CHAPTER-2
REVIEW OF RELATED LITERATURE

2.1. INTRODUCTION

A thorough and sophisticated review of literature is the foundation and inspiration key for substantial, useful research in the relevant field. It appraises, encapsulates, compares, contrasts and correlates various scholarly books, research articles and other relevant sources that are directly related to the research area and enables the researcher to develop a better understanding of the research problem.

The literature reviews involve the systematic identification, location, scrutiny, summary of written material that contains information on a research problem. A literature review is usually a critic of the status of knowledge on a carefully defined research topic and it enables the researcher to acquaint himself with current knowledge in the research area. The purpose is to determine the extent to which the theory and research have been developed about the studied topic, identify the definition of concepts and variables already established, examine elements of research used by others, such as designs, methods, instruments and techniques of data analysis that may prove useful in the proposed project.

It enables the researcher to justify the research question and theoretical or conceptual framework to establish the importance of the research area, to provide background information related to the topic to select promising methods and measures to up-to-date knowledge in the respective field and to adopt techniques, tools and process in the research activity.

A serious and scholarly attempt has been made by the scholar to go through the problem in hand and brief accounts of the relevant studies are cited in this chapter in connection to the literatures of Yoga, Meditation and Brain Training.
2.2. REVIEWS ON YOGA

Lee ES et al., (2005) examined the changes in health-related quality of life associated with 3 months of mind-body training as practiced in community-based settings of metropolitan New York City area with 194 adults. A prospective cohort study was done in eight centres with a yoga programme including stretching exercises for large muscle groups and shoulders, neck, hips, back, and knees, postures for “energy accumulation” and 5- to 10-minute meditation intended to facilitate “energy awareness”. At baseline, new participants reported lower scores than U.S. norms for 7 of 8 domains of the Medical Outcomes Study SF-36 general health questionnaire. After 3 months of training, within patient change scores improved in all domains (P< .0001), including a change of +15.5 in the mental health domain. In hierarchical regression analysis, younger age, baseline level of depressive symptoms and a history of hypertension were independent predictors of greater improvement in the SF-36 mental health score. Five participants (2.9%) reported a musculoskeletal injury.

Khodaskar et al (2015) focused upon the efficacy of yogic practices for prison inmates to attain control over anxiety, aggression and impulsiveness. The male prisoners (N= 90) of Amravati district central jail, Amravati Maharashtra, who were charged with murder under Indian Penal Code 302 and who spent at least three years in prison were selected from convenient sample. Two equally identical groups of 45 participants were selected from experimental and control groups within age range of 25 to 54 years, Anxiety aggression and impulsivity were measured by using standardized scales test. A numbers of significant psychological benefits including better emotional control, anger and anxiety management and dealing more positively with life behind the prison walls were noted.
This study has demonstrated potential validity of yoga psychology as an important factor in reduction of anxiety, aggression and impulse control behaviours.

**Janakiramaiah N et al., (2000)** compared the efficacy of Sudarshan Kriya yoga with electro convulsive therapy (ECT) and imipramine. The research population included 45 patients hospitalized with severe depression as defined by the Beck Depression Inventory and Hamilton Rating Scale for Depression. The subjects were purposively assigned into three groups and electroconvulsive therapy, imipramine, an antidepressant medication, at typical dosing and training in SKY administered respectively to them. The daily practice of Sudarshan Kriya yoga (SKY) was found to be equally effective to medication and nearly as effective as electro-shock therapy in the remission of depression among patients. Patients practicing SKY were noted to have a 67 percent remission rate of their symptoms showed it to be as effective as imipramine and nearly as effective as electroconvulsive therapy. They are highly suggestive and further investigation into the clinical efficacy of yoga practice is warranted and could present itself as a low-risk/high-reward alternative to traditional depression treatments.

**Uebelacker LA et al., (2010)** reviewed the literatures of studies that evaluates the therapeutic efficacy of yoga practices for the treatment of depression and possible mechanisms. Studies were included in the review if they were clinical trials with one of the intervention arms involving a predominantly yoga intervention and a requirement for participants to have a diagnosed depressive disorder or elevated depression symptoms. Eight trials were found. The number of participants ranged from 28 to 89. Of the five studies that compared yoga to no/minimal treatment, four found some evidence that yoga was superior to the control group, and the final one did not directly compare the two groups. Studies varied in length of intervention from 3 days to 12 weeks and in intensity from daily to once per week, and different types of yoga were used (some asana-focused and some meditation-
focused). Effect sizes of differences varied widely, and methodological differences and flaws threatening internal validity make it difficult to draw general conclusions.

**Mohan Raj et al., (2015)** analysed the effect of power yoga practice on selected physiological parameters among middle aged men. For this study 100 middle age male persons were selected from Coimbatore city, after the scrutiny by the scholar and experts 40 middle aged men were selected as subjects by adopting purposive random sampling technique. The age of the subjects ranged from 35 to 42 years. They were divided into two equal groups namely, power yoga group and control group. The subjects were tested to find out the resting pulse rate, vital capacity and blood pressure. The pulse rate was assessed by arterial pulse, vital capacity was measured by digital Spiro meter and blood pressure was measured by sphygmomanometer. The power yoga group participated in power yoga practice for a period of twelve weeks and control group did not participate in any special practice. The data were collected before and after the training period and the pre-test, post-test and the adjusted post-test were analysed by Analysis of Covariance (ANCOVA). The level of significance for the study was chosen as 0.05. It is concluded from the results that the power yoga practice group has significant improvement in resting pulse rate, vital capacity and blood pressure among middle aged men.

**Woolery A, et al., (2004)** assessed the short-term effect of yoga on mood in mildly depressed young adults. The study comprised of twenty-eight 18-29 year olds with mild depression. Measurements of depression and anxiety levels were made using the Beck Depression Inventory (BDI), State Trait Anxiety Inventory (STAI), and Profile of Mood States (POMS) survey instruments before classes began, midway through the program and at the program’s completion. Morning cortisol levels were also taken at the same time points. They were motivated with two 1-hour classes per week for 5 weeks, emphasising the Iyengar Yoga type. The yoga group showed a significantly greater reduction in depression
compared to the control group (p<.001). A similar pattern was seen for trait anxiety (p<.001).

