
Chapter - II

Review of Related Literature

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The researcher reviewed the available literature, which are relevant research works, relevant studies, facts and related to the selected problem, the importance of referring related literature is so vital for any study undertaken, this can be better understood by the statement given by J.C. Agarwall¹ “The literature in any field forms the foundation, upon which all future work will be built”. The major source from which the author was able to collect the required literature is confined to the Library of Sri Siddaganga College of Physical Education, Tumkur University, Libraries of Bangalore University (Department of Psychology, Department of Physical Education), Rashthrothana Parishad, Bangalore, Vivekananda Yoga Kendra, Bangalore and internet. The following are some of the literature available for the future research work, which forms the foundation of the study.

According to M.K. Gharote and S.K. Ganguly,² the inclusion of yogic exercises in the program of physical activities of the school is suggested for the improvement of minimum muscular fitness among the school children.

¹ J.C. Aggarwal, “Educational Research”, (W.D. Arya Book Depot, 1975), p.109.

² M.L. Gharote and S.K. Ganguly, “A Survey of Minimum Muscular Fitness on School Children”, “Indian Journal in Medicine”, (63, 1975), pp. 1242-1250.

Kamleshan³ reports that selected yogic practice is not beneficial if the improvement of cardio-respiratory endurance is the goal sought. However, he analyses that there is basis to believe that the selected yogic practices may assist in the improvement of cardio-vascular status of persons.

Yadav and Dubey⁴ “Yoga is recognized as one of the most important and valuable heritage of India. Today the whole world is looking towards yoga for the answer to various physical, mental, psychological and social problems”.

V. Chandramohan⁵ “A study on the effects of yogic exercises of psycho physiological functioning on 30 healthy subjects was grouped into yoga and non-yoga groups was carried out at Institute of Aerospace medicine. After 6 months statistically significant difference in psychological, physiological measures were found in yoga group.

Thaper, C.L.⁶ study emphasizes on simplicity of practices and postural and attitudinal aspects leading to spins offs in flexibility of mind and enhancement of awareness, confidences humility, concentration, relaxation, perseverance acceptance, co-operation and disciplining- basic elements useful for fine tuning of education and development of total personality of the child. The approach they

³ H.V. Kamleshan, “Effect of Selected Yogic Exercises on Cardio-Respiratory Endurance”, (Unpublished Masters Dissertation, submitted to Bangalore University, 1974), p.23.

⁴ M.S. Yadav and B.C. Dubey, “Alternative, Medicine Sports Science, Yoga and Naturopathy”, Souvenir-World Congress on Alternative Medicine, Sports Science, Yoga and Naturopathy, (July, 2000), p.12.

⁵ V. Chandramohan et al., “Effects of Yogic Exercises on Psycho Physiological Performance”, Conference Hand Book Fourth International Conference on Frontiers in Yoga Research and Applications, (December, 1997), p.29.

⁶ C.L. Thaper, “Yoga for fine Tuning of Education”, Conference Hand Book. Fourth International Conference on Frontiers in Yoga Research and Applications, (December, 1997), p.57.

planned resulted in enhanced awareness, involvement, receptivity and discipline among students in all areas of education reducing element of mechanistic and tension.”

Dr. Vasudeva Bhatt⁷ “A study was conducted to highlight the importance of yogic practices which imbibe self awareness and self esteem among youth by reducing stress and tension. The yogic practice program was given to fifty college students for 8 weeks. A questionnaire was constructed and administered in the beginning and at the end of the program. It was found out that strong self awareness and good managements of stress was associated with youth group who took part in yogic practices.

N.K. Datta, Yogacharya Prabhu,⁸ “Studied the problems faced by some 30 people who were part of the yoga camp and studied the change in the parameters like the blood pressure level, oxygen consumption and breathing rate before and after practicing yoga. The results showed that there was a reduction in the oxygen consumption per minute after practicing yoga. It was also found that the breathing rate had reduced from 13.5 per minute to 10.5 per minute. The basal metabolic rate (BMR) decreased by about 15-18 during the meditation process.

⁷ Vasudeva Bhatt, “Youth Stress Management with Yogic Practices”, Conference Hand Book Fourth International Conference on Frontiers in Yoga Research and Applications, (December, 1997), Abstract-75.

