CHAPTER I
INTRODUCTION

Kedar is a very active child. He is full of energy, constantly on his toes and all the time on move. The only time he rests is when he is asleep. He has to be constantly kept engaged, says his mother. Hyper-enthusiasm and hyperactivity of Kedar, at times converts into aggression. ‘There is nothing to worry’, says the family physician to the tired parents, ‘encourage him join any organized physical activity, that’s the best way to channelize his energy’ he further adds.

Prachi is a very quiet girl. She prefers to be alone, talks substantially less than her age mates and engages in solitary activities. ‘Put her in a game class, it will definitely help’ suggests a friend to her worried mother.

Madhura is an intelligent but restless girl. Although she is quick to grasp, understands details, she becomes easily anxious, fidgets constantly and often tends to make silly and small mistakes in her work. ‘Participation in sports would help her to improve concentration and reduce anxiety’ writes the school counselor in her report.

Three different children, three different behavior patterns needing change and suggestion is one, Sports!!

1.1 Participation in Sports and Exercise

Participation in a sport and similar physical activity gives beneficial exercise to the body. These exercises could be aerobic exercises such as jogging, bicycling, rope jumping, running and swimming, all requiring dramatically increased oxygen consumption over an extended period of time. All aerobic exercise is marked by its high intensity, long duration and requisite high endurance. The other major form of exercise is isotonic exercises such as weight lifting or high intensity, short duration, low endurance exercises such as sprinting, which build up specific parts of the body, but have little effect on overall fitness, as they draw on short-term stores of glycogen rather than on a long term energy conversion system associated with aerobics. A proper amount of stimulating exercise controls how one looks and how one feels. Exercise speeds up the circulation of blood and improves the functions of all the internal organs. It activates the glands, makes them more prolific, improves their action and develops their strength and builds stronger and healthier cells. Exercise makes the entire body actively and radiantly alive with a feeling, energy and well-being and makes one buoyant and alert. Lastly, exercise builds confidence; for there is no road to confidence as sure as the knowledge of one's physical and mental ability. It cultivates power of will and
determination; it gives complete mastery over physical and mental self; it promotes personal efficiency and all desirable mental characteristics (Pantpratinidhi, 1950).

Exercise is a health enhancing behavior. It plays an important role in maintaining and developing physical and mental health. A mere 30 minutes of exercise a day can decrease the risk of several chronic diseases including heart disease and some cancers, including breast cancer. Health benefits of exercise include increased efficiency of cardio-respiratory system, improved physical work capacity, the optimization of body weight, the improvement or maintenance of muscle tone and strength, an increase in joint tissue and muscle flexibility, the reduction or control of hypertension, improved cholesterol level, improved glucose tolerance, improved tolerance for stress and reduction in poor health habits, including cigarette smoking, alcohol consumption and poor diet (Center for the advancement of health, 2000b; Ebbeson, Prkhachin, Mills & Green, 1992). The digestive and excretory functioning may be enhanced by being physically fit, and that weight control may also be an added benefit for many who exercise regularly. Increased longevity may actually build up as a function of physical fitness. Regular physical activity contributes positively to people’s physical and psychological health (USDHHS, 2000). For example, exercise is linked to decreased risk of morbidity and mortality for many chronic conditions such as chronic heart disease, cancer, obesity and it is associated with increased strength, flexibility and self-esteem. Maintaining a physically healthy lifestyle is essential for good health.

Exercise also has many benefits for mental health. Mental health is defined as the successful performance of mental function, resulting in productive activities, fulfilling relationships with other people, and the ability to adapt to change and to cope with adversity; from early childhood until late life, mental health is the springboard for thinking and communication skills, learning, emotional growth, resilience and self-esteem (Surgeon General’s Report on physical activity & health, 1996). People who exercise have higher self-esteem as they feel fit and feel good about the body. Self-esteem is defined as ‘evaluation that an individual makes and customarily maintains with regard to the self as a capable, successful, important and worthy individual’ (Coopersmith, 1967). It is a personal judgment of worthiness, a subjective experience which the individual conveys to others by verbal reports and other expressive behaviors. Such individuals are more alert and able. They are better workers, miss fewer days of work, have less illness, are involved in fewer accidents, and have better attitude towards work (President’s Council on Physical Fitness & Sports, 1996), have decreased feelings of depression and anxiety, and are better able to manage stress, resulting in decrease in stress related behavior. There may be benefits in terms of
socialization too, that is, meeting new people and creating new friendships and acquaintances and maintaining old ones.