Significant pre- to post-class reductions were seen in depression-dejection, tension-anxiety, anger-hostility, fatigue-inertia, confusion-bewilderment, and total mood disturbance. Yoga participants also showed higher morning cortisol levels, which are associated with self-esteem, hardiness, and tenacity, and lower levels of nervousness and depression.

Khosravi et al.,(2015) determined the impact of general program of yoga on the muscle fitness, body composition and metabolic risk factors in middle age women with overweight. Thirty middle age women with overweight were randomly assigned to the yoga intervention group or the control group. Muscle endurance and flexibility, fat percentage, body mass index (BMI), blood glucose and lipids levels were obtained, before and after 8 weeks of yoga practice. Data analysed with independent t test by SPSS 19.

Data indicates that significant increased in muscle endurance (p = 0.012) and flexibility (p = 0.049) occurred in yoga group but not in control group. Significantly decrease in BMI and body fat percentage than control group observed (p≤0.0001). There were no significant differences between control and yoga group in glucose, total triglyceride and total cholesterol. These findings suggest that middle age women with overweight may benefit from yoga practice to improve the muscle fitness and body composition.

Mendelson T, et al., (2010) determined feasibility, acceptability, and preliminary outcomes of a school-based mindfulness through the yoga intervention. Ninety-seven 4th and 5th graders in the inner city of Baltimore participated in a 4-day per week 12-week yoga and mindfulness program at school. Each yoga session lasted 45 minutes with yoga types of inspired postures and movement series, including bending, stretching, and fluid movement.

The brief period of discussion prior to the guided mindfulness practice in which instructors offered didactic information about topics such as identifying stressors, using mindfulness techniques to respond to stress, cultivating positive relationships with others, and keeping
one’s mind and body healthy. The intervention group’s survey responses showed significant improvements in involuntary stress responses as compared to controls (p<.001). Significant different were also seen on three subscales, including rumination, intrusive thoughts, and emotional arousal (p<.01).

Stueck M et al., (2005) evaluated the assistance of yoga can in reducing stress responses in preteens. The study group consisted of forty-eight 11-12-year olds with abnormal exam anxiety. Subjects were assigned to the experimental group to participate in a 15-session program of relaxation, yoga, and other meditation and social interaction exercises. A yoga module consisting of relaxation by ‘journey through the body’, ‘six energy techniques’ and massage techniques improved the mental health and assisted in reducing the stress responses. Significant effects were seen in a comparison immediately after the training in areas like decreased aggression, decreased helplessness in school, decreased physical complaints, improved stress coping abilities etc. In the comparison after 3-months, the following effects were seen: improvements in emotional balance, decreased anxiety, decreased shyness in social contacts, and decreased impulsiveness.

Chakraborty et al., (2015) determined the effects of simple yogic exercise programs (asanas and pranayamas) on selected cardiovascular function tests in thirty nine elderly individuals of both sexes, between 50 and 70 years of age, with no active medical disorders. The study was conducted at a yoga centre in Siliguri town of Darjeeling district of West Bengal. Mean Arterial Pressure(MAP), Resting Heart Rate(RHR), Heart Rate Post Exercise(HRPE) and Heart Rate Recovery Time(HRRT) were measured, once initially and again after six weeks of yoga training under supervision of a certified yoga instructor. There was definite improvement of cardiovascular functions as revealed by significant decrease in MAP, RHR, HRPE& HRRT after 6 weeks.
Singh Baljinder Bal (2015), assessed the effects of Chandra nadi pranayama on haematological parameters. Thirty, University level girls of Department of Physical Education (T), Guru Nanak Dev University, Amritsar between the age group of 21 - 26 years (Mean ± SD: age 22.8 ± 2.023 years, height 5.53 ± 1.822 ft, body mass 61.506 ± 4.514 kg) volunteered to participate in the study. The subjects from Group-A: experimental were subjected to a 4-week Chandra nadi pranayama (Left Nostril). Student t test for paired samples was utilized to compare the means of the pre-test and the post-test. No significant differences were found in Haemoglobin (Hb), Total Cholesterol (TC), Low Density Lipoprotein Cholesterol (LDL-Cholesterol), High Density Lipoprotein Cholesterol (HDL-Cholesterol) and Triglycerides (TG) among university level girls.

Pullen PR et al. (2010) determined the benefits of yoga for African American Heart failure patients. The research population consisted of 40 patients 38 African American, 1 Asian, 1 Caucasian with systolic or diastolic HF were randomized to the yoga group (YG, N=21) or the control group (CG, N=19). Patients attended a total of 16 supervised sessions over an 8-10 week period of 5 minute warm-up, including breathing exercises a 40 minute period of postures, ending with a 15 minute relaxation phase. Pre- and post-measurements included a treadmill stress test to peak exertion, flexibility, interleukin-6 (IL-6), C-reactive protein (CRP), and extra cellular-super oxide dismutase (EC-SOD). QoL was assessed by the Minnesota Living with Heart Failure Questionnaire (MLwHFQ). Yoga therapy offered additional benefits to the standard medical care of predominantly AA HF patients by improving cardiovascular endurance, QoL, inflammatory markers and flexibility.

Sharma et al., (2015) investigated the effectiveness of yoga intervention on physiological and health-related QOL measures in people with PD. Thirteen people with stage 1-2 PD were randomized to either a yoga (n = 8) or a control group (n = 5). The yoga group participated in twice-weekly yoga sessions for 12 weeks. Participants
were tested at baseline, and at 6 and 12 weeks using the Unified Parkinson's Disease Rating Scale (UPDRS), clinical measures of health-related QOL and physiological measures. Significant improvement in UPDRS scores ($P = .006$), diastolic blood pressure ($P = 0.036$) and average forced vital capacity ($P = 0.03$) was noted in the yoga group over time. Changes between groups were also noted in two SF-36 subscales. Positive trends of improvement were noted in depression scores ($P = 0.056$), body weight ($P = 0.056$) and forced expiratory volume ($P = 0.059$). Yoga participants reported more positive symptom changes including immediate tremor reduction. The results suggest that yoga may improve aspects of QOL and physiological functions in stages 1-2 PD. Future larger studies are needed to confirm and extend our findings of the effects of yoga in PD.

