Chapter 2

Review of Related Literature

Introduction

Sincere efforts were made by the research scholar to locate literature for this study. The relevant study from various sources, which the research scholar had come across, are cited below. The researcher reviewed various Ph.D. M. Phil. and M.Ed. (Physical Education) research dissertations which were related to the study. Review of literature helps the researcher establish a link between the known and the unknown, the past and the present. In fact, the examination and explanation to the research in literature are the sources of motivation and clarification to the research worker. In this chapter various reviews are noted which will throwlight on the effect of Suryanamaskar, Breathing exercises and Omkar chanting on swimming performance.

Reviews taken were from books and scientific journals. Attempt has been made to report a few studies related to the problem. The related reviews were divided into following groups

i. Reviews related to Suryanamaskar  
ii. Reviews related to Breathing Exercises  
iii. Reviews related to Omkar Chanting  
iv. Reviews related to Swimming Performance  
v. Reviews related to Statistical Methods
2.1 Reviews related to Suryanamaskar

Suryanamaskar has advantages and no side effects. (www.yogapositions.co.in) In fact, each of the 12 postures of Suryanamaskar renders the body limberness and strength coupled with mental peace. Moreover, many ailments can be cured by performing the well-coordinated movements of Suryanamaskar. The breathing is cleared, concentration power increases and the entire physiology gets invigorated.

Paresh D. Trivedi, (Trivedi, 2013) a research scholar from Rajasthan, explained various benefits of Suryanamaskar such as stretching and toning of muscles keeping them supple and flexible, and increase in the spine and waist flexibility. The various yoga postures of Suryanamaskar along with Pranayama help to achieve core stability or the strengthening of back muscles around the spine and diaphragm more easily and effortlessly.

Dr. Milind Modak stated in his book, ‘Suryanamaskar’ (Modak & Joglekar, 2010) that due to Suryanamaskar blood supply from heart increased from 5 litres to 25 litres per minute, free fatty acid in blood reduced and increased breathing and blood supply capacity.

Dr. Nitin Unkule (Unkule N., 2014) stated in his book about Suryanamaskar that benefits of doing Suryanamaskar include strengthening of spinal cord muscles, also due to stretching during doing Suryanamaskar, peripheral motor nerves get excited, all joints remains flexible.

The study about ‘effects of Yoga training on cardio-respiratory functions of school children of Pondicherry’(Madanmohan & Gopalkrushnapal, 2002) was
done with objective to study the effects of six months training in yogic breathing and postures on cardio-respiratory functions of school children of Pondicherry and to study the effects of six months training in Suryanamaskar on cardio respiratory functions of school children of Pondicherry. 84 students from 8th standard were samples and they were randomly divided into four groups. One group was doing Yoga and Pranayama, second was doing fast Suryanamaskar, third was doing slow Suryanamaskar and the last group was control group. Different parameters were tested for cardiovascular function; anthropometric measurements, heart rate, strength and blood pressure before and after six months study period. Yoga as well as Suryanamaskar training produced significant improvement in strength, endurance and pulmonary function. This study showed that yoga training of six months improves endurance, pulmonary function and cardiovascular system to survive stressful stimuli.

In a ‘comparative study of Yogasanas and Gymnastic Activities on Flexibility of School Boys’, (Thakur, 2013) rationale of the study was to find out the effects of Yogasanas and gymnastic activities on flexibility. One hundred and fifty (N=150) school boys of Howrah district, West Bengal state were randomly selected as subjects for the study. The age limit of the subjects was 10-12 years. All the subjects were divided into three equal groups such as Gr. Y (n=50), Gr. G (n=50), Gr. C (n=50). Gr. Y and Gr. G were experimental groups and Gr. C was control group. Initially all the flexibility measures of different parts of the body such as wrist flexion, wrist extension, elbow flexion, spine flexion, trunk flexion, knee flexion, ankle dorsal flexion and ankle planter flexion were tested
for all the subjects of each group and thereafter specific yogic treatment and
gymnastic activities were implemented on Group Y and Group G respectively
for four days in a week and continued for a period of one year and finally the
subjects were retested on criterion measures. The data was analysed by t-ratio
to find out the effects of the treatment. The investigator has also made an
attempt to measure the superiority among experimental groups. The result of the
study showed that all the flexibility measures such as wrist flexion, wrist
extension, elbow flexion, spine flexion, ankle planter flexion, knee flexion,
ankle dorsal flexion and trunk flexion improved significantly among the
subjects of Group Y and Group G after one year treatment. In comparison
among experimental groups, Yogasanas were superior to gymnastic activities
for improvement of wrist extension, spine flexion, trunk flexion and ankle
dorsal flexion whereas gymnastic activities were superior to Yogasanas for
improvement of wrist flexion. No superiority was observed among Yogasanas
and gymnastic activities for development of elbow flexion, knee flexion and
ankle planter flexion.

To determine whether a typical yoga practice meets the current
recommendations for levels of physical activity required to improve and
maintain health and cardiovascular fitness, (Hagins, Moore, & Rundle, n.d.)
Hagins, M. et. al. conducted an observational study on twenty yoga
practitioners of age 31.4 years. Scholars concluded that metabolic costs of yoga
do not meet recommendations for levels of physical activity for improving or
maintaining health or cardiovascular fitness.
On related terms, (Sinha, Ray, Pathak, & Selvamurthy, 2002) Sinha et. al. undertook the study to observe critically the energy cost and different cardio respiratory changes during the practice of Suryanamaskar. 21 males sample from Indian Army practised yoga for three months duration. Suryanamaskar seemed an ideal aerobic exercise as it involves both static stretching and slow dynamic component of exercise with optimal stress on the cardiorespiratory system.

In a one year controlled study, the integrated approach of yoga: a therapeutic tool for mentally retarded children, (Uma, Nagendra, Vaidehi, & Seethalakshmi, n.d.) Uma K. et al conducted this study on 90 mentally retarded children. Duration was one academic year. Control and experimental group were prepared. This study shows the significance of yoga as an effective therapeutic tool in the management of mentally retarded children.

In a study ‘Why every athlete should need yoga’, (Hiremath, 2013) researcher stated that every athlete irrespective of sport or discipline has the potential to enhance their ability by adopting a regular Yoga practice. Today’s top athletes have a unique ability to consistently perform at their highest potential in comparison to their competitors. For high school, college and professional sports, most athletes are very similar in physical abilities, so how are some athletes able to consistently dominate their competitions. The most important benefit of Yoga is physical and mental health therapy. The aging process, which is largely an artificial condition, caused mainly by auto-intoxication i.e. self-poisoning, can be slowed down by practising yoga, by keeping the body clean,
flexible and well lubricated. According to a medical scientist, yoga therapy is successful because of the balance created in the nervous and endocrine systems, which directly influences all other systems and organs of the body. Yoga acts both as curative and preventive therapy. The very essence of yoga lays in attaining mental peace and improved concentration powers. Through the practice of yoga we become aware of inter-connectedness between our emotional and physical levels.

