Chapter II
REVIEW OF RELATED LITERATURE

Sincere efforts have been made by the research scholar to locate the related literature. A brief account of related literature available is given in this chapter.

Literature of review was presented in following section.

YOGA

Bhowmik Sanjib Kumar, Pal Diwakar, Pant Gaurav(2010)¹, exercise and flexibility go hand in hand. It increases the range of motion in joints and also the lubrication in the joints. Apart from stretching the muscles it also stretches the ligaments, tendons and the fascial sheath that surrounds the muscles. The best part of exercise is that it acts on those joints as well, that were never really moved, leave alone exercising. The purpose of the study was to investigate the effect of Vinyasa sun salutation on flexibility among school children. The subjects were 30 boys' students of V. V.M. school, Gwalior. The age of the subjects ranged between 14 to 16 years. The subjects were equally assigned to random sampling procedure into two groups, i.e. experimental group and control group. The experimental group participated in Vinyasa Sun Salutation training programme. The duration of the training programme was six weeks. Quantitative measurements of flexibility with Goniometer (in degrees) for wrist, hip, knee and ankle joints were taken in the beginning and at the end of experimental period of six weeks. Training was given 3 times in a week; each session scheduled for 45 minutes. The significance of mean difference between the pre-test and post-test means of flexibility for wrist, hip, knee and ankle joints were analyzed using t-ratio. The level of significance chosen was 0.05. The experimental group showed significant improvement in overall flexibility as a result of systematic training of Vinyasa Sun Salutation, whereas control group did not show any significant improvement.

Padhi Laxmipriya, Patra Sanjib(2009)², Pranayama is the fourth Anga or limb of Astangayoga. It is one of the important components of Astangayoga. This review article on pranayama will provide valuable information to the readers, as well as, practitioners to have adequate knowledge about the psycho-physiological research done while using pranayama as an intervention. The findings of research studies have been arranged in sequence and with different sub headings.

Chatterjee Sridip, Mondal Samiran(2009)³, The phenomenon of aging can be well understood under the light of modern approaches i.e. Free Radical or Oxidation, DNA Damage, Mitochondrial Decline, Hayflick limit, Telomers, Disposal Soma, Membrane, Radiation, Genetic, Psychological, Neurological, Endocrine and Immunological Theories. The story of Rishi Chyavan is very popular in Indian Mythology. This only confirms that the problem of aging was conceived in ancient India and an appropriate method was invented to counter the process. Yoga is an ancient technique to improve physical, physiological, psychological and spiritual health. Its practices promote the general health and prevent common ailments. This article critically reviews on the causes of aging and role of yoga in its prevention. The search was restricted to original research work (1985-2008) available on Pubmed, Jstore, Science daily, Science direct etc. The scholar identified very few studies which directly focus on role of yoga for successful aging. However, integrated approach of yoga (Yamas and Niyams, Yogic Diet, Cleansing Process, Asana, Pranayama and Dhyana) can face the challenge in health care, improve quality of life and control the aging process successfully.

Sat Bir S. Khalsa(2009)⁴, There is good evidence for cognitive and physiological arousal in chronic insomnia. Accordingly, clinical trial studies of insomnia treatments aimed at reducing arousal, including relaxation and meditation, have reported positive

results. Yoga is a multicomponent practice that is also known to be effective in reducing arousal, although it has not been well evaluated as a treatment for insomnia. In this preliminary study, a simple daily yoga treatment was evaluated in a chronic insomnia population consisting of sleep-onset and/or sleep-maintenance insomnia and primary or secondary insomnia. Participants maintained sleep–wake diaries during a pretreatment 2-week baseline and a subsequent 8-week intervention, in which they practiced the treatment on their own following a single in-person training session with subsequent brief in-person and telephone follow-ups. Sleep efficiency (SE), total sleep time (TST), total wake time (TWT), sleep onset latency (SOL), wake time after sleep onset (WASO), number of awakenings, and sleep quality measures were derived from sleep–wake diary entries and were averaged in 2-week intervals. For 20 participants completing the protocol, statistically significant improvements were observed in SE, TST, TWT, SOL, and WASO at end-treatment as compared with pretreatment values.

Malhotra Varun (2009)\(^5\), Fifty six Type 2 diabetic subjects between the age group of 30-60 years were studied to see the effect of 40 days of Yoga asanas on the following parameters anthropometric, biochemical profile, pulmonary function nerve conduction velocity and electrophysiological study. The duration of diabetes ranged from few months to 10 years. Subject suffering from cardiac, renal and proliferative retinal complications were excluded from the study Yoga asanas included Suryanamskar, Tadasan, Konasan, Padmasan Pranayam, Paschimottansan Ardhmatsyendrasan, Shavasan, Pavanmukthasan, Sarpsan and Shavasan. Subjects were called to the cardio-respiratory laboratory in the morning time and were given training by the yoga expert. The Yoga exercises were performed for 30-40 minutes every day for 40 days in the above sequence. The subjects were prescribed certain medicines and diet. The basal blood glucose, serum insulin, lipid profile, body mass index, malondialdehyde levels (MDA) as an index of lipid peroxidation, cardiac function, p300, nerve conduction velocity of the median nerve was measured and repeated after 40 days of Yogic regime. Another group of 50 Type 2 diabetes subjects of comparable age and severity, called the

control group, were kept on prescribed medication and light physical exercises like walking. Their basal & post 40 days parameters were recorded for comparison. Blood sugars decreased significantly from 208.3 to 171.7 mg/dl. QTc interval decreased implying a sign of longevity. MDA levels decreased signifying a decrease in oxidative stress. Serum Insulin levels normalised indicating a decrease in insulin resistance at the molecular level. Pulmonary function improved after pranayama in our patients. P3 component of ERP showed a decrease in latency from 391.16 to 331.0 msec. Right hand and left hand median nerve conduction velocity increased from 52.81 ± 1.1 m/sec to 53.87 ± 1.1 m/sec and 52.46 ± 1.0 to 54.75 ± 1.1 m/sec respectively. Control group nerve function parameters deteriorated over the period of study, indicating that diabetes is a slowly progressive disease involving the nerves. Yoga asanas have a beneficial effect on glycaemic control and improve neuroendocrine function in mild to moderate Type 2 diabetes.

Bera T. K. (2008)⁶, Research reports, available so far, reveal that the physiological significances of yoga are generally explained in terms of its effects. In fact, the accurate mechanism about how yoga works at physiological level is less known. Although many experts explain various mechanism of yoga physiologically, however many of such explanations are based on assumptions and speculations. In this study, considering the claims of traditional texts, the present researcher has drawn certain cardinal principles based on the physiological findings of scientific researches in yoga.

Galantino, Mary Lou, Galbavy, Robyn Quinn, Lauren (2008)⁷, they completed a systematic review of the literature on the effect of yoga on quality of life and physical outcome measures in the pediatric population. We explored various databases and included case-control and pilot studies, cohort and randomized controlled trials that examined yoga as an exercise intervention for children. Using the Sackett levels of evidence, this article reviews the literature on yoga as a complementary mind-body

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movement therapy. We address the research through three practice patterns according to the Guide to Physical Therapist Practice and provide considerations for the inclusion of yoga into clinical practice. The evidence shows physiological benefits of yoga for the pediatric population that may benefit children through the rehabilitation process, but larger clinical trials, including specific measures of quality of life are necessary to provide definitive evidence.