Guarracino JL et al., (2006) identified the beneficial participation of yoga in obesity prevention, hypertension control, and positive quality of life. The research population was seventy healthy women and men of the age group 18 years who were recruited from 3 fitness centers in Massachusetts. A yoga module of Hatha and relaxation yoga was given to them. The majority of study participants (55.7%) had practiced yoga for less than 1 year, followed next by those who had practiced yoga for more than 5 years (31.4%). The majority of participants (57.1%) practiced yoga for 1-2 hours per week, followed by those who spent less than 1 hour per week practicing yoga (24.3%). According to survey results of the 70 participants, hatha and relaxation yoga had a statistically significant role in controlling weight, hypertension, and mood. Of the participants, those who had practiced yoga for less than 1 year had a significantly higher systolic blood pressure (mean 117.13) than those who had practiced yoga for 1-4 years (mean 107.56). However, the survey participants’ mean BMI (24.41) was significantly different from the
BMI used as a cut off for determining obesity (30.0), thus suggesting that individuals who practice hatha and relaxation yoga may not generally be obese.

**Menezes et al., (2015)** reviewed the emotion regulation potential of yoga practice, given that it combines techniques that foster positive psychological outcomes. The results suggest that yoga produces improvements in emotional functioning in healthy subjects and people who suffer from some physical illnesses, particularly in psychological self-reported variables. Evidence regarding behavioural and neuro physiological correlates remains less well-established. Mechanisms that possibly mediate the relationship between yoga and emotion regulation are discussed and methodologies are considered, with suggestions for future studies. In summary, emerging evidence suggests that yoga may help foster healthier psychological responses, indicating its potential as an emotion regulation strategy.

**Jain SC et al., (1991)** found out how yoga can improve pulmonary function and exercise capacity in children with asthma. The study started with 46 children with a mean age of 15.8 years. Forty days yoga practice, cleansing procedures, postures, and breathing were given to the research population. The measurements were made of forced expiratory volume, distance walked in a 12-minute time period and overall physical fitness as assessed by a modified Harvard Step Test. Twenty-six patients were followed for up to two years and asthma symptoms and medication requirements were measured. Improvements were seen in expiratory volume, distance walked in a 12-minute time period and overall physical fitness. Of patients followed for up to two years, children showed a continued reduction in asthma symptoms and less need for medication. Fourteen of the children with mild asthma who continued yoga every day for 15-30 minutes remained asymptomatic.

**Parco et al., (2015)** aimed to examine the effects of 1-year of yoga exercise on the cardiovascular risk factors including central obesity, hypertension, dyslipidaemia and
hyperglycaemia in middle-aged and older Hong Kong Chinese adults with MetS. Adults diagnosed with MetS using National Cholesterol Education Program criteria (n = 182; mean ± SD age = 56 ± 9.1) were randomly assigned to a 1-year yoga intervention group or control group. Systolic and diastolic blood pressure, waist circumference, fasting plasma glucose, triglycerides, and high-density lipoprotein cholesterol were examined at baseline, midway, and on completion of the study. Physical activity level and caloric intake were assessed and included in the covariate analyses. A reduction of the number of diagnostic components for MetS was found to be associated with the yoga intervention. Waist circumference was significantly improved after the 1-year yoga intervention. A trend towards a decrease in systolic blood pressure was observed following yoga intervention. These results suggest that yoga exercise improves the cardiovascular risk factors including central obesity and blood pressure in middle-aged and older adults with MetS. These findings support the complementary beneficial role of yoga in managing MetS.

**Vinutha et al., (2015)** integrated approach of yoga therapy (IAYT) had shown beneficial effects in the management of type 2 diabetes mellitus (DM). Autonomic dysfunction is one of the major complications of type 2 DM. Research studies have demonstrated that yoga can modulate autonomic functions. Hence, the current study was designed to assess the effect of IAYT on autonomic functions in type 2 diabetics. 15 patients of type 2 DM with ages ranging from 35 to 60 years were recruited for the study. They were diagnosed with type 2 diabetes from 1-year to 15 years. Assessments were made on day 1 (before yoga) and day 7 (after 1-week of yoga practice). Heart rate variability (HRV), blood pressure (BP) response to the isometric handgrip and heart rate response to deep breathing were assessed before and after 1-week of IAYT. There was a significant reduction in fasting plasma glucose from 154.67-130.27 mg/dL (Wilcoxon signed rank test, P = 0.029) following 1-week of IAYT. BP response to isometric hand
grip improved significantly (Wilcoxon signed rank test, P = 0.01). There was no statistical significant change in HRV components and heart rate response to deep breathing test. However, there was a trend of increase in the low frequency power (41.07%), high frequency power (6.29%), total power (5.38%), and standard deviation of all NN intervals (SDNN) (6.29%). These findings suggest that, IAYT improved autonomic functions in type 2 diabetes patients.

Parikh et al., (2014) assessed the beneficial effects of yoga in the improvements in the pulmonary functions of young healthy adults. The study group consisted of 30 young adults (19 males and 11 females) who were students of first year M.B.B.S., medical college Baroda. They were motivated to participate in yoga workshop for one hour daily for four weeks. The first phase of the recording of the pulmonary parameters (M.V.V,FVC,FEV1,PEFR) was done at the beginning of their course. The second phase of the recording was done after 4 weeks of the regular yoga practice. The data were analysed using student’s Paired T – test. Participants had a mean ±SD age of 17.81 ± 0.48 years, height of 164.21±5.09 cm and weight of 54.34±5.63kg. The MVV(L/MIN) - before yoga practice showed a value of 97.4±24.4 and after , it showed a value of 119±28. The FVC(ml) - before yoga practice showed a value of 2575 ±631and after , it showed a value of 2768 ±618. The FEV1(ml)- before yoga practice showed a value of 2270± 636 and after , it showed a value of 2476 ±570. The PEFR(L/MIN) - before yoga practice showed a value of 479±103 and after , it showed a value of 585±120. For all the parameters, a P value of <0.01 was considered as statistically significant. There was a statistically significant increase in all the above lung parameters in the regular yoga practitioners. This study proposes that regular practice of yoga can improve health related aspects of physical fitness and general wellbeing.
Mullur et al., (2014) determined the anxiety levels in apparently healthy full time housewives and to study the effects of Yoga on anxiety levels among them. Present study is a comparative interventional study. Study was conducted on 50 apparently healthy full time housewives (20-50 years) who attended one month Yoga camp. Hamilton Anxiety (HAMA) Scale was used to evaluate anxiety levels before and at the end of the yoga camp. Statistical analysis was done by Paired t test using SPSS 9.0. The baseline pulse rate, SBP, DBP were 82.90 ± 4.25 bpm, 124.84 ± 11.022 mm Hg, 85.20 ± 10.81 mm Hg respectively. After four weeks yoga camp there was statistically significant lowering of pulse rate (77.58 ± 3.86 bpm), SBP (117.92 ± 6.76 mm Hg), DBP (78.68 ± 6.62 mm Hg). Before yoga training, percentage distributions of subjects with mild, moderate and severe anxiety were 6%, 18% and 76% respectively. At the end of four week yoga training, percentage distributions of subjects with mild, moderate and severe anxiety were 44.23%, 19.23% and 36.53% respectively. There was highly significant (p = 0.000) difference in the mean values of total score before (33.71 ± 4.90) and after (26.93 ± 4.53) yoga. These results indicate that there was a reduction in the severity of anxiety from severe to moderate and mild indicating decrease in anxiety following yoga. Based on the results of our study, we conclude that regular yogic practices and adapting and implementing the principals and philosophy of yoga in day to day life may decrease the anxiety level.

