

***EFFECT OF KRIYA ON PHYSIOLOGICAL PARAMETERS OF
SCHOOL GOING CHILDREN***

TOWARDS

Partial fulfillment of Master of Science in Yoga Therapy (M. Sc. YT)

SUBMITTED BY

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Under the Guidance of

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CERTIFICATE

This is to certify that **KAMAL** who has got MSc registration with start from August 01, 2018 by Swami **Vivekananda Yoga Anusandhana Samsthana, Deemed University**, has successfully completed the required training in acquiring the relevant background knowledge in Yoga Therapy and has completed the M.Sc. course of 2 years to submit this research project entitled “**effect of kriya on physiological parameters of school going children**” as per the regulations of the University.

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DECLARATION

I hereby declare that the subjected study was conducted by me at **Swami Vivekananda Yoga Anusandhana Samsthana (S-VYASA)**, Bengaluru, under the guidance of **DR. VIKAS RAWAT PhD S-VYASA** University Bengaluru.

I also declare that the subject matter of my dissertation entitled “**effect of kriya on physiological parameters of school going children**” has not previously formed the basis of the award of any degree, diploma, associate-ship, fellowship or similar titles.

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**STANDARD INTERNATIONAL TRANSLITERATION CODE USED TO
TRANSLITERATE SANSKRIT WORDS**

a	=	अ	ña	=	ञ	pa	=	प
ā	=	आ	ca	=	च	pha	=	फ
i	=	इ	cha	=	छ	ba	=	ब
ī	=	ई	ja	=	ज	bha	=	भ
u	=	उ	jha	=	झ	ma	=	म
ū	=	ऊ	ñ	=	ञ	ya	=	य
ṛ	=	ऋ	ṭa	=	ट	ra	=	र
ṝ	=	ॠ	ṭha	=	ठ	la	=	ल
e	=	ए	ḍa	=	ड	va	=	व
ai	=	ऐ	ḍha	=	ढ	śa	=	श
o	=	ओ	ṇa	=	ण	ṣa	=	ष
au	=	औ	ta	=	त	sa	=	स
m̐	=	अं	tha	=	थ	ha	=	ह
ḥ	=	अः	da	=	द	kṣa	=	क्ष
ka	=	क	dha	=	ध	tra	=	त्र
kha	=	ख	na	=	न	jña	=	ज्ञ
		ga	=	ग	gha	=	घ	

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Chapter 1

INTRODUCTION

1.1 HEALTH IN SCHOOL CHILDRENS

World health organization (WHO) has produced many reports which have identified issues, raised awareness, mortality data and absolute morbidity, and provided policies and guidelines for governments, agencies and practitioners to focused on children and adolescents health. WHO also stated “to formulate national policies and strategies and plans to develop a multispectral approach, to involve citizens in planning, organization, operation and control of primary health care; and to focus on education as a means of preventing and controlling health problems (St Leger, 1999). Children’s externalizing and internalizing disorders can be conceptualized as emotional dys-regulation or patterns of emotional regulation that may result in symptoms of psychopathology (Alderman et al., 2014). Child health and child schooling performance are directly connected to each other. Better child health is always responsible for the good performance. Child health reflects behavioral decision of households in the presence of unobserved individual, family and community (Alderman et al., 2014).

1.2 PHYSICAL HEALTH IN SCHOOL CHILDRENS

There is clear link between physical activities and health (Biddle et al., 2004). Spending time on inactive activities such as using social media like facebook, instagram, playing video games and watching television and low parental education impact negatively on the physical health of children (Morshad Alam et al., 2019). The American College of Sports Medicine based their proposals on guidelines for adults and suggest that children and adolescents should achieve 20–30 min of vigorous exercise every day. Also the primary recommendation of Health Education Authority in the UK was that all young people should participate in physical activity of at least moderate intensity for 1 h per day to enhance and maintain muscular strength, flexibility, and bone health (Andersen et al., 2006).

1.2.1 Body Mass Index (BMI) in School Children

A person's weight in kilograms divided by the square of height in meters is called Body Mass Index (BMI) . BMI can be measured as a substitute to direct measures of body fat. BMI is sex and age specific in children. In children, a high BMI can lead to weight-related diseases and other health issues and less BMI can also put one at risk for health issues (Osama et al., 2017). The prevalence of childhood overweight has increased markedly over the last 2 decades (Sorof et al., 2004) Childhood obesity is a global problem occurring in various countries worldwide. In a survey it was estimated there were 41 million obese children below 5 years of age and over 340 million children aged 5-19 with excessive weight (Rusek et al., 2018). According to WHO there are 1 billion overweight people in the world, Out of them 300 million are obese. The condition of malnutrition children is also worse, 70% of the world's malnourished children live in Asia (Warraich et al., 2009). In case of continuing the present pace the number of obese or overweight infants and young children will reach 70 million people by 2025. So now the goal of the WHO for 2025 is to prevent the increase in the prevalence of obesity and overweight in children (Emamian et al., 2019). Due to different variety of drinks and high calories meals in the market, simultaneously with an decrease in physical activities; A greater growth in BMI index among children and adolescents has been noted over the last few years. On the other hand in the every population there are many children suffering from deficiency of body mass and malnutrition The cause of it is not only poverty but also lack of adequate nutrition in food and poor family life (Helena Popławska, Elżbieta Huk-Wieliczuk, 2011).

1.2.2 Flexibility in School Children

Low back pain among adolescents and children has a etiology which is directly correlated to personal factors and lifestyle such as muscle strength, overweight and flexibility (Luis, 2012). In a study it is observed that 75% of boys and 35% of girls aged 10 revealed reduced flexibility of hamstrings. In the other study. Hereby et al. confirmed this observation in 15 to 17-year-old boys.(Czaprowski et al., 2013).

1.2.3 Strength in School Children

Some Research finding suggests that early intervention with health related practice enhance children academic development and physical wellness. It is important that aerobic endurance, flexibility, and muscular strength/endurance be regarded as essential elements in the early childhood physical education program (Gabbard, 1988). Strength training in childhood is one of the conditions of injury prevention and good posture and also important element of excellent fitness and conditioning preparation that is needed for the later development of the sport. Strength development is a necessary part of every physical and sports activities for children (Herodek & Simonovic, 2013).

1.2.4 Peak flow rate (PFR) in children

In children, the respiratory tract is probably more often affected by disease than any other system of the body (Dugdale & Moeri, 1968). A simple but reliable method for measuring the value of lung function is known as PFR. Many investigators have determined normal values for PFR in adults and in children and, similarly, many authors have investigated its value in the diagnosis of pulmonary disease (Juhl, 1970). It has been shown in study that the ventilator function of normal children varies with age and stature (Nairn et al., 1961).

1.3 YOGA

Yoga plays an important role and has made unlimited Contribution in the modern age as it caters to the Physiological, Spiritual, biological and Sociological necessities of the human being.. The word 'yoga' is derived from the roots of Sanskrit 'Yuj' which means to join, to attach, to bind, and a concentrate It also means Union. Yoga is proper union of our will with the will have had. The accurate denotation of the word 'Yoga' is 'yoke'. It means for joining the individual spirit with the Universal spirit, or God. Yoga means the Experience of individual with inner being. Yoga is not religion it is a method by which one obtain Control of his powers. It is the means to reach complete Self-Realization (Karak et al., 2015).Yoga is oldest system of personal development emerged from the Indian culture. Yoga is becoming increasingly popular for children, as there is

vast availability of books, videos and other group activities (Deborah et al., 2009). Yoga was introduced to the western world in the 19th century. Yoga is useful in deterrence as well as management of stress and stress-induced disorders. Recent clinical research showed the benefits of Thai yoga practice such as improving extensibility of soft tissue, spine and joint flexibility, balance performance, increasing respiration, and anaerobic exercise performance. Principles of health-related physical fitness include: flexibility, cardiovascular endurance, muscular strength/endurance, and body composition (Kongkaew et al., 2018).

In the past few decades, it has been the subject of research as a therapeutic measure in coronary heart disease, chronic obstructive pulmonary disease, mental stress, obesity, diabetes and hypertension (Taneja, 2014). The beneficial effects of yoga are believed to be held through yama (ethical behavior), niyama (self-discipline), asana (poses), pranāyama (breath), pratyāhāra (sense withdrawal), dhāranā (concentration), dhyāna (meditation) and samādhi (deep meditative awareness) (Evans et al., 2009).

1.3.1 Yoga and BMI

Excess eating, nutrient-poor foods and a sedentary lifestyle have led to an epidemic of obesity and type 2 diabetes all over the world. A combination of yoga practices which emphasized breathing techniques is capable to reduce the body mass index (BMI) (Telles et al., 2010). Among other exercises, yoga has shown to be effective for the treatment of both physical and mental health problems. Recent trials have demonstrated that yoga practice is associated with numerous health benefits and can be effectively used as an adjunctive treatment for chronic illness. Various research studies revealed that participation in physical activities and in various sports is improving the physical fitness by lowering percentage of body fat and increasing the lean body mass (Karak et al., 2015).

1.3.2 Effect of Yoga on Flexibility and Strength

The most recognizable form of yoga practiced in the West is haṭha yoga, which concentrates on physical health and well-being. It involves the practice of postures (*āsana*) for strength and

flexibility, breathing techniques. There were many way of yoga include postures (*āsana*) which are designed to develop flexibility, strength, balance and the bringing together the body, mind and breath using controlled breathing exercises (*pranāyama*) and meditation. The practice of Yoga may help the body become more flexible, giving the muscles and joints greater range of motion as yogic stretching is proposed to help release lactic acid from the muscle cells into the blood stream so that it does not hinder muscular contraction (Amin & Goodman, 2014). Yoga offers a self-corrective, holistic approach to health and has been shown to be effective in several chronic lifestyle-related diseases. Yoga has also been used in patients with Chronic low back pain by increasing spinal flexibility (Amin & Goodman, 2014). A rising number of research studies have shown that the practice of haṭha yoga can improve flexibility and strength and may help control such physiological variables as blood pressure, respiration and heart rate, and metabolic rate to improve overall exercise capacity (Baljinder & Kaur, 2009)

Children's contribution in yoga programs is receiving increasingly extensive attention as an exercise system that promotes not only physical health benefits but also psychological well-being. Due to the focus on mind and body integration, yoga can increase basic motor, cognitive, and communication skills in children with developmental disabilities, including Down syndrome, cerebral palsy, attention deficit disorder (ADD), attention deficit hyperactivity disorder (ADHD) (Deborah & Ellen, 2009). In yoga; a controlled breathing practice helps in focusing of mind and promoting the physical postures including balancing, forward bending, backward bending and twisting postures which are believed to increase the flexibility and strength. Yoga is said to improve children's well-being including motor skills, coordination and strength. It is also suggested as health promoting practice (Deborah et al., 2009).

