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Improvement of structure of human brain function through Yoga Practice and the affect on academic performance of students

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Abstract

Background: Human concentration and attention largely depends on the physical health and activation of the brain and it also help us to fell positive thinking, imagination, effort, creative activity, interest to study etc. Yoga is a such type of exercise that helps to maintain proper movement and communication of various parts of the body. We find the reality of nature in the body through our breathing. Practicing yoga every day awakens the nerves and produces energy hormones. As a result, our negative attitude and depression are removed and a positive outlook on life is created.

Aims: To review scientific literature related to Yoga practice and improvement of structure of human brain and the affect on academic performance of students.

Methodology: Researcher reviewed and critically analyzed over 42 articles and collected evidence through on electronic database; Pubmed, Medline, Embase, Google Scolar, Google Advance search, Web of science.

Result: Yoga practice improve our brain function and higher level of concentration which can influence the academic performance of students and also helps to reduce symptoms like shortness of breath, gastrologic problems, aggressiveness, irritation mood, laziness etc.

Conclusion: As a result of practicing Yoga every day to improve the Gray matter density in our brain and actively response to nervous system.

Keywords: -Yoga Practice, Structure of brain, concentration, Physical health, academic performance.

Introduction:

The advent of yoga dates back to many ancient times of India. Yoga has been practiced in India since ancient times. There is no substitute for yoga to keep ourselves healthy in our modern life. So, the benefits of yoga are given special importance in medical science. The scientifically correct time for yoga practice is 3.40 a.m. Moreover, in the cool and fresh weather of the morning keeps fresh the body and mind. As a result, your day-to-day work will be better. In ancient times physical movement, meditation and breathing were practiced to reconcile the mind, body and spirituality (G. Neha et al. 2019). At present times we are affected by various negative attitudes due to our busyness, tension, anxiety and mental worries. For this, we cannot proper concentrate to any work (Joice at.al. 2018). For long time yoga practice, we can change our attention and perception and concentration level (Varma, A at.al., 2014). So, Yoga has an important role to improve cognitive portion in our brain (Joice at.al. 2018). Many of scientists found that yoga growth new neurons in brain but few studies have examined how yoga affected the brain practicing yoga day by day helps to reduce the stress on our brain (Bhanu, 2015) and also increase our reflective level thinking (Kauts, 2012). Even those who are diabetes patient keep balance of body by yoga practice. 7-8 weeks yoga practices improve the intelligence of children who are learning disability (Parisa, 2015). As people get older, their brine function with psychological profile has decreases. As a result, the negative effect falls on thinking level. Yoga also helps to keep our psycho-physical system smoothly (De & Modan, 2016).

If yoga practice decreases sympathetic activity and cause a shift in the autonomic balance towards parasympathetic dominance and indicates helps to reduce stress by optimizing the autonomic function (Patil S G at.al., 2013). 12 weeks yoga training program can change in the brain's baseline and activated cerebral blood flow and right sensorimotor area and greater impact found in right hemisphere function, particularly in the frontal lobes (Cohen, 2009) and yoga significantly develops to brain memory function and transcendental meditation improve short term (Kauts & Sharma, 2012). Yoga not only makes the body comfortable by releasing hormones from the inside of our brain, but also helps to reduce stress and anxiety. Dopamine, Oxytocic, Serotonin and endorphins hormones helps to bring good thought into our brain. Dopamine hormone help us to gain experience from different fact and restore it in memory and Serotonin hormone help us to reduce our tension, depression and mental stress etc. and it also helps to keep control our emotions and happier all the time (Emmy Lymn, 2019). Psychological stress puts pressure on the sympathetic nervous system. This makes it difficult for the body to react. As a result, the intervention of the autonomic nervous system affects a number of unconscious activities driven by the brain, such as digestion metabolism, and so on. Meditation helps balance to our body. (Medha, Koushik et. al. 2020).

Yoga practice increases gray matter density:

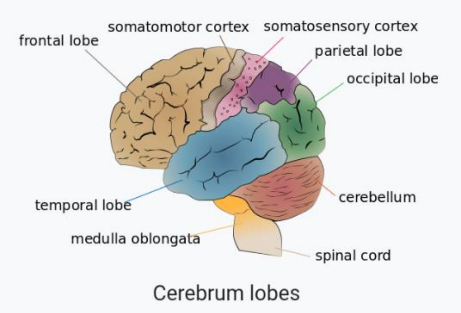
Human brains primarily made up of two types of tissues: white and gray matter. A normal human brain consists of about 60%, white matter and 40% gray matter. Both of tissues play an important role in cognitive development. However, each brain tissue type has a different function (Emmy Lymn, 2019).

Gray Matter: The cusped part of the top of our cerebrum area is called gray matter. Another name is cerebral cortex. It is pink color. This is why we are alive and blood flow is just right. After die a man, it turns gray due to its concentration of neurons. So, gray matter is very responsible for many of our brain function like learning

skill and memory store (Luders E at al., 2012). It also plays an important role in maintaining our eyesight, hearing, smell, touch, body balance and helps to moves muscles and be in self-awareness.