While studying Yoga and Physical, Mental, Spiritual Health, (Magar & Mhaske, 2013) health is the basic requirement to enjoy life and have peace. Peace and satisfaction in life can be fulfilled by practicing Yoga. Yoga is not only curative but precautionary too. It refreshes and relaxes our body. Yoga aims at complete self-development and total self-realization. Health plays a very important role in modern life. Today a man is called healthy only when he is fit. Fitness includes the realms of mental, moral, social, and emotional fitness as well. Health and fitness both aspects can be attained by proper exercise. Practice of Yoga and physical exercise in the fresh air and sunshine, sleep, well-chosen food and proper care of the body, all these help us to maintain out health fitness. This paper explains the role of Yoga and physical exercise in making everyone healthy which will be useful for self-development. It also explains the benefits of various types of Asana.

In the study, importance of Suryanamaskar for a Healthy Life, (Buchha) researcher stated that recently many people are turning towards Yoga to get rid of physical problems and found Suryanamaskar a simple, yogic exercise that
provides immense health benefits. Suryanamaskar is a sequence of yogic postures along with chants that together comprise a complete yoga called Suryanamaskar (Sun Salutation). It is also a worship system of worshipping Surya and has been practised in India for thousand years. It is a combination of twelve poses in series with graceful movement.

Cheryl Fenner Brown and JoAnn Lyons, (Brown & Lyons, 2011) suggested in American Bone Health Yoga sequence, rationale of Suryanamaskar that it was excellent and dynamic series that stimulates bone in the spine, the hip and the wrist.

In an attempt to interpret knowledge about Influence of Suryanamaskar on Human Body, (Urs, Nandar, & Raj, n. d.) yoga has power of offering a holistic mind, body and soul therapy. Yoga is incredible in terms of stress management. Stress is an important factor in the causation of heart disease. It brings a person back to homeostasis. For people who have anxieties of many kinds, yoga helps lower their basic physiological arousal level. For the general person, yoga greatly enhances mental health: mood, sense of self, motivation, sense of inner direction and purpose, as well as physical health. And physical health is so important for mental health. Suryanamaskar is a series of twelve physical postures. These alternating backward and forward bending postures flex and stretch the spinal column through their maximum range giving a profound stretch to the whole body. Suryanamaskar helps to promote sleep and calmness, improves muscle flexibility, strengthens abdominal muscle and improves the human organ capacities.
The study about effects of Suryanamaskar on cardio vascular and respiratory parameters on school students, (Kumar, Sivapriya, & Thirumani, 2011) the researchers stated following points. Modern medical science has started to study the effects of Suryanamaskar and yogic techniques. With increasing scientific research in Suryanamaskar and Yoga, its therapeutic aspects are explored in wide angle. In Yoga the sun is represented by suryanadi, the pranic channel which carries the vital life- giving force. Suryanamaskar is the combination of Asana and Pranayama. Suryanamaskar has been integrated into physical education in many public and private schools across the country. The ultimate goal is to improve the physical health and increase the quantity of sportsmen with effective cardio respiratory efficiency. Method used for this study was designed to evaluate the effects of 45 days daily practice of Suryanamaskar on blood pressure (BP), heart rate (HR), respiratory rate (RR), forced vital capacity (FVC) and peak expiratory flow rate (PEFR) in school students of both sexes. 115 school students aged 10 to 14 years were recruited for the study. The participants were trained to perform Suryanamaskar for 45 days study period. The cardiovascular and respiratory parameters BP, HR, RR, FVC and PEFR were measured before and after practice of Suryanamaskar. The results showed that the Systolic blood pressure, PEFR and FVC increased significantly and RR, HR and diastolic blood pressure decreased significantly after the practice of Suryanamaskar. Conclusion was that the beneficial effects of Suryanamaskar can be applied to all schools to improve the physical health and sports activities of the students.
To see the effects of Suryanamaskar, Yoga practice on resting heart rate, blood pressure, flexibility and upper body muscle endurance in low to moderate active adult males and females, (Shankar & Pancholi, 2011) authors stated the following aspects. 80 subjects of age group 18-40 years were randomly assigned to either a yoga or control group. Two weeks of interventions were executed. Results were tested with the post-hoc t test, significant increase in flexibility and push ups and decreased blood pressure in yoga group was seen.

In similar way, B.S. Mody stated acute effects of Suryanamaskar on the cardiovascular and metabolic system (Mody, 2010). Sample was 60 males and females, period of intervention was over two years. Conclusion was that regular practice of Suryanamaskar may maintain or improve cardio respiratory fitness.

Likewise, a pilot study to see the effects of Suryanamaskar practice on cardio-respiratory fitness parameters (Bhutkar, Bhutkar, & Taware, 2008) in Solapur, Maharashtra was repeated. Researchers conducted the study on 78 subjects for six months. Finding was, Suryanamaskar practice can be advocated to improve cardio-respiratory fitness for healthy individuals.

To study the effects of Nadi-shodhan Pranayama and Suryanamaskar on pulmonary functions (Fareedabanu & Shetty, 2012), scholars collected data from 50 young healthy students aged 18-24 years for 3 months. This study suggests, practicing of both Nadi –shodhan Pranayama and Suryanamaskar can produce significant improvement in pulmonary functions by increasing respiratory muscle strength and endurance.
The study ‘Immediate effects of Suryanamaskar on reaction time and heart rate in female volunteers, (Bhavanani, Ramanathan, & Balaji, ND) Suryanamaskar (SN), and a yogic technique was composed of dynamic muscular movements synchronized with deep rhythmic breathing. As it may have influence on Central Nervous System (CNS), this study planned to investigate immediate effects of SN on reaction time (RT) and heart rate (HR). 21 female volunteers attending yoga classes were recruited for study group and 19 female volunteers not participating in yoga were recruited as external-controls. HR, auditory reaction time (ART) and visual reaction time (VRT) were recorded before and after three rounds of SN in study group as well as 5 minutes of quiet sitting in both groups. Performance of SN produced immediate decrease in both VRT and ART (P<0.001). This was significant when compared to self-control period (P<0.001) and compared to external control group, it decreased significantly in ART (p=0.02). HR increased significantly following SN compared with both self-control (p=0.025) and external-control group (p=0.032). Faster reactivity may be due to intermediate level of arousal by conscious synchronization of dynamic movements with breathing. Rise in HR is attributed to sympathetic arousal and muscular exertion. We suggest that Suryanamaskar may be used as an effective training means to improve neuro-muscular abilities.

While studying the effects of Yoga on the Memory of Middle School Level Students, (Banerjee, n.d.) Banerjee found that yoga, as the scientific wealth of India, yoga is one of the greatest gifts of India to the world. It has been an important part of daily routine for the Indian lifestyle. Today yoga has become one of the most popular systems of health and healing all over the world. The
sample of the present study comprises 40 students of the seventh class from school of Raipur C.G. The pre and post-test of experimental and control group design was followed. There were two groups (control group and experimental group) and 20 students were assigned to each group. The experiment was conducted for 60 days with yoga practice viz. Suryanamaskar, Pranayama (Anulom-Vilom), Bhramari, Omkar Jap and Yoganidra regularly in the morning hours. Memory scale from P.G.I. memory scale from N. N. Wig was used. In within-group comparison and between boys and girls, memory scores ($t=9.90$, $p<0.05$) were significantly influenced.

A similar study was conducted to see the effect of Suryanamaskar on sustained attention in school children. (Javadekar & Manjunath, 2012) Researchers collected data of 64 school children of age 12 to 14, by dividing into two equal groups; experimental and control. Pre and post-test was conducted using a digit letter substitution task test. Period of intervention was 30 days. They concluded that physical activity given regularly in a structured manner improves the process of attention.