Researchers interested in exercise and physical activity have also recognized importance of self related phenomena. Involvement in regular exercise and physical activity programs that improve skill, knowledge, fitness and health are linked to enhanced self perceptions (Fox, 1997). These changes may then generalize to more favorable views about the self, leading to an improved sense of well-being (Berger & McInman, 1993; Morgan, 1985). Because of the beneficial effects of exercise on mood and self esteem, exercise has been used as a treatment for depression (Herman et al., 2002). Sports experience can have lifelong effects on the personality and psychological development of children (Weinberg & Gould, 2003).

1.2 Adolescence

Two crucially formative, but relatively neglected phases in life span are first three years of life and early adolescence covering ten through fourteen. These periods powerfully shape the rest of the life course and it’s during these periods individuals should be given decent chances of growing up intact.

Adolescence is the developmental stage between childhood and adulthood. It is generally said to start just before the teenage years, and end just after them. Considered neither children nor adults, adolescents are in a transitional stage marked by considerable growth. It is a period of rapid physical changes that transform a child’s body into an adult body capable of reproduction. Adolescents may show a growth spurt- a period of very rapid growth in height and weight. The growth spurt for girls begins earlier than that of boys, around the age of 10, while it starts for the boys around the age of 12. It is the period when the sex organs mature; the pituitary gland in the brain signals other glands to begin producing the sex hormones, androgens (male hormones) and estrogen (female hormones). Development of primary and secondary sex characteristics is a major change which adolescents face. The surge of hormones may lead to rapid mood swings. Boys have feelings of anger and annoyance associated with higher hormonal levels. In girls, level of hormones is associated with depression as well as anger. Adolescents are aware of what is happening to their bodies, and they may react with horror or joy.

With remarkable physical changes, development of the brain is also seen in this period. The number of brain cells-neurons continues to grow, their interconnections become richer and more complex and adolescent thinking becomes more sophisticated. The prefrontal cortex, which is not fully developed until the early 20’s, undergoes considerable development
during adolescence. But during this process of growth, due to brain immaturity, the adolescents are seen to be engaging into risky and impulsive behaviors. Drug use, other kind of substance use and abuse, special concerns with body image resulting in eating disorders, lack of exercise causing obesity may pose serious threats to adolescents’ health and well being.

But during this growth period, positive changes are also seen. The prefrontal cortex becomes increasingly efficient in communicating with other parts of the brain, which permits the different areas of the brain to process information more effectively. The prefrontal cortex allows the people to think, evaluate, and make complex judgments in uniquely human way. It also provides impulse control. The ability to reason abstractly improves their critical thinking and they actively seek to understand the values and justifications they encounter. They also show increased sense of identity. They can see various aspects of the self simultaneously, and this view becomes more organized and coherent. They look at the self from a psychological perspective, viewing traits not as concrete entities but as abstractions. Although, they perceive who they are (their self – concept), this does not mean they like themselves (their self – esteem) (Feldman, 2009).

Adolescence is one of the healthiest periods of life. This period of rapid growth and development also is a period of stresses and storms. It is important to focus on risky and inappropriate behaviors of an adolescent while promoting positive self-development along with self-esteem among them. A large number of adolescents facing adulthood are inadequately prepared to meet the requirements of the workplace, the commitments of relationships in the family and with friends, and also the responsibilities of full participation in the democratic society. These young people are extremely vulnerable to multiple high risk behaviors and school failures and a large number of them are at moderate to high risk of impairing their life chances through engagement in behaviors and activities that are destructive to themselves and others (Poinsett, 1996). What kind of experiences during adolescence are ‘enormously helpful’ to the process of growing up? What makes an individual a ‘good’ person and enhances personality development? According to Poinsett, (1996), the essential requirements are,

- Find a valued place in a constructive group.
- Learn how to form close, durable human relationships.
- Achieve a reliable basis for making informed, deliberate decisions, especially on matters that have crucial consequences such as education and relationships.
- Know how to use available support system.
- Find ways to being useful to others beyond the self.
Belief in a promising future with real opportunities.

Cultivate the inquiring and problem solving habits of mind for lifelong learning and adaptability.

Learn respect for democratic values and understand responsible citizenship. Family plays a role to meet these needs, but only to some extent. If the role of media, schools and other institutions is studied, it is found that Sport and Sport Organizations can influence children and youth and the choices they make almost daily. Sport acts as a powerful attachment, the type of sport and sports heroes influence habits and choices to a great extent.