⁸ N.K. Dutta and N. Yogacharya Prabhu, “Yoga for Stress Management amongst Youth”, Conference Hand Book, Fourth International Conference on Frontiers in Yoga Research and Applications, (December, 1997), Abstract, 76.

S.S. Jaswal, Girdhar, Baljeet ⁹ “The study was conducted to find out the effect of exercise program on strength, power and speed of school boys of different age groups. It was observed that exercise program brought about significant improvement in strength, power and speed of the subjects”.

Ranbir Singh Sahiya and Mahendar Singh¹⁰ “The belief that yogic practices influenced the physical and mental health of an individual has persisted from very early times. It was only during the last fifty years or so that modern scientists have sought to confirm these claims of yogic’s by impartial observation, experimentation and verification.

Indranil Manna¹¹ ‘The aim of the study was to search out the effects of practicing yoga on heart rate, flexibility and reaction time. For the study 32 yoga subjects (16 boys, 16 girls) were selected. The resting heart rate, flexibility, reaction time and some anthropometric measures were taken from the subjects of both yoga and control group. Results showed that yoga group had significantly better ($P < 0.001$) flexibility than that of control group. It was also noted that subjects of yoga group had better mental concentration than that of the subjects of control group. It was concluded that yoga practice helps to improve the reaction time and increase flexibility and thus it helps to keep the body fit.

⁹ Jaswal, S.S., Giridhar, Baljeet, “Effect of Exercise Program on Strength, Power and Speed of School Boys”, Abstract, 199.

¹⁰ Ranbir Singh Sahiya and Mahendar Singh, “Yoga in Modern World A Review”, Souvenir International Conference on Physical Education, Sports Science and Medicin, (November, 2001).

¹¹ Indranil Manna, Nilanjana Ghosh, Sumanter Banerjee, Seema Ghosh, Sanjit Blums Kar and Prakash Dhara Vidya @ date vsnl.net.in.

V. Jeyaveera Pandian¹² “Effect of physical exercises and yogic practices on selected physical variables among the sports participants (school level) was assessed during off season. The results reveal that the yogic practices evidenced significant improvement on abdominal muscular endurance and flexibility than physical exercise.

Urmila Raut, N.B. Shukla¹³ “A study been conducted on 100 yoga students who are undergoing training on yoga at Malaviya centre, Banaras Hindu University, Varanasi. Pre and post test were conducted for physical fitness on various physical components to test the significant or insignificant differences existing in tested physical fitness components. The results of the study stated that there were significant differences in fitness components among the students who were undergoing training in yoga.

Shri. P.A. Borgave¹⁴ “positive changes in self perception and well being, improvement in self confidence and awareness, positive changes in mood, relief of tension, relief of feelings such as depression and anxiety, increased mental well being, increased alertness and clear thinking, increased energy and ability to cope with daily and other activity, increased enjoyment of other exercises and social contracts and the development of positive thinking are all the psychological benefits of physical activity.

¹² Dr. V. Jayaveera Pandian, “A Study on outcome between physical exercises and yogic exercises on selected physical variables during off season among sports participants”, Souvenir Asia-Specific International Conference, (Sept. 2003), p.57.

¹³Urmila Raut and N.B. Shukla, “Yoga and Fitness”, Proceedings National Conference on Sports Managements, (March, 2003), p.112.

¹⁴ P.V. Borgave, “Physical Activity and Psychological Benefits”, Souvenir XIX National Conference of Sports Psychology, (Jan, 2007), p.38.

D.N. Doss¹⁵ “yogic exercises develop great powers of concentration which helps a lot in all games and sports Yoga also develops the will power, agility and suppleness”.

J.M. Tanner¹⁶ “Yogic exercises give a blood flush to the spine, sympathetic nerves and cells and the spine that elasticity so essential to a vigorous body”.

According to Gharote,¹⁷ Psycho-physiological study on the effect of short term yogic training on the adolescent high school boys showed that there was a rapid improvement in Automatic Balance scores.

According to Vijayendra Pratap¹⁸ significant increase in hand steadiness and increase in body control was found after training in yogic exercises.