The experiment, conducted on randomly selected 30 female students of age ranging from 14 to 16, proposed to measure the effect of Suryanamaskar practice on the body composition of female students. (Sukla, 2010) Estimated body fat percentage was assessed by skin fold caliper at the biceps, triceps, suprailable and sub scapular. The experiment was of 6 weeks, 5 days a week for duration of 30 minutes. Percentage of fat is taken according to the assessment of body composition chart by JVGA Durnin and MM Rahaman. Paired t test was
applied and the result was tested for significance 0.05 level. The obtained ‘t’ value between the pre-means of experimental group and control group was 0.18 which is less than the required value of 2.14 (0.05 level). The obtained ‘t’ value between the pre- and post-means of experimental group was 0.10 which is less than the required value of 2.14 (0.05 level). The ‘t’ value of the pre- and post-means of control group was 0.40 which is less than the required value of 2.14 (0.05 level). It shows that both the groups had similar total body fat of body composition. The ‘t’ value of the pre- and post-means of experimental group and control group was 0.01 which is very less than the required value of 2.14 (0.05 level). The finding reveals that no significant differences between the pre- and post-test of experimental and control group may be attributed to the fact that the selected age group was active and has hectic schedule which keeps the fat percentage to a very low level. This indicated that the Suryanamaskar practice has no effect on the body composition of female students.

The investigation, effect of six weeks Yogasana on Basal Metabolic Rate of Novice Female Players (Yadav & Tadang, n.d.) was conducted to determine the effects of 6-week yogasana on basal metabolic rate of novice female players. Thirty female beginner players were selected as subjects for the present investigation, age ranging from 17 to 24 years. To investigate the influence, six weeks Yogasanas were imparted to the subjects of group A (Yoga training) and B (control group). The significance of difference was tested for the basal metabolic rate by paired ‘t’ test. The six weeks of Yogasanas include Poorna Bhujangasan, Baddhapadmasana, Kukkut asana, Hal asana and Ardha Matsyendrasana. The effect of 6-week yogasana was used to identify the
significant differences (p<0.005-0.001) in improvement of basal metabolic rate of novice female players in group A (Yoga training) as compared to group B (control group). Asana training may be recommended to improve other physiological based performance and enhance basal metabolic rate.

A study was conducted to analyze the effect of Suryanamaskar on stress level (Sharma, 2014) and another one was to examine the effects of Yogasana and Pranayama in non-insulin dependent diabetes mellitus. (Malhotra, 2004) Results showed that Suryanamaskar provides the individual to manage the stress to a great level and yogasana have a beneficial effect on glycaemic control in mild to moderate Type 2 diabetes. A similar uncontrolled open pilot study comprising ashtanga yoga for children and adolescents for weight management and psychological well-being. (Benavidas & Caballero, n.d.) was conducted. Benavidas conducted a 12 weeks program for 20 children. Results showed an average 2 kg loss. So it can be concluded that ashtanga yoga may be beneficial as a weight loss strategy.

Chowdhary, through a systematic investigation suggested Suryanamaskar for the sprinters in athletics (Chowdhary, 1970). In his research there were twenty three men athletes who were the students of L.N.C.P.E. (Lakshmibai National College of Physical Education), Gwalior. The subjects were distributed into two groups by using simple random sampling techniques. One group underwent a training programme of Suryanamaskar which consists of eight poses or Asana. The second group was treated as the control group. This investigation assessed flexibility levels of various joints in the body in relation to the stride length in
sprint running. The findings revealed that there was statistically significant gain in stride length of sprinters participating in the study. The results conclude that Suryanamaskar is an acceptable training method to improve the length of stride among the athletes participating in sprinting event.

The purpose of the study was to find out the effects of Asanas and Pranayama on selected physical and physiological component. (Lohan, 2002) The study has been conducted on 120 boy students between age group 12 to 16 years. Four groups consisting of 30 students each were formed. This study examines which type of yogic group had the maximum effect on the physical and the physiological fitness of subjects. Results showed that every type yogic exercise improves the physical and physiological fitness but training of Asanas and Pranayama collectively can produce the best results.

Bera and Rajapurkar studied forty male high school students aged 12-15 years, participating in the study related to body composition, cardiovascular endurance and anaerobic process. (Bera & Rajapurkar, 1993) The subjects were placed in two group viz. Yoga and Control group. Body composition, cardiovascular endurance, anaerobic power was measured using standard method. The duration of experimental was one year. The result of ANCOVA revealed that a significant difference in ideal body weight, body density, cardiovascular endurance and anaerobic power was observed as a result of Yoga training. This study could not show considerable changes in body fat, skeletal diameter and the majority of the body circumferences. It was evident that some
of the fat folds (triceps, sub scapular, supra iliac, umbilicus, thigh and calf) and body circumference (waist umbilical and trip) reduced significantly.

Bera T.K. proposed Bera's training schedule (BTS) tool for improvement in performance of some selected events in track and field. (Bera, 1991) 100 metre running, broad jump, shot put, high jump, 200 metre run and 800 metre run were developed using the principles of yoga, psychology and physical training. The five potential dimensions incorporated in BTS on the basis of results of various research reports were relaxation, practice of mental imagery, demonstration of high quality athletic performance, practice of specific athletic skills and discussion between the athlete and the coach. The face validity of BTS was established. To test the effectiveness of the BTS vis-à-vis performance in selected athletic events, a vertical teaching model (VTM) was compared with BTS in an experimental design. 120 subjects aged 20 to 30 years participated in the experiment. The experiment consisted of the two treatment groups (BTS and VTM) and one control group designed separately for men and women subjects. The data was analysed after a treatment period of 6 weeks, using ANCOVA and Scheffe's post hoc technique. The result of this study revealed that Bera's training schedule (BTS) showed a better impact in improving physical performance of the selected events in track and field.

Ganguly and Gharote conducted a research with a view to assess the effects of selected Yogic practices on the variables of endurance and flexibility which are the important factors of physical fitness. (Ganguly & Gharote, 1989) The study involved 70 subjects who were the trainees of the regional police training
centre, Khandala. The subjects were equally assigned to two groups; experimental group and control group. The results revealed that sitting pulse rate of the subjects of experimental group was low as compared to that of the control group. Moreover, the cardiovascular endurance as judged by Harvard Step Test improved significantly in the subjects of the experimental group. Similarly, the improvement in flexibility among the subjects of experimental group was statistically significant.

Gharote M. mentioned the effect of Yogic exercises on the strength and endurance of the abdominal muscles of the female. (Gharote M., 1970) Researcher reported a significant improvement in strength and endurance of the abdominal muscles of the females as a result of the systematic schedule of Yogic exercises. Most of his studies evaluated the effects of Yogic exercises having same set of exercises.

Gharote M. studied the effects of Yogic training on physical fitness such as speed, flexibility, strength, endurance in an isolated manner. (Gharote M., 1973) He used Fleishman’s Battery of basic fitness on the adult males and females. Though general physical fitness index was seen to improve significantly, all the test items of the battery could not be improved in this study.

Gharote M. conducted a test on the selected Yogic exercises and he found that it helped to increase the physical fitness index as derived from the Fleishman’s Battery of basic fitness test. (Gharote M., 1976) The significant improvement was seen in extent flexibility, dynamic flexibility, soft ball, cable jump, pull ups, 600
yards run after the yogic practice at the end of three weeks. The losing group showed significant reduction in all skin folds included in this study.