1.3 Benefits of Sport participation

Today, because there is more time and less supervision, the community that once nurtured the youth is ‘no more’. With greater mobility and autonomy, the adolescents can be in many places and can do many things beyond meaningful adult scrutiny. The experiences involving personal discipline and the ability to persevere are rapidly diminishing and thus sports can be a useful vehicle for teaching rules of life.

Sports program promotes,

- Responsible social behavior
- Greater academic success
- Confidence in one’s physical abilities
- An appreciation of personal health and fitness
- Strong social bonds with individuals and institutions
- Discharge of physical and psychological stress
- Handling, controlling and expressing emotions appropriately
- Opportunity to express creatively

Involvement of young people in Sport produces multiple benefits,

1. Losing is frequently seen as failure in life, but a Sport program, creates a positive learning environment, enabling a child to learn the psychological benefits of losing. The child understands that benefits too can be derived from losing. Children will be losing a lot in life, but what is learnt on the sport ground is, it is possible to bounce back, even after the loss.

2. Losing a match, a game, a point can lead to more hard work; spark the killing instinct resulting in a win. What is learned in sports is that losing is critical to continued success.
3. Children can also understand that efforts are important; outcome will follow. The relationship between ability and effort is very difficult to establish and understand in day to day life, but this very information can be learnt on the sport field through practical experience.

4. The play ground teaches excellent lessons on sportsmanship, fair play and provide venue to work towards understanding of ethics.

5. It is realized on the sport ground that life has several options open, one may not succeed as a player, yet being a successful coach, commentator, manager, judge, administrator, sport journalist and advisor, is possible and each of these positions can give name and fame.

6. Children get a chance to take responsibility, make decisions and can get integrally involved in sport activity. This can develop good leadership qualities learn realities of life without having any harsh impact.

7. Sport can inculcate a sense of self discipline to a great extent.

8. It makes children flexible in their approach, help them to play roles effectively and helps in smooth transition from one role to another.

One of the major advantages of participation in sport is found to be in the area of emotional intelligence (EI). People who participate in sport or exercise programmes report higher levels of self confidence, greater feelings of control, improved imagination and a greater sense of self – sufficiency. Other studies conducted to investigate the relationship of exercise to various personality factors found that aerobic fitness training increased scores on self – sufficiency, intelligence and decreased scores on insecurity and showed positive changes in various aspects of personality adjustment. In fact, Psychologists and psychiatrists’ rate exercise as the most effective technique for changing a bad mood and an effective technique to energize oneself. Increase in vigor, clear thinking, alertness and an increased sense of well – being are some added advantages.

Another major advantage of participation in sport was found in the area of cognitive and executive function (EF). Stanley and Arthur (2003) conducted meta-analysis and examined eighteen intervention studies published between 1966 and 2001. Healthy but sedentary older adults were studied to determine the role of aerobic fitness training on cognitive vitality in them. Fitness training was found to have robust but selective benefits for cognition, with the largest fitness-induced benefits occurring for executive-control processes. The magnitude of fitness effects on cognition was also moderated by a number of programmatic and methodological factors, including the length of the fitness-training
EI, Executive Function and Explanatory Style in Mallakamb

Intervention, the type of the intervention, the duration of training sessions, and the gender of the study participants. Kramer et al. (1999) found that those who received aerobic training showed substantial improvements in performance on tasks requiring executive control compared with anaerobically trained subjects. Kubota et al. (2001) at the 2001 Society for Neuroscience conference, reported that, following a 12 week regimen of jogging for 30 minutes two to three times a week, young adults significantly improved their performance on a number of cognitive tests. The scores fell again if participants stopped their running routine. Preliminary results from a series of studies undertaken with elementary school children do indicate a strong relationship between academic achievement and fitness scores. Physically fit children identified visual stimuli faster. Brain activation patterns provided evidence that the fit children allocated more cognitive resources towards the task, as well as processing information faster. Staying physically healthy can maintain and even enhance cognition and brain function, as well as, reduce the risk of age associated neurological disorders, such as Alzheimer disease (Kramer, Ericson & Colcombe, 2006). Recently, health psychologists have studied impact of exercise on cognitive functioning and found beneficial effects, especially on executive functioning involved in planning and higher order reasoning (Smith, et al., 2010). Exercise also appears to promote memory and healthy cognitive aging (Pereira et al., 2007)

Link is also found between explanatory style and athletic performance. In a cross-sectional survey with 50 young elite tennis players, Prapavessis and Carron (1988) found that players presenting cognitive, motivational and emotional maladaptive achievement patterns (evaluated by a questionnaire) gave ratings that were internal, persistent and recurrent for explaining failure performances and were judged by their coaches to be less persistent in their matches. Two studies using Content Analysis of Verbatim Explanation - CAVE; (Peterson & Park, 1998) were reported by Rettew and Reivich (1995). Baseball and basketball teams with a more optimistic explanatory style won more games and performed significantly better in games following a loss than teams with a pessimistic explanatory style. Studies using explanatory styles have focused more on the competitive performance of the sportsman.