According to Kuttner, L¹⁹ In their study compared the effects of a Yoga intervention with a wait-list control for 25 adolescents (ages 11-18; 20 girls and 5 boys) with IBS. Participants were randomly assigned to either group. The Yoga intervention consisted of an initial one-hour instructional session, followed by daily home practice for four weeks. This four-week intervention period was followed by a four-week follow-up period. The wait-list control group received the Yoga intervention after the initial eight weeks.

¹⁵ S.N. Doss, “Yoga utility in Games and Sports”, Vyayam Vignan, (November, 1970).

¹⁶ Tanner, J.M., “The Physical of the Olympic Athletic, (London George, Alen and Urwin Ltd., 1964), p.18.

¹⁷ M.L. Gharote, “A Psycho-physiological Study of the Effects of Short Term Yogic Training on the Adolescent High School Boys”, Yoga Mimamsa, (14, 1972), pp. 92-99.

¹⁸ Vijayendra Pratap, “Steadiness in Normal Before and After Yogic Practices – An Explanatory Study, Yoga Mimamsa, XI, (13,1968), p. 2.

¹⁹ L. Kuttner, A Randomized Trial of Yoga for Adolescents with Irritable Bowel Syndrome Pain, Research and Management, 11(4), pp. 217-23.

The results of the study are very positive. At the first follow-up point (eight weeks into the study), participants in the first Yoga group reported lower levels of functional disability, less use of emotion-focused avoidance as a coping strategy, and less anxiety than participants in the wait-list control group. After the second round of the Yoga intervention, researchers combined the follow-up data of both groups, and found a significant decrease in gastrointestinal symptoms and emotion-focused avoidance. Although there were not significant results for other measures (depression and pain), there were statistically non-significant improvements in both, suggesting that the yoga intervention did not, at least, negatively influence these outcomes.

Chaya and others²⁰ Researchers at a residential yoga education and research center near Bangalore City in south India investigated the effects of yoga (asana, pranayama, and meditation) on basal metabolic rate (BMR). Researchers compared two groups of residents at the center: 55 (24 women) who had been practicing yoga daily for the past six months or more, and 49 (15 women) who were working at the center and living a similar lifestyle, but not practicing yoga. The average BMR of the yoga practitioners was significantly lower than that of the non-yoga group, and this was not due to differences in body weight. There were also significant differences in respiratory variables (lower in the yoga group) but not in heart rate. What are the implications having lower BMR? Although low BMR is sometimes discussed as a health risk (i.e., for obesity), elevated BMR is

²⁰ M.S. Chaya et al., The effect of long term combined yoga practice on the basal metabolic rate of healthy adults, *BMC Complementary and Alternative Medicine*, (6), p. 28.

also associated with greater stress. It is unclear from the health literature whether a reduced BMR is a desirable health outcome, and future research should attempt to link BMR with any health outcomes associated with yoga practice. The authors recognize these difficulties in interpreting their findings, and suggest the lower BMR seen among yoga practitioners may be a healthy adaptation associated with reduced overall arousal.

Yoga and Pranayama help overweight teens lose weight. Researchers from Hampton University in Virginia presented findings on the benefits of yoga and pranayama for teenagers at the March 2006 American Heart Association's annual conference on Cardiovascular Disease Epidemiology and Prevention. Their study compared weight loss/gain in two groups of overweight high school students: 30 students who were taught 40 minutes of yoga and pranayama four times a week for 12 weeks, and 30 students who received no instruction. Neither group was instructed to diet or change food intake. Students in the yoga group showed a 5.7 percent decrease in average body mass index (BMI) and weight loss of six pounds, whereas students in the control showed a non-significant increase in average BMI.²¹

Stress management: a randomized study of cognitive behavioural therapy and yoga.²²

²¹ American Heart Association's 46th Annual Conference on Cardiovascular Disease Epidemiology and Prevention, Phoenix, March 2-5, 2006, CDC "Overweight and Obesity", News Release, American Heart Association.

²² J. Granath et al., Cognitive Behavior Therapy, (35(1), 2006), pp. 3-10.