**Bhogal R.S. (2008)**, Therapeutic applications of Yoga have been evident all over the world. However, the sufficient research data, to establish the scientific bases of the healing/curing mechanism, are not available so far. This article is an attempt to propose a plausible scientific reasoning behind such a mechanism in the light of "Physiology of Traditional Yoga and Meditation" as well as, in the context of "a better body functioning through Yogic interventions." Impact of selected Yoga Practices on various conditions and body organs, along with contra-indications of Yoga practices for certain conditions; have also been proposed in the article.

**Kuvalayananda Swami(2007)**, Intra-oesophageal pressures were seen to be more negative during Uddiyana and more positive during Uddiyana Bandha in comparison to deep inspiration and expiration respectively. The favourable influence of these pressure changes on circulation has been discussed.

**Kuvalayananda Swami, Karambelkar P. V. (2007)**, With controlled diet regimen; no increase in urinary acidity was noted after Bhashrika Pranayama for 45 minutes followed by rest for 15 minutes. One round of Bhashrika consisted of 40 strokes of Kapalabhati in 20 seconds followed by Puraka-Kumbhaka-Rechaka of 10-20-40 seconds followed by next round in the same manner.

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Kuvalayananda Swami (2007)\textsuperscript{11}, Better functioning of nervous system, endocrine glands, circulatory, respiratory and digestive systems through the practice of pranayama and thus vitalizing the human organism is discussed in details and its psychological impact in respect of inner perceptions leading to higher consciousness has been outlined.

Kuvalayananda Swami (2006)\textsuperscript{12}, A gradual evolution of pranayama has been formulated and divided into five important stages. In the first evolutionary stage pranayama invariably meant Antar-Kumbhaka. In the second stage pranayama became independent of religious practices, but during pranayama mental recitation of Gayatri with Vyaha and Pranava and Siras was compulsory along with meditation of Savita (Sun.). Use of pranayama with simplified technique and mental recitation of Pranava for spiritual and mystic goals marked the third evolutionary stage. During the fourth evolutionary stage it became a pure psychophysiological practice. During the Fifth evolutionary stage Hathayogins described eight varieties of kumbhaka emphasising more on the physical rather than the mental aspect. Last but not the least an attempt to co-ordinate pranayama with modern physiology is being made by Kaivalyadhama.

Bera T. K. (2006)\textsuperscript{13}, A conceptual approach towards standardization and evaluation of asanas, based on biomechanical principles and subjective expressions, has been proposed. Using criteria of Yogasana, as found in ancient texts, the evaluation of performance score of a Yogasana (PSY) is suggested by means of the equation: \( \text{PSY} = (\text{SB} + \text{MT}) + \text{SM} \) (where, SB=Stability of Body, MT=Maintenance of Time, SM=Stability of Mind). An innovative instrument for the purpose has also been proposed. The terms Asana and Yogasana have been used synonymously.

Bhole M. V., Karambelkar P. V.(2006)\textsuperscript{14}, Stomach pressure was found to increase from 10 to 100 mm Hg. during the performance of Sirsasana, Sarvangasana, Matsyasana, Halasana, Ardha-salabhasana, Bhujangasana, Ardhamatsyendrasana, Cakrasana, Dhanurasana, Salabhasana, Mayurasana, Naukasana and Yoga Mudra. It varied in different asanas.

Sharma B. R., Sreekumaran T. P., Bhole M. V.(2006)\textsuperscript{15}, A critical study of twenty-one easily available Samskrta commentaries on Patanjala- Yoga-Sutras by seventeen commentators from different walks of life has thrown light on the acceptable as well as controversial points and has indicated areas for further studies, viz.,

1. 'Asana' as envisaged by Patanjali has a strong 'experiential base'.
2. The concept of 'asana' will have to be taken at the level of the citta to understand and follow its experiential nature.
3. As none of the Sutras dealing with 'asana' have any instructional verbs, they cannot be treated at the level of doing" or 'to be done' only, but they require to be understood in the light of 'What is happening?' also.
4. The concept of 'ananta-samapatti' as interpreted by the commentators does not give adequate practical and educational approach to its understanding.
5. Likewise, interpretation of the concept of 'dvandv anabhighbatah' by commentators also seems to be inadequate.

Kuvalayananda Swami (2006)\textsuperscript{16}, Cultural and therapeutical advantages of important asanas based on experimental research and experience have been discussed in the light of modern anatomy and physiology.

Vinekar S. L. (2006)\textsuperscript{17}, Asanas could be done as exercises and as 'postures'. Through the practice of both types of asanas, one can achieve orgnaic and functional

promotion of health and fitness. As postures they work on postural substrate and muscle tone and thus help to develop body awareness through proprioception and vestibular sense. Sensation of ‘pleasant pain; felt by the individual is the limit for developing a particular asana and allowing that asana to work on various systems of the body.

Khire Usha, Bhogal R. S., Walimbe, Gauri, Khaire, Madhurix (2005)¹⁸, Twelve gainfully employed women of age range 25-45 years, in a study of intra-comparative prepost quasi-experimental design volunteered to undergo a well-planned Integrated Yoga Programme, 60 minutes a day for 30 days. The programme comprised Asanas-Pranayama-Omkar-Yoga Meditation, spaced over a period of three months. A significant (t=5.16; p<.001) enhancement in Quality Of Life (part-1) and a favorable yet statistically non-significant (t=2.75; p>0.05) improvement in Quality Of Life (part-2) were observed. However, only a slightly favorable and non-significant enhancement in Work-Efficiency was observed. The correlation between scores on Quality Of Life (QOL) and Work Efficiency (WE) was observed to be largely an average one. Interestingly enough, the scores on prakrti pariksana and the scores on Triguna questionnaire show a better correlation with the scores on QOL and WE, as compared to that between the scores on Personality tests and QOL, as well as, Personality and WE scores, indicating a great potential in nurturing perennial Yogic and Ayurvedic principles for the welfare of the humanity. A significant correlation between the scores on Teja mahabhuta and the scores on QOL & WE seems to support this observation.

Shruddha. S. Kamat ¹⁹ (2004). Correlation of näòës in ancient Indian scriptures and meridians in ancient Chinese medicine. The present study is done to have a comprehensive view of the concepts of näòës and Meridians in the ancient Indian scriptures and the ancient Chinese medicine respectively. The word näòë comes from the Saàskåta root näd, meaning movement. In the Ágvedä, it means stream. In yoga, näòës

¹⁹ http://www.libraryofyoga.com/handle/123456789/432
are the channels of Kuëòaliné energy. Ayurveda mentions 72,000 different näöês. Tantra yoga identifies 14 principle näöês of which the following three namely iòä, Pingalä, and the suçumnä näö are important. Chinese medicine proposes that there are currents of energy in the body, called meridians that are modulated by the effects of yin and yang, and influenced by environmental and emotional effects. There were correlations found between näöês and meridians in regard to various aspects. Energy as Qi and pränä is found in writing of ancient medical guide such as “Yellow emperor’s Guide” in Chinese, and Ayurvedic system in India. The Chinese mode is more synthetic, it tends to see how different phenomena are inter-connected, in Chinese thought, man has never been separated from nature, he is an inseparable part of his environment, the idea is conveyed that human beings are an integral part of nature, but only a small part. The goal is not to dominate nature, but to live in harmony with it. Hence, a relation is found between ancient Indian scriptures and ancient Chinese medicine and hence an overall view of most of the concepts of näöês and meridians are outlined in the study. Further research may be done on the details of the diagnosis of disease based on näöês and Meridians.

