CHAPTER II

REVIEW OF RELATED LITERATURE

The research for reference material is a time consuming but fruitful phase of the graduate programme. A familiarity with the literature in any problem area helps the students to discover what is already known, what others have attempted to find out, what methods have been promising disappointing, and what problems remain to be solved.

The literature in any field forms the foundation upon which all future work will be built." The reviews of literature are generally used as a basis for inductive reasoning for locating and synthesizing all the relevant literature on a particular topic.

The present chapter covers the available literature pertaining to the psycho-somatic regulative programmes, namely, yogic practices, progressive relaxation techniques and physical exercises. The review of literature has been collected from a number of pertinent studies undertaken by the physical educationists, sports scientists and sports administrators. Considering the purpose of the present study the reviews have been mainly classified into the following aspects:

1. Studies on Yoga as Relaxation Training
2. Studies on Progressive Muscular Relaxation Training
3. Studies on Physical Exercises as Relaxation Training

2.1 STUDIES ON YOGA AS RELAXATION TRAINING

Jayachitra and Pauline (2011) conducted a study to find out the effect of yoga Nidra on dimension of anxiety and achievement motivation among women physical education students. For this study, sixty students were selected from Sri Sarada College of physical Education for women, Salem at random aged 25 – 30 years. They were divided into two groups namely Nidra group and Control group. The Nidra group was exposed to Yoga Nidra relaxation training at the end of their regular activities and the Control group was not given any specific training besides their regular activities for twelve week. The collected data on anxiety and achievement motivation were statistically analysed using dependent 't' ratio as recommended by Clarke and 0.05 level was fixed as level of significance. The result of the study revealed that Yoga Nidra relaxation training positively influenced the selected psychological variables among the selected physical education students.

Arunachalam (2011) The complete breath technique, also called three part breathing, slowly fills and empties the entire lung capacity. A smooth maximum inhalation is accomplished by first expanding the abdomen and

lower rib cage, then expanding the middle rib cage, and finally expanding the upper rib cage. A breathing pattern characterized as rapid, low-tidal volume, predominantly thoracic ventilation with relatively low alveolar and blood concentrations of carbon dioxide is associated with psychological characteristics of anxiety, neurosis, depression, phobic Yoga Breathing behavior and high levels of perceived and objective stressors. Voluntary performance of this breathing pattern seems to intensify subjective and physiological indicators of anxiety when exposed to stress. Abdominal breathing may help stretch and relax the diaphragm in persons who manifest stress by excessive tonic diaphragm contraction. Breathing cause rhythmic pressure on and movement of the abdominal organs, which could affect the functioning of those organs. In fact, a yoga breathing exercise of pulling in the abdominal muscles during exhalation is claimed to create perfect digestion. Yogic breathing practices provider no known health threats to normal persons when carried out in accordance with the usual instructions and precautions. However, persons with cardiac abnormalities should have approval from a physician and be careful to avoid hyperventilation during rapid breathing and to avoid marked heart rate changes during breath holding.

Kovacic and Kovacic (2011) gathered information on the immediate and short-term effects of relaxation training according to the Yoga In Daily Life system on the self-esteem of patients with breast cancer. Design: This is a parallel-groups design. Settings/location: Baseline interventions took place

at the Institute for Oncology of Ljubljana (Slovenia). At discharge, the experimental group was issued with audiocassette recordings containing the instructions for relaxation training to be practiced individually at home for an additional 3 weeks. The convenience sample of 32 patients with breast cancer was recruited from an accessible population of hospitalized women. Patients were randomized to the experimental (n=16) and to the control group (n=25). I Both groups received the same standard physiotherapy for 1 week, while the experimental group additionally received a group relaxation training sessions according to the Yoga in Daily Life system. At discharge, the experimental group was issued with audiocassette recordings containing similar instructions for relaxation training to be practiced individually at home for an additional 3 weeks. Outcome measures were obtained by blinded investigators (physiotherapists) using standardized questionnaires (Rosenberg Self-Esteem Scale) at baseline (after the surgery); at 1 week (1 week postattendance; at discharge); and at 4 weeks (4 weeks postattendance); prior the commencement of radiation. Analysis of variance showed that there were statistically significant differences between the experimental and control group in all measuring self-esteem scores over the study period ($p<0.0005$). At the same time, the control group's scores remained unchanged over the study period ($p>0.05$). The results indicate that relaxation training according to the Yoga in Daily Life system could be a useful clinical physiotherapy intervention for patients who have breast cancer

and who are experiencing low self-esteem. Although this kind of relaxation training can be applied to clinical oncology in Slovenia, more studies need to be done.

Nieuwsma et al. (2011) used quantitative and qualitative measures modeled on the Explanatory Model Interview Catalogue (EMIC) to elicit beliefs about the symptoms, causes, treatments, and stigma associated with depression. Data were collected from 92 students at a university in the Himalayan region of Northern India and from 97 students at a university in the Rocky Mountain region of the United States. U.S. participants in this study were included primarily to approximate a "Western baseline" (in which professional conceptions of depression are predominantly rooted) from which to elucidate Indian perspectives. Compared to U.S. participants, Indian participants were more likely to view restive symptoms (example irritation, anxiety, difficulty thinking) as common features of depression, to view depression as the result of personally controllable causes (example failure), to endorse social support and spiritual reflection or relaxation (example yoga, meditation) as useful means for dealing with depression, and to associate stigma with depression. Efforts aimed at reducing depression among Indians should focus more on implementing effective and culturally acceptable interventions, such as yoga, meditation, and increasing social support.

Manocha et al. (2011) assessed the effect of meditation on work stress, anxiety and mood in full-time workers. 178 adult workers participated in an 8-week, 3-arm randomized controlled trial comparing a "mental silence" approach to meditation (n = 59) to a "relaxation" active control (n = 56) and a wait-list control (n = 63). Participants were assessed before and after using Psychological Strain Questionnaire (PSQ), a subscale of the larger Occupational Stress Inventory (OSI), the State component of the State/Trait Anxiety Inventory for Adults (STAI), and the depression-dejection (DD) subscale of the Profile of Mood States (POMS). There was a significant improvement for the meditation group compared to both the relaxation control and the wait-list groups the PSQ (P = .026), and DD (P = .019). Mental silence-orientated meditation, in this case Sahaja Yoga meditation, is a safe and effective strategy for dealing with work stress and depressive feelings. The findings suggest that "thought reduction" or "mental silence" may have specific effects relevant to work stress and hence occupational health.