1.3.3 Yoga And Peak Expiratory Flow Rate (PEFR)

Yoga practices mainly consist of *pranāyama* (to control the breathing in a superior and surprising way to get maximum benefits) Asana (posture- a particular position of the body which contributes to steadiness of body and mind), and meditation. Yoga is considered to be a very good exercise for maintaining proper health and also has a profound effect on the lung functions of an individual. It is claimed that yogic practices help in prevention, control and rehabilitation of many respiratory

diseases (Doijad VP, 2012) There are a number of reports on the effect of yoga training on pulmonary functions like forced expiratory volume (FEV), forced expiratory volume in 1st second (FEV1) and peak expiratory flow rate (PEFR) (Mandanmohan et al., 2003).

1.4 KRIYA

Before start the practice of *pranāyama*, any imbalance in the *doshas* should be aloof Physiologically , an effort needs to be made to remove the mucus blocking in the respiratory tracts, excess fats from the body, and excess gastric juice secretions from the stomach. In addition to this, these practices are believed to be producing revitalizing and rejuvenating effect in the organs of various systems. In *haṭha* Yoga, there are six purification practices specifically designed for serving this purpose. They are *kriyā* or *ṣaṭkarma* When we split “*ṣaṭkarma*” is the combination of two words “*shat*” means six and “*karma*” means action. The *ṣaṭkarma* are very powerful practices that can never be learned from books or taught by inexperienced people. One should have adequate knowledge and skill to teach them. *haṭha* the literal meaning of *kriyā* is cleansing. *kriyās* are categorized into six and every one of them has a particular role to play as far as their cleansing action is concerned. The practice of *kriyā* is quoted with its sub-classification in *haṭhayogapradīpikā* and *gheraṇḍa saṁhītā*

However, in this theoretical scientific article, all varieties of *kriyā* described in *haṭha* Yoga have been explained with its physiological effects. Evidence ? based findings are limited using *kriyā* as the interventions (Patra, 2017).

According to *haṭha* yoga *pradīpikā* *ṣaṭkarma* are divided in following:-

Dhauti	Antar dhauti Vatsara Varisara Agnisara Bahiskrita
--------	--

	<p>Danta dhauti</p> <p>Jihva Karna Kapalrandhra Chakshu</p> <p>Hrid dhauti</p> <p>Vastra Danda Vaman</p>
Basti	<p>jala (water)</p> <p>sthala (dry)</p>
Neti	<p>sutra (thread)</p> <p>jala (water)</p> <p>dudha (milk)</p> <p>ghṛta (ghee)</p>
Trāṭaka	<p>antaraṅaga (internal)</p> <p>bahiraṅaga (external)</p>
Nauli	<p>dakṣiṇa (right)</p> <p>vāma (left)</p> <p>madhyama (middle)</p>

Kapālabhāti	vātakrama (breathing) vyutkrama (reversed) sītkrama (cooling)
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Haṭha yoga is famous for these six cleansing techniques. Although only six in number, each has a variety of practices.

dhauti is divided into four parts. According to the *Gheraṇḍa saṁhitā* they are called *atamra* (internal) *dhauti*, *danta* (teeth) *dhauti*, *hṛda* (cardiac) *dhauti* and *mula śodhana* (rectal cleaning).

atamra dhauti is divided into four practices: *vātasara dhauti*, expelling air through the anus, *vārisara dhauti*, evacuating a large quantity of water through the bowels, *vāhniśāra dhauti*, rapid expansion and contraction of the abdomen, *bahiṣkṛta dhauti*, washing the rectum in the hand

Hṛda dhauti is divided into three practices: *dandā dhauti*, inserting a soft banana stem into the stomach, *vastra dhauti*, swallowing a long thin strip of cloth, *vāmana dhauti*, regurgitating the contents of the stomach.

The last practice of *dhauti*, *mula śodhana* can be performed in two ways .it is done either by inserting a turmeric root or the middle finger into the anus

The second *karma*, *basti* is divided into two parts: *jala* (water) *basti* and *sthala* (dry) *basti*. In *jala basti* you suck water into the large intestine through the anus and then expel it. In *sthala basti* you suck air into the large intestine.

The third *karma*, *neti* , has four practices: *jala* (water) *neti*, passing warm Saline water through the nose , *sutra* (thread) *neti*, passing clarified butter through the nose, *ghṛta* (ghee) *neti*, passing clarified butter through the nose , *dugdha* (milk) *neti*, passing milk through the nose.

The fourth *karma* is *trāṭaka*, which is steady and continuous gazing at a point of concentration. It has two practices: *antara* (internal) and *bāhir* (external) *trāṭaka*.

The fifth *karma* is *nauli*, in which you isolate and churn the abdominal muscles. It has three practices. When the muscles are isolated to the right it is *dakṣiṇa nauli*, to the left , *vāma nauli* and in the middle it is *madhyama nauli*.

The last *karma* is *kapālabhāti*, which has three practices: *vātakarma kapālabhāti* which is similar to *bhastrikā praṇāyāma*, *vyutakarma kapālabhāti* sucking water in through the nose and expelling it through the mouth, *śītakrama kapālabhāti*, sucking water in through the nose.

1.4 NEED OF THE STUDY

With rising levels of obesity in children and adolescents, and declining levels of some aspects of physical activity, the children are losing their strength, flexibility and lungs capacity (Biddle et al., 2004). So the need of present study is to see the effect of specific *kriyās* on physiological parameters.

1.6 STATEMENT OF THE PROBLEM

kriyā based on ancient scriptures helps to detoxify the body, balance the *tridoshas* and de sensitization. However empirical study needs to be carried out to substantiate the applicability and efficacy of these (*jala neti*, *sutra neti*, *vaman dhauti*, *laghu śāṅkha prakṣālana* , *kapālabhāti*) *kriyā* to increase flexibility, strength, lungs capacity and to maintain BMI.

Chapter 2

2.1 REVIEW OF ANCIENT LITERATURE/SCRIPTURES

Saṭ karma are the cleansing techniques .They are recommended to be done to prepare the body for yoga practices .they are named *ṣaṭ karma* because they are six(*ṣaṭ* in sanskrit) in number
kriyā definition according to *gheraṇḍasamhītā*

Maharishi Gheranda mentioned in *gheraṇḍasamhītā* as kriyā on first step in *gheraṇḍasamhītā*, the human body (including mind) is mentioned as **Ghata**. And the process of cleansing the body and mind is mentioned as **Ghata shuddhi**. (Chandra & Vasu, 1996).

According to *gheraṇḍasamhītā*

धौतिर्बास्ति नेतिलौलिकी त्राटकं तथा ।

कपलभतिश्चैतानि षट्कर्माणी समाचरेत् ॥ घेरण्डसंहीताय ॥१२फ

dhautirbāsti netilaulikī trāṭakam tathā |

kapalabhatisacaitāni ṣaṭkarmāṇī samācaret ||gheraṇḍasamhītā (1.12)

Dhauti, Vasti, neti, trāṭaka ,laulikī and *kapālabhāti* are the six practices known as *ṣaṭkarma* (Chandra & Vasu, 1996).

2. According to *haṭhayogapradīpikā*

धौतिर्बास्ति तथा नेतिस्त्राटकं नौलिकं तथा ।

कपालभातिश्चैतानि षट्कर्माणि प्रचक्षते ॥ हठयोगप्रदीपिका चर ॥२२फ

dhautirbastitathā netistrāṭakam naulikam tathā|

kapālabhatisacaitāni ṣaṭkarmāṇī pracakṣate || haṭhayogapradīpikā (2.22)

Dhauti, basti, neti, trāṭaka, laulikī and kapālabhāti -these are said to be as *ṣaṭkarma* or the six cleansing process (Saraswati, 1986).

3. According to *haṭharatnāvali*

चक्रिनौलिर्घौतिर्नेतिर्बास्तिर्गजकरिणी ।

त्रोटनं मस्तकभातिः कर्माण्यष्टौ प्रचक्षते ॥ हठरत्नावलि च१ ॥२५५

cakrinaulirdhautirnetirbastirgajakariṇī

troṭanam mastakabhātiḥ karmāṇyaṣṭau pracakṣate ||*haṭharatnāvali* (1.25)

Cakri, Nauli, Dhauti, Neti, Basti, gajakariṇī, troṭanam and *mastakabhāti* these are to be eight *karmas* or eight purificatory processes (Reddy, V, 1982).

KRIYA ACCORDING TO DIFFERENT SCIPTURES:-

1. TRATKA

Acc to *gheraṇḍa saṁhītā*

निमेषोन्मेषकं त्यक्त्वा सूक्ष्मलक्ष्यं निरीक्षयेत् ।

यावद्भ्रुन पतति त्राटकं प्रोच्यते बुधैः ॥घेरण्डसंहिता च१ ॥५३५

nimeṣonmeṣakarī tyaktvā sūkṣmalakṣyaṁ nirīkṣayet

yāvadbhrūna patati trāṭakam procyate budhaiḥ ||*gheraṇḍasaṁhītā* (1.53)

Gazing steadily without winking at any small object,until tear begin to flow is called *trāṭaka* by the wise (Chandra & Vasu, 1996).

According to *haṭharatnāvali* and *haṭhayogapradīpikā*

निरीक्षेत् निश्चलदृशा सूक्ष्मलक्ष्यं समाहितः ।

अश्रुसम्पातपर्यन्तमाचार्यैस्त्रातकं स्मृतम् ॥ हठयोगप्रदीपिका चर ॥३१॥ हठरत्नावलि च१ ॥५२॥

nirīkṣet niścaladṛṣā sūkṣmalakṣyaṁ samāhitaḥ।

aśrusampātaparyantamācāryaistrātakam smṛtam।।haṭhayogapradīpikā

(2.31), *haṭharatnāvali* (1.52)

Looking intensely with an unwavering gaze at a small point until the tears are shed is known as *trāṭaka* (Reddy, V, 1982) (Saraswati, 1986).

Procedure of *trāṭaka* in haṭha yoga

There are *bahiraṅga* or external, *antaraṅga* or internal types in the practice. *bahiraṅga* involves an object or a symbol to gaze at. *antaraṅga trāṭaka* involves clear and stable inner visualization of an object. The practice of *trāṭaka* is continued until the subtle form of the image manifests in front of the closed eyes. The point of concentration which is a symbol or object activates the inner probable and can soak up the mind. Symbol can be objects such as crystal ball, full moon, a star, symbol of OM. The figure shows *Jyoti Trāṭaka*, practice with the flame.

Antaraṅga trāṭaka uses the impression left by these symbol in the mind. *Trāṭaka* can be done at any time but is more effective when performed on empty stomach. Throughout the practice one has to remain as a silent witness with awareness. If there is an uncontrollable flow of thoughts during *trāṭaka*, *mantra japa* should also be done at the same time. The gazing with closed eyes should be by meditating on *ajñā cakra*. (Chandra & Vasa, 1996).

2.KAPALABHATI

Kapāla or means forehead, *bhāti* means shine. It is commonly called as frontal brain cleansing.

Acc to *gheraṅḍa saṁhītā*

वाम क्रमेणाव्युत्क्रमेण शीत्क्रमेणा विशेषतः ।

भालभातिं त्रिधा कुर्यात् काफदोषं निवारयेत् ॥ घेरण्डसंहिता च ॥५५फ

vāma krameṇāvvyutkrameṇa sītkrameṇā viśeṣataḥ |

bhālabhātiṃ tridhā kuryāt kāphadoṣaṃ nivārayet || *gheraṇḍasaṃhītā* (1.55)

There are three kinds of *kapālabhāti*, *vāma krama* and *sītkrama* and help to remove *kapha* disorder (Chandra & Vasu, 1996).