Gharote conducted the effect of short term yogic training program on the physical fitness of school boys. (Gharote M., 1976) He tested groups, viz. one experimental and the other control group. Detraining and delayed effects on the different items of the Fleishman's Battery of basic fitness test were recorded. The significant improvement observed in the present study in leg lifts, shuttle and balance suggests improved trunk strength and stretching nature of the various Asanas included in the selected yogic exercises and maintenance of static stretching. The balancing and the rhythmic and controlled yogic breathing seemed to be responsible for influencing the result. The results of the pre-study indicate the utility value of yogic exercise in the physical fitness program and should form a basis for introducing exercises in the schools. These exercises could possibly be combined with other vigorous conditioning program to attain maximum benefits.

Kanade and Gharote conducted a study to see the effects of yogic training on physical fitness and selected athletic events. (Kanade & Gharote, 1990) The purpose of this study was to investigate whether additional training in selected yogic exercises will bring any improvement in physical fitness and the performance in the athletic events like high jump and 1500 metres run. Sixty students from the physical education college were randomly selected and divided into 3 groups of 20 each. They were randomly assigned to the Control group, Experimental group I and Experimental group II. Experimental group I
was given yogic training comprising of Asanas selected on the basis of assumption that they would favourably influence the performance in high jump. The experimental group II was trained in selected breathing exercises besides Asanas with the assumption that they would facilitate better performance in 1500 metres run. The control group was not given any training. The criterion measures adopted for the experimental group I were Fleishman’s Battery of basic physical fitness tests and high jump. The criterion measures adopted for experimental group II were Harvard step test and 1500 metres run. The training period consisted of six weeks duration and the training was imparted for six days a week. The changes in the criterion measures of all the three groups were tested for significant by student ‘t’ test. The result showed that yogic training in the selected exercises contributed to the improvement of physical fitness, high jump and 1500 metres run. This suggests the usefulness of yogic exercises in the training programme and coaching in athletics.

Khupsangikar, S. (Khupasangikar, 1996) studied the effects of Yogasanas and specific exercises on the performance of 100 metres run on fifteen boys. The investigator selected a set of specific exercises and Yogasanas and conducted four weeks training program on the selected subjects. An overall improvement in the 100 metres run was observed and their timing reduced as well. There was significant improvement in the flexibility of the boys, therefore the improvement of stride length and running actions were seen.

Kulkarni and Datar studied the effects of Yoga (Asanas and Pranayama) in cardiac efficiency of randomly selected subjects in age group 16 to 24
years. (Datar & Kulkarni, 1997) The groups were consisted of 48 males and 15 females. Their cardiac efficiency was tested before and after Yogic training. 10 males and 10 females acted as control group. The experimental subjects underwent Yogasanas and Pranayama training of 60 minute per day for 21 days. Trikonasana, konasana, paschimotanasana, Ushtrasana, Yogmudra, Suptavajrasana, Sarvangasana and Matsyasna were the Asanas whereas Kapalbhati, Bhasrika, Suryabhedana, Nadishuddhi, Ujjie, Bhramari and Omkar were the Pranayama techniques selected as treatment. It was concluded that the practice could improve the cardiac efficiency of the subjects and enhance physical fitness adding to healthy long life which is the need of modern time.

Moorthy found the detraining effect of Yogic and non-Yogic exercises. (Moorthy, 1983) It revealed that after discontinuing the training in both non-yogic exercises as well as yogic exercises, the ability in important components of physical fitness has been decreased. But as compared to the non-yogic exercise program, Yogic exercises program help to retain their effects for a longer period of time and hence are more advantageous than non-yogic exercises for boys and girls.

Saha and Bhole evaluated the effects of three weeks Yogic training program on psychomotor performance. (Saha & Bhole, 1983) They improved after training and passive relaxation. The observation emphasized that the yogic program helps to free tensions and develop alertness and concentrate the mind with the body with better understanding. The present study helps us to conclude that yogic training program increased performances involving speed and accuracy.
Steric and Mary conducted four activity courses on the development and maintenance of physical fitness for college women. (Steric & Mary, 1964) They proved dynamics, body conditioning and movement were equally effective in developing and maintaining abdominal strength and endurance. Body conditioning and badminton were equally superior to other activities in developing and maintaining arm and leg strength and endurance as measured by modified pull ups and jump.

Thorat had done a research work on the effect of four weeks training program of Asanas on the Rope Mallakhamb performance on 10 to 12 years old girls. (Thorat, 1991) He found that there was a significant improvement in the Rope Mallakhamb performance of 10 to 12 years aged girls after 4 weeks of training program of selected Asanas. He concluded that this effect was due to overall effect of Yoga program conducted for four weeks period.

Vinod, S. and Khire, U studied the effect of comprehensive training in Ashtanga yoga on reaction time, as a measure of general intelligence, in relation to age, sex and socio-economic status. (Vinod & Khire, 1998) Fifty five respondents, including males (p=39) and female (n2=16) belonging to different socio-economic groups participated. They were divided into three age groups, and were tested for their auditory and visual reaction time both simple and disjunctive before and after one month comprehensive training in Ashtanga Yoga (CTAY) imparted daily for 2 hours. Entire group of 55 respondents showed highly significant reduction in all the four types of RTs (Reaction Time)
regardless of their age, sex and socio-economic status. However, the smaller age
group, in general, showed a slightly better effect of yoga on all types of RTs.

2.2 Reviews related to the Breathing Exercises

While studying ‘Breathe Easy: Model and control of simulated respiration for
animation’, (Zordan, BhriguCelly, Chiu, & Paul, n.d.) authors stated that
animation of the breath has been largely ignored by the graphics community,
even though, it is a signature movement of the human body and an indicator for
lifelike motion. In this paper, they presented an anatomically inspired,
physically based model of the human torso for the visual simulation of
respiration using a mixed system of rigid and deformable parts. This novel
composition of anatomical components was necessary to capture the key
characteristics of breathing motion visible in the human trunk because the
movement is generated fundamentally through the combination of both rigid
bone and soft tissue. They propose a simple anatomically meaningful muscle
element based on springs, which is used throughout both actively to drive the
motion of the ribs and diaphragm and passively for other muscles like those of
the abdomen. In addition, they introduced a straightforward method for
preserving incompressible volume in deformable bodies to use in approximating
the motion of the gut related to breath. Through the careful construction of this
anatomically based torso, control for respiration becomes the generation of
periodic contraction signals for a minimal set of two muscle groups. They
showed the flexibility of their approach through the animation of several
breathing styles using their system and they verified their results through video and analytical comparisons.

Meditation: a stress reliever, (Gujjala & Aruna Kumari, 2014) in this study, cardiovascular parameters and respiratory functions of those practicing meditation were compared with those of non-meditators. Stress is the greatest disorder of the modern society. Health is immensely influenced by one’s mental state. Yoga and meditation have been extensively studied for their beneficial effects on human health. The present study is aimed at determining the effect of Raja-Yoga meditation on pulmonary functions and cardiovascular parameters. Here, Forced Vital Capacity [FVC] and Forced Expiratory Volume in first second [FEV1] are the pulmonary function tests done. The cardiovascular parameters are the heart rate and blood pressure. Meditators had significant decrease in resting heart rate and diastolic blood pressure. Forced Vital Capacity and Forced Expiratory Volume (FEV) also significantly increased in Raja Yoga meditation as compared to non-meditators. The study shows that Raja-Yoga meditation confers significant benefits in respiratory functions and cardiovascular parameters.