White Matter: White matter is maintaining connection with different part of body and brain. Brain sends and collects information to different parts of the body like internet communication. As such, white matter allows your brain to coordinate your thought as well as your movements.

In general, both gray and white matter complement each other allow to think, coordinate, movement and interpret the world surrounding you. Damage or reduction in one or the other area affects your cognitive abilities. Practicing Yoga improve the gray matter density in our brain (Jancke L, 2009).



Cerebrum lobes

Frontal Lobe: The frontal lobe is the most advance part of our brain. This portion is responsible for most of thinking, planning and reasoning. Moreover, it plays role imagination, emotional regulation, self- awareness. During yoga keep refresh the frontal lobe for a while.

Parietal Lobe: This section of the brain controls all the information coming from our senses. And, it also takes in the sights, sounds and we can imagine how much activity have done like move, working, driving etc. During Yoga help to slow down of that section.

Occipital Lobe: The occipital lobe deals with aspects of vision, including- distance, depth perception, color determination, object recognition, movement, face recognition, memory information (Rehman A & Al khalili Y, 2020).

Temporal Lobe: Function of the temporal Lobe are language comprehension, smell and emotion association etc. During Yoga practice helps to refresh the mind and thing correctly (Smith; Kosslyn, 2007).

Brain is folded tissue: Every day practice meditation, Yoga Pose like asanas, Pranayama helps us to develop our physical, mental and spiritual aspects. The folds of our brain continue to grow pranayama (G. Neha.et al.2019). The folds are like cloth. It called cortical folds. That's because the brain has to fit our brain and our skull is small, it has to find a way to squeeze itself in there (Jancke L, 2009). Just as we can put a lot of things in a trolly bag because we fold all clothes so, the nerves in brain folded to hold to fit in skull (Emmy Lymn, 2019). According to Researchers, MRI brain scans showed that long-term meditation can change cortex lobe, because of its neuroplasticity result (Cohen, 2009). So, the present study reviewed whether yoga has an improved the structure of brain and also effect on academic performance in students.

Significance of the study:

Yoga assimilates us with nature. The role of yoga is essential for coordination with self-control. Everyday practicing yoga increases the concentration of the students. They work actively (Dottere & Lowe,2011; Jons et al. 2018). The aim of the present study is to an investigate yoga has an effect on academic performance with changes in the structure of brain. Various studies have shown that yoga practice causes changes in the

cerebral cortex region of the brain. Result found that the increase self-control in our body and able to accurate work. So, the success rate in education is high.

Objectives of the study:

To review scientific literature related to Yoga practice and improvement of structure of human brain and the affect on academic performance of students.

Method:

The present study were systematic reviews data collected through online based on evidence. The electronic database: PubMed, Medline, Embas, Google Scolar, Google Advance search and web of science were carefully searched for the purpose of review of literature.

Discussion:

Researcher involving a comprehensive study of structural brain scene found that a person's general intelligence is associated with the volume of gray matter in that specific area of the brain. Essentially the thicker volume of the gray matter in a region of your brain, the more cells are present there and thus, the move likely to perform better (Emmy Lymn, 2019).

Yoga improves our Brain structure: Most of study came from functional and structural neuro imaging studies, typically employing magnetic resonance imaging (MRI). Many structures research often use voxel-based morphometry (VBM) to investigate changes in gray matter (Fox et al., 2014). Some morphometric studies of yoga have consistently found gray matter change in regions related to the self-regulation mechanism mentioned above as attention control, emotion regulation and self -awareness (Lazers at al., 2004; Holzel et al., 2008; Luders at al.,2012).

Internal health benefits of Yoga practice:

- Good blood circulation
- Lowered blood pressure
- Lowered respiratory rate
- Improvement in gastrointestinal health
- Higher levels of pain tolerance
- Increase immunity
- Renewed energy
- Increase metabolism
- Well sleep
- Dropping the cholesterol
- Boosted red blood cells
- Reduce the risk heart attack
- Lower migraine problem

External health benefits of Yoga practice

- Keeps premature aging at bay
- Increasing strength
- Maintain the body weight
- Increasing core strength
- Improving Endurance

Mental health for Yoga practice

- Uplift your mood
- Reduce stress
- Fights depression
- Builds concentration
- Improve memory
- Tendency to accurate work
- Brings about a positive outlook to life

Yoga Practice and Anxiety reduction: this is because our stress hormones trigger different parts of our body. As a result, release more sugar into your bloodstream, increase your blood pressure, and produce inflammation (Chen W at al., 2012). Loge time keep hold sustained for serious condition patient was die due to heart attack, high blood pressure and diabetes (Streeter CC at al., 2010). Yoga helps to reverse these effects (Thirthalli J,at, al. 2013). Another study cited that 12 minutes of per day yoga practice helps lower body inflammation response, which is important as chronic inflammation is linked to serious long -term conditions like depression and heart attack (Streeter CC at al., 2010).

