are potentially related to the activation of systemic and cellular inflammation, as well as to pro-inflammatory transcription profiles in circulating leukocytes. The study (Irwin *et al.*, 2015) analyzed whether treatment targeted at insomnia-related complaints may reverse the values of inflammatory markers

in adults with insomnia. In this randomized study, 123 adults with insomnia were randomly assigned to cognitive-behavioral therapy for insomnia (CBT-I) and Tai Chi Chuan (TCC) exercises during 2-hour sessions per week for 4 months with observations after 7 and 16 months. In the CBT-I cognitive-behavioral therapy group, decreased the CRP levels (months 4 and 16, $p < .05$), proinflammatory cytokine monocytes production (only month 2, $p < .05$ only) and proinflammatory gene expression (month 4, $p < .01$). On the other hand, in the Tai Chi (TCC) group there was a slight decrease in CRP (month 4, $p = 0.06$), a significant decrease in the production of proinflammatory cytokine monocytes (months 2, 4, 7 and 16; all $p < .05$) and proinflammatory gene expression (month 4, $p < .001$). In CBT-I and TCC studies bioinformatic analyses based on TELiS promoter showed reduced activity of nuclear factor κ B and AP-1.

Meditation and relaxation exercises influence the centers responsible for emotions. Studies by Brown and Ryan found that people who regularly exercise can better manage their behavior and positive emotional states [Brown, Ryan 2003; Brown, Ryan 2005]. Taiji is not only physical exercise, but above all relaxation, maintaining a specific kind of mind concentration. This is also confirmed by other publications [Li *et al.* 2003; Yalden, Chung 2001], which makes it known as meditation in motion [Hendlin 1978].

The results of recent years' research have proved the effectiveness of Taiji Quan and Qigong exercises. In an 18-week experiment aimed at both subjective and objective clinical evaluation of the positive impact of Yang-style Taiji exercises in young beginners [Esch *et al.* 2007] blood pressure, heart rate, cortisol levels in saliva as well as subjective evaluation with the SF-36 questionnaire were measured. Significantly, it showed a reduction in salivary cortisol, which appears to be an indicator of overall stress reduction. Similar results were obtained in the research by Tang examining a group of eighty students [Tang *et al.* 2007]. The results were analogous to those for using medicines.

Through Taiji Quan's practice, the mind remains alert but at the same time calm. Exercised movement sequences give focus by directing concentration to the inside. This active type of concentration is an integral part of the practice [Lee 2002]. It was found that if the forms in Taiji are performed without concentration, they are no different from other forms of physical activity. This diversity and distinctiveness are ensured by concentration on performing movements [Lee 2002]. As in hatha yoga, the practice of Taiji does not require the adoption of a particular spiritual or philosophical system in order to benefit from therapeutic intervention.

An emotional state can have a major impact on the treatment of the disease. The effects of mental stress can be tricky and affect the functioning of the whole body. With age, it is usually more difficult to cope with stress.

In fact, aging can be described as a progressive decline in the ability to adapt to mental and physical stress. One of the effects of Taiji Quan and Qigong exercises is to free yourself from unnecessary muscle tension resulting from the stress you experience. The muscles are an excellent barometer of mental state (excessive emotional stimulation always leads to increased muscle tension) [Hazlett *et al.* 1994; Hoehn-Saric *et al.* 1997].

In turn, Jacobson in his work: *The effect of T'ai Chi Chuan training on balance, kinesthetic sense, and strength* [Jacobson *et al.* 1997], claims that mental tension increases through deep sensory stimuli under conditions of high musculoskeletal tension, contributing to distress and anxiety. If this is true, learning to release excessive muscle tension through Taiji Quan and Qigong would have a soothing effect on the psyche and reduce psychophysical arousal. Moreover, the possibility of observing the emergence of autonomic stimulation and reversal of this process allows the individual to return to a state of equilibrium more quickly, thus reducing mental stress leading to disease or blocking recovery processes [Everly, Rosenfeld 1981].

Breathing is the bridge between mind and body. When we are stimulated, breathing becomes faster, when we are relaxed we breathe more slowly and the mind calms down. Scientific studies on breathing indicate that it is, in a way, a tool for achieving and increasing emotional balance. The breathing technique in Taiji Quan or Qigong exercises means that the sympathetic nervous system is not stimulated and the chest breathing is efficient. It is widely recognized that diaphragmatic breathing calms mentally and physically [Everly, Rosenfeld 1981; Chaitow *et al.* 2002; Kabat-Zinn 1990; Yang 1997].

Taiji Quan and Qigong also have a more direct effect on nervous tension / anxiety. They facilitate broadly understood thinking / open mind [Everly, Rosenfeld 1981]. When the mind is focused on the body and breath, while looking for the wrong muscle tone, negative thoughts are less likely to arise and they are easier to remove. This practice of maintaining focus on the body and movement and releasing persistent thoughts is consistent with the definition of the relaxation technique developed by the National Institutes of Health [US National Institutes of Health 1995] and other authorities in the field of relaxation techniques [Benson 1975; Kabat-Zinn 1990]. Taiji has been proved to cause key aspects of the relaxing effect. Jin [1989] in his work *Changes in heart rate, noradrenaline, cortisol and mood during Tai Chi* indicated a decrease in salivary cortisone and a drop in anxiety after Tai Chi exercises (n=66). In other work: *Efficacy of Tai Chi, brisk walking, meditation, and reading in reducing mental and emotional stress*, the same author [Jin 1992] examined the effectiveness of Taiji in overcoming stress (n=96). It turned out that in reducing anxiety, Taiji gives better results in comparison to control group, who was reading a neutral text. In turn,

Brown and co-workers [1995] compared the psychological effects of 16 weeks of Taiji training with a walk combined with relaxation technique instructions. While men and women were included in the study, only women in the Taiji group experienced a significant reduction in mood disorders, including tension, depression, anger, confusion, and total mood disturbance, and their overall mood improved.

