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Testing of the suggested algorithm for the correction of psychoemotional stress manifestations in students through the use of meditative techniques in combination with pharmacological support in the jujutsu martial art

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Summary

The relevance of studying the mental health of students and the development of methods for the correction of emerging pathological conditions is determined, first of all, by the presence of stress-inducing factors in the student environment such as test-taking situations, periods of social adaptation, the need for professional self-determination, etc., which is complemented by social tension in the world and the deterioration of the ecological environment. Unfortunately, the lack of timely assistance can have profound negative consequences for the physical health and life quality of the future generation, which necessitates additional measures to preserve the psychoemotional state of university students. It is known that in European and American culture the solution of psychoemotional state disorders has been realized long enough ago by borrowing Eastern mental practices with their subsequent adaptation to the socio-cultural values of mankind: Tibetan Buddhist meditation, meditative neurobiology, anti-stress meditations, etc. However, it has never been discussed that such practices can be supplemented with measures based on the achievements of modern pharmacology and nutritional and metabolic support.

Therefore, the authors set the goal to substantiate and experimentally test the effectiveness of the combined meditative-pharmacological methodology of mitigating the emotional tension manifestations in students of higher educational institutions in the course of classes in the jujutsu martial art.

The paper analyzes modern scientific and scientific-methodological literature and studies the factors influencing the mental health of students, in particular, the intensity of psychoemotional stress manifestations during study in higher education institutions. The negative impact of this phenomenon on the functional state of organs and systems of the body with deterioration of health and life quality is proved. The expediency of using meditative techniques to reduce the intensity of stress manifestations is shown. For the first time in the practice of martial arts, the combination of meditation during the training process of students engaged in the jujutsu martial art to reduce the intensity of stress manifestations and the «Acetyl-L-carnitine» special neuroprotective nutritional supplement to correct the emotional stress manifestations in students of higher education institutions has been used.

Thus, to reduce the stress manifestations students tend to use means that not only fail to prevent mental health but even often produce a negative impact on it (nicotine, alcohol, drugs, physical and mental overload, etc.). The use of meditative techniques for this purpose in combination with special neuroprotective means largely solves the issue of reducing the intensity of psychoemotional stress manifestations in students of higher education institutions.

Keywords: *student youth, psychoemotional stress, meditation, martial arts, jujutsu, mental health, neuroprotectors.*

Articulation of issue

According to modern scientific data, the relevance of research on students' mental health, is determined by the presence of stress inducing factors in the student environment (Egan, 2019), such as test-taking situations, periods of social adaptation, the need for professional self-determination, etc. As a well-known Ukrainian researcher on the psychology of stress and intrapersonal conflicts, G. N. Dubchak

noted, <...> educational activities at the university are one of the most stressful. For young people receiving education, the period of study is a long and complex process that requires tremendous intellectual and physical effort, emotional stability, psychological balance, achievement of set goals, and coping with stressful situations, especially during the examination period» (Дубчак, 2019).

It has been proved that the experienced stress and its consequences pose a very significant threat both to the mental (Janssen et al., 2018) and physical health of an individual (Baum et al., 1999). This fully applies to the youth period in general and the student period in particular, when personal resources seem inexhaustible, and at the same time, optimism about one's health assessment prevails over concern for its preservation. Unfortunately, the lack of timely assistance can have profound negative consequences for the physical health and life quality of the future generation (González-Díaz et al., 2017), which requires additional measures to preserve the psychoemotional state of university students.