2.3 Reviews related to Omkar Chanting

A research was conducted with the purpose to study the effect of prayer and meditation on galvanic skin response (GSR). (Anand & Das, n. d.) It was hypothesized that there was a significant positive effect of prayer and meditation (Om chanting) on galvanic skin response (GSR). The sample consisted of 20 normal, healthy female participants through purposive sampling.
The age group of the sample was 18 to 24 years (Mean= 18.7, SD=1.55). Gender was female and minimum education was graduation. The daily practice time of prayer and meditation session was 30 minutes for one month. Pre-Post data was recorded before and after intervention of prayer and meditation session by using single group pre-post research design. Recordings of galvanic skin response (GSR) were made on a computerized polygraph (Model Physiopac, PP 4, Medicaid Systems, Chandigarh, India) test. The results revealed a significant increase in GSR values as an effect of prayer and meditation which suggested the psycho-physiological relaxation. Practicing prayer and meditation increases the galvanic skin response and hence decreases the stress level of the individual.

The paper about Mantra and Yantra was published in Indian medicine and alchemy. (Rosu, 1984) Arion Rosu presented it at the International Workshop on Mantras and Ritual Diagrams in Hinduism, held in Paris, 21-22 June, 1984. The complete text in French is based upon an analysis of Ayurveda literature from ancient times down to the present and of numerous Sanskrit sources concerning the specialized sciences: alchemy and latrochemistry, veterinary medicine as well as agricultural and horticulture techniques.

In a comparative study of peak expiratory flow rate and breath holding time in normal and ‘Om’ meditators, Bora, G. (Bora, n.d.) stated that ‘Om’ is the name or symbol of God (Ishwara, Brahman). Either chanting or thinking about ‘Om’ is anecdotally reported to cause a quiet mental state and improve the all round performance of the brain and body. The study design aimed to find the effect of ‘Om meditation’ on Peak Expiratory Flow Rate (PEFR)
and Breath Holding Time (BHT), among Non-targeted thinking (control) and Dhyana (‘Om’ meditation) Groups. Source of data was 30 healthy male MBBS students (in the age group of 18 – 20 years) of Adichunchanagiri Institute of Medical Sciences, B.G. Nagara, studying first year MBBS. The group was divided equally into two sub-groups on a random basis (each sub-group consisting of 15 students). Each of these sub-groups was made to get familiarized with the procedure.

I. Dhyana group—Performing a targeted thinking task – ‘Om’ meditation.

II. Control group—Performing a non-targeted task, i.e. sitting relaxed with eyes closed.

The first phase of the recording of the pulmonary parameters i.e. PEFR and BHT was done at the beginning of the course. The second phase of the recording was done after two months following the training. The data thus obtained was subjected to statistical analysis using student ‘t’ test and other relevant statistical tools to compare the changes in the measured parameters between the two groups. In the ‘Om’ meditators, peak expiratory flow rate and breath holding time significantly increased as compared to the non-meditators. The present study revealed highly significant improvement in PEFR and Breath Holding Time in the experimental group after consistent meditation of ‘Om’ as compared to control group.

Karnik, C. stated in the study about effects of Mantras on Human Beings and Plants. (Karnik, n. d.) The classic texts of Indian origin record the influence of mantras on plants and animals. Ayurveda also recognizes the importance of this
realm of medicine. The author during his various experiments on plants found that these from the stage of seeding to the maturity are affected by certain types of sound waves, especially Mantras. The study reveals that the plants have shown a positive response to this type of particular sound waves regarding the growth, their efficiency in curing the diseases etc.

**Gurjar, A.** conducted a study on analysis of Acoustic of “OM” Chant and its effect on Nervous System. (Gurjar, Ladhake, & Thakare, n. d.) ‘Om’ does not have a translation. Therefore, the Hindus consider it as the very name of the Absolute, it is body of sound. In the scriptures of ancient India, the ‘Om’ is considered as the most powerful of all the mantras. The others are considered aspects of the Om, and the Om is the matrix of all other mantras. It has been recognized that the Mantras have beneficial effects on human beings and even plants. The syllable Omis quite familiar to a Hindu. It occurs in every prayer. Invocation to most gods begins with this syllable. Om is also pronounced as AUM. The syllable Omis not specific to Indian culture. It has religious significance in other religions also. Om is not given any specific definition and is considered to be a cosmic sound, a primordial sound, the totality of all sounds etc. The entire psychological pressure and worldly thoughts are removed by chanting Om Mantra. To systematically understand the sound ‘Om’ and its effect on nervous system is the endeavor of this research work. With proposed algorithm, analysis has been carried out for the divine sound Om. By this analysis they concluded that Om serves as a brain stabilizer, which is also an energy medicine for human beings under stress.
In a study about autonomic changes during Om meditation (Telles, Nagarathana, & Nagendra, n.d.) Telles, S. stated that the autonomic and respiratory variables were studied in seven experienced meditators (With experience ranging from 5 to 20 years). Each subject was studied in two types of sessions — Meditation (with the period of mental chanting of Om) and Control (with a period of non-targeted thinking). The meditators showed statistically significant reduction in heart rate during meditation compared to the control period (paired ‘t’-test). During both types of session there was a comparable increase in the cutaneous peripheral vascular resistance. Keeping in mind similar results of other authors, this was interpreted as a sign of increased mental alertness, even while being psychologically relaxed (as shown by the reduced heart rate).

In the study of Time-Frequency Analysis of Chanting Sanskrit Divine Sound “Om” Mantra (Gurjar, Ladhake, & Thakare, n.d.), researchers stated that the attentiveness and concentration are pilfered from them by the proceedings taking place around us in the world in recent times. Different challenges and impediments are faced by the people working in the software industries. It is tough to handle the stress some times. Therefore, to come out of the fore mentioned troubles, meditation is essential for all human beings. In the same way, for psychological stress, speech signal is uttered to be a considerable indicator. In the direction of meditating, for a human subject, ‘Om’ is a spiritual mantra, outstanding to fetch peace and calm. The entire psychological pressure and worldly thoughts are taken away by the chanting of Om mantra. Elimination of interruption and introduction of new dynamism in the body are caused by the Om chanting. The awareness could be promoted through the
repetition of Om mantra. Furthermore this mantra transcends the limitations of a mentality. To systematically understand the meditative chant, termed the divine sound ‘Om’, is the endeavour of this research work. With wavelength transformations, time-frequency analysis has been carried out for the divine sound Om. By this analysis we could conclude that stability in the mind is achieved by chanting Om, hence it proves that the mind becomes calm and brings peace to the human subject.

Kapil Dev, Ph.D. scholar in Physical Education stated in his study, undertaken to determine the effect of Om Chanting on Anxiety of Adolescence. (Dev, n.d.) The total sample consisted of 40 graduation and post-graduation boys of Dev Sanskriti Vishwa Vidyalaya, Haridwar. All the samples belonged to the age range of 18-25 years. Om Chanting exercise was given to all samples in a group for a period of 25 days regularly with a definite pattern in the morning. SCAT (Sinha’s Comprehensive Anxiety Test) was used as data collection device. In this study t-test was used for analysis. It is found that Om Chanting has a positive significant relationship with anxiety.