According to *haṭhayogapradīpikā*

भस्त्रवल्लोहकारस्य रेचपूरौ ससंभ्रमौ ।

कपालभातिर्विल्याता कफदोषविशेषणी ॥ हठयोगप्रदीपिका च ॥३५फ

bhastravallohakārasya recapūrau sasambhramau |

kapālabhātirvikhyātā kaphadoṣaviśeṣaṇī || *haṭhayogapradīpikā* (2.35)

This is to perform rapid inhalation and exhalation like the bellows of the black smith. This *kapālabhāti* destroys all the disorder arising from excess of phlegm (Saraswati, 1986).

According to *haṭharatnāvali*

भस्त्रिवल्लौहकाराणां रेचपूरसुसंभ्रमौ ।

कपालभातिर्विल्याता सर्वरोगविशेषणी ॥ हठरत्नावलि च ॥५४फ

bhastrivallauhakārāṇāṃ recapūrasusambhramau |

kapālabhātirvikhyātā sarvarogaviśeṣaṇī || *haṭharatnāvali* (1.54)

This is to perform rapid inhalation and exhalation like the bellows of the blacksmith. *Kapālabhāti* destroy all the disorders (Reddy, V, 1982).

There are three kinds of *kapālabhāti* according to *gheraṇḍa saṃhītā*. They are *vātakrama*, *vyutkrama* and *sītkrama* (Chandra & Vasu, 1996).

According to *gheraṇḍa saṁhītā*

ईडया पूरयेद्वायुं रेचयेत्पिण्गलापुनः ।

पिण्गलया पूरयित्वा पुनश्चन्द्रेण रेचयेत् ॥ घेरण्डसंहीता च१ ॥५६फ

īḍayā pūrayedvāyum reecayetpiṅgalāpunah|

piṅgalayā pūrayitvā punaścandreṇa recayet||gheraṇḍasaṁhītā (1.56)

Drawing the wind through the left nostril and expelling it through the right ,and drawing it again through the right and expelling it through the left is *vātakrama* (Chandra & Vasu, 1996).

VYUTKRAMA

नासाभ्यां जलमाकृष्य पुनर्वक्त्रेण रेचयेत् ।

पायं पायं व्युत्क्रमेण श्लेष्म दोषं निवारयेत् ॥ घेरण्डसंहीता च१ ॥५८फ

nāsābhyāṁ jalamākṛṣya punarvaktreṇa recayet|

pāyaṁ pāyaṁ vyutkrameṇa śleeṣma doṣaṁ nivārayet|gheraṇḍasaṁhītā (1.58).

Drawing the water through nostrils and expelling through the mouth slowly and slowly is called *vyutkrama* (Chandra & Vasu, 1996).

Sītkrama

शीत्कृत्य पीत्वा वक्त्रेण नासानालैर्विरेचयेत् ॥ घेरण्डसंहीता च१ ॥५९फ

śītkṛutya pītva vaktreṇa nāsānālairvirecayet||gheraṇḍasaṁhītā (1.59)

A mouth full of warm water is pushed up to nose to let it out is *sītkrama* (Chandra & Vasu, 1996)

3.NETI:

Neti refers to cleansing of nasal passages. According to hatha yoga text there are four types of *neti* - *jala neti* practice with water, *Sutra neti* -practice with thread, *dugdha neti*- practice with milk, *ghṛta* (ghee) *neti*- practice with *ghṛta* (Patra S, 2017).

SUTRA NETI

According to gheraṇḍa saṁhītā

वितस्तिमानं सूक्ष्मसूत्रं नासानाले प्रवेशयेत् ।

मुखान्निर्गमयेत्पश्चात् प्रोच्यते नेतिकर्मकम् ॥ घेरण्डसंहीता च१ ॥५०फ

vitastimānaṁ sūkṣmasūtraṁ nāsānāle praveśayet |

mukhānnirgamayetpascāt procyate netikarmakam || gheraṇḍasaṁhītā (1.50)

A thin thread, measuring half a cubit, inserted into the nostrils and pulled out by the mouth, is called *neti kriyā* (Chandra & Vasu, 1996).

According to haṭhayogapradīpikā

सूत्रं वितस्ति सुस्निग्धं नासानाले प्रवेशयेत् ।

मुखान्निर्गमच्चैषा नेतिः सिद्धैर्निगद्यते ॥ हठयोगप्रदीपिका च२ ॥२९फ

sūtraṁ vitasti susnigdham nāsānāle praveśayet |

mukhānnirgamaccaisā netiḥ siddhairnigadyate || haṭhayogapradīpikā (2.29)

A soft thread is inserted through nose and taken out from the mouth is called *neti* (Saraswati, 1986).

According to haṭharatnāvali

आखुपुञ्जाकारनिभं सूत्रं सुस्निग्धनिर्मितम् ।

षड्वितस्तिमितं सूत्रं नेतिसूत्रस्य लक्षणम् ॥ हठरत्नावलि च१ ॥३७फ

ākhupuñcākāranibhaṃ sūtram susnigdhanirmitam |

ṣaḍvitastimitam sūtram netisūtrasya lakṣaṇam | |haṭharatnāvali (1.37)

A smooth thread made like the tail of the rat, of four and half feet in length, is *neti* thread (Reddy, V, 1982)

नसानाले प्रवेश्यैनं मुखान्निर्गमयेत्क्रमात् ।

सूत्रस्यान्तं प्रवद्ध्वा तु भ्राम्येन्नासनालयोः ॥हठरत्नावलि च१ ॥३८फ

nasānāle praveśyainam mukhānnirgamayetkramāt |

sūtrasyānta pravaddhvā tu bhrāmyennāsanālayoḥ | |haṭharatnāvali (1.38)

Introducing it in one nostril, it should be taken out from the mouth gradually. By joining the thread it should be rotated through nostrils (Reddy, V, 1982).

Procedure of Sutra neti: Person should be asked to insert the thread or catheter straight into the nostrils by tilting the head little back. The thread should not be forced through the nose but gently pushed so that it slowly passes down into the throat. When it reaches the back of the throat, two fingers are inserted in the mouth and hanging thread should be pulled out. Then the thread is moved backward and forwards. The same procedure is repeated from the other nostril.

Jala neti: Pot which has a nozzle is fit into the nostril. Person while leaning forward should tilt the head to one side placing the nozzle of *neti* pot other side. Water is introduced while breathing through the mouth. At the end, nose should be blowed throughly to drain out the remaining water. *bhastrikā* or *kapālabhāti* are advised after *jala neti* to dry the nose.

4 DHAUTI:

According to *gheraṇḍasamhītā*,

अन्तर्धौतिर्दन्तधौतिहृद्घौतिर्मूलशोधनम् ।

धौतिं चतुर्विधां कृत्वा घटं कुर्वन्तु निर्मलम् ॥ घेरण्डसंहिता च१ ॥१३फ

antardhautirdantadhautirhrddhautirmūlaśodhanam

dhautim caturvidhām krtvā ghaṭam kurvantu nirmalam | | *gheraṇḍasaṁhītā* (1.13)

The *Dhauti* are of four kinds, they are-(1) *Antara Dhauti* (internal washing);(2) *Danta Dhauti* (cleaning of the teeth);(3) *hṛda Dhauti* (cleaning the heart);(4) *mulaśodhana* (cleaning the rectum) (Chandra, & Vasu, 1996).

1. *AntaraDhauti*

अन्तर्धौतिर्दन्तधौतिहृद्घौतिर्मूलशोधनम् ।

धौतिं चतुर्विधां कृत्वा घटं कुर्वन्तु निर्मलम् ॥ च१ ॥१४फ

antardhautirdantadhautirhrddhautirmūlaśodhanam

dhautim caturvidhām krtvā ghaṭam kurvantu nirmalam | | *gheraṇḍasaṁhītā* (1.14)

Antara Dhauti is again subdivided into four parts: (a) *vātasara* (wind purification) (b) *vārisara* (water purification), (c) *vāhanīsara* (fire purification) and (d) *bahiṣkṛta* (rectal cleansing) (Chandra, & Vasu, 1996)

Vātasara Dhauti (wind purification)- is performed by breathing in slowly through the mouth in *kāki mudrā*, and then swallowing the air into the stomach while expanding the abdomen. It can be done ten times or until the stomach is fully expanded. Then the air should be passed through the large intestine to do . it is helpful to assume an inverted posture . *pāsini mudrā* is the best. The air should then pass the anus easily out. (Chandra, Vasa, 1996).

Vārisara Dhauti (water purification) is more commonly known today as *śaṅkha prakṣāḷana* In this practice total of sixteen glasses of warm saline water has to drink and evacuated through the bowels. Two glasses of water are to be drunk with intervals and a series of five specific *asanas* to be performed. *Asanas* are *tāḍāsana triyaka tāḍāsana, kaṭi cakarāsana, tiryaka bhujāṅgāsana* and *udarā karṣāsana*. After every two glasses of water, *asanas* should be performed until the water

starts flowing out of the anus. Once clear water comes out, then it is inferred that the stomach and intestines are cleaned. (Chandra, Vasa, 1996).

There is a shorter technique called *laghu śaṅkha prakṣāḷana* where six glasses of warm saline water are taken. After every two glasses of water same series of *asanas* are to be repeated. The *haṭharatnāvali* mentions the use of jaggery water or milk water instead of saline water. There is also various other herbs and juices which could be used like few drops of lemon, onion or garlic juice. Sometimes it can also be advised with carrot or celery juice.

Diet after Dhauti:

Forty five minutes after completing the practice of *śaṅkha prakṣāḷana*, a saltless liquid mixture of cooked rice, *mung dal* and *ghee* has to be eaten to fill the stomach completely.

Vāhanīsara Dhauti (fire purification): also known as *agnisāra kriyā* involves moving the fire in the body. Fire is related to the essence of fire located in the naval region. Fire is stimulated by the movement of abdominal muscles and organs. This can be felt by increase in the internal heat.

नाभि ग्रन्थिं मेरुप्रष्टे शतवारञ्च कारयेत् । घेरण्डसंहिता च१ ॥२०५

nābhi granthim merupraṣṭe śatavāraṅca kārayet | gheraṇḍasaṅhītā (1.20)

The naval should be pushed against the spine hundred times.

The practice can be done in standing or sitting in *bhadrāsana jālandhara bandha* is performed first and then the abdomen is pushed out and in rapidly while the breath is held. It can be done while breathing through the mouth with the tongue extended and moving the abdomen in rhythm with the breath. (Chandra, & Vasu, 1996)

Bahiṣkṛta Dhauti (rectal cleansing): is very difficult to practice as it involves pushing the rectum out and washing it with the hands standing naval-deep water. (Chandra, & Vasu, 1996).

