

**A CLINICAL STUDY TO EVALUATE THE
IMPROVEMENT IN COGNITIVE ABILITIES
AMONG SCHOOL CHILDREN BY PRACTICE OF
ASANA, PRANAYAMA AND DHYANA.**

By

C N RENUKA (17Y0324)

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in

Naturopathy and Yoga

Under the guidance of

***Dr. LAKSHMI NARAYAN SHENOY [Assistant director of Government
Ayurveda research center, Mysuru]***

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Dr Lakshmi Narayan Sheoy
[BAMS, MD, PhD]
Assistant Director
Government Ayurveda Research Center,
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DATE:

SIGNATURE OF CANDIDATE

PLACE: MYSURU

C. N. RENUKA (17Y0324)

LIST OF ABBREVIATIONS USED

Sl. No.	Abbreviated Forms	Full Forms
1	BCE	BEFORE COMMON ERA
2	Ca	Circa (Approximately)
3	CAM	COMPLEMENTARY AND ALTERNATIVE MEDICINE
4	ECCE	EARLY CHILDHOOD CARE AND EDUCATION
5	Fig	FIGURE
6	MMSE	MINI MENTAL STATE EXAMINATION
7	NCERT	NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING
8	NICE	NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE
9	OED	OXFORD ENGLISH DICTIONARY
10	%	PERCENTAGE
11	Sl.No	SERIAL NUMBER
12	UNICEF	UNITED NATIONS CHILDREN'S FUND

ABSTRACT

Background and Objectives

Cognitive development is a natural development in children which includes orientation, registration, attention and calculation, memory, language, executive functions like faculties. It is developed in children in a systematic milestone way, it can be enhanced by parents, with the change of behaviour.

cognitive development is a multifaceted entity, as it is connected with physical, mental, social, philosophical, economical and genetical predispositions still the lack of cognitive functions is present in children, for which cause is unknown.

The chief aim of this study is to improve the cognitive abilities of children by practice of Asana, pranayama and dhyana without any medications, just by incorporating yogic practice in their life style.

Methods

The study was a clinical comparative study with 2 groups with pre, post and follow up test design. 30 subjects were selected randomly from Pramathi hill view academy and assigned 15 subjects each into case and control group as per the inclusive and exclusive criteria. Group A of 15 students were given intervention of yoga of 45 minutes regularly for 21 days and assessed according to parameters and statistical tests.

Results: The study showed highly significant results in the case group at the end of the intervention. However, there was no change in between the groups with a non-significant test of significance.

Interpretation & Conclusion: Hence it can be concluded that Asana, pranayama and dhyana proves to be valuable in improving cognitive functions among children.

Keywords: Cognition; Children; Asana; Pranayama; Dhyana.

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1. INTRODUCTION

Cognitive development is a natural development in children which includes orientation, concentration, memory, intelligence, attention, calculation and like faculties. It is developed in children, in a systematic milestone way and can be enhanced by parents, with the change of behavior. The child acquires the above faculties by their parents through genes, by the social environment, through social behavior and etiquette by environment and some of the faculties may also develop due to our culture, tradition and our philosophical thoughts. And the cognitive development is a multifaceted entity it also depends upon the style of communication, the style of leadership, and also involves many tools of emotional intelligence also. Cognitive development also happens in association with development, schooling, interaction with the friends, reading habits, and ability to acquire in knowledge gained by the child in a due course of time. As it is connected with physical, mental, social, philosophical, economical and genetical predispositions still the lack of cognitive abilities are present in children, for which cause is unknown. This study intends to find a solution for such children with the help of asana, pranayama and dhyana without any, medication and try to assess its effects on the students especially for cognitive faculties. Here special attention is given to assess memory in its all forms and also assessment will be done for concentration, orientation, registration, attention and calculation, language and executive functions too. It is a study which focuses on the vital role of yoga in cognitive development among school children.

The children: the future of tomorrow “Children are our future”. The Wealth of a nation is not so much in its of economical and natural resources but it lies more decidedly in the kind and quality of the wealth of its children and youth. It is they who will be the creators and shapers of a nation’s tomorrow. It, therefore, become mandatory for every nation and every society to nurture a strong, healthy and intellectual children and youth. Hence development of children in Physical, Mental, Social, Emotional, and spiritual planes is necessary. Cognition¹ is a term referring to the mental processes involved in gaining knowledge and comprehension. These cognitive processes include thinking, knowing, remembering, judging, and problem-solving. Yoga means "union" in Sanskrit, the classical language of India. Yoga² is the art and science of living, and is concerned with the evolution of mind and body. Therefore, yoga incorporates a system of disciplines for furthering an integrated development of all aspects of the individual. As a result changing lifestyle, drastic development, busy life schedules, it has become prime concern to the parents and society about the cognitive development, physical development, mental development and spiritual development of the children. To achieve this proper education should be provided, it should be progressive, in keeping with the needs of the society and should not only create great professionals excelling in their fields but also a good human beings. Yoga helps to achieve the complete development of the individual in physical, social, mental, emotional, and spiritual planes. Yoga helps for complete personality development of the child. Previous research suggests that yoga practice have immense impact on performance of central nervous system and improve their action, concentration and other cognitive faculties³. The National Trust is a statutory body of the Ministry of Social justice and empowerment. Government of India, set up under “National Trust for the welfare of persons with Autism, cerebral palsy, Mental

retardation and Multiple disabilities” Act (Act 44 of 1999)⁴, Has highlighted cognitive impairment in children in a scientific manner. The practice of yoga can increase grey matter volumes in the temporal and frontal lobes, producing positive impacts on mental health and improved cognitive functions⁵. It is believed that the practice of yoga can also result in changes in perception, attention, and cognition. Investigations have shown the beneficial effects of yoga on cognition, such as increased performances on visual and verbal memory and improved memory scores⁶.

There are many tools available to assess the cognitive function in students and many interventions are also available to improve cognitive abilities of the children, many theories also designed and formulated on this subject to get the answer why these things are happening in children which is one of the most sought topics in the department of education, even government of India designed many programmes but the results are not satisfactory. Society needs a simple viable, a scientific assessment tool and an intervention which is having a sustainable quality without side effects and which is also a drugless intervention still it is not sophisticated such interventions are need of the hour and all this things can be possible with Indian traditional yoga which is scientifically proven its advantages over the years.

Yoga is one of the oldest golden treasures of Indian heritage and culture founded by Maharshi Patanjali more than 5 thousand years back. It is one of the most basic books of yoga philosophy and its applications in human life are vivid. The western philosophers also researched on this book and found that it is scientific and reliable.

Yoga is not a special tool for any ailments but it is part and parcel of our lifestyle, because it has got many facets like mental, physical, social, philosophical,

spiritual. hence it is a standard remedy for all melodies it also be called as panacea for any disease. Many schools of yoga advocated the above concept in their teachings and out of which the simplest, reliable, acceptable, valid, repeatable, and most suitable for the children is asana, pranayama, and dhyana.

The question arises as to how does yoga helps in improving the cognitive functions and this research answers it as it consists of 15 subjects in control and case group each who are selected randomly from a school and case group will be given intervention for 21 days and both groups are assessed with the MMSE scale pre, post and follow up. Through this we can know how this study decides about the role of yoga in improving the cognitive functions.

This study intends to give a valid acceptable tool of intervention for improving cognitive functions in children, which is a major component in this scientific digital world. This study also directed towards finding a holistic solution for improving cognitive abilities in the form of Asana, Pranayama and Dhyana, which has to be validated scientifically, systematically in this study.

There are many assessment tools are available to assess scientifically, reliably and also validate the intervention. Mini-Mental State Examination is one of the most scientific, advanced tool of assessment which is very simple and administered easily to the children and has eight components which is easy for calculation and assessment. This case being accepted more than 95%, valid more than 96%, repeatable more than 98% and recognised internationally as a good case for memory assessment, this case also standardised and used by many researches hence it is most reliable.

The study is designed to assess the cognitive faculties and promote the concept of Asana, pranayama and Dhyana in children with a sample size of 15 in two groups.

The expected outcome of the study is to highlight the effect of Asana, pranayama and dhyana in improving cognitive faculties.

2. OBJECTIVES

Children are the future of our nation hence their development is necessary for the successful building of the nation. Cognitive development is the major component of the overall development of children and This study intends to improve the cognitive functions of children through yoga.

Yoga helps to achieve the complete development of the individual in physical, social, mental, emotional, and spiritual planes. Yoga helps for the complete personality development of the child.

The main objectives of this study is:

- To evaluate the effect of yoga techniques Asana, pranayama and dhyana in children with special reference to cognitive faculties.
- To compare and assess the effect of yoga techniques and without yoga techniques in children with special reference to cognitive faculties.

3. REVIEW OF LITERATURE

Yoga means "union" in Sanskrit, the classical language of India. Yoga is the art and science of living, and is concerned with the evolution of mind and body. Therefore, yoga incorporates a system of disciplines for furthering an integrated development of all aspects of the individual².

Yoga is considered to be one of the systems of Indian Philosophy. It is the most valuable contribution of Indian Philosophy to the enrichment of Indian heritage. Yoga is a scientific system of physical and mental practices that originated in India more than three thousand years ago. Its purpose is to help each one of us to achieve our highest potential and to experience enduring health and happiness. With Yoga, we can extend our healthy, productive years far beyond the accepted norm and, at the same time, improve the quality of our lives. According to the Yogis, true happiness, liberation and enlightenment comes from union with the divine consciousness known as Brahman or with Atman, the transcendent self. The various Yoga practices are a methodology for reaching that goal. Yoga is one of the six orthodox systems of Indian Philosophy. It was collated, co-ordinated and systematized by Patanjali in his classical work, the Yoga Sutras, which consists of 185 aphorisms.

According to Maharshi Patanjali⁷, Yoga has got 8 steps, he mentioned it as

"8 limbs of Yoga".

yamanyamasanapranayamapratyaharadharanadhyanasamadhayo-a-shtavaangani

They are:

- 1) Yama
- 2) Niyama
- 3) Asana
- 4) Pranayama
- 5) Prathyahara
- 6) Dharana
- 7) Dhyana
- 8) Samadhi

The eight components of yoga are external discipline, internal discipline, posture, breath regulation, concentration, meditative absorption, and integration.

1) **YAMA**

Yamas are the principles that teach us how to treat others and the world around us.

These include:

Ahimsa (non-harming)-This principle refers to behaving in a way that nourishes growth and contributes to the life force around us. Yoga and activism are interlinking mindsets in this way. Social justice seeks to uplift and liberate all people from harm, which is ahimsa at work within the collective.

Satya (truthfulness)-We all wear masks, or different personalities, depending on who we're interacting with. Yoga asks us to drop the mask and find our true, authentic self and to act from this self.

Asteya (non-stealing)-This principal is not as literal as simply “do not take material items from others.” It’s about respecting other folks’ energy, time, and resources.

Brahmacharya (abstinence)-This may be applied as total celibacy, but it can also be performed by simply treating our primal life force as sacred. We carry sexual energy within us, and yoga asks that rather than spreading it in many directions without thought, we mindfully use it in ways that align with the rest of yoga philosophy.

Aparigraha (non-hoarding)-It has been said that greed is the root of all evil. Greed stems from a scarcity mentality. This results in individuals holding on too tightly to wealth, material items, and people, which perpetuates harm.

2) NIYAMA

Niyamas are the standards by which we should practice self-discipline.

Saucha (cleanliness) - Although gurus and yoga scripture do recommend bathing regularly, eating clean, and keeping one’s space clean, this tenet also refers to having pure and positive thoughts about yourself and others. When we are clean in the mind, we become clear channels for the divine to enter us.

Santosha (contentment) - We must practice the ability to feel completely content with the way everything is right now in this very moment. We live in a capitalistic system in which we’re told to always strive for and want more, which means we’re never satisfied with what we already have.

Tapas (burning zeal) - The saying is that practice makes perfect, and the reason for this is because repeated effort yields mastery of that which we are attempting to learn.

Svadyaya (self-knowledge) -The Bhagavad Gita says, “Yoga is the journey of the self, through the self, to the self.” Yoga is meant to be a process of direct inquiry into our internal world. The more we dive inward, the more we can learn about the infinite nature of our consciousness.

Ishvarapranidhana (full surrender to the divine) - Yoga asks us to seek a supreme divine being (whatever that means to us personally), and allow ourselves to connect with them through our practice.

3) ASANA

sthirasukhamaasanam

The postures of meditation should embody steadiness and ease.

Asana literally means "posture" or "pose". According to an ancient and authoritative text, an Asana is "a particular posture of the body, which is both steady and comfortable¹⁷". We can call these postures "psychophysical", since they form the basis of Yoga's mind-body integration work. More than a hundred classical poses, with as many variations, can be subdivided into two groups:

(1) Active

(ii) Passive

Active poses tone specific muscle and nerve groups, benefit organs and endocrine glands and activate brain cells. The passive poses are employed primarily in meditation, relaxation, and pranayama practices. The complete set of Yoga asanas covers the entire human anatomy, quite literally from the top of the head to the tips of the toes. The greatest benefit from practicing asanas comes of when we learn how to

relax in a given pose. This real relaxation results from a state of deep concentration in which the mind is totally focused on a single object. During the practice of asanas, the object of concentration is the body. The practitioner focuses his mind on the incoming and outgoing breaths, the steady flexion and extension of different muscle groups, or other bodily sensations. Ideally this inward focus should be maintained throughout the entire yoga class.

4) PRANAYAMA

tasmin sati shvasaprashvasayorgativichchhedahpranayamah

With effort relaxing, the flow of inhalation and exhalation can be brought to a standstill; this is called breath regulation.

It is the 4th limb of Astanga yoga which was introduced by Maharshi Patanjali. The perfection of yogaSana leads one to a natural awareness and deeper understanding of breath and its variations. It is necessary to develop this awareness of breath along with the habit of diaphragmatic breathing before beginning the practice of pranayama. Dividing the word Pranayama clarifies its meaning, Prana means "life force" and Yama means "control", thus, Pranayama is the control of the life force. Prana, or life force, refers to the total latent and active energies in the human being and the universe. This energy in its many manifestations sustain us; it is the vital energy in the sunlight, in the food we eat and in the air we breath. Breath is a vehicle for Prana, it carries one of the most subtle form of this vital energy. Therefore, the first and most important step in the practice of Pranayama is learning to regulate the breath, thereby having control over the motion of the lungs.

5) PRATYAHARA

Pratyahara is sense withdrawal. This technique teaches us the way to journey inward and find ultimate peacefulness. The Bhagavad Gita, an ancient Hindu scripture, says our senses are likened to a boat on water. Each time the five senses are enraptured with external objects, the boat is swayed by the tumultuous waves of sense perception. When we cut our senses off from the external world, we are able to dive within ourselves to the vast universe that lies inside.

6) DHARANA

Dharana means concentration. Fixing the attention towards the particular region or place is called Dharana. You may choose to look at a candle, a deity statue, or another unmoving object during meditation in order to train the mind in this way. Once the mind has learned focus during meditation, we can take this type of concentration into our daily lives.

7) DHYANA

tatrapratyayaikatanatadhyanam

In meditative absorption, the entire perceptual flow is aligned with that object.

Swami Vivekananda, a master Yogi of modern times said- "The greatest help to spiritual life is meditation. In meditation we divert ourselves of all material conditions and feel our divine nature. We do not depend upon any external help in meditation".

Meditation in Physiology:

Through the practice of meditation or Dhyana one achieves a state of

- (a) emotional stability
- (b) a quiet mind

Which are the primary pre-requisites for meditation. It will be realized that these practices begin at the physiological level with proper control of reflexes, postures and respiratory functions; it then progresses through techniques of concentration to progressive control of higher mental processes, leading to control of mind. Through proper conditioning by this yogic regimen, several autonomic, involuntary functions are also brought under control.

Meditation thus:

- Prevents distractibility
- Expands awareness
- Develops Creative intelligence
- Improves clarity of perception

Scientific views and Effects of meditation

- Meditation brings the brain waves to alpha rhythm.
- At alpha right brain is activated.
- Meditation is a technique to control one's brain at alpha.
- By relaxing and visualizing through meditative procedures, one exercises control over one's brain by wave of alpha.
- Visualizing at alpha constitutes programming for the brain.

- Programming can cancel impressions, increase skills, and trigger problem solving process.
- Successful programming can cause the brain to function intuitively and psychically.
- Meditation causes brain and body changes which are measurable by some modern scientific gadgets viz., Electro encephalography (EEG Machine), Polygraph, and Evoked potential monitoring equipment etc.
- Meditation training helps people to become clairvoyant is a person who is able to perceive ideas or facts outside the ordinary range of human senses.

8) **SAMADHI**

Finally, samadhi is enlightenment. When the object of meditation engulfs, this meditation appears as a subject then the individuality is lost. The journey of the eight limbs of yoga is meant to take us from doing-ness to being-ness. Once we have mastered all the former steps in the sutras, we are able to accomplish the most important facet of life that propels our spiritual journey forward: the ability to stay in the present moment indefinitely.

HISTORY OF YOGA

The Science of yoga has its origin five thousand years ago! long before the first religion or belief System were born. In the yogic period, lord shiva is seen as the first yogi or Adi yogi and the first guru or Adi guru.

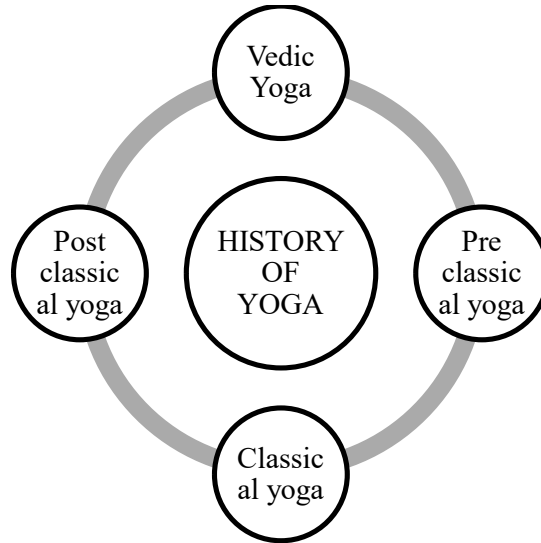
Several thousand years ago, on the banks of the lake kantisarovara in the Himalayas Adi yogi poured his profound knowledge of yoga into the legendary Saptharishis(seven sages). The sages carried this powerful yogic science to different parts of the world including Asia, the middle east, north Africa and South America.

Agastya, one of the Saptharishi who travelled across the Indian subcontinent Crafted this Culture around a core Yogic way of life. The no. of seals and fossils remains in the Indus Saraswathi valley civilization with yogic motive and figures performing yoga sadhana, suggest the presence of yoga in ancient India.

Until recently western scholars and Indologists believed that Yoga developed only as late as 500 B.C. Now it is confirmed by archaeological surveys, and scientists working with satellite technology: Yoga is over 5000 years old. The very earliest indication of the existence of some form of Yoga practices in India comes from the Harappan culture. The ancient texts of Vedas are the oldest scriptures in the world. The Sanskrit word Veda means "knowledge" and rig means "praise". Thus the Rig Vedas are a collection of hymns that are in praise of a higher power. The other three Vedas are Yajur Veda, Sama Ved, and Atharva Veda. Vedic Yoga can also be called Archaic Yoga, as people believed in a ritualistic way of life. Rituals, sacrifices, and ceremonies existed because they were considered a means of connection to the spirit world. People turned to rishis or Vedic yogis for illumination. Vedic masters were blessed with a vision of the supreme reality and their hymns speak of their marvellous intuitions. A number of excavated seals show a figure seated in a Yoga position that

has been used by the Indian Yogis for meditation till the present day. One of the depicted figures bears signs of divinity worshipped as the Lord of Yoga. At the time of excavations at Mohenjadarro, Stuart Piggot wrote⁸.

For the purpose of understanding the development of this great Yogic spiritual tradition, one may divide into four-time frames.



1) Vedic Yoga: (ca. 3000 – 4000 BCE) This period dates back to ancient India when Yoga was intimately connected to the ritual life of ancient Indians. It revolved around the idea of sacrifice (Yajna) as a means of joining the material world with the invisible world of the spirit.

2) Preclassical Yoga: (ca. 2500 – 100 BCE) The most important literature to emerge during this time are the Upanishads, a collection of texts that describe the inner vision of reality resulting from devotion to Brahman, the Absolute.

1. Isa (IsUp), Yajurveda
2. Kena (KeUp), Samaveda
3. Katha (KaUp), Yajurveda
4. Prasna (PrUp), Atharvaveda
5. Mundukya (MuUp), Atharvaveda

6. Mandukya (MaUp), Atharvaveda
7. Taittiriya (TaiUp), Yajurveda
8. Aitareya (AiUp), Rigveda
9. Chandogya (ChhUp), Samaveda
10. Brhadaranyaka (BrUp), Yajurveda

One of the most important texts to emerge from this time is the famous „Bhagavad Gita“ (The Lord’s Song), which provides the most comprehensive description of yoga at that time.

3) Classical Yoga: (ca. 100 BCE – 500 AD) This period marked the emergence of one of the most important texts on Yoga, Patanjali’s Yoga Sutras.

4) Postclassical Yoga: This period was very rich in producing various schools and practices of Yoga, such as Vedanta, Hatha and Tantra Yoga. Several reliable texts on Hatha Yoga such as the "Hatha Yoga Pradipika", "The Goraksha Samhita" and the "Gherand Samhita" emerged during this time.

Modern Period

In the late 1800s and early 1900s, yoga masters began to travel to the West, attracting attention and followers. This began at the 1893 Parliament of Religions in Chicago, when Swami Vivekananda wowed the attendees with his lectures on yoga and the universality of the world’s religions. In the 1920s and 1930s, Hatha Yoga was strongly promoted in India with the work of T. Krishnamacharya, Swami Sivananda and other yogis practicing Hatha Yoga. Krishnamacharya opened the first Hatha Yoga school in Mysuru in 1924 and in 1936 Sivananda founded the Divine Life Society on the banks of the holy Ganges River. Krishnamacharya produced three students that

would continue his legacy and increase the popularity of Hatha Yoga: B.K.S. Iyengar, T.K.V. Desikachar and Pattabhi Jois. Sivananda was a prolific author, writing over 200 books on yoga, and established nine ashrams and numerous yoga centers located around the world⁹.

The importation of yoga to the West still continued at a trickle until Indra Devi opened her yoga studio in Hollywood in 1947. Since then, many more western and Indian teachers have become pioneers, popularizing hatha yoga and gaining millions of followers. Hatha Yoga now has many different schools or styles, all emphasizing the many different aspects of the practice.

In recent times yoga is part and parcel of world culture because of initiation by our honourable prime minister Narendra Modi in 2015. International Yoga Day has been celebrated annually on 21 June since 2015, following its inception in the United Nations General Assembly in 2014. The Indian Prime Minister, Narendra Modi, in his UN address in 2014, had suggested the date of 21 June, as it is the longest day of the year in the Northern Hemisphere and has special significance in many parts of the world.

After the international declaration every year in June 21st the people all over the world that day as international yoga day in India it is celebrated with the 45 minutes yoga protocol all over the country impact of this celebration made as yoga as a universal language for mental health and because of this acceptance of yoga outside India and inside India became very high and thus yoga became very popular and the government of India also declared yoga as a sports, because of all these activities yoga also included in professional curriculum, the one of the compulsory subjects in many

central universities and also diploma and post graduate certification course also offered in many universities.

THE CHILDREN: THE FUTURE OF TOMORROW

“Children are our future”

The Wealth of a nation is not so much in its of economical and natural resources but it lies more decidedly in the kind and quality of the wealth of its **children**. It is they who will be the creators and shapers of a nation’s tomorrow. It, therefore, becomes mandatory for every nation and every society to nurture a strong, healthy and intellectual children and youth.

Hence the development of children in Physical, Mental, Social, Emotional, and spiritual planes is necessary.

Every parent dream to have healthy, intelligent and kind children. But to achieve this requires patience and active participation in their development.

As a result changing lifestyle, drastic development, busy life schedules, it has become prime concern to the parents and society about the cognitive development, physical development, mental development, and spiritual development of the children.

Our young children strive to be:

- Happy and healthy
- Inquirer
- Confident
- Communicative
- Creative

- Caring
- Open-minded
- Resilient
- Sensitive to diversity
- Respectful
- Mindful
- Life-long learner

Scientific research also indicates that within the span of the early childhood years and schooling years, there are certain ‘sensitive periods’ or ‘critical periods’ for the development of some cognitive, linguistic, social and psychomotor competencies (Fig 1). These have significant implications for the planning of a framework for children’s learning and development.