PART-II Effect of yoga on the visual memory in school children. The present study assessed the visual memory in school children following general yoga practices. Children (n = 297 whose ages ranged from 10-12 years) were randomly assigned 3 groups. Each group practiced a specific yoga module (Physical stamina = Dynamic practices; Creativity = artwork, crafts, skits; IQ = Special quiz, debate). These techniques were practiced and visual memory was assessed initially and after 9 days. There were 277 children who were got after dropouts and checking for abnormal data and that were taken for assessment. All 3 groups showed significant increase in visual memory (p<0.001, paired sample t-test) but physical stamina showed a higher increase (27.73 % change) than other two groups. The left or right dominant yoga modules have influenced the visual memory more than physical and balancing effects of yoga modules.

Govindarajulu N, Sivanandanam G, Bera T.K. (2004) Reports of yoga training on various biochemical variables among patients are amply available; however,
similar study on nonnal subjects is meager. This study was, therefore, conducted on randomly selected 30 undergraduate (19-23 years) college men. They were observed for a period of 10 weeks in a self controlled study and then exposed to an experimental treatment of yoga training for a period of eight weeks. The training (some compulsory and optional asanas) was programmed for duration of six days per week in the morning and evening sessions of one and half hours for a total period of 10 weeks. Prior to self-control and before and after experimental treatment, the data were collected on Lactate Dehydrogenate (LDH). High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL), and Red Blood Cells (RBC) and White Blood Cells (WBC). Statistical analysis results by ANOVA revealed that there was significant mean gain in the selected biochemical variables.

Ganguly S.K., Bera T.K., Gharote M.L.(2003) 21,This experiment examined the effects of three-year Yoga exercise programme on health related physical fitness and academic achievements of schoolboys, aged 10-13. Physical fitness variables tested were cardiovascular function, body fat percentage, abdominal muscle strength/endurance and flexibility, whereas the variables of academic achievement were the marks secured in theoretical subjects as per the school examination. The subjects participated in the selected Yoga exercise programme 3 days per week for 45 min. per day for consecutively three years. Results indicate that performance on all variables of physical fitness and academic achievement was improved significantly. A comparison of Yoga exercise subjects with a comparable control group revealed significant interaction between treatment and time on all variables. During three year period of experiment, pretest to posttest scores of the yoga exercise subjects tend to improve progressively with faster rate over the scores of control subjects. The results of Pearson correlation indicate that body fat % is inversely related to all the variables of academic achievement, whereas other attributes of physical fitness indicate a low but positive relationship with academic achievement.

Govindarajulu N., Murugesan R., Bera T.K.(2000) Declined health and fitness status of school children has become a challenging problem of research. Many recent investigations indicate increasing trend of severity in health problems that affect overall work capacity of school children. In this study, status of work capacity of elite school players (n=75), age ranged 13-17 years, from some of the schools of Pondicherry (India), was evaluated. Work capacity of 13 years, 15 years and 17 years boys has been compared. Result of ANOVA and follow-up statistics revealed that work capacity varies as age increases. Regular participation in different exercise regimes although helped to improve work capacity, however, the players habitually participating in yogic exercises along with exercise regimes could show higher work capacity. The study suggests benefit in inclusion of yoga in the exercise regimes for exhibiting better performance in school sports.

Bera T. K, Ganguly S. K., Jolly S.R., Gharote M. L(1998) This study examined the effects of three-year Yogic exercise programme on motor functions of school boys, ages 10-13. Variables tested were cardiovascular function, body fat percentage, abdominal muscle strength/endurance, flexibility, balance and grip strength. The subjects participated in the selected Yogic exercise programme 3 days week' with 45min. day' for consecutively three years. Results indicate that performance on all variables was significantly improved (p < 0.01) during the course of study. A comparison of Yogic exercise subjects with a comparable control group revealed significant interaction between treatment and time on all variables except grip strength. During three-year period of experiment, pretest to posttest scores of the yogic exercise subjects tend to improve progressively with faster rate over the scores of control subjects.

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ANTHROPOMETRIC MEASUREMENT

Mridha Sanjib (2010)²⁴, Present study reveals the profile on selected anthropometrical and health-related physical fitness variables of teen-age boys having proficiency in yoga, and also compares the data of present study on the selected variables with accepted standards. Volunteers of this study were top yoga performers in under 14-years (n=10) and under 17-years (n=10) boys' category, who were selected during the State Level Yogasana Championship, 2009. Height and weight were the anthropometrical variables and body mass index (BMI), flexibility, and muscular strength were the health-related physical fitness variables. BMI was measured from weight/height ratio, flexibility - from sit-and-reach test and muscular strength by grip strength. Obtained data were compared with ICMR norms of height, weight and BMI, and for flexibility it was compared with USA President's Challenge Fitness Standard, 2005 (PCFS). Comparing the profiles of under 17-year (Group-A) and 14-year (Group-B) boys with the ICMR norms of height, weight and BMI of same age group, it was observed that height of both groups and weight of Group-A was significantly lower (P< 0.01) than the norm value. However, there was no difference in BMI of both groups and weight of Group-B. Flexibility was significantly low in Group-B, but in Group-A it was significantly high (P<0.05), as compared to PCFS (2005) norm. Strength of Group-A was 59.4 kg (±11.69) and in Group-B it was 32.4 kg (±7.04). Teen-age boys – yoga performers of West Bengal were found lacking in height (both groups), and weight of under 17-year category. But BMI of both groups and weight of under 14-year group is at par with the ICMR norm. Flexibility of under 17-year group is high but in under 14-year group it is low.

Chatterjee Sridip, Mondal Samiran(2010)²⁵, The aim of the present study was to observe the effect of selected yogic exercises on hGH level in a middle aged Indian group. Five middle aged (4 male, 1 female) healthy volunteers (Age: 48.80 ± 7.09 years) were participated in this prospective study. For maintaining homogeneity of the group

anthropo-physiological test: height, weight, body mass index (BMI), grip strength, resting pulse rate, blood pressure, resting respiratory rate and peak expiratory flow rate were measured before and after six weeks of yoga intervention. Basal level of serum hGH were measured prior to and six weeks of yoga intervention programmed by Enzyme-Linked-Immuno Sorbent Assay (ELISA). Single experimental group design was adopted and mean, SD and paired t-test were calculated. All the anthropo-physiological data of pre to post intervention were recoded as: Weight, $P = 0.38$; BMI, $P = 0.52$; Right Hand Grip Strength, $P = 0.57$; Left Hand Grip Strength, $P = 0.66$; Resting Pulse Rate, $P = 0.26$; Systolic Blood Pressure, $P = 0.48$; Diastolic Blood Pressure, $P = 0.84$; Resting Respiratory Rate, $P = 0.0023$; Peak Expiratory Flow Rate, $P = 0.01$. Six weeks yoga intervention produced an improvement in Growth Hormone (pre test: $0.29 + 0.35$ ng/ml vs post test: $0.93 + 1.40$ ng/ml; $P = 0.37$).