Another researcher, Wang, along with his co-workers, compared 10 regular Tai Chi Chuan practitioners with 10 people who lead a sedentary lifestyle (they did graded exercises on a rehabilitation bike) [Wang *et al.* 2002]. Blood flow to the skin, skin vascular conductivity, skin temperature at rest and during exercise were measured. Plasma nitric oxide levels before and after exercise were also analyzed. Blood flow to the skin, skin vascular conductivity, skin temperature and plasma nitric oxide levels were higher in Taiji practitioners, both at rest and during exercise.

Taiji Quan and Qigong can create an irritating effect if they are taught badly. Physiological tranquility cannot be achieved if the details of the movement learning methodology are overwhelming and learning takes place in an atmosphere of self-centricity and competition. Also, if you over-emphasize muscle relaxation and do not pay attention to proper posture and movement patterns, the potential to improve balance, strength, or functioning of the body may be lost. Practicing Taijiquan and Qigong is associated with the philosophy of the East. The happy tranquility that characterizes this philosophy of meditation in motion can affect older people. Acting in harmony with what life brings, a person can change a negative attitude to a positive sense of optimism. According to this view, fear is generated by a "disturbing, ungrateful, deceptive mind" [Hoff 1982]. Philosophical Taoism suggests that it is possible to avoid fears and emotions that exhaust the body [Henricks, Lao-Tzu 1989]. This view is in line with the approach of modern cognitive-behavioral therapy in treating anxiety. Taoisans are known for their long and healthy lives, and Tai Chi masters have a reputation as powerful opponents of old age. Rather than giving in to weakness, these aged masters improve their skills and their understanding of the art deepens. This tradition gives older people an optimistic view of aging, which in itself can improve the functioning and mobility of older people [Hausdorff *et al.* 1999]. Finally, Taiji is an appropriate way to reduce fears and all its potential adverse effects on older people, including the fear of falling, as it has a direct impact on maintaining a balanced posture. Wolf and his colleagues in the study *Reducing frailty and falls in older persons: an investigation of Tai Chi and computerized balance training* [Wolf *et al.* 1996] indicated a significant reduction in fear of falling after 15 weeks of practicing Taiji Quan and Qigong. Because strong fear of falling probably impairs balance and gait [*cf.* Adkin *et al.* 2002; Brown *et al.* 2002], this

in turn can cause even greater fear of falling. Action directed at these two aspects can have a profound synergistic effect on mobility, peace of mind and quality of life for older people.

It is worth mentioning here the epidemiological study on depression concerning Taiji Quan exercises conducted in the USA. These studies have shown that more than 2 million people over the age of 65 suffer from depression-related symptoms, of which 50 per cent live in nursing homes. The proportion of suicides committed by men over 85 years old is six times higher than the population. The populations of highly developed countries are aging at a dizzying rate. Over the next 35 years, the number of Americans over 65 will double and over 85 will triple. For this reason, scientists from UCLA (University of California – Los Angeles) have directed their research towards methods to treat depression. The research included Taiji Quan, Qigong exercises. The study involved 112 patients over 60 years of age with severe depression and treated with escitalopram, a selective serotonin reuptake inhibitor for about 4 weeks. Out of this group, 73 people who felt improvement due to the pharmacology used were randomized to the group that was practicing Taiji and to the group that had 2 hours of health education classes per week for 10 weeks. All subjects were evaluated taking into account the level of depression, anxiety, quality of life as well as cognitive abilities and immune system responses. The evaluation was carried out twice, at the beginning of the study and repeated after 4 months. Based on the Hamilton Depression Scale, the level of depression was assessed, according to which 10/11 corresponds to the diagnosis of the disease. It was shown that 94% of Taiji practitioners reached a value < 10 and 65% a value less than or equal to 6, which corresponds to remission. Compared to the group that had received health education, 77% achieved a value < 10, and 51% experienced remission of symptoms. Although both groups showed improvement in the reduction of depression, a greater reduction was observed among those taking escitalopram and participating in Taiji exercises, which proved to be most appropriate in form and accessibility for older people. The study showed that the body and mind exercises included in Taiji are effective in helping to treat depression. The researchers' plan is to apply a gradual reduction in pharmacotherapy in favour of Tai Chi exercises [Lavretsky *et al.* 2011].

An extremely important publication which is a review of the influence of Taiji Quan and Qigong exercises on the mental state of a person is: *Tai Chiton psychological well-being: systematic review and meta-analysis* [Wang *et al.* 2010]. The authors analyzed the quantitative effects of Taiji exercises on the improvement of mental state (anxiety, depression, fatigue, insomnia) on populations of people of the East and the West. Based on 8 English and 3 Chinese databases, randomized and non-rand-

omized studies and case studies were analyzed in March 2009. The analysis of these studies (clinical trials and observational studies) shows that performing Taiji exercises proves to be beneficial especially in patients with chronic emotional ailments and for mental health promotion. Particularly in 23 out of 33 RCTs (randomized) and NRS (non-randomized) studies, it was shown that regular exercise up to 1 year significantly reduced anxiety, depression and improved the mood of healthy adults and patients with chronic disorders. Analyses were performed in different subgroups concerning e.g. insomnia, fatigue, stress, depression. For example, in the subgroup concerning depression, 9 RCTs and 4 NRSs were analyzed in 634 people. The effect of Taiji exercises on depression was demonstrated in adults, healthy people, people with RA, muscular pains, cardiovascular diseases and in obese people. The analysis of this subgroup showed that these individuals performed exercises from 6 to 48 weeks from 40 minutes to 2 hours per day, 1 to 4 times a week. Taiji practices in these cases had a significant impact on a significant improvement in well-being and reduction of the effects of depression (ES, 0.56;95% CI, 0.31 to 0.80) with $I^2 = 62\%$.

It should be noted, however, that there may be some inaccuracies in these cases concerning the comparative sphere of research as they were developed over a different period of time. Most of them were published in China, Hong Kong and Taiwan, which may indicate the potential existence of methodological differences between the East and the West.

In another study, Jin [1989] made one of the first analyses of the influence of Taiji styles of Yang and Wu on the endocrine system. He studied and compared psychological and physiological changes on a group of 33 beginners (exercising ≤ 8 months) and 33 Taiji practitioners for more than one year. Hormone level tests were performed in the morning, at noon, and in the evening during and after exercise. They showed that Tai Chi practice increased heart rate, increased nor-epinephrine excretion in urine, and decreased cortisol concentration in saliva. It also showed a relative reduction of tension, depression, anger, fatigue, and anxiety.