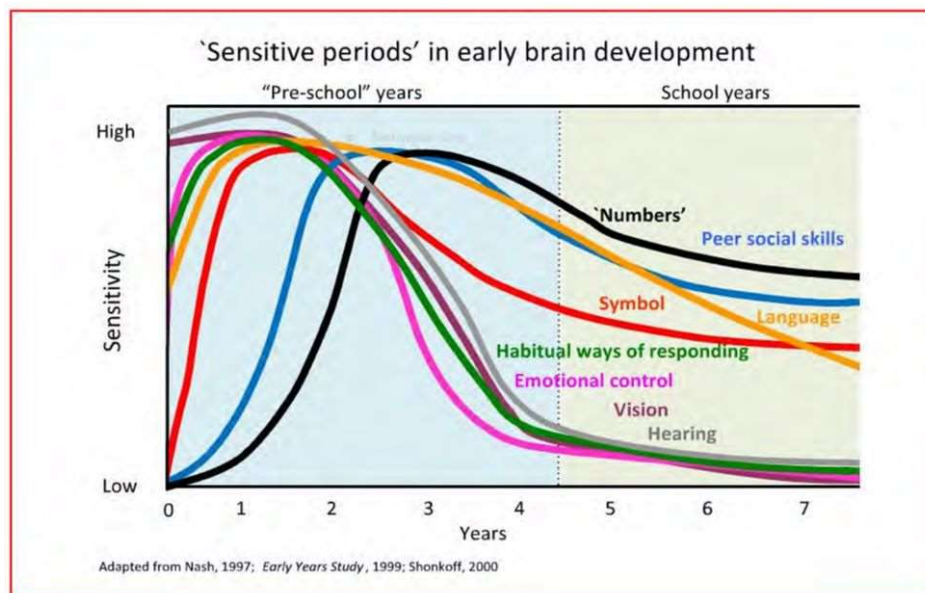


Figure:1

Source: No Wolves Along the Way: towards a national ECD model in Kyrgyzstan, Hugh McLean & RakhatOrozova, UNICEF, 2009)

To achieve this a proper education should be provided, It should be progressive, in keeping with the needs of the society and should not only create great professionals excelling in their fields but also good human beings.

Yoga helps to achieve the complete development of the individual in physical, social, mental, emotional, and spiritual planes. Yoga helps for complete personality development of the child.

Yoga is one of the components of 'Be a Fit Kid' which aims at increasing physical exercise and nutrition in children¹⁰. Following the 12 week program, there was a significant improvement in body composition, fitness, nutrition knowledge, dietary habits and significant reductions in total cholesterol and triglyceride levels. This suggested that yoga based health promotion programs are well received by children and can favorably change being overweight and the development of adult life-style related diseases. Apart from the beneficial effects on physical fitness, yoga practice improves several aspects of cognition and executive functions. Executive functions are good predictors of math and reading competence throughout the school years^{11,12}. It is possible that yoga might help improve executive functions⁶, possibly related to the fact that yoga includes several mental techniques apart from the physical. Also, school children practicing yoga for 10 days improved spatial memory scores¹³, strategic planning and the ability to concentrate. Hence, yoga practice appears to influence physical fitness and cognitive functions.

The National Institutes of Health define complementary and alternative medicine (CAM)¹⁴ as a group of diverse medical and health care systems, practices, and products that are not currently considered to be part of conventional medicine. CAMs encompass a range of mind body methodologies, such as yoga, tai-chi, and meditation that may be beneficial to the health of their practitioners. Yoga is an ancient Indian science and way of life that includes the practice of specific postures, regulated breathing, and meditation. It is designed to bring balance and health to the

physical, mental, emotional, and spiritual dimensions of the individual. Yoga is often depicted metaphorically as a tree and comprises eight aspects: yama (universal ethics), niyama (individual ethics), asana (physical postures), pranayama (breath control), pratyahara (control of the senses), dharana (concentration), dyana (meditation), and samadhi (bliss). Yoga maybe an alternative form of physical activity which may assist in achieving recommended levels of physical activity for individuals who have disabilities or symptoms that prevent them from performing traditional forms of exercise.

COGNITIVE FUNCTIONS

Cognition ¹⁵ can be defined as mental activity that goes on in the brain when a person is processing information-organizing it, understanding it, and communicating it to others. The Oxford English Dictionary (OED) notes cognition traces its roots to the Latin cognit- (“a getting to know, acquaintance, notion, knowledge, etc.”). Eric Partridge’s *Origins: A Short Etymological Dictionary of Modern English* notes cognition originates from the Latin cognoscere (“to know, to learn about”).

There are two types of thinking, sometimes referred to as System 1 and System 2, characterize much of how we think and process information (Kahneman, 2011; Stanovich & West, 2000). System 1, which involves making quick decisions and using cognitive short cuts, is guided by our innate abilities and personal experiences. System 2, which is relatively slow, analytical, and rule based, is dependent more on our formal educational experiences. Overall, our thinking has to be governed by the interplay between the two¹⁷. Cognitive abilities¹⁸ are brain-based skills we need to carry out any task from the simplest to the most complex. They have more to do with the mechanisms of how we learn, remember, problem-solve, and pay attention, rather

than with any actual knowledge. For instance, answering the telephone involves perception (hearing the ring tone), decision taking (answering or not), motor skill (lifting the receiver), language skills (talking and understanding language), social skills (interpreting tone of voice and interacting properly with another human being). Cognitive abilities or skills are supported by specific neuronal networks. For instance memory skills rely mainly on parts of the temporal lobes and parts of the frontal lobes (behind the forehead). People with traumatic brain injuries can experience lower cognitive ability linked to compromised neuronal regions and networks (which is why neuro rehabilitation is so important).

PERCEPTION

Recognition and interpretation of sensory stimuli (smell, touch, hearing...)

ATTENTION

Ability to sustain concentration on a particular object, action, or thought, and ability to manage competing demands in our environment.

MEMORY

Short-term/ working memory (limited storage), and Long-term memory (unlimited storage).

MOTOR SKILLS

Ability to mobilize our muscles and bodies, and ability to manipulate objects.

LANGUAGE

Skills allowing us to translate sounds into words and generate verbal output.

VISUAL AND SPACIAL PROCESSING

Ability to process incoming visual stimuli, to understand spatial relationship between objects, and to visualize images and scenarios.

EXECUTIVE FUNCTIONS

Abilities that enable goal-oriented behaviour, such as the ability to plan, and execute a goal. These include:

Flexibility: the capacity for quickly switching to the appropriate mental mode.

Theory of mind: insight into other people's inner world, their plans, their likes and dislikes.

Anticipation: prediction based on pattern recognition.

Problem solving: defining the problem in the right way to then generate solutions and pick the right one.

Decision making: the ability to make decisions based on problem-solving, on incomplete information and on emotions (ours and others').

Working memory: the capacity to hold and manipulate information "on-line" in real time.

Emotional self-regulation: the ability to identify and manage one's own emotions for good performance.

Sequencing: the ability to break down complex actions into manageable units and prioritize them in the right order.

Inhibition: the ability to withstand distraction, and internal urges.

COGNITIVE DEVELOPMENT IN SCHOOL-AGE CHILDREN

Cognitive development¹⁶ in school-age children has been one of the most active areas of research in developmental science. Yet the range of issues investigated has been relatively narrow and based primarily on Piaget's theory of cognitive development, school-related concerns about the testing of intelligence and achievement, behaviourist theories of conditioning and learning and, more recently, information-processing theories.

Today many cognitive-developmental scholars are moving toward a broader, more integrative orientation, emphasizing relationships among the traditional categories for behaviour (cognition, emotion, social behaviour, personality, and so forth) and constructs that highlight the interaction or collaboration of child and environment. There has also been a growing emphasis on constructing and using methods and statistics that allow direct tests of cognitive-developmental hypotheses, in place of traditional methods and statistics, which often do not allow appropriate tests.

A Portrait of The Capacities of The School-Age Child

The cognitive capacities that develop during the school years do not develop in stages as traditionally defined. Instead, children's abilities seem to cumulate gradually and to show wide variations as a function of environmental support. Certain

components of children's capacities do show weakly stage like characteristics, however. At specific periods a wide range of children's abilities appear to undergo rapid development. These spurts may be particularly evident in children's best performances.

When the various neo-Piagetian theories are compared, there seems to be a consensus, with substantial empirical support, that four of these large-scale reorganizations occur between ages 4 and 18. At approximately age 4, middle-class children develop the capacity to construct simple relationships of representations, coordinating two or more ideas. The capacity for concrete operations emerges at age 6-7, as children become able to deal with complex problems about concrete objects and events. The first level of formal operations appears at age 10-12, when children can build general categories based on concrete instances and when they can begin to reason hypothetically. Abilities take another leap forward at age 14-16, when children develop the capacity to relate abstractions or hypotheses.

Cognitive developmentalists have often assumed that all children move through the same general developmental sequences, but research suggests that such generality occurs at best only for the most global analytic categories, such as concrete and formal operations. With more specific analyses, it seems that children will demonstrate important differences in developmental sequences. Only with research on these differences will a full portrait of school-age children's capacities be possible.

Little consensus exists on the specific processes underlying the cognitive changes that occur during the school years. Most characterizations of these processes fall into two opposing frameworks: an emphasis on changes in organization, usually conceptualized in terms of either logic or short-term memory capacity, versus an

emphasis on the continuous accumulation of independent habits or production systems. Progress is not likely to arise from the continuation of arguments based on this assumption of opposition. The most promising direction for resolution would seem to lie in attempts to determine when abilities show reorganization and when they show continuous accumulation.

Process of cognitive development

Many of the questions about the nature of developmental stages, their universality, and the extent of individual differences would be substantially clarified by a solid analysis of the processes underlying cognitive development. However, the best way to conceptualize the results of the extensive research literature on developmental processes is very much an open question. No emerging consensus is evident here, except perhaps that none of the traditional explanations is adequate. Three main types of models have dominated research to date.

The first type of model grows out of Piaget's approach. The developing organization of behavior is said to be based fundamentally in logic (Piaget, 1957, 1975). Developmental change results from the push toward logical consistency. Stages are defined by the occurrence of an equilibrium based on logical reversibility, and two such equilibria develop during the school years—one at concrete operations and one at formal operations.

Tests of this process model have proved to be remarkably unsuccessful. The primary empirical requirement of the model is that, when a logical equilibrium is reached, individuals must demonstrate high synchrony across domains. The prediction of synchrony arises from the fact that at equilibrium a logical structure of the whole

(*structure d'ensemble*) emerges and quickly pervades the mind, catalyzing change in most or all of the child's schemes. Consequently, when a 6-year-old girl develops her first concrete operational scheme, such as conservation of number, the logical structure of concrete operations should pervade her intelligence in a short time, according to Piaget's model. Her other schemes should quickly be transformed into concrete operations.

Such synchrony across diverse domains has never been found. Instead, synchrony is typically low, even for closely related schemes such as different types of conservation (e.g., number, amount of clay, and length). Even if one allows that several concrete operational schemes might have to be constructed before the rapid transformation occurs, the evidence does not support the predicted synchrony (Biggs and Collis, 1982; Fischer and Bullock, 1981; Flavell, 1982b).

Efforts to study other implications of the logic model also have failed to support it (e.g., Braine and Romain, 1983; Ennis, 1976; Osherson, 1974). Several attempts have been made to build alternative models based on some different kind of logic (e.g., Halford and Wilson, 1980; Jacques et al., 1978). But thus far there have been only a few studies testing these models, and it is therefore not yet possible to evaluate their success.

The second type of process model in cognitive-developmental theories is based on the information-processing approach. The child is analyzed as an information-processing system with a limited short-term memory capacity. In general, the numbers of items that can be maintained in short-term memory are hypothesized to increase with age, thereby enabling construction of more complex skills. The exact form of the capacity limitation is a matter of controversy, but in all existing models it involves an

increase in the number of items that can be processed in short-term or working memory. The increase is conceptualized as a monotonic numerical increment from 1 to 2 to 3, and so forth, until some upper limit is reached.

This memory model has been influential and has generated a large amount of interesting research, although it has not yet produced any consensus about the exact form of the hypothesized memory process (Dempster, 1981; Siegler, 1978, 1983). One of the primary problems with the model seems to be the difficulty of using changes in the number of items in short-term memory to explain changes in the organization of complex behaviour. Although analysis of behavioural organization is always difficult, the distance between the minimal structure in short-term memory and the complex structure of behaviour such as conservation or perspective-taking seems to be particularly difficult to bridge. How can a linear numerical growth in memory be transformed into a change from, for example, concrete operational to formal operational perspective-taking skills (Elkind, 1974)? Although such a transformation may be possible, its nature has not proved to be transparent or simple (Flavell, 1984). Moreover, how to conceptualize working memory is itself a controversial issue. Various investigators have challenged the traditional conceptualization that there is an increase in the size of the short-term memory store (Chi, 1978; Dempster, 1981; see also Grossberg, 1982: chs. 11 and 13). Fortunately, ever richer developmental models involving ideas about working memory capacity have continued to appear since Pascual-Leone's (1970) ground-breaking work (see Case, 1980; Halford and Wilson, 1980), and perhaps one of these will be successful in overcoming the problems mentioned.

The third common type of model assumes that development involves continuous change instead of general reorganizations of behaviour like those predicted

by the logic and limited-memory models. The fundamental nature of intelligence is laid down early in life, and development involves the accumulation of more and more learning experiences. Behaviourist analyses of cognitive development constitute one of the best-known forms of this functionalist model. A small set of processes defines learning capacity, such as conditioning and observational learning, and all skills—ranging from the reflexes of the newborn infant to the creative problem solving of the artist, scientist, or statesman—are said to arise from these same processes (Bandura and Walters, 1963; Skinner, 1969). Any behavioural reorganizations that might occur are local, involving the learning of a new skill that happens to be useful in several contexts.

Some information-processing approaches also assume that the nature of intelligence is laid down early and that development results from a continuous accumulation of many learning experiences: The child builds and revises a large number of cognitive "programs," often called production systems (Gelman and Baillargeon, 1983; Klahr and Wallace, 1976). Children construct many such systems, such as one for conservation of amount of clay and one for conservation of amount of water in a beaker. At times they can combine several systems into a more general one, as when conservation of clay and conservation of water are combined to form a system for conservation of continuous quantities. These reorganizations remain local, however. There are no general levels or stages in cognitive development—no all-encompassing logical reorganizations and no general increments in working memory capacity.

Researchers who believe in the continuous-change model tend to investigate the effects of specific types of processes or content domains on the development of

particular skills. One of the processes emphasized within the continuous change framework has been automatization, the movement from laborious execution of a skill or production system to execution that is smooth and without deliberation. Several studies have demonstrated that automatization can produce what seem to be developmental anomalies. When school-age children are experts in some domain, such as chess, they can perform better than adults who are not experts (Chi, 1978). More generally, many types of tasks produce no differences between the performances of children and adults (Brown et al., 1983; Goodman, 1980).

In research on specific content domains, the general question is typically how the nature of a domain affects a range of developing behaviors. For example, the nature of language, mathematics, or morality is said to produce "constraints" on the form of development in relevant behaviors (Keil, 1981; Turiel, 1977). Development in domains that involve self-monitoring, such as knowledge about one's own memory processes (metamemory), is hypothesized to have general effects on many aspects of cognitive development (Brown et al., 1983; Flavell and Wellman, 1977).

Within the continuous-change, functionalist framework, investigators often assume that there is some intrinsic incompatibility between general cognitive-developmental reorganizations and effects of specific domains or processes. Yet it is far from obvious that any such incompatibility exists. The process of automatization can have powerful effects on developing behaviors, and at the same time children can show general reorganizations in those behaviors (Case, 1980). The domain of mathematics can produce constraints on the types of behaviors children can demonstrate, and at the same time those behaviors can be affected by general reorganizations. The reason for the assumption of incompatibility seems to be that

developmentalists view the logic and limited-memory models as incompatible with the continuous-change model.

The assumption of incompatibility between reorganization and continuous change seems to stem from the fundamental starting points of the models: The logic and short-term memory models focus primarily on the organism as the locus of developmental change, whereas the continuous models focus on environmental factors. Several recent theoretical efforts have sought to move beyond this limit of the three standard models by providing a more genuinely interactional analysis, with major roles for both organismic and environmental influences (Fischer, 1980; Halford and Wilson, 1980; Silvern, 1984). Approaches that explicitly include both organism and environment in the working constructs for explaining developmental processes may provide the most promise for future research.

GOVERNMENT SCHEMES FOR ENFORCING THE OVERALL DEVELOPMENT OF CHILDREN

- **NATIONAL EARLY CHILDHOOD CARE AND EDUCATION (ECCE)**¹⁷

Early childhood refers to the formative stage of first six years of life, with well marked sub-stages (conception to birth; birth to three years and three years to six year) having age-specific needs, following the life cycle approach. It is the period of most rapid growth and development and is critical for survival. Growing scientific evidence confirms that there are critical stages in the development of the brain during this period which influence the pathways of physical and mental health, and behaviour throughout the life cycle. Deficits during this stage of life have substantive and cumulative adverse impacts on human development.

The first six of life are critical years of human life since the rate of development in these years is more rapid than at any other stage of development. Global brain research also informs us about the significance of early years for brain development. Early Childhood Care and Education (ECCE) makes a positive contribution to children's long term development and learning by facilitating an enabling and stimulating environment in these foundation stages of lifelong learning.

VISION OF THE POLICY

The vision of the policy is to achieve holistic development and active learning capacity of all children below 6 years of age by promoting free, universal, inclusive, equitable, joyful and contextualised opportunities for laying the foundation and attaining full potential.

It furtherance of the vision of the policy, the government shall be guided by the following objectives:

- i. Facilitate comprehensive childcare supports, infrastructure and services aimed at holistic well-being of children and responsive to their

developmental needs along the continuum of care from conception to age six.

- ii. Universalise and reinforce ECCE and ensure adaptive strategies for inclusion of all children with specific attention to vulnerable children.
- iii. Engage capable human resources and build their capacity to enhance and develop quality services for children and their families.
- iv. Set out the quality standards and curriculum framework for ECCE provisions and ensure their application and practice through advocacy and enforcement through appropriate institutional arrangements.
- v. Raise awareness and create common understanding about the significance of ECCE and promote strong partnerships with communities and families in order to improve the quality life of young children through institutional and programmatic means and appropriate use of technology as required.
- vi. Recognise diversity of contexts, develop and promote culturally appropriate strategies and materials and work within the framework of decentralised governance using participatory and locally responsive approaches.

CENTRAL GOVERNMENT SCHEME FOR SCHOOL EDUCATION

Education is the most important lever for social, economic and political transformation. A well-educated population, equipped with the relevant knowledge, attitudes and skills is essential for economic and social development in the twenty-first

century. Education is the most potent tool for socio-economic mobility and a key instrument for building an equitable and just society. Education provides skills and competencies for economic well-being. Education strengthens democracy by imparting to citizens the tools needed to fully participate in the governance process. Education also acts as an integrative force in society, imparting values that foster social cohesion and national identity.

➤ **QUALITY IMPROVEMENT IN SCHOOLS**¹⁸

During the 10th Five Year Plan, “Quality Improvement in Schools” was introduced as a composite centrally sponsored scheme having the following components:

- i. National Population Education Project,
- ii. Environmental Orientation to School Education,
- iii. Improvement of Science Education in Schools,
- iv. Introduction of Yoga in Schools,
- v. International Science Olympiads.

A decision was taken to transfer four of these components to National Council of Educational Research and Training (NCERT) w.e.f. APRIL 2006, except the component of improvement of Science Education in school that was transferred to States.

ROLE OF YOGA IN IMPROVING COGNITIVE ABILITIES IN CHILDREN

Yoga improves cognitive functions: Cognitive functions are intellectual processes by which one becomes aware of, perceives, or comprehends ideas. These functions help us to focus on the problem, process the required information, arrive at the logical conclusion, make decision and then execute the task. Studies show that practice of yogic techniques cause improvement in aspects of perception, thinking, reasoning, and remembering the task. Yogic techniques especially dhyana and shavasana improve attentiveness. Increased attentiveness decreases response time or reaction time. Reaction time is an index of the processing ability of central nervous system and a simple means of determining sensory-motor performance. Madanmohan et al (1992) reported that yoga practice for 12 weeks results in significant reduction in visual and auditory reaction times in the normal adult male volunteers. Malathi and Parulkar (1989) also reported reduction in auditory and visual reaction time after yoga training. Similar, findings were also demonstrated by the practice of mukhbhastrikapranayama (a yogic technique in which breath is actively blasted out in 'whooshes' following a deep inspiration) on reaction time (Bhavanani et al, 2003). A decrease in reaction time indicates an improved sensory-motor performance and enhanced processing ability of central nervous system. This may be due to greater arousal, faster rate of information processing, improved concentration and / or an ability to ignore extraneous stimuli. Sarang and Telles (2007) reported that there were improved scores and fewer errors on Letter Cancellation task; a left-hemisphere dominant task, after practice of yoga based relaxation technique. These results suggest that yoga practice brings about a greater improvement in this task which requires selective attention, concentration, visual scanning abilities, and a repetitive motor response. In another study (2006), they reported a reduction in the peak latencies of P300 after yoga based relaxation technique. Clearly, yogic meditation enhances cognitive processes underlying the

generation of P300. Scientific studies also show that unilateral forced nostril breathing affects cerebral hemispheric dominance. Telles et al (2007) evaluated the effect of three yoga breathing practices (right, left, and alternate nostril breathing) on performance of letter-cancellation task. The letter-cancellation task scores were significantly improved, i.e., there were fewer errors following right and alternate nostril yoga breathing. In another study, Joshi and Telles (2008) found that left nostril breathing increases performance of participants in the spatial cognitive task. Therefore, left nostril breathing increases the spatial tasks whereas, right nostril breathing increases verbal tasks. These results may be related to the enhancement of contralateral hemispheric function found with selective nostril breathing. Yoga has beneficial effects on other cognitive functions. Telles et al (2006) studied the performance of participants on mirror-tracing task. The star to be traced was six pointed and the outline was made of 60 circles (4 mm in diameter). They found improved reversal ability, eye-hand co-ordination, speed and accuracy in the yoga group which is necessary for mirror star tracing. Telles et al (1997) found that one month practice of yoga led to significant decrease in the degree of optical illusion assessed by using standard Muller-Lyer lines. This can be attributed to a combination of focusing and defocusing involved in yoga practice, as these factors are known to influence the degree of illusion. Vani et al (1997) reported a progressive increase in critical flicker fusion frequency following 10 day yoga training programme. The critical flicker fusion frequency is the frequency at which a flickering stimulus is perceived to be steady, with higher values suggesting greater perceptual accuracy.

Certain types of yoga practice improve autonomic nervous system by modulating parasympathetic and sympathetic activity, significant changes in brain rhythms, sensory motor rhythm, regulation of breathing rate, and improvement in the

cardiac activity and enhance the sense of "well-being"^{19,20}. Previous research suggests that yoga practice have immense impact on performance of central nervous system and improve their action, concentration and other cognitive faculties²². The practice of yoga can increase grey matter volumes in temporal and frontal lobes, producing positive impacts on mental health and improved cognitive functions. The practice of yoga can increase grey matter volumes in temporal and frontal lobes, producing positive impacts on mental health and improved cognitive functions. It is believed that the practice of yoga can also result in changes in perception, attention, and cognition. Investigations have shown the beneficial effects of yoga on cognition, such as increased performances on visual and verbal memory and improved memory scores ²³. The National Trust is a statutory body of the Ministry of Social justice and empowerment. Government of India, set up under “National Trust for the welfare of persons with Autism, cerebral palsy, Mental retardation and Multiple disabilities” Act (Act 44 of 1999)²⁴, Has highlighted cognitive impairment in children in a scientific manner.

ASSESSMENT OF COGNITIVE FUNCTIONS

There are many assessment tools are available to assess scientifically, reliably and also validate the intervention. Mini-Mental State Examination is one of the most scientific, advanced tool of assessment which is very simple and

administered easily to the children and has eight components which is easy for calculation and assessment. This case being accepted more than 95%, valid more than 96%, repeatable more than 98% and recognised internationally as a good case for memory assessment, this case also standardised and used by many researches hence it is most reliable.

The Mini-Mental State Exam (MMSE) is a widely used case of cognitive function; it includes tests of orientation, attention, memory, language and visual-spatial skills.

The **mini mental state examination** (MMSE) is a commonly used set of questions for screening cognitive function. The mini mental state examination is far more sensitive in detecting cognitive impairment than the use of informal questioning or overall impression of a patient's orientation.

- The case takes only about 10 minutes.
- The mini mental state examination provides measures of orientation, registration (immediate memory), short-term memory as well as language functioning.
- The examination has been validated in a number of populations. Scores of 25-30 out of 30 are considered normal; the National Institute for Health and Care Excellence (NICE) classifies 21-24 as mild, 10-20 as moderate and <10 as severe impairment.
- Before administering the Mini Mental State Examination it is important to make the patient comfortable and to establish a rapport.

The specificity of the examination ranges from 56% to 96%. Sensitivity of the examination ranges from 56 to 96%. Examination mainly directed towards to evaluate cognitive functions. MMSE has a reasonable reliability.