Evaluating the effects of Hath Yoga and Omkar Meditation on cardiorespiratory performance, psychological profile, and melatonin secretion. Thirty healthy men in the age group of 25-35 years volunteered for the study. They were randomly divided into two groups of 15 each. Group 1 subjects served as controls and performed body flexibility exercises for 40 minutes and slow running for 20 minutes during morning hours and played games for 60 minutes during evening hours daily for 3 months. Group 2 subjects practised selected
yogic Asana (postures) for 45 minutes and Pranayama for 15 minutes during the morning, whereas during the evening hours these subjects performed preparatory yogic postures for 15 minutes, Pranayama for 15 minutes and meditation for 30 minutes daily, for 3 months. Orthostatic tolerance, hear rate, blood pressure, respiratory rate, dynamic lung function (such as forced vital capacity, forced expiratory volume in 1 second, forced expiratory volume percentage, peak expiratory flow rate and maximum voluntary ventilation) and psychological profile were measured before and after 3 months of yogic practices. Serial blood samples were drawn at various time intervals to study effects of these yogic practices and Omkar Meditation on melatonin levels. Yogic practices for 3 months resulted in an improvement in cardio respiratory performance and psychological profile. The plasma melatonin also showed an increase after three months of yogic practices. The systolic blood pressure, diastolic blood pressure, mean arterial pressure and orthostatic tolerance did not show any significant correlation with plasma melatonin. However the maximum night time melatonin levels in yoga group showed a significant correlation ($r = 0.71, p < 0.05$) with well-being score. These observations suggest that yogic practices can be used as psycho physiological stimuli to increase endogenous secretion of melatonin, which, in turn, might be responsible for improved sense of well-being.

2.4 Reviews related to Swimming Performance

A study was undertaken by researchers at Ball State University in the United States to evaluate strength building programs for swimmers. Ten highly trained
male swimmers participated and continued with their daily swimming training, which consisted of about 5600 metres performed in intervals. Strength training was performed twice a week with ten swimmers split into two groups, which performed resistance training techniques. The two groups were:

a. A weight assisted dip and pull up group consisted to strengthen the triceps and latissimusdorsi (back) muscles, which are believed to produce the main effort during front crawl swimming. Three sets of both the dips and pull ups were used with the subjects aiming to perform as many repetitions as possible for all sets.

b. Traditional weight training routines including lat pull downs, leg extensions, leg curls, triceps extensions and bent arm fly exercises with either free weight or machines. Three sets of 8 to 12 repetitions were used with the resistance lifted increased over time.

The six weeks of swimming and strength training were followed by six weeks of swimming only workouts. The study showed the following results

- Over 12 week period, there were no differences between the two groups in lean body mass or percent body fat.
- The weight assisted dip and pull up group improved 22.9 metre front crawl sprint speed by 0.3 seconds, from 11.2 to 10.9 seconds, while the traditional people failed to improve.
- In a 365.8 metre front crawl time trial there was no difference between the two groups with times and stroke rates about the same.
The dip and pull up group improved power output while exercising on a bio-kinetic swim bench at a swim speed of 2.66 metres per second (a bio-kinetic swim bench is a mechanical device that measures muscle power on dry land as a swimmer mimics typical swimming movements).

According to Granny, yoga improves the swimmers’ body alignment, balance and grace which are integral for all sports performance.(Granny G., 2008) It helps in the coordination of muscular and respiratory system. Pranayama helps in acquiring more oxygen for the muscles and body while swimming. Yoga improves the body’s balance and makes it more streamlined; it also increases the flexibility of the arms, legs and hips. Athlete’s body cannot get stronger without gravity. So, in swimming, there is not much chance for the muscles and bones to build up. Yoga helps in increasing bone density. It helps build extended and supple muscles that are less prone to injury.

Adho Mukha Svanasana (Downward facing Dog Pose) and Urdhva Mukha Svanasana (Upward Facing Dog pose) is good for shoulders. Baddha Konasana helps in forming free and loose hips. Ankle help in propelling the body with a kick start. Virasana (Warrior Pose) makes your ankles flexible. Trikonasana (Triangle Pose) helps in improving breathing on alternate sides of the body which is very essential while swimming. Camel pose strengthens the back of swimmer’s body and relaxes their head and neck. Headstand pose strengthens the back and shoulder.

Of the things that make life worth living, swimming ranks high with Megan. It is one of his absolute essentials. It is refuge, a source of inspiration, guardian
and promoter of his health, a boon companion. A shoulder injury cut him off
from this lifeline for six agonizing months. Frustrated and fearful of another
injury, he returned to the only exercise that ever gave him the same sensory
peace as swimming: Yoga. After much searching, he discovered ashtanga yoga
and found a first rate teacher. Unlike the more static forms of yoga, Ashtanga
flows from one posture to the next. The whole sequence is more like learning
swim strokes than calisthenics. At first, it was hard, a really humbling
experience.

Ashtanga yoga takes total concentration: many of the postures involve gravity-
defying balance that relies on complete harmony of body and mind. But the
reward is feeling close to the weightlessness of being in the water.

Certainly yoga has a piscine element: These days he actually slips through the
water more easily, his alignment and flexibility are better than ever. Swimming
keeps him in fine trim but yoga gives his body far more sinewy aspect, his spine
elongated, limbs compact and muscular. Unexpectedly, the vigorous Ujjaie
breathing he learned in the yoga studio translates into greater endurance in the
pool. After years of struggling with bilateral breathing it suddenly has become
effortless. Most surprising are the psychic consequences. Especially in the New
York City pools he uses. A few months of deep breathing and deliberate
focusing happily changed his attitude toward the annoyances of public
swimming. He became more philosophical of the guy who always wants to race
with the woman who does her wall exercises in his lane. Yoga has not only
increased lung capacity but tolerance for others. What began as a way to prevent
further injury has become an integral part of researcher's life. Yoga kept him injury free (and free from worry about injury) and it elevated workouts to a new level. He felt more comfortable with his body and more in control of mind. Combined with yoga, swimming became even more gratifying, a greater pleasure, which put it even higher on short list of life's indispensables.

Baptist, B. is a yoga teacher and athletic trainer in Cambridge, Massachusetts, known for his work with Philadelphia Eagles and as the host of ESPN's "Cyberfit". Kathleen Finn Mendola is a health and wellness writer based in Portland, Oregon. (Baptist & Mendola, 2006) They found that the minimal gravity effect of swimming is appealing to those who suffer from injury that precludes them from high-impact movement, as well as pregnant women, to people with chronic joint pain and the elderly. Logging laps in the pool undoubtedly provides physical and psychological benefits. But too much time spent in the water without counteracting or opposing activities can be detrimental, resulting in body misalignment and lack of bone strength. They also studied that a yoga practice can complement even an amateur's swim routine by introducing two legs of the fitness triad-strength building and flexibility. Asanas (postures) utilize body weight as a powerful source of resistance: Outside of the water, gravity helps to build strength and muscle. In addition, postures take the body through a full range of motion, encouraging flexible, supple muscles that are less prone to injury. Consistent practice of yoga also yields extended muscles, as opposed to the contracted, compact muscle associated with running or cycling and extended muscles which are
physiologically necessary for a swimmer: To be efficient in the water, every stroke and kick demands a full extension of the arm and leg. When executing all four strokes, swimmers run to increase aerobic conditioning — the third leg of the fitness trade— because effective aerobic training requires more than just a few laps in the pool. “If you just casually swim laps, chances are you will be unable to bring your heart rate up high enough and sustain it long enough to gain significant aerobic conditioning,” says Sims.