Rani, et al. (2011) assessed the impact of Yoga Nidra on psychological problems in patients with menstrual disorders. Patients were recruited from the Department of Obstetrics and Gynecology, C.S.M. Medical University (erstwhile KGMU), Lucknow, Uttar Pradesh, India. A total of 150 female subjects were randomly divided into two groups: 1) group of 75 subjects (with yogic intervention) and 2) a control group of 75 subjects (without yogic intervention). Assessment of psychological general wellbeing (tool) was used

for all the subjects Assessment of psychological general well being (tool) was used for all the subjects (Cases and controls). This assessment was done twice first time in the beginning (baseline) and then after six months. Anxiety decreased significantly (P<0.003) and depression decreased significantly (P<0.01) in the Yogagroup. Positive wellbeing and general health improved significantly (P<0.02), and vitality improved significantly (P<0.01) after six months of Yoga therapy (Yoga Nidra) in the Yoga group compared with the control group. The current findings suggest that patients with menstrual irregularities having psychological problems improved significantly in the areas of their wellbeing, anxiety and depression by learning and applying a program based on Yogic intervention (Yoga Nidra).Narasimhan, Nagarathna and Nagendra (2011) examined the safety and feasibility of conducting a weeklong free yogacamp, and assess its impact on the negative and positive affect in normal healthy volunteers. In this open-arm study450 participants were taught integrated yoga module. It included asanas, pranayama, relaxation, notional correction and devotional sessions. Assessment was carried out on the first and last day of the camp, using a modified version of Positive Affect Negative Affect Scale (PANAS). It has ten questions each to measure positive (PA) and negative affect (NA). Nine questions have been added which are referred as other positive affect (OPA) and other negative affect (ONA) domains. Three hundred and twelve sets of pre-post data were analyzed. There was an increase in PA of PANAS by 13%

(P<0.001, Wilcoxon's signed rank test) and OPA by 17% (P<0.001). The NA reduced by 47% (P<0.001) and ONA by 48% (P<0.001). It is feasible and safe to conduct a weeklong yoga camp in an urban setting, and integrated yogapractices can reduce the negative affect and increase the positive affect within one week.

Chong et al. (2011) reviewed and critical appraisal of the effect of yoga on stress management in healthy adults.A systematic literature search was performed to identify randomized controlled trials (RCTs) and clinical controlled trials (CCTs) that assessed the effects of yoga on stress management in healthy adults. Selected studies were classified according to the types of intervention, duration, outcome measures, and results. They were also qualitatively assessed based on Public Health Research, Education and Development standards. The systematic review was based on eight RCTs and CCTs that indicated a positive effect of yoga in reducing stress levels or stress symptoms. However, most of the studies had methodological problems in that the intervention duration was short and limited follow-up data was available. This review revealed positive effects of yoga on stress reduction in healthy adult populations.

Chong, et al. (2011) evaluated and compared the appropriateness of the Silver Yoga exercise programme for community and institutional elders and to determine their preferences towards yoga exercises. A convenience

sample of 97 participants (64 community elders; 33 institutional elders) was interviewed individually after six months of Silver Yoga exercises. Participants rated the level of difficulty, acceptability, feasibility and helpfulness of the Silver Yoga programme (four phases: warm-up, hatha yoga, relaxation and guided-imagery meditation) and the abdominal breathing technique, based on a 10-point Cantril ladder scale. Further, participants expressed their preferences of yoga exercises based on four open-ended questions. The programme was fairly acceptable, feasible and helpful for community and institutional elders (means ranged from 8·33-9·70). The warm-up, relaxation, guided-imagery meditation and abdominal breathing are fairly easy to follow and perform (means ranged from 0·20-0·94). However, the postures in hatha yoga phase were relatively challenging but still manageable for the institutional elders (mean = 1·97, SD 2·33). Further, community elders preferred to practise yoga 61-90 minutes everyday in a group of 11-20, while the institutional elders preferred to practise yoga 31-60 minutes three times per week, in a group of <10. The Silver Yoga exercise programme is acceptable, feasible, helpful and manageable for community and institutional elders. However, different exercise protocols, such as practice intensity and group size, could be applied to different older populations.

Engstrom, et al. (2010) investigated whether moderately experienced meditators activate hippocampus and the prefrontal cortex during silent mantra meditation, as has been observed in earlier studies on subjects with

several years of practice. Subjects with less than 2 years of meditation practice according to the Kundalini yoga or Acem tradition were examined by functional magnetic resonance imaging during silent mantra meditation, using an on-off block design. Whole-brain as well as region-of-interest analyses were performed. The most significant activation was found in the bilateral hippocampus/parahippocampal formations. Other areas with significant activation were the bilateral middle cingulate cortex and the bilateral precentral cortex. In conclusion, the main finding in this study was the significant activation in the hippocampi, which also has been correlated with meditation in several previous studies on very experienced meditators.

Field, Diego and Hernandez-Reif (2010) determined the immediate effects of a combined form of Tai chi/yoga. 38 adults participated in a 20-min Tai chi/yoga class. The session was comprised of standing Tai chi movements, balancing poses and a short Tai chi form and 10 min of standing, sitting and lying down yoga poses. The pre- and post- Tai chi/yoga effects were assessed using the State Anxiety Inventory (STAI), EKG, EEG and math computations. Heartrate increased during the session, as would be expected for this moderate-intensity exercise. Changes from pre to post-session assessments suggested increased relaxation including decreased anxiety and a trend for increased EEG theta activity. The increased relaxation may have contributed to the increased speed and accuracy noted on math computations following the Tai chi/yoga class.

2.2 STUDIES ON PROGRESSIVE MUSCULAR RELAXATION TRAINING

Rees, (2011) made efforts to identify potential training to enhance comprehensive soldier fitness, this analysis searched MEDLINE via PubMed and elsewhere for 33 reasonably significant modalities, screening over 11,500 articles for relevance regarding soldier resilience. Evaluation of modalities that are exclusively educational or cognitive/behavioral in nature is deferred. Using the volume and quality of research over 40 parameters distributed among the five domains of resilience (physical, emotional, spiritual, social, and family life), these data allow culling of most of the meditative modalities and discrimination among the remaining techniques. The resulting order of merit is Transcendental Meditation, mindfulness, and progressive muscle relaxation. Transcendental Meditation, mindfulness, and progressive musclerelaxation, in that order, have the most supporting data. Fortuitously, they also represent a cross section of the domain of techniques regarded as meditation, stress management, or relaxation, with three very different mechanisms of action. They are suitable potential options for improving soldier resilience.