Jay M. Griffith and his research team in the publication *Qigong Stress Reduction in Hospital Staff* [Griffith *et al.* 2008] presents the results of research on the effectiveness of Qigong exercises as part of the hospital staff training program in stress reduction. The study group underwent Qigong exercises for 6 weeks. Examination, analysis and perception of stress were observed based on the PSS-10 scale (Perceived Stress Scale). In addition, the same group was included in the study based on the SF-36 (Short Form 36) quality of life questionnaire and the size of the pain changes was determined according to the VAS scale (Visual Analogue Scale). In the group exercising Qigong, statistically significant reduction of perceived stress was demonstrated compared to the

control group ($p = 0.02$). Based on the analysis of the SF-36 questionnaire results, it was found that the Qigong group showed greater improvement compared to the control group ($p = 0.04$). As part of the analysis, Qigong exercisers ($p = 0.03$) showed a significant reduction in pain intensity. Regression analysis showed a relationship between the level of stress and the exercises performed in the studied groups. The improvement in this sphere was higher in the Qigong group ($R^2 = 0.34$, $p = 0.02$) compared to the control group. These results indicate that even exercises performed for a relatively short time effectively reduced the stress of hospital staff. They also had a positive effect on reducing pain and improving the quality of life [Li *et al.* 2014].

Table 1. Number of studies and number of participants with regard to the studied population.

population under study	number of studies	number of participants
elderly people	4	5031
women	2	109
people with mental disorders	4	276
people with somatic disorders	1	1209
general population	4	9333
<i>p</i>	$p > 0.020$	

p-test probability level for the Lilliefors test

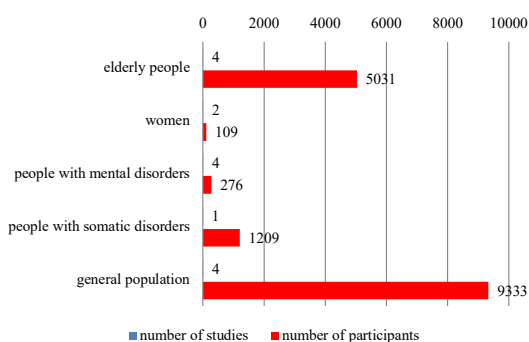


Fig. 1. Number of studies and number of participants with regard to the studied population.

In discussing the positive effects of Taiji Quan and Qigong exercises, attention should be paid to subsequent studies [Hertenstein *et al.* 2011; Hannaford 1998; Kerr *et al.* 2008] regarding Taiji Quan and Qigong, related to the issue of brain plasticity. The scientific discovery of new paradigms in rehabilitation has allowed for a better understanding of the basic mechanisms underlying cerebral plasticity. The study is constituting the first step towards the assessment of Taiji Quan and Qigong in this regard that despite the lack of direct tactile stimulus exercises, they increase tactile sensitivity in people practicing Taiji for a longer period. The rationale for this study comes from the fact that, unlike other thera-

peutic paradigms, Taiji Quan and Qigong practitioners focus “specific mental attention” on the extremities of the body, including the hands (e.g. *lao gong* points – the palm) while performing exercises. It is no longer disputed that the basic connection patterns in the nervous system are formed during the developmental period based on the genetic program, but the neural network circuits are plastic and lifelong modifiable. These plasticity effects are the basis for the repair and compensation of damage at all levels of the human CNS [Kossut 2009; Kwolek 2013].

Table 2. Number of studies and number of participants with regard to the frequency of activities.

frequency of activities	number of tests	number of participants
once a week	2	151
twice a week	4	1393
more than twice a week	3	86
<i>p</i>	$p > 0.20$	

p-test probability level for the Lilliefors test

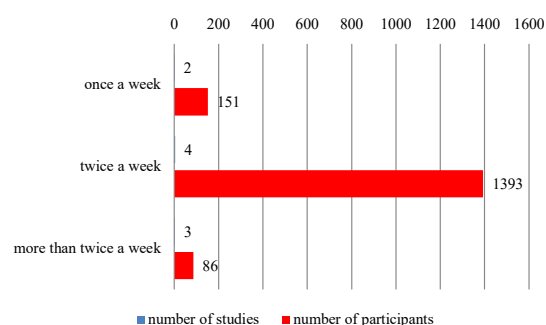


Fig. 2. Number of studies and number of participants with regard to the frequency of activities.

In order to obtain a synthetic publication a collective analysis was made of the number of studies (carried out up to 2020, located in Internet databases: Scopus, Science Direct, KlnicalKey, Web of Science) and the number of participants. No significant differences between the frequency of studies performed on different populations were confirmed ($p > 0.020$). Studies on elderly people, people with mental disorders and the general population were the most frequent. There were four of them. The number of studies conducted only on the group of women was two, while the study conducted in the group of people with somatic disorders was only one. Summing up the individual categories of research, the research samples included at least 109 people (in the case of studies on women) up to 9333 people (in the case of studies concerning the general population). More than one thousand people were included in studies describing the characteristics of older people, people with somatic disorders and the general population (Table 1, Fig. 1).

There were no statistically significant differences between the frequency of studies describing a different

frequency of sports activities ($p > 0.05$). Classes conducted once a week were mentioned in 2 studies with a total number of 151 participants. Classes conducted twice a week were mentioned in 4 studies with a total of 1,393 participants, and classes conducted more than twice a week were mentioned in 3 studies with a total number of 86 participants (Table 2, Fig. 2).

However, the differences between the frequency of research on different subjects proved to be significant ($p < 0.05$). Factors such as stress, motor coordination and motor skills were examined most often, in 4 studies. Vitality (1 study) and sleep disorders (2 studies) were the least frequently examined. Works on mental health appeared in the number of 3. Summarizing the individual categories of research, the research samples included at least 86 participants (in the case of the vitality studies) and up to 9333 (in the case of the stress studies). More than one thousand people were included in studies describing stress, motor coordination and motor skills as well as sleep disorders (Table 3, Fig. 3).