**SOME OF THE PREVIOUS RESEARCH WORKS WHICH ARE
DONE ABOUT COGNITIVE FUNCTIONS IN CHILDREN ARE
AS FOLLOWS**

- Effects of diet on behaviour and cognition in children(Available from :
<https://www.cambridge.org/core/journals/british-journal-of-nutrition/article/effects-of-diet-on-behaviour-and-cognition-in-children/54F8DA9C708A34A737D663BBEABED1D0>)
- The Relationship between Physical Activity and Cognition in Children: A Meta-Analysis(Availablefrom:
<https://journals.humankinetics.com/view/journals/pes/15/3/article-p243.xml>)
- Effect of Mind Sound Resonance Technique (MSRT – A yoga-based relaxation technique) on psychological variables and cognition in school children: A randomized controlled trial (Available from
:<https://www.sciencedirect.com/science/article/pii/S0965229920318732>)
- Effect of yoga or physical exercise on physical, cognitive and emotional measures in children: a randomized controlled trial (Available from:
<https://capmh.biomedcentral.com/articles/10.1186/1753-2000-7-37>)
- Effect of Yoga on Cognitive Abilities In Schoolchildren from a Socioeconomically Disadvantaged Background: A Randomized Controlled Study (Available from:
<https://www.liebertpub.com/doi/abs/10.1089/acm.2011.0579>)

- The effect of Yoga Education on the Cognitive functions of Children in Early Childhood (Available from:

<https://www.proquest.com/openview/d8d7bcb3864b39d0c4c9e2ad4647b8fb/1?pq-origsite=gscholar&cbl=1056401>)

4. METHODOLOGY

Review of literature gives us an idea regarding the cognitive functions in children and the need to improve them, and also it shows that yoga plays a vital role in improving cognitive functions among children. On this foundation, it is necessary to

adopt exact protocol of intervention and continue the clinical study where in practical application of some of the facts, discussed in review of literature is to be implemented.

MATERIALS

- A Protocol of yoga for 45 minutes has been prepared after discussing with the peer group, resource persons of yoga and referring to the classical texts of yoga, which is used in this study to improve the cognitive functions among children.
- Certification has been done by the investigator about disclosing the details of the project to the students.
- Consent by the subjects has been taken, a copy of it form has been attached in Annexure 1.
- The scale used to assess the cognitive functions is MMSE, a copy of it form has been attached in Annexure 2.
- Registration forms were used to register the students for the yoga sessions for the 21 days, a copy of it form has been attached in Annexure 3.
- Feedback forms were used to take the feedback from the students to know their feedback the yoga sessions. a copy of it form has been attached in Annexure 4.
- A detailed case history of each student in the case and control group has been taken from a standardised case history format, a copy of it form has been attached in Annexure 5.
- Inauguration was done before the starting of the yoga sessions. a copy of the invitation has been attached in Annexure 6.

- Valedictory function was done after the completion of the yoga sessions, a copy of the invitation for the valedictory function has been attached in Annexure 7

YOGA PROTOCOL

Yoga protocol interventions are designed after discussion with peer group, peer group consists of:

President: Dr. Radha krishna Ram Rao, Principal GNCYMC&H, Mysuru

Members:

Dr Lkashmi Narayan Shenoy, Assistant Director, GARC, Mysuru

Dr Jisha, Assistant professor, GNCYMC&H, Mysuru

Dr Bharath Chandra, Assistant professor, GNCYMC&H, Mysuru

Dr Suma, Assistant professor, GNCYMC&H, Mysuru

Dr Suman, Assistant professor, GNCYMC&H, Mysuru

Secretary:

Dr Deepak, Associate professor, GNCYMC & H, Mysuru

The above group is created by Principal GNCYMC&H and the protocol is designed by the Peer group after that ethical committee approval is taken from the institutional ethical committee of GNCYMC & H, Mysuru.

INTERVENTION

A set of Asana, Pranayama and Dhyana are selected and used as an intervention to improve cognitive abilities.

- Prayer (01 minute)
- Preparatory practices – *Sukshmayayama* (07minutes)

Asana: (12Minutes)

- *Sarala Natarajasana* (10 counts)
- *Padahasthasana* (10 counts)
- *Vipareeta karani asana /Sarvangasana* (10 Counts)
- *Chakrasana* (10 Counts)
- *Parvatasana* (10 Counts)
- *Sarala Bhujangasana* (10Counts)
- *Padmasana* (20 Counts)
- *Shashankasana* (10 Counts)
- *Paschimottanasana / Janu Sirshasana* (10 Counts)
- *Shavasana* (with Deep Relaxation Technique) (06 Minutes)

Pranayama:

- *Nadi Shodana pranayama* (04 Minutes)
- *Bhramari pranayama* (04 Minutes)

Dhyana(10Minutes)

- Om meditation
- Transcendental meditation
- Closing Prayer (01 Minute)

Total duration of one session: 45minutes

Duration of the whole intervention period: 21days

SUKSHMA VYAYAMA

PRARAMBHIK STHITI (BASE POSITION)

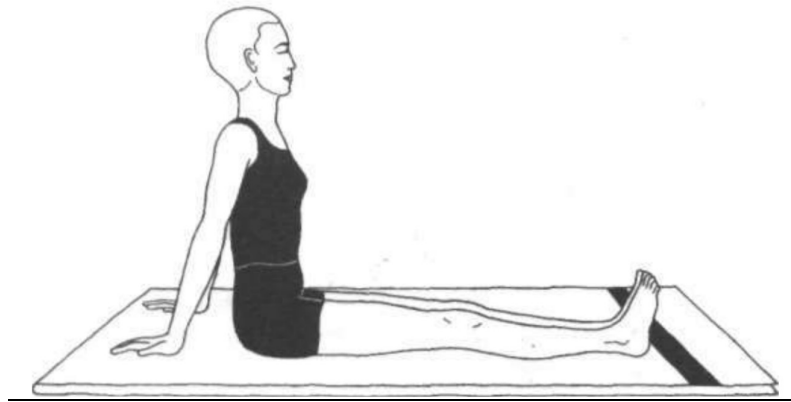


Figure:2 – Base position

Sit with the legs outstretched. Place the palms of the hands on the floor to the sides and just behind the buttocks. The back, neck and head should be straight. Straighten the elbows. Lean back slightly, taking the support of the arms. Close the eyes and relax the whole body in this position.

PADANGULI NAMAN (TOE BENDING)

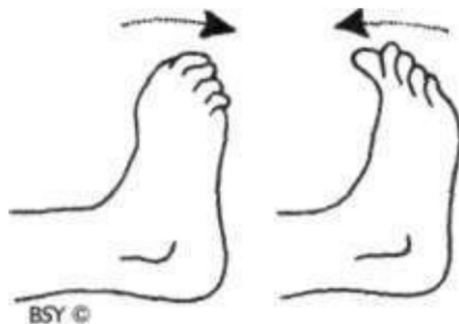


Figure: 3 – Toe bending

Sit in the base position with the legs outstretched and the feet slightly apart. Place the hands beside and slightly behind the buttocks. Lean back a little, using the arms to support the back. Keep the spine as straight as possible. Be aware of the toes.

Move the toes of both feet slowly backward and forward, keeping the feet upright and the ankles relaxed and motionless. Hold each position for a few seconds. Repeat 10 times.

GOOLF NAMAN (ANKLE BENDING)

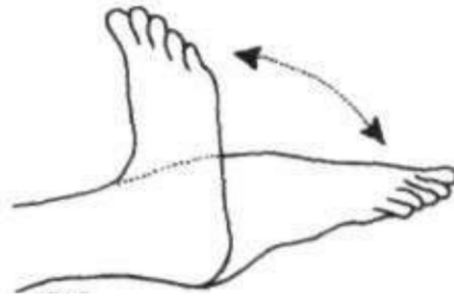


Figure: 4 – Ankle bending

Remain in the base position. Keep the feet slightly apart. Slowly move both feet backward and forward, bending them from the ankle joints. Try to stretch the feet forward to touch the floor and then draw them back towards the knees. Hold each position for a few seconds. Repeat 10 times.

GOOLF CHAKRA (ANKLE ROTATION)

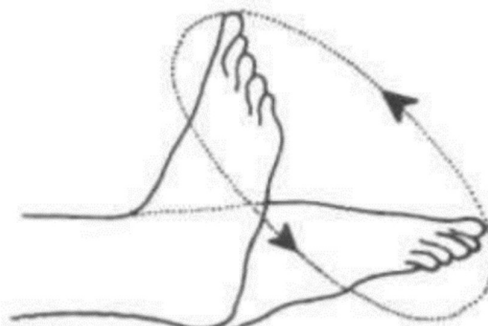


Figure: 5 - Ankle rotation

Remain in the base position. Separate the legs a little, keeping them straight.

Keep the heels on the ground throughout the practice.

Stage I: Slowly rotate the right foot clockwise from the ankle 10 times and then repeat 10 times anti-clockwise. Repeat the same procedure with the left foot.

Stage 2: Place the feet together. Slowly rotate both feet together in the same direction, keeping them in contact with each other. Do not allow the knees to move. Practise 10 times clockwise and then 10 times anticlockwise.

Stage 3: Keep the feet separated. Slowly rotate both feet from the ankles together but in opposite directions. The big toes should touch each other on the inward stroke of each foot.

Do 10 rotations in one direction and then 10 rotations in the opposite direction.

GOOLF GHOORNAN (ANKLE CRANK)

Figure: 6 – Ankle crank

Remain in the base position. Bend the right knee and bring the foot towards



the buttock. Turn the knee out to the side and place the foot on the left thigh. Make sure the ankle is far enough over the thigh to be free for rotation. Hold the right ankle with the right hand to support the ankle. Hold the toes of the right foot with the left hand. With the aid of the left hand, slowly rotate the right foot 10 times clockwise, then 10 times anti-clockwise. Repeat with the left foot placed on the right thigh.

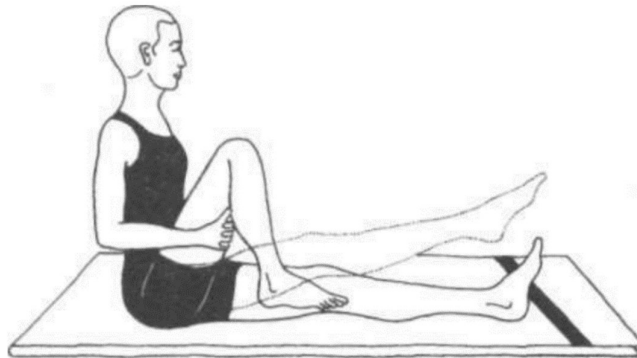
JANUFALAK AKARSHAN (KNEECAP CONTRACTION)

Stay in the base position. Contract the muscle surrounding the right knee, drawing the kneecap back towards the thigh. Hold the contraction for 3 to 5 seconds, counting mentally. Release the contraction and let the kneecap return to its normal position. Practise 5 times. Repeat with the left kneecap 5 times, then with both kneecaps together. Breathing: Inhale while contracting. Hold the breath during contraction. Exhale while relaxing the knee muscles. Awareness: On the breath, mental counting and contraction.

JANU NAMAN (KNEE BENDING)

Figure: 7 - Knee bending

Stay in the base position. Bend the right knee and clasp the hands under the right thigh. Straighten the right leg, pulling up the kneecap. Keep the hands under the



thigh but straighten the arms. Do not allow the heel or toes to touch the floor. Bend the right leg at the knee so that the thigh comes close to the chest and the heel near the buttocks. Keep the head and spine straight. 29 This is one round. Practise 10 rounds with the right leg and then 10 rounds with the left leg.

DWI JANU NAMAN (DOUBLE KNEE BENDING)

Sitting in the base position, place both palms flat on the floor at the side and slightly in front of the buttocks. Bend both knees together, and place the feet on the floor in front of the buttocks. Straighten the legs and raise the feet so that they are about 8 cm above the floor in the final position. Point the toes forward. The hands and arms should support and maintain stability of the body. Try to keep the head and spine upright. Remain in the position for a second. Bend the knees and bring the legs back to the starting position, keeping the heels slightly above the floor. Draw the toes back towards the shins. This is one round. Practise 5 to 10 rounds, keeping the heels off the floor throughout the practice.

JANU CHAKRA (KNEE CRANK)

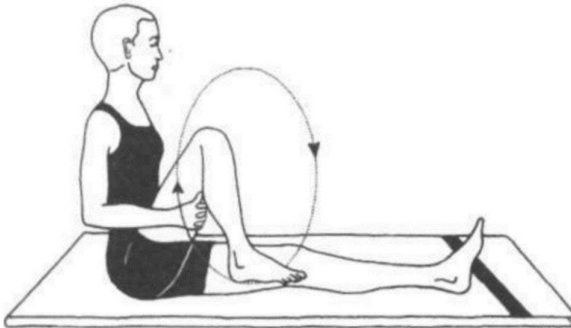


Figure: 8 - Knee crank

Sit in the base position. Bend the right leg at the knee as described in practice 6. Place the hands under the right thigh and interlock the fingers or cross the arms holding the elbows. Raise the right foot from the ground. Rotate the lower leg from the knee in a large circular movement; try to straighten the leg at the top of the upward movement. The upper leg and trunk should be completely still. Rotate 10 times clockwise and then 10 times anti-clockwise. Repeat with the left leg.

ARDHA TITALI ASANA (HALF BUTTERFLY)

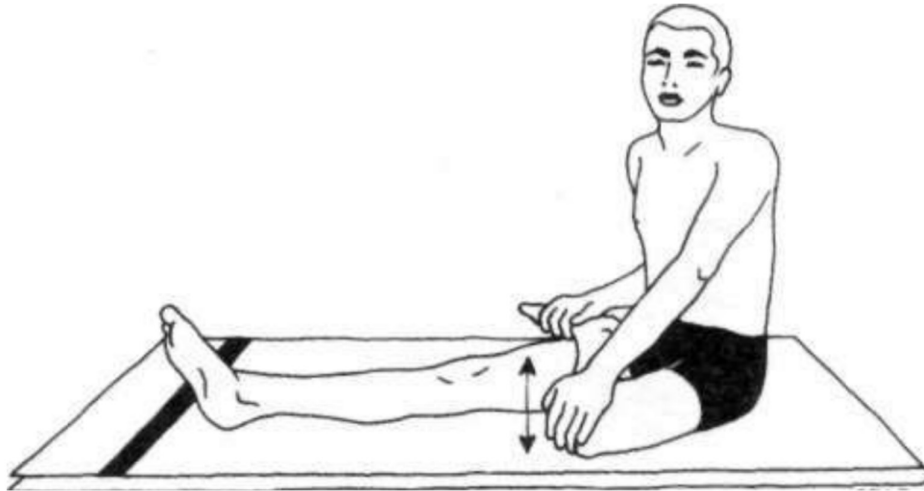


Figure: 9 - Half butterfly

Sit in the base position. Bend the right leg and place the right foot as far up on the left thigh as possible. Place the right hand on top of the bent right knee. Hold the toes of the right foot with the left hand. This is the starting position.

Stage I: with breath synchronisation While breathing in, gently move the right knee up towards the chest. Breathing out, gently push the knee down and try to touch the knee to the floor. The trunk should not move. Do not force this movement in any way. The leg muscles should be passive, the movement being achieved by the exertion of the right arm. Slowly practise 10 up and down movements. Awareness: On the breath, mental counting, movement of hip joint and relaxation of inner thigh muscles.

SHRONI CHAKRA (HIP ROTATION)

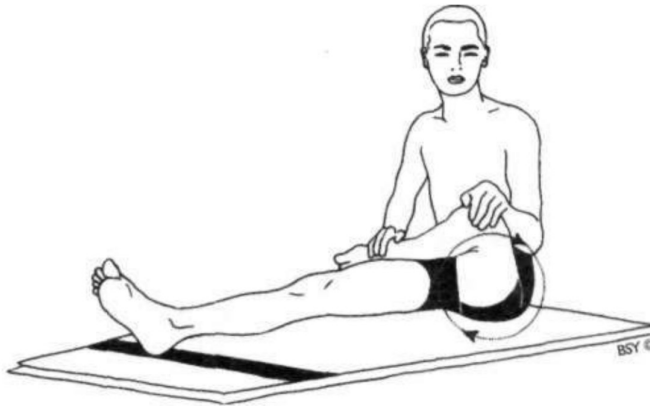


Figure:10- Hip rotation

Sit in the same starting position as for asana 9 with the right leg on the left thigh. Using the muscles of the right arm, rotate the right knee in a circle trying to make the circular movement as large as possible. The index finger may be pointed out and used as a guide to perfection of the circular movement. Practise 10 rotations clockwise and then 10 rotations anticlockwise. Straighten the leg slowly. Release the knee as described in the note to asana 9. Repeat with the left leg.

POORNA TITALI ASANA (FULL BUTTERFLY)



Figure: 11- Full butterfly

Sit in the base position. Bend the knees and bring the soles of the feet together, keeping the heels as close to the body as possible. Fully relax the inner thigh muscles.

Stage I: Clasp the feet with both hands. Gently bounce the knees up and down, using the elbows as levers to press the legs down. Try to touch the knees to the ground on the downward stroke. Do not use any force. Practise 30 to 50 up and down movements.

Stage 2: Keep the soles of the feet together. Place the hands on the knees. Using the palms, gently push the knees down towards the floor, allowing them to spring up again.

Do not force this movement. Repeat 20 to 30 times. Straighten the legs and relax.

MUSHTIKA BANDHANA (HAND CLENCHING)

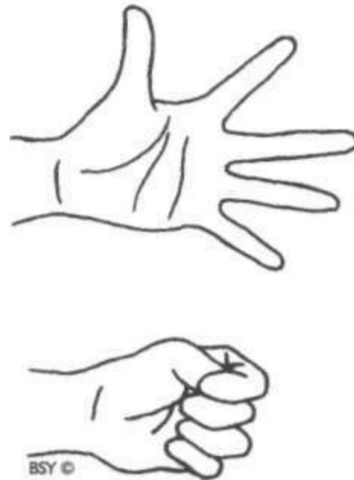


Figure: 12 - Hand clenching

Sit in the base position or a cross-legged pose. Hold both arms straight in front of the body at shoulder level. Open the hands, palms down, and stretch the fingers as wide apart as possible. Close the fingers to make a tight fist with the thumbs inside. The fingers should be slowly wrapped around the thumbs. Again open the hands and stretch the fingers. Repeat 10 times.

MANIBANDHA NAMAN (WRIST BENDING)

Remain in the base position or a cross-legged pose. Stretch the arms in front of the body at shoulder level. Keep the palms open and fingers straight throughout the entire practice. Bend the hands backward from the wrists as if pressing the palms against a wall with the fingers pointing toward the ceiling. Bend the hands forward from the wrists so that the fingers point toward the floor. Keep the elbows straight throughout the practice. Do not bend the knuckle joints or fingers. Bend the hands up again for the next round. Repeat 10 times.

MANIBANDHA CHAKRA (WRIST JOINT ROTATION)

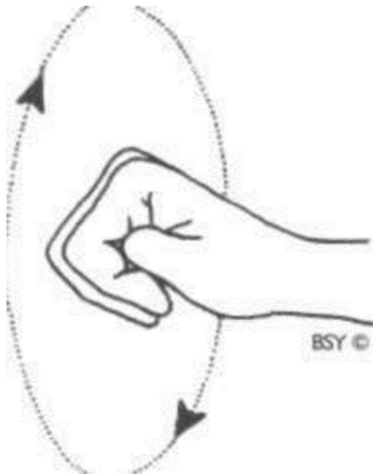


Figure: 13 - Wrist joint rotation

Remain in the base position or a comfortable cross-legged pose, but keep the back straight. Stage I: Extend the right arm forward at shoulder level. Make a fist with the right hand, with the thumb inside. The left hand may be used as a support if necessary. This is the starting position. Slowly rotate the fist about the wrist, ensuring that the palm faces downward throughout the rotation. The arms and elbows should

remain perfectly straight and still. Make as large a circle as possible. Practise 10 times clockwise and 10 times anti-clockwise. Repeat the same with the left fist.

Stage 2: Extend both arms in front of the body with the fists clenched. Keep the arms straight and at shoulder level. Rotate the fists together in the same direction. Practise 10 times in each direction.

Stage 3: Practise as in stage 2. Rotate the fists together in the opposite direction. Practise 10 times in each direction.

KEHUNI NAMAN (ELBOW BENDING)

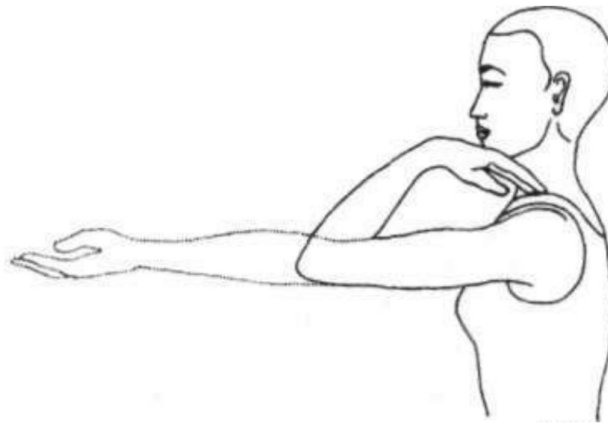


Figure:14 - Elbow bending

Stage I: Remain in the base position or a cross-legged pose. Stretch the arms in front of the body at shoulder level. The hands should be open with the palms facing up. Bend the arms at the elbows and touch the fingers to the shoulders. Straighten the arms again. This is one round. Repeat 10 times.

Stage 2: Extend the arms sideways at shoulder level, hands open and palms facing the ceiling. Bend the arms at the elbows and touch the fingers to the shoulders. Again straighten the arms sideways. Repeat 10 times.

SKANDHA CHAKRA (SHOULDER SOCKET ROTATION)



Figure:15 - Shoulder socket rotation

Stage I: Remain in the base position or a cross-legged pose. Place the fingers of the right hand on the right shoulder. Keep the left hand on the left knee and the back straight. Rotate the right elbow in a large circle. Practise 10 times clockwise and 10 times anti-clockwise. Repeat with the left elbow. Make sure that the head, trunk and spine remain straight and still.

Stage 2: Place the fingers of the left hand on the left shoulder and the fingers of the right hand on the right shoulder. Fully rotate both elbows at the same time in a large circle. Try to touch the elbows in front of the chest on the forward movement and touch the ears while moving up. Stretch the arms back in the backward movement and touch the sides of the trunk while coming down. Practise slowly 10 times clockwise and then 10 times anticlockwise.

GREEVA SANCHALANA (NECK MOVEMENTS)

Stage I: Sit in the base position or a cross-legged pose with the hands resting on the knees in jnana or chin mudra. Close the eyes. Slowly move the head forward and try to touch the chin to the chest. Move the head as far back as comfortable. Do not strain. Try to feel the stretch of the muscles in the front and back of the neck, and the loosening of the vertebrae in the neck. Practise 10 times.

Stage 2: Remain in the same position, keeping the eyes closed. Face directly forward. Relax the shoulders. Slowly move the head to the right and try to touch the right ear to the right shoulder without turning the head or raising the shoulders. Move the head to the left side and try to touch the left ear to the left shoulder. This is one round. Do not strain; touching the shoulder is not necessary. Practise 10 rounds.

Stage 3: Remain in the base position. Keep the head upright and the eyes closed. Gently turn the head to the right so that the chin is in line with the shoulder. Feel the release of tension in the neck muscles and the loosening of the neck joints. Slowly turn the head to the left as far as is comfortable. Do not strain. Practise 10 times on each side.

Stage 4: Remain in the same position with the eyes closed. Slowly rotate the head downward, to the right, backward and then to the left side in a relaxed, smooth, rhythmic, circular movement. Feel the shifting stretch around the neck and the loosening up of the joints and muscles of the neck. Practise 10 times clockwise and then 10 times anticlockwise. Do not strain. 43 If dizziness occurs, open the eyes. After the practice, keep the neck straight and the eyes closed. Be aware of the sensations in the head and neck.

ASANAS

SARALA NATARAJASANA (LORD SHIVA'S DANCE)



Figure:16 - Lord Shiva's dance

Stand upright with the feet slightly apart. Bend and raise the left knee so the thigh is horizontal, the foot pointing away from the body and slightly to the right of the right leg. Bend the right knee slightly. Place the left arm across the body in line with the left thigh, with the palm and fingers facing down. Bend the right elbow so that the right palm faces forwards and the forearm is vertical. The right elbow should be just behind the left wrist. Practise gyana mudra with the right hand and gaze toward the horizon. This is the final position.

Breathing: Breathe normally throughout the practice.

Benefits: This asana balances the nervous system, develops control of the body and mental concentration, and makes the legs supple.

PADA HASTASANA (FORWARD BENDING POSE)

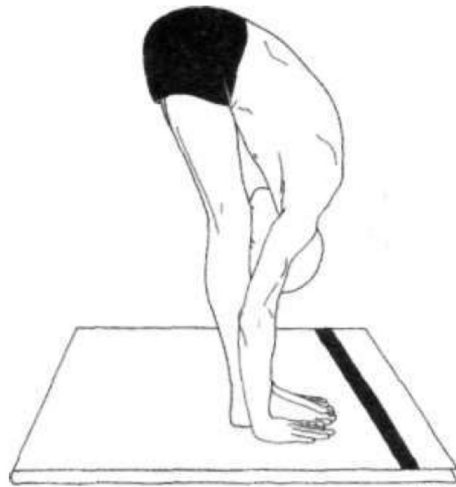


Figure:17 - Forward bending pose

Bend forward until the fingers or palms of the hands touch the floor on either side of the feet. Try to touch the knees with the forehead. Do not strain. Keep the knees straight.