This study compared the psychological and physiological benefits of a Kundalini yoga program and a stress management program based on cognitive behavioral therapy principles. 33 employees (26 women) at a large Swedish company were randomly assigned to one of the two programs. Each program included 10 sessions over 4 months. Participants in both groups showed significant improvements in both psychological (self-rated stress and stress behavior, anger, exhaustion, quality of life) and physiological (blood pressure, heart rate, urinary catecholamines, salivary cortisol) outcomes. There was no significant difference between groups. The authors conclude that both “cognitive behaviour therapy and yoga are promising stress management techniques.”

Physiological Responses to Iyengar Yoga Performed by Trained Practitioners²³

This study measured the physiological responses of 15 female intermediate/advanced level Iyengar yoga practitioners (mean age 43.5 ± 6.9 yr), during an active Iyengar asana practice. In particular, the report focuses on cardiovascular and respiratory responses. During the 90 minute practice, practitioners expended an average of 149.4 ± 50.7 Kcal, which is equivalent to very mild exercise (walking might expend 300 Kcal, in comparison), and the practice did not meet the standards for sustained cardiovascular exercise. Backbends had the greatest cardiovascular response, compared to standing poses,

²³ S.E. Blank, *Journal of Exercise Physiology Online*, (9), 7-23.

inversions, and seated or supine poses. Interestingly, misalignment in poses influenced blood pressure responses in the pose. For example, misalignment in the warrior poses was associated with greater systolic blood pressure in the poses.

Raghuraj ²⁴ and others conducted a study on the effect of Pranayama on Grip strength. The present study was conducted to determine breathing through a particular nostril has a lateralized effect on hand grip strength. 130 right hand dominant, school children between 11 and 18 years of age were randomly assigned to 5 groups. Each group had a specific yoga practice in addition to the regular program for a 10 day yoga camp. The practices were (1) right (2) Left (3) Alternate nostril breathing (4) breath awareness. Hand grip strength of both hand was assessed initially and at the end of 10 days for all 5 groups. The right left and alternate-nostril breathing groups had a significant increase in grip strength of both hands ranging from 4.1% to 6.5% at the end of the camp though without any lateralization effect. Hence the present results show that yoga breathing through a particular nostril or through alternate nostrils increases hand grip of both hands without lateralization.

Tripathi Bhagirathi Pathak ²⁵ conducted a study on the effect of Kapal Bhati on vital capacity and breath holding capacity. Purpose of the study was to investigate the effect of Kapal bhati on vital capacity and breathe holding capacity

²⁴P. Raghu Raj et al., "Pranayama Increases Grip, Strength without Lateralized Effects", Kaivalyadhama, Lonavla, (28, No.3 and 4).

²⁵ Rajesh Tripathi et al., "Effect of Kapal Bhati on Vital Capacity and Breath Holding Capacity", Scientific Journal in Sport and Exercise, (2, No.2, 2006), p.17.

forty male subjects were selected random ranging age in 18-21 years, subjects were drawn from B.P.E 1st year class of Vidya Niketan College of Physical Education Bhopal. These 40 subjects were categorized into two equal groups by random sampling using the random numbers it was ensured that all of them medically fit to undergo the training for research project. The experimental group was given Kapalabati exercises daily for a duration of eight weeks gradually increasing the exercise from 5 to 30 minutes. The results have indicated that there were significant improvement in vital capacity and breath holding capacity as a consequence of eight week training programme of Kapalabhati.

Madan Mohan ²⁶ and Others Conducted a study on the effect of short term training in savitri and shastrika Pranayama on respiratory pressure and endurance, reaction time, blood pressure, heart rate. Thirty students volunteers were divided into two groups of fifteen each. Group I was given training in suvitri Pranayama that involves slow, rhythmic, and deep breathing. Group II was given training in shastrika Pranayama, which is bellows type rapid and deep breathing. Selected parameters were measured before and after three week period. Savitri Pranayama produced a significant increase in respiratory pressure and respiratory endurance. Heart rate, rate pressure product and double product decreased in Savitri Pranayama group but increased significantly in Bhastrik group.

²⁶ Madan Mohan et al., "Effect of Slow and Fast Pranayamas on Reaction Time and Cardiovascular Variables", Department of Physiology, Jawaharlal Institute of Post Graduate Medical Education and Research, Pondicherry.

