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Review paper

THE ROLE OF YOGA IN EDUCATION

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ABSTRACT

The aim of this paper is to explain the possibilities of applying yoga in education through the presentation of the conducted research. Yoga involves various techniques with the aim of achieving psychosocial balance. We are witnessing an increase in stress and emotional disorders in children; children are becoming more sedentary, and are preoccupied with the multitude of stimuli that come constantly via cell phone, computer, and television. By examining a series of research effects of yoga, we can conclude that yoga has proved to be effective in treating a variety of conditions and diseases. Practicing yoga can help reduce stress, anxiety symptoms, and depression. It examines the possibilities of introducing yoga as part of the school curriculum for healthy children and children with disabilities. Results have so far shown possible contributions of yoga in schools in the form of attention improvement, self-regulation and reduction of tension.

Keywords: yoga, education, schools, health.

INTRODUCTION

Education is increasingly becoming a challenge in the world we live in. Surrounded by mobile phones and other forms of modern technology that bring something new every day, accustomed to speed, frequent activity changes and bombarded with stimuli, children come to schools where the most common method is listening and transcribing from the blackboard while sitting at a desk for six hours.

Excessive demands and too high expectations that are often put on children result in increasing stress and anxiety. Difficulties in meeting teachers and parents' expectations are often a cause of stress in children. At the same time, those same parents and teachers are often under stress themselves. We teach children, for example, about the reproduction of annelids, while no one teaches them how to breathe properly and thus reduce stress.

Young people are increasingly under stress. For example, in a Finnish study by Santalahti et al (2005), as many as 50% of adolescents have symptoms of emotional and psychosomatic disorders. In a Croatian study, Vulić Prtorić and Lončarević (2016) found that 13 – 17% of students aged 11 to 15 experience intense internalized symptoms (stress, anxiety, depression). Stress levels are even higher in younger people compared to older people (Hagen, Nayar, 2014).

Chronic stress can result in many health problems such as anxiety, insomnia, muscle pain, high blood pressure and weakened immunity, heart disease, depression and others. (Hagen, Nayar, 2014). Attention levels are also strongly influenced by stress levels (Stueck and Gloeckner, 2005). Stress reduces the amount of norepinephrine, in charge of attention and mental vitality, and dopamine, which causes weakening of the enjoyment of activities that were previously enjoyable. It also reduces the amount of serotonin, which is responsible for good mood (Hagen, Nayar, 2014). On the other hand, it increases the level of cortisol, which is associated with the death of dendritic cells, atrophy of hippocampus, and thus with memory difficulties (Lupien et al., 1998).

In our Croatian education system, movement is limited to a physical education class. In addition, children are allowed to move during breaks, while during classes movement is prohibited or very restricted. Paradoxically, modern research suggests a direct link between movement and learning. Muscle activity, particularly coordinated, balanced movements, stimulate the production of neurotrophins, such as dopamine, which stimulate the growth of existing neurons and increase the number of new neurons and neural connections in the brain (Fotuhi, 2013; Hanaford, 1995).

There is an urgent need for an education reform that would create a more conducive climate for learning in school and result in better outcomes. The aim of this paper is to describe the effects of practicing yoga on health through a review of research, and to analyze the applying possibilities and role of yoga in education for healthy students, but also for students with disabilities.

WHAT IS YOGA?

The word "yoga" comes from Sanskrit and has the original meaning of "unite, connect" (Paramhans Swami Maheshwarananda, 2006). In its original meaning, the word "yoga" means "an all-pervasive, eternally awake consciousness that keeps the entire universe in balance" (Paramhans Swami Maheshwarananda, 2006, 11).

Yoga refers to the goal, unity and harmony with oneself and others, but also to the methods by which that goal is achieved. The first written sources date, according to some sources, to around 3000 BC, but according to the scriptures, it can be assumed that the knowledge of yoga originates from much earlier, from the time when it was transmitted by the word of mouth (Kumar, 2008).