The results of previous studies have demonstrated that in European and American culture, the solution to psychoemotional disorders was carried out by borrowing mental Eastern practices with their subsequent adaptation to the socio-cultural values of mankind: Tibetan Buddhist meditation, meditative neurobiology, anti-stress meditation, etc. (Tang et al., 2017; Rinpoche, Tworokov, 2014). These mental practices are based on managing the functions and mental states peculiar to the individual through physical relaxation and increasing concentration, willpower, analytical skills, etc. However, as M. Mazykin notes (Мазикін, 2020), this was preceded by a large-scale and result-significant project of the Mind and Life Institute (the Meditative Neurobiology Project, 2000), implemented jointly with twenty leading US universities (Tang et al., 2017; Rinpoche, Tworokov, 2014). It should be noted that many psychological practices for coping with stress originate from Eastern culture and martial arts. Meditative techniques are no exception, as, for instance, every jujutsu training session begins and ends with meditation. At the beginning of the session, meditation aims to eliminate all extraneous thoughts and attention focusing only on the teacher (sensei), the dojo (*place of study; understanding of the warrior's path*), and other students present in the class. At the end of the session, meditation serves to summarize the results of the training, restore harmony between the personal essence and the environment, psychological relaxation, etc. (Орлов, 2013). In general, during the analysis of the literature, we noted a low level of social support in combination with the diversity of emotional sufferings, which is reflected in the peculiarities of students' everyday life confirming the need for

the adoption of appropriate preventive measures, a more active search for efficient methods of stress manifestation correction, including psychogenic and pharmacological practices, which is quite rare in studies on this issue. In this pioneering research, we propose to combine martial arts meditation practices and the use of a neuroprotective agent with antioxidant effects, which has long been used not only in general clinical practice (Pennisi et al., 2020) and in the treatment of various mental disorders, but also in the training of athletes (Гуніна et al., 2023), although it has not been used in this combination before.

Meditation is a state of deep relaxation, mostly subconscious, or a group of mental exercises used in both spiritual and religious and health-related spheres to achieve a special state of consciousness. Meditation is the practice of focusing the mind on a specific object, thought, or activity to train attention, and awareness, and achieve a mentally clear, emotionally calm, and stable state. In the process of meditation, a person seems to «breakthrough» into the mysteriously deep layer of his/her essence, to his/her so-called Higher Self (Орлов, 2013; Височіна, 2017).

Meditation is now used for general psychological relaxation and stress manifestation reduction (Madan et al., 2022). It impacts the autonomic nervous system and regulates the activity of other internal organs and systems, as well as the course of metabolic processes in the body. Hence, it is possible to support the action of purely meditative practices by targeting pharmacological effects on metabolic processes in the central and autonomic nervous systems above all (Ngô, 2013; Park et al., 2022).

A further analysis of the state of the art in the theory and practice of examining methods of overcoming psychoemotional stress revealed studies that proved the positive impact of meditation on the human body (Височіна, 2017; Tang et al., 2015). Meditation in Eastern martial arts (Трысов, 2000; Kim, 2000) is not even considered an alternative to medical treatment, but rather a possibility of direct therapeutic effect on human health (Burke et al., 2006; Koutures, Demorest, 2018; Woodward, 2009).

The literature highlights the issues of counteracting the influence of various stress inducing factors, which allows a person to maintain high performance in extreme conditions, by using physical loads of a certain focus and intensity as

one of the important factors in overcoming stressful situations during the education of students (Трысов, 2000), but, unfortunately, such studies are scarce.

The existence of a positive relationship between physical load and mental health has been proved (Орлов, 2013; Вербецька et al., 2023). However, even physical loads are not always able to overcome the mental strain experienced by university students on their own, and in this regard, additional anti-stressor stimuli are needed to not only optimize the situation «here and now» but also to prevent its long-term consequences (Артюшенко, Гречуха, 2022; Aksenova et al., 2023).

Physical exercises, however, are not the only way to maintain or restore mental toughness; there is also such method as meditation. In this aspect, in our opinion, the combination of meditative practices specific to Eastern martial arts and the modern pharmacotherapeutic approach can be very successful, which is why the task of evaluating its effectiveness in empirical studies to correct stress manifestations in university students has been set.

Objective: to substantiate and experimentally test the efficiency of the combined meditative-pharmacological methodology for releasing psychic tension in university students while practicing jujutsu martial art.