Moorthy ²⁷ A study to find out the effect of yogic exercise on cardiovascular fitness was undertaken. An investigation was conducted on sixteen male students and five female students. Selected randomly from the YMCA College's of Physical Education Madras. To find out the cardio-vascular fitness, the Harvard step test was administered. The subjects were since yogic exercise for a period after six weeks. The result showed a final test was conducted effect six weeks. The data shows a significant improvement in the fitness test as a result of yogic exercises.

Joshi ²⁸ conducted a study on effect of some yogic practice on physiological and psychological Parameters. The present study aimed to study the impact of kapalabhati Vaman and Bhramari Pranayama on physiological and psychological parameters. The sample of the study consisted of 40 males. Subjects ranging in age between 18-25 years. The experimental group was given yoga daily for one hour a day in which 1 included Kapalabhati Vaman Bhramari Paranyama for two month. It was ensured that all subjects made medical. Test to under go for the research project. The pre and post test was taken before and after practice by statistical analysis it has been observed that there is a significant relationship between the practice of Kapalabhati Vaman and Bharamari on Hemoglobin. E.S.P. F.U.C. Physical and mental health.

²⁷ A.M. Moorthy, "The Effect of Selected Yogic Practices on Cardio Vascular Fitness Level of College Men and Women", Unpublished Master's Thesis, Department of Physical Education, Aligappa University Karaikudi, Tamil Nadu.

²⁸ Bhanu Prakash Joshi, "Effect of Some Yogic Practice on Human Subjects" 14th International Conference on Trana – Anveshan, Bangalore, India, (18-21, December, 2003).

Tran ²⁹ and others conducted a study on the effects of Hatha yoga practice on the health related aspects of physical fitness. The present study was studied to determine the effects of Hatha yoga practice on the health related aspects of physical fitness including muscular strength, endurance, flexibility, Cardio respiratory fitness, body composition and pulmonary function. The sample of the study consisted of 10 untrained volunteers including 9 female and one male ranging in age between 18-28 years subjects were required to attend a minimum of two yoga class per week for a total of 1 week, Each yoga session consisted of 10 minutes of Pranayama 15 minutes of dynamic warm-up exercise 50 minutes of asana. 10 minutes of supine relaxation in savasana. The subjects were tested before and after the 8week training programme. The result indicated that regular Hatha yoga practice can elicit improvement in the health related aspects of physical fitness.

Karambelkar, Deshapande and Bhole conducted study on some respiratory studies on Bhastika pranayama with internal and external retention of breath. The present study was conducted to determine the effect of bhastika pranayama with bahya kumbhaka and with antar kumbhaka increases oxygen consumption and carbon dioxide output. The sample of male subjects were given experimental treatment for 1 year. The results indicate the practice of different variation of

²⁹ M.D. Tran et al., "Effects of Hatha Yoga Practice on the Health-Related Aspects of Physical Fitness", Department of Exercise Science, University of California at Davis, Davis CA 95616, Pre Cardiol, 2001, Autumn, (4 (4)), 165-170.

bhastrika pranayama with bahya kumbhaka and antar kumbhaka had significant increase in oxygen consumption and carbon dioxide output.

Sahu and Bhole³⁰ conducted a study on “Effect three weeks yogic training programme on psycho-motor performance”. They selected ten male subjects between the age group of twenty five to forty five years. They were undergone three weeks training in yoga and also high pitched Omkar recitation was given to them in the evening for this study. As a part of testing programme Bhatia Intelligence Test Battery was given to them at periodic intervals.

Psycho-motor performance of subjects was studied by way of their ability to make the dots on the chart paper of the MC Dongall-Schuster Apparatus after 3 days of training.

The same was repeated after every week during five to six p.m. in a calm and quiet room. The students were asked to make three attempts for each condition and the average of three attempts was taken for calculation. 3 x 3 factorial design was used to find out the result. They came to a conclusion that yogic training programmes increased performance involving speed and accuracy.

Karambelka, Ganguly and Moorthy³¹ investigated that the yogic training did help the females, to reduce their cholesterol level. Although, apparently there is slight lowering in the mean weight and triceps skin fold measurement these

³⁰ R.J. Sahu and M.V. Bhole, ‘Effect of Three Week Training Programme on Psycho-motor Performance’, Yogamimamsa, (22, 1984).