One of the fundamental works of the philosophy of yoga is "Yoga Sutra of Patanjali". Patanjali shaped the eight degrees of yoga: yama, niyama, asana, pranayama, pratyahara, dharana, dhyana, samadhi (Paramhans Swami Maheshwarananda, 2012). Yama and niyama relate to learning self-control and discipline, pranayama is a breathing exercise, pratyahara is a sensory withdrawal exercise, dharana are concentration exercises, dhyana is meditation, and samadhi is a state of unity consciousness. In accordance with Patanjali's "Yoga Sutras", it is still practiced all over the world today.

In a broader sense, yoga is a lifestyle that involves practicing awareness and achieving harmony using a variety of methods.

A typical yoga class begins with relaxation exercises. We consciously relax each part of the body for five to ten minutes. During relaxation, we focus on breathing and practice proper breathing, which, in addition to chest and clavicular breathing, also includes diaphragm breathing (so-called abdominal breathing). This is followed by dynamic exercises to warm up the joints, warm up and relax the muscles. Next are asanas. Asana means "position" (Paramhans Swami Maheshwarananda, 2012). Asanas are such positions that are the least tiring, and are beneficial for the psycho-physical state. Movement is aligned with breathing, while being aware of the motion. This is followed by a conscious breathing exercise (pranayama) and meditation.

Relaxation at the beginning of exercises is very important because it brings a number of benefits. Conscious relaxation activates the circles of the parasympathetic system and thus strengthens them (Hanson, Mendius, 2014). It also calms the sympathetic nervous system (Hanson, Mendius, 2014). The relaxation response can even alter gene reflection and thus alleviate cell damage due to chronic stress (Hanson, Mendius, 2014). Relaxation can be achieved through conscious techniques of relaxation, breathing and meditation.

Breathing in yoga is conscious, which means controlled; it is deeper than during usual exercising. If, for example, we inhale and exhale five times, each time a little deeper than usually, it raises the energy level and relaxes; it first activates the sympathetic and then the parasympathetic nervous system, and can lead to the so-called flow or a meditative state known to athletes, artists, etc. (Hanson, Mendius, 2014).

Practicing yoga involves coordination of movements, stretching muscles in combination with abdominal breathing, which improves circulation and results in release of tension, increased oxygen, and has a beneficial effect on the central and autonomic nervous system (Peck et al., 2005).

When practicing yoga, the movements are performed consciously. Awareness activates central areas of the brain and improves coordination between the prefrontal cortex and the limbic system (Siegel, Barros, 2007).

Peck et al. (2005) emphasize the importance of body awareness. Body awareness allows us to also be aware of the feelings that manifest as physical reactions that the body creates. Yoga develops body awareness, which is confirmed by research (Peck et al., 2005). Body awareness can also lead to increased calmness, decreased tension, and improved concentration (Peck et al., 2005). Yoga exercises deactivate the sympathetic and stimulate the parasympathetic nervous system, which results in a sense of peace, emotional balance, improved concentration, and a sense of serenity (Peck et al., 2005).

Meditation is a part of yoga. According to Patanjali, dharana, a concentration exercise, precedes dhyana, a meditative state. Meditation can be described as the intentional regulation of attention to the present moment. It encompasses concentration, relaxation, altered states of consciousness, interruption of thought, and achieving the attitude of the self-observer (Paramhans Swami Maheshwarananda, 2012). It is described as a practice that puts the emphasis on achieving alertness, expanding self-awareness, and increasing cohesiveness (Peck et al., 2005). When experienced Tibetan meditation practitioners enter deep meditation, they emit gamma brain waves due to which large areas in the brain pulse in unison 30 to 80 times per second (Lutz, Brefczynski-Lewis, Johnstone and

Davidson, 2004). Meditation increases the amount of gray matter in the insula (Hölzel et al., 2011; Lazar et al., 2005), hippocampus (Hölzel et al., 2011), and prefrontal cortex (Lazar et al., 2005; Luders et al., 2009). Furthermore, it has been found that meditation enhances the activation of left frontal areas, thus improving one's mood (Davidson, 2003).