Research methods: *theoretical* – analysis and synthesis of educational and methodological literature, systematization of scientific data, generalization of practice experience, comparison of different views on the problem under study and *empirical* – pedagogical questionnaire to study the level of compliance with the pressures.

The study, under the general supervision of Honored Coach of Ukraine Aleksandr Orlov, was conducted simultaneously at two locations – at the “Alians” Self-Defense Club (Pereiaslav, Kyiv Region; coach Hryhorii Serebnyi) and the “Bushinkan Kazakhstan Martial Arts Development Center” (Almaty), with the inclusion of higher education institution students practicing jujutsu martial art in these clubs. All students trained three times a week for two hours; it should be noted that each session included two mandatory meditation sessions.

In total, 32 male students aged 17 to 21 were selected and divided into groups. The first of them (intact control group) included 10 students who only trained regularly during their studies at the

university; the second (placebo group) involved 10 subjects, who were administered starch capsules as a control. The third group (experimental) consisted of students ($n = 12$) who trained and at the same time took a special nutritional supplement “Acetyl-L-carnitine” (“NOW Foods”, USA) in the form of 500 mg vegetarian capsules. The division of students into groups was based on the following criteria: skill level, experience in martial arts, level of physical fitness, sportsmanship, and gender (all men). The course duration was one month, and the daily dosage was 2 capsules at a time once a day; a questionnaire to determine the level of compliance with the pressures was conducted before and immediately after the course.

The “NOW Foods” manufacture presents acetyl-L-carnitine (ALC) substance as a modified amino acid that supports the formation of cellular energy by facilitating the transport of fat to the mitochondria, where ALC is converted to ATP (“cellular fuel”), which is a bioavailable form of the active natural substance L-carnitine. ALC, like its structural precursor L-carnitine, can cross the blood-brain barrier (Ferreira, McKenna, 2017), helping to neutralize oxygen-induced damage in brain tissue, maintain the energy-producing function of mitochondria and normal neurotransmitter activity (Alhasaniah, 2023). Basically, the results of clinical trials prove that ALC is able to optimize, first of all, the state of the central nervous system, although it also exerts a positive effect on other individual systems and organs (Sergi et al., 2018), and human health in general (Adeva-Andany et al., 2017).

The findings. The theoretical analysis indicates that of all the existing martial arts schools, the jujutsu school, which uses all the techniques characteristic of other Eastern martial arts, is most consistent with the directions and content of student training (Вербецька et al., 2023) and educates and forms such skills as the ability to control not only one’s state but also the psychological state of one’s potential opponent, the ability to estimate his/her readiness for aggression, and the forms and timing of its manifestation (Орлов, 2013).

Theoretical analysis has revealed that numerous factors provoke the development of stress (Nakashima, Yamaguchi-Shinozaki, 2013). In students engaged in martial arts, the stressors include anxiety about successful performing at competitions, financial expenses, determining the

time required for training sessions, doubts about their abilities, as well as non-sports stressors of everyday life, etc. (Орлов, 2013; Burke et al, 2007; Weinberg, Gould, 2018).

All groups of examined students simultaneously attended jujutsu training sessions for a month. However, the subjects of the control group (“CG”) trained and meditated according to the training program for disciples of the jujutsu martial art, those of the placebo group meditated twice (at the beginning and end of the training session) and took a placebo capsule with starch, and those of experimental group trained according to a specific, identical for all program, meditated, and took a special neuroprotective nutritional supplement “Acetyl-L-carnitine”. After 30 days, all students who practiced jujutsu during their studies at the university were surveyed to determine their self-assessment of compliance with the pressures according to the test of the famous Ukrainian

psychologist B.G. Dodonov, as described in the work (Височіна, 2017) (Table 1).