Vancampfort, et al. (2011) investigated the scientific evidence of the effects of introducing body-directed techniques into psychomotortherapy for patients with schizophrenia. PubMed, PEDro, CINAHL, psycINFO and SPORTDiscus were searched form 1 January, 2000, tot 1 January 2011, for

reports of randomised controlled trials, controlled clinical trials and for studies wit a different design. The Tijdschrift voor Psychiatrie (the Dutch Journal of Psychiatry), the Tijdschrift voor Vaktherapie (The Journal for Special therapies) and Actuele Themata (Actual Themes) in psychomotor therapy were also screened. The quality of the methodology was assessed with the help of a checklist. Evidence for the efficacy of the interventions was summarised on the basis of a best-evidence synthesis. Eleven studies satisfied our inclusion and exclusion criteria. There was a strong evidence for the reduction of psychiatric symptoms after yoga and reduced feelings of anxiety and stress after progressive muscle relaxation. There is limited evidence for yoga in reducing feelings of anxiety and stress and for body-directed group techniques in reducing negative symptoms. Qualitative research reported that mindfulness – and massage-techniques were able to considerably reduce feelings of stress. There is no evidence for the beneficial effects of dancing techniques. A body-directed approach can be effective an deserves to be included in the multidisciplinary treatment of schizophrenia.

Moritz, Treszl and Rufer, (2011) reported that nail-biting is currently classified as an impulse control disorder not otherwise specified. Although seldom targeted as a primary symptom, nail-biting is often associated with somatic complications and decreased quality of life. The present study assessed the effectiveness of an innovative self-help technique, titled

decoupling (DC). DC aims at attenuating pathological nail-biting by performing motor sequences that decouple and rearrange the behavioral elements involved in the habit. A total of 72 participants with excessive nail-biting were recruited via specialized self-help forums and were randomized to either DC or progressive muscle relaxation (PMR) groups after baseline assessment. Four weeks later, participants underwent a similar assessment as before and were asked to rate the effectiveness of the intervention. The primary outcome parameter was the Massachusetts General Hospital Scale (MGH) adapted. Relative to the PMR group, the DC group showed significant progress in withstanding the urge to bite their nails. Furthermore, they appraised the appearance of their nails as considerably less compromised at the end of the treatment relative to participants undergoing PMR. At statistical trend level, the DC group showed a significantly greater decline on the adapted MGH relative to PMR. Despite methodological limitations, the present study asserts that the effectiveness of DC, previously shown for trichotillomania, extends to nail-biting.

Vancampfort, et al. (2011) examined the efficacy of a single progressive muscle relaxation session compared with a control condition on state anxiety, psychological stress, fatigue and subjective well-being in patients with schizophrenia.Sixty-four out of 88 eligible patients with schizophrenia. Patients were randomly assigned to either a single progressive muscle relaxation session during 25 minutes or a resting control

condition with the opportunity to read for an equal amount of time. Before and after the single interventions the State anxiety inventory and the Subjective exercise experiences scale were completed. Effect sizes were calculated. Only within progressive muscle relaxation, participants (n=27) showed decreased state anxiety,psychological stress and fatigue and increased subjective well-being. Between-group differences in post scores were found for state anxiety, subjective well-being and psychological stress, but not for fatigue. The effect size favouringprogressive muscle relaxation was 1.26 for subjective well-being and -1.25 and -1.02 for respectively state anxiety andpsychological stress. Progressive muscle relaxation is highly effective in reducing acute feelings of stress and anxiety in patients with schizophrenia. A reduction in stress and state anxiety is associated with an increase in subjective well-being.

Chan, et al. (2011) documented that Neuro-electrophysiological studies on meditative breathing revealed its association with either a relaxed or an attentive state. The present study aimed to investigate whether the Shaolin Dan Tian Breathing (DTB) technique, which consists of the Passive and Active subtypes and can be considered as a relaxation exercise and Qigong, would induce both relaxed and attentive states. Twenty-two adults and 22 age-, gender- and education-matched controls received training on the Shaolin DTB (experimental group) and the progressive muscle relaxation respectively for one month. Eyes-closed resting EEG data before and

immediately after each type of breathing were obtained individually at baseline and after one-month training. At baseline, the EEG changes after the Shaolin DTB between both groups were comparable. After one-month training, participants in the experimental, but not the control, group showed enhanced temporal alpha asymmetry (an index of relaxation and positive mood) after performing the Passive DTB for five minutes, and enhanced intra- and inter-hemispheric theta coherence (an index of attention and alertness) after performing the Active DTB. The present findings suggested a positive effect of the Shaolin DTB technique on enhancing human neural activity and connectivity, which may possibly enhance mood state and cognitive functions.

Kang, (2010) conducted a study to review various relaxation and meditation intervention methods and their applicability for a preventive service program. The author of this paper tried to find various relaxation and meditation programs through a literature review and program searching and to introduce them. The 'Relaxation Response' and 'Mindfulness Based Stress Reduction (MBSR)' are the most the widely used meditative programs in mainstream medical systems. Abdominal breathing, Progressive Musclular Relaxation (PMR), Relaxative Imagery, Autogenic Training (AT) and Biofeedback are other well-known techniques for relaxation and stress management. I have developed and implemented some programs using these methods. Relaxation and meditation classes for cancer patients and a

meditation based stress coping workshop are examples of this program. Relaxation and meditation seem to be good and effective methods for primary, secondary and tertiary preventive service programs. Program development and standardization and further study are needed for more and wider use of the mind-body approach in the preventive service area of medicine.

Chen and Francis, (2010) examined the effect of a 6-week combined abbreviated progressive relaxation technique (APRT) and guided imagery (GI) intervention for the management of chronic pain (N=19) and, using power analysis, explore recommended sample sizes for future clinical trials. Results indicated consistent and clinically significant trends of improvement on pain (McGill Pain Questionnaire, visual analog scale), mental health (Depression Anxiety and Stress Scale), all domains of quality of life (RAND-36 Health Survey), and sleep for the treatment group only. Owing to inadequate power in this study, these results were not statistically significant. Methodologic concerns, along with suggestions for an improved intervention protocol, are discussed. It is concluded that there is strong preliminary evidence for the efficacy of APRT and GI as an adjunct to conventional treatment options for chronic pain.