Table 3. Number of studies and number of participants with regard to the type of disease.

disease under study	number of studies	number of participants
stress	4	9333
motor coordination and motor skills	4	5124
vitality	1	86
mental health	3	122
sleep disorders	2	1332
<i>p</i>	$p < 0.05^*$	

p-test probability level for the Lilliefors test

* statistically significant result

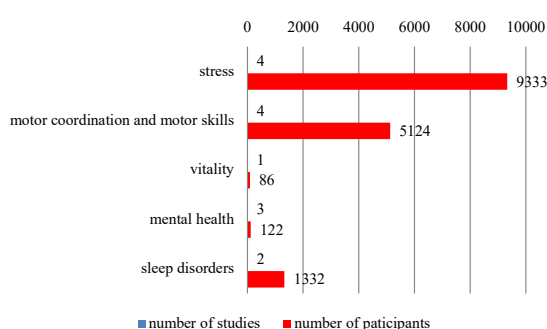


Fig. 3. Number of studies and number of participants with regard to the type of disease.

The principle behind Taiji movement is that the muscles are twisted in one direction and then returned to their natural position, are alternately tensioned and loosened, forcing the simultaneous movement of energy in the transverse channels. In rehabilitation therapy, a similar situation is in a sense present in the PNF movement patterns. External movements stretch, strengthen

muscles, tendons and ligaments, while spiral and circular movements have an impact on the relaxation of internal organs and increase the circulation of internal energy. This forms the basis for the regulation of many body processes including relaxation and emotions [Albuquerque *et al.* 2010].

When discussing the importance of the impact of Taiji Quan and Qigong exercises, we cannot ignore their proven importance for the treatment of PTSD (post-traumatic stress disorder), a problem connected with contemporary battlefield. In the work *Psycho-trauma and effective treatment of post-traumatic stress disorder in soldiers and peacekeepers* the researchers studied the properties and characteristics of therapeutic methods used worldwide to treat PTSD of soldiers who participated in peacekeeping operations and Gulf Wars. Officially, there is psychiatric care for soldiers in the armed forces of all countries, but many of them are hesitant to take up treatment. They prefer to hide their condition for fear of intolerance, stigmatization and loss of job, despite evidence that treatments such as time-limited psychotherapy can achieve lasting improvements in psychosocial functioning and reduce the severity of stress-related mental symptoms. In one of the reports of this publication: Fortunato *et al.* report “little miracles” about the veterans who were treated holistically from May 2008, one third of the 37 soldiers who completed their treatment could successfully return to their units. Even after a severe catatonia. The therapy was run for 35 hours a week. It consisted of daily psychotherapy, group therapy and integrative medicine. Soldiers received lower doses of drugs. Unconventional therapeutic techniques were used, such as Taiji Quan and Qigong, therapeutic massage, yoga. The trial therapy helped the participants to come to terms with their most painful experiences and reduce their emotional involvement [Yitzthum *et al.* 2009]. Another publication on PTSD [Grodin *et al.* 2008]: “Treating Survivors of Torture and Refugee Trauma: A Preliminary Case Series Using Qigong and T’ai Chi” discusses the value of Qigong and T’ai Chi exercises in the practice of therapeutic interventions relating to the treatment of PTSD (post-traumatic stress disorder) of survivors of torture, trauma and refugee stress. An alternative concept of treatment of these injuries supported by the study is presented in this paper. The positive impact of such therapies is based on the scientific literature describing the impact of using Taiji and Qigong to alleviate the effects of these experiences, and the results of research conducted among survivors of torture are presented. Observations of the examined cases gave promising results and indicated new possibilities of approach to solving this type of problems with the use of the above mentioned exercises.

There is a relationship between the human mental condition and sleep disorders resulting from the influence of many factors of modern civilization. The importance

of healthy sleep for efficient human functioning was presented in studies [Kapala 2014]. The results of the conducted research [Fuzhong *et al.* 2004] showed that adults and older people with moderate sleep disorders performing regular Tai Chi exercises for a minimum period of 6 months improved their self-assessment of sleep quality. It has been shown that a methodical program of these exercises conducted at moderate intensity can be an effective, non-pharmacological means of improving sleep for elderly people with sleep disorders.

It should also be objectively noted that the effectiveness of Taiji and Qigong exercises still raises doubts in some aspects due to the results of previous, sometimes controversial studies as well as a limited number of scientifically supported mechanisms of this form of activity. This is also due to the fact that many mechanisms at the current level of knowledge and, at the same time, diagnostic instrumental capabilities cannot be investigated.

Discussion

Research by other authors reveals a broader context of knowledge about the impact of Taiji and Qigong exercises. They revealed, for example, that the GMV (gray matter volume) indicators of the thalamus and hippocampus were greater in the Taiji Quan exercise group compared to the control group. It is noteworthy that thalamus GMV is positively correlated with both meditation levels and emotional stability [Sijia Liu *et al.* 2019]. In another randomized study on the psychophysiological effects of physical exercise and Taiji Quan in patients with chronic schizophrenia [Ho *et al.*, 2016], the results suggest significant psychophysiological benefits, namely in terms of motor and memory coordination [cf. Cynarski, Sieber 2015]. In turn, researchers from the University of Cassino found encouraging results on the impact of Taiji Quan exercises on oncological patients [Raimondo, Lunardini 2019].

The period of human aging is associated with an increase in activation of the sympathetic nervous system, which is associated with problems of hypertension and cardiovascular diseases. The aim of the study by Motivala *et al.* [2006] was to investigate whether the practice of Taiji Quan, a relaxing motor practice, favors decreases in the activity of the sympathetic nervous system in older people. The results showed that Taiji exercises significantly decreased sympathetic activity, indexed according to the period before exercise ($p < 0.01$).