The results of the study demonstrated that, firstly, the same number of students from the “intact control” and experimental groups have high and average levels of compliance with the pressures – 40% each (Table 2). Secondly, it is shown that the number of students with a low level of compliance with the pressures in the control and placebo groups is 3.34% higher than in the experimental group. The number of students with an average level of compliance with the pressures in the “intact control” and placebo groups is 6.6% higher than in the experimental group. As for the number of students with a high level of compliance with the pressures, during jujutsu classes in connection with meditation combined with the use of the neuroprotective agent ALC, this index is 10.0% higher than in both groups of young men not receiving pharmacological support.

Table 1

Determining the results of the test of compliance with the pressures according to B. G. Dodonov

No.	Test questions	Answer options, in points		
		rarely	sometimes	often
	I think I am underestimated by the team	1	2	3
	I try to work, even when I am not quite healthy	1	2	3
	I constantly worry about the quality of my work	1	2	3
	I can be aggressively disposed	1	2	3
	I can't stand criticism on my own	1	2	3
	I can be on edge	1	2	3
	I try to be a leader whenever possible	1	2	3
	I am considered persistent and assertive	1	2	3
	I suffer from insomnia	1	2	3
	I can fight back against my enemies	1	2	3
	I am emotionally and painfully affected by trouble	1	2	3
	I do not have enough time to rest	1	2	3
	I have conflict situations	1	2	3
	I lack the will to realize my potential	1	2	3
	I don't have enough time for my favorite occupation	1	2	3
	I do everything quickly	1	2	3
	I feel afraid that I will not enter the university	1	2	3
	I act out of the blue and then worry about the things I do	1	2	3
Total points		The level of compliance with the pressures		
		III	II	I
		51–46	45–34	33–18

Notes: level of compliance with the pressures: I – low, II – average, III – high

Table 2

The level of compliance with the pressures in different groups of students engaged in jujutsu

The level of compliance with the pressures	Intact control group (n = 10)		Placebo-control group (n = 10)		Experimental group (n = 12)	
	number	%	number	%	number	%
Low	2	20,0	2	20,0	2	16,6
Average	4	40,0	4	40,0	4	33,4
High	4	40,0	4	40,0	6	50,0

Therefore, the results of the study indicate almost the same low and average level of students' compliance with the pressures during training in the jujutsu martial art and meditation as well as during training in jujutsu and meditation in connection with placebo. This allows us to assert the unity of the ways of influence of physical exercises and meditative techniques on the psycho-emotional state of students. However, the additional use of the neuroprotective agent ALC in the form of a special nutritional supplement "Acetyl-L-carnitine" significantly improves the results of the test of estimating compliance with the pressures of students engaged in jujutsu thus allowing them to improve their psycho-emotional state and reduce stress level during their studies at the university.

The conducted theoretical and experimental studies confirmed the achievement of the set goal and the effectiveness of the applied methodology, which provided the basis for making the following **conclusions:**

The period of study at the university is characterized by a variety of emotional sufferings, which is reflected in their lifestyle, including a careless attitude toward their health.

It has been established that meditation is an important constituent of the process of mastering the jujutsu martial art, and in the physical aspect improves the technical skills of athletes, as the speed and accuracy of movement tend to increase when the body is relaxed. In the mental aspect, meditation allows you to increase the ability to concentrate and penetrate deeper into your inner world, i.e. "space out" from the problems of the present.

The study of meditative techniques used in the jujutsu martial art as a means of relieving psycho-emotional tension has permitted to develop recommendations for their use: it is necessary to start meditation under the guidance of a specialist, a master of Eastern martial arts; it is advisable to meditate in the same favorable place, sitting comfortably on your knees; in case of emotional

arousal, calming meditative techniques should be used, whereas in a depressed state – on the contrary, the nervous system stimulating technique would be more appropriate; meditation should be practiced in students' free and most convenient time to achieve an efficient relaxation.

It is proved that students engaged in the jujutsu martial art for the reduction of tension and manifestations of psycho-emotional stress, a combination of meditative techniques and special neuroprotective means has a positive effect on indices of compliance with the pressures, which allows to substantiate the expediency of using such means during studying and motor activity, including martial arts.