Boulgarides et al., (2014) identified outcome measures that were responsive to change in individuals with PD after an 8-week adaptive yoga program and to determine appropriate sample sizes for future studies. In a repeated measures design, 10 participants with a Hoehn and Yahr stage of 2 or 3 were tested prior to and after an 8-week control phase and again after they underwent an 8-week adaptive yoga program. Analysis of variance (ANOVA) tests revealed differences in time of measure that approached significance for the depression subscale of the Hospital Anxiety and Depression Scale
(HADS) (p = 0.008) and the 30-Second Chair Stand (TSCS) (p = 0.013). The interaction between time of measure and gender approached significance for the Sit-and-Reach Test (SRT) (p = 0.08 and 0.03, right and left respectively), with male participants improving in sit-and-reach flexibility compared with female participants after intervention. The interaction between time of measure and age approached significance for the Single-Leg Balance test (SLB) (p = 0.007), with younger participants improving in SLB time after intervention. Power calculations found that a sample size ranging from 33 to 153 would be required to achieve significance at the 0.01 level in the various outcome measures in a future study of this design. The depression subscale of the HADS, the TSCS, the SLB, and the right and left SRT were the measures that changed following the yoga intervention and are recommended as outcome measures in future studies investigating the effectiveness of yoga for individuals with PD. This preliminary study supports further investigation of adaptive yoga using a randomized design and a larger sample size of individuals with PD.

**Mondal S et al., (2014)** assessed the effect of 12 weeks of yoga therapy on blood sugar and lipid profile in elder women. Twenty elderly (age range 50 to 70 years) women were recruited from two old age home and randomly divided into two groups (n=10) of yogic practice group and control group. Yogic practice group were subjected to regular yoga practice (Asanas, Kriyas, Pranayamas) for 12 weeks (3 sessions per week, 45 minutes per session), while the control group did not participated any regular activity. The dependent variables were fasting plasma glucose, post-prandial blood sugar, total cholesterol, triglycerides, low density lipoprotein, very low density lipoprotein and high density lipoprotein and were examined before and after 12 weeks of yogic intervention in both groups. A significant (p ≤ 0.05) decrease in fasting plasma glucose, post-prandial blood sugar, total cholesterol, triglycerides, low density lipoprotein and very low density lipoprotein; with a significant (p ≤ 0.05) increase in high density lipoprotein level from its
initial value; while showing insignificant result in control group. It may be concluded that adoption of yoga on long term basis would bring proper control of blood sugar and lipid profile levels in elderly women.

**Jyotsna et al., (2012)** found the randomized control trial was to see the effect of Sudarshan Kriya and related practices (comprehensive yogic breathing program) on quality of life, glycaemic control, and cardiac autonomic functions in diabetes. Diabetes mellitus is a risk factor for sudden cardiac death. Cardiac autonomic neuropathy has been implicated in the causation of sudden cardiac death. Therefore, a maneuver to prevent progression of cardiac a total of 120 patients of diabetes on oral medication and diet and exercise advice were randomized into two groups: (1) Continued to receive standard treatment for diabetes. (2) Patients administered comprehensive yogic breathing program and monitored to regularly practice yoga in addition to standard treatment of diabetes. At 6 months, quality of life and postprandial plasma glucose significantly improved in the group practicing yoga compared to baseline, but there was no significant improvement in the fasting plasma glucose and glycated haemoglobin. On per protocol analysis, sympathetic cardiac autonomic functions significantly improved from baseline in the group practicing comprehensive yogic breathing. This randomized control trial points towards the beneficial effect of yogic breathing program in preventing progression of cardiac neuropathy. This has important implications as cardiac autonomic neuropathy has been considered as one of the factors for sudden cardiac deaths.

**Dhaliwal et al., (2014)** determined the effect of 6-week yogic practices on physiological fitness status of university level girls. The research population included, sixty (N=60) female between the age group of 18-25 years were selected as subjects from department of physical education (T). The subjects were purposively assigned into two groups: Group-A: Experiental (N1=30) and Group-B: Control (N2=30). All the subjects
were informed about the objective and protocol of the study. The subjects from Group A were subjected to 6-week of yogic practices. The training consisted of a variety of yogic asanas: (i.e., Standing Postures, Balancing Postures and Backward/Forward Bending Postures). The 6-week yogic practices brought about significant improvement in cardiovascular endurance \( t = 8.92 \), body composition \( t = 16.64 \), muscular strength & endurance \( t = 8.52 \) and flexibility \( t = 15.31 \) in Group (A) as compared with the control one. The 6-week yogic practices had significant effect on cardiovascular endurance, body composition, muscular strength & endurance and flexibility.

**Ramkumar (2014)** assessed the effect of yoga module on Attention and Remembrance. The study started with 800 adolescent students; 159 high anxiety students and 142 low- anxiety students were selected on the basis of scores obtained through Stress Battery. Experimental group and control group were given pre-test to assess their attention as well as short term remembrance. A yoga module consisting of yoga asanas, pranayama, meditation, prayer and a value orientation programme was administered on experimental group for 7 weeks. The experimental and control groups were post-tested for their performance in attention and remembrance tests. The results show that the students, who practiced yoga module yielded higher attention levels and exhibited better short term remembrance.