Meditation also strengthens the immune system (Davidson, 2003; Tang et al., 2007). Meditation has been shown to help control the hypothalamic-pituitary-adrenal axis and related systems (e.g. the parasympathetic nervous system) which has the effect of reducing stress, improving digestion, immunity, and mood (Grossman et al., 2004; Carlson, Speca, Patel, 2003). During meditation, dopamine is released in the ventral striatum which is associated with behavioural control (Kjaer et al., 2002).

EEG studies have shown that the Sahaja Yoga Meditation system leads to an increase in alpha and theta waves in the frontal areas of the brain, and reduces the complexity of EEG patterns (Aftanas, Golocheikine, 2001, 2002). Reduced complexity of EEG patterns in the frontal areas of the brain is associated with the increased conscious control of cognitive processes (Aftanas, Golocheikine, 2001, 2002).

YOGA PRACTICE ADJUSTMENTS FOR CHILDREN

Yoga exercises, the way of performing and duration should be adapted to the psycho-physical abilities of children (Paramhans Swami Maheshwarananda, Maheshwarananda, Puchnarová, 1998). Exercises last less time, and the time can be gradually extended. Since the skeletal and hormonal systems are still developing, children should not stay in certain positions for too long. Practicing yoga also requires certain prerequisites, such as knowing the main parts of the body, knowing the breathing process, and distinguishing the state of tension from the state of relaxation. Graduality in the introduction of new exercises is also important; certain exercises can be performed only when the previous steps have been mastered. So, for example, pranayama exercises in children are performed only when they had mastered the process of proper breathing and can, to some extent, control that process.

THE IMPACT OF YOGA ON PSYCHO-PHYSICAL HEALTH

A review of available research indicates that practicing yoga can improve the general physical condition, posture, strengthen immunity, and reduce and eliminate certain symptoms. Yoga can be an anti-stress technique and help reduce anxiety and depression, as well as affect psychological well-being which will now be briefly documented by available research.

Asanas help to adjust the vertebrae, increase flexibility, strengthen muscles and tendons, and thus contribute to proper posture (Khalsa, 2007). By practicing asanas and pranayama, internal organs are being regenerated, the epidermal, digestive, and cardiovascular systems are being cleansed of toxins and wastes, the nervous and endocrine systems are being balanced, and brain cells nourished (Khalsa, 2007). Exercise stabilizes blood pressure and heart rate in adults, children and adolescents (Bhargava et al., 1988; Birdee et al., 2009). The capacity of lungs is higher, breathing becomes more regular, and there is a fewer number of inhales and exhales per minute (Joshi, Joshi, Gokhale, 1992; Raub, 2002).

The potential effect of yoga on reducing stress, anxiety and depression, which are increasingly present in adults, but also in children, has been studied in several papers. Some research included self-assessments as a measure of emotional states, and some included physiological indicators.

Yoga has shown to be an effective anti-stress technique in both adults and children (Granath et al., 2006; Kalayil, 1988). Positive effects on anxiety and panic states have also been recorded (Telles, Gaur, Balkrishna, 2009; Kozasa et al., 2008; Kuttner et al., 2006; So, Orme-Johnson, 2001). Practicing yoga, unlike walking, increases the level of the GABA neurotransmitter, which plays a role in anxiety disorder (Karri, Yakhkind, Jensen, 2010). Yoga exercises have helped elementary school children reduce situational anxiety (Kalayil, 1988), whereas high school students became better at controlling anger, were less tired, reduced their anxiety, and improved their mood compared to the control group (Khalsa et al., 2012). The conclusion of a meta-analysis of 124 studies that dealt with the effects of yoga, practicing asanas, meditation and breathing, is that yoga can reduce depression (Balasubramaniam, Telles, Doraiswamy, 2013).