Venkatareddy M., Madhavi Sunitha., Raju P.S., Prasad K.V.V. Annapurna N., Vijayalakshmi P. (2003) 30 obese women of age range 19-53, categorized into two groups, as per Body Mass Index (BMI), were exposed to one-hour practice of asanas and pranayamas in the morning for the period of 90 days. A significant reduction ($p<0.05$) in BMI was seen in both the groups. In group II (BMI greater than 35) the reduction was greater as compared to group II (BMI 25-35). Lean Body Mass (LBM), however, did not show significant change in both the groups.

Chaya M.S, Kurpad A.V, Nagendra H.R, and Nagarathna R. (2003) different procedures practiced in yoga have stimulatory or inhibitory effects on the basal metabolic rate when studied acutely. In daily life however, these procedures are usually practiced in combination. The purpose of the present study was to investigate the net change in the basal metabolic rate (BMR) of individuals actively engaging in a


combination of yoga practices (asana or yogic postures, meditation and pranayama or breathing exercises) for a minimum period of six months, at a residential yoga education and research center at Bangalore. The measured BMR of individuals practicing yoga through a combination of practices was compared with that of control subjects who did not practice yoga but led similar lifestyles. The BMR of the yoga practitioners was significantly lower than that of the non-yoga group, and was lower by about 13% when adjusted for body weight (P < 0.001). This difference persisted when the groups were stratified by gender; however, the difference in BMR adjusted for body weight was greater in women than men (about 8% and 18% respectively). In addition, the mean BMR of the yoga group was significantly lower than their predicted values, while the mean BMR of non-yoga group was comparable with their predicted values derived from 1985 WHO/FAO/UNU predictive equations. This study shows that there is a significantly reduced BMR, probably linked to reduced arousal, with the long term practice of yoga using a combination of stimulatory and inhibitory yogic practices.

Niekerk SM., Louw Q., Vaughan C., Grimmer-Somers K., Schreve K. (2003)28, All the reported measures of sitting posture, as well as photographs, have one flaw, as these measures are external to the body. These measures use calculations from external bony landmarks to estimate spinal posture, on the understanding that what is being measured externally reflects the shape, health and performance of structures of the underlying spine. Without a comparative measure of the relative position of the structures of the spine, the validity of any external spinal posture measure cannot be established. This paper reports on a study which tests the validity of photographs to measure adolescent sitting posture. The study was conducted in a laboratory at the Department of Human Biology, University of Cape Town. A random sample of 40 adolescents were recruited from the Cape metropolitan schools, to detect differences of three degrees or more between the repeated measures of upright, normal or slouched posture (photographs) and between the posture photographs and LODOX measures.

Eligible participants were healthy male and female subjects aged 15 or 16 years old, in Grade 10, and who were undertaking Computer or Computype studies at their schools. Two posture measurement tools were used in the study, namely: Photographs were taken using the Photographic Posture Analysis Method (PPAM) and Radiographs were taken using the LODOX (LODOX (Pty) Ltd) system. Subjects' posture was assessed in simulated computer workstations. The following angles were measured: the sagittal head angle, cervical angle, protraction/retraction angle, arm angle and the thoracic angle.

RESULTS: Data from 39 subjects (19 males, 20 females) was used for analysis (17 15-year-olds (7 boys and 10 girls), 22 16-year-olds (12 boys and 10 girls)). All but one photographic angle showed moderate to good correlation with the angles (Pearson r values 0.67-0.95) with the exception being the shoulder protraction/retraction angle Pearson r values. Bland Altman limits of agreement illustrated a slight bias for all angles. The reliability study findings from repeated photographs demonstrated moderate to good correlation of all angles (ICC values 0.78-0.99). The findings of this study suggest that photographs provide valid and reliable indicators of the position of the underlying spine in sitting. Clinically it is important to know whether a patient is showing true progression in relation to a postural intervention. Based on the results of this study, the PPAM can be used in practice as a valid measure of sitting posture.

PSYCHOLOGICAL

Shenbagavalli A., Kumar N.(2010)29, the present study is an outcome of the effect of comprehensive training in astanga yoga on selected psychological variables of orphan children. As the study was intended to focus mainly on the impact of yogic programme, the orphan children between the age group of eleven to fifteen years, staying in the special homes namely Dr. T.S.Soundram and Uzhiyragam orphan homes in Gandhigram, Dindigul District, Tamilnadu, were divided into two groups namely control male and female groups and experimental male and female groups as the equal sample of forty five children, constituting a total sample size of 180 subjects comprising ninety males and ninety females. Based on the review of past studies and in consultation with

the experts in the field of study it was decided to explore the improvement in selected psychological variables namely Self concept and Social Adjustment in orphan children as subjects, by administering the Astangaga yogic programme consisting of Yogasanas, Pranayama and Meditation practices with pre and post evaluation. To find out the significance between the pre and post means of each group "t" tests and Analysis of Covariance was used to find out significant difference between control and experimental groups on the adjusted posttest means of the male and female children on selected psychological variables. Pre test means were used for covariate for statistical analysis. Self concept constructs and Social Adjustment of orphan male and female children had improved significantly.

Bhogal R. S.(2010) 30, Concept of mind and basic Principles of Mental Health, as viewed from Yogic and psychological perspectives, have been discussed before suggesting a practical and synthetic Yoga Module for Health, Happiness and Harmony. In the rest of the paper, mechanism of yogic management of Mental III- Health as well as, related dietary considerations have also been discussed. The author proposes an experiential paradigm for yogic intervention in achieving a sound mental health.

Arun Kumar, Muchhal Mahesh Kumar(2009) 31, The sample of the present study comprised 100 adolescents of 12th class from schools of Moga district. The post test experimental and control group design was followed. There were two groups (control group and experimental group). 50 students (25 male, 25 female) were assigned in each group. The experiment was conducted for 20 days with seven yoga exercise (4 Asana - Suryanamaskar, Sasankasan, bhujangasan, Savasan and 3 Pranayama — Bhastrika, Kapalbhati, Bharamari) regularly in the morning. Emotional Intelligence test developed by Dr. N.K. Chadha was used. Yoga exercise has positive effect on students of emotional intelligence.

Kumar Arun, Kumar Muchhal Mahesh (2009)\textsuperscript{32}, The sample of the present study comprised 120 adolescents of 10th class from schools of Moga district. The post test experimental and control group design was followed. There were two groups (control group and experimental group) 60 students were assigned in each group and average age of the students was 16 years. The experiment was conducted for 30 days with yoga exercises, Satkriyas (Kapalbhati and Trataka), Pranayamas (Anulom-Vilom, Sitali, Sitkari and Bhramari) and Meditation regularly in the morning. Academic stress and its components showed statistically significant reduction due to the yoga module.

Ireland Jae (2009)\textsuperscript{33}, You might love to go to the yoga studio to focus your mind and body, and you might consider allowing your children to do the same. Teaching children to do yoga, or enrolling them in a yoga class can be beneficial to their health. While they should never practice unsupervised, a yoga instructor can show your child how to do the correct poses to result in greater well being. With so many children inactive and gaining weight, yoga may be the right type of exercise to get them moving and active.

A study published in a 2008 Journal of Pediatric Physical Therapy noted that yoga was an effective way to help rehabilitate children who had undergone surgery or been in accidents. Yoga limbers the body through stretching, and researchers found that children who practiced yoga as part of their rehabilitation plan found physiological benefits as opposed to children who did not practice yoga.

Yoga website YogaDelights.com claims that yoga can help with children who have physical impulses or attention problems. Yoga helps train children to focus, meditate and control impulses, channeling that energy into something more constructive. If your child constantly has problems speaking out in class or taking his turn, yoga may be a good way to harness those impulses and make them more manageable.