**Raja, Chidambara S.,(2014)** found out the effect of yogic practices on selected body composition measures and triglycerides among obese women. To achieve this purpose, 20 obese women, with BMI of 30-40 (W/H2), were randomly selected as subjects from various places around Chidambaram. The age of the subjects were ranged from 30 to 35 years. The subjects were further classified at random into two equal groups of 10 subjects each, in which, group - I underwent yogic practices for six days (Monday to
Saturday) per week for sixteen weeks and group - II acted as control who were not allowed to attend any special training. The selected criterion variables such as percentage of body fat, body mass index and triglycerides were measured before and after the yogic practice period. The selected criterion variables were assessed by using Deurenberg et al formula, Quetelet index and Boehringer Mannheim kit method. The collected data were statistically analyzed by using Analysis of Covariance (ANCOVA). From the results of the study it was found that there was a significant reduction in percentage of body fat (p > .05) and body mass index (p > .05) and a significant increase in high density lipoprotein level (p > .05) after the yogic practice when compared with the control group. It was concluded from the result of the study, that yogic practice is a better tool to reduce the percentage of body fat and body mass index and increase the level of high density lipoprotein.

**Parthasarathy S et al, (2014)** determined the implementation of yogic practices has proven benefits in both organic and psychological diseases. Forty-five women with anxiety selected by a random sampling method were divided into three groups. Experimental group I was subjected to asanas, relaxation and pranayama while Experimental group II was subjected to an integrated yoga module. The control group did not receive any intervention. Anxiety was measured by Taylor's Manifest Anxiety Scale before and after treatment. Frustration was measured through Reaction to Frustration Scale. All data were spread in an Excel sheet to be analysed with SPSS 16 software using analysis of covariance (ANCOVA). Selected yoga and asanas decreased anxiety and frustration scores but treatment with an integrated yoga module resulted in significant reduction of anxiety and frustration. To conclude, the practice of asanas and yoga decreased anxiety in women, and yoga as an integrated module significantly improved anxiety scores in young women with proven anxiety without any ill effects.
Pal R et al., (2014) designed to appraise the role of yoga in improving age-related degenerative changes in cardio metabolic risk profile, autonomic function, stress, and BDNF. Healthy active males of three age groups (20-29, 30-39, and 40-49 years) were randomly assigned to practice yoga daily 1 h for 3 months. Significantly higher values of heart rate (HR), blood pressure (BP), load in heart (DoP), myocardial oxygen consumption (RPP), and total cholesterol (TC) were noted in senior age group. HR, BP, DoP, RPP, and TC decreased significantly following yogic practice. High frequency (HF), total power (TP), all time domain variables of heart rate variability (HRV), and skin conductance (SC) were significantly decreased with advancement of age. HF, TP, and time domain parameters of HRV and SC increased significantly following yogic practice. Higher levels of catecholamine and low frequency (LF) power of HRV was noted with advancement of age. Levels of catecholamine and LF significantly decreased following yogic practice. Cortisol and adrenocorticotropic hormone (ACTH) level raised in senior age group. BDNF, serotonin, and dopamine were low in higher age group. Significant decrement of cortisol; ACTH; and increment in serotonin, dopamine, and BDNF was noted following yogic practice. This study revealed that yogic practices might help in the prevention of age-related degeneration by changing cardio metabolic risk factors, autonomic function, and BDNF in healthy male.

Haldavnekar et al., (2014) compared the effect of two yoga practices namely laghushankhaprakshalana (LSP) kriya, a yogic colon cleansing technique and back pain specific asanas (Back pain special technique [BST]) on pain, disability, spinal flexibility and state anxiety in patients with CLBP. In this randomized control (self as control) study, 40 in-patients (25 were males, 15 were females) between 25 and 70 years (44.05 ± 13.27) with CLBP were randomly assigned to receive LSP or BST sessions. The measurements were taken immediately before and after each session of either of
the practices (30 min) in the same participant. Randomization was used to decide the day of the session (3rd or 5th day after admission) to ensure random distribution of the hang over effect of the two practices. Statistical analysis was performed using the repeated measures analysis of variance. Significant group * time interaction (P < 0.001) was observed in 11 point numerical rating scale, spinal flexibility (on Leighton type Goniometer) and (straight leg raise test in both legs), Oswestry Disability Index, State Anxiety (XI component of Spieldberger's state and trait anxiety inventory. There was significantly (P < 0.001, between groups) better reduction in LSP than BST group on all variables. No adverse effects were reported by any participant. Clearing the bowel by yoga based colon cleansing technique (LSP) is safe and offers immediate analgesic effect with reduced disability, anxiety and improved spinal flexibility in patients with CLBP.

2.3. REVIEWS ON MEDITATION

Zeidan F et al, (2010) analysed the effects of brief and sham mindfulness meditation on mood and cardiovascular variables. Eighty-two undergraduate students (34 males, 48 females), with no prior meditation experience, participated in three sessions that involved training in either mindfulness meditation, sham mindfulness meditation, or a control group. Heart rate, blood pressure, and psychological variables (Profile of Mood States, State Anxiety Inventory) were assessed before and after the intervention. The results of the study implied that the meditation intervention was more effective at reducing negative mood, depression, fatigue, confusion, and heart rate, when compared to the sham and control groups. The results indicated that brief meditation training has beneficial effects on mood and cardiovascular variables that go beyond the demand characteristics of a sham meditation intervention.

Roberts-Wolfe D et al., (2012) determined the effects of mindfulness training on emotional information processing (i.e., memory) biases in relation to both clinical
symptomatology and well-being in comparison to active control conditions. Fifty-eight university students (28 female, age = 20.1 ± 2.7 years) participated in either a 12-week course containing a "meditation laboratory" or an active control course with similar content or experiential practice laboratory format (music). Participants completed an emotional word recall task and self-report questionnaires of well-being and clinical symptoms before and after the 12-week course. The result of the study showed that the Mediators showed greater increases in positive word recall compared to controls \[F (1, 56) = 6.6, p = 0.02\]. The meditation group increased significantly more on measures of well-being \[F (1, 56) = 6.6, p = 0.01\], with a marginal decrease in depression and anxiety \[F (1, 56) = 3.0, p = 0.09\] compared to controls. Increased positive word recall was associated with increased psychological well-being \(r = 0.31, p = 0.02\) and decreased clinical symptoms \(r = -0.29, p = 0.03\). These data suggested that mindfulness training may improve well-being via changes in emotional information processing.