By practicing the "Siddha Samadhi Yoga" programme which includes meditations and pranayama, there were higher scores on the psychological well-being scale in adults (Kozasa et al., 2008). In a study involving 200 students aged 17, a group practicing yoga reported higher levels of happiness and mental balance (Gupta, Singh, Singh, 2016). Meditation has been shown to increase empathy (Lazar et al., 2005; Lutz et al., 2008).

YOGA AND COGNITIVE FUNCTIONS

Many studies confirm the effects of yoga practice on cognitive functions in both adults and children. Improvements in attention, perception, and memory have been confirmed, and some research indicate the possibility of influencing the speed of problem-solving and executive functions.

One of the first studies on the effects of yoga on attention in children was in the 1970s (Hopkins, Hopkins, 1979). The study involved 34 children aged six to 11. The children were divided into groups; one group exercised for 15 minutes, the other group had psychomotor exercises during that time. Concentration was measured through the score of one concentration game. Both groups significantly improved concentration. The disadvantage of the research is that there was no control group that did not do anything during that time.

Several studies that included a control group confirmed the effect of yoga on improving attention in both adults and children (Hopkins, Hopkins, 1979; Razza, Bergen-Cico, Raymond, 2015; Pradhan, Nagendra, 2010; Manjunath, Teles, 2001; Tang et al., 2007; Telles et al., 1993; Valentine, Sweet, 1999). Attention was measured by performance on tests, questionnaire assessments, and observation.

Nilsoge et al. (2016) found beneficial effects on working memory on a sample of 40 children without disabilities aged eight to 14 who practiced yoga, compared to the control group of children.

In another study, after one month of daily yoga programme lasting 75 minutes, the completion time of the mental health test in girls aged 10 to 13 decreased (Manjunath, Telles, 2001). In their review paper, Murphy, Donovan and Tailor (1997) point out that meditation, in addition to attention, also has a beneficial effect on perception and creativity, and reduces reaction time and field dependence. Similar conclusions were reached by So and Orme-Johnson (2001) studying the effects of TM meditation. As many as 154 students from a Chinese high school were divided into a meditation group and a control group. After six months of daily exercise for 20 minutes, there were significant shifts in the results of practical intelligence, field dependence, creativity, and information processing speed, compared to the control group.

Given that practicing yoga has an impact on cognitive abilities, it is reasonable to assume that it also improves school success, i.e. grades, which has been confirmed in several studies (Harrison, Manocha, Rubia, 2004; Kauts, Sharma, 2009).

YOGA AND SELF-REGULATION

The effects of yoga on executive functions, such as planning, learning regulation, and self-monitoring, which play a very important role in the learning process, were also studied. In a study by Manjunatha and Telles (2004), there was an improvement in planning, task-solving speed, and memory in a group of children who practiced yoga, while there was no improvement in a group of children who engaged in other physical activity. Self-regulation is one of the most important components of school readiness (Blair 2002; Raver 2004), as it affects peer acceptance and school success (Blair, Razza 2007; Ladd Birch, Buhs, 1999; McClelland, Morrison, Holmes, 1999). It is also associated with self-esteem, health, and achievement (Moffitt et al., 2011; Shoda, Mischel, Peake, 2000).

Razza et al. (2015) examined the effectiveness of a yoga-based intervention on improving self-regulation in preschool children (aged three to five). Significantly greater progress was made on all measures of self-regulation, delay of gratification, and inhibition control in the experimental group, compared to the control group.

Ramadoss and Bose (2010) found significant improvements in self-control in a group of 190 high school students who practiced yoga, compared to the control group. Similar results were obtained by Khalsa et al. (2012) and Noggle et al. (2012); groups of high school students who practiced yoga were significantly better at controlling anger.

YOGA FOR CHILDREN WITH DISABILITIES

Practice and research have shown that children with disabilities are able to practice yoga and benefit from the exercise.