Aurora, et al. (2010) reported that prazosin is recommended for treatment of Post traumatic Stress Disorder (PTSD)-associated nightmares.

Level A. Image Rehearsal Therapy (IRT) is recommended for treatment of nightmare disorder. Level A. Systematic Desensitization and Progressive Deep Muscle Relaxation training are suggested for treatment of idiopathic nightmares. Level B. Venlafaxine is not suggested for treatment of PTSD-associated nightmares. Level B. Clonidine may be considered for treatment of PTSD-associated nightmares. Level C. The following medications may be considered for treatment of PTSD-associated nightmares, but the data are low grade and sparse: trazodone, atypical antipsychotic medications, topiramate, low dose cortisol, fluvoxamine, triazolam and nitrazepam, phenelzine, gabapentin, cyproheptadine, and tricyclic antidepressants. Nefazodone is not recommended as first line therapy for nightmare disorder because of the increased risk of hepatotoxicity. Level C. The following behavioral therapies may be considered for treatment of PTSD-associated nightmares based on low-grade evidence: Exposure, Relaxation, and RescriptingTherapy (ERRT); Sleep Dynamic Therapy; Hypnosis; Eye-Movement Desensitization and Reprocessing (EMDR); and the Testimony Method. Level C. The following behavioral therapies may be considered for treatment of nightmare disorder based on low-grade evidence.

Ben-Zeev, Larson and Sarratt (2010) documented that persecutory ideation is one of the most commonly reported psychiatric symptoms in individuals with schizophrenia and is associated with significant patient distress and impairment. Therefore, much attention has recently been

devoted to theoretical explanations of persecutory ideation that can help inform and guide patient care. A cognitive model of persecutory ideation suggests that individuals with psychosis who experience anxiety along with other stressors are at increased risk for developing intense "threat" or persecutory beliefs. Correlational studies have found evidence for this proposed link between anxiety levels and the persistence, distress levels, and degree of conviction associated with persecutory ideation. Importantly, recent research has found support for a possible prospective/causal role for anxiety in the generation and maintenance of paranoid beliefs. Existing interventions for persecutory ideation consist of pharmacological treatments that have variable efficacy and often entail serious side-effects, and cognitive behavioral treatments (CBT) that target persecutory thoughts, but are often unavailable, require high level of clinician expertise, and may be difficult to conduct with patients who are cognitively impaired or apprehensive about openly exploring their paranoid beliefs. Given the empirical support for a prospective relationship between anxiety and persecutory ideation, it is reasonable to predict that clinicians could impact persecutory ideations indirectly by making good use of existing evidence-based interventions for anxiety. Progressive Muscle Relaxation (PMR) is an effective method for reducing physiological arousal and treating various anxiety disorders, and has been shown to be feasible with patients with psychosis. We offer that exportability and ease of use makes PMR a promising intervention for mental

health practitioners to target anxiety precipitating persecutory ideation. We hypothesize that PMR could be used to help ameliorate anxiety in patients who are at risk or already experiencing persecutory ideation, subsequently reducing the frequency, level of conviction, and distress associated with persecutory thoughts. Our hypothesis could be tested through feasibility and randomized control trials of PMR for treatment of persecutory ideation in individuals with schizophrenia. We expect the relationship between PMR and persecutory ideation will be mediated by reduction in anxiety. Potential advantages of examining our hypothesis include identifying a viable, efficacious, cost-effective novel intervention for paranoia in patients with psychosis. In addition, PMR could be easily facilitated by practitioners with varying levels of training and integrated with other existing interventions for persecutory ideation.

Choi, (2010) examined the effects of music, progressive muscle relaxation (PMR), and music combined with progressive muscle relaxation on the reduction of anxiety, fatigue, and improvement of quality of life in family hospice caregivers. Subjects (N = 32) were divided randomly into 4 groups: control, music only, progressivemuscle relaxation only, and music combined with progressive muscle relaxation and were tested twice a week for a duration of 2 weeks. A pre and posttest measuring anxiety and fatigue was administered each session. Quality of life was measured only on the first and last session. Results of three-way mixed design ANOVA indicated no

significant main effect for group. However, results revealed a significant main effect for pretest and posttest on anxiety $F(1, 28) = 51.82$, $p < .01$ and fatigue, $F(1, 28) = 32.86$, $p < .01$. Significant difference on time effect were found for both anxiety $F(3, 84) = 3.53$, $p < .05$ and fatigue $F(3, 84) = 5.21$, $p < .01$. Follow-up paired t tests used for posthoc testing were conducted to compare pre and posttest difference scores for each group separately. Statistical results indicated a significant difference in quality of life when comparing the subject sample as a whole across the four days of treatment period, $F(1, 28) = 14.21$, $p < .01$. Follow-up paired sample t test indicated that the control and PMR group exhibited a significant difference in pre and posttest quality of life scores. There was a significant correlation between anxiety and quality of life ($r(32) = .75$, $p < .01$), anxiety and fatigue ($r(32) = .55$, $p < .01$), and fatigue and quality of life ($r(32) = -.53$, $p < .01$).

Sharpe, et al. (2010) investigated the efficacy of an attention training technique (ATT) on pain ratings, threshold and tolerance during the cold pressor task. One hundred and three undergraduate students were randomly assigned to receive either threat-alleviating or threat-inducing information about the task. Participants were then re-randomized to receive either ATT or progressive muscle relaxation (PMR). Hence, the present study had a 2 (threat expectancy: high vs. low) x2 (training: ATT vs. PMR) design. Analyses confirmed that the threat manipulation was effective in increasing the harm associated with the task. ATT resulted in a relative reduction in

hypervigilance to sensory pain words compared to PMR. ATT was also associated with a lower degree of focus on internal sensations, but not mindfulness or difficulty disengaging from pain words. Results showed that, relative to relaxation training, those receiving ATT reported pain less quickly than those receiving relaxation, although there were no differences between the training groups for tolerance or pain ratings. These results show that ATT changes the cognitive processes of internal/external focus and hypervigilance towards sensory pain words, but not difficulty disengaging or mindfulness. Although ATT changed threshold, the fact that neither pain ratings nor tolerance was affected suggests that a single, brief session of ATT may not be sufficient to affect broader change. Nonetheless, this study shows that ATT can change cognitive processes thought to be associated with heightened perception of pain and that this changes how quickly pain is registered and is therefore worthy of further investigation.