**Stefan et al., (2010)** identified the impact of Mindfulness-Based Therapy on Anxiety, depression and mood symptoms in clinical samples. The search identified 39 studies totalling 1,140 participants receiving mindfulness-based therapy for a range of conditions, including cancer, generalized anxiety disorder, depression, and other psychiatric or medical conditions. The result of the study showed that the effect size estimates suggested that mindfulness-based therapy was moderately effective for improving anxiety (Hedges’ g = 0.63) and mood symptoms (Hedges’ g = 0.59) from pre to post-treatment in the overall sample. In patients with anxiety and mood disorders, this intervention was associated with effect sizes (Hedges’ g) of 0.97 and 0.95 for improving anxiety and mood symptoms, respectively. These effect sizes were robust, unrelated to publication year or number of treatment sessions, and were maintained over follow-up. The study suggested that the
mindfulness-based therapy is a promising intervention for the treatment of anxiety and mood problems in clinical populations.

Tanay G et al., (2012) evaluated the effect of a brief mindfulness based preventive intervention on dispositional and state mindfulness; putative proximal factors/processes engendered through the development of mindfulness, including increased decentring and reduced experiential avoidance and distal mood and anxiety vulnerability factors, including reduced depression-related dysfunctional attitudes, anxiety sensitivity and negative affectivity among a university-community sample in Israel. Fifty-three adult participants between the ages of 20 and 52 (M (age) = 25.2 years, SD (age) = 4.3 years; 65.4% women) were recruited from the Haifa University community. Nineteen participants were randomly assigned to an experimental condition M (age) = 25.3 years, SD (age) = 4.3 years; 66% women) and studied prospectively over the course of a Four-session (21-day) mindfulness skills training intervention; and 34 participants were randomly assigned to a no-intervention (control) condition (M (age) = 24.9 years, SD (age) = 2.4 years; 64.7% women) and studied prospectively. The study demonstrated statistically robust and clinically significant relations between mindfulness and the theorized proximal and distal mood and anxiety vulnerability factors.

Vazquez-Montes M et al., (2012) juxtaposed mindfulness-based cognitive therapy with unrestricted services for health anxiety (hypochondriasis) by comparing the impact of MBCT in addition to usual services (unrestricted services) with unrestricted services (US) alone. The 74 participants were randomized to either MBCT in addition to US (n = 36) or US alone (n = 38). Participants were assessed prior to intervention (MBCT or US), immediately following the intervention, and 1 year post intervention. In addition to
independent assessments of diagnostic status, standardized self-report measures and assessor ratings of severity and distress associated with the diagnosis of hypochondriasis were used. The result of the study showed that the intention to treat (ITT) analysis (N = 74), MBCT participants had significantly lower health anxiety than US participants, both immediately following the intervention (Cohen's d = 0.48) and at 1-year follow-up (d = 0.48). The per-protocol (PP) analysis (n = 68) between groups effect size was d = 0.49 at post intervention and d = 0.62 at 1-year follow-up. Meditational analysis showed that change in mindfulness mediated the group changes in health anxiety symptoms. Significantly fewer participants allocated to MBCT than to US54et criteria for the diagnosis of hypochondriasis, both immediately following the intervention period (ITT 50.0% vs. 78.9%; PP 47.1% vs. 78.4%) and at 1-year follow-up (ITT 36.1% vs. 76.3%; PP 28.1% vs. 75.0%).

Kumar, et al., (2012) correlated performance in a substitution task and state anxiety following yoga in army recruits among 140 men (M age = 30.3 yr., SD = 5.7) from Indian army in north India. They were naive to yoga and were assigned to yoga and breath awareness groups randomly, with 70 in each group. 20 healthy males of comparable age (M age = 33.7 yr., SD = 7.0) formed a comparison group. Their performance in a digit-letter substitution task and a state anxiety subscale was assessed immediately before and after two 45-min. sessions. The two groups of soldiers practiced either yoga or breathe awareness. The comparison group listened to meditation music. Digit-letter substitution scores increased in both groups of army personnel and in the comparison group. The study stated that the anxiety decreased after yoga and listening to meditation music, but not after breath awareness. The study suggested that even in army personnel naive to yoga, a yoga-based intervention or listening to meditation music could reduce anxiety while increasing performance on an attention task.
Monti DA et al., (2012) focused upon the changes in cerebral blood flow and anxiety associated with an 8-week mindfulness programme in women with breast cancer employing the functional magnetic resonance to evaluate changes in cerebral blood flow. The research population consisted of eighteen breast cancer patients of the age group 52-77 were randomized to the MBAT or education control group. A voxel-based analysis was performed to assess differences at rest, during meditation and during a stress task. The anxiety sub-scale of the symptoms Checklist-90-Revised was compared with changes in resting CBF before and after the programmes. Subjects in the MBAT arm demonstrated significant increases in CBF at rest and during meditation in multiple limbic regions, including the left insula, right amygdala, right hippocampus and bilateral caudate. Patients in the MBAT programme also had a significant correlation between increased CBF in the left caudate and decreased anxiety scores. In the MBAT group, responses to a stressful cue resulted in reduced activation of the posterior cingulate. The results demonstrated that the MBAT programme was associated with significant changes in CBF, which correlated with decreased anxiety over an 8-week period.

Chen Y, et al., (2012) evaluated the effects of brief mindfulness meditation on anxiety symptoms and systolic blood pressure in Chinese nursing students”. One hundred and five nursing students were randomly approached by email and seventy-two responded. Sixty recruited students were randomized into meditation and control group (n=30 each) after screening and exclusion due to factors known to influence mood ratings and autonomic nervous system measures. The meditation group performed mindfulness meditation 30min daily for 7 consecutive days.
The control group received no intervention except pre-post treatment measurements. The Self-Rating Anxiety Scale and Self-Rating Depression Scale were administered to participants, and heart rate and blood pressure were measured. Pre- and post-treatment data were analysed using repeated-measures analysis of variance. The present study examined that the mindfulness meditation was beneficial for Chinese nursing students in reducing anxiety symptoms and lowering systolic blood pressure. Individuals with moderate anxiety are most likely to benefit from a short-term mindfulness meditation program.