Breathing: Exhale while bending forward. Try to contract the abdomen in the final position to expel the maximum amount of air from the lungs.

VIPAREETA KARANI ASANA (INVERTED POSE)

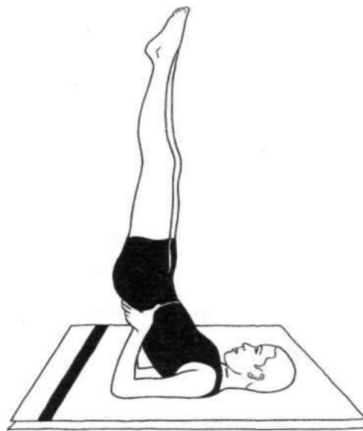


Figure:18 - Inverted pose

Lie flat on the back with the legs and feet together in a straight line. Place the hands and arms close to the body with the palms facing down. Relax the whole body. Raise both legs, keeping them straight and together. Move the legs over the body towards the head. Push down on the arms and hands, raising the buttocks. Roll the spine from the floor, taking the legs further over the head. Turn the palms up, bend the elbows and let the top of the hips rest on the base of the palms near the wrist. The hands cup the hips and support the weight of the body. Keep the elbows as close to each other as possible. Raise both the legs to the vertical position and relax the feet. In the final position, the weight of the body rests on the shoulders, neck and elbows, the trunk is at a 45 degree angle to the floor and the legs are vertical. Note that the chin does not press against the chest. Close the eyes and relax in the final pose for as long as is comfortable. To return to the starting position, lower the legs over the head, then place the arms and hands close to the body, palms facing down. Slowly lower the spine, vertebra by vertebra, along the floor. Do not lift the head. When the buttocks reach the floor, lower the legs, keeping them straight. Relax the body in Shavasana.

Breathing: Inhale while in the lying position. Retain the breath inside while assuming the final pose. Once the body is steady in the final pose, practise normal or ujjayi breathing. Retain the breath inside while lowering the body to the floor.

CHAKRASANA (WHEEL POSE)



Figure:19 - Wheel pose

Lie down on your back with your feet apart, bend your knees and place your feet on the ground close to your body. Now bring your palms under your shoulders such that the fingers point towards the shoulders and the elbows are shoulder-width apart. Inhale and press your palms firmly into the floor. Lift your shoulders and elbow firmly into the floor. Your Feet should be pressed firmly into the floor, and lift your hips up. The spine should be rolled up so that it may seem to resemble a semi-circular arch or wheel. Straighten out your arms and legs as much as possible so that the hips and chest may be pushed up. Hold this pose for at least 15-30 seconds. To go back to the original, bend your elbows to lower your head and shoulders to the floor. Then bend your knees and bring your spine and hips back to the ground and relax.

PARVATASANA (MOUNTAIN POSE)



Figure: 20 - Mountain pose

Take the left foot back beside the right foot. Simultaneously, raise the buttocks and lower the head between the arms, so that the back and legs form two sides of a triangle.

The legs and arms should be straight in the final position. Try to keep the heels on the floor in the final pose and bring the head towards the knees. Do not strain.

SARALA BHUJANGASANA (COBRA POSE)

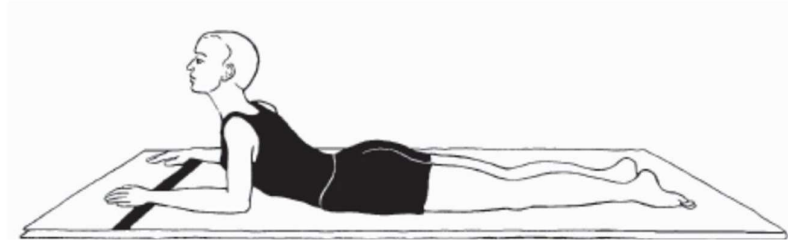


Figure: 21- Cobra pose

Lower the buttocks and hips to the floor, Straightening the elbows, arch the back and push the chest forward into the cobra pose. Bend the head back and direct the gaze upward to the eyebrow centre. The thighs and hips remain on the floor and forearms on the floor, bend the back slightly backwards.

PADMASANA (LOTUS POSE)



Figure: 22 - Lotus pose

Start by sitting on the floor with your legs stretched in front of you and the heels touching the floor. Place the hands by your sides while keeping the spine erect. Slowly move your legs a little wider while keeping the heels on the ground.

Bend one of your knees and place it on the opposite thigh by using the hands to get the feet towards you. Ensure that the sole of your feet is pointed upwards and the heel as close as possible to the abdomen.

Do the same on the other leg so that both the legs are locked in a criss-cross. Make sure to keep the spine erect and the head straight. These are the basic steps of padmasana. Take deep breaths and stay in this pose for 2 to 3 minutes.

SHASHANKASANA (POSE OF THE MOON OR HARE POSE)

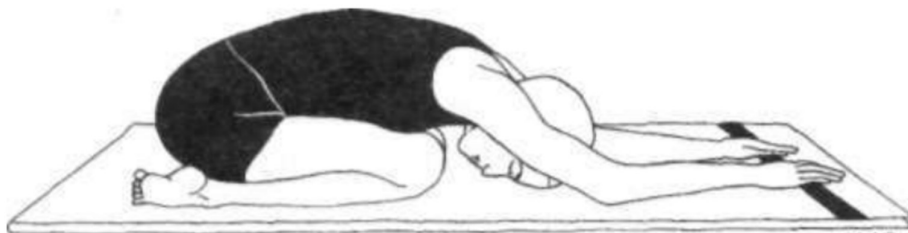


Figure: 23 - Pose of the moon or hare pose

Sit in vajrasana, placing the palms on the thighs just above the knees. Close the eyes and relax, keeping the spine and head straight. While inhaling, raise the arms above the head, keeping them straight and shoulder width apart. Exhale while bending the trunk forward from the hips, keeping the arms and head straight and in line with the trunk. At the end of the movement, the hands and forehead should rest on the floor in front of the knees. If possible, the arms and forehead should touch the floor at the same time. Bend the arms slightly so that they are fully relaxed and let the elbows rest on the floor. Retain the breath for up to 5 seconds in the final position. Then, simultaneously inhale and slowly raise the arms and trunk to the vertical position. Keep the arms and head in line with the trunk. Breathe out while lowering the arms to the knees. This is one round. Practise 3 to 5 rounds.

Benefits: This asana stretches the back muscles and separates the individual vertebrae from each other, releasing pressure on the discs. Often nerve connections emanating from the spinal cord are squeezed by these discs, giving rise to various forms of backache. This posture helps to relieve this problem and encourages the discs to resume their correct position. It also regulates the functioning of the adrenal glands. It tones the pelvic muscles and the sciatic nerves and is beneficial for women who have an underdeveloped pelvis. It helps to alleviate disorders of both the male and female reproductive organs. Regular practice relieves constipation. When practised with ujjayi pranayama in the final position, it helps to eliminate anger and is very cooling for the brain.

PASCHIMOTTANASANA (BACK STRETCHING POSE)

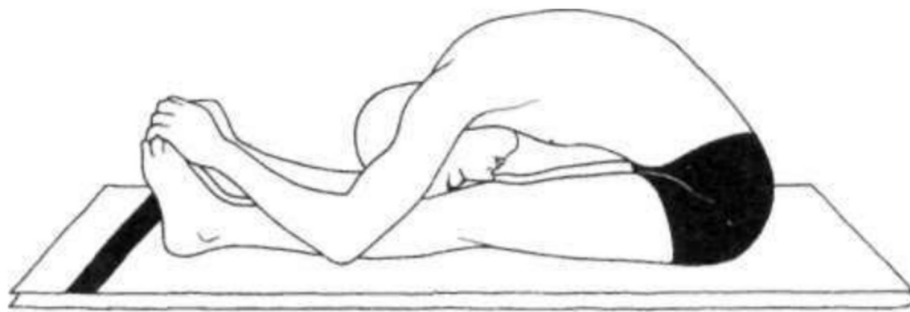


Figure: 24 - Back stretching pose

Sit on the floor with the legs outstretched, feet together and hands on the knees. This is the starting position. Relax the whole body. Slowly bend forward from the hips, sliding the hands down the legs. Try to grasp the big toes with the fingers and thumbs. If this is impossible, hold the heels, ankles or any part of the legs that can be reached comfortably. Move slowly without forcing or jerking. Hold the position for a few seconds. Relax the back and leg muscles allowing them to gently stretch. Keeping the legs straight and utilising the arm muscles, not the back muscles, begin to bend the

elbows and gently bring the trunk down towards the legs, maintaining a firm grip on the toes, feet or legs. Try to touch the knees with the forehead. Do not strain. This is the final position. Hold the position for as long as is comfortable and relax. Slowly return to the starting position. This is one round.

Breathing: Inhale in the starting position. Exhale slowly while bending forward. Inhale in the static position. Exhale while bringing the trunk further towards the legs with the arms. Breathe slowly and deeply in the final position or retain the breath out if holding for a short duration. Inhale while returning to the starting position.

Benefits: This asana stretches the hamstring muscles and increases flexibility in the hip joints. It tones and massages the entire abdominal and pelvic region including the liver, pancreas, spleen, kidneys and adrenal glands. It removes excess weight in this area and helps alleviate disorders of the urogenital system. It stimulates circulation to the nerves and muscles of the spine. It is used in yoga therapy for the management of prolapse, menstrual disorders, sluggish liver, diabetes, colitis, kidney complaints, bronchitis and eosinophilia.

JANU SIRSHASANA (HEAD TO KNEE POSE)

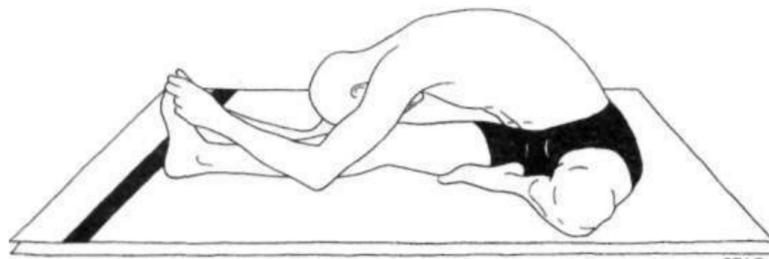


Figure: 25 - Head to knee pose

Sit with the legs outstretched and the feet together. Bend the left leg, placing the heel of the foot against the perineum and the sole of the foot against the inside of the right thigh. Keep the left knee on the floor. Place the hands on top of the right

knee, keeping the spine straight and the back muscles relaxed. This is the starting position. Slowly bend forward, sliding the hands down the right leg, and grasp the right foot. If possible, hold the big toe with the index finger, middle finger and thumb of the left hand and the outside edge of the foot with the right hand. Try to touch the knee with the forehead. This is the final position. Keep the back relaxed and do not strain. Hold the position for as long as is comfortable. Return to the starting position and rest the hands on the knees. Change sides and repeat with the right leg bent and the left leg straight. Practise up to 5 times with each leg.

Breathing: Inhale in the starting position. Exhale while bending forward. Retain the breath outside if holding the final position for a short time. Breathe normally if holding the pose for longer. Inhale while returning to the starting position.

SHAVASANA (CORPSE POSE)

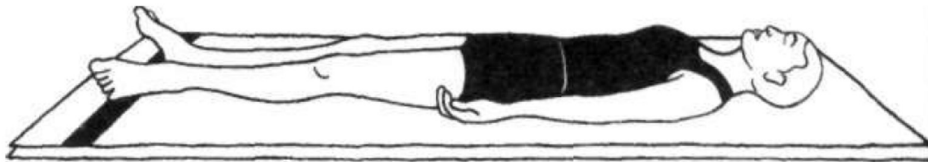


Figure: 26 - Corpse pose

Lie flat on the back with the arms about 15 cm away from the body, palms facing upward. A thin pillow or folded cloth may be placed behind the head to prevent discomfort. Let the fingers curl up slightly. Move the feet slightly apart to a comfortable position and close the eyes. The head and spine should be in a straight line. Make sure the head does not fall to one side or the other. Relax the whole body and stop all physical movement. Become aware of the natural breath and allow it to become rhythmic and relaxed.

PRANAYAMA

NADI SHODHANA PRANAYAMA (PSYCHIC NETWORK PURIFICATION)



Figure: 27 - Psychic network purification

Hand position: Nasagra Mudra (nosetip position)

Hold the fingers of the right hand in front of the face. Rest the index and middle fingers gently on the eyebrow centre. Both fingers should be relaxed. The thumb is above the right nostril and the ring finger above the left. These two digits control the flow of breath in the nostrils by alternately pressing on one nostril, blocking the flow of breath, and then the other. The little finger is comfortably folded. When practising for long periods, the elbow may be supported by the left hand although care is needed to prevent chest restriction.

BHRAMARI PRANAYAMA (HUMMING BEE BREATH)



Figure: 28 - Humming bee breath

Sit in a comfortable meditation asana. The spinal cord should be erect, the head straight and the hands resting on the knees in chin or jnana mudra. The ideal posture for this practice is padmasana or siddha / siddha yoni asana.

The position of nadanusandhana asana, which is used in nada yoga, may also be utilised as follows. Sit on a rolled blanket with the heels drawn up to the buttocks. Place the feet flat on the floor with the knees raised and the elbows resting on the knees. (For full details refer to Bihar School of Yoga publication *Yoga and Kriya*). Close the eyes and relax the whole body for a short time. The lips should remain gently closed with the teeth slightly separated throughout the practice. This allows the sound vibration to be heard and felt more distinctly in the brain. Make sure the jaws are relaxed. Raise the arms sideways and bend the elbows, bringing the hands to the ears. Use the index or middle finger to plug the ears. The flaps of the ears may be pressed without inserting the fingers. If the position of nadanusandhana has been assumed, plug the ears with the thumbs, resting the other four fingers on the head. Bring the awareness to the centre of the head, where ajna chakra is located, and keep the body absolutely still.

Breathe in through the nose. Exhale slowly and in a controlled manner while making a deep, steady humming sound likes that of the black bee. The humming sound should be smooth, even and continuous for the duration of the exhalation. The sound should be soft and mellow, making the front of the skull reverberate. This is one round. At the end of exhalation, breathe in deeply and repeat the process. Perform 5 rounds.

MEDITATION

OM MEDITATION

- Origin & Meaning

A mantra is a syllable or word, usually without any particular meaning, that is repeated for the purpose of focusing your mind. It is not an affirmation used to convince yourself of something.

Some meditation teachers insist that both the choice of word, and its correct pronunciation, is very important, due to the “vibration” associated to the sound and meaning, and that for this reason an initiation into it is essential. Others say that the mantra itself is only a tool to focus the mind, and the chosen word is completely irrelevant.

Mantras are used in Hindu traditions, Buddhist traditions (especially Tibetan and “Pure Land” Buddhism), as well as in Jainism, Sikhism and Daoism (Taoism). Some people call mantra meditation “om meditation”, but that is just one of the mantras that can be used. A more devotion oriented practice of mantras is called japa, and consists of repeating sacred sounds (name of God) with love.

- How to do it

As most type of meditations, it is usually practiced sitting with spine erect, and eyes closed. The practitioner then repeats the mantra in his mind, silently, over and over again during the whole session.

Sometimes this practice is coupled with being aware of the breathing or coordinating with it. In other exercises, the mantra is actually whispered very lightly and softly, as an aid to concentration.

As you repeat the mantra, it creates a mental vibration that allows the mind to experience deeper levels of awareness. As you meditate, the mantra becomes increasingly abstract and indistinct, until you're finally led into the field of pure consciousness from which the vibration arose.

Repetition of the mantra helps you disconnect from the thoughts filling your mind so that perhaps you may slip into the gap between thoughts. The mantra is a tool to support your meditation practice. Mantras can be viewed as ancient power words with subtle intentions that help us connect to spirit, the source of everything in the universe.

OM is a well-known example of a mantra. But there are thousands of others. Here are some of the most well-known mantras from the Hindu & Buddhist traditions:

- Om
- so-ham
- om namahshivaya
- om manipadme hum
- rama
- yam
- ham

You may practice for a certain period of time, or for a set number of “repetitions” – traditionally 108 or 1008. In the latter case, beads are typically used for keeping count. As the practice deepens, you may find that the mantra continues “by itself” like the humming of the mind. Or the mantra may even disappear, and you are left in a state of deep inner peace.

TRANSCENDENTAL MEDITATION (TM)

- Origin & Meaning

Transcendental Meditation is a specific form of Mantra Meditation introduced by Maharishi Mahesh Yogi in 1955 in India and the West. In the late 1960s and early 1970s, the Maharishi achieved fame as the guru to the Beatles, The Beach Boys and other celebrities.

It is a widely practiced form of meditation, with over 5 million practitioners worldwide, and there is a lot of scientific research, many sponsored by the organization, demonstrating the benefits of the practice. There are over 600 scientific papers, many of them peer-reviewed, and I have used part of their research when composing my benefits of meditation page. However, there are also critics of the Maharishi and his organization, and some accusation of cultish behavior and doubtful research practices.

- How to do it

Transcendental meditation is not taught freely. The only way of learning it is to pay to learn from one of their licensed instructors. The support given seems to be good, though.

In general, however, it is known that TM involves the use of a mantra and is practiced for 15–20 minutes twice per day while sitting with one's eyes closed. The mantra is not unique, and is given to the practitioner based on his gender and age. They are also not “meaningless sounds”—rather, they are Tantric names of Hindu deities. This probably is irrelevant for most people.

METHODS

Aims and objectives of the study

- To evaluate the effect of yoga techniques Asana, pranayama and dhyana in children with special reference to cognitive faculties.
- To compare and assess the effect of yoga techniques and without yoga techniques in children with special reference to cognitive faculties.

Source of the sample

The data is collected randomly from Pramathi hill view academy, kuvempunagar as per the protocol. The selection of the children is random and the selected children will undergo intervention for a period of 21 days.

Sample size

The sample size is 30 with two groups of 15 each.

Sampling

Simple random sampling technique is adopted in this study and samples are selected randomly by lottery method and assigned into two groups of 15 each in trial and control group

Inclusion criteria

1. 10-18 years of age
2. Cooperative subjects
3. Subjects of both the gender

Exclusion criteria

1. Already undertaking personal yoga practice
2. Severe cognitive impairment

3. Physically disabled

Diagnostic criteria

The internationally acclaimed MMSE scale is used in this study and the ratings of the scale is stated below.

Interpretation of MMSE

<u>Method</u>	<u>Score</u>	<u>Interpretation</u>
Single Cutoff	<24	Abnormal
Range	<21	Increased odds of dementia
	>25	Decreased odds of dementia
Education	21	Abnormal for 8 th grade education
	<23	Abnormal for high school education
	<24	Abnormal for college education
Severity	24-30	No cognitive impairment
	18-23	Mild cognitive impairment
	0-17	Severe cognitive impairment

Interpretation of MMSE Scores

Score	Degree of Impairment	Formal Psychometric Assessment	Day-to-Day Functioning
25-30	Questionably significant	If clinical signs of cognitive impairment are present, formal assessment of cognition may be valuable.	May have clinically significant but mild deficits. Likely to affect only most demanding activities of daily living.
20-25	Mild	Formal assessment may be helpful to better determine pattern and extent of deficits.	Significant effect. May require some supervision, support and assistance.
10-20	Moderate	Formal assessment may be helpful if there are specific clinical indications.	Clear impairment. May require 24-hour supervision.
0-10	Severe	Patient not likely to be testable.	Marked impairment. Likely to require 24-hour supervision and assistance with ADL.

Source: Folstein MF, Folstein SE, McHugh PR: "Mini-mental state: A practical method for grading the cognitivestate of patients for the clinician." *J Psychiatr Res* 1975;12:189-198.

Study design

A comparative clinical study with trial and placebo group.

Method of grouping

Group A : consists of subjects who underwent designed yoga protocol comprises of Asana, pranayama and dhyana for 21 days with 15 subjects – Case group

Group B : consists of subjects who does not underwent designed yoga protocol comprises of Asana, pranayama and dhyana for 21 days with 15 subjects – Control group

Assessment schedule

The assessment schedule is pre, post and follow up type of assessment where in the first assessment will be taken on 0th day, 21st day and 30th day after the intervention as a part of follow-up protocol.

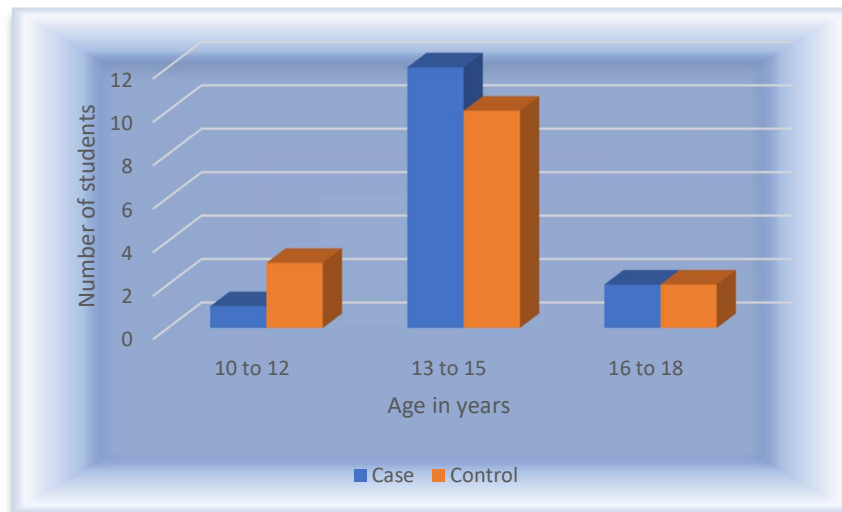
Statistical analysis

The differential statistics with the help of SPSS software

The Inferential statistics tests used was the Chi-square test and fishers exact test.

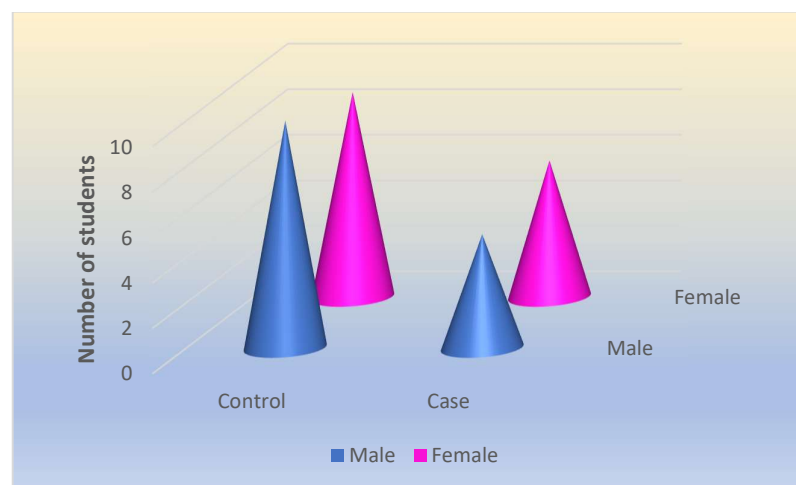
5. OBSERVATIONS

GRAPH 1 - Age wise distribution of subjects



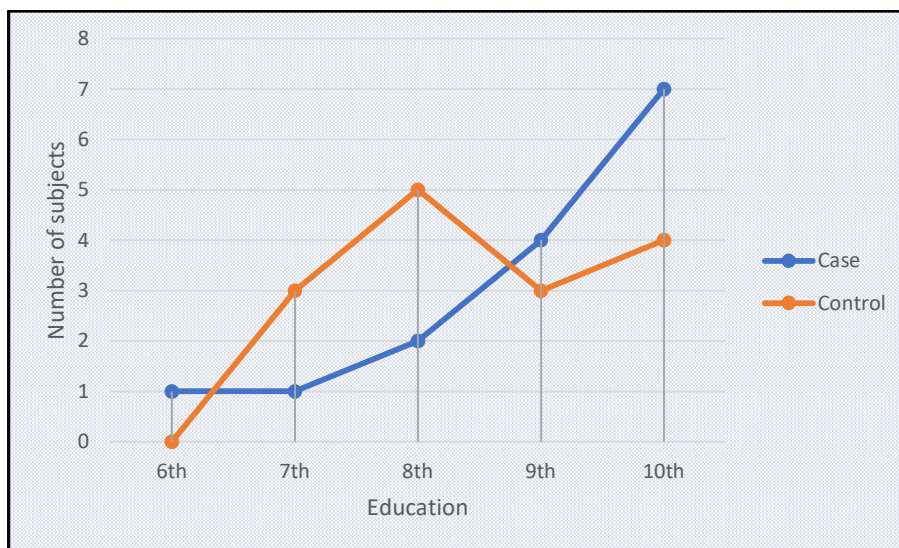
There are 15 subjects in the case and control group each. 4 subjects are under the age group of 10-12 years in which 1 subject is under case group and 3 subjects in control group, 22 subjects are between 13-15 years in which 12 are under case and 10 are under control group, 4 subjects fall under 16-18 years in which 2 subjects are under case group and control group each.