Improving the quality of life of women in the perimenopausal period is now an important global health problem. Research reports confirm the impact of Taiji exercise on the quality of life, but not all reviews consider it to be the main factor affecting women's quality of life in this period. The study [Wang *et al.* 2017] aimed to assess the clinical evidence of Taiji Quan's impact on

women's quality of life in the perimenopausal period. This systematic review confirmed the significant impact of exercise on women's overall health, vitality, social functions, and emotional health during this period of life. Discoveries suggest that Taiji can be recommended as an effective and safe complementary treatment for patients with perimenopausal syndrome.

Scientific research shows that regular use of meditation exercises has an impact on brain function. During the exercises, certain paths of reaction are weakened and the paths that do not function adequately are stimulated. Such interference at the neurobiological level contributes to the overall improvement of brain function. As a result of systematic exercises, unexpected changes often occur. People who practice, for example, in order to prevent imbalances, discover that they have a talent for dancing. Taiji Quan exercises can be classified as techniques that affect both the physical and emotional sphere of a person [Dobos *et al.* 2006] and as such can be highly useful in stress reduction [Esch *et al.* 2003].

Summary

Psychotherapists agree on one thing – there is no universal therapeutic method to help all patients. Some techniques contain strategies to relax, others to concentrate or to be attentive. Differences will appear in the degree of difficulty in performing them. Therefore, it is advisable to choose the most effective methods based on problems, needs, diagnosis as well as patients' reactions. Each of the previously discussed methods can produce different therapeutic effects and specific individual benefits by developing useful skills. The choice of therapeutic technique should be adjusted to the abilities and inclinations of a given person, so that the factors that carry out the intended task could be as natural as possible.

In the case of Taiji exercises, it is possible to observe in the practitioners the experience on the basis of which they react and on which they learn. It allows these people to work in other contexts as well, e.g. how to cope with life more effectively. Personal experiences gained during the exercises are necessary to be truly understood and applied. It is important to remember the individual differences in the assessment as well as in the choice of the exercise technique, because some people are more interested and inclined to physical exercise, while others achieve better results by focusing on cognitive processes. The factors governing relaxation processes may seem similar in different techniques (e.g., focus on breathing), but each of them involves a different cognitive process. A very important aspect of Taiji, Qigong exercises is that they contain elements of all these techniques and seem to be the most universal.

The authors of ancient medical texts claimed unanimously that the most effective form of treatment is

prevention. Yellow Emperor (Huang Ti): “Why don’t the wise men cure diseases that have already developed, but those that have not yet developed. They do not treat disorders that have already developed, but those that have not yet developed. This is how it is done. When you only take medication when the disease has already developed, or only when the disorder has already developed, it is like digging a well when someone is thirsty, or forging knives when a battle is coming. A bit too late, right?” [Maoshing 1995]. On the basis of the cited text one can see how far the approach to treatment in Western medicine is different.

Taiji is now beginning to be seen by *specialist physicians in rehabilitation* medicine as an auxiliary or alternative therapy. These terms may indicate that science has not yet proved its effectiveness so thoroughly. Based on the analysis and research presented in the paper, it can be concluded that the forms of Taiji ideally meet the objectives of preventive exercises aimed at maintaining both physical and mental health, especially of the elderly and physically weaker people. For some diseases they can be an effective form of treatment. When observing millions of Chinese people of different ages practicing in squares, or reading new scientific reports on the positive aspects of Taiji exercises, the question arises whether it is not one of the elements of the return to the nature of life, a kind of psychophysical lifeline that culture and wisdom of the East have left us.

Conclusions

The practice of Taiji Quan and Qigong forms is associated with the improvement in the quality of psychosocial life and mental well-being, including the reduction in stress, anxiety, depression, mood and sleep disorders. The final conclusions from the analyses of the available studies are limited due to differences in research construction affecting the comparative sphere. Further randomized studies are needed to obtain additional clinical information.

The strengths of the review were a comprehensive literature search and data quality assessment. The limitation came from the fact that qualitative data synthesis was often based on the statistical significance of results in studies with small sample sizes.

Based on the analysis of the studies, the following conclusions were drawn:

- Taiji Quan and Qigong exercises have a potential impact on the ability of healthy people to relax;
- They have an impact on the activation of positive mental states of people exercising;
- They have an impact on the reduction of everyday stress, can be performed regardless of age, fitness level or health condition. For healthy people, they will be preventive exercises, and for people with ailments, effective therapy;

- It is worth spreading this kind of exercises as a good system, useful in the process of prevention of lifestyle diseases.

The clinical significance of Taiji & Qigong exercises in terms of size and long-term sustainability of its results should be tested in future studies with larger samples. Future systematic reviews should be carried out by properly reporting methodological details and following the guidelines for carrying out such reviews.

References

1. Adkin A.L., Frank J.S., Carpenter M.G., Peysar G.W. (2002), *Fear of falling modifies anticipatory postural control*, “Exp Brain Res.”, vol. 143, no. 2, pp. 160-170.
2. Albuquerque E., Conde M., Araujo P. (2010), *PNF-CHI: The art of balance*, International Congress of Sciences and Health Technologies. Terceira, Portugal, http://www.laterlifetraining.co.uk/wp-content/uploads/2013/02/Gawler_Done_PSI-and-Otago-workshops_WCAA2012abstract.pdf
3. Badawi K., Wallace R.K., Orme-Johnson D., Rouzere A.M. (1984), *Electrophysiologic characteristics of separatory suspension periods occurring during the practice of the transcendental meditation program*, “Psychosomatic Medicine”, vol. 46, pp. 3, pp. 267-276.
4. Benson H. (1975), *The Relaxation Response*, William Morrow and Company, New York.
5. Bhatia M., Kumar N., Pandey R.M., Kochupilla V. (2003), *Electrophysiologic evaluation of Sudarshan Kriya: An EEG, BAER and P300 study*, “Indian Journal of Pharmacology”, vol. 47, pp. 157-163.
6. Brosse T.A. (1946), *A psychophysiological study*, “Main Currents in Modern Thought”, no. 4, pp. 77-84.
7. Brown K.W., Ryan R.M. (2003), *The benefits of being present: Mindfulness and its role in psychological well-being*, “Journal of Personality and Social Psychology”, vol. 84, no. 3, pp. 727-733.
8. Brown K.W., Ryan R.M. (2005), *Sudarshan Kria yogic breathing in the treatment of stress, anxiety, and depression: Part II – clinical application and guidelines*, “Journal of Alternative and Complementary Medicine”, vol. 11, no. 4, pp. 711-717.
9. Brown L.A., Gage W.H., Polych M.A., Sleik R.J., Winder T.R. (2002), *Central set influences on gait. Age-dependent effects of postural threat*, “Exp Brain Res”, vol. 145, no. 3, pp. 286-296.
10. Brown D.R., Wang Y., Ward A., Ebbeling C.B., Fortlage L., Puleo E., Benson H., Rippe J.M. (1995), *Chronic psychological effects of exercise and exercise plus cognitive strategies*, “Med Sci Sports Exerc”, vol. 27, no. 5, pp. 765-775.
11. Chaitow L., Bradley D., Christopher G. (2002), *Multidisciplinary Approaches to Breathing Pattern Disorders*, Churchill Livingstone, Edinburgh.
12. Cynarski W.J., Sieber L. (2015), *Martial arts (alternative) medicine – channel of transmission to Europe*, “Ido Move-