“By incorporating the basic aerobic for the four basic strokes when you swim — breast, freestyle, butterfly and backstroke — you can get a full body workout. However, achieving a cardiovascular workout in the pool is more challenging. You must use interval training — swimming laps at a vigorous pace against a clock.” In Sims’ work with swimmers, she focuses on key body areas and applies some of what she calls “universal principles” of Asanas to help them ward off injury and improve performance:

**Shoulder blades:** In Adho Mukha Svanasana (Downward-facing dog) and Urdhva Mukha Svanasana (Upward-Facing dog), your instructor may tell you that the shoulder blades need to drop down the back. The same principle applies in swimming, where the shoulders create the biggest problems. Rotator cuff injuries or shoulder tendonitis are not held in place when the arm is raised in freestyle stroke. Instead of the muscle carrying the weight of the arm, the tendon bears the burden. Over time the tendon becomes frayed and aggravated.

**Hips:** Baddha Konasana (Bound ankle pose), with the soles of the feet touching together and the outside of the knees flat on the floor, demonstrate a healthy
external rotation of the hip. For many people, though, the hips remain locked and stiff. In a swimmer, this congestion can manifest in a faulty breaststroke kick. Without free, loose hips, it is difficult to complete this stroke effectively and efficiently.

**Ankles:** In all the standing poses of yoga, it is important to place the foot on the ground and in order to get full extension and flexible ankles, allow the foot to rest solidly on the ground. Similarly, swimmers use the ankles as the foundation of movement propelling the body forward with a kick. The top of the foot should hit the water as if in Virasana (Hero Pose) at 180 degrees. Sims often worked with runners who had such severe ankle stiffness that their kick literally pulled them backwards—“like trying to lift a plane off the ground with the flaps down.”

### 2.5 Reviews related to statistical methods

**Germer** studied the effect of weight training and plyometric training on vertical jump, standing broad jump and 40 metre sprint. (Germer, 1987) His study was to determine if plyometric exercise program was better than weight training programme in improving leg power as measured by vertical jump, standing broad jump and 40 metre sprinting ability. The training consisted of plyometric drills two times a week and weight training exercise three times a week for an eight week period. Pre-test to the post-test showed mean gains for the weight training, plyometric training and control group respectively. The gains achieved by both treatment groups were significantly greater than those experiments by the control group, but no difference was seen between the gains attained by the
two treatment groups. It was concluded that under the delimitations of this study, there is no difference between two programs in improving leg power.

Linda conducted a study to determine if the circuit training program used at Jefferson Intermediate School in San Gabrial, CA, would significantly improve the student's physical performance test scores. (Linda, 1984) The subjects were divided into control group and experimental group. The control group did not participate in circuit training, whereas the experimental group participated in circuit training once a week for 15 weeks. Fishers' 't' test for co-related means revealed that only one of the six different physical performance test showed significant improvement which was obtained in the two tests in the experimental group. Thus, it was concluded that the circuit training did not have a significant effect on the physical performance test scores.

Johnson selected 120 college freshmen to study the effects of continuous slow running, interval and peace training methods, on running performance. (Johnson, 1971) The subjects trained once a day, three times a week for eight days. It was concluded that the treatment variables were highly effective in improving running performance of college freshmen. It was further concluded that slow continuous running was effective for improving performance in slow pace runs.

Greenberg studied the effects of two interval training program on running ability. (Greenberg, 1966) Two experimental groups of thirty subjects were employed in the training program which was conducted three times weekly for seven weeks. Both the groups trained over distance of 110, 220 and 330 yard. In
one group, speed of running was held constant while the number of repetition of each distance was increased. The second group ran a fixed number of repetitions at progressively faster speed. Both experimental groups improved significantly over the control group. However, no significant difference in improvement of running ability over a 400 yards distance was found between the experimental groups.

Robinson and Suces trained two groups of athletes for thirty minutes of running. (Robinson, 1980) One group was continuously running for the entire of duration, whereas the other group practised on 100, 200 and 300 metres at intervals with a work rest of ratio of 1:3, the control group continued with normal work practice. The result finding was that the means of VO2 max. scores increased 8.9% for distance group and 3.1% and 3.2% for the interval and control group respectively. The anaerobic threshold changes resulted in average increase of 15.6% for VO2 max at anaerobic threshold for distance group and 11.3% for interval group and only 6.5% average increase for control group. Thus, they concluded that both moderate and intensive training increases anaerobic threshold as well as endurance performance and also the changes were more closely related to endurance performance than VO2 max changes.

Noon reported the efforts of two interval training program during a 12 week period. (Noon, 1965) He studied electro-cardio graphic recordings, blood tests and time for 5000 metres run. The findings indicated that speed training caused more rapid positive changes in electro-cardio graphic and blood test results and in running time 5000 metres. The over distance training caused the same
changes but with fewer extreme result and at a slower rate. He concluded that both types of training should be employed in planning long-range work schedules, since there were positive physiological changes unique to both long and short distance training methods.

Brar studied the effects of interval running with three different types of recovery during the relief interval, on cardio-respiratory endurance and selected physiological variables. (Brar, 1986) The subjects were 80 untrained students of Kendriya Vidyalaya, Gwalior, studying in grades nine and ten. The subjects were equally assigned to three experimental groups participating in an interval running program for a period of ten weeks. The different treatment factors for the three groups were the types of ten weeks. The differential treatment factors for the three groups was the type of recovering during the relief interval i.e. the first group performed jogging the second a combination of walking and jogging and the third only walking. The data on cardio-respiratory and selected physiological variables of physical work capacity and resting pulse rate were recorded before and at the end of the experimental period of ten weeks. He concluded that: (1) Interval training was an effective method in developing cardio respiratory endurance of the boys. The group, which performed jogging, or a combination of walking-jogging, produced better results when compared to the group, which performed walking alone during the relief interval. (2) Interval running was an effective method in improving physical work capacity and effective in lowering pulse rate. The group which performed jogging during the relief interval was found superior to the groups which performed a combination of walking-jogging, or walking alone, in increasing work capacity and in
lowering the resting pulse rate. (3) The control group did not show any significant changes in cardio-respiratory and selected physiological variables.