2. Danta dhauti (cleansing of teeth)

दन्तमूलं जिह्वामूलं रन्ध्रञ्च कर्णयुग्मयोः ।

कपालरन्ध्रं पञ्चैते दन्तधौतिं विधीयते ॥ घेरण्डसंहिता च१ ॥२६फ

dantamūlaṁ jihvāmūlaṁ randhraṅca karṇayugmayoh|

kapālarandhrāṁ pañcaite dantadhautiṁ vidhīyate||gheraṅḍasaṁhītā (1.26)

Danta Dhauti is cleansing of the teeth with the special stick,i.e, of *neem* or *babul*(1).*Dantadhauti* includes *jihva dhauti*- cleaning the tongue,by rubbing it with the joined first finger and thumb in a downward motion and then squeezing it, *Karna dhauti*-clening the uper back portion of the palate, *caksu Dhauti* -bathing the eyes, with tepid saline water or with urine.(Chandra, & Vasu, 1996).

(3) *Hṛda Dhauti* (purification of heart)

Hṛda Dhauti is purification of heart (or rather throat).

हृद्दौतिं त्रिविधां कुर्याद्दण्डवमनवाससा ॥ घेरण्डसंहिता च१ ॥३६फ

hrddhautiṁ trividhāṁ kuryāddaṅḍavamanavāsasā||gheraṅḍasaṁhītā (1.36)

Hṛda Dhauti, is of three kinds,(a) *danda* (a stick),(b) *vāmana* (water)and by (c) *vastra* (cloths)(1).(Chandra, & Vasu, 1996)

Danda Dhauti (cleansing with stick):

The first practice is *danda dhauti* i.e. practising with stick. Although a soft banana stem is traditionally used, *Gheranda* advises the use of use of the sugar cane or turmeric roots.

Vāmana Dhauti (cleansing with water)or *vyāghra kriyā* (cleansing like tiger)- is second practice of *hṛda Dhauti* *vāmana* is to vomit, *vyāghra* is tiger. In this practice food is vomited out from the stomach three hours after the meal. Vomiting can be practised after drinking warm saline water and tickling the back of the throat.

भोजनान्ते पिबेद्वारि चाकण्ठपूरितं सुधीः ।

उर्ध्वां द्रष्टिं क्षणं क्रत्वा तज्जलं वमयेत्पुनः ।

नित्यमभ्यासयोगेन कफ पित्तं निवारयेत् ॥ घेरण्डसंहिता च१ ॥३९फ

bhojanānte pibedvāri cākaṅṭhapūritam sudhīḥ|

urdhvām draṣṭirṅ kṣaṇam kratvā tajjalam vamayetpunaḥ|

nityamabhyāsayogena kapha pittam nivārayet| |gheraṇḍasaṁhītā (1.39)

After meal, let the practitioner drink water full upto the throat, then looking for a short while upwards, let him vomit out again. By daily practising this yoga, disorders of phlegm and bile are cured.

Kuñjala kriyā: is almost identical to *vyāghra kriyā* except it is performed on empty stomach. After *vyāghra kriyā* diet is restricted to sweet milk rice pudding . There is no restriction in diet in *kuñjala kriyā* (Chandra, & Vasu, 1996).

Vastra Dhauti:

चतुरण्गुलविस्तारं हस्तपञ्चदशायतम् ।

गुतूपदिष्टमार्गेण सिक्तं वस्त्रं शनैर्ग्रसेत् ।

पुनः प्रत्याहारेच्यैतद्दुदितं धौतिल्कर्म तत् ॥ हठयोगप्रदीपिकाच२ ॥२४फ

caturāṅgulavistāraṁ hastapañcadaśāyatam|

gutūpadiṣṭamārgēṇa siktam vastram śanairgraset|

punaḥ pratyāhārecyaitaduditam dhautilkarma tat| |haṭhayogapradīpikā (2.24)

A strip of wet cloth, four angulas wide (i.e. seven to eight centimeters) and 15 hand spans (i.e. one and a half meters) in length is swallowed and then taken out slowly. (Saraswati, 1986).

4 Mūla śodhana:

अपानक्ररता तवद्याचन्मूलं न शोधयेत् ।

तस्मत्सर्वप्रयत्नेनमूलशोधनमाचरेत् ॥ घेरण्डसंहीताय ॥४२फ

apānakraratā tavadyācanmūlarī na śodhayet |

tasmatsarvaprayatnenamūlaśodhanamācaret || *gheraṇḍasaṁhītā* (1.42)

Mūla śodhana :is done by inserting middle finger into the rectum and rotating it clockwise and anticlockwise.

Finger nails should be cut short and none irritating oil can be used to lubricate the anus. *gheraṇḍasaṁhītā* also recommends the use of a turmeric root instead of finger and to start by sitting in *utkaṭāsana*.(Chandra, & Vasu, 1996).

5.NAULI

The word *nāla* means tubular vessel. Here, it means the naval stream i.e. rectus abdominal muscle.

Gheraṇḍa saṁhītā calls it is as *laukiki*.

1 According to *gheraṇḍa saṁhītā*

अमन्दवेगेन तुन्दं तु भ्रमयेदुभपार्श्वयोः ।

सर्वरोगान्निहन्तिह देहानलविवद्धर्नम् ॥ घेरण्डसंहीता(१.५२)

amandavegena tundaṁ tu bhramayedubhapārśvayoḥ |

sarvarogānnihantiha dehānalavivaddharnam || *gheraṇḍasaṁhītā* (1.52)

Moving the recti muscles from one side to the other is called *laukiki*.(Chandra, & Vasu, 1996).

2 According to *haṭhayogapradīpikā*

अमन्दावतवेगेन तुन्दं सव्यापसव्यतः ।

नतांसो भ्रामयेदेषा नौलिः सिद्धैः प्रषस्यते ॥ हठयोगप्रदीपिका(२.३३)

amandāvartavegena tundaṁ savyāpasavyataḥ |

natāṁso bhrāmayedeṣā nauliḥ siddhaiḥ praśasyate | |*haṭhayogapradīpikā* (2.33)

Stirring the abdominal muscles from right to left is called *Nauli*. (Saraswati, 1986).

3 According to haṭharatnāvali

सा च नौलिर्द्विध प्रोक्त भारीचैत्कान्तिकान्तरा ।

भारी स्यद्वाह्यरूपेण जयन्तेऽन्तस्तु सा तथा ॥ हठरत्नावलि १ ॥३१५

sā ca naulirdvīdha prokta bhārīcāitkāntikāntarā |

bhārī syadvāhyarūpeṇa jayante'ntastu sā tathā | |*haṭharatnāvali* (1.31)

Nauli is said to be of two types:*Bahya* (external)and *Antra* (internal).(Reddy, V, 1982).

Procedure

According to gheraṇḍasamhītā , when rectus abdominal muscles are rotated from the left to right , it is called *daksina nauli*.From right to left it is called *vāma nauli* When muscles are grouped together in the middle, it is called *mādhya nauli* Person should keep the feet little apart and rest the palms of the hands just above the knees by directing the thumb to the medial side of the thigh. *jālandhara bandha* (throat lock) can be performed while exhaling. *uḍayāna bandha* (abdominal lock)is performed by sucking the abdomen in with the exhalation.The recti muscles can be isolated in the middle, right or left by lifting the hands a little and changing the pressure.Rotating the muscles in clockwise and anticlockwise is called as *Nauli calana*(churning).(Chandra, & Vasu, 1996).

6.BASTI

Basti is cleaning of large intestine by *yogic* enema.

1 According to gheraṇḍasaṁhītā

There are two types of *Basti karma* ,*jala* and *sthala*.

जलबस्तिः शुष्कबस्तिर्बस्तिः स्याद्विधेः स्मृता ।

जलबस्तिं जले कुर्याच्चुष्कबस्तिं सद क्षितौ ॥ घेरण्डसंहीतायश् ॥४५फ

jalabastih śuṣkabastirbastih syādvividha smṛtā

jalabastim jale kuryāccuṣkabastim sada kṣitau | *gheraṇḍasaṁhītā* (1.45)

The *Bastis* are two kinds, viz. *Jalabasti*(or water *Basti*) and *Suskabasti*(or dry *Basti*). Water *basti* is done in the water and dry *Basti* on the land.(Chandra, & Vasu, 1996).

2 According to haṭharatnāvali,

बस्तिस्तु द्विविधा प्रोक्ता जलवायु प्रभेदतः ।

चक्रिंकृत्वा यथाशक्या बस्तिञ्चैव तु कारयेत् ॥ हठरत्नावलिश् ॥४१फ

bastiastu dvividhā proktā jalavāyu prabhedataḥ

cakriṅkṛtvā yathāśakyā bastiñcaiva tu kārayet | *haṭharatnāvali* (1.41)

Differentiating on water and air ,*Basti* as said to be of two types.after doing *cakri* according to the best of one's effort one should practise *Basti*.(Reddy, V, 1982).

1 *Jala basti*:

Jala basti is *yogic* enema with water

नाभिद्घ्नजले पायौ न्यस्तनालोत्कटासनः ।

आधाराकुञ्चनं कुर्यात् क्षालनं बस्तिकर्म तत् ॥ हठयोगप्रदीपिकाग्र ॥२६फ

nābhidaghrajale pāyau nyastanālotkaṭāsanaḥ।

ādharākuñcanam kuryāt kṣālanam bastikarma tat ॥ *hathayogapradikaa*(2.26)

Sitting in *utkaṭāsana* naval deep in water, a tube is inserted to the anus by contracting and then cleaning with water is called *Basti*.

A tube of at last 13 to 15 centimeters long, perfectly smooth and hollow is used to insert to the anus. Tube can be wiped with bees wax or ghee for lubrication . When 4 centimeters of the tube is inserted into the anal passage in *utkaṭāsana* person should be asked to perform *uḍayāna bandha* and hold the *madhyama nauli*. Then water is sucked up by holding the breath. catheter or tube should be removed without exhaling. Then person is asked to stand up and exhale slowly through the nose .Water should be expelled out in squatting position .Relaxation should be given in the form of *śavāsana* and *pāsini mudrā* should be practised. This relases the air from the bowel and induces bowel action if there is any water remaining.

Basti can be done in warm or hot weather before *pranayama* and *bandhas* . Before using the catheter for insertion, it should be sterilized properly. (Saraswati, 1986).

2 *Sthala basti*:

बस्तिं पश्चिमोत्तानेन चालयित्वा शनैरधः ।

अश्विनी मुद्रा या वायुमाकुञ्चयेत् प्रसारयेत् ॥ घेरण्डसंहिताग्र ॥४८फ

bastim paścimottānena cālayitvā śanairadhah।

aśvinī mudrā yā vāyumākuñcayet prasārayet ॥ *gheraṇḍasaṁhītā* (1.48)

It is performed while lying on the back , assuming *viparita karini* position. Then the knees are brought down to the chest to push the sphincter muscles out so that air is sucked in. *Sthala basti* can also be practised in *pāsini mudrā* or in *asvini mudrā* or *paścimottānasana* .(Chandra, & Vasu, 1996)

The *haṭharatnāvali* says that after practicing *basti*, food should not be taken for three *ghaṭi* i.e.72 minutes.