Sport and activity of exercise is accessible to nearly everyone; it is not only low cost, but also a low tech activity, thereby allowing for potentially widespread participation. Thus, Sport is a source of self discovery and a means of learning a responsible social behavior, appreciating personal health, fitness and proportionate development of the body. It can also build up tremendous confidence in oneself. These multiple benefits of participation in
physical activity were known to our ancestors and thus India has a very rich traditional physical culture.

1.4 Traditional Indian Physical Culture

A strong and healthy body can cherish a strong and healthy mind. The universal truth of healthy mind and body was thoroughly understood and accepted by our ancestor’s right from the evolution of the human race. This resulted in the development of the Traditional forms of Indian Physical Culture, such as Wrestling, Dand, Baithak, Hututu, Soorya Namaskar, Yogasana and many more individual and team games. The physical activity exercises were developed not only for males, but also for children, girls and for females. These physical activity included variety of movements which could be performed with and without apparatus. These exercises are not only the physical forms of exercise, but are considered to be the way of life, essential for personal and spiritual growth (Mujumdar, 1950). The system of developing the body and mind and the capacity of sustaining power, have been the prominent features of different forms of Indian Physical Culture. The physical Culture System is mentioned in details, in ‘Manasollhas’ of King Someshwar Chalukya (1124 to 1138 A.D). It mentions Wrestling, one of the popular games of India, better suited for building vigorous manhood and develops endurance, strength, courage and self-confidence in the highest degree.

Maharishi Patanjali, around 2nd century, collated, co-ordinated and systematized the Yoga philosophy in his classical work, Yoga-Sutra. The system of Yoga teaches the means by which the ‘jivatma’ can be in communion with the ‘Parmatma’ to secure ‘moksha’ (liberation’). In the 8 step process, the asanas come as a third step. The Hatha Yoga represents asana and pranayama. ‘Ha’ means ‘Sun’ and ‘tha’ means ‘moon’. The Sun represents the energies of the Solar Plexus, while the Moon represents the energies of the emotions located in the limbic region of the brain. Hatha Yoga seeks to balance the body with the mind, gut instincts with intuition. Hatha Yoga is not an end onto itself; rather it is a means to direct the mind by removing the obstacles of unsteadiness and discomfort that are experienced in the body, breath and sensory awareness. The benefits of Yoga practice manifest on two levels (Stiles, 2002). The central benefit is produced from following the guidelines of Patanjali’s classic Yoga Sutras. When this relaxation of effort and steadiness of body is created, the resulting pleasurable sensations of being in the stillness and contentment of the final posture pervade all the levels of psychology, physiology and consciousness. It is this benefit that makes yoga unique. The multidimensional being is put into a state of re-integration that originally creates the feelings of wholeness. This benefit is common to all
asanas utilized with concentrated, steady glottal breathing (*Ujjayee Pranayam*). The general benefits create mental equilibrium, emotional health, calmness, sensitivity to oneself and prepare the mind for meditative introspection. The secondary benefit is from the practice of asanas that relate to specific movements of the body and how they positively affect the physiology. These benefits are important from the health and curative point of view and form the basis of yoga therapy. Without receiving the general benefits of Classical Yoga, the specific benefits to health and physiology are short-lived. The general benefits are necessary to support the perceptual and life-style changes necessary for prolonged improvements in health. The practice of asanas results in feeling well, improved health, better posture and increased self esteem. The goal of practicing asana is indeed freedom from duality. This form of exercise has now reached far and wide, in several parts of the world and is not only getting practiced for physical and mental health, spiritual development and but also for participating in competitions. It has undergone several modifications too. With the traditional method of practice, slow and steady movements and controlled breathing, dynamic varieties like Power Yoga, which combine aerobic movements with yogic postures, have also gained popularity.