- ment for Culture. Journal of Martial Arts Anthropology", vol. 15, no. 3, pp. 8–21; doi: 10.14589/ido.15.3.2.
13. Dobos G., Altner N., Lange S., Musial F., Langhorst J., Michalsen A., Paul A. (2006), *Mind-body medicine as a part of German integrative medicine*, "Bundesgesundheitsblatt - Gesundheitsforschung - Gesundheitsschutz", vol. 49, pp. 723–728.
 14. Esch T., Fricchione G.L., Stefano G.B. (2003), *The therapeutic use of the relaxation response in stress-related diseases*, "Med Sci Monit", vol. 9, no. 2, pp. RA23–34.
 15. Esch T., Duckstein J., Welke J., Stefano G.B., Braun V. (2007), *Mind/body techniques for physiological and psychological stress reduction: Stress management via Tai Chi training – a pilot study*, "Med Sci Monit", vol. 13, no. 11, pp. CR488–497.
 16. Everly G.S., Rosenfeld R. (1981), *The Nature and Treatment of the Stress Response*, Plenum, New York.
 17. Fuzhong L., Fisher J.K., Harmer P., Irbe D., Tearse R.I., Weimer Ch. (2004), *Tai Chi and Self-Rated Quality of Sleep and Daytime Sleepiness in Older Adults: A Randomized Controlled Trial of Tai Chi*, "J Am Geriatr Soc", vol. 52, pp. 892–900.
 18. Griffith J.M., Hasley J.P., Hong Liu H., Severn D.G., Conner L.H., Adler L.E. (2008), *Qigong Stress Reduction in Hospital Staff*, "The Journal of Alternative and Complementary Medicine", vol. 14, no. 8, pp. 939–945.
 19. Grodin M.A., Piwowarczyk L., Fulker D., Bazazi A.R., Saper R.B. (2008), *Treating Survivors of Torture and Refugee Trauma: A Preliminary Case Series Using Qigong and Tai Chi*, "The Journal of Alternative and Complementary Medicine", vol. 14, no. 7, pp. 801–806.
 20. Hannaford C. (1998), *Smart moves that perfect the mind. Fundamentals of educational kinesiology*, Oficyna Wydawnicza MEDYK, Warszawa [Polish translation].
 21. Hausdorff J.M., Levy B.R., Wei. J.Y. (1999), *The power of ageism on physical function of older persons: reversibility of age-related gait changes*, "J Am Geriatric Soc", Nov., vol. 47, no. 11, pp. 1346–1349.
 22. Hazlett R.L., McLeod D.R., Hoehn-Saric R. (1994), *Muscle tension in generalized anxiety disorder: elevated muscle tonus or agitated movement?*, "Psychophysiology", vol. 31, no. 2, pp. 189–195.
 23. Hendlin S.J. (1978), *T'ai chi chaun and gestalt therapy*, "J Contemp Psychother", vol. 10, no. 1, pp. 25–31.
 24. Henricks R.G., Lao-Tzu (1989), *Te-Tao Ching*, Ballantine, New York.
 25. Hertenstein J.S., Weiss J. [eds.] (2011), *The Handbook of Touch: Neuroscience, Behavioral and Health Perspectives*, Mathew Springer Publishing Company.
 26. Ho Rainbow T.H., Fong T.C., Wan A.H., Au-Yeung F.S., Wong C.P., Ng W.Y., Cheung I.K., Lo P.H., Ng S.M., Chan C.L., Chen E.Y., Chen E.Y. (2016), *A randomized controlled trial on the psychophysiological effects of physical exercise and Tai-chi in patients with chronic schizophrenia*, "Schizophrenia Research", vol. 171, no. 1–3, pp. 42–49.
 27. Hoehn-Saric R., Hazlett R.L., Pourmotabbed T., McLeod D.R. (1997), *Does muscle tension reflect arousal? Relationship between electromyographic and electroencephalographic recordings*, "Psychiatry Res", vol. 71, no. 1, pp. 49–55.
 28. Hoff B. (1982), *The Tao of Pooh*, Penguin, Harmondsworth.
 29. Irwin R.M., Olmstead R., Breen E.C., Witarama T., Carrillo C., Sadeghi N., Arevalo J.M.G., Ma J., Nicassio P., Bootzin R., Cole S. (2015), *Cognitive Behavioral Therapy and Tai Chi Reverse Cellular and Genomic Markers of Inflammation in Late-Life Insomnia: A Randomized Controlled Trial*, "Biological Psychiatry", vol. 78, no. 10, pp. 721–729.
 30. Jacobson B.H., Chen H.C., Cashel C., Guerrero L. (1997), *The effect of T'ai Chi Chuan training on balance, kinesthetic sense, and strength*, "Percept Mot Skills", vol. 84, no. 1, pp. 27–33.
 31. Jin P. (1989), *Changes in heart rate, noradrenaline, cortisol and mood during Tai Chi*, "J Psychosom Res", vol. 33, no. 2, pp. 197–206.
 32. Jin P. (1992), *Efficacy of Tai Chi, brisk walking, meditation, and reading in reducing mental and emotional stress*, "J Psychosom Res", vol. 36, no. 4, pp. 361–370.
 33. Kabat-Zinn J. (1990), *Full Catastrophe Living*, Dell, New York.
 34. Kapala A. (2014), *Sleep disorders in the context of civilisation changes*, "Sztuka Leczenia", no. 3–4, pp. 35–44 [in Polish].
 35. Kerr C.E., Shaw J.R., Wassermann R.H., Chen V.W., Kanojia A., Bayer T., Kelley J.M. (2008), *Tactile acuity in experienced Tai Chi practitioners: evidence for use dependent plasticity as an effect of sensory-attentional training*, "Experimental Brain Research", vol. 188, no. 2, pp. 317–322.
 36. Kossut M. (2009), *Synapses and brain plasticity*, PAN, fundacjarozwojunauki.pl/res/Tom1/Nauka%20swiatowa%20i%20polska%5B1%5D.Rozdzial%2009.pdf [in Polish].
 37. Kwolek A. (2013), *Medical Rehabilitation*, vol. 1, Elsevier Urban & Partner, Wroclaw, 2nd edn. [in Polish].
 38. Lavretsky H., Alstein L., Olmstead R., Ercoli L., Riparetti-Brown M., Cyr N., Irwin M. (2011), *Complementary Use of Tai Chi Chih Augments Escitalopram Treatment of Geriatric Depression: A Randomized Controlled Trial*, "American Journal of Geriatric Psychiatry", vol. 19, no. 10, pp. 839–850.
 39. Lee Y.H. (2002), *Discovering the essential power of tai chi chuan: the yin and yang of leadership* [dissertation], San Antonia TX, University of the Incarnate Word.
 40. Leung Y., Singhal A. (2004), *An examination of the relationship between Qigong meditation and personality*, "Social Behavior and Personality: An International Journal", vol. 32, no. 4, pp. 313–320.
 41. Li F., Fisher K.J., Harmer P., Shirai M.A. (2003), *A simpler eight-form easy tai chi for elderly adults*, "J Aging Phys Act", vol. 11, no. 2, pp. 217–229.
 42. Li F., Harmer P., Liu L., Eckstorm E., Fitzgerald K., Stock R., Chou L.S. (2014), *A randomized controlled trial of patient-reported outcomes with tai chi exercises in Parkinson's disease*, "Movement Disorders", vol. 29, no.4, pp. 539–45.
 43. Li Y., Zhang Y., Cui Ch., Liu Y., Lei M., Liu T., Meng L., Jin Ch. (2017), *The effect of Tai Chi exercise on motor function and sleep quality in patients with stroke: A meta-analysis*, "International Journal of Nursing Sciences", vol. 4, no. 3., pp. 314–321.