John M. Grohol, (2012) investigated the effectiveness of mindfulness cognitive therapy in reducing the anxiety of patients with bipolar disorder. The study started with 95 patients with bipolar disorder, who were at least 18 years old. They were either assigned to MBCT or typical therapy. Those in the MBCT group received weekly mindfulness meditation practice, cognitive therapy regarding depression, and psycho education. All of the participants were assessed at baseline and follow up using the Montgomery-Asberry Depression Rating Scale (MADRS), the Young Mania Rating Scale (YMRS), the Depression Anxiety Stress Scales, and the State Trait Anxiety Inventory (STAI). They were also evaluated for mood episode recurrences over the study period. Overall, 34 participants assigned to the MBCT group finished the program and were assessed at follow up. The findings revealed that there were no significant differences between the two groups regarding improvements in MADRS and YMRS scores over the 12-month study period.

Thorsten, et al., (2009) focused upon Mindfulness-based cognitive therapy as a treatment for chronic depression. To achieve this purpose currently symptomatic patients with at least three previous episodes of depression and a history of suicidal ideation were randomly allocated to receive either MBCT delivered in addition to treatment-as-usual
Depressive symptoms and diagnostic status were assessed before and after treatment phase. Self-reported symptoms of depression decreased from severe to mild levels in the MBCT group while there was no significant change in the TAU group. Similarly, numbers of patients meeting full criteria for depression decreased significantly more in the MBCT group than in the TAU group. Results are consistent with previous uncontrolled studies. Although based on a small sample and, therefore, limited in their generalizability, they provide further preliminary evidence that MBCT can be used to successfully reduce current symptoms in patients suffering from a protracted course of the disorder.

Anita David, (2013) assessed the effectiveness of yoga on academic motivation, adjustment behaviour and self-esteem among adolescents with low scholastic performance with the selected background variables. The investigator applied Imogene King’s Goal Attainment Theory in selected schools at Chennai. Stratified sampling technique was instituted to select the samples. The sample consisted of 300 adolescents both boys and girls with low academic performance and adjustment behaviour, 150 for the study group and 150 for the control group. Manipulation included the lecture cum demonstration on yoga for 5 school days and a booklet was issued followed by supervised practice on yoga for 89 days. The tool consisted of four modules including demographic variables, Academic Achievement Motivation Questionnaire (AAMQ), pre-quarterly test, quarterly examination marks and pre-half yearly test and half-yearly examination marks, Bells Adjustment Inventory (BAI) Indian adaptation and Self-Esteem Inventory (SEI). The study group showed a high level of improvement in the academic motivation with the mean score of 142.80 and SD 6.80 and in the control group the mean score was 95.32 with SD 7.18 during post-test II which is statistically highly significant at plt0.001. The result
depicted that the adolescents of the study group had high improvement in the adjustment behaviour than that of the control group.

2.4. REVIEWS ON BRAIN FITNESS

Thomas (2012) contacted a study on the effect of different movement exercises on cognitive and motor abilities. The influence of physical activity on motor and cognitive performance has been approved in several studies. However, it is still unclear which functions are affected, and why. It also remains unknown what type of physical training is best suitable. The present study focuses on special movement aspects based on the Brain Gym® program. Four groups of subjects (n = 64) participated in two experiments with pre-post intervention design. In experiment 1, two groups of subjects were exposed to a sensorimotor adaptation study design by executing center out pointing movements under distorted visual feedback conditions with their dominant and non-dominant arm to test for inter manual transfer (IMT) as pre- and post-test. The intervention in both groups consisted of specified movement exercises with the right and left extremities: participants of Experimental group executed movements crossing the body midline and participants of Control group movements without crossing the body midline. Results showed a decreased retention of adaptation but larger IMT for Experimental group during post-test. We conclude that movements crossing the body midline impede retention but enhance IMT of sensorimotor adaptation. A potential relationship to an improvement of communication between the cerebral hemispheres evoked by the movement exercises crossing the body midline is rather speculative. In experiment 2, two groups were exposed to the d2-test measuring concentration and attention and a dice-test testing for visual-spatial abilities as pre- and post-test. The interventions were similar to experiment 1. Results yielded no
Rehab Hafez (2017) effect of brain gym on manipulating skills and balance for beginners in rhythmic gymnastics. Brain Gym used in over 80 countries in Education, Business, Sport and the Performing arts with profound and lasting results. Brain Gym helps to release any ‘block’ that is holding you back from enjoying the best you can be. It is that simple. The purpose of this study was to investigate the effect of brain gym on manipulating skills and balance for beginners in rhythmic gymnastics. Twenty young rhythmic gymnastics, divided into two groups. The experimental group (n = 10) performed brain gym and control group (n = 10) performed traditional exercise. The physical and skilful variables collected before and after eight weeks. Subject's parents and coaches were required to read and complete a health questionnaire and informed consent document; there was no history of injuries, diabetes or recent surgery. Significant difference between experimental group and control group in Standing Stork Test, dynamic balance and Performance level of Manipulating Skills (MS) for post-test to the experimental group. Finally, brain gym program for 8 weeks, resulted in an increase in Standing Stork Test, dynamic balance and Performance level of Manipulating Skills. These results have to be taken into account by coaches in order to better understand and applicant of brain gym concepts for technical effects of training.

Ramkumar N.R 2014) the effect of brain gym® on academic engagement for children with developmental disabilities. Following recent legislative initiatives in education requiring evidence-based practices, schools have implemented various instructional programs characterized as evidence-based. However, it is important to
question whether these methods are truly effective. One example of a methodology currently promoted and used in schools is an educational kinesiology program called Brain Gym®. Brain Gym® is reported to improve various education related skills. The purpose of this study is to investigate the effect of Brain Gym® on academic engagement for children with developmental disabilities. In this study, Brain Gym® was compared to an alternate intervention, simple physical activity, which did not conform to Brain Gym® guidelines. Neither intervention produced consistently positive effects for academic engagement. Based on these findings, it is questionable whether Brain Gym® can successfully be used with children with developmental disabilities to improve engagement. These results can inform the decision-making process of selecting evidence-based practices in education.