3.0 BENEFITS AND LIMITATIONS

1. Trataka

Acc to *gheranda samhita* the benefit of *trāṭaka* is given as

नेत्र रोगा विनश्यन्ति दिव्यदृष्टिः प्रजायते । घेरण्डसंहिता (१.५४)

netra rogā vinaśyanti divyadr̥ṣṭiḥ prajāyate | gherandasamhita (1.54)

All eye disorders are destroyed and clairvoyance is induced (Chandra & Vasu, 1996).

Acc to *haṭha yoga pradīpikā* the benefit of *trāṭaka* is given as

मोचनं नेत्ररोगाणां तन्द्रादीनां कपाटकम् ।

यत्नतस्त्राटकं गोप्यं यथा हाटकपेटकम् ॥ हठयोगप्रदीपिका चर ॥३२ फ

mocanam netrarogaṇāṃ tandrādīnāṃ kapāṭakam |

yatnatastrāṭakam gopyam yathā hāṭakapeṭakam || haṭhayogapradīpikā (2.32)

Trāṭaka eradicates all eye disease, fatigue and sloth and closes the doorway creating that these problems. It benefits not only the eyes but a whole range of physiological and mental level. *Haṭhayogapradīpikā* also mentions the arousal of clairvoyance but other capacities such as telepathy, psychic healing etc, can develop. One pointedness of mind strengthens will-power, improves memory and ability to concentrate. Physiologically *trāṭaka* relieves eye ailments such as eye strength, headache and astigmatism (Saraswati, 1986).

2. Kapalabhati

Benefits according *gherand samhita*

Prevents ageing,relaxes facial muscles, rejuvenates cells and nerves, can be used as *jala neti*. Spiritually helps to awaken *ajñā cakra*. (Chandra & Vasu, 1996).

3.Neti

Benefits Acc to *gheraṇḍa saṁhītā*

साधनाच्चेति कार्यस्य खेचरी सिद्धिमप्नुयात् ।

काफदोषा विनश्यन्ति दिव्यदृष्टिः प्रजायते ॥ घेरण्डसंहिता च१ ॥५१फ

sādhānānneti kāryasya khecarī siddhimapnuyāt |

kāphadoṣā vinaśyanti divyadr̥ṣṭiḥ prajāyate || *gheraṇḍasaṁhītā* (1.51)

Practice of *neti* removes *kapha* disorders and it helps to master over *khecarī mudrā* (Chandra, & Vasu, 1996).

Acc to *haṭhayogapradīpikā*

कपालशोधनी चैव दिव्यदृष्टिप्रदायिनी ।

जत्रूर्ध्वजातरोगौघं नेतिराशु नितिराशु निहन्ति च ॥ हठयोगप्रदीपिका च२ ॥३०फ

kapālaśodhanī caiva divyadr̥ṣṭipradāyinī |

jatrūrdhvajātarogaudham netirāśu nitirāśu nihanti ca || *haṭhayogapradīpikā* (2.30)

Sutra and *jala neti* cleanse the frontal sinuses, bestow perfect vision, and soon destroy the upper region above the shoulders.

On the physical level, irrigation of the nasal mucosa removes accumulated mucus from the nostrils,associated passages and sinuses, allowing air to flow without obstruction.According to *haṭhayogapradīpikā*, *neti* leads to *divya dr̥ṣṭī* or Divine sight. *divya dr̥ṣṭī* is the faculty of clairvoyance which manifests with the awakening of *ajñā cakra*. (Saraswati, 1986).

Indication:

Cold,cough,allergic rhinitis,hey fever,tonsillitis,diseases of earss,eyes,and throat,sinusitis, headache ,cold insesitivity to smell, asthma. Mouth breathing in childern leads to poor memory, concentration and development is overcome by *neti*.

Contraindications:

Haemorrhage, nasal polyps (Saraswati, 1986)

4.Dhauti

Benefits of *Dhauti* according *haṭhayogapradīpikā*

कासश्वासप्लीहकुष्ठं कफरोगाश्च विंशतिः ।

धौतिकर्मप्रभावेण प्रयान्त्येव न संशयः ॥हठयोगप्रदीपिकाचर ॥२५५

kāsaśvāsaplīhakuṣṭhāṁ kapharogāśca viṁśatiḥ |

dhautikarmaprabhāveṇa prayāntyeva na saṁśayaḥ | |haṭhayogapradīpikā (2.25)

As a result of performing , asthma, disease of the spleen and the skin and twenty varities of disease caused by excess of phlegm undoubtedly get cured. (Saraswati, 1986)

Benefits of *Dhauti* according *gheraṇḍasāmhītā*

गुलमज्वरप्लीहाकुष्ठ कफ पित्तं विनश्यति ॥ घेरण्डसंहीताचर ॥४१५

gulamajvaraplīhākuṣṭha kapha pittam vinaśyati | |gheraṇḍasāmhītā (1.41)

Gherandasamhita states that *Dhauti* can cure ailments pertaining to *kapha* , *pitta* and diseases of liver and spleen.(Chandra, & Vasu, 1996).

Contraindications :

Acute fever, visceral infection,stomach or intestinal ulcers,hermia,heart diseases,high blood pressure.

5.Nauli

Benefits according to *haṭhayogapradīpikā*

मन्दाग्नि सन्दीपन पाचनादि सन्दीपिकानन्दकरी सदैव ।

अशेषा दोषामय शोषणी च हठक्रिया मौलिरियं च नौलिः ॥हठयोगप्रदीपिकाचर ॥३४फ

mandāgni sandīpana pācanādi sandīpikānandakarī sadaiva

aśeṣā doṣāmaya śoṣaṇī ca haṭhakriyā mauliriyam canauliḥ | *haṭhayogapradīpikā* (2.34)

It kindles the digest fire, removing indigestion, sluggish digestion and all the disorders of vitiated *dosas*. (Saraswati, 1986).

Indications

Nauli is especially useful in constipation , hyperacidity , diarrhoea,flatulence, depression, hormonal imbalances ,sexual and urinary disorder, laziness, dullness , lack of energy ,and emotional imbalance . It controls one’s appetite and strengthens will-power. (Saraswati, 1986).

Contra indication:

It is contra – indicated in Heart disease, hypertension, hernia, gastric or duodenal ulcers, abdominal surgery (Saraswati, 1986).

6. Basti

Benefits of basti according to *haṭhayogapradīpikā*

गुल्मप्लीहोदरं चापि वातपित्त कफोद्भवाः ।

बस्तिकर्म प्रभावेण क्षीयन्ते सकलामयाः ॥हठयोगप्रदीपिका चर ॥२७फ

gulmaplihodaram cāpi vātapitta kaphoodbhavāḥ

bastikarma prabhāveṇa kṣīyante sakalāmayāḥ || *haṭhayogapradīpikā* (2.27)

Enlargement of the glands and spleen and diseases arising from *vata*(air),*pitta*(bile), *kapha*(mucus)are eliminated from the body through the practice of *basti*. (Saraswati, 1986).

By practicing *jala basti* the appetite increases,the body glows ,excess dosas are destroyed and the *dhatu*s,senses and mind are purified.

धात्विन्द्रियन्तःकरणप्रसादं दद्याच्च कान्तिं दहनप्रदीप्तिम् ।

अशेषदोषोपचयं निहन्यादभ्यास्यमानं जलबस्तिकर्म ॥ हठयोगप्रदीपिकाचर ॥२८फ

dhātvindriyantaḥkaraṇaprasādaṁ dadyācca kāntim dahanapradīptim |

aśeṣadoṣopacayaṁ nihanyādabhyāsyamānaṁ jalabastikarma || *haṭhayogapradīpikā* (2.28)

Practice of *Jalabasti* invigorates the *dhatu*s, the senses and internal organs and gives a sense of well-being.It bestows luster, stimulates digestion and completely destroys all the accumulated diseases. (Saraswati, 1986).

It is to be noted that *Svatmarama* has described only *Jalabasti*.

2.2 SCIENTIFIC LITERATURE REVIEW

AUTHOR & YEAR	SAMPLE DETAILS	INTERVENTION & DURATION	ASSESSMENT	RESULTS	CONCLUSION
(Kekan, 2013)	60 doctors from Mumbai	<i>Kapalbhati</i> ,8 weeks	abdominal Skinfold thickness, body mass index (BMI)	It is observed that body mass index and abdominal skinfold thickness is decreased in the subjects from study group as compared to that of control group at the end of 8 weeks	From this study, it is concluded that Body Mass Index and Abdominal Skinfold Thickness show a decline after practicing <i>Kapalbhati pranayama</i> . So, <i>Kapalbhati pranayama</i> can be practiced regularly to reduce obesity
(Halappa, 2019)	1	<i>Vaman dhouti</i> once in 10 days , for 10 years	Body weight, BMI, and resting blood pressure were also	The significant reduction in the frequency and	By considering the initial short course of AT, it

			<p>measured. The intensity of migraine pain was assessed using a numbered Visual Analog Scale ranging from 0 to 10 (0 rating indicates no pain and a score of 10 suggests worst pain). In addition, the frequency of the migraine attacks was noted down based on the detailed history and referring to the clinical records.</p>	<p>intensity of migraine was observed over a period of 10 years. The patient could live without taking the allopathic medicines during this entire period of 10 years. Moreover, the complete cessation of migraine attacks was observed over a period of time with the regular VD practice.</p>	<p>can be concluded that VD (self-induced emesis) may be one of the long-term control or preventive measures in patients with migraine by reducing the frequency and intensity of migraine attacks over a specified period of time</p>
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<p>(Haldavnekar RV, Tekur P, Nagarathna R, 2014)</p>	<p>40 patients (25 males, 15 females) With chronic low back pain (CLBP) .</p>	<p>Randomly assigned Lsp and Bst session each of duration 30 minutes. Practices was given on either 3rd or 5th day after get admission in center (randomly selection of day)</p>	<p>Oswestry disability index, Eleven point numerical rating scale, Spieldberger's state and trait anxiety inventory, Spinal flexibility.</p>	<p>This was a single blind randomized self as control study with cross over feature, that compared the immediate effect of two yoga techniques, on 40 participants with CLBP. Results were showed significant group * time interaction ($P < 0.01$, Repeated Measures ANOVA) with better improvement after LSP than BSP on all variables</p>	<p>Both yoga practices, namely yoga based physical postures (BST) and yoga based colon cleansing (LSP) have beneficial effects immediately after the practice in patients with CLBP. The LSP is better than BST in reducing pain, disability and anxiety and also in increasing flexibility.</p>
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(Meera et al., 2019)	NIL	NIL	NIL		<p>According to yogic literature, neti is an important shatkriyā which play a pivotal role in managing upper respiratory tract diseases. . We found that only minimal studies were published in indexed journals like PubMed, Scopus and Ayush Portal. Limited available yogic literary works and lack of research were the</p>
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					main shortcomings
(Rastogi & Rastogi, 2007)	1	Jala neti For 10 days twice a day	acute rhino sinusitis	The expulsion of mucous was associated with an instant feeling of relaxation, lightness of head and reduced headache. The symptoms of headache and fever gradually resolved on the consequent days and	Jalaneti, a variant of Nasya therapy of Ayurveda and a common technique in practice at yoga and nature cure setups in India has a long history of its use and benefits associated with this. This is one of the most