44. Liu S., Li L., Liu Z., Guo X. (2019), *Long-Term Tai Chi Experience Promotes Emotional Stability and Slows Gray Matter Atrophy for Elders*, "Frontiers in Psychology", vol. 10, article 91.
45. Maciaszek J., Osinski W., Szecklicki R., Steplewski R., Salamon A., Sufinowicz M. (2006), *Effects of Tai Chi training on physical fitness in overweight and obese elderly men*. Department of Theory of Physical Education and Anthropomotrics, University School of Physical Education in Poznan.
46. Maciaszek J., Osinski W. (2012), *Effect of Tai Chi on Body Balance: Randomized Controlled Trial in Elderly Men with Dizziness*, "American Journal of Chinese Medicine", vol. 40, no. 2, pp. 245-253.
47. Maoshing N. (1995), *Yellow Emperor's classic of medicine. A new translation of the Neijing Suwen with commentary*, Shambhala Publications.
48. Motivala S.J., Sollers J., Thayer J., Irwin M.R. (2006), *Tai Chi acutely decreases sympathetic nervous system activity in older adults*, "Journals of Gerontology – Series A Biological Sciences and Medical Sciences", vol. 61, no. 11, pp. 1177-1180.
49. Nedeljkovic, M., Ausfeld-Hafter B., Streitberger K., Seiler R., Wirtz P. (2012), *Taiji practice attenuates psychobiological stress reactivity – A randomized controlled trial in healthy subjects*, "Psychoneuroendocrinology", vol. 37, no. 8, pp. 1171-1180.
50. Pop T., Wlodyka R. (2012), *Influence of Tai Chi exercises on relaxation of healthy individuals*, "Journal of Combat Sports and Martial Arts", vol. 3, no. 1, pp. 35-41.
51. Raimondo S., Lunardini S. (2019), *A study of Taijiquan and the Treatment of Cancer*, "Ido Movement for Culture. Journal of Martial Arts Anthropology", vol. 19, no. 1S, pp. 92-95; doi: 10.14589/ido.19.1S.14.
52. Reid-Arndt S.A., Matsuda S., Cox C.R. (2012), *Tai Chi effects on neuropsychological, emotional, and physical functioning following cancer treatment: A pilot study*, "Complementary Therapies in Clinical Practice", vol. 18, no. 1, pp. 26-30.
53. Simpkins C.A., Simpkins A.M. (2010), *Meditation for psychotherapists and their clients*, Zysk i S-ska, Poznan [in Polish]
54. Snyder D.K., Wills R.M. (1989), *Behavioral versus insight-oriented martial therapy: Effects on individual and interpersonal functioning*, "Journal of Consulting and Clinical Psychology", vol. 57, pp. 39-46.
55. Sufinowicz M., Sleboda R., Nowak A., Maciaszek J., Osinski W., Steplewski R. (2006), *Effects of tai chi on changes in concentration of markers of bone turnover in elderly men*, Department of Methodology of Physical Education Department of Hygiene, University School of Physical Education in Poznan.
56. Tang Y.Y., Ma Y., Wang J., Fan Y., Feng S., Lu, Q. (2007), *Short-term meditation training improves attention and self-regulation*, Proceedings of the National Academy of Sciences of the United States of America, vol. 104, no. 43, pp. 17152-17156.
57. (1995) U.S. National Institutes of Health. *Integration of Behavioral and Relaxation Approaches into the Treatment of Chronic Pain and Insomnia*, NIH Technology Statement Online, Oct 16-18, pp. 1-34.
58. Wang C., Bannuru R., Ramel J., Kupelnick B., Scott T., Schmid C.H. (2010), *Tai Chiton psychological well-being: systematic review and meta-analysis*, "BMC Complementary and Alternative Medicine", vol. 10, no. 23, pp. 3-14.
59. Wang J.S., Lan C., Chen S.Y., Wong M.K. (2002), *Tai Chi Chuan training is associated with enhanced endothelium-dependent dilation in skin vasculature of healthy older men*, "Journal of the American Geriatrics Society", vol. 50, no. 6, pp. 1024-1030.
60. Wang Y., Shan W., Li Q., Yang N., Shan W. (2017), *Tai Chi Exercise for the Quality of Life in a Perimenopausal Women Organization: A Systematic Review*, "Worldviews on Evidence-Based Nursing", vol. 14, no. 4, pp. 294-305.
61. Webster C.S., Luo A.Y., Krageloh Ch., Moir F., Henning M. (2016), *A systematic review of the health benefits of Tai Chi for students in higher education*, "Preventive Medicine Reports", vol. 3, pp. 103-112.
62. Wolf S.L., Barnhart H.X., Kutner N.G., McNeely E., Coogler C., Xu T. (1996), *Reducing frailty and falls in older persons: an investigation of Tai Chi and computerized balance training*, "Journal of the American Geriatrics Society", vol. 44, no. 5, pp. 489-497.
63. Yalden J., Chung L. (2001), *Tai chi: towards an exercise program for the older person*, "Aust J Holist Nurs", vol. 8, no. 1, pp. 4-13.
64. Yang J.M. (1997), *Back Pain: Chinese Qigong for Healing and Prevention*, YMAA, Jamaica Plain.
65. Yitzthum K., Mache S., Joachim R., Quarcoo D., Groneberg D. (2009), *Psychotrauma and effective treatment of post-traumatic stress disorder in soldiers and peacekeeper*, "Journal of Occupational Medicine and Toxicology", vol. 4, no. 21; doi: 10.1186/1745-6673-4-21.