\textsuperscript{33} www.livestrong.com/article/32273-positive-effects-yoga-children/#ixzz1woL0Ruaw.
Anxiety

Many children suffer from some form of anxiety. Whether they are nervous about school, stressed because of family life or even social situations, yoga can help calm an anxious child. Even simple and specific breathing exercises can be effective when a child isn't in a position to do traditional yoga. She can take the principles from practicing yoga in a studio and apply them in her day-to-day life.

Hyperactivity

Hyperactivity and overstimulation is a problem that many parents battle with daily. Thanks to an age of computers, television, DVDs, video games and wild graphics, it's no wonder that kids can't seem to sit still. Allowing your child to practice yoga gives him the opportunity to participate in an activity that focuses on the inward and uses no props, games or controllers. Even just an hour a week can calm the overstimulation form other activities.

Self Esteem

Children find self esteem when they master a skill. Yoga may be a good choice for boosting your child's self esteem. As she gets better at the poses and more comfortable with her technique, you'll find that she has confidence that rivals any football star or cheerleader. Yoga also places a focus on health and well being, and she'll be able to take time for herself to concentrate on her own health.

Dubey Rakesh, Nayak Alka(2009)\textsuperscript{34}, The statistical analysis of the data gathered on 100 swimmers who are having the problem of Stress and Tension, Frustration, Migraine, Loss of Confidence and Concentration etc who attended 6 months training. Physiological variables i.e. Pulse Rate, Respiratory Rate, Breath Holding Time, Blood pressure and lungs capacity, Reaction Time were carried out by following standardized procedures. In order to determine the effect of asana on different variables. All the

\textsuperscript{34} Rakesh Dubey, Alka Nayak, “Yogic Asanas And Pranayam For Stress, Tension And Migraine”, \textit{International Research Journal} 2(7), 2009, p: 0974-2832
Swimmers under study were randomly divided into two groups. The first group was named as; Control group second was named as Asanas group. The first group was not given any sort of training where as other groups were exposed to asanas. For six months, Asanas exercises Paschimotanasan, Sarvangasan, Uttanpadasan, Bhujangasan, Salbhasan, Bhashrika Anuloma-Viloma Kapalbhati, Brahmri and Udgar were practiced. One-way analysis of variance technique was used and post hoc test was applied to check the significant differences between the pair of groups. The level of significance was fixed at 0.05, which was considered to be the most appropriate. In fact the researcher tried his best to use’ highly sophisticated equipments available in the country to find out the best results. The results obtained for each of the variables. There is no positive type of plan to perfect economic and efficient type of plan of exercise to improve and removal of stress. The purpose of this study was to see the effect of asanas and pranayam on swimmers who are having the problem of Stress and Tension, Frustration, Migraine, Loss of Confidence and Concentration etc. The available literature indicated that other different exercises have positive effect on removal of stress but Shr. Kabalyananda and other experts of yoga have given more emphasis on asanas and pranayam for stress removal. In order to study the effect, 100 swimmers were chosen and were divided into two groups. Subjects of asanas groups were assigned to perform yogic exercises and pranayam while subjects of control group did not perform any particular activity during the assigned time for practice. The practice sessions were held for 1 hour daily for six months under the trained leadership. The obtained data from pre and post tests were, analyzed by one way analysis of variance, which was further subjected to Scheffe’s of Post Hoc test when ‘F’ values, of the groups was found significant. The measurements were taken by most sophisticated equipment available in the country. The positive effects and changes were found in pulse rate, respiratory rate, Blood pressure, reaction time, etc after doing the yoga and pranayama exercise and the changes were found in the behavior of the individual too. The results of the study have indicated that Asanas exercises have proved significantly effective in improving Lungs capacity, Reaction time. Pulse rate blood pressure, Savasana sarvangasana pranayama have proved to be the best for removal of Stress and Tension, Deep breathing have proved to be the best for removal of Frustration, Savasana sarvangasana pranayama have proved to be the best for removal
of Migraine, Bhujangasana sarvangasanas meditation have proved to be the best for removal of Loss of Confidence and Concentration etc. The subjects of asnas group perform better flexibility exercise then the control group. The changes were found in the behavior of asnas group. As they behave very calm at the time of competition. Mean difference between asanas and control groups have proved that yogic exercises are better than normal life style and asnas help to gain improvement in Lungs capacity, Reaction time. Pulse rate blood pressure. Improvement in these variables shows that asanas exercises can increase the efficiency of the subjects.

Shafique Ahmed Mundewadi, Baji, Pradeep, Kamble Prafull, Waghmare, Pradnya (2007)\textsuperscript{35}, The present study was designed to determine effect of Pranayama on parasympathetic nervous system. Fifteen male medical students volunteered to undergo Pranayama training. At the start of study basal heart rate, expiration/inspiration ratio & lying to standing (30th to 15th ratio) tests were determined. The subjects were given training in Kapalabhati, Yogic Savasana, bhashtrika, nadi sudhhi and Bhramari for 45 minute daily for 6 days per week for a duration of 2 months. At the end of training session all three tests were repeated. Results of our study revealed a significant reduction in basal heart rate and increase in expiration/inspiration ratio & 30th/15'h ratio (standing to lying test). This indicates increase in parasympathetic tone. Thus we conclude that Pranayama training shifts autonomic balance more towards parasympathetic, leading to reduction of stress on heart.

Kulkarni D.D. (2006)\textsuperscript{36}, This study was conducted on the yoga practitioners of mixed genders on two separate sets. In Set-A, the group I consists of yoga entrants (n=136) in the age range of 20-40 years having completed yoga course of various duration ranging from 45 days to one year and group II with yoga professionals (n=16) in the age range 40-60 years, practicing yoga at least above five years, whereas in the set B, the group III consists of professional yoga instructors (n=6) teaching yoga at least a decade


and group IV is the control group (n=12) that includes non academic persons in the age group of 25-50 years, were tested for stress response level. The skin millivoltage (Skin mV) response data on four loads (electrical) viz., 10.R, 100RQ, IKQ, and 10KQ, were collected on perceptron instrument. The results of A & B sets showed non-significant decrease in all loads indicating an overall reduction in stress response. However, magnitude wise, the skin mV response in yoga experts of set A and yoga instructors of set B were higher compared to yoga entrants and control groups, inferring better relaxation response. This study concludes that the skin mV response can only indicate the stress response changes. But the skin mV response cannot grade the intensity of stress response.

**Parihar Rakesh, Malhotra Dalip, Sharma Anita (2005)**, In this study, an effort has been made to gauge the effect of 40-day yoga training on concentration and academic achievement of the students who were randomly assigned to two groups viz. Experimental (treatment group with yogic exercises) and Control group (non-treatment group without any yogic exercises). Each group consisted of 50 subjects (Ss) with equal number of boys and girls. The study further aimed at analyzing the differences if any between Experimental and Control group and also between two sexes viz. boys and girls in terms of their concentration and academic achievement. Scores for concentration and academic achievement have been compared for the two groups and two sexes through repeated measure ANOVA of the order of 2x2x(2). 2 factor interactions between group x yoga and gender x yoga in concentration and academic achievement depict that due to yogic exercises, the experimental (treatment group) has been benefited more and in the gender, the effect is more prominent in the girls. This holds good for both concentration and academic achievement.