Delgado, et al. (2010) examined psychological and physiological indices of emotional regulation in non-clinical high worriers after a mindfulness-based training programme aimed at reducing worry. Thirty-six female university students with high Penn State Worry Questionnaire scores were split into two equal intervention groups: (a) mindfulness, and (b) progressive muscle relaxation plus self-instruction to postpone worrying to a specific time of the day. Assessment included clinical questionnaires, daily self-report of number/duration of worry episodes and indices of

emotional meta-cognition. A set of somatic and autonomic measures was recorded (a) during resting, mindfulness/relaxation and worrying periods, and (b) during cued and non-cued affective modulation of defence reactions (cardiac defence and eye-blink startle). Both groups showed equal post-treatment improvement in the clinical and daily self-report measures. However, mindfulness participants reported better emotional meta-cognition (emotional comprehension) and showed improved indices of somatic and autonomic regulation (reduced breathing pattern and increased vagal reactivity during evocation of cardiac defense). These findings suggest that mindfulness reduces chronic worry by promoting emotional and physiological regulatory mechanisms contrary to those maintaining chronic worry.

Baraniak and Sheffield (2011) evaluated the efficacy of psychologically based interventions for addressing psychological outcomes in patients with chronic obstructive pulmonary disease (COPD). Electronic databases, key journals and reference lists of included studies were scrutinised for inclusion; in addition authors were contacted for potential unpublished research. Nine studies were identified for inclusion. Data was extracted by two reviewers independently using a standardised extraction sheet and a series of meta-analyses completed for measures of anxiety, depression and quality of life. Eight studies evaluated a cognitive behavioural- or psychotherapeutically based intervention and one study evaluated taped progressive muscle

relaxation. The studies revealed some evidence for the interventions' impact on anxiety, but, taken together interventions had limited effectiveness. The meta-analyses that were conducted revealed a small effect for anxiety only. The results are discussed considering the limitations of the research and previous work in this area. A systematic evaluation of psychological interventions on psychological co-morbidity in patients with COPD is recommended.

Urech, et al. (2010) compared the immediate effects of two active and one passive 10-min relaxation technique on perceived and physiological indicators of relaxation. 39 healthy pregnant women recruited at the outpatient department of the University Women's Hospital Basel participated in a randomized controlled trial with an experimental repeated measure design. Participants were assigned to one of two active relaxation techniques,progressive muscle relaxation (PMR) or guided imagery (GI), or a passive relaxation control condition. Self-reportedrelaxation on a visual analogue scale (VAS) and state anxiety (STAI-S), endocrine parameters indicating hypothalamic-pituitary-adrenal (HPA) axis (cortisol and ACTH) and sympathetic-adrenal-medullary (SAM) system activity (norepinephrine and epinephrine), as well as cardiovascular responses (heart rate, systolic and diastolic blood pressure) were measured at four time points before and after the relaxation exercise. Between group differences showed, that compared to the PMR and control conditions, GI was significantly more effective in

enhancing levels ofrelaxation and together with PMR, GI was associated with a significant decrease in heart rate. Within the groups, passive as well as active relaxation procedures were associated with a decline in endocrine measures except epinephrine. Taken together, these data indicate that different types of relaxation had differential effects on variouspsychological and biological stress systems. GI was especially effective in inducing self-reported relaxation in pregnant women while at the same time reducing cardiovascular activity.

Mackereth, et al. (2009) compared the effects of reflexology and progressive muscle relaxation training for people with multiple sclerosis, provided by nurse therapists, on psychological and physical outcomes. A crossover design was chosen with a 4-week break between treatment phases. The Short Form 36 and General Health Questionnaire 28 were completed by patients (n=50) pre and post each of the 6-week treatment phases. Salivary cortisol levels, State Anxiety Inventory, systolic and diastolic blood pressure and heart rate data were collected pre and post the weekly sessions. All of the chosen measures except for three SF-36 scales recorded significant changes, however, despite the 4-week break (washout period), most outcome measures did not return to their pre-treatment baseline levels. This meant that the analysis of the data was complicated by significant effects involving ordering of treatment occurring for eight of the variables (one from SF-36, two from the GHQ, SAI, Salivary Cortisol, Systolic BP and HR).

However, there was a difference in the State Anxiety Inventory values between the treatments of the order of 1.092 units (95%CI 0.211-1.976) (p=0.016, Wilks lambda=0.885, df=1, 48) in favour of reflexology. Changes in salivary cortisol comparing levels pre 1st to post 6th session favoured reflexology (95%CI 0.098-2.644) (p=0.037, Wilks lambda=0.912, df=1, 48). A significant difference was found in the way the treatments affected change in systolic blood pressure following sessions; this favoured progressive muscle relaxation training (p=0.002, Wilks lambda=0.812, df=1, 48).

Bernardy, Krampen and Kollner (2008) identified factors at the beginning and at the end of an inpatient psycho-somatic rehabilitation predicting the successful transfer of Progressive Relaxation (PR) according to Jacobson three months after the stay. Eighty patients in a psycho-somatic rehabilitation centre were studied in the beginning (T1), at discharge (T2) and three months after discharge (T3). Every patient participated in courses on PR. Transfer was defined as successful if patients practised PR at least once a week three months after their stay. Potential predictors were: diagnosis, age, symptoms, previous experiences, and motives at T1 and frequency of practising, adequateness of group size and change of symptoms at T2. Stepwise logistic regression analysis was used to identify predictors. Three months after the course 52,5% of the patients were able to transfer PR successfully into their daily lives. 68,8% of cases had been correctly classified by logistic regression through: participation motive "positive thoughts" (T1)

and "frequency of practising PR outside the course" (T2). Intrinsic participation motives and practising independently are significant predictors of long-term transfer of PR. This indicates the necessity of discussing motives at the beginning as well as frequency of practising during the PR course.

Dittrich, et al. (2008) addressed the influence of an aerobic exercise program combined with relaxation on pain and psychological variables in migraine patients. The aerobic exercise group (n = 15) participated in a 6-week, twice-weekly, indoor exercise program (45 minutes of gymnastics with music and 15 minutes of progressive muscle relaxation). The program led to a significant reduction of self-rated migraine pain intensity. Although there was an improvement in depression-related symptoms within the aerobic exercise group.