Próby oceny wpływu ćwiczeń Taiji Quan i Qigong na stany emocjonalne

Słowa kluczowe: taiji quan, qigong, stan emocjonalny, ćwiczenia relaksacyjno--medytacyjne

Abstrakt

Problem i cel. Celem badań [Nedeljkovic *et al.* 2012] było określenie wpływu regularnej praktyki Taiji na psychobiologiczną reakcję na stres u zdrowych mężczyzn i kobiet. Jest to pierwsze badanie z randomizacją, w którym badano wpływ Taiji Quan na wielkość odpowiedzi kory nadnerczy, autonomicznego układu nerwowego oraz psychiki na znormalizowane i potwierdzone wywołanie stresu psychospołecznego u zdrowych początkujących w Taiji Quan. Badane, wywołane stresem charakterystyczne fizjologiczne zmiany u ćwiczących Taiji w porównaniu do grupy kontrolnej wykazywały znacznie niższą reaktywność kortyzolu na stres ($p = 0,028$), częstość akcji

serca ($p = 0,028$), a także niższe poziomy α -amylazy ($p = 0,049$). Zgłaszali niższy wzrost odczuwanego stresu ($p = 0,006$) i utrzymywali wyższy poziom spokoju ($p = 0,019$) w odpowiedzi na stres psychospołeczny

Metody. Przegląd, retrospektywna analiza zbiorcza (metaanaliza) wyników wielu badań (randomizowanych nierandomizowanych, badań obserwacyjnych, psychologicznych i złożonych) zawartych w kilku bazach internetowych (Scopus, Science Direct, ClinicalKey, Web of Science) została podjęta celem ich syntezy i przeprowadzona do listopada 2019 roku. Dane zostały wyodrębnione i zweryfikowane przez dwóch recenzentów. Terminy pojęć stosowane celem dokonania przeglądu to: „Tai Chi”, „Chi Kung”, „Taiji Quan”, „Qigong”, „Tai Chi Chuan”, „Ta'i chi”, „tai ji”, „Tai Ji Quan”, and „taijiquan”. Uwzględniono 65 artykułów naukowych związanych z podjętym tematem badań. Wyniki. Przegląd tematycznych publikacji rozpoczęto od pracy Reid-Arndt *et al.* [2012]. Jej celem było określenie wpływu 10-tygodniowego programu Taiji (TJ) na zdrowie neuropsychologiczne, psychiczne i fizyczne kobiet, które przeszły chorobę nowotworową. Dwadzieścia trzy kobiety z historią raka uczestniczyły w 60-minutowych zajęciach (TJ) dwa razy w tygodniu przez 10 tygodni. Przed i po interwencji uczestnicy wykonywali

testy neuropsychologiczne (pamięć, funkcjonowanie wykonawcze, język i uwaga), 5 testów równowagi. Ponadto wypełniały one kwestionariusze samo opisowe, dotyczące dolegliwości neuropsychologicznych, stresu i nastroju oraz zmęczenia. Po 10-tygodniowej sesji uczestnicy wykazali mniej dolegliwości neuropsychologicznych i lepsze funkcjonowanie neuropsychologiczne. Wykazali także lepszą równowagę i zgłosili lepsze samopoczucie psychiczne.

Wnioski. Na bazie dokonanej analizy badań wysunięto następujące wnioski:

- ćwiczenia Taiji Quan oraz Qigong mają potencjalny wpływ na zdolność do relaksacji osób zdrowych,
- mają one wpływ na aktywizację pozytywnych stanów mentalnych osób ćwiczących,
- mają wpływ na redukcję codziennego stresu, może być wykonywane bez względu na wiek, poziom sprawności fizycznej czy też stan zdrowia. Dla osób zdrowych będą to ćwiczenia profilaktyczne, a w przypadku osób z dolegliwościami skuteczną terapią,
- warto rozpowszechnić tego rodzaju ćwiczenia, jako dobry system przydatny w procesie profilaktyki chorób cywilizacyjnych.