*Soorya Namaskar* or Sun Salutation exercise too is intended to impart health, strength and longevity. It is a practice to perform 12 *Soorya Namaskars* every morning, during the sunrise. In its simplest form, it is a 10 count exercise, involving stretching, forward and backward bending and balancing. Appropriate breathing is to be done along with each position of the *Sooryanamaskar*, thus this exercise gives all the benefits of *Pranayam*. This exercise promotes the functioning of all the sensory systems, organs, the brain, spinal cord and the endocrine system. The thalamus, hypothalamus, the autonomic nervous system and the limbic system— all involved in emotions get appropriately activated, so as to experience happiness, calmness, peacefulness, satisfaction and energy. These positive feelings promote mental health and the negative emotions like anger, worry and depression are controlled. Hippocampus and the prefrontal centers are involved in memory and intelligent activity. Thus it is important to have the neurons in this area healthy and to reduce the death rate due to aging. Exercise helps in doing so and since ‘*Soorya Namaskar*’ is a complete exercise, it is believed to stimulate intelligent activity. The *Soorya Namaskars* are performed by reciting the mantra ‘om’ with a name of Sun God. Research has shown that reciting of the mantra ‘om’ activates the frontal lobe, temporal lobe and the occipital lobe and expands the power spectrum of these areas of the brain (Patwardhan, 2010). All these exercises are very cost effective, they require very meager apparatus and space and the entire body is exercised in short time and are found to give several physical and psychological benefits.
Mallakhamb is another exercise belonging to traditional Indian Physical Culture. Holding the Rope in the toes or holding the Pole in the thighs involves the horizontal pressure of the muscle groups on respective body parts, which is not a natural movement. It exerts the body and initial practice involves pain, bruising and sometimes injury. Movements on Mallakhamb are to be performed against gravity, which requires building up of mental skills, sustenance, will power and patience. Learning of skills on Mallakhamb involves constant challenges. The skills have to be learnt in the face of fear, which puts cognitive and emotional demands on the performer. This exercise in particular stimulates the mind and builds the body; and since Mallakhamb is the combination of acrobatic and yogic movements, it can have effects of keeping the mind calm and composed. The controlled and rhythmic breathing and smooth balanced movements help a lot in developing the mental and physical faculties of the body. The retentive abilities of the mind and the positive and constructive thinking power of an individual are much advanced. The acrobatic nature of the feats improves the sense of judgment and the hectic swings, jumps or somersaults promote toughness and fearlessness. By the hanging and swinging events, the neuromuscular coordination is enhanced (Deshpande, 1986). Preliminary research has shown that conditioning on Mallakhamb for a period of 6 weeks improves agility, muscular endurance, strength, flexibility and aerobic power (Nimkar, 2000). Exercise on Mallakhamb ensures good muscular strength of hands, legs, and thighs. It makes the body light, supple, tough, and vigorously active. The serpentine movements in Mallakhamb greatly increase the suppleness of the joints of the vertebral column. Arm holds, quick fast rotational movements, twisting movements and balancing exercises at the top of Mallakhamb give sufficient strength and tone to all the muscles to develop a beautiful, muscular body. Thus, regular practice on Mallakhamb not only develops sound body but also a healthy and composed mind and strong will power.

Once confined to enthusiasts in particular disciplines, interests in sports and games, including tournaments and meets, held in distant lands, has spread far and wide among general public, thanks to the television boom in India. This enthusiasm in watching sports has not resulted in participation in sports, thus widespread participation in sports is not seen. People watch sport, read about it, discuss it and also have large fan following. Yet, most viewers are passive audience in sports (Ghosh, 1997). There is also a dearth of good research studies on Indian sports such as Kabaddi, Hu Tu Tu, Mallakhamb and so on.

The coaches, parents and participants speak highly of variety of benefits, both physical and psychological, experienced by the regular practice of Mallakhamb. Thus, this research study is a sincere effort to understand the value of this form of Indian Physical
Culture, so that we learn to appreciate its glorious past, and study its verifiable and substantial contribution in the development of Emotional Intelligence, Executive Function and Explanatory Style.

1.5 Aim
To study the effect of participation in Indian Physical Sport Mallakhamb on Emotional Intelligence, Executive Functions and Explanatory Style

1.6 Objectives
This research study was conducted to investigate the differences in Emotional Intelligence (EI), Executive Functions (EF) and Explanatory Style (ES) in experimental group (EG) - the group exercising Mallakhamb, which learnt and practiced competitive skills on Mallakhamb, an Indian sport, for one year, compared to those who do not practice any competitive sport- Control Group (CG) - group not exercising Mallakhamb

1.6.1 Emotional Intelligence: The objectives for Emotional Intelligence are as follows,
To compare the pre intervention and post intervention scores of Emotional Intelligence of group exercising Mallakhamb and