2.3 STUDIES ON PHYSICAL EXERCISE AS RELAXATION TRAINING

Kim, et al. (2011) examined the effects of a 6-wk intervention that used guided relaxation and exerciseimagery (GREI) to increase self-reported leisure-time exercise behavior among older adults. A total of 93 community-dwelling healthy older adults (age 70.38 ± 8.15 yr, 66 female) were randomly placed in either a placebo control group or an intervention group. The intervention group received instructions to listen to an audio compact disk (CD) containing a GREI program, and the placebo control group received an audio CD that contained 2 relaxation tracks and instructions to listen to music

of their choice for 6 wk. Results revealed that listening to a GREI CD for 6 wk significantly increased self-reported leisure-time exercise behaviors ($p = .03$). Further exploration of GREI and its effects on other psychological variables related to perceived exercise behaviors may substantiate its effectiveness.

Feldman, Greeson and Senville (2010) reported that decentering has been proposed as a potential mechanism of mindfulness-based interventions but has received limited empirical examination to date in experimental studies comparing mindfulness meditation to active comparison conditions. In the present study, we compared the immediate effects of mindful breathing (MB) to two alternative stress-management techniques: progressive muscle relaxation (PMR) and loving-kindness meditation (LKM) to test whether decentering is unique to mindfulness meditation or common across approaches. Novice meditators (190 female undergraduates) were randomly assigned to complete one of three 15-min stress-management exercises (MB, PMR, or LKM) presented by audio recording. Immediately after the exercise, participants completed measures of decentering, frequency of repetitive thoughts during the exercise, and degree of negative reaction to thoughts. As predicted, participants in the MB condition reported greater decentering relative to the other two conditions. The association between frequency of repetitive thought and negative reactions to thoughts was relatively weaker in the MB condition than in the PMR and LKM conditions, in which these two variables were strongly and positively correlated. Consistent with the

construct of decentering, the relative independence between these two variables in the MB condition suggests that mindful breathing may help to reduce reactivity to repetitive thoughts.

Jong, et al. (2010) assessed predictors and reported treatment strategies of HIV-related fatigue in the combined antiretroviral (cART) era. Five databases were searched and reference lists of pertinent articles were checked. Studies published since 1996 on predictors or therapy of HIV-related fatigue measured by a validated instrument were selected. A total of 42 studies met the inclusion criteria. The reported HIV-related fatigue prevalence in the selected studies varied from 33 to 88%. The strongest predictors for sociodemographic variables were unemployment and inadequate income. Concerning HIV-associated factors, the use of cART was the strongest predictor. Comorbidity and sleeping difficulties were important factors when assessing physiological influences. Laboratory parameters were not predictive of fatigue. The strongest and most uniform associations were observed between fatigue and psychological factors such as depression and anxiety. Reported therapeutic interventions for HIV-related fatigue include testosterone, psycho-stimulants (dextroamphetamine, Methyphenidate hydrochloride, pemoline, modafili) dehydroepiandrosterone, fluoxetine and cognitive behavioural or relaxation therapy. HIV-related fatigue has a high prevalence and is strongly associated with psychological factors such as depression and anxiety. A validated instrument should be used to measure

intensity and consequences of fatigue in HIV-infected individuals. In the case of fatigue, clinicians should not only search for physical mechanisms, but should question depression and anxiety in detail. There is a need for intervention studies comparing the effect of medication (antidepressants, anxiolytics) and behavioural interventions (cognitive-behavioural therapy, relaxation therapy, graded exercise therapy) to direct the best treatment strategy. Treatment of HIV-related fatigue is important in the care for HIV-infected patients and requires a multidisciplinary approach.

Ewert, et.al. (2009) examined whether a multimodal, secondary prevention program (MP) is superior to a general physical exercise program (EP) in influencing the process leading to chronic low back pain (LBP) in nurses with a history of back pain. A total of 235 nurses from 14 nearby hospitals and nursing homes who experienced at least one episode of back pain during the previous 2 years were invited into the study. Of these, 183 nurses were enrolled and 169 (83 in the MP and 86 in the EP) qualified for the intent-to-treat analysis. The EP consisted of 11 group sessions, each lasting 1 hour. After introductory sessions, subsequent sessions included general physical strengthening and stretching exercises as well as instructions for a home-training program. The MP consisted of 17 group sessions of 1.75 hours and one individual session of 45 minutes. In addition to the full EP, the MP included 5 psychological units, 7 segmental stabilization exercises units, and 8 ergonomic and workplace-specific units. The primary

study end-point variable was pain interference, and the secondary study end-point variables were pain intensity and functioning as measured with the West Haven-Yale Multidimensional Pain Inventory and the Short Form-36, respectively. These study end-point variables were defined a priori. There was no statistically significant difference between the 2 groups. Small-to-moderate effects were observed in both intervention programs across all study end-point variables. For pain interference, the effect size at 12 months after intervention was 0.58 in the MP and 0.47 in the EP. A multimodal program is not superior to a general exercise program in influencing the process leading to chronic LBP in a population of nurses with a history of pain. The most likely explanation is a commonpsychological mechanism leading to improved pain interference that is irrespective of the program used. Considering the lower resources of the general exercise program, the expense for a multimodal program is not justified for the secondary prevention of LBP and disability.

Arroyo-Morales, et al. (2008) evaluated the effect of massage on neuromuscular recruitment, mood state, and mechanical nociceptive threshold (MNT) after high-intensity exercise. Participants, randomized into two groups, performed three 30-second Wingate tests and immediately received whole-body massage-myofascial induction or placebo (sham ultrasound/magnetotherapy) treatment. The duration (40 minutes), position, and therapist were the same for both treatments. Dependent variables w.ere

surface electromyography (sEMG) of quadriceps, profile of mood states (POMS) and mechanical nociceptive threshold (MNT) of trapezius and masseter muscles. These data were assessed at baseline and after exercise and recovery periods. Generalized estimating equations models were performed on dependent variables to assess differences between groups. Significant differences were found in effects of treatment on sEMG of Vastus Medialis (VM) ($p = 0.02$) and vigor subscale ($p = 0.04$). After the recovery period, there was a significant decrease in electromyographic (EMG) activity of VM ($p = 0.02$) in the myofascial-release group versus a nonsignificant increase in the placebo group ($p = 0.32$), and a decrease in vigor ($p < 0.01$) in the massage group versus no change in the placebo group ($p = 0.86$). Massage reduces EMG amplitude and vigor when applied as a passive recovery technique after a high-intensity exercise protocol.