				<p>vanished finally during the course of therapy, which continued for 10 days . A re-examination after 10 days of therapy was without any symptom or sign of the preceding disease.</p>	<p>recommended therapies and has proved to be of worth in management of a number of nasal conditions including common cold, sinusitis and allergies of nose.</p>
(Kumar, 2014)	40	Jala neti , 40 days	Optic Nerve Conduction Velocity.	<p>Mean and standard deviation of the experimental and control group for optic nerve conduction velocity level in the subjects are given in table 1. It is observed that there is a positive change in the level</p>	<p>The Neti Kriyā as described in the Ancient Yogic Texts that it gives relaxation to the cranial Nerves related to ENT system. During the Neti Kriyā when the water passes through the</p>

				<p>of optic nerve conduction velocity between both the groups. The significant level for observing the t value is 0.01 and it shows the significant change in optic nerve conduction velocity level as “t” value is 3.52. Thus Hypothesis has been rejected.</p>	<p>nasal passage, it reduces the waste or congested matters from the sinus pockets & also stimulates the nerves passing through the cribriform plate of the ethmoid bone to the olfactory bulb of cranial nerve.</p>
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(Singh et al., 1988)	69 Irritable Bowel Syndrome: 27 ,Anxiety Neuroses:17 , Chronic Renal Failure :8,Thyrotoxicosis: 5, healthy participants:12.	Shankha Prakshalana, Irritable Bowel Syndrome:first 5 days 1 time next 7 days 4 times after weekly 1 time, Anxiety Neuroses: repeated course, Chronic Renal Failure: 5 course in 10 days	Irritable Bowel Syndrome, Anxiety Neuroses, Chronic Renal Failure ,Thyrotoxicosis	Healthy Volunteers: In all 12 normal persons underwent this procedure showed by satisfactory results. (i) Irritable Bowel Syndrome : effect of Shankha Prakshalana, seven variables were taken in to consideration and each variable was assessed before and after treatment. These were – (i) constipation, (ii) vague abdominal pain, (iii) loss of appetite, (iv) vomiting	The statement ‘feels very light and also a sense of rejuvenation in the body’ is based on the personal experience of 57 patients of varying disorders and 12 healthy volunteers who practiced Shankha Prakshalan.
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				<p>tendency, (v) diarrhoea, (vi) irregular bowel habits and (vii) drugs. From the precipitation of the final score value it became obvious that there is significant percentage of relief in patients complaining of constipation and vague abdominal pain 85.71 and 87.37% respectively. Irregular bowel habits and diarrhoeal cases showed a noticeable improvement by</p>	
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				<p>42.85% and 50.00% respectively.</p> <p>40% of the patients, complaining of the loss of appetite were satisfied with an increase in their hunger. As far as vomiting tendency is concerned, only 33% of the cases were relieved and the rest remained status quo. Drug dependency was drastically cut-off, either totally or partially in 57.14% of the cases, thus reducing many</p>	
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				<p>of its side effects and ultimately help developing a drug free life style,</p> <p>Chronic Renal Failure: six patients who were given five courses of Shankha Prakshalana, not much change was noticed in their blood urea and creatinine , Anxiety Neurosis In these patients there was a significant symptomatic relief and a subjective feeling of well being ,</p> <p>Thyrotoxicosis : Shankha</p>	
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				Prakshalana yielded very satisfactory result in all of them	
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Chapter 3

AIMS AND OBJECTIVE

4.1 AIM

The aim of the study is to evaluate the effect of kriyā on physiological parameters on school children.

4.2 OBJECTIVE

To discover the effect of kriyā on body mass index (BMI) in school children.

To ascertain the effect of kriyā on flexibility in school children.

To determine the effect of kriyā on strength in school children.

To determine the effect of kriyā on peak flow rate (PFR) in school children.

4.3 RESEARCH QUESTION

Do kriyā maintain the body mass index in school children?

Do kriyā increase the flexibility in school children?

Do kriyā increase the strength in school children?

Do kriyā enhance the peak flow rate (PFR) in school children?

4.4 HYPOTHESIS

Kriyā may maintain the body mass index in school children.

Kriyā may increase the flexibility in school children.

Kriyā may increase the strength in school children.

Kriyā may enhance the Peak Flow Rate (PFR) in school children.

4.5 NULL HYPOTHESIS

Kriyā may not maintain the body mass index in school children.

Kriyā may not increase the flexibility in school children.

Kriyā may not increase the strength in school children.

Kriyā may not enhance the peak flow rate (PFR) in school children.

Chapter 4

METHODS

4.1 SUBJECTS

4.1.1 Source of Subject

Subjects for this study were recruited from global international school, Arya Nagar, Hisar (Haryana) who enrolled in 8th, 9th and 10th class and have received 21 days kriyā and asana orientation program with age between 13 to 16 years for subject (Y_K group = male =14,female=6,Y group=male =13,female=7,C group= male=14,female=6).

4.1.2 Inclusion Criteria

- Those who were willing to participate in the study.
- Age range between 13-16 years, normal healthy boys and girls.
- Fresh yoga practitioner.

4.1.3 Exclusion Criteria

- Students having any kind of illness and under medication excluded from the study.
- Students those who already had experience of yoga practice.

4.1.4 Ethical Consideration and Informed Consent

The authorized letter and permission for the study is taken from SVYASA yoga university (Bengaluru) and global international school, Arya-Nagar Hisar (Haryana) All students were explained in detail about objectives of the study that involves measurement of physiological parameters (BMI, flexibility, strength and PFR). Also, have been explained about voluntary nature of participation and would not be provided any incentives for their participation. Hence, were obtained informed consent form prior to take data.

4.1.5 Calculation of Sample Size

Previous studies accomplished in the field of *kriyā* was analyzed to calculate sample size. A previous study done on *kapālabhāti* kriyā improves the BMI level having sample size =60 (Kekan, 2013).

G*Power is software that provides effect size calculators and graphics options. It contains also a calculator that supports many central and non-central probability distributions. Sample size N has computed a function of power level and significance level (Alpha). To ensure to get dependable results based on the previous study which used G*Power Analysis, a sample size of 60 (Asana group n = 20, *Kriyā* and asana group n = 20, control group n= 20) chosen.

5.0 4.1.6 DESIGN OF THESTUDY:

The present study is ANOVA study between three groups. School going children were selected for this study. The data for all the three groups were collected between the period of june 2019 and july 2019 from the students of global international school, Arya Nagar, Hisar (Haryana).

4.2 YOGA GROUP

There were 20 students who had been given yoga practices including asana, prāṇāyama and relaxation technique (DRT) for 21 day.

ASANA CHART

1 Starting prayer

2 Sukṣma vyāma (5 min)

(a).Ankle stretch

(b).Feet rotation

3 Wrist rotation (clock wise and anti clock wise).

4 Variation of neck exercise

Neck up and down

Left right

Clock wise and anti clock wise rotation

5 Loosening exercise (10 min)

(a).Lower back exercise: bend your lower back left and right side (5-5 time on both side alternate)

(b).Upper back exercise: put your one hand on another shoulder and push it on back side (twisting exercise) (4-4 time)

(c).Variation of shoulder rotation

(d).Palm stretch (side wise).

(e).Variation of jumping exercise

Leg stretch jumping

Jump with twisting

(f).Variation of leg stretch

Stretch legs (up –down)

Stretch legs (left-right)

(g).Side banding exercise (alternate)

With one hand

Side banding with both hands up

(h).Twist your back with stretch hands.

6 Sun salutation (5 min)

7 Standing asana (8 min)

Tāḍāsana

ardacakrāsana

arda kaṭīcakrāsana

trikonāsana both side

pādahastāsana

8 Sitting āsana (7 min)

(a) bhunamanāsana

(b) uṣṭrāsana

(c) paścimotānāsana and halāsana swing

9. Prone āsana (7min)

naukāāsana

bhujāṅgāsana parvatāsana swing

dhanurāsana

10. Supine āsana (3-3 times)

(a) pavana muktāsana

11 Prāṇāyāma (7 min)

bhastrikā

nāḍī śodhana

12 DRT (Deep Relaxing Techniques) 10 min

13 Closing Prayer (3 time OM chanting)

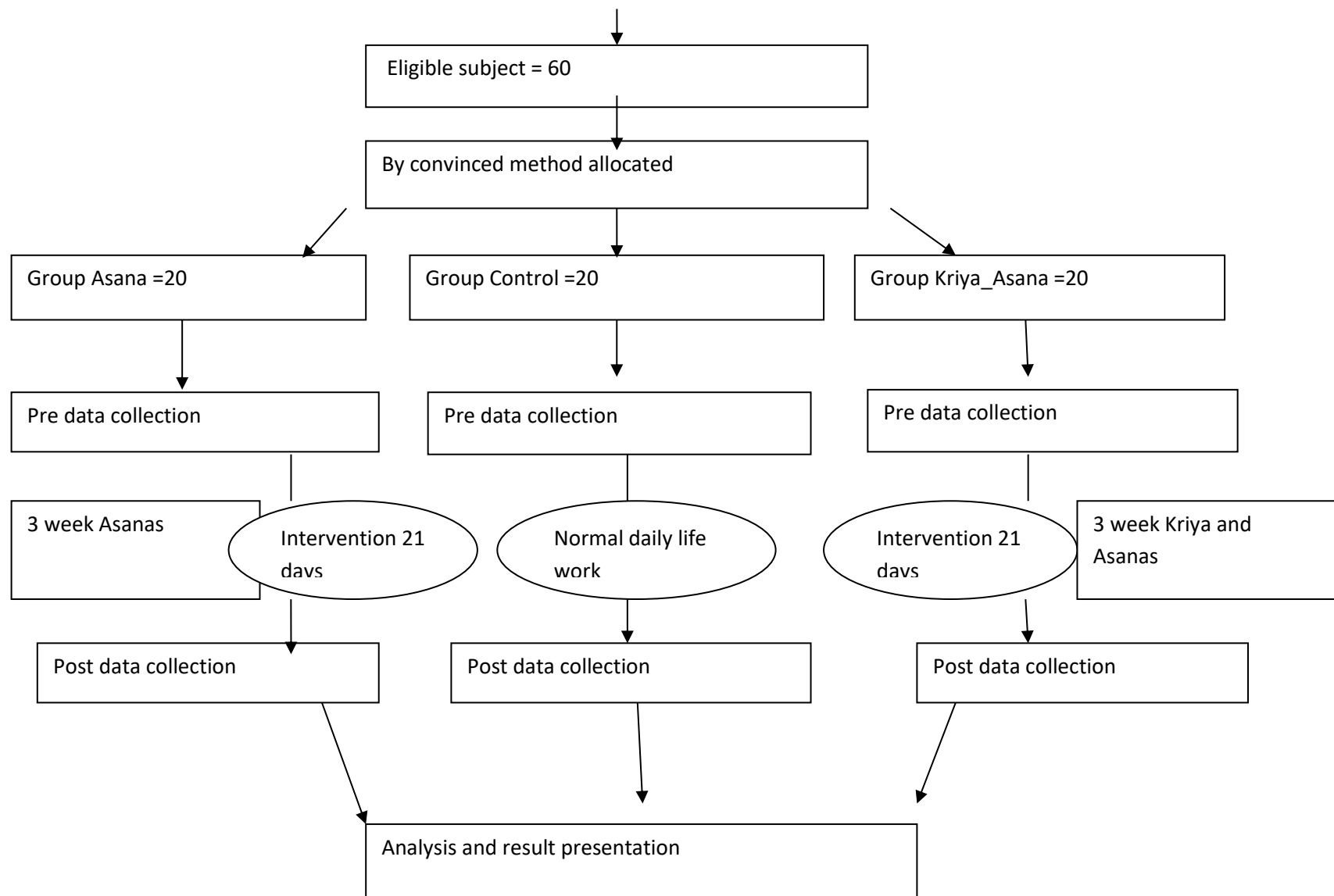
4.3 YOGA AND KRIYA GROUP

There were 20 students who had been given yoga practices including asana, prāṇāyama, relaxation technique (DRT) along with yogic kriyā for 21 day. Same āsana are give to this group also which given to yoga group Kriyā jala neti, sutra neti, vamana dhouti , kapālabhāti , laghu śaṅkha prakṣālana were given 3 times in first week, 2 times in second week and 1 time in third week.