A recent study examined the possibilities and impact of practicing yoga in 29 children with autism spectrum disorder (Sotoodeh et al., 2017). A yoga instructor had practiced with each child individually for 30 minutes, three times a week for eight weeks. There have been significant shifts in The Autism Treatment Evaluation Checklist (ATEC) in all areas except spoken language communication.

Uma et al. (1989) investigated the effect of yoga in children with intellectual disabilities. Ninety children were divided into an experimental group that practiced yoga, and a control group that participated in normal school activities for one hour each day for one school year. The group that practiced yoga made significant progress on intelligence tests, psychomotor and social skills, as opposed to the control group.

It was further found that meditation can reduce anxiety, improve social skills, and academic achievement in adolescents with specific learning difficulties (Beauchemin, Hutchins, Patterson, 2008).

Possibilities of introducing yoga as part of the school curriculum for children with mood and behavioural disorders were also explored. After three and a half months of exercising one hour, twice a week during class, teachers reported better attention and reduction in symptoms of mood and/or behavioral disorders (Steiner et al., 2013).

Yoga is increasingly practiced by children with cerebral palsy. In one case study, there was a shift in posture, balance control, flexibility, and functional mobility in a nine-year-old girl who practiced yoga following a six-week programme tailored for people with motor impairments (Bugajski et al., 2013).

A number of studies have confirmed that practicing yoga reduces the symptoms of attention deficit and hyperactivity disorder (ADHD), i.e. it improves attention while reducing hyperactivity and impulsivity. There have also been significant shifts in parent and teacher assessments (Boeshansz, 2009; Grosswald et al., 2008; Chou, Huang, 2017; Hariprasad et al., 2013; Harrison, Manocha, Rubia, 2004; Jensen, Kenny, 2004; Shannahoff-Khalsa, 2004) and in attention and reaction time tests (Chou, Huang, 2016). Some research has found that – in addition to attention – organizational skills, reading, and writing in children with ADHD can be improved (Mehta Shah et al., 2012), and oppositional behaviour can be reduced (Redfering, Bowman, 1981).

By practicing yoga together, parents and children have opportunities to improve their relationship as well. This was demonstrated by Harrison, Manocha and Rubia (2004) investigating the effect of Sahaja meditation on families with 48 children with ADHD. There have been significant shifts in self-esteem, school success, parent-child relationship, and reduction in ADHD symptoms in children. Anxiety has also decreased. Some children have discontinued medical therapy or reduced the dose of medication. These children had even greater effects by meditating. Many children stated that they fall asleep and concentrate more easily. They reported fewer problems with peers. Ninety-two percent (92%) of parents reported significant changes and their satisfaction with the programme. There was no progress in the control group while they waited for the programme; there were also significant changes after the programme.

Hariprasad et al. (2013) showed that yoga can also be practiced by children with very pronounced symptoms of ADHD. Nine children aged five to 16 with very pronounced ADHD symptoms exercised each day with their parents during their hospital stay. They continued to exercise at home three times a week for

one month. They all progressed in performing the exercises and the symptoms decreased. A couple of months later, when they stopped exercising, the symptoms worsened.

YOGA IN SCHOOLS

Based on the review of research on the effects of yoga so far, it can be assumed that yoga could be very much welcome as part of the school curriculum helping to achieve the planned outcomes.

Yoga is already a part of the curriculum in nine thousand US schools. More than 5,400 yoga instructors have been trained for conducting yoga programmes in schools (Khalsa, Butzer, 2016).

The number of yoga programme evaluation studies as part of the school curriculum is growing exponentially. Six studies were published in the period from 2005 to 2009, the number increased to 30 in the period from 2010 to 2014, while in 2015 there were 11 studies published (Khalsa, Butzer, 2016). Most studies have been conducted in the US and India. One available study is from Israel and one from Germany. Although yoga has been practiced in European schools for more than 30 years, according to the programmes of various schools, there are no European research in the available databases. The "Research on Yoga in Education" programme founded by Flak (http://www.ryeuk.org/) is present in some European countries (France, UK, Italy, Belgium, etc.). According to the "Yoga in daily life" system by Paramhans Swami Mahewswarananda, it is also practiced in many countries in Europe, America, Australia, Asia, and even Africa. Many teachers in Croatia have completed their education according to the "Yoga in daily life" system and use their knowledge in working with students.