Thomas J.H. Keeley and Kenneth R. Fox (2009) made study on impact of physical activity and fitness on academic achievement and cognitive performance in children. The potential for physical activity and fitness to improve cognitive function, learning and academic achievement in children has received attention by researchers and policy makers. This paper reports a systematic approach to identification, analysis and review of published studies up to early 2009. A three-step search method was adopted to identify studies that used measures of physical activity or fitness to assess either degree of association with or effect on a) academic achievement and b) cognitive performance. A total of 18 studies including one randomized control trial, six quasi-experimental and 11 correlational studies were included for data extraction. No studies meeting criteria that examined the links between physical activity and cognitive function were found. Weak positive associations were found between both physical activity and fitness and academic
achievement and fitness and elements of cognitive function butt was not supported by intervention studies. There is insufficient evidence to conclude that additional physical education time increases academic achievement; however there is no evidence that it is detrimental. The quality and depth of the evidence base is limited. Further research with rigor beyond correlation all studies is essential.

**Muchsin Doewes (2009)** contacted a study on exercise and brain health in elderly people, physical ability and physiological function of organs will decrease and bebagai kinds of disease began to emerge. To handle the elderly to maintain their quality of life, then do physical activity such as aerobic exercise. However, aerobic exercise began to be abandoned and shifted to the brain gym. This condition is skewed because the aim of improving brain health as well as efforts to improve the quality of life of elderly people become less optimal. So far, the benefits of aerobic exercise and sports mix of the brain that can empower the physical fitness and brain health in elderly has not been found. This paper aims to find a model combination of aerobic exercise and exercise the brain in order to further improve the physical fitness and brain health. The combination of aerobic exercise and exercise the brain in elderly is not only good for physical fitness, but also can improve brain health. Participation in the program of regular exercise on the elderly is a very effective modality to reduce and prevent a decline in function associated with aging problems. Potential benefits from a combination of aerobic exercise and exercise the brain that develops behind the marker of physical fitness at the same time may affect brain health.

**Karen J. Miller, (2013)** effect of a computerized brain exercise program on cognitive performance in older adults’ research indicates an association between
stimulating mental activities and better memory performance as people age, but studies on computerized mental stimulation programs are limited. We explored whether computerized brain training exercises improved cognitive performance in older adults. Methods: In local retirement communities, a convenience sample was randomized into an intervention group (N = 36), who used a computer program 5 days a week for 20e25 minutes each day, or a wait-list control group (N = 33). All were older adults without dementia (mean age: 81.8 years; SD: 6.1; 67% female). Neuropsychological testing was completed at baseline (Time 1), 2 months (Time 2), and 6 months (Time 3). Three cognitive domains (Immediate Memory, Delayed Memory, and Language) were compared in the two groups as a function of time using mixed models. Results: The intervention group used the computerized program (Brain Fitness, Dakim Inc., Santa Monica, CA) for an average of 43 (SD: 4.4) sessions by Time 2 and 81 (SD: 37.5) sessions by Time 3. Mixed models examining cognitive domains as function of time revealed significant group differences in Delayed Memory (F(2,72) = 4.7, p = 0.01) but not Immediate Memory and Language; no significant improvements were noted for the control group. Among all participants, anyone playing at least 40 sessions over the 6 months improved in all three domains (Immediate Memory, Delayed Memory, and Language). Conclusion: Participating in a computerized brain exercise program over 6 months improves cognitive abilities in older adults. These results extend literature indicating the benefit of training exercises, whether in a classroom format or via a computerized self-paced program. (Am J Geriatr Psychiatry 2013; 21:655e663).

**Ventura C.A (2003)** made a study on training the brain: Fact and fad in cognitive and behavioural remediation putatively safe and effective for improving cognitive performance in both health and disease, products purported to train the
brain appeal to consumers and healthcare practitioners. In an increasingly health-centred society, these applications constitute a burgeoning commercial market. Sparse evidence coupled with lack of scientific rigor, however, leaves claims concerning the impact and duration of such brain training largely unsubstantiated. On the other hand, at least some scientific findings seem to support the effectiveness and sustainability of training for higher brain functions such as attention and working memory. In the present paper we provide a tectonic integration and synthesis of cognitive training approaches. Specifically, we sketch the relative merits and shortcomings of these programs, which often appeal to parents who must choose between side-effect-laden medication and other less conventional options. Here we examine how neuroplasticity allows the healthy as well the impaired to benefit from cognitive training programs. We evaluate the evidence and consider whether brain training can be a stand-alone treatment or an adjunct to pharmacotherapy, outline promising future prospects, and highlight what training outcomes are plausible in line with available data. Future research would determine whether the field of brain training realizes its potential to revolutionize education and rehabilitation or withers away engulfed in controversy.

**Vasistha et al. (2015)** conducted a study to explore emotional intelligence in relation to academic motivation. Sample for the study included 156 children of (78 boys and 78 girls) class XI residing at Allahabad city. ‘Test of Emotional Intelligence (Student-Form)’ of K. S. Misra, and ‘Academic Motivation Inventory’ developed by J. P. Srivastava were used as tools for the study. The values of coefficient of correlation between academic motivation and emotional intelligence for total sample (= .327), boys (= .404) and girls (= .223) are significant at .01/.05 level. It means that emotional intelligence
is positively related to academic motivation in both boys and girls. It may be due to the reason that as academic motivation of students’ increases they are better motivated to handle, manage and control their own emotions. The study also revealed that students with high, moderate and low academic motivation differ from one another on emotional intelligence. Further observation shows that students (both boys & girls) with high academic motivation had high emotional intelligence as compared to the students with low academic motivation.

Tomporowski, Davis et al., (2008) analysed the relationship between the exercise and children’s intelligence, cognition and academic achievement. The contemporary cognitive theory development directed towards exercise and recent research demonstrating the salutary effects of exercise on adults cognitive functioning and studies conducted with animals that have linked physical activity to changes in neurological development and behaviour. Similar to adults, exercise facilitates children’s executive function (i.e., process required to select, organize and properly initiate goal directed). Exercise may prove to be simple, yet important, method of enhancing those aspects of children’s mental functioning central to cognitive development.

2.5. SUMMARY OF REVIEW LITERATURE

To have a clear and comprehensive picture in current status of Yogic training, meditation and brain exercises, the research studies conducted in this area had been reviewed. The investigator have gone through various periodicals, journals, relevant books, master and doctoral theses and research quarterlies on physical education, meditation and brain fitness. The reviews summaries the effect of Yogic Training, Meditation and Brain exercises and also their contribution to the developing sports scenario. However no study has been reported to examine the effects of those trainings
such as Yogic Training, Meditation and Brain exercises in Tribal school students. Hence
the present study is the first attempt to evaluate the efficacy of Yogic training, Meditation
and Brain exercises as a new area of investigation.