4.4 CONTROL GROUP

In this group 20 students were recruited for the study and made them perform general activities.

Total subject = 60



4.5 MATERIALS AND METHODS

4.5.1 Sit And Reach (SAR)

Sit and Reach used to measure spinal flexibility, has been shown to have positive correlation with hamstring flexibility.(Baltaci et al., 2003) The subject sits on the floor with his legs extended towards the SAR apparatus with the sole of the foot touching the board. Participant then bends forward to his maximum capacity pushing the indicator with his fingers keeping the elbows straight The distance covered is then measured in centimetres.(Tekur et al., 2008)



Sit and Reach

4.5.2 Peak Flow Rate Meter (PFR)

A mini PEFR meter was used to check the PFR of these subjects. The purpose and technique of performing PEFR was explained along with a demonstration of the correct manner of performing the test. When subjects had understood the method and were able to perform correctly, they were made to give the test in the standing position. They were closely observed to ensure that they maintain an airtight seal between their lips and the mouthpiece of the instrument. The highest value of the three readings will be record as the final PFR value. (Holcroft et al., 2003).



PFR

4.5.3 Hand Grip

Hand grip strength were measured using hand grip dynamometer. Subjects were encouraged to perform maximal contractions keeping their arm extended at shoulder level, horizontal to the ground. The test was repeated three times at intervals of 15 seconds independently in both hands and the maximum value obtained was recorded (Madanmohan et al., 2008).



Hand dynamometer

4.5.4 Weighing Machine and Inch Tape

Simple weighing machine and inch Tape were used to measure weight and height.



Weighing machine



Inch tape

Chapter 5

5.0 DATA ANALYSIS

5.1 DATA COLLECTION PROCEDURE

Data collection were done first day and the last day of the intervention with the help of trained persons.

5.2 DATA ANALYSIS

Data analysis was done by using software called “SPSS” Data of (i) flexibility, hand strength, lungs capacity and BMI recorded were tested. Here for the analyses ANOVA test was performed.

Chapter 6

6.0 RESULT

Variables	GROUPS					
	Y		Y_K		C	
	Pre_ Mean±SD	Post_ Mean±SD	Pre_ Mean±SD	Post_ Mean±SD	Pre_ Mean±SD	Post_ Mean±SD
BMI	19.21±3.21	19.95±3.46****	18.09±2.95	18.49±2.89	20.08±4.31	20.85±4.29** *
FLEXIBILITY	10.20±4.09	13.85±3.91*** @	7.35±6.37	16.00±5.64 ***	3.65±5.53	4.80±6.11
STRENGTH	30.55±15.56	31.40±15.05	31.00±14.19*	34.65±15.0 7***	32.10±18.46	38.05±17.31* **
PFR	307.50±67.11	356.00±66.52** *	310.00±67.5 12	400.00±55. 53***	319.50±65.4 1	351.50±66.4 3***

Variables	GROUPS					
	Y		Y_K		C	
	Mean difference	SD difference	Mean difference	SD difference	Mean difference	SD difference
BMI	0.74	0.25	0.40	-0.06	0.77	-0.02
FLEXIBILITY	3.65	-0.18	8.65	-0.73	1.15	0.58
STRENGTH	0.85	-0.51	3.65	0.88	5.95	-1.15
PFR	48.5	-0.59	90	-11.97	32	1

Difference table

The mean of three groups were tested using ANOVA. As the aim of present study is to assess flexibility, BMI, strength and PFR among school going children. The following findings were made within group.

- 1). There is significant change in BMI in yoga group and control group but there is not any significant change in yoga and kriyā group.
- 2). There is significant change in flexibility yoga group and yoga and kriyā group but there is no any significant change in value of control group.
- 3). There is significant change in strength in yoga and kriyā group and also in control group but there is not any significant change in yoga group.
- 4). For the PFR there is significant change in all the three groups.

The following findings were made in between groups

Flexibility is exponential significant in yoga and kriyā group but for the other variables the value is not significant.