Yoga as a programme was most often offered at a time when other students were having physical education classes, but on multiple occasions some teachers incorporated exercises during or after classes. Most yoga programmes are conducted by trained yoga instructors, and in some programmes, teachers are trained by yoga instructors.

Based on the available data, three systematic review papers related to the area of yoga-based school interventions have been conducted so far. The last systematic analysis was in 2016 (Khalsa, Butzer, 2016).

Subsequently, a number of other papers in this field were published, only some of which met strict methodological criteria, meaning that they included experimental and control groups in which participants were selected randomly (so-called randomized controlled trials).

A systematic analysis of 12 studies (Serwacki, Cook-Cottone, 2012) indicates multiple benefits of practicing yoga during classes for healthy children, but also for children with autism, intellectual disabilities, learning difficulties, and emotional difficulties. Attention, concentration, and self-esteem have increased in students, stress coping strategies have improved, and stress, anxiety, and emotional arousal have decreased (Serwacki, Cook-Cottone, 2012). The authors state that although yoga-based interventions show some positive outcomes, methodological limitations of some research (quasi-experimental plans, cohort studies, insufficiently described intervention programmes) prevent definitive conclusions from being drawn.

The following systematic analysis of nine studies that met methodological criteria (Ferreira-Vorkapic et al., 2015) found small- to medium-size effects for measures of mood, tension, anxiety, self-esteem, and memory.

Two studies state that there was a higher level of stress during and after practicing yoga (Haden, Daly, Hagins, 2014; White, 2012), compared with the control group and the group that had a normal physical education class. They give possible explanations for these negative effects. They state that yoga exercises are new to children and require adjustment and effort in the initial period which can be stressful. Therefore, they recommend that the impact of yoga on stress is examined after the initial period, that is, after the intervention. As another possible reason for the increased stress, they cite the inadequacy of certain techniques, such as breathing exercises for children, and emphasize the need to adjust the yoga programme with regard to children's age. Breathing exercises can also be practiced by children, but it is necessary to achieve the prerequisites previously described in this paper. The authors of research in which there was greater stress in individual children (Haden, Daly, Hagins, 2014; White, 2012) as a possible explanation suggest that students with awareness training through yoga became more aware of emotions, which may initially result in greater stress, but ultimately in finding better ways to deal with emotions.

Ferreira-Vorkapic et al. (2015) further argue that the positive effects of practicing yoga were shown in shorter programmes lasting 15 to 30 minutes, and that programmes of longer duration are too demanding for children. However, there are studies that speak in favor of the positive effects of practicing yoga in 45-minute programmes as well (Telles et al., 2013; Verma et al., 2014).

The fact is that in most papers, yoga programmes are not described in detail, and we cannot determine how suitable certain programmes are for children. Only the names of the programmes are given, for example, "Kripalu Yoga" (Noggle, 2012), "The Mindful Awareness for Girls through Yoga" (White, 2012), "Yoga

Fitness for Kids" (Peck et al., 2005), Marsha Wenig's yoga programme (Boeshnaz, 2009), and techniques covered by the programmes, for the most part asanas, exercises for relaxation, breathing, meditation, or guided imagination.

A year later, a critical analysis of yoga research in schools was conducted by Kalsa and Butzer (2016). Of 47 studies included in the analysis, 27 met the most stringent methodological criteria. The authors conclude that, despite the difficulties of comparing research arising from heterogeneity in yoga programmes and the different duration of programmes, the research findings suggest positive effects of yoga practice. The authors also emphasize the need for more methodologically adequate research that would include various measures of effect, such as psychophysiological measures.