GRAPH 2 - Sex wise distribution of subjects



There are 9 male subjects and 6 female subjects in case group, 8 male subjects and 7 female subjects in control group.

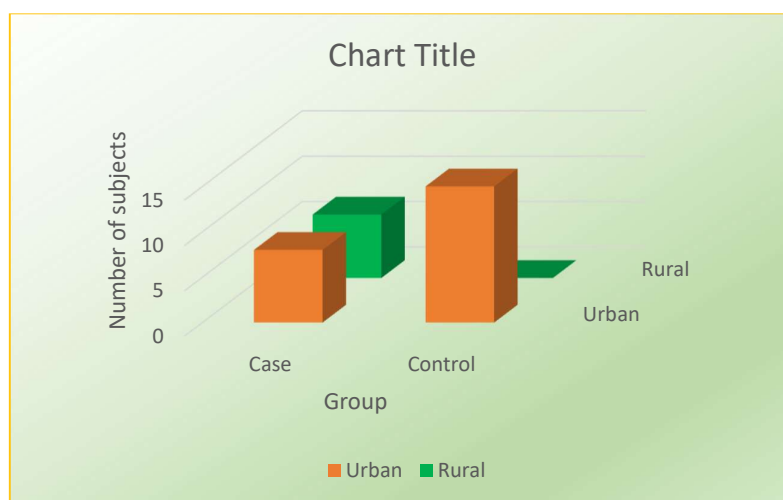
GRAPH 3 - Education wise distribution of subjects



There is 1 subject from 6th class in case group, 4 subjects from 7th Class 1 and 3 in Case and control group respectively.

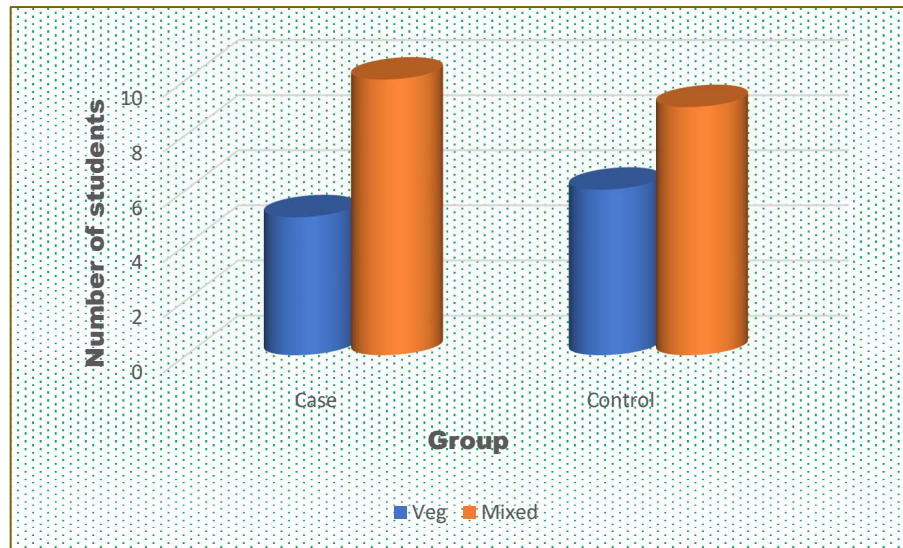
There are 2 subjects from 8th class in case group and 5 in control group, 4 subjects in case group and 3 subjects in control group from 9th class, there are 7 subjects in case group and 4 subjects in control group from 10th class.

GRAPH 4 - Habitat wise distribution of subjects



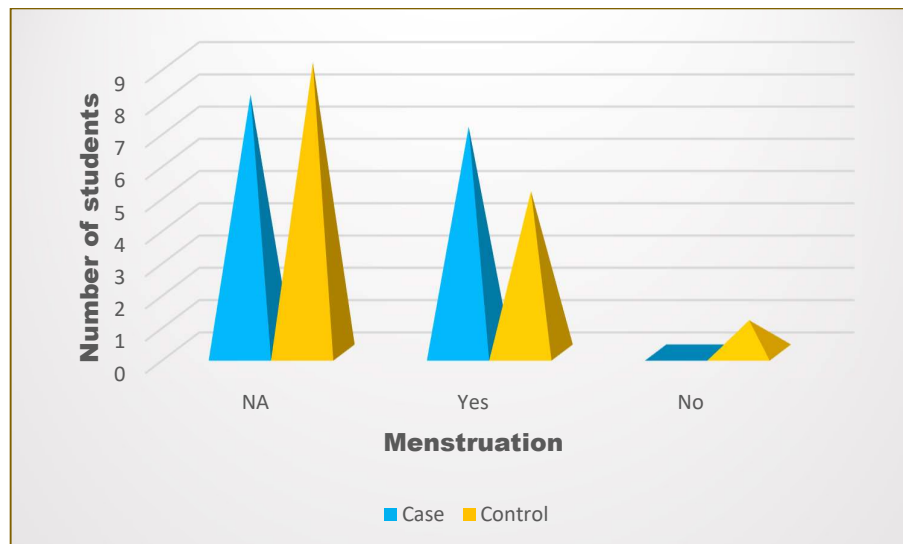
From observation we find that there are 8 subjects from urban and 7 subjects from rural habitat in case group, 15 subjects from urban in control group.

Graph - 5 Diet wise distribution of subjects



By observation, we find that there are 5 students in case group and 6 students in control group who are vegetarians. There are 10 students in case group and 9 students in control group whose diet is mixed.

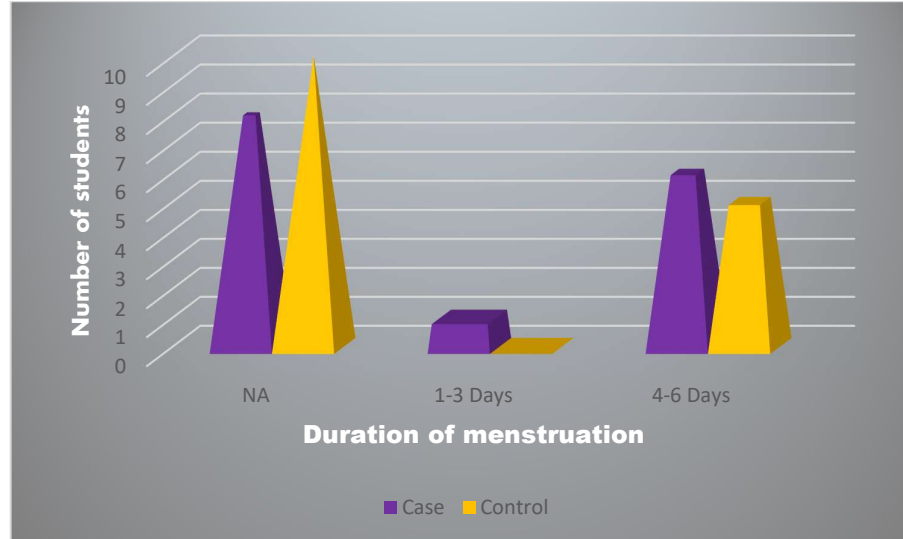
GRAPH 6 - Menarche wise distribution of subjects



Through observation we find that there are 7 students in case and 5 students in control group who have attained menarche and 1 student in control group who have

not yet attained menarche. There are 8 students in case and 9 students in control group to whom the menstruation is not applicable.

GRAPH 7 - Duration of menstruation wise distribution of subjects



By observation we find that 6 students in case group and 5 students in control group whose menstruating period is 4 to 6 days. 1 student is having duration of 1 to 3 days of menstruating period. There are 8 students in case and 10 students in control group to whom the duration of menstruating period is not applicable.

Table 1 - General Linear Model

(Overall MMSE scores)

Descriptive Statistics

	group	Mean	Std. Deviation	N
pre_mmse	Case	24.33	1.496	15
	Ctrl	25.13	1.598	15
	Total	24.73	1.574	30
post_mmse	Case	28.13	1.125	15
	Ctrl	26.47	1.302	15
	Total	27.30	1.466	30
FU_mmse	Case	28.53	.990	15
	Ctrl	25.80	1.474	15
	Total	27.17	1.859	30

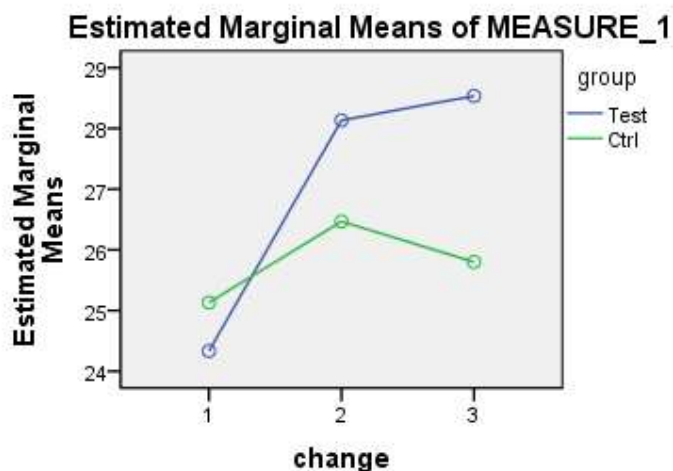
Table 2 - Tests of Within-Subjects Effects (Overall MMSE scores)

Measure: MEASURE_1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Change	125.267	2	62.633	80.693	.000
change * group	49.267	2	24.633	31.736	.000
Error(change)	43.467	56	.776		

Graph 8 - Profile Plot

(Overall MMSE scores)



The overall assessment for cognitive functions shows a significant improvement in case group when compared to control group. The observation in the graphical representation shows a significant exponential rise of scores up to a certain level and again it increased in a gradual manner which shows the improvement in cognitive functions even after the termination of yoga practice in the case group. In case of control group there is slight increase in the cognitive functions and then it decreased gradually. The Pearson Chi Square case for change between groups for overall MMSE assessment (cognitive functions) is 0.000 and that for change within groups is 0.000. which implies there is no change statistically it may be attributed to small sample size and the change observed in the case group is minimal, however there is a remarkable change not only in the graphical representation even clinically better results have been observed by the patient and clinicians too.

Table 3 - General Linear Model
(Scores of the domain ORIENTATION)

Descriptive Statistics

	group	Mean	Std. Deviation	N
pre_orient	Case	9.00	1.069	15
	Ctrl	8.73	.594	15
	Total	8.87	.860	30
post_orient	Case	9.87	.352	15
	Ctrl	9.27	.704	15
	Total	9.57	.626	30
FU_orient	Case	9.80	.414	15
	Ctrl	9.00	.535	15
	Total	9.40	.621	30

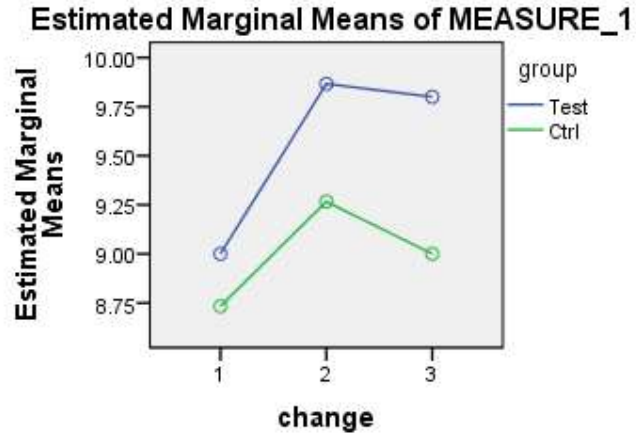
Table 4 - Tests of Within-Subjects Effects
(Scores of the domain ORIENTATION)

Measure: MEASURE_1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Change	8.022	2	4.011	13.300	.000
change * group	1.089	2	.544	1.805	.174
Error(change)	16.889	56	.302		

Graph 9 - Profile Plot

(Scores of the domain ORIENTATION)



The assessment for orientation shows a significant improvement in the case group when compared to the control group. The observation in the graphical representation shows a significant exponential rise of scores up to a certain level and again it decreased minimally. In the case of the control group, there is a slight increase in the orientation and then it decreased gradually. The Pearson Chi-Square case for change between groups for assessment of orientation is 0.174 and that for change within groups is 0.000.

Table 5 - General Linear Model

(Scores of the domain REGISTRATION)

Descriptive Statistics

	Group	Mean	Std. Deviation	N
pre_reg	Case	2.73	.458	15
	Ctrl	3.00	.000	15
	Total	2.87	.346	30
post_reg	Case	2.93	.258	15
	Ctrl	3.00	.000	15
	Total	2.97	.183	30
FU_reg	Case	3.00	.000	15
	Ctrl	3.00	.000	15
	Total	3.00	.000	30

Table 6 - Tests of Within-Subjects Effects

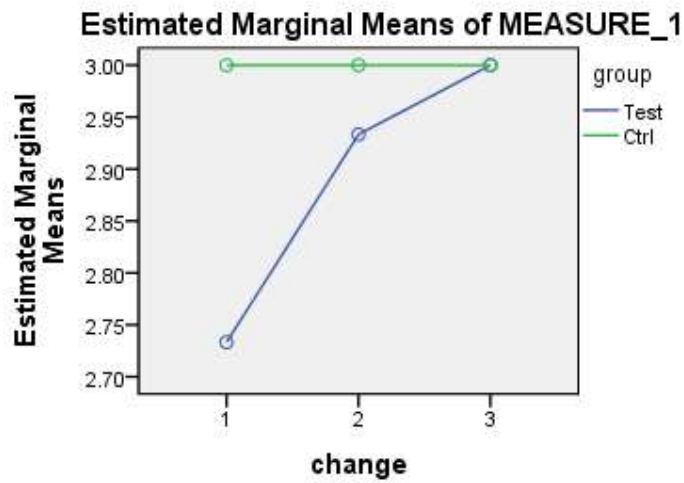
(Scores of the domain REGISTRATION)

Measure: MEASURE_1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Change	.289	2	.144	3.872	.027
change * group	.289	2	.144	3.872	.027
Error(change)	2.089	56	.037		

Graph 10 - Profile Plots

(Scores of the domain REGISTRATION)



Through observation, it is found that there is a notable difference between the case and control group in the assessment results of the domain registration in cognitive functions. The scores of registration of case group exponentially increased from pre to post-assessment and there is a sustained increase even in follow-up assessment for registration. In the control group the graph of registration shows no change, it is constant throughout all assessments. The Pearson Chi-Square case for change between groups for assessment of orientation is 0.027 and that for change within groups is 0.027.

Table 7 - General Linear Model

(Scores of the domain ATTENTION AND CALCULATION)

Descriptive Statistics

	Group	Mean	Std. Deviation	N
pre_att	Case	2.80	.775	15
	Ctrl	3.20	1.014	15
	Total	3.00	.910	30
post_att	Case	4.13	.640	15
	Ctrl	3.00	1.254	15
	Total	3.57	1.135	30
FU_att	Case	4.20	.676	15
	Ctrl	3.00	1.134	15
	Total	3.60	1.102	30

Table 8 - Tests of Within-Subjects Effects

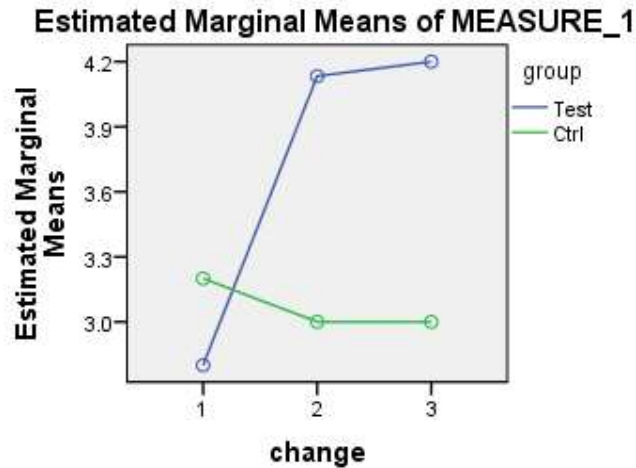
(Scores of the domain ATTENTION AND CALCULATION)

Measure: MEASURE_1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Change	6.822	2	3.411	10.881	.000
change * group	12.289	2	6.144	19.600	.000
Error(change)	17.556	56	.313		

Graph 11 - Profile Plots

(Scores of the domain ATTENTION AND CALCULATION)



From observation, it is observed that there is a noticeable change between the results of case and control group in the domain of attention and calculation. The graph shows that there high exponential rise in case group from pre to post assessment and that change is sustained in a increasing manner clinically and statistically and is seen in the follow up assessment. In the case of control group there is decrease in the results of the domain attention and calculation from pre to post assessment and it is maintained in that manner and noticed in the assessment of follow up. The Pearson Chi-Square case for change between groups for assessment of orientation is 0.000 and that for change within groups is 0.000.

Table 9 - General Linear Model
(Scores of the domain RECALL)

Descriptive Statistics

	group	Mean	Std. Deviation	N
pre_recall	Case	2.47	.640	15
	Ctrl	2.47	.640	15
	Total	2.47	.629	30
post_recall	Case	2.80	.414	15
	Ctrl	2.73	.594	15
	Total	2.77	.504	30
FU_recall	Case	2.73	.594	15
	Ctrl	2.67	.617	15
	Total	2.70	.596	30

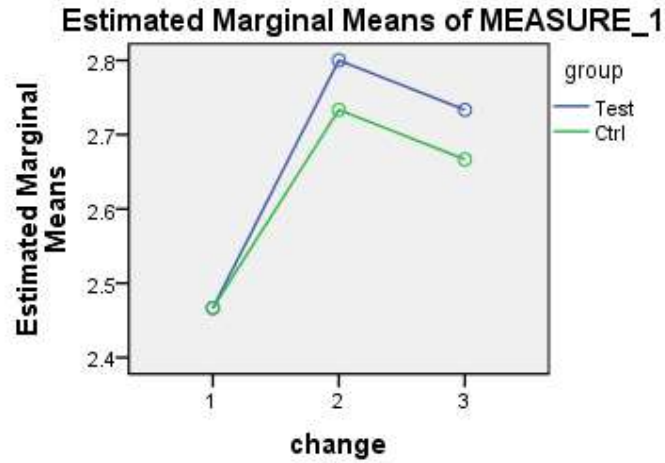
Table 10 - Tests of Within-Subjects Effects
(Scores of the domain RECALL)

Measure: MEASURE_1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
change	1.489	2	.744	4.911	.011
change * group	.022	2	.011	.073	.929
Error(change)	8.489	56	.152		

GRAPH 12 – Profile Plots

(Scores of the domain RECALL)



From graph it is observed in case group there is exponential rise in the results of recall from the assessment to a certain level and again it decreased when assessed in the follow up session. In case of control group the graph shows exponential rise to a certain level and then it decreased. These type results are may be due to the short duration of the intervention and due to some covid restrictions. The Pearson Chi-Square case for change between groups for assessment of orientation is 0.929 and that for change within groups is 0.011.

Table 11 - General Linear Model
(Scores of the domain LANGUAGE)

Descriptive Statistics

	group	Mean	Std. Deviation	N
pre_lang	Test	5.00	.845	15
	Ctrl	5.13	.990	15
	Total	5.07	.907	30
post_lang	Test	5.67	.488	15
	Ctrl	5.40	.828	15
	Total	5.53	.681	30
FU_lang	Test	5.93	.258	15
	Ctrl	5.33	.816	15
	Total	5.63	.669	30

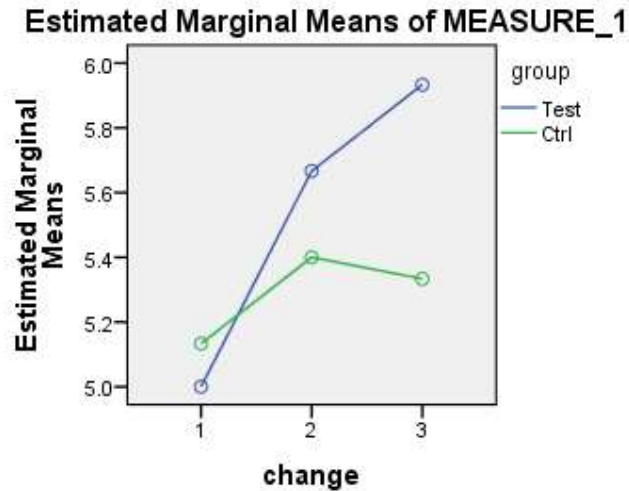
Table 12 - Tests of Within-Subjects Effects
(Scores of the domain LANGUAGE)

Measure: MEASURE_1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
change	5.489	2	2.744	13.777	.000
change * group	2.022	2	1.011	5.076	.009
Error(change)	11.156	56	.199		

GRAPH 13 – Profile Plots

(Scores of the domain LANGUAGE)



From observation, it is observed that there is a noticeable change between the results of case and control group in the domain of Language. The graph shows that there high exponential rise in case group from pre to post assessment and that change is sustained in a increasing manner clinically and statistically and is seen in the follow up assessment. In the case of control group there is decrease in the results of the domain language from pre to post assessment and it is maintained in that manner and noticed in the assessment of follow up. The Pearson Chi-Square case for change between groups for assessment of language is 0.009 and that for change within groups is 0.000.

Table 13 - General Linear Model

(Scores of the domain EXECUTIVE FUNCTIONS)

Descriptive Statistics

	group	Mean	Std. Deviation	N
pre_ex_fn	Test	2.33	.724	15
	Ctrl	2.60	.507	15
	Total	2.47	.629	30
post_ex_fn	Test	2.73	.458	15
	Ctrl	2.93	.258	15
	Total	2.83	.379	30
FU_ex_fn	Test	2.87	.352	15
	Ctrl	2.80	.414	15
	Total	2.83	.379	30

Table 14 - Tests of Within-Subjects Effects

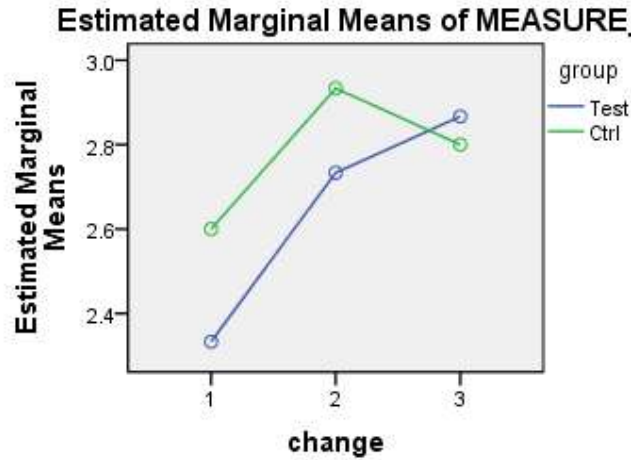
(Scores of the domain EXECUTIVE FUNCTIONS)

Measure: MEASURE_1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
change	2.689	2	1.344	7.397	.001
change * group	.467	2	.233	1.284	.285
Error(change)	10.178	56	.182		

GRAPH 14 – Profile Plots

(Scores of the domain EXECUTIVE FUNCTIONS)



From observation, it is observed that there is a noticeable change between the results of case and control group in the domain of Language. The graph shows that there high exponential rise in case group from pre to post assessment and that change is sustained in a increasing manner clinically and statistically and is seen in the follow up assessment. In the case of control group there is increase in the results of the domain Executive functions from pre to post assessment and again it is decreased. The Pearson Chi-Square case for change between groups for assessment of Executive functions is 0.285 and that for change within groups is 0.001

6. RESULTS

GRAPH 15 - Age wise distribution of subjects

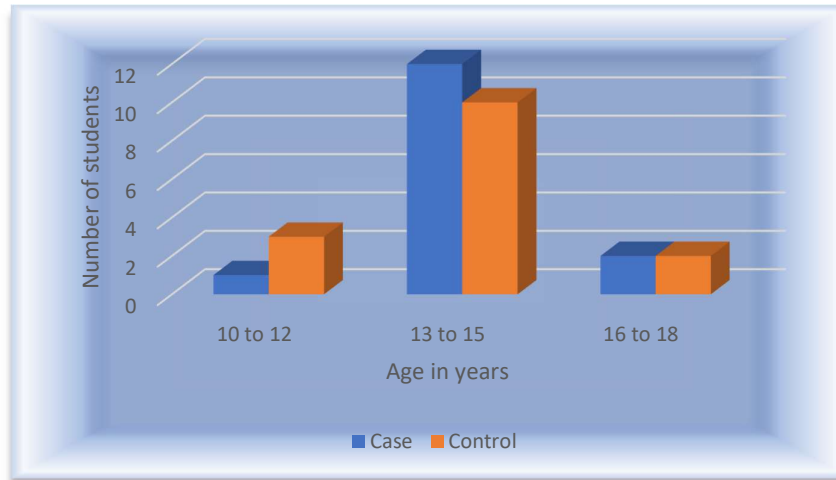


Table 15- Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.182	2	.554

The P value is 0.554 hence the result of the data is insignificant it may be due to smaller sample size.