**Santosh Kumari, Kohli Tehal, Batani Devi (2005)**, The sample of the present study comprised 60 secondary school students, with high academic stress. The pre and

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post test experimental and control group design was followed. There were two experimental and one control group. One group was provided training through shatkriyas and other through Pranayamas. Control group was not provided any training, shatkriyas and pranayamas both have reduced all the components of academic stress of students with equal effectiveness except academic anxiety which was reduced more effectively by pranayama as compared to shatkriyas.

**Bhogal R.S., Oak J.P., Gore M.M.A., Kulkarni D.D, Bera T.K. (2005)**[^39], A month-long Yoga/Aerobic training and 6 monthly follow-up programme revealed a more beneficial effects in the Residential Yoga Group (RYG), in terms of reduction of Anxiety, as compared to Non-Residential Yoga Group and Aerobic Group. This may be credited to good motivation, persistent and regular practice with patience, dietary regulations and full faith in Yoga Therapy. These groups of obese Indians were not the patients of Anxiety Neurosis.

**Vernon A Barnes, Lynnette B Bauza, Frank A Treiber(2003)**[^40], The purpose of this study was to determine the effect of stress reduction via the Transcendental Meditation program on school rule infractions in adolescents. Forty-five African American adolescents (ages 15–18 years) with high normal systolic blood pressure were randomly assigned to either Transcendental Meditation (n = 25) or health education control (n = 20) groups. The meditation group engaged in 15-min sessions at home and at school each day for 4 months. The control group was presented 15-min sessions of health education at school each day for 4 months. Primary outcome measures were changes in absenteeism, school rule infractions and suspension days during the four-month pretest period prior to randomization compared with the four-month intervention period. Comparing the pretest and intervention periods, the meditation group exhibited a mean decrease of 6.4 absentee periods compared to an increase of 4.8 in the control group (p < .05). The meditation group exhibited a mean decrease of 0.1 infractions over the four


months compared to an increase of 0.3 in the control group (p < .03). There was a mean reduction of 0.3 suspension days due to behavior-related problems in the meditation group compared to an increase of 1.2 in

the control group (p < .04). These findings demonstrate that the Transcendental Meditation program conducted in the school setting has a beneficial impact upon absenteeism, rule infractions, and suspension rates in African American adolescents.

Ganguly S.K., Bera T.K, Gharote M.L. (2002), Yoga has received a worldwide popularity today for its multi-faceted application for the humanity. Earlier researches in Kaivalyadhama Laboratory revealed that yoga training brings positive changes in health and fitness by altering psychoneuro-physiological and biochemical variables even for school going children. Looking towards the significant contribution of yoga for school children in India, schools and educational institutions are now advocating its inclusion in the newly formulated educational curriculum. Here, the question arises, whether Yoga helps to improve academic achievement of school children? No research evidence as an answer to this question is available until date. Therefore, Kaivahadhama Research Laboratory has undertaken this project to assess the utility of Yoga training on academic achievement. Fifty residential school boys (IN=50), age range from 13 - 15 years, from Gurukul High School, Lonavla, were divided randomly into two equal Groups viz.. experimental and Control Groups. A long term (3 years) Yoga training to the experimental subjects revealed that selected Yoga routine practised on alternate days in a week could significantly improve overall academic achievements. This result suggests advocating Yoga in educational curriculum as justified.

James A., Raub M.S.(2002), Yoga has become increasingly popular in Western cultures as a means of exercise and fitness training; however, it is still depicted as trendy as evidenced by an April 2001 Time magazine cover story on “The Power of Yoga.” There is a need to have yoga better recognized by the health care community as a

complement to conventional medical care. Over the last 10 years, a growing number of research studies have shown that the practice of Hatha Yoga can improve strength and flexibility, and may help control such physiological variables as blood pressure, respiration and heart rate, and metabolic rate to improve overall exercise capacity. This review presents a summary of medically substantiated information about the health benefits of yoga for healthy people and for people compromised by musculoskeletal and cardiopulmonary disease.

Bhogal R.S. (1998)\(^{43}\) The justification, of the need to understand Yoga from psychological viewpoints, has been attempted so as to perceive the relevance of Yoga Psychology to the modern life and living. Yoga has been proposed as an effective tool for desirable modifications in human personality. The present article, first of the series, delineates the conceptual framework for the proposed role of Yoga in stress, anxiety and emotional disorders.

Brown R.P., Gerbarg P.L.(1997)\(^{44}\), Yogic breathing is a unique method for balancing the autonomic nervous system and influencing psychologic and stress-related disorder. Part I of this series presented a neurophysiologic theory of the effects of Sudarshan Kriya Yoga. Part II will review clinical study, our own clinical observation and guidelines for the safe and effective use of yoga breath techniques in a wide range of clinical conditions. Although more clinical studies are needed to document the benefits of programs that combine pranayama, asanas and meditation there is sufficient evidence to consider Sudarshan Kriya Yoga to be beneficial, low risk, low cost adjunct to the treatment of stress, anxiety, post-traumatic stress disorder, depression, stress-related medical illness, substance abuse and rehabilitation of criminal offenders. SKY has been used as a public health intervention to alleviate PTSD in survivors of mass disasters. Yoga techniques enhance wellbeing, mood, attention, mental focus and stress tolerance. Proper training by skilled teacher and 30 minute practice every day will maximize the


\(^{44}\) RP Brown, PL. Gerbarg, “Sudarshan Kriya Yogic Breathing In The Treatment Of Stress, Anxiety, And Depression, Part II-Clinical Applications And Guidelines”, Columbia College of Physicians and Surgeons, New York, NY, USA.
benefits. Health care providers play a crucial role in encouraging patients to maintain their yoga practices.

Sandra Benavides, Joshua Caballero\textsuperscript{45}, a12-week prospective pilot Ashtanga yoga program enrolled twenty children and adolescents. Weight was measured before and after the program. All participants completed self-concept, anxiety, and depression inventories at the initiation and completion of the program. Fourteen predominately Hispanic children, ages 8–15, completed the program. The average weight loss was 2 kg. Weight decreased from 61.2 ± 20.2 kg to 59.2 ± 19.2 kg (p = 0.01). Four of five children with low self-esteem improved, although two had decreases in self-esteem. Anxiety symptoms improved in the study. Ashtanga yoga may be beneficial as a weight loss strategy in a predominately Hispanic population.

Kauts Amit, Sharma Neelam \textsuperscript{46}, Academic performance is concerned with the quantity and quality of learning attained in a subject or group of subjects after a long period of instruction. Excessive stress hampers students' performance. Improvement in academic performance and alertness has been reported in several yogic studies. The main objective of the study was to assess the effect of yoga on academic performance in relation to stress. The study started with 800 adolescent students; 159 high-stress students and 142 low-stress students were selected on the basis of scores obtained through Stress Battery. Experimental group and control group were given pre test in three subjects, i.e., Mathematics, Science, and Social Studies. A yoga module consisting of yoga asanas, pranayama, meditation, and a value orientation program was administered on experimental group for 7 weeks. The experimental and control groups were post-tested for their performance on the three subjects mentioned above. The results show that the students, who practiced yoga performed better in academics. The study further shows that low-stress students performed better than high-stress students, meaning thereby that stress affects the students' performance.