Smith, et.al. (2008) compared the effects of two mind-body interventions: mindfulness-based stress reduction (MBSR) and cognitive-behavioral stress reduction (CBSR). Perceived stress, depression, psychological well-being, neuroticism, binge eating, energy, pain, and mindfulness were assessed before and after each course. Pre-post scores for each intervention were compared by using paired t tests. Pre-post scores across interventions were compared by using a general linear model with repeated measures. SETTINGS/LOCATIONS: Weekly meetings for both courses were held in a large room on a university medical center campus.

MBSR subjects improved on all eight outcomes, with all of the differences being significant. CBSR subjects improved on six of eight outcomes, with significant improvements on well-being, perceived stress, and depression. Multivariate analyses showed that the MBSR subjects had better outcomes across all variables, when compared with the CBSR subjects. Univariate analyses showed that MBSR subjects had better outcomes with regard to mindfulness, energy, pain, and a trend for binge eating. While MBSR and CBSR may both be effective in reducing perceived stress and depression, MBSR may be more effective in increasing mindfulness and energy and reducing pain. Future studies should continue to examine the differential effects of cognitive behavioral and mindfulness-based interventions and attempt to explain the reasons for the differences.

Kim, (2007) determined the effectiveness of SMIs. Forty-six experimental studies with a randomized or nonequivalent control group pre-post test design were included in the analysis. The selected studies were classified according to the sample characteristics, the types and methods of the interventions, and the types of outcome variables. Six intervention types were distinguished: cognitive-behavioral intervention(CBT), relaxation techniques(RT), exercise(EX), multimodal programs 1 and 2(MT1, 2), and organization focused interventions(OTs). Effect sizes were calculated for the 4 outcome categories across intervention types: psycho-social outcome, behavioral-personal resources, physiologic, and organizational outcome.

Individual worker-focused interventions (ITs) were more effective than OTs. A small but significant overall effect was found. A moderate effect was found for RT, and small effects were found for other ITs. The effect size for OTs was the smallest. The interventions involving CBT and RT appeared to be the preferred means of reducing worker's psycho-social and organizational outcomes. With regard to physiologic outcomes, RT appeared to be most effective. CBT appeared to be most effective in reducing psycho-social outcomes. SMIs are effective. Interventions involving RT and CBT are more effective than other types.

Robb, et.al. (2006) documented that a large proportion of patients may develop chronic pain following cancer treatments such as surgery, radiotherapy, or chemotherapy. These patients can experience significant levels of physical and psychological morbidity. They investigate a cognitive-behavioral pain management program (PMP) for cancer patients with chronic treatment-related pain. Thirteen patients (1 man, 12 women; mean age 52 yrs) completed the study, 9 of whom had a history of breast cancer and had received extensive medical treatment, including surgery. A combination of physical and psychological techniques were adapted from previous work in chronic benign pain and implemented by two therapists. Interventions included education, relaxation, exercise training, and goal setting. A variety of outcomes were examined to assess general fitness, psychological distress, coping success, activities of daily living, and pain report. The median number

of interventions by each therapist was 10 (4 to 15). Postintervention, there was a significant trend toward improvement in many variables, including anxiety and depression (P < .01), fitness (walking: P < .05), and coping with pain (P < .01). This was a feasibility study and has several limitations. It appears, however, that all patients had a positive outcome. Further research is now required to assess the effectiveness of this approach. Results of this preliminary study are clinically relevant, as they suggest that a pain management program that uses cognitive-behavioral principles is worthy of further investigation for patients with chronic cancer-treatment-related pain.

Wallman, et al. (2004) investigated whether 12 weeks of graded exercise with pacing would improve specific physiological, psychological and cognitive functions in people with chronic fatigue syndrome (CFS). Changes in any of the physiological, psychological or cognitive variables assessed. Following the graded exercise intervention, scores were improved for resting systolic blood pressure (P = 0.018), work capacity (W.kg(-1)) (P = 0.019), net blood lactate production (P = 0.036), depression (P = 0.027) and performance on a modified Stroop Colour Word test (P = 0.029).

Van Weert, et.al. (2004) hypothesised that this six-week intensive rehabilitation programme would result in physiological improvements and improvement in quality of life. Thirty-four patients with cancer-related physical and psychosocial problems were the subjects of a prospective observational study. A six-week intensive multi-focus rehabilitation

programme consisted of four components: individual exercise, sports, psycho-education, and information. Measurements (symptom-limited bicycle ergometry performance, muscle force and quality of life [RAND-36, RSCL, MFI]) were performed before (T0) and after six weeks of rehabilitation (T1). After the intensive rehabilitation programme, statistically significant improvements were found in symptom-limited bicycle ergometry performance, muscle force, and several domains of the RAND-36, RSCL and MFI. The six-week intensive multi-focus rehabilitation programme had immediate beneficial effects on physiological variables, on quality of life and on fatigue

Blanchard, Courneya, and Laing. (2001) examined the effects of an acute bout of exercise on state anxiety in breast cancer survivors. 34 stage I or II breast cancer survivors ranging in age from 39-65 ($X = 50.50$; $SD = 6.62$). Participants completed the State Anxiety Inventory prior to and five minutes following an acute bout of exercise. A main effect resulted for group ($p < 0.01$) and time showing that state anxiety significantly decreased from pre- to post exercise ($p < 0.03$). Group by time interaction showed that state anxiety for the low state anxiety group did not change from pre- to post exercise ($p > 0.05$); however, state anxiety significantly decreased in the high state anxiety group ($p < 0.03$). Acute exercise may be an effective intervention in reducing state anxiety in breast cancer survivors, especially those with high state anxiety.

Hoodin, et al. (2000) evaluated prospectively the contribution of a psychological self-management program to the amelioration of headache-related distress of patients with intractable migraine treated in a comprehensive, multidisciplinary, inpatient program. Data from 221 admissions to a Commission on Accreditation of Rehabilitation Facilities-accredited, nationally recognized, inpatient treatment unit were analyzed for the current study. On admission and on discharge (average length of stay, 12.9 days), subjects completed a 7-day retrospective, self-report questionnaire assessing health behavior compliance and emotional factors. The intervention consisted of intensive medical therapy in addition to cognitive-behavioral treatment delivered in a group setting. Adherence increased significantly for relaxation practice and life-style modifications of diet, exercise, and sleep regulation for headache prevention (P<.00001). Beck Depression Inventory scores decreased significantly (P<.00001), and a greater decrease in depression by the end of the program was reported by subjects who practiced relaxation most compared with those who practiced relaxation least. Low baseline adherence rates for health behavior increased significantly during the final week of inpatient treatment. Behavioral self-management variables, not headache reduction, were significantly associated with patients' reduction in affective distress.