GRAPH 16 - Sex wise distribution of subjects

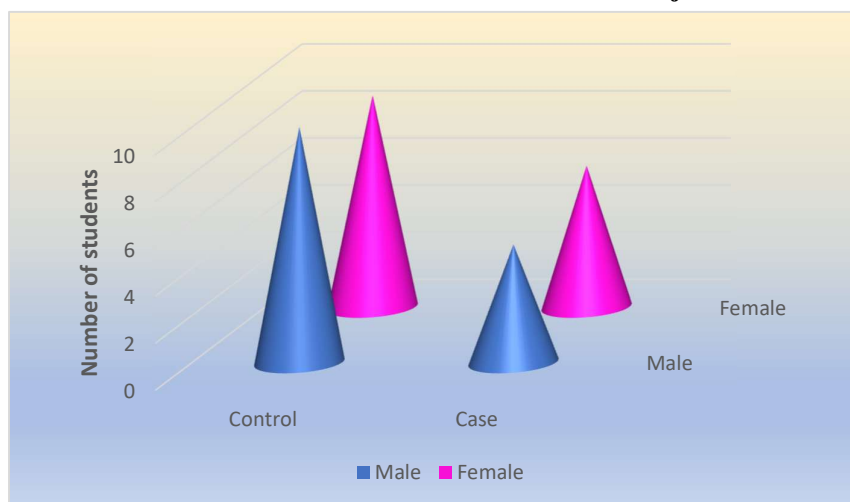


Table 16 - Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	0.135	1	.712

The p value is 0.712 hence the data is insignificant, it may be insignificant due to small sample size and covid restrictions.

GRAPH 17 - Education wise distribution of subjects

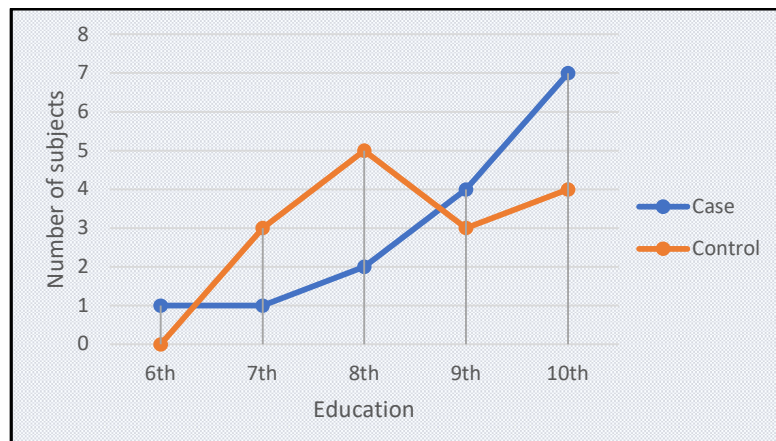


Table 17 - Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.247	4	.374

The result of the data is insignificant as the Pearson chi square Asymp. Sig. (2 sided) value is 0.374. The reason for insignificance may be because of small sample size and covid restrictions.

GRAPH 18 - Habitat wise distribution of subjects

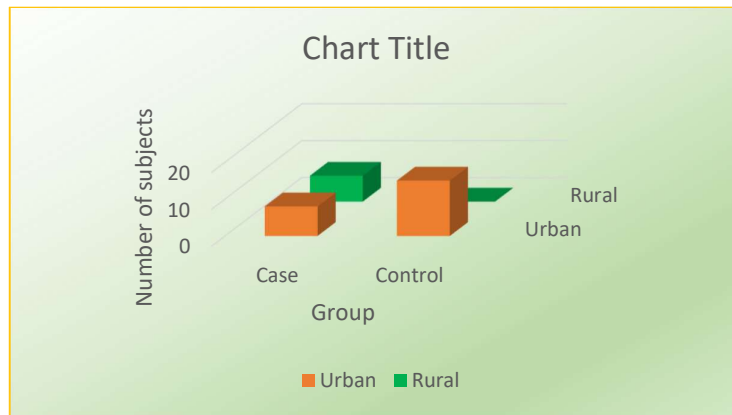


Table 18 - Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)
Pearson Chi-Square	9.130	1	.003	
Fisher's Exact Case				.006

The p value is 0.006 hence the result of the data is insignificant, it may be due to smaller sample size.

Graph - 19 Diet wise distribution of subjects

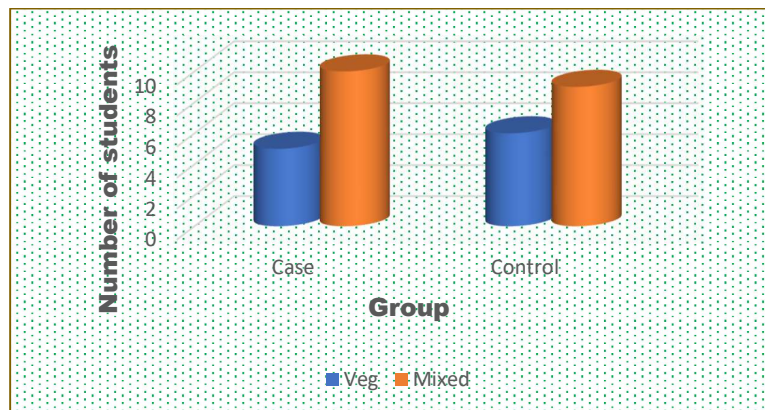


Table 19- Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2- sided)
Pearson Chi-Square	.144	1	.705	
Fisher's Exact Case				1.000

The result of the data is insignificant, as the p value is 1.000 it may be due to small sample size and covid restrictions and also the sample is taken from a school where most of the students are inmates.

GRAPH 20 - Menarche wise distribution of subjects

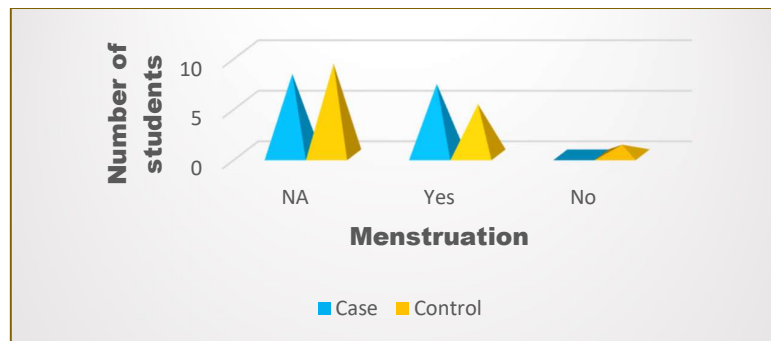


Table 20 - Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.392	2	.499

The result of the data is insignificant as the p value is 0.449 it may be due to small size of the sample and from the same locality in the school.

GRAPH 21 - Duration of menstruation wise distribution of subjects

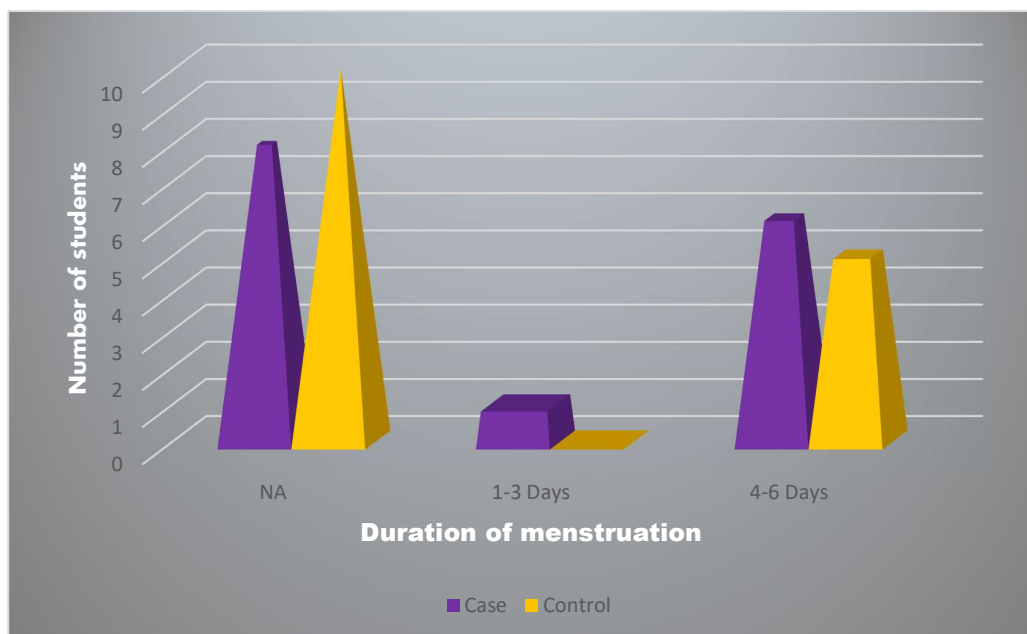


Table 21 - Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.313	2	.519

The result of the data is insignificant as the Pearson Chi-square Asymp. Sig. (2 sided) value is 0.519. It may be due to small sample size and covid restrictions.

Table 22 - General Linear Model

(Overall MMSE scores)

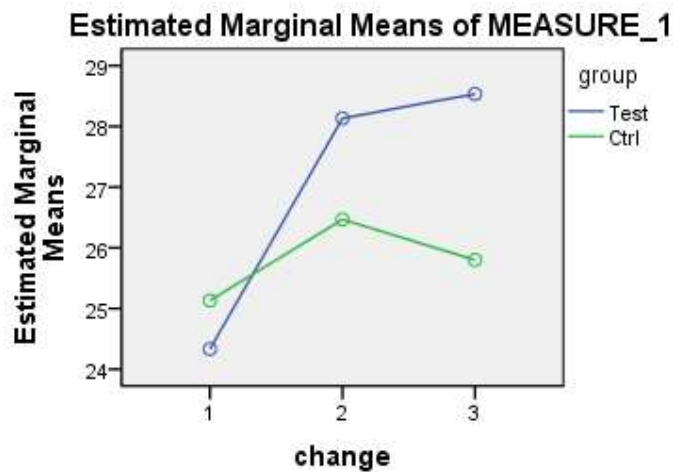
Tests of Within-Subjects Effects

Measure: MEASURE_1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Change	125.267	2	62.633	80.693	.000
change * group	49.267	2	24.633	31.736	.000
Error(change)	43.467	56	.776		

GRAPH 22 - Profile Plot

(Overall MMSE scores)



The overall results for all domains of MMSE (cognitive functions) are different for both the groups. The case group shows an exponential rise from pre to post assessment and even in the follow up assessment it shows an increase in the scores of MMSE, hence it denotes the value of yoga as intervention to improve cognitive abilities. In control group the scores of MMSE increased up to a certain

level and then it gradually decreased and justifies the effect of intervention of the case group. Therefore, it is highlighted that yoga as intervention improves the cognitive functions in children.

The Pearson Chi Square case for change between groups for overall MMSE assessment (cognitive functions) is 0.000 and for change within groups is 0.000. The scores of MMSE between the groups and within the groups is significant.

**Table 23 - General Linear Model
(Scores of the domain ORIENTATION)**

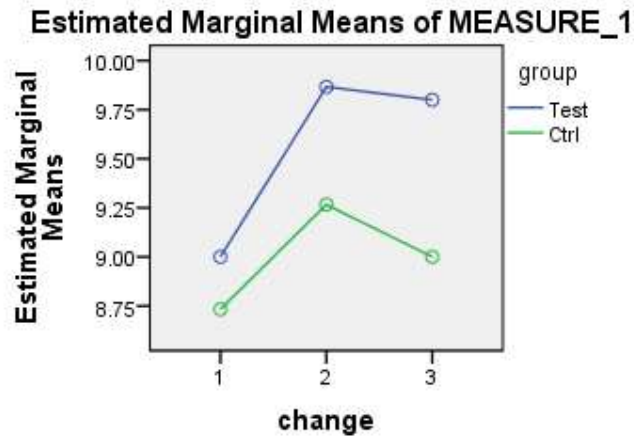
Tests of Within-Subjects Effects

Measure: MEASURE_1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Change	8.022	2	4.011	13.300	.000
change * group	1.089	2	.544	1.805	.174
Error(change)	16.889	56	.302		

GRAPH 23 - Profile Plots

(Scores of the domain ORIENTATION)



The overall results for the domain of orientation are different for both groups. The case group shows an exponential rise from pre to post-assessment and then it minimally decreased. In control group the scores of the domain orientation increased up to a certain level but less than the rise in case group and then it gradually decreased and justifies the effect of intervention of the case group. Therefore, it is highlighted that yoga as intervention improves the orientation in children.

The Pearson Chi-Square case for change between groups for assessment of orientation is 0.174 and that for change within groups is 0.000. The result for change within group is significant. The result between the group is insignificant it may be due to the shorter duration of the intervention and smaller size of the sample.

Table 24 - General Linear Model
(Scores of the domain REGISTRATION)

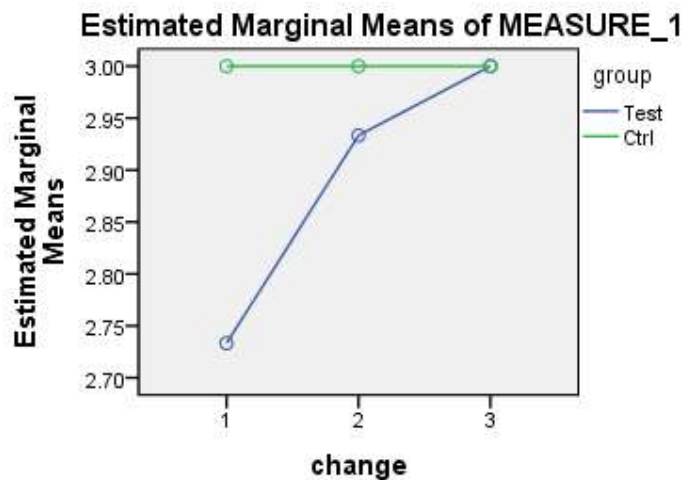
Tests of Within-Subjects Effects

Measure: MEASURE_1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Change	.289	2	.144	3.872	.027
change * group	.289	2	.144	3.872	.027
Error(change)	2.089	56	.037		

GRAPH 24 - Profile Plots

(Scores of the domain REGISTRATION)



The results of the assessment in registration among case group shows that there is an exponential rise from pre to post-assessment and that rise is sustained further, it shows the positive effect of yoga as an intervention in improving registration i.e. one of the cognitive functions. In the case of control group the graph

shows a constant line indicating no change. It justifies the effect of yoga in improving registration.

The Pearson Chi-Square case for change between groups for assessment of registration is 0.027 and that for change within groups is 0.027. The result for change within the group and between the group is significant.

Table 25- General Linear Model

(Scores of the domain ATTENTION AND CALCULATION)

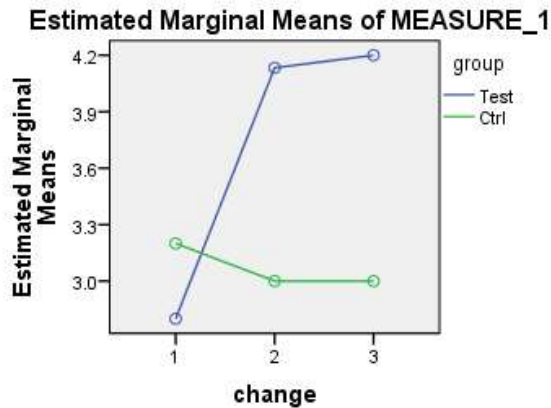
Tests of Within-Subjects Effects

Measure: MEASURE_1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Change	6.822	2	3.411	10.881	.000
change * group	12.289	2	6.144	19.600	.000
Error(change)	17.556	56	.313		

GRAPH 25 - Profile Plots

(Scores of the domain ATTENTION AND CALCULATION)



The rise in the results of case group in attention and calculation shows that the role of yoga in improving attention and calculation when compared to the control group. There is exponential rise to a certain level and after that it is maintained in an increasing manner shows the positive effect of yoga in improving attention and calculation. To justify this there is inverse results in the control group which shows a negative territory as there is a decrease in the results of the subjects among control group.

The Pearson Chi-Square case for change between groups for assessment of registration is 0.000 and that for change within groups is 0.000. The result for change within the group and between the group is significant.

Table 26 - General Linear Model

(Scores of the domain RECALL)

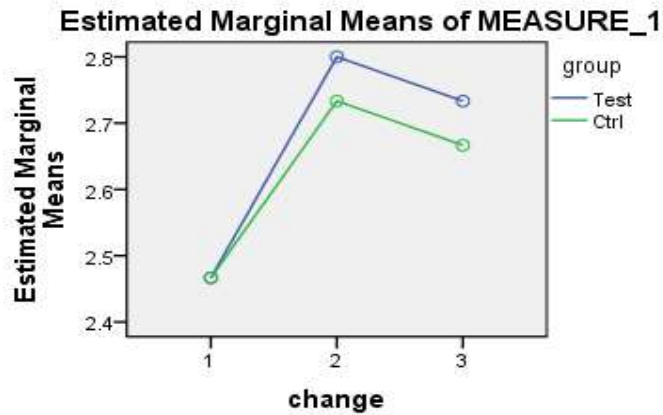
Tests of Within-Subjects Effects

Measure: MEASURE_1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
change	1.489	2	.744	4.911	.011
change * group	.022	2	.011	.073	.929
Error(change)	8.489	56	.152		

GRAPH 26 - Profile Plots

(Scores of the domain RECALL)



The increase in the results of case group in recall suggests the role of yoga in improving domain of recall in cognitive functions, as the graph shows decrease after the termination of yoga session it shows that yoga has to practiced regularly everyday to maintain the improvements seen through the intervention. In case of control group there is rise in the results of recall to a lesser account when compared to the control group and after that there is decline in the graph. These types of results are may be due to the smaller sample size and shorter duration of the intervention.

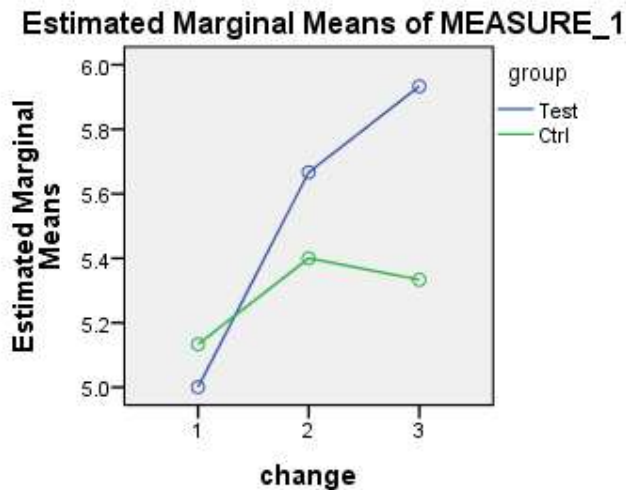
The Pearson Chi-Square case for change between groups for assessment of recall is 0.929 and that for change within groups is 0.011. The result for change within the group and between the group are insignificant, it may be due to the shorter duration of intervention and covid restrictions during the period of intervention.

Table 27 - General Linear Model
(Scores of the domain LANGUAGE)

Measure: MEASURE_1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
change	5.489	2	2.744	13.777	.000
change * group	2.022	2	1.011	5.076	.009
Error(change)	11.156	56	.199		

GRAPH 27 - Profile Plots
(Scores of the domain LANGUAGE)



The increase in the results of case group in recall suggests the role of yoga in improving domain of recall in cognitive functions, as the graph shows decrease after the termination of yoga session it shows that yoga has to practiced regularly every day to maintain the improvement seen through the intervention. In case of control group there is rise in the results of recall to a lesser account when compared to the control

group and after that there is decline in the graph. These type of results are may be due to the smaller sample size and shorter duration of the intervention.

The Pearson Chi-Square case for change between groups for assessment of recall is 0.929 and that for change within groups is 0.011. The result for change within the group and between the group are insignificant, it may be due to the shorter duration of intervention and covid restrictions during the period of intervention.

Table 28 - General Linear Model
(Scores of the domain EXECUTIVE FUNCTIONS)

Descriptive statistics

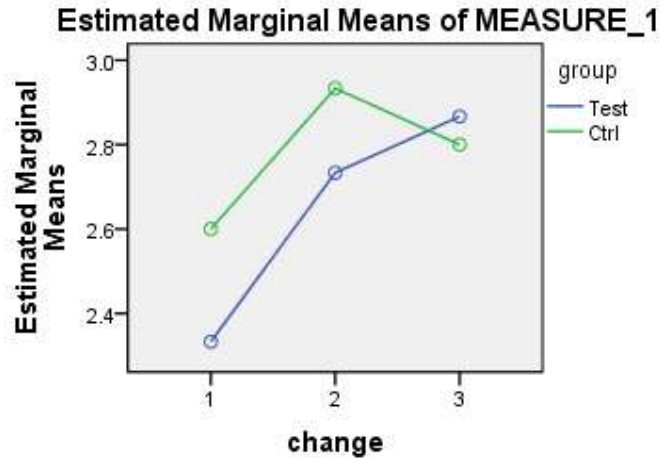
Tests of Within-Subjects Effects

Measure: MEASURE_1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
change	2.689	2	1.344	7.397	.001
change * group	.467	2	.233	1.284	.285
Error(change)	10.178	56	.182		

GRAPH 28 - Profile Plots

(Scores of the domain EXECUTIVE FUNCTIONS)



The increase in the results of case group in the domain executive functions indicates the role of yoga in improving executive functions, as the graph shows again increase in the scores of values of executive functions it says that yoga is very useful in increasing executive functions among school children. The rise in scores of executive functions among control group initially then the decrease indicates the effect of improvement in case group in executive functions when compared to control group.

The Pearson Chi-Square case value for change between groups for assessment of executive functions 0.285 and it is insignificant, it may be due to smaller sample size and covid restrictions. The result for change within the group is 0.001, which is significant.

7. DISCUSSIONS

The analysis of results were done using the data collected at pre intervention, post intervention and follow up of the intervention during the study to give a better picture of demographic observations and results. The results were discussed in the previous chapter with statistical interpretation and a detailed discussion were done in this chapter.

This chapter contains the discussion on various aspects of study like Methodology, Observation and Results.

DISCUSSION ON LITERARY REVIEW

The concept of cognition and development of cognition in children is clearly explained in the literature review. The importance of children and their development in cognition is very much important to children as well as society. The yoga plays a vital role in improving cognitive functions and it is proved it previous researches. Inclusion of yoga in daily activities of every school is needed for the improvement of cognitive functions among children

DISCUSSION ON METHODOLOGY

The scale used to assess the cognitive functions are MMSE which is acceptable and affordable. The sampling is done by simple random sampling and a systematic and scientific methods are used to collect the data and analysis of the data to draw the inferences. The MMSE scale is very easy to administer with good acceptability, validity and repeatability same is observed when scale is administered and the values of assessment are accurate and easy to understand also.

The sample size is small and covid restrictions but there were no dropouts in the study, even the yoga session was conducted for 21 days without any break for 45 minutes per day still all students participated enthusiastically and all participated in the assessment schedule including the follow up on 30th day after the intervention. And the follow up is done to assess the effect of Asana, pranayama and dhyana in a long term basis and also understands the effect of yoga technique on sustainable mode

DISCUSSION ON OBSERVATIONS

There were total of 30 students selected for the study and were randomly divided into case and control group. Students in case group attended the yoga class regularly and participated actively. The session was conducted for 21 days for 45 minutes each day.

The study is done in midst of covid restrictions hence the duration is subjected for 21 days but for sustainable results, it is noted that the yoga techniques should be performed regularly without any break as apart of students curriculum then the cognitive functions will definitely improve and concentration, attention and memories will be at its peak.

DISCUSSION ON RESULTS

There were some insignificant results in the distribution which may be due to the smaller sample size and restrictions during the covid period. The results in the scores of MMSE were insignificant in some domains and insignificant in others it may be due to the shorter duration of the intervention period, smaller sample size. If

the yoga intervention given permanently MMSE scores in all 5 domains will improve and the yoga techniques not only improves the physical, mental, social, philosophical, spiritual but it was also in the behavioural activities of the students which is duly recognized by the teachers of the school where they have pointed out their improvement in academia and out of academia. Some of the students also received prizes from the family members and parents which justifies the effect of yoga in behavioural science too. The feedback from the students also justifies the above facts where in there is a change observed themselves in leadership quality, communication , enthusiasm and interpersonal relationships thus the whole personality of the students has been changed drastically and to sustain such changes in future the same protocol may be used as a tool in future as a part of their life style and also curriculum.