\textsuperscript{46} http://www.ijoy.org.in/text.asp?2009/2/1/39/53860
PHYSIOLOGICAL

Sugumar C., Raghavan G.(2010), Study reveals the effect of Pranayama practice on breath holding time, blood clotting time, blood pressure and resting respiratory rate of college women players. 24 female students from Dr. Sivanthi Aditanar College of Physical Education Tiruchendur, were selected as subjects randomly as subjects and divided into two groups as Pranayama group (PG) and control group (CG). Breath holding time, blood clotting time, blood pressure and resting respiratory rate were tested at the beginning and end of six-weeks experimental treatment. The collected data was statistically analyzed by using dependent't' test and analysis of covariance (ANCOVA). It was found that there was significant improvement of breath holding time and blood clotting time of PG when compared to the CG. At the same time there was no improvement in blood pressure and resting respiratory rate of PG when compared to the CG.

Gore M.M, Gharote M. L, Rajapurkar M. V(2008), Physiological functions were studied in 12 healthy and trained subjects before, during and after 10 minutes Kapalabhati (KB) on 8 channel polygraph. Heart rate and Eye movements increased and finger pulse volume decreased significantly during KB. No significant change was found in EEG and Blood-pressure. An apneic condition was observed immediately after KB.

Sultana D., Mathew, Gincy, Vipin A.U.(2007), The purpose of the study was to determine the effect of 12-weeks of cycling and pranayama on selected respiratory variables. The subjects of the study were 60 women post graduates studying in Pondicherry University. The subjects were randomly assigned to four groups that is one control group (N=15) and three experimental groups (N=15 each). Group-I practiced cycling, Group-II practiced pranayama and Group-III practiced combination of cycling.

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and pranayama five days a week for a period of 12 weeks. The control group did not participate in any sort of physical activity (cycling and pranayama) during the same period. All the subjects were tested in the selected respiratory variables such as respiratory rate, tidal volume and vital capacity before and after 12 weeks of cycling and pranayama. Respiratory rate was noted by seeing the number of breath per minute. The tidal volume and vital capacity recorded in liter with a standard Spiro meter. The data pertaining to selected respiratory variables were analysed by ANOVA and it concluded that there is a significant change on respiratory rate, tidal volume and vital capacity after the 12 weeks of cycling and pranayama practices.

Kuvalayananda Swami(2007)⁵⁰, Composition of CO₂ in different parts of alveolar air was found to be non-uniform in normal and deep exhalation.

Kuvalayananda Swami(2007)⁵¹, Presupposing uniform metabolism throughout the period of experiments, it was seen that -1) CO₂ % in expired air had a direct relationship with the time of one round of Pranayama kept at 14, 21, 28, 35 and 49 seconds in various ratios from 1:1 to 1:6 for Puraka-Rechaka and 1:1:2 to 1:4:2 for Puraka-Kumbhaka-Rechaka.

2) CO₂ volume, as calculated per unit time proved to be maximum during Pranayama with one round for 14 secs, and minimum when one round was for 49 secs, having ratio of 1:4:2 for Puraka-Kumbhaka-Rechaka indicating either CO₂ retention or decrease in CO₂ production.

3) Inclusion of Kumbhaka was seen to reduce CO₂ elimination.

Kuvalayananda Swami(2007)⁵², Progressive reduction in O₂ consumption and CO₂ elimination was seen during one round of Pranayama of 14, 21, 28 and 35 seconds duration with varying ratios of 1:1 to 1:4 for Puraka-Rechaka and 1:1:2 to 1:2:2 for

Puraka-Kumbhaka-Rechaka. Retention of breath (Kumbhaka) seems to have very little influence on gaseous exchange even though it is highly advocated in different varieties of Pranayama.

Karambelkar P. V., Deshpande R. R., Bhole M. V. (2007)\textsuperscript{53}, Eleven rounds of Bhastrrika each comprising 20 strokes of Kapalabhati with Antar-kumbhaka and 40 strokes of Kapalabhati with Bahya-kumbhaka showed increase in Oxygen consumption and CO2 output. Significant increase in minute ventilation was observed with Antar-kumbhaka while slight decrease was seen with Bahya-kumbhaka.

Karambelkar P. V., Bhole M. V., Gharote, M. L. (2006)\textsuperscript{54}, Electrical activity in muscles was reduced during the maintenance of selected asanas in a relaxed manner while it increased when the same asana was performed in an isometric fasjopm.

Santhanam R. (2006)\textsuperscript{55}, Ten weeks' training in asanas showed a decrease of 4.03 Kilo Cal. per sq.m per hour (i.e. 12.8\%) in a study on 20 sedentary males.

Kesari M. G., Vaishwanar P. S., Deshkar B. V. (2006)\textsuperscript{56}, Effect of two months practice in Yogasanas and Pranayama on urea clearance and creatinine clearance values of 30 male students of Medical College, Aurangabad in the age group of 17 to 20 years was studied. These effects were compared with those of non-yogic exercises performed by similar group of 30 male students of the same age group. At the end of two months period urea clearance and creatinine clearance values of the group performing Yogasanas and Pranayama were significantly raised whereas these values mostly remained unchanged in the group performing non-yogic exercises.

Ghosh S.K.(2006), The purpose of the study was to analyse comparative effect of physical exercises, yogic practices and the combination of both on physiology of human body. To facilitate the study sixty school girls were selected at random basis and were divided into equal four groups, namely only physical exercise group, yogic practice group, the combination group and a control group. The experimental group under took six weeks practice programme (pre-test and post -test were made) for collecting the data. The data were collected on the basis of selected physiological variables, namely pulse rate, respiratory rate and mean arterial pressure. Data were analysed statistically, significant difference in physiological function was observed.

Gore M.M, Kulkarni D.D, Bhogal R.S, Oak J.P, Bera T.K (2005), Forty eight residential school boys, in the age range of 10-15 years were tested for training and detraining effect of yoga on EEG alpha, and autonomic functions. The experimental group (N=24) was given 45 minutes yoga intervention daily for 45 days. The control group did not receive any training. The trend of results in Experimental Group showed increase in alpha index by 10%, in Heart rate (PR) by 7 beats / min and in PEER by 11 liters / min. There was no change in BP and respiration rate decreased by 2 breath / min in comparison to detraining phase. There was nonsignificant drop in alpha index by 30 - 32% and reduction in HR by 7 beats / min. Systolic and Diastolic BP reduced by 7 and 4 mmHg. The Control group (N=24) showed non-significant changes. This suggests that the yoga training leads to improved autonomic functions, physiological arousal and better attention required for the optimum learning efficiency.

Suarez-Rubio S. (2005) 59, Scientific research on the practice of Yoga has focused on its physiological effects, with particular attention to its alleged ability to ameliorate physical diseases and psychological disorders. The ultimate purpose of Yoga, however, is to bring about a different level of awareness, characterized by holisic physical, cognitive and spiritual changes. This study introduces a 34-item test that demonstrates interconnectedness of these three areas. The test is also used to test the hypothesis that individuals who show coherence in their brain hemispheric preferences attain higher scores in these areas. It is suggested that this may be the result of contemplative practices.