Following these systematic analyses, a few more quantitative randomized experimental studies evaluating the effects of yoga programmes have been published. The "Transformative Life Skills" programme that includes teaching about stress, reaction to stress, exercising asanas, relaxation, breathing, and meditation (Frank et al., 2017) showed a significant increase in emotional regulation, positive thoughts, and cognitive restructuring in response to stress, compared to the control group. There was no significant effect on somatization measures, school success, and general mood. The students accepted the programme well and found it useful.

In addition to experimental plans involving quantitative methods, some of the researchers tried to use qualitative methods to examine the effectiveness of yoga as part of the school curriculum. Yoga practitioners often notice non-specific changes that are difficult to measure by classical quantitative methods. Qualitative methods, which collect data on life experiences, are a good tool precisely for researching such complex, unique experiences (Conboy et al., 2013). By reviewing research that included qualitative methods, we can conclude that most participants report positive experiences during and after practicing yoga. Elementary and high school students also reported that practicing yoga helped them recognize signs of stress, and that they used some exercises in stressful and emotionally demanding situations (Conboy, 2013; Mendelson et al., 2010; Charbonneau, 2011; Thomas, 2014), when angry (Thomas, 2014), before going to bed, and in other situations (Butzer et al., 2017; Thomas, 2014; Conboy, 2013). Older students, aged 15 to 16, noticed increased awareness of the body, thoughts and emotions (Charbonneau, 2011). They stated that they felt calmer after relaxation and breathing exercises (Conboy, 2013; Thomas, 2014).

Some studies have reported that a small number of students did not like yoga programmes, mostly because they were held at the same time as other students had their usual physical education class (Butzer et al., 2017; Conboy et al., 2013).

Three studies included teachers' observations and interviews (Thomas, 2014; Tubbs, 2018; Mendelson et al., 2010). The teachers observed positive changes in concentration, learning, and behavior (Thomas, 2014; Tubbs, 2018; Mendelson et al., 2010).

Two studies have explored the possibility of implementing yoga in schools as a form of intervention for children with attention deficit disorder. Peck et al. (2005) conducted a study that included a control group, and attention was measured as time spent on the task, whereas in a study conducted by Boeshanzs (2009), teachers' attention assessments were compared before and after the intervention, and there was no control group. Although the results indicate a favorable effect on attention in both studies, due to small samples and methodological shortcomings, no serious conclusions can be drawn about the effectiveness of programmes designed specifically for groups of children with these difficulties. In both studies, children with attention deficit disorder were able to practice according to instructions for up to 30 minutes, which indicates children's ability to practice yoga in a school context despite the difficulties.

Yoga programmes are also being introduced at the preschool level. Several studies have addressed the possibilities and effects of applying yoga in kindergartens. Only one of them involved a randomized plan with a control group. Razza et al. (2015) examined the effectiveness of a yoga-based intervention on improving self-regulation in preschool children aged three to five. There were 16 children in the experimental group and 13 in the control group. The educator led the "Yoga Kids" programme (Wenig, 2003) for a year. The programme lasted from the initial 10 minutes to 30 minutes a day, and consisted of breathing exercises and sun salutations in the morning, asanas were following literary activities in the afternoon, and breathing exercises were put in between. Significant advances were made in all self-regulatory measures – attention, delay in meeting needs, and inhibition control in the experimental group with significant differences in self-regulation at the end of the programme, compared to the control group. Most progress happened in those children who were most at risk for self-regulation dysfunction.