GENERAL DISCUSSIONS

Table 29 - Age wise distribution of subjects

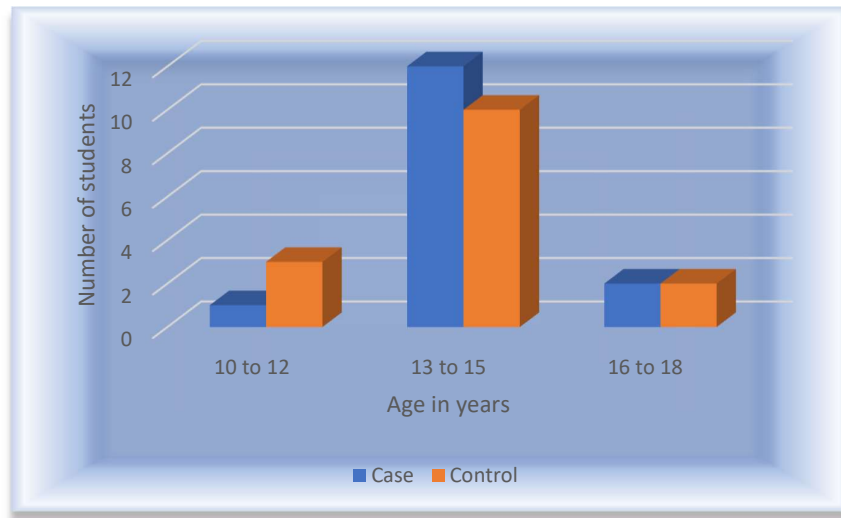
Crosstab

		group		Total	
		Case	Ctrl		
age	10-12	Count	1	3	4
		% within group	6.7%	20.0%	13.3%
	13-15	Count	12	10	22
		% within group	80.0%	66.7%	73.3%
	16-18	Count	2	2	4
		% within group	13.3%	13.3%	13.3%
Total		Count	15	15	30
		% within group	100.0%	100.0%	100.0%

Table 30 - Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.182	2	.554

GRAPH 29 - Age wise distribution of subjects



As the intervention is given to school going children, the age wise distribution is not uniform and because of that the p-value is insignificant. Even though the distribution among age is not uniform, still all the students actively participated in the intervention and have given good feedback clinically. If the sample is larger then the distribution might have become uniform and p-value would have been significant. The insignificant p-value might be due to the smaller sample size and covid restrictions during the intervention period. Even apart from all these restrictions, the results were identifiable clinically and scientifically.

Table 31 - Sex wise distribution of subjects

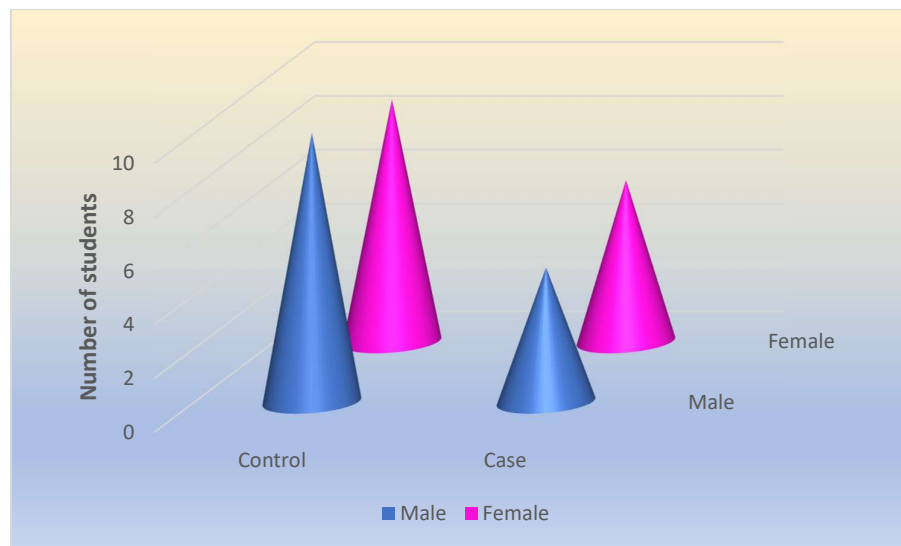
Crosstab

		group		Total	
		Case	Ctrl		
sex	Male	Count	9	8	17
		% within group	60.0%	53.3%	53.3%
	Female	Count	6	7	12
		% within group	40.0%	40.0%	46.6%
Total	Count	15	15	30	
	% within group	100.0%	100.0%	100.0%	

Table 32 - Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	0.135	1	.712

GRAPH 30 - Sex wise distribution of subjects



As the intervention is given to school going children, the gender wise distribution is not uniform and because of that the p-value is insignificant. Even though the distribution among age is not uniform, still all the students actively participated in the intervention and have given good feedback clinically. If the sample is larger then the distribution might have become uniform and p-value would have been significant. The insignificant p-value might be due to the smaller sample size and covid restrictions during the intervention period. Even apart from all these restrictions, the results were identifiable clinically and scientifically.

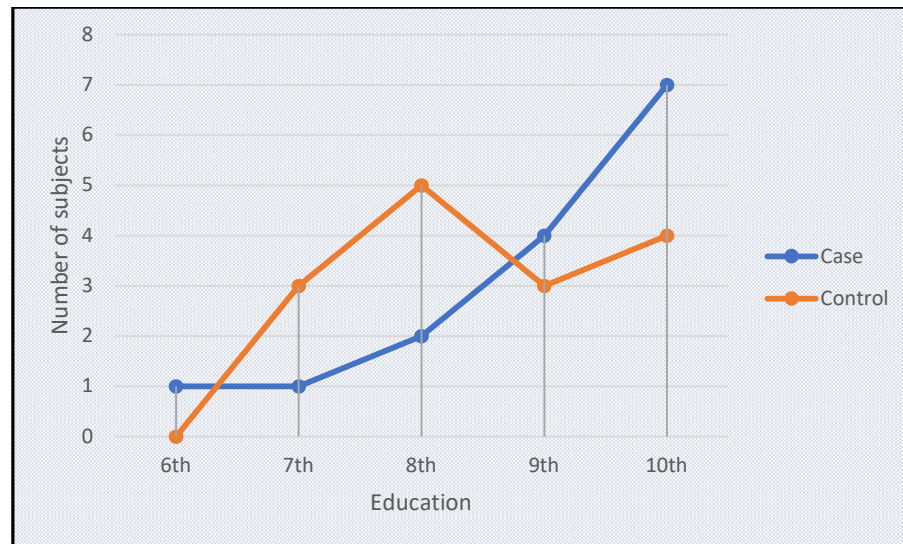
**Table 33 - Education wise distribution of subjects
Crosstab**

		group		Total
		Case	Ctrl	
6 th	Count	1	0	1
	% within group	6.7%	0.0%	3.3%
7 th	Count	1	3	4
	% within group	6.7%	20.0%	13.3%
8 th	Count	2	5	7
	% within group	13.3%	33.3%	23.3%
9 th	Count	4	3	7
	% within group	26.7%	20.0%	23.3%
10 th	Count	7	4	11
	% within group	46.7%	26.7%	36.7%
Total	Count	15	15	30
	% within group	100.0%	100.0%	100.0%

Table 34 - Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.247	4	.374

GRAPH 31 - Education wise distribution of subjects



As the intervention is given to school going children, the class wise distribution is not uniform and because of that the p-value is insignificant. Even though the distribution among age is not uniform, still all the students actively participated in the intervention and have given good feedback clinically. If the sample is larger then the distribution might have become uniform and p-value would have been significant. The insignificant p-value might be due to the smaller sample size and covid restrictions during the intervention period. Even apart from all these restrictions, the results were identifiable clinically and scientifically.

Table 35 - Habitat wise distribution of subjects

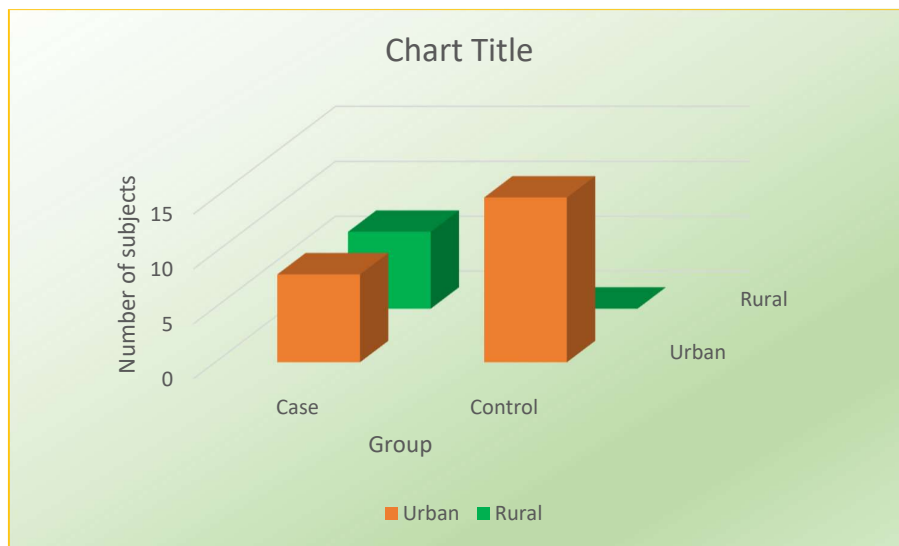
Crosstab

		group		Total	
		Case	Ctrl		
habitat	Urban	Count	8	15	23
		% within group	53.3%	100.0%	76.7%
	Rural	Count	7	0	7
		% within group	46.7%	0.0%	23.3%
Total		Count	15	15	30
		% within group	100.0%	100.0%	100.0%

Table 36 - Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2- sided)
Pearson Chi-Square	9.130	1	.003	
Fisher's Exact Case				.006

GRAPH 32 - Habitat wise distribution of subjects



As the intervention is given to school going children, the habitat wise distribution is not uniform and because of that the p-value is insignificant. Even though the distribution among age is not uniform, still all the students actively participated in the intervention and have given good feedback clinically. If the sample is larger then the distribution might have become uniform and p-value would have been significant. The insignificant p-value might be due to the smaller sample size and covid restrictions during the intervention period. Even apart from all these restrictions, the results were identifiable clinically and scientifically.

Table 37 - Diet wise distribution of subjects

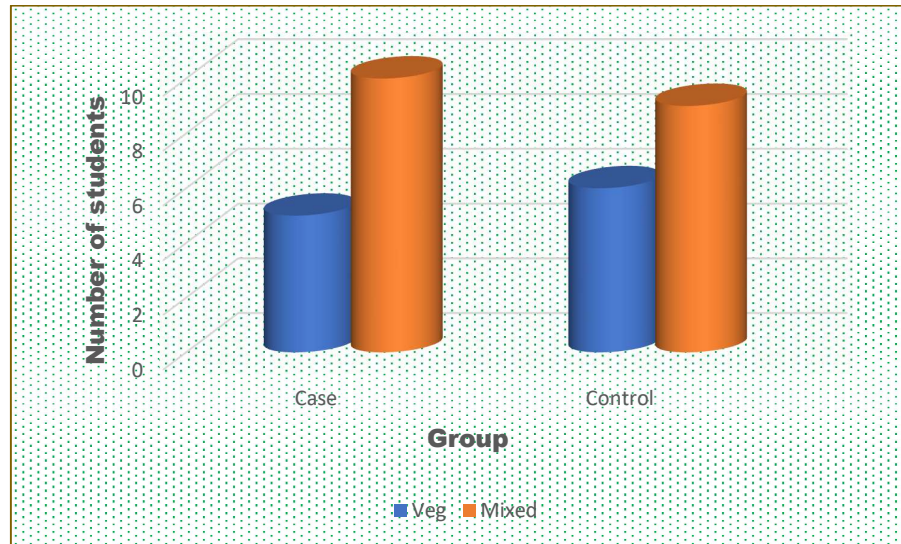
Crosstab

		group		Total
		Case	Ctrl	
diet	Count	5	6	11
	Veg % within group	33.3%	40.0%	36.7%
	Count	10	9	19
	Mix % within group	66.7%	60.0%	63.3%
Total	Count	15	15	30
	% within group	100.0%	100.0%	100.0%

Table 38 - Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2- sided)
Pearson Chi-Square	.144	1	.705	
Fisher's Exact Case				1.000

GRAPH 33 - Diet wise distribution of subjects



As the intervention is given to school going children, the diet wise distribution is not uniform and because of that the p-value is insignificant. Even though the distribution among age is not uniform, still all the students actively participated in the intervention and have given good feedback clinically. If the sample is larger then the distribution might have become uniform and p-value would have been significant. The insignificant p-value might be due to the smaller sample size and covid restrictions during the intervention period. Even apart from all these restrictions, the results were identifiable clinically and scientifically.

Table 39 - Menarche wise distribution of subjects

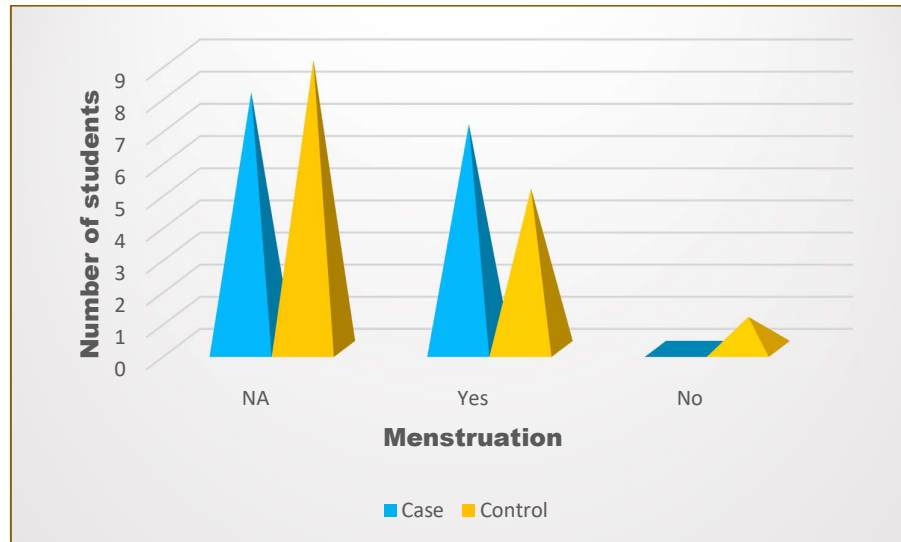
Crosstab

		group		Total
		Case	Ctrl	
NA	Count	8	9	17
	% within group	53.3%	60.0%	56.7%
menust Yes	Count	7	5	12
	% within group	46.7%	33.3%	40.0%
No	Count	0	1	1
	% within group	0.0%	6.7%	3.3%
Total	Count	15	15	30
	% within group	100.0%	100.0%	100.0%

Table 40 - Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.392	2	.499

GRAPH 34 - Menarche wise distribution of subjects



As the intervention is given to school going children, the students in menarche wise distribution is not uniform and because of that the p-value is insignificant. Even though the distribution among age is not uniform, still all the students actively participated in the intervention and have given good feedback clinically. If the sample is larger then the distribution might have become uniform and p-value would have been significant. The insignificant p-value might be due to the smaller sample size and covid restrictions during the intervention period. The other reasons might be due to the different dietary habits among the students and physical inactivity. Even apart from all these restrictions, the results were identifiable clinically and scientifically.

Table 41 - Duration of menstruation wise distribution of subjects

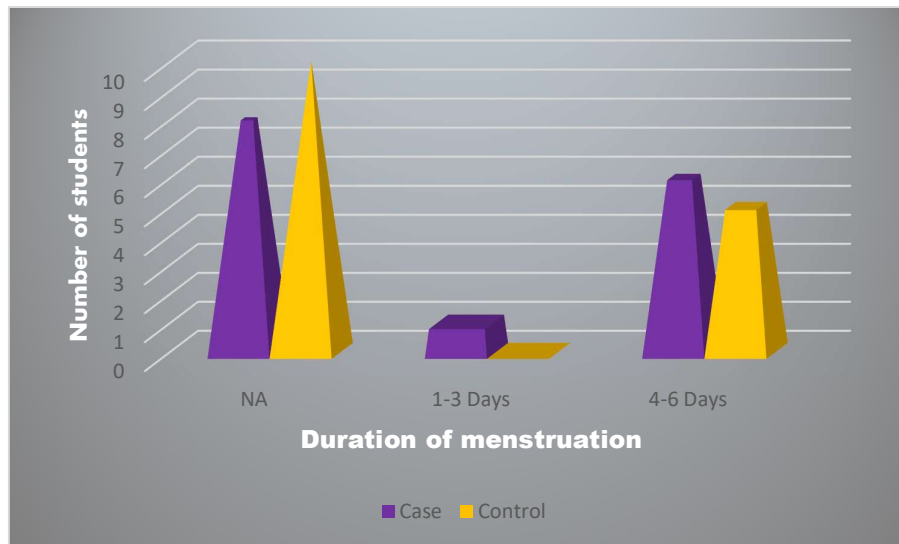
Crosstab

		group		Total
		Case	Ctrl	
NA	Count	8	10	18
	% within group	53.3%	66.7%	60.0%
durn_men 1-3d	Count	1	0	1
	% within group	6.7%	0.0%	3.3%
4-6d	Count	6	5	11
	% within group	40.0%	33.3%	36.7%
Total	Count	15	15	30
	% within group	100.0%	100.0%	100.0%

Table 42 - Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	1.313	2	.519

GRAPH 35 - Duration of menstruation wise distribution of subjects



As the intervention is given to school going children, the students in the duration of menstruation is different and the distribution is not uniform, hence the p-value is insignificant. Even though the distribution among age is not uniform, still all the students actively participated in the intervention and have given good feedback clinically. If the sample is larger then the distribution might have become uniform and p-value would have been significant. The insignificant p-value might be due to the smaller sample size and covid restrictions during the intervention period. The other reasons might be due to the different dietary habits among the students and physical inactivity. Even apart from all these restrictions, the results were identifiable clinically and scientifically.

Table 43 - General Linear Model

(Overall MMSE scores)

Descriptive Statistics

	group	Mean	Std. Deviation	N
pre_mmse	Case	24.33	1.496	15
	Ctrl	25.13	1.598	15
	Total	24.73	1.574	30
post_mmse	Case	28.13	1.125	15
	Ctrl	26.47	1.302	15
	Total	27.30	1.466	30
FU_mmse	Case	28.53	.990	15
	Ctrl	25.80	1.474	15
	Total	27.17	1.859	30

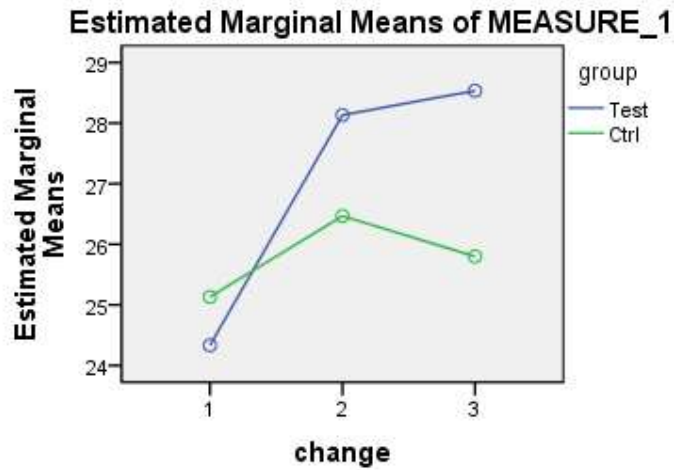
Table 44 - Tests of Within-Subjects Effects

Measure: MEASURE_1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Change	125.267	2	62.633	80.693	.000
change * group	49.267	2	24.633	31.736	.000
Error(change)	43.467	56	.776		

GRAPH 36 - Profile Plots

(Overall MMSE scores)



The overall assessment of MMSE for the case group shows a significant improvement statistically and clinically and the graph also shows an exponential rise up to a certain extent and even after that it is gradually increasing signifying the notable improvement for the intervention group and also it is sustainable. Hence it shows the importance of yoga as intervention to improve the cognitive functions. To justify this statement the reverse of results happened in control group as it increased initially and then decreased in subjects of control group in the same time.

Table 45 - General Linear Model

(Scores of the domain ORIENTATION)

Descriptive Statistics

	group	Mean	Std. Deviation	N
pre_orient	Case	9.00	1.069	15
	Ctrl	8.73	.594	15
	Total	8.87	.860	30
post_orient	Case	9.87	.352	15
	Ctrl	9.27	.704	15
	Total	9.57	.626	30
FU_orient	Case	9.80	.414	15
	Ctrl	9.00	.535	15
	Total	9.40	.621	30

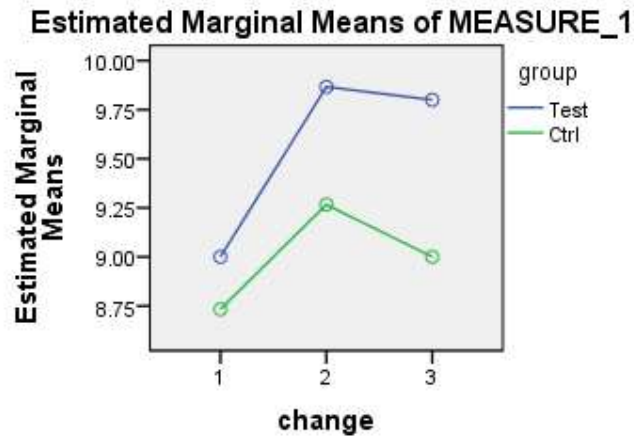
Table 46 - Tests of Within-Subjects Effects

Measure: MEASURE_1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Change	8.022	2	4.011	13.300	.000
change * group	1.089	2	.544	1.805	.174
Error(change)	16.889	56	.302		

GRAPH 37 - Profile Plots

(Scores of the domain ORIENTATION)



The assessment for orientation among cognitive functions shows a significant improvement in the case group when compared to the control group. The assessment in orientation for the case group shows a significant improvement statistically and clinically and the graph also shows an exponential rise up to a certain extent and after that, it decreased minimally, it may be due to the shorter duration of the intervention and smaller sample size of less variability. It suggests that yoga has to be included as a day-to-day activity in the school activity to maintain the positive changes shown in the orientation after the intervention of yoga. Hence it shows the importance of yoga as an intervention to improve orientation. To justify this statement the reverse of results happened in the control group as it increased initially but less than the case group and then decreased in subjects of the control group at the same time.

Table 47 - General Linear Model

(Scores of the domain REGISTRATION)

Descriptive Statistics

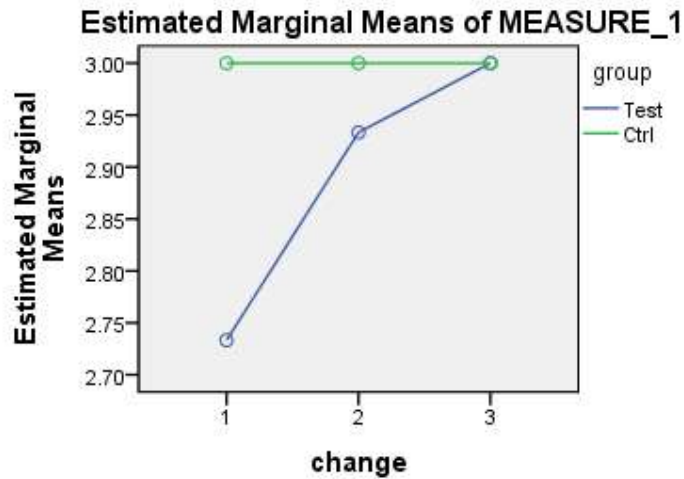
	Group	Mean	Std. Deviation	N
	Case	2.73	.458	15
pre_reg	Ctrl	3.00	.000	15
	Total	2.87	.346	30
	Case	2.93	.258	15
post_reg	Ctrl	3.00	.000	15
	Total	2.97	.183	30
	Case	3.00	.000	15
FU_reg	Ctrl	3.00	.000	15
	Total	3.00	.000	30

**Table 48 - Tests of Within-Subjects Effects
(Scores of the domain REGISTRATION)**

Measure: MEASURE_1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Change	.289	2	.144	3.872	.027
change * group	.289	2	.144	3.872	.027
Error(change)	2.089	56	.037		

**GRAPH 38 - Profile Plots
(Scores of the domain REGISTRATION)**



There is exponential rise in the results of the domain registration among case group and that improvement is maintained even after the cessation of the yoga as intervention. Therefore it shows the importance of yoga in improving registration among children. There is no change in control group as the initial score was already high and it may be due to the smaller sample size and covid restrictions during the intervention period. But finally we can easily notice the role of yoga in improving registration among children. Therefore yoga incorporation to children increases the domain of registration from MMSE scale assessment. Yoga plays a vital role in improving registration among children.