³¹ P.V. Karambelka et al., “Effect of Yogic Practices on Cholesterol Level in Females”, Yogamimamsa, (20, No. 1&2, 1981).

reduction are statistically non significant and also no significant relationship was found between weight reduction, triceps changes and cholesterol level changes. This may be due to the short training period of three weeks, which may be having lesser impact on weight and body fat deposition than on cholesterol. The present study has confirmed that just as in males even three weeks of yogic training programme reduces cholesterol significant in females also.

It is also observed in this study that the females have generally higher cholesterol than normal. On the whole, the yogic training reduced the mean cholesterol level significantly.

Dhanaraj³² studied the effect of yoga and the 5BX - fitness plan on selected physiological parameters. The result indicated an increase in basal metabolic rate, tidal volume is basal state. T-4 thyroxing hemoglobin hematocrined blood cell PWC 130, vital capacity, chest expansion, breath holding time and flexibility after yoga training. Decreases in heart rate in basal state were also observed.

Mull³³ conducted a study to find out the effect of yogic physical cultural on the physical fitness status of high school boys. The subjects were selected from a school of Gwalior. The physical culture group and the control group was matched on the basis of total physical fitness and showed that they did not significantly differ in physical fitness before training started.

³² V. Dhanraj, "The Effect of Yoga and the 5bx Fitness Plan on Selected Physiological Parameters", (Doctoral Thesis, University of Albertia, 1974).

³³ T. Mull, "Yoga and Fitness", First National Symposium on Kiranthropomertry Souvenir, (1991).

Fleishman's physical fitness test battery was used for the pre-test. After giving five months of training for the experimental group, the post tests were calculated.

Backialakshmi ³⁴ conducted a study on "influence of selected Asanas and Aerobic exercises on selected motor fitness and physiological variables among school boys". The purpose of this study was to find out whether Asanas and Aerobic exercises had any influential effect on motor fitness and physiological variables. For this purpose he selected ninety subjects from Kendriya Vidyalaya, Karaikudi. Subjects were divided into three homogeneous groups based on their initial performance. Group 'A' is control group and Group 'B' and 'C' were given treatment for forty minutes daily for five days a week for a period of six weeks. The Scheffe's post hoc test was used to analysis the mean and the differences between the means of the various groups. Through this statistical technique he came to a conclusion that Asanas and Aerobic exercises had significantly improved the motor fitness and physiological variables among school boys.

Krishnan conducted a study on effect of selected yogic exercises and Bharathiyam exercises on physiological variables among school boys. For this purpose he selected ninety boys between the age group thirteen to fifteen years from higher secondary school, Thirumayam. Subjects for this study were divided into three homogeneous groups based on their initial performance. Group A was

³⁴ Backiallakshmi, "Influence of Selected Asanas and Aerobic Exercises on Selected Motor Fitness and Physiological Variables among School Boys", Unpublished M.Phil., Dissertation, Alagappa University, 1990.

treated as control group and group C and B were given Bharathiyam and yogasanas respectively. Both experiment groups B and C were given treatment for 30 minutes daily for five days a week for a period of six weeks. The Scheffe's post hoc test was used to analyze the means and differences between the means of the various group. He came to a conclusion that yogic and Bharathiyam exercises had significantly improved the physiological variables.

Sankaralingam ³⁵ conducted a study on "Effect of yogic practices on the physical fitness and perceptual motor skills of high school students of Pudukottai District. The purpose of the study is to survey the physical fitness and perceptual motor skills of high school boys in Pudukottai District and to find out the influence of selected yogic exercises on them. For this he selected sixty subjects in the age of fifteen years. Subjects were divided into two groups. Selected yogic exercises were given to the experimental group. ANOVA were used for this study. He came to a conclusion that the yogic exercise had significantly improved physical fitness and perceptual motor learning of high school boys.

³⁵ Sankaralingam, Muthaiah, "Effect of Yogic Practices on the Physical Fitness and Perceptual Motor Skills of High School Students of Pudukkottai District", Unpublished M.Phil., Dissertation, Alagappa University, 1992.