Meditations are increasingly pervasive as youth programmes in schools, community, and clinical practice. Thousands of students in the US have undergone a Transcendental Meditation (TM) programme through "The David Lynch Foundation". The programme is intended for students from the age of 10 onward as a treatment for ADHD, emotional problems, and learning difficulties. "The US Committee for Stress-Free Schools" founded in 2005 provided TM programmes to students and teachers across the US a (Black, Milam, Sussman, 2008). Students

have a meditation programme twice a day for 15 minutes. Evaluation of the effects of TM in relation to the control group showed progress in intelligence (So, Orme-Johnson, 2001), learning, academic success (Nidich et al., 2011), psychological well-being (Wendt, Hipps, Abrams, 2015), reducing anxiety (Elder et al., 2011) and drug use (Monahan, 2009). The programme also resulted in a lower dropout rate (Colbert, 2013). It turned out to be good for children with ADHD; the impact was manifested on attention, organizational skills, learning independence, better sleep, better EEG image, and the effects remained present even after three months (Travis, Grosswald, Stixrud, 2011).

In addition to the studies described here, a number of studies with greater methodological limitations have been conducted, such as a plan that does not include a control group, includes only small samples, has insufficiently described interventions, etc. Research into the effects of yoga in school are quite heterogeneous in terms of the type, duration and manner of implementation of yoga programmes, sample size, student age, and assessment methods, and are therefore difficult to compare.

Although most programmes include exercises that traditionally belong to yoga, they differ in the choice and order of exercises, as well as the way they are performed and the approach of the instructor. Due to that, the outcomes of individual programmes may differ. Many programmes, not having knowledge of how to perform and effects, have taken some yoga exercises from the traditional corpus while excluding some exercises without which the effect is not complete. Many programmes that were a part of individual research lasted very short. Given the duration of the programme, it is logical to expect that programmes that last longer will produce greater changes in the practitioners. It is unrealistic to expect a short-term programme to lead to complex and process changes on the cognitive and socioemotional level. Research also differ in the selected measuring instruments. Certain subtle changes can only be captured by appropriately selected assessment methods, and the conclusion that there are no changes after the programme may be incorrect. Some research has failed to determine the effectiveness of yoga, while most have confirmed the specific contribution of yoga to stress, self-regulation, and cognitive abilities found in evaluations of yoga programmes in centers outside of school.

From the research above, it can be concluded that replacing physical education or some other leisure activity with yoga is not a good way of introducing yoga into the school curriculum. It seems that practicing yoga as a separate activity in school and practicing some yoga techniques several times a day, for example at the beginning of a class, can yield good results.

CONCLUSION

By reviewing a series of research, this paper sought to contribute to answering the question of the role of yoga in education. Interest in researching the possibilities of yoga as a therapy for various conditions and diseases, as a form of prevention and intervention in children with disabilities, and as part of the school curriculum is growing. Previous research confirms the effects of yoga on health condition, cognitive functions, emotions, and self-regulation. In schools that introduced yoga as part of the curriculum, there has been a reduction in stress, improved mood, increased attention and calm in some children, which are prerequisites for successful learning. Possible benefits have been demonstrated through the use of yoga exercises during breaks, during classes, and as a separate activity.

Following the above, we can conclude that yoga could play a significant role in education by helping to achieve outcomes and encourage psychosocial development.

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ULOGA JOGE U OBRAZOVANJU

SAŽETAK

Cij rada je kroz prikaz istraživanja obrazložiti mogućnosti primjene joge u obrazovanju. Joga uključuje razne tehnike kojima je jedan od ciljeva postizanje psihosocijalne ravnoteže. Svjedoci smo porasta stresa i emocionalnih poremećaja kod djece; djeca se sve manje kreću, a sve su više zaokupljena mnoštvom podražaja koja dolaze neprestano mobitelom, računalom, televizijom. Pregledom niza istraživanja učinaka joge možemo zaključiti da se pokazala učinkovitom kod različitih stanja i bolesti. Vježbanje joge može pomoći u smanjenju stresa, simptoma anksioznosti, depresivnosti. Istražuju se mogućnosti joge kao dijela školskoga kurikuluma, kako za tipičnu tako i za djecu s teškoćama. Dosadašnji rezultati pokazuju moguće prinose joge u školama u vidu poticanja pažnje, samoregulacije te smanjenja napetosti.

Ključne riječi: joga, obrazovanje, škola, zdravlje.