Table 49 - General Linear Model

(Scores of the domain ATTENTION AND CALCULATION)

Descriptive Statistics

	Group	Mean	Std. Deviation	N
pre_att	Case	2.80	.775	15
	Ctrl	3.20	1.014	15
	Total	3.00	.910	30
post_att	Case	4.13	.640	15
	Ctrl	3.00	1.254	15
	Total	3.57	1.135	30
FU_att	Case	4.20	.676	15
	Ctrl	3.00	1.134	15
	Total	3.60	1.102	30

Table 50 - Tests of Within-Subjects Effects

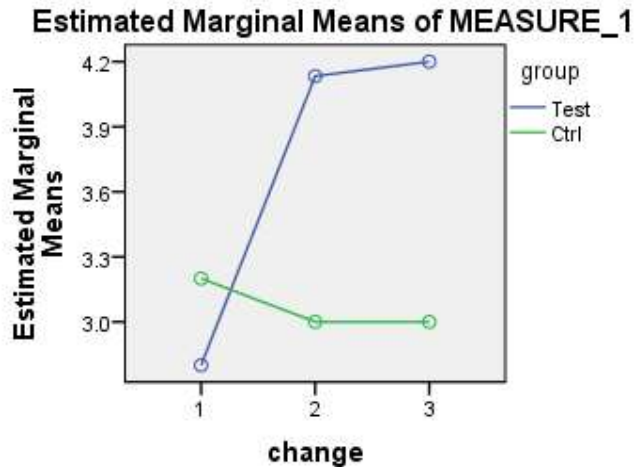
(Scores of the domain ATTENTION AND CALCULATION)

Measure: MEASURE_1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Change	6.822	2	3.411	10.881	.000
change * group	12.289	2	6.144	19.600	.000
Error(change)	17.556	56	.313		

GRAPH 39 - Profile Plots

(Scores of the domain ATTENTION AND CALCULATION)



There is exponential rise in the results of the domain attention and calculation among case group and that improvement is increasingly maintained even after the cessation of the yoga as intervention. Therefore it shows the importance of yoga in improving attention and calculation i.e. one of the cognitive functions among children. There is decline in the results of attention and calculation from MMSE assessment in control group, which justifies the statement that yoga helps in increasing attention and calculation. And finally there is marked role of yoga in improving attention and calculation among children. There is improvement in the cognitive function that is attention and calculation through the intervention from a period of 21 days of yoga session.

**Table 51 - General Linear Model
(Scores of the domain RECALL)**

Descriptive Statistics

	group	Mean	Std. Deviation	N
	Case	2.47	.640	15
pre_recall	Ctrl	2.47	.640	15
	Total	2.47	.629	30
	Case	2.80	.414	15
post_recall	Ctrl	2.73	.594	15
	Total	2.77	.504	30
	Case	2.73	.594	15
FU_recall	Ctrl	2.67	.617	15
	Total	2.70	.596	30

Table 52 - Tests of Within-Subjects Effects

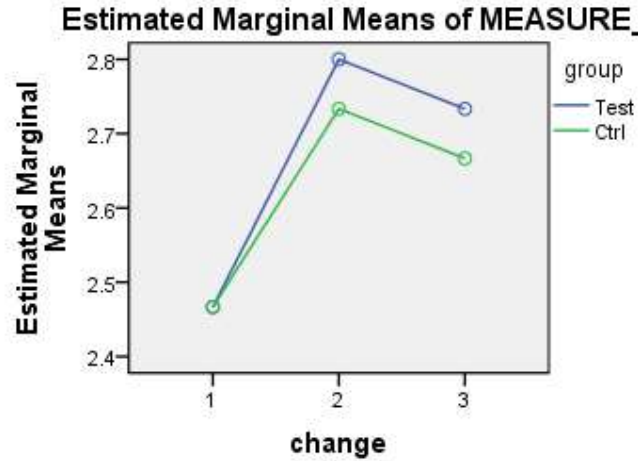
(Scores of the domain RECALL)

Measure: MEASURE_1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Change	1.489	2	.744	4.911	.011
change * group	.022	2	.011	.073	.929
Error(change)	8.489	56	.152		

GRAPH 40 - Profile Plots

(Scores of the domain RECALL)



The initial rise in the results of recall in case group shows the importance of yoga in improving recall and the proceeding decline shows that yoga has to be practised every day to maintain those results obtained after the intervention. In case of control group the rise initially in results of recall shows that there is increase but less than that with intervention and decrease afterwards tells it might be reduced due to several reasons and one might be due to the smaller sample size and may be due to the covid restrictions. The graph justifies that one have to practice yoga every day and incorporate in day to day activities and as a schedule in school.

**Table 53 - General Linear Model
(Scores of the domain LANGUAGE)**

Descriptive Statistics

	group	Mean	Std. Deviation	N
pre_lang	Case	5.00	.845	15
	Ctrl	5.13	.990	15
	Total	5.07	.907	30
post_lang	Case	5.67	.488	15
	Ctrl	5.40	.828	15
	Total	5.53	.681	30
FU_lang	Case	5.93	.258	15
	Ctrl	5.33	.816	15
	Total	5.63	.669	30

Table 54 - Tests of Within-Subjects Effects

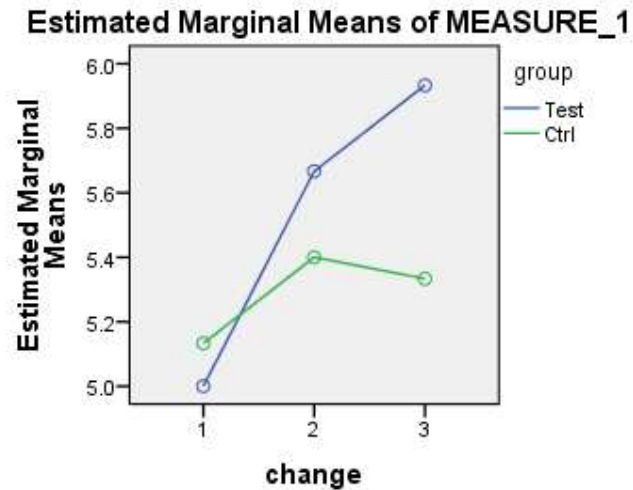
(Scores of the domain LANGUAGE)

Measure: MEASURE_1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Change	5.489	2	2.744	13.777	.000
change * group	2.022	2	1.011	5.076	.009
Error(change)	11.156	56	.199		

GRAPH 41 - Profile Plots

(Scores of the domain LANGUAGE)



The initial rise in the results of language in case group shows the importance of yoga in improving language and the proceeding increase which is maintained after the intervention shows the positive effect of yoga in improving language among school children. In case of control group the rise initially in results of language shows that there is increase but less than that with intervention and decrease afterwards tells it might be reduced as there was no intervention given to control group. All these results shows that yoga helps to improve and maintain the improvement of cognitive functions in school going children.

Table 55 - General Linear Model
(Scores of the domain EXECUTIVE FUNCTIONS)

Descriptive Statistics

	group	Mean	Std. Deviation	N
pre_ex_fn	Case	2.33	.724	15
	Ctrl	2.60	.507	15
	Total	2.47	.629	30
post_ex_fn	Case	2.73	.458	15
	Ctrl	2.93	.258	15
	Total	2.83	.379	30
FU_ex_fn	Case	2.87	.352	15
	Ctrl	2.80	.414	15
	Total	2.83	.379	30

Table 56 - Tests of Within-Subjects Effects

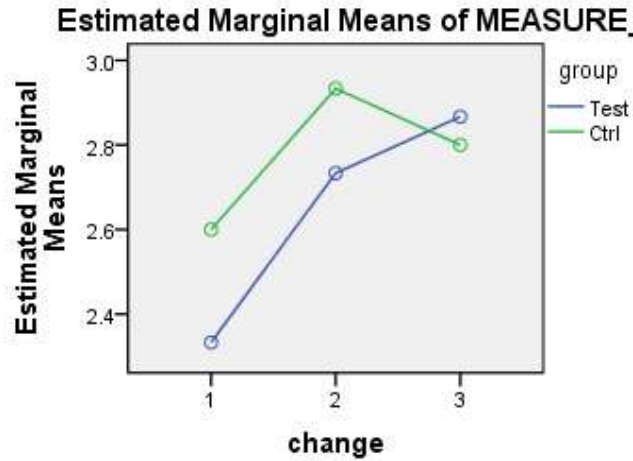
(Scores of the domain EXECUTIVE FUNCTIONS)

Measure: MEASURE_1

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Change	2.689	2	1.344	7.397	.001
change * group	.467	2	.233	1.284	.285
Error(change)	10.178	56	.182		

GRAPH 42- Profile Plots

(Scores of the domain EXECUTIVE FUNCTIONS)



The initial rise in the results of executive functions in case group shows the importance of yoga in improving language and the proceeding increase which is maintained after the intervention shows the positive effect of yoga in improving executive functions among school children. In case of control group the rise initially in results of language shows that there is increase but less than that with intervention and decrease afterwards tells it might be reduced as there was no intervention given to control group. All these results shows that yoga helps to improve and maintain the improvement of executive functions in school going children.

8. RECOMMENDATION FOR FUTURE STUDY

- The study can be employed for a larger sample for receiving better results and also for testing the efficacy of the intervention.
- The length of the study intervention can be extended to a longer duration of about 6 months or a year to get better results in each individual.
- One can also introduce a multi-centric study so that yoga can be benefited by school-going children of all the schools
- Yoga can be therapeutically employed for each individual disease or disorder.
- Yoga as a branch of medical science is a vast subject with wide scope for research and benefits.

9. CONCLUSION

On the basis of concepts, analysis and clinical observations made in this study, the following conclusions were drawn.

Cognitive faculties in children are developing rapidly and it is more needed in the present scientific world wherein the intelligence of the students is evaluated in a broader sense in school, colleges, and universities and also this is the Intelligent quotient is the basic qualification for employment too. In the fast-growing commercially exploited scientific world, the cognitive faculties like concentration, attention, memory, intelligence, needed to be at its peak without any drug therapy and these faculties should be maintained at its peak sustainably then only achievements in the life can be observed.

Yoga is a scientific tool of Indian origin which has got a multifaceted dimension where it can enhance the mental faculties sustainably for a longer duration Asana, pranayama and dhyana are the special tools in yoga wherein they enhance the mental faculties not only in the psyche level but beyond the psyche level and it will try to enter panchakosha level in a systematic way and try to reach the anandamaya kosha which is said to be the highest level in a chronological systemic way.

In this study yoga techniques are administered to the students according to the protocol to evaluate its effects on mental faculties with special reference to memory using a specialized standardized MMSE scale.

Group A : consists of subjects who underwent designed yoga protocol comprises of Asana, pranayama and dhyana for 21 days with 15 subjects – Trial group

Group B : consists of subjects who does not underwent designed yoga protocol comprises of Asana, pranayama and dhyana for 21 days with 15 subjects – Control group.

The assessment of the groups has been done on 0th,21st, and 30th day after intervention and the results of assessment are assessed statistically and clinically with suitable tools of assessment.

The analysis of results shows a exponential rise in cognitive function especially for the trail group when compared to control group. The assessment is done specifically for the 6 domains separately with overall result at the end.

The domain results in orientation, registration, attention and calculation and executive functions are statistically and clinically indicative of rise in their value and for the domain of recall and language the effect is initially observed but in the later stage over a period of time it remained static which indicates that to get sustainable outcome the yoga techniques should be adopted permanently as a part of their lifestyle. The overall result shows a exponential improvement for mental faculties in trail group when compared to control group which shows the effect of yoga on the mental faculties and the study definitely showed the importance of yoga on the mental faculties with a highly positive findings both statistically and clinically but to sustain that same enhancement one needs to practice yoga techniques permanently as a part of their lifestyle.

10. SUMMARY

The study titled “A CLINICAL STUDY TO EVALUATE THE IMPROVEMENT IN COGNITIVE ABILITIES AMONG SCHOOL CHILDREN BY PRACTICE OF ASANA, PRANAYAMA AND DHYANA” was conducted. It was a comparative clinical study between Group A which is trail group who had undergone intervention and the Group who didn't undergo the intervention.

The objective of the study is to evaluate the effect of yoga techniques Asana, pranayama and dhyana in children with special reference to cognitive faculties.

To compare and assess the effect of yoga techniques and without yoga techniques in children with special reference to cognitive faculties.

First part of this clinical study compromises of the contents like review of literature of the contents like Yoga , cognition and children. It deals with the yoga and its history, cognitive abilities and its development in children, the scientific evidence supporting the role of yoga in improving the cognitive functions by practice of yoga, review of the previous researches on the cognitive functions and how the yoga helps in improving cognitive functions.

Second part of this clinical study comprises of materials and methods used in the present study, observations and results of the clinical trial. Discussion on the review of literature, materials and methods, observations and results. This part also includes general observations, recommendation for further study, conclusion and summary of the study.

Total 30 subjects were included in this study and assigned 15 subjects each into case and control group. All the information necessary was collected by employing a case sheet proforma prepared specifically for the study.

The MMSE scale was adopted for assessment of the subjects. This was a comparative study comprised of two groups, group A consisting of 15 subjects who were given the intervention and group B consisting of 15 subjects who didn't undergo intervention.

Intervention for the Group A was 45 minutes yoga session regularly for 21 days. Patients were assessed using MMSE scale 0th day as pre assessment , 21st day as post assessment after intervention and 30th day after the intervention as follow-up, and the scores were compared. Once the study was completed the data recorded in the case sheet were analyzed and tabulated.

The study reveals a maximum no. of subjects in the age group of 13 to 15 years of age with male dominance. Most of the subjects are from 10th standard of schooling. The study reveals that most of the subjects are from urban habitat and most of them are of mixed diet.

The overall result shows a exponential improvement for mental faculties in trail group when compared to control group which shows the effect of yoga on the mental faculties and the study definitely showed the importance of yoga on the mental faculties with a highly positive findings both statistically and clinically but to sustain that same enhancement one needs to practice yoga techniques permanently as a part of their lifestyle. The domain results in orientation, registration, attention and calculation and executive functions are statistically and clinically indicative of rise in their value and for the domain of recall and language the effect is initially observed but in the later stage over a period of time it remained static which indicates that to get sustainable outcome the yoga techniques should be adopted permanently as a part of their lifestyle.

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12. ANNEXURES

ANNEXURE – 1

GOVERNMENT NATURE CURE AND YOGA MEDICAL COLLEGE, MYSURU

Title of the Project:

A Clinical study to evaluate the improvement in cognitive abilities among school children by practice of Asana, Pranayama, and Dhyana.

CERTIFICATE BY INVESTIGATOR

Date:

Serial. No:

This is to certify that I have disclosed full details about this observational study to the patient Mr/Mrs/Ms..... In the words that is clearly understood by the patient.

Signature.....

CONSENT BY SUBJECT

Date:

I Mr/Mrs/Ms....., have been informed to my satisfaction by the attending physician, the purpose of the observational trial and the nature of treatment and follow up.

I am also aware of my right to opt out of the trial at any time during the course of the trial without having to give reasons for doing so.

I, exercising my free power of choice, hereby give my consent to be included as a subject in the trial on "A Clinical study to evaluate the improvement in cognitive abilities among school children by practice of Asana, Pranayama, and Dhyana."

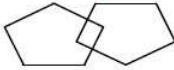
Signature.....


ANNEXURE – 2

Mini-Mental State Examination (MMSE)

Patient's Name: _____ Date: _____

Instructions: Score one point for each correct response within each question or activity.

Maximum Score	Patient's Score	Questions
5		"What is the year? Season? Date? Day? Month?"
5		"Where are we now? State? County? Town/city? Hospital? Floor?"
3		The examiner names three unrelated objects clearly and slowly, then the instructor asks the patient to name all three of them. The patient's response is used for scoring. The examiner repeats them until patient learns all of them, if possible.
5		"I would like you to count backward from 100 by sevens." (93, 86, 79, 72, 65, ...) Alternative: "Spell WORLD backwards." (D-L-R-O-W)
3		"Earlier I told you the names of three things. Can you tell me what those were?"
2		Show the patient two simple objects, such as a wristwatch and a pencil, and ask the patient to name them.
1		"Repeat the phrase: 'No ifs, ands, or buts.'"
3		"Take the paper in your right hand, fold it in half, and put it on the floor." (The examiner gives the patient a piece of blank paper.)
1		"Please read this and do what it says." (Written instruction is "Close your eyes.")
1		"Make up and write a sentence about anything." (This sentence must contain a noun and a verb.)
1		"Please copy this picture." (The examiner gives the patient a blank piece of paper and asks him/her to draw the symbol below. All 10 angles must be present and two must intersect.) 
30		TOTAL

Government of  Karnataka
Government Ayurveda research center
Government Nature Cure & Yoga Medical College
K.R.S. Road , Mysore-570020

Mail:renukacnrb@gmail.com

Telephone: 0821-2516963

“FREE YOGA CAMP FOR CHILDREN”

REGISTRATION FORM


Participant Photo

1	Name (In capital letters)	
2	Home address	
3	Mobile Number E-mail id	
4	Aadhaar Number	
5	Have you attended yoga classes earlier? If yes, specify the venue and your experience in yoga class	
6	Your expectation from this yoga class	
7	Do you need such type of programme oftenly? If yes, how many days	

Date:

Venue:

Participant signature


 Government of Karnataka
 Government Ayurveda research center
 Government Nature Cure & Yoga Medical College
 K.R.S. Road , Mysore-570020

Mail:renukacnrb@gmail.com

Telephone: 0821-2516963

“FREE YOGA CAMP FOR CHILDREN”

FEEDBACK FORM

SL No	Questions	Response			
		Very Well Structured	Well Structured	Somewhat Structured	Very structured
1	How was the Format of the yoga class.	Very Well Structured	Well Structured	Somewhat Structured	Very structured
2	Had your expectation fulfill?	Yes		No	
3	Content of the yoga class?	Best	Good	Not up to the mark	
4	How was your practical experience?	Best	Good	Not up to the mark	
5	Is it useful for you in future?	Very useful	Useful	Not useful	

6. Anything special comments from your side?

7. Do you need such type of programme in the future?

8. Overall rating of the programme? 1 2 3 4 5

CASE SHEET

Name of the patient :
Age :
Sex :
Religion :
Educational Status :
Occupation :
Habitat : Urban/Rural
Address :
Economic Status :

Ph. No :

1. CHIEF COMPLAINTS:

2. HISTORY OF CHIEF COMPLAINTS:

3. ASSOCIATED COMPLAINTS:

4. PAST HISTORY:

A) History of:

- Developmental Disorders:
- Any neurological illness:
- Any Congenital anomalies:
- Others:

B) Treatment History:

- Previous Medication:
- Drugs used:
- Response: no response/ mild/ moderate/ good

5. FAMILY HISTORY:

- History of genetic disorders/ epilepsy/ others:

6. PERSONAL HISTORY:

- i. Diet: a) Vegetarian:
b) Mixed:
- ii. Sleep:
- iii. Bowel:
- iv. Micturition:

7. MENSTRUAL HISTORY:

Menarche:

Duration:

Quantity:

Associated Complaints:

8. VITAL EXAMINATION:

Pulse Rate :

Respiratory Rate :

Blood Pressure :

Temperature :

Body Weight :

Height :

BMI :

9. GENERAL PHYSICAL EXAMINATION:

Pallor :

Icterus :

Cyanosis :

Clubbing :

Lymphadenopathy :

Edema :

Skin Changes :

10. SYSTEMIC EXAMINATION:

Central Nervous System:

Cardiovascular System:

Respiratory System:

Gastrointestinal System:

Musculoskeletal System:

ANNEXURE – 6



ಕರ್ನಾಟಕ ಸರ್ಕಾರ
ಆಯುಷ್ ಇಲಾಖೆ

ಸರ್ಕಾರಿ ಆಯುರ್ವೇದ ಸಂಶೋಧನಾ ಕೇಂದ್ರ, ಮೈಸೂರು
ಸರ್ಕಾರಿ ಪ್ರಕೃತಿ ಚಿಕಿತ್ಸೆ ಮತ್ತು ಯೋಗ ವೈದ್ಯಕೀಯ ಕಾಲೇಜು, ಮೈಸೂರು
ಇವರ ಸಹಯೋಗದಲ್ಲಿ

ಶಾಲಾ ಮಕ್ಕಳಿಗೆ ಉಚಿತ ಯೋಗ ಶಿಬಿರ

ಉದ್ಘಾಟನಾ ಸಮಾರಂಭ

ಸ್ಥಳ : ಪ್ರಮತಿ ಹಿಲ್ ವ್ಯೂ ಅಕಾಡೆಮಿ , ಕುವೆಂಪುನಗರ
ದಿನಾಂಕ ಮತ್ತು ಸಮಯ: **05/01/2022 , 10:00 AM**

ಉದ್ಘಾಟನೆ - ಡಾ ರಾಧಾ ಕೃಷ್ಣ ರಮಾ ರಾವ್
ಪ್ರಾಚಾರ್ಯರು, ಸರ್ಕಾರಿ ಪ್ರಕೃತಿ ಚಿಕಿತ್ಸೆ ಮತ್ತು ಯೋಗ ವೈದ್ಯಕೀಯ
ಕಾಲೇಜು, ಮೈಸೂರು

ಅಧ್ಯಕ್ಷತೆ - ಡಾಲ್ಕಿ ನಾರಾಯಣ ಶೆಣೈ, ಸರ್ಕಾರಿ ಆಯುರ್ವೇದ
ಸಂಶೋಧನಾ ಕೇಂದ್ರ, ಮೈಸೂರು

ಮುಖ್ಯ ಅತಿಥಿಗಳು - ಯೋಗತ್ಮ ಶ್ರೀ ಹರಿ, ಸಂಸ್ಥಾಪಕರು ಜಿ ಎಸ್
ಎಸ್ ಯೋಗ ಫೌಂಡೇಶನ್ ಮೈಸೂರು
ಸಿ ಎಸ್ ಸುದರ್ಶನ, ಪ್ರಾಚಾರ್ಯರು ಪ್ರಮತಿ ಹಿಲ್ ವ್ಯೂ
ಅಕಾಡೆಮಿ , ಕುವೆಂಪುನಗರ

ಎಲ್ಲರಿಗೂ ಆದರದ ಸುಸ್ವಾಗತ

ಸಿ ಎನ್ ರೇಣುಕ

ANNEXURE – 7



ಕರ್ನಾಟಕ ಸರ್ಕಾರ

ಆಯುಷ್ ಇಲಾಖೆ

ಸರ್ಕಾರಿ ಆಯುರ್ವೇದ ಸಂಶೋಧನಾ ಕೇಂದ್ರ, ಮೈಸೂರು
ಸರ್ಕಾರಿ ಪ್ರಕೃತಿ ಚಿಕಿತ್ಸೆ ಮತ್ತು ಯೋಗ ವೈದ್ಯಕೀಯ ಕಾಲೇಜು, ಮೈಸೂರು
ಇವರ ಸಹಯೋಗದಲ್ಲಿ

ಶಾಲಾ ಮಕ್ಕಳಿಗೆ ಉಚಿತ ಯೋಗ ಶಿಬಿರ

ಸಮಾರೋಪ ಸಮಾರಂಭ

**ಸ್ಥಳ : ಪ್ರಮತಿ ಹಿಲ್ ವ್ಯೂ ಅಕಾಡೆಮಿ , ಕುವೆಂಪುನಗರ
ದಿನಾಂಕ ಮತ್ತು ಸಮಯ: 26/01/2022 , 10:00 AM**

ಉದ್ಘಾಟನೆ - ಡಾ ರಾಧಾ ಕೃಷ್ಣ ರಮಾ ರಾವ್
ಪ್ರಾಚಾರ್ಯರು, ಸರ್ಕಾರಿ ಪ್ರಕೃತಿ ಚಿಕಿತ್ಸೆ ಮತ್ತು ಯೋಗ ವೈದ್ಯಕೀಯ
ಕಾಲೇಜು, ಮೈಸೂರು

ಅಧ್ಯಕ್ಷತೆ - ಡಾಲ್ಕಿ ನಾರಾಯಣ ಶೆಣೈ, ಸರ್ಕಾರಿ ಆಯುರ್ವೇದ
ಸಂಶೋಧನಾ ಕೇಂದ್ರ, ಮೈಸೂರು

ಮುಖ್ಯ ಅತಿಥಿಗಳು - ಯೋಗತ್ಮ ಶ್ರೀ ಹರಿ, ಸಂಸ್ಥಾಪಕರು ಜಿ ಎಸ್
ಎಸ್ ಯೋಗ ಫೌಂಡೇಶನ್ ಮೈಸೂರು
ಸಿ ಎಸ್ ಸುದರ್ಶನ, ಪ್ರಾಚಾರ್ಯರು ಪ್ರಮತಿ ಹಿಲ್ ವ್ಯೂ
ಅಕಾಡೆಮಿ , ಕುವೆಂಪುನಗರ

ಎಲ್ಲರಿಗೂ ಆದರದ ಸುಸ್ವಾಗತ

ಸಿ ಎನ್ ರೇಣುಕ

13. PHOTO GALLERY



Visited Pramathi Hill view Academy, kuvempunagara and discussed with the principal about the research project the yoga sessions.



Taking the consent from children



Taking detailed
case history of
subjects





Assessment of cognitive functions using
MMSE



Yoga sessions



FEEDBACK FROM STUDENTS

...I am able to stay active all the day and the Shavasana and pranayama make me feel better and improve my mood. I am able to focus on the studies a lot more than before...



The 21 days yoga classes were very useful to. I am able to concentrate longer time in classes than before. It has helped

Yoga was very useful to me, I am able to stay active all day and feel happy. I am able to sleep a lot better than before at night. I was having back pain previously but after yoga I felt relief from back pain. ...