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STUDENTAMS SIŪLOMO PSICHOEMOCINIO STRESO APRAIŠKŲ KOREKCIJOS ALGORITMO TESTAVIMAS, NAUDOJANT MEDITACINES TECHNIKAS KARTU SU FARMAKOLOGINE PARAMA DŽIUDŽITSU KOVOS MENE

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SANTRAUKA

Studentų psichikos sveikatos tyrimų ir besiformuojančių patologinių būklių koregavimo metodų kūrimo aktualumą pirmiausia lemia streso veiksniai, esantys studentų aplinkoje. Iš jų pažymėtini egzaminų situacijos, socialinės adaptacijos laikotarpiai, apsisprendimas renkantis būsimą profesinę veiklą, kuriuos papildo socialinė įtampa pasaulyje ir blogėjanti ekologinė aplinka. Deja, laiku nesuteikiama pagalba gali neigiamai veikti jaunosios kartos fizinę sveikatą ir gyvenimo kokybę, todėl reikia papildomų priemonių universiteto studentų psichoe-mocinei būklei išsaugoti. Yra žinoma, kad Europos ir Amerikos šalių kultūroje, siekiant išvengti ar ištaisyti šios būklės pažeidimus, mentalinės rytietiškos praktikos, tokios kaip Tibeto budizmo meditacijos, neurobiologija, antistresas, jau seniai yra taikomos atsižvelgiant į sociokultūrinės žmonių vertybes. Kadangi psichikos reiškinių tyrimas turi būti vertinamas taip pat, kaip ir bet kuris kitas mokslas, įrodymais pagrįsta pedagoginė ir medicininė-biologinė įtaka gali būti pagrįstai naudojama. Tačiau mintis, kad tokia praktika gali būti papildyta priemonėmis, pagrįstomis šiuolaikinės farmakologijos pasiekimais ir mitybos bei medžiagų apykaitos palaikymu, mokslo darbuose dar niekada nebuvo aptarta.

Todėl straipsnio autoriai iškėlė tikslą pagrįsti ir eksperimento būdu išbandyti kombinuotos meditacinės-farmakologinės metodikos veiksmingumą emocinio streso apraiškoms švelninti aukštųjų mokyklų studentams džiudžitsu kovos menų pratybų metu.

Darbe analizuojama šiuolaikinė mokslinė ir mokslinė-metodinė literatūra, nagrinėjami studentų psichinę sveikatą lemiantys veiksniai, ypač psichoemocinio streso apraiškų padariniai studijuojant aukštosiose mokyklose. Įrodyta neigiama šio reiškinio įtaka funkciniai organizmo sistemų būklei, blogėjančiai sveikatai ir gyvenimo kokybei. Darbe atskleista meditacinių metodų panaudojimo galimybė mažinant streso apraiškų sunkumą. Autoriai pirmą kartą, siekdami sumažinti streso poveikį, studentų džiudžitsu treniruočių procese naudojo tradicinį kovos menuose taikomą meditacijos derinį, skirtą emocinės įtampos apraiškoms mažinti, papildydami jį specialiu neuroprotektiniu maisto papildu „Acetil-L-karnitinas“.

Yra žinoma, kad psichoemocinio nestabilumo sunkumui sumažinti studentai naudoja priemones, kurios ne tik neatitinka psichikos sveikatos prevencijos, bet netgi dažnai turi jai neigiamą poveikį (nikotinas, alkoholis, narkotikai, fizinė ir psichinė perkrova ir kt.). Tyrimo rezultatai parodė, kad meditacinės technikos naudojimas šiuo tikslu kartu su specialiais neuroprotektiniais agentais iš esmės išsprendžia studentų sportininkų psichoemocinio streso apraiškų sunkumo mažinimo klausimą, kartu gerinant jų sveikatą.

Raktažodžiai: studentai, sportininkai, psichoemocinis stresas, meditacija, kovos menai, džiudžitsu, psichinė sveikata, neuroprotektoriai.