Rameshpal selected hundred boys of 14 to 16 years of age for the study and they were divided into five groups i.e. A, B, C, D and E, each consisting of twenty subjects at random. Groups A, B, C and D were subjected to different training programs and E acted as the control group. (Rameshpal, 1986) The training programs consisted of four different combinations of different proportions of aerobic and anaerobic training to develop endurance of the subjects. Group A was trained with the ratio of 70% aerobic and 30% anaerobic, Group B with 60% aerobic and 40% anaerobic, group C with 50% aerobic and 50% anaerobic, and D group with 40% aerobic and 60% anaerobic training. Subjects were trained thrice a week for a period of ten weeks. Interval training of extensive interval method was used to impact aerobic and anaerobic training respectively. The performance in 800 metres run of the subjects were recorded to the nearest to one tenth of a second, before and after the completion of experimental period. He concluded that the different proportions of aerobic and anaerobic training employed in the ratio of 70:30, 60:40, 50:50, 40:60 percents adopted in this study proved to be effective for improving the performance of 800 metre runners. The combination of 40% aerobic and 60% anaerobic training appeared to be most effective for improving performance in 800 metres run. Absence of improvement in the case of control group may be considered a reflection of inactivity.
The purpose of the study was to examine the effect of selected Kalaripayattu skills training program on selected psychomotor variables of high school boys. (UdhayaShankar & Sivaji, 2013) For the present study, forty students were randomly selected as samples from Swami Shivanandha High School, PeriyanaiKanpalayam, Coimbatore. They were divided into two equal groups; each group consisted of 20 subjects. Group I was the Kalaripayattu Skill Training Group (KTG) and Group II acted as control group. The control group did not undergo any specific training program. The age of the subjects ranged from 13 to 15 years. The researcher had selected the coordination and balance variables for the study. The selected variables were assessed by using standardized test. The training program was fixed for five days over a period of eight weeks. The total duration of the training session was fixed for sixty minutes. The data was collected before and after eight weeks of training program. The collected data was analysed using independent t-test. The level of significance was fixed at 0.05. The findings of the present study have strongly indicated that Kalaripayattu skill training has significant effect on selected psychomotor variables i.e. coordination and balance of high school boys.

The purpose of the study was to find out the effect of cup stacking training on selected psychomotor variables of school students. (Shivaji, 2013) To achieve the purpose of the study, twenty four boys from P.R. Govt. Higher Secondary School, Magarsamapatti, Krishnagiri District were selected as subjects randomly. The subject age ranged from 12 to 15 years. The subjects were divided into two equal groups. Each group consisted of twelve subjects. Group I was the Cup Stacking Training Group (CSTG) and underwent training for three
days per week for five weeks and Group II acted as the control group. Hand-eye coordination and visual reaction time were selected as variables. The selected criterion variables such as hand-eye coordination and visual reaction time were assessed before and after the training period. Hand-eye coordination was assessed by catching a tossed ball with both hands, visual reaction time was assessed by chronoscope. The total duration of the training period was fixed for five weeks. The collected data was statistically analysed by using analysis of co-variance (ANCOVA) and was used to find out the significant difference between experimental and control groups. In all the cases 0.05 level of confidence was fixed to test the significance. The result of the study revealed that there was a significant difference between SCTG and CG of hand-eye coordination and visual reaction time.

Analysis of Academic Achievement on Selected Motor Skill Related Performance among the Eight Grade Respondents. (Arulmozhi, n.d.) The purpose of the study was designed to analyze the academic achievement on selected motor skills related performance among the eight grade respondents. During the academic year 2012-2013, 30 boys and 30 girls studying in Government Higher Secondary School, Silattur, Erchi, Aranthang, Pudukkov, Tamilnadu, India were selected for the study. They were selected on the basis of their academic achievement in the quarterly examination as above average, average, below average achievers, making up a total of 60 respondents. The age of the respondents ranged from 12 to 14 years. The academic achievement of respondents in the quarterly examination was considered as an independent variable for this study. The criterion variables selected for the study are motor
skills related performance such as shuttle run and stroke stand. The data were statistically analysed by using Two Way (2*3) analysis of variance (ANOVA) for evaluating the influence of the two criterion variables. The obtained results have Three F-ratio. Two for main effect; the first F-ratio for rows (referring to gender) and columns (referring to academic achievement) and one for interaction (referring to the gender and academic achievement). The obtained F-ratio for column (referring to the gender and academic achievement) was significant. Scheffe's test was used as Post Hoc Test separately for column to find out the significant differences between paired mean. In all the conditions, the significant level was fixed at 0.05 level, which was considered to be appropriate. The result reveals that there existed significant differences between the above average achievers and average achievers; above average achievers and below average achievers; and average achievers and below average achievers irrespective of gender in agility. Hence, it also reveals that there was no significant difference between average achievers and below average achievers; and above average achievers and average achievers irrespective of gender in agility. Among the different academic achievement irrespective of gender, the result indicated that there was no significant difference in balance. Further, it also reveals that there existed no significant difference in balance among the genders of different academic achievement.

Hamack study the effects of a selected progressive resistance training program on cardio respiratory efficiency, power and free running speed. (Hamack, 1968) Forty-five male subjects were divided into three equated group's interval running, resistance running (employing an exer-genic) and control group. The
effects of the six week training program were determined by pre-test, initial post rest and final post-test for oxygen debt rapid, power developed by the legs, free running speed elapsed time for a 600 yard run. Significant improvement was found in oxygen debt rapid (0.5 level) and elapsed time for a 600 yard run (0.01 level) between the interval and control group.

2.6 Findings from the Review of Literature

Main findings from reviews were:

1. Suryanamaskar was a condensed set of exercise which required minimum space and equipments and results are maximum.

2. Suryanamaskar helps in increasing cardiovascular capacity, flexibility and endurance. It is helpful exercise in weight control management. Suryanamaskar stimulates spinal cord muscles, nerves and all joints of human body. Suryanamaskar was also helpful in physical as well as mental health.

3. Suryanamaskar was useful exercise to all age groups that is from children to older adults and for both genders.

4. Findings of reviews related to Breathing Exercises stated that Yoga and meditation decreases the resting heart rate and diastolic blood pressure significantly.

5. Findings of reviews related to Omkar Chanting stated that Chanting or thinking about ‘Om’ is reported to cause a quiet mental state and improves the all round performance of the brain and body. Also consistent meditation of ‘Om’ shows highly significant improvement in
Peak Expiratory Flow Rate (PEFR) and Breath Holding Time. Besides this, 'Om' meditation shows significant reduction in heart rate and increase in the cutaneous peripheral vascular resistance. This is interpreted as a sign of increased mental alertness, even while being psychologically relaxed.

6. Findings related to reviews on Swimming Performance described that Suryanamaskar and Yoga improves the swimmers’ body alignment, balance and grace which are integral for all sports performances. It helps in the coordination of muscular and respiratory system. Pranayama helps in acquiring more oxygen for the muscles and body while swimming. Suryanamaskar improves the balance of the body and makes it more streamlined; it also increases the flexibility of the arms, legs and hips. Suryanamaskar and Ashtanga yoga takes total concentration. Many of the postures involve gravity-defying balance that relies on complete harmony of body and mind. It creates a feeling of weightlessness of being in the water. Deep breathing and deliberate focusing changes the attitude. Suryanamaskar not only increases the lung capacity but tolerance for others too. Consistent practice of Suryanamaskar also yields extended muscles, as opposed to the contracted, compact muscle associated with running or cycling and extended muscles which are physiologically necessary for a swimmer. To be efficient in the water, every stroke and kick demands a full extension of the arm and leg. When executing all four strokes, swimmers run to increase aerobic conditioning.
7. Findings of reviews related to Statistical Methods suggested that in pre-post experimental model of research, many researchers used ANOVA and Independent sample ‘t’ test.

The above reviews of the study conducted on different physical, psychological, and general motor fitness components related to health and fitness, are related to this study. But from all these reviews the researcher found that present study was totally different and not being covered by any other researcher. This review proves that the present investigation was totally new and no study was done previously in this area.
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