Sandstrom and Keefe (1998) stated that there has been growing interest in the use of formal self-management training programs for people

with fibromyalgia (FM). In these programs, health care professionals serve as trainers and provide education about FM and guided instruction in specific self-management strategies. A review of the literature on formal self-management training programs for FM suggests that they can be divided into groups: 1) those emphasizing training in coping skills (e.g.,relaxation, activity pacing, and problem-solving techniques), and 2) those emphasizing training in physical exercise(e.g., cardiovascular fitness, strength, and endurance training). In this article, They review studies that have tested the efficacy of both types of programs.and proved it was effective.

Mendez and Belendez (1997) evaluated the effects of a behavioral program to increase treatment adherence and to improve stress management in adolescents with IDDM. A quasi-experimental pretest-posttest design with a nonequivalent control group was used. Eighteen subjects were assigned to the experimental group, which received the program, while nineteen subjects made up the control group, which received routine medical care. During the 12 intervention sessions with diabetic adolescents, different procedures were applied: instruction, blood glucose discrimination training, role-playing, relaxation exercises, self-instructions, problem-solving strategies, and homework, among others. The results show significant changes in the experimental group in variables related to diabetes information (patients and their parents), adherence, daily hassles, uneasiness and likelihood of

response in social interactions, skills and frequency of glycemic analyses, blood glucose estimate errors, and negative family support (parents).

Pfingsten, et al. (1996) integrated psychotherapeutic intervention in order to lessen emotional impairment, to change behavioral patterns (which advocate rest and the avoidance of physical activity), and to change cognitive attitudes and fears concerning exercise and work ability. Nevertheless, the interplay of cognitive measures and disability in treatment programs still remains an unclear issue. Ninety disabled patients with chronic low back pain were admitted to an 8-week outpatient program of functional restoration and behavioral support. The program consisted of a pre-program (education, stretching and calisthenic exercises) and an intensive treatment period (physical exercises, back school education, cognitive behavioral group therapy, relaxation training, occupational therapy, vocational counseling), which took place for 5 weeks, 7 h a day, as an outpatient program. The targets of the psychological interventions were (a) to change maladaptive behavior (inactivity, social withdrawal) and increase the patient's activity level at home, (b) to alter maladaptive cognitions (somatization, catastrophizing, passive expectations concerning treatment) and to improve their own positive coping skills, (c) to identify and stop operant conditioned behavior, and (d) to prevent depressive symptoms and strengthen the level of emotional control. The program's philosophy encouraged the patients' active efforts to improve their functional status within a therapeutic environment that reinforced

positive behavior traits conductive to getting well. The main therapeutic target was to facilitate a return to work. Apart from a medical examination and a personal interview, the patients' physical impairment, pain descriptions, and psychological distress (according to different criteria for evaluation) were also measured. This included variables such as depression, psycho vegetative complaints, quality of life and workplace satisfaction, disability, and coping with disease. Measurements were repeated at the end of the 8-week program, and following 6- and 12-month intervals. In comparison with the initial values, a statistically significant improvement became evident in reducing pain, disability, depression, and psycho vegetative signs ($P < 0.001$).

Cox, et al. (1991) examined the effects of a rehabilitation programme in patients with asthma or COPD who have major complaints despite the fact that their pulmonary function is not severely disturbed. The treated group consisted of 44 patients with an obstructive lung disease, FEV1 68.3% of predicted value. This group was compared with 43 patients in a control group. These were volunteers, who were comparable for pulmonary function, reversibility, age, sex, Quetelet index, pulmonary medication and educational level. These groups were examined for 2 years by means of tests and questionnaires. Changes from baseline values were analysed by covariance analysis. Patients followed a rehabilitation programme which consisted of an optimal medical treatment in combination with training of physical endurance,

health education and psychological and social support. The duration of the programme was 3 months, 38 hours a week. Pulmonary rehabilitation had a long-term beneficial effect on endurance, several psychological valuables, consumption of medical care, attitude towards way of life, skills, coordination and smoking habits. Bronchial hyper responsiveness, need of pulmonary drugs and complaints of cough and sputum production did not change after rehabilitation. Airway obstruction and subjective feelings of dyspnoea, allergy and hyper responsiveness only decreased in the short term (less than I year). This study shows that pulmonary rehabilitation improves many variables in the short as well as in the long run.

Duivenvoorden and Van Dixhoorn (1991) investigated in 119 myocardial infarction patients. They were randomly assigned to either a five-week daily exercise training or to an identical training in combination with six sessions of relaxation therapy, individually. The psychic outcome was constructed as a composite measure of change on six psychological questionnaires. The aim was to determine the predictive qualities of base-line: (1) clinical data; (2) exercise testing; (3) psychosocial information derived from interview; and (4) validated psychological questionnaires and whether the kind of rehabilitation programme has any influence on the predictive qualities of the variables. The psychic outcome turned out to be highly predictable (multiple correlation of 0.72). Predictors of relatively high importance were age, work-status and job-level, followed by mild heart

failure, diastolic blood pressure and heart rate, all of them dependent upon the kind of treatment. It implies that the type of rehabilitation programme modified the effect of the determinants of psychic outcome. This research strategy is promising and deserves to be stimulated in order to build rehabilitation programmes tailored to the needs and abilities of the individual patient.

2.4 SUMMARY OF REVIEWS

The investigator reviewed related studies on influence of Different packages of psycho-somatic regulative programmes, Yogic practices, Jacobson progressive muscular relaxation technique, physical exercises and combination of yogic practice, Jacobson progressive muscular relaxation technique and physical exercise on selected psychological and physiological variables. The reviewed studies proved that there was still scope for under taking the research to finding out the attempt has been made for such an comparative effects, which would be much beneficial in different packages of psycho-somatic regulative programmes situations. Hence, with the experience gained through review of the above literature, the investigator formed suitable methodology for this study, which is presented in Chapter III.