Difference kind of Yoga postures provide benefits for the body.

Types of Yoga Practice	Benefits
Padmasana	Elimination of respiratory problems, increased lung function.
Pavana Muktasana	Elimination of digestive problems, Constipation problems, increased hunger.
Uthan padmasana	Reduce knee pain.
Salvasana	Reduce back pain.
Vujangasana	Reduce neck pain.
Ardhakurmasana	Helps reduce belly and buttock fat.
Halasana	Increases blood circulation and reduce mental stress.
Setubandhasana	Increase the ability to concentration.
Salamba shirsasana	Increase blood flow to the brain.

Yoga and Academic Performance:

Yoga improves the structure of brain function for which students can concentrate to their study. As a result, a significant impact on academic performance. Many of researcher showed that, if practicing yoga for 3 months before start the examination slowly increase concentration level (Sahasi & Mohan, 1989). Because, our brain alert and active the hippocampus and parietal lobe for memory storage (Broad & Draganski, 2006) and also improve the visual-spatial, perception knowledge for high judging (Sampaio & Draganski, 2014). So, yoga helps to maintain the emotion and mental balance in our life (Negendra HR & Nagarathna R, 1977). Six-month yoga practice (Meditation, Asanas, and Pranayama) students can feel good thought in their mind. Body weight continues to decrease, increased vital capacity, acceleration in endocrinal function and improve our cognitive domains (Singh & Udupa, 1977). Three months during yoga practice (Savasana) reduce many of problems go out from body like headache, insomnia and nervousness etc. (Datey K K, 1977). per day meditation practices along with physical postures (asanas) to change the life style of students and also, they can remember a thing for a long time after study (Telles & Nagarathna). Another study showed that after meditation- a) students are change their maladaptive behavior, b) physical and mental health is good, c) create a good psychological structure, d) they find a new direction in life (Dua J, 1998). Chanting the "OM" mantra for two hours before the start of any examination keeps the mind clam and active. This often students can give the right answer to the questions (Sharma R, 2002). Students who have examination phobias, if they everyday practice yoga for three-four days before start the examination, they get free from mental stress and the exam is good. Students can easily perform these type test as reasoning test, ability rest, problem-solving test etc. (Singh K P, 2018). Yoga poses like (Streeter CC at al., 2010) very necessary to reduce high pressure (Kauts & Sharma, 2009).

Seven ways have an impact on Academic performance:

Emotion Regulation: Yoga help to develops our self-regulation skill like friendful behaviors, cooperate, adaptation, Ego-control, attention to boost mind activeness, to response internal cues, quick feed back and meta cognitive behaviors etc. (Butzer B & Flynn L, 2018).

Academic Performance: Students did not proper concentrate when taught traditional way in the class because of their lack of healthy mind. Yoga practice keep active mind and increase interest of students in their study. So, they can easily succeed in education.

Reduced tension: Yoga can improve the gray matter in brain. Serotonin, Dopamine hormones are release from frontal lobe. As a result, it reduces anxiety and control blood pressure.

Resilience to stress: Researcher claim that 8 weeks yoga practice a day in school, students' can increase their thinking level and actively do any work (White LS, 2020) and 10 weeks yoga practice they can easily handle any challenging task (Sarkissian at al., 2018). It may improve the sense of control, anxiety so, increasing resilience (Butzer B & Flynn L, 2018).

Fewer Problem Behavior: There are some students in school who become easily agitated which has an impact on their academic performance (Simone Robers, 2012). Yoga helps to stop the negative attitude of students and control of impulsive behaviors (Frank J at al., 2017).

Physical Well-being: 12 weeks yoga practice everyday 4-5 minutes improve the motor abilities, including strength and flexibility (Folleto J C at al., 2016) and 5-15 minutes every day improve the physical well-being, including their body posture, sleep, remove fatigue and diet control (Chen, D.D & Pauwels L, 2014).

Teacher well-being and classroom climate: Yoga create a good environment in school and making a good interaction between students and teachers (Butzer, B, Flynn L, 2018).

Conclusion:

The present study has shown that yoga practice changes the structure of our brain. The nerves in the brain are awakened and energy-producing hormones release from brain likes Dopamine, Oxytocic, Serotonin and endorphins. These hormones help to bring good thought and remove negative thought in our mind. Yoga increases blood circulation and immunity develops in body. It also dependency grows in one's mind and depression are removed and a positive outlook on life is created. The practicing of yoga has an impact in education. Children can remember a thing for a long whole after learning it. Various studies review has shown that the success rate of students in higher by the practice of yoga. Chanting "OM" mantra everyday practice it is seen that fear, restlessness disappears in our mind and mental balance is return. Students tend to work an accurately. So, the role of yoga is an important for every person to keep the healthy body and increase concentration.

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