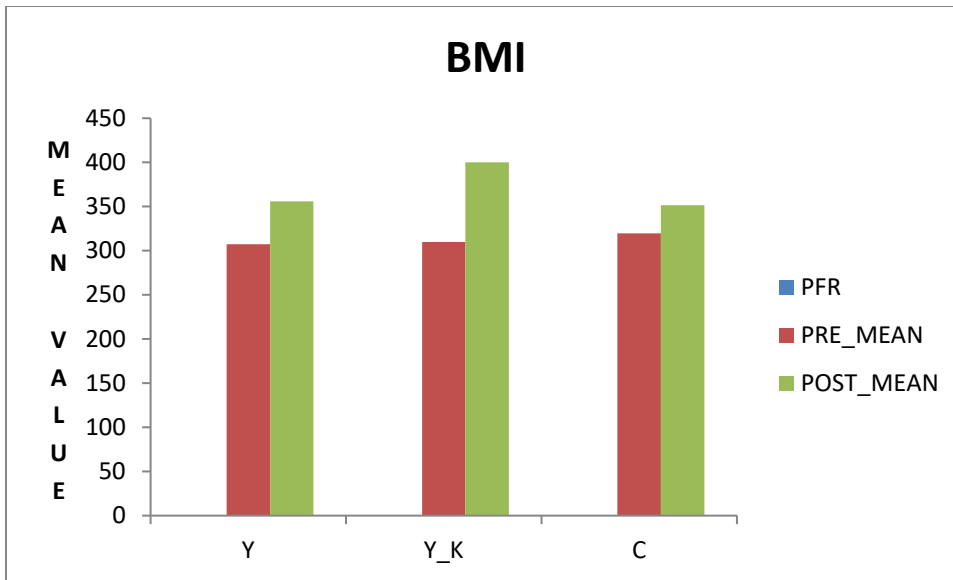


Fig 1 BMI

Legend: Y-Yoga group

Y_K-Yoga _ kriyā group

C-Control group

Fig 1 shows that the BMI mean value of Y,Y_K and C group of pre and post

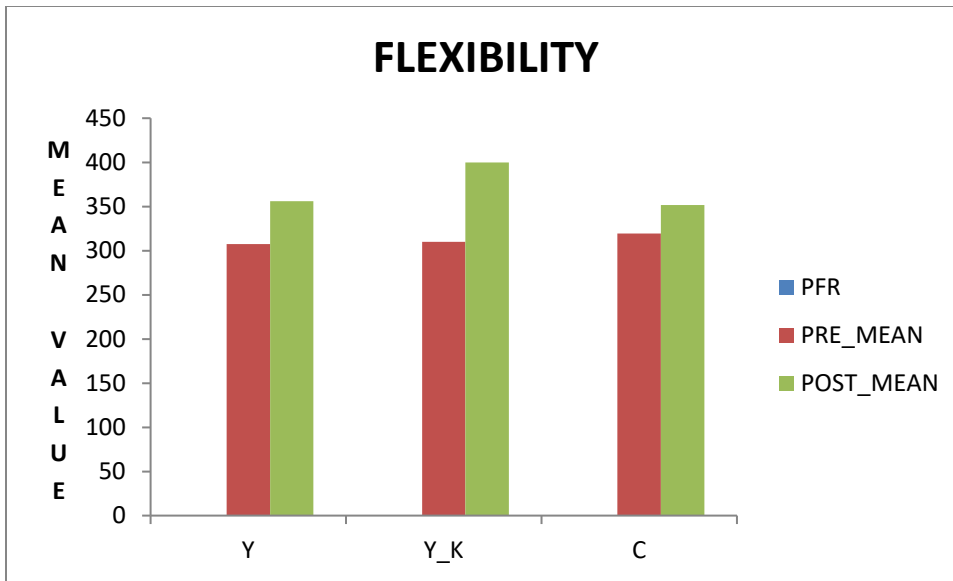


Fig. 2 Flexibility

Legend: Y-Yoga group

Y_K-Yoga _ kriyā group

C-Control group

Fig 2 shows that the flexibility mean value of Y,Y_K and C group of pre and post

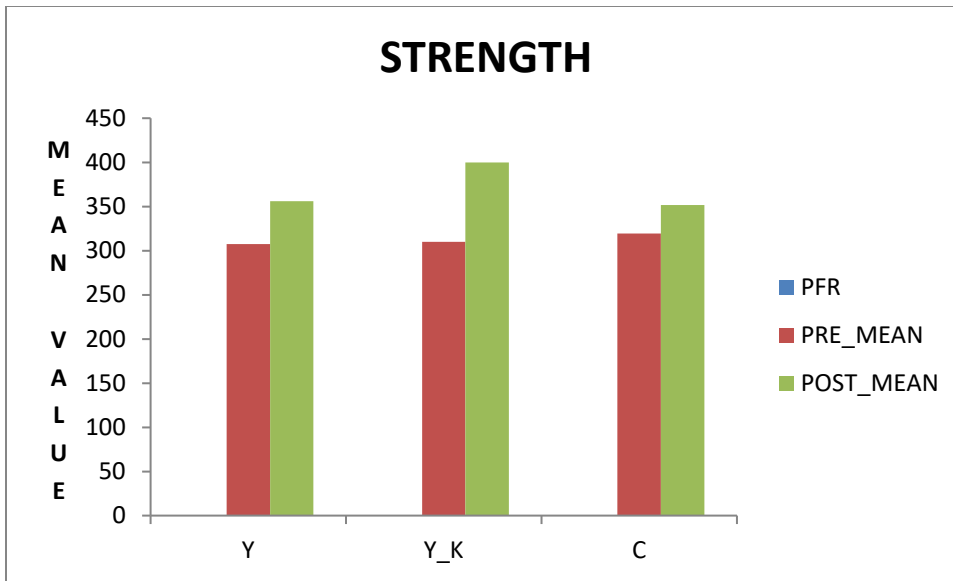


Fig 3

Legend : Y-Yoga group

Y_K-Yoga _ kriyā group

C-Control group

Fig 3 shows that the strength mean value of Y, Y_K and C group of pre and post

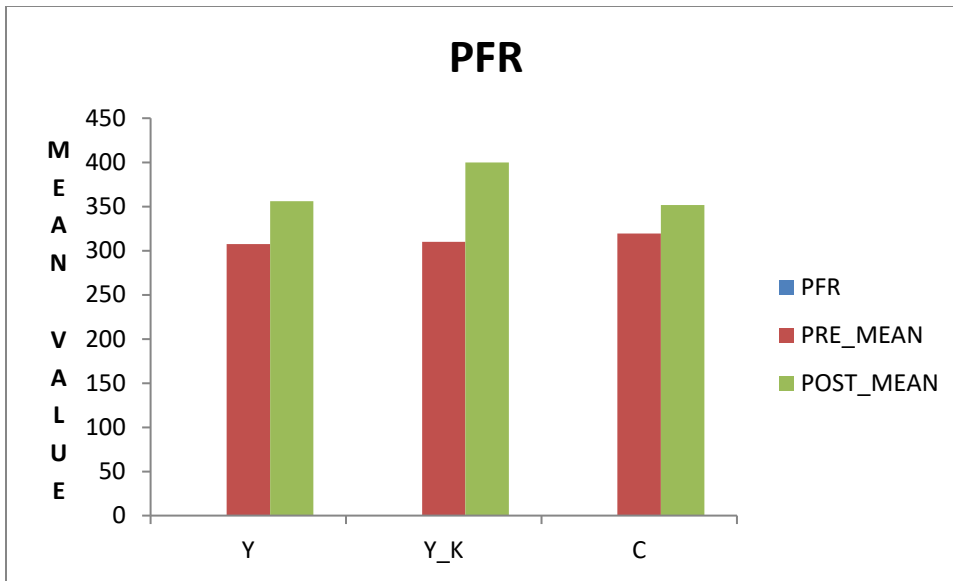


Fig 4

Legend: Y-Yoga group

Y_K-Yoga _ kriyā group

C-Control group

Fig 4 shows that the PFR mean value of Y, Y_K and C group of pre and post

Chapter 7

7.0 DISCUSSIONS

There are many references about significance of kriyās. vāmana dhauti is found to be very effective in migraine (Halappa, 2019). kapālabhāti kriyā found to very useful to reduce the BMI (Kekan, 2013). It was also known that an extensive study on the effect of kriyā on the health is still to be explored.

The mean of three groups were tested using ANOVA. As the aim of present study is to assess flexibility, BMI, strength and PFR among school going children. The following findings were made within group.

- 1). There is significant change in BMI in yoga group and control group but there is not any significant change in yoga and kriyā group.
- 2). There is significant change in flexibility yoga group and yoga and kriyā group but there is no any significant change in value of control group.
- 3). There is significant change in strength in yoga and kriyā group and also in control group but there is not any significant change in yoga group.
- 4). For the PFR there is significant change in all the three groups.

The following findings were made in between groups

Flexibility is exponential significant in yoga and kriyā group but for the other variables the value is not significant.

8.0 CONCLUSION

Research shows that yoga and kriyā effected significant positively on flexibility as compare to yoga and control group in between group comparison. In within group comparison there is significant increase in BMI in yoga group and control group. There is significant increase in flexibility in yoga and yoga kriyā group but there is no significant change in control group. There is significant change in strength in yoga kriyā and control group. For PFR there is significant change in all the three groups.

Chapter 9

9.0 APPRAISAL

9.1 UNIQUENESS OF THE CURRENT STUDY

It is the first scientific study which include more than one kriyā for intervention.

9.2 STRENGTH OF THIS STUDY

The data was collected from a school in Haryana in June month of 2019. Anova is used for this research design.

9.3 LIMITATIONS

The present study is not a randomized control trial. Also the sample size was very less.

9.4 SUGGESTIONS FOR FUTURE

This study can be done on the large scale and on different variables on different diseases.

Chapter 10

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APPENDIX-A PHOTOS DURING DATA COLLECTION









APPENDIX- B-DEMOGRAPHIC DETAILS

SR.NO	NAME	FATHERS NAME	CLASS	GENDER	AGE	GROUPS	DIET	GAME	VILLAGE
1	KRITI	SUBHASH	10	FEMALE	14	Y_K	VEG	NO	ARYA NAGAR
2	PRIYANKA	KRISHAN	9	FEMALE	14	Y_K	VEG	NO	ARYA NAGAR
3	PRIYA	BALBIR SINGH	9	FEMALE	13	Y_K	VEG	NO	ARYA NAGAR
4	MAX NOOR	NARESH KUMAR	9	FEMALE	13	Y_K	VEG	NO	ARYA NAGAR
5	SIMRAN	SURESH KUMAR	9	FEMALE	13	Y_K	VEG	YOGA	ARYA NAGAR
6	KUSUM	SHUBHAS	9	FEMALE	13	Y_K	VEG	NO	ARYA NAGAR
7	SIDDESH	VIJAY SONI	9	MALE	13	Y_K	VEG	VOLLYBALL	RAWALWAS
8	VISHAL	KULDEEP	9	MALE	16	Y_K	NON.VEG	VOLLYBALL	SANJAY NAGAR
9	YASH	HOSYAR SINGH	9	MALE	14	Y_K	VEG	CRICKET	AZAD NAGAR
10	DEEPAK	VINOD KUMAR	9	MALE	13	Y_K	VEG	FOOTBALL	ARYA NAGAR
11	ARYAN	VED PAL	9	MALE	14	Y_K	VEG	VOLLYBALL	AZAD NAGAR
12	HIMANSHU	PARDEEP KUMAR	9	MALE	14	Y_K	VEG	CRICKET	ARYA NAGAR
13	MAHAVISH	SHER SINGH	9	MALE	14	Y_K	VEG	NO	ARYA NAGAR
14	VINIT	BALBIR SINGH	9	MALE	13	Y_K	VEG	CRICKET	ARYA NAGAR
15	RITIK	SUNIL	9	MALE	15	Y_K	NON.VEG	NO	ARYA NAGAR
16	RAHUL	BALBIR SINGH	9	MALE	15	Y_K	VEG	VOLLYBALL	GANGWA
17	HARSH	SANTPAL	8	MALE	14	Y_K	VEG	NO	LUDAS
18	ANKUSH	SATYWAN	10	MALE	14	Y_K	VEG	KABBADI	KIRTAN
19	MANISH	KRISHAN KUMAR	10	MALE	15	Y_K	VEG	KABBADI	ARYA NAGAR
20	SACHIN	SUBHASH	10	MALE	16	Y_K	NON.VEG	FOOTBALL	ARYA NAGAR
21	SUNNY	KARAMBIR	10	MALE	14	Y	VEG	NO	ARYA NAGAR
22	YOGESH	RAMESH	10	MALE	15	Y	VEG	CHESS	ARYA NAGAR
23	PAWAN	HAWA SINGH	10	MALE	18	Y	NON.VEG	HIGH JUMP	ARYA NAGAR

24	PANKAJ	KRISHAN KUMAR	10	MALE	14	Y	NON.VEG	WRESTLING	GANGWA
25	ROHIT KUMAR	MAHABIR	10	MALE	14	Y	VEG	WRESTLING	ARYA NAGAR
26	KHUSHI	RAJKUMAR	10	FEMALE	15	Y	VEG	NO	AZAD NAGAR
27	BABITA	MADANLAL	10	FEMALE	15	Y	VEG	NO	ARYA NAGAR
28	GOUTAM	ANIL	9	MALE	13	Y	VEG	VOLLYBALL	ARYA NAGAR
29	SURENDER	SITARAM	9	MALE	15	Y	VEG	RACE	ARYA NAGAR
30	ANUSHKA	RAKESH	9	FEMALE	13	Y	VEG	NO	ARYA NAGAR
31	RAHUL	PAWAN	9	MALE	15	Y	VEG	ATHELITICS	CHANDAN NAGAR
32	VIVEK	AMARJEET	8	MALE	15	Y	NON.VEG	KABBADI	ARYA NAGAR
33	SARTEENA	DALEEP KUMAR	10	FEMALE	15	Y	VEG	NO	TOKASH
34	HAPPY	BALBIR SINGH	10	MALE	15	Y	NON.VEG	FOOTBALL	ARYA NAGAR
35	ASHISH	BHEEM	8	MALE	13	Y	NON.VEG	VOLLYBALL	ARYA NAGAR
36	TAMANA	ANAND	10	FEMALE	16	Y	VEG	NO	ARYA NAGAR
37	JASVIR	BALWAN	8	MALE	13	Y	VEG	NO	ARYA NAGAR
38	SUSHIL	MAHENDER	10	FEMALE	15	Y	VEG	NO	ARYA NAGAR
39	PRIYA	BALBIR SINGH	9	FEMALE	14	Y	VEG	NO	ARYA NAGAR
40	PANKAJ	SUNDER	8	MALE	13	Y	NON.VEG	KABBADI	HINDWAN
41	DEEPANSHU	SATISH	10	MALE	15	C	NON.VEG	BADMINTON	AZAD NAGAR
42	BHEEM	JAGDEESH	10	MALE	16	C	NON.VEG	NO	PATAN
43	RAJEEV	RAJENDER	10	MALE	14	C	VEG	VOLLYBALL	ARYA NAGAR
44	ROHIT DANGI	AJIT SINGH	10	MALE	16	C	NON.VEG	NO	ARYA NAGAR
45	PAYAL	SATAYPAL	10	FEMALE	14	C	VEG	NO	ARYA NAGAR
46	LUXMI	PURUSOTAM	10	FEMALE	15	C	VEG	NO	ARYA NAGAR
47	LAKSHAY	BIRJLAL	9	MALE	14	C	VEG	VOLLYBALL	ARYA NAGAR
48	MUSKAAN	RAJKUMAR	10	FEMALE	15	C	VEG	NO	ARYA NAGAR
49	KAVI	KRISHAN	9	MALE	15	C	NON.VEG	VOLLYBALL	CHANDAN NAGAR

50	RAJAT	JEET	9	MALE	15	C	VEG	VOLLYBALL	CHANDAN NAGAR
51	ANKIT	BALWAN	9	MALE	15	C	VEG	VOLLYBALL	HINDWAN
52	RAHUL	ANIL	9	MALE	14	C	VEG	VOLLYBALL	ARYA NAGAR
53	ABHAY	ASHOK	8	MALE	13	C	NON.VEG	KABBADI	ARYA NAGAR
54	DEEPAK	SITARAM	8	MALE	13	C	NON.VEG	VOLLYBALL	ARYA NAGAR
55	NAVEEN	SADHURAM	8	MALE	13	C	NON.VEG	NO	HINDWAN
56	KHUSHBU	MUKESH	10	FEMALE	14	C	VEG	NO	GANGWA
57	SAKSHI	DHARMPAL	10	FEMALE	13	C	VEG	NO	GANGWA
58	LALIT	BALBIR	8	MALE	13	C	NON.VEG	KABBADI	ARYA NAGAR
59	NITISH	MANJEET	10	MALE	16	C	NONVEG	VOLLYBALL	ARYA NAGAR
60	KOMAL	KULWANT	10	FEMALE	14	C	VEG	NO	ARYA NAGAR