Shenbagavalli A. (2005) 60, This study was designed to analyze the effect of the selected yogic exercises on the Cardio Vascular Endurance and Body fat percentage of the individual. To achieve this purpose, the subjects were selected randomly from the Chidambaram Chettiar Girl's Higher Secondary School, Kottaiyur. Total of 60 students were selected randomly and they were divided into two groups of 30 each. Group I was treated as experimental and group II was considered as control group. The initial reading was taken for both the groups by measuring their height, weight, skin fold measurement and cardiovascular efficiency. The Cardio vascular Endurance was measured by using the Harvard step test. For Body fat percentage skin fold measurements were taken at the biceps, triceps, sub scapular and supra-iliac sites. The experimental group was progressively introduced to the selected yogic exercises given in the National Fitness Corps syllabus published by government of India in 1965. The practice session was conducted for 30 minutes on all days except Sundays for a period of six weeks. After six weeks the post test measurements were taken. The difference in the percentage of subjects improving in the experimental group and the corresponding control group was tested for significance of difference by computing the 't' ratio. It was concluded that the practice of the selected yogic exercises helped to increase the physical efficiency index derived from the Harvard step test score which was the indication of the improved Cardiovascular efficiency. There was no change in the height, and weight after the experimental treatment. Body fat percentage did not show any significant reduction and changes in body density were also not found to be statistically significant.

Gore M. M.(2005)\textsuperscript{61}, 6 weeks yoga training was observed beneficial to 5 young weight lifters in the experimental group in comparison to 5 young weight lifters of the control group in respect of the improvement in Chest circumference, Blood pressure, Peak expiratory flow rate and Pulse rate.

Gore M.M.(2004)\textsuperscript{62}, Blood pressure (BP) and Pulse Rate (PR) were studied before and immediately after 10 rounds of Anulom Vilom pranayama in four different conditions on eight male volunteers who were beginners or fresh students of yoga. Four conditions were: (1) without kumbhaka as well as time ratio; (2) without kumbhaka but with time ratio of 1:2:2; (3) with kumbhaka and time ratio 1:2:2 and (4)with kumbliaka, three bandhas and time ratio of 1:2:2. Results showed that in condition No.1 there was insignificant reduction in BP and increase in PR. In condition No.2 also, an increase in systolic BP by 8.7 mmHg was nonsignificant (p>0.05), where in condition No.3 an increase in SBP by 5.3 mmHg was significant (p<0.05) and in condition No.4 BP increased but not significantly (p<0.10) by 6.8 mmHg. Marginal increase in PR by 3 beats/min was nonsignificant. The increase in BP due to practice of kumbhaka, bandhas and specific time ratio was found within the normal range and therefore the traditional technique of Anulom Vilom pranayama (condition No.3 and 4) are 'physiologically safe' even for the beginners.

Ranee R., Badami S., Krishnaswami R., Krishnamurti H.(2004)\textsuperscript{63}, The present study comprised of 18 children with Developmental Disabilities in the age group of 10.5 years to 16. In methodology, time series design was adopted. A multi disciplinary team was involved in designing and conducting the program. The intervention appeared to

bring about positive changes in Chest Expansion and Peak Expiratory Flow Rate [PEFR], Heart Rate, and Blood Pressure. Overall condition of CP children showed improvement with respect to muscle tone, coordination, posture, standing and sitting balance and mobility. Learning abilities showed considerable improvement in Retention and recall [memory] of verbal information, verbal comprehension and processing as well as visual imagery and to a lesser extent in motor coordination and visual perception. The study concludes that Yoga has a beneficial effect on children with Developmental Disabilities by reducing stress, improving respiration and neuro-muscular functions, and learning and psychosocial abilities. Further studies are required to standardize yoga therapy for challenged children.

**Ghosh S.K.(2003)**

Sixty subjects, age ranged from 13-15 years, were randomly divided into four groups of equal number: physical exercise group, yogic practice group, combined group and a control group. The experimental groups underwent twelve weeks treatment programme. Both pre-test and post-test were made for the collection of data. The data collection was made on the selected physiological variables, namely, pulse rate, respiratory rate, breath-holding time and mean arterial pressure. The results of Analysis of Covariance (ANCOVA) followed by the Scheffe's test showed significant decrease in all the groups except control group. Between combined group and yoga group, physical exercie group and yoga group a significant difference in paired adjusted final mean is seen. But there was no significant difference in pulse rate in combined group when compared with the physical exercise group.

**Govindarajulu, Tiroumourougane K., Bera T.K. (2003)**

Sixty high school boys, age ranges from 14 to 16 years, volunteered in this study. The sample consists of athletes (n1=20), non-athletes (n2=20) and controls (n3=20). Both the athletes and non-athletes were subjected to eight weeks training of yogic practices along with participation.

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in daily school programme. The control group did not participate in the said yoga training, however participated in daily routine programme in the school. Prior to and after the training programme the subjects were assessed for blood pressure, vital capacity and cardiorespiratory efficiency. The data collected from all the three groups were statistically analysed by ANOVA. The results revealed significant mean differences in the criterion variables were higher in athletic group as compared to non-athletic and control groups.

The vital capacity of the lungs is a critical component of good health. Vital capacity is an important concern for those with asthma, heart conditions, and lung ailments; those who smoke; and those who have no known lung problems. Using the Spiropet spirometer, researchers measured vital capacity. Vital capacity determinants were taken near the beginning and end of two 17-week semesters. No control group was used. Midwestern university yoga classes taken for college credit. A total of 287 college students, 89 men and 198 women. Subjects were taught yoga poses, breathing techniques, and relaxation in two 50-minute class meetings for 15 weeks. Vital capacity over time for smokers, asthmatics, and those with no known lung disease. The study showed a statistically significant (P < .001) improvement in vital capacity across all categories over time. It is not known whether these findings were the result of yoga poses, breathing techniques, relaxation, or other aspects of exercise in the subjects' life. The subjects' adherence to attending class was 99.96%. The large number of 287 subjects is considered to be a valid number for a study of this type. These findings are consistent with other research studies reporting the positive effect of yoga on the vital capacity of the lungs.

**Palsane M. N.(1998)**, The history of the last four hundred years in Europe has been a simultaneous growth in political freedom, economic prosperity, intellectual
advancement and social reform; but it has also been a slow and sure decay of traditional
religious morality and social order. The other orientation cultivated through religion
and philosophy over the millennia has been lost in just four hundred or less years. The
psychological benefits of Yoga include - (1) impulse control, cultivation of an attitude of
detachment, gaining control over the excitation and its potential fall out, thereby
maintaining neurophysiological balance; (2) meditation is useful in clarifying goals and
resolving internal conflicts. Motivational and attitudinal orientation of the prescription in
Yamas and Niyamos are such as to take care of most of the stress producing situations in
life; (3) Yoga provides a rational and empirical system of thought and living. Anything
that causes disturbances can be examined in the light of yoga; (4) in Yoga like modern
psychotherapies de-emphasising of ego involvement is prescribed for many abnormal
conditions, anxieties and stresses; (5) "Freedom from bondage" in yoga signifies one's
liberation from all kinds of fixations and attributes as well as continual feeling of freedom
and knowledge.

Balasubramanian Bhawani, Pansare M. S. (1991)68, Aerobic Power ("02 max)
and anaerobic power were estimated in medical students before and after six weeks of
yogic training. A significant increase in aerobic power and a significant decrease in
anaerobic power was observed. This may be due to conversion of some of the Fast
Twitch (F.T.) muscle fibres into Slow Twitch fibres (S.T.) during yogic training.

68 Bhawani Balasubramanian, M. S. Pansare, “Effect Of Yoga On Aerobic And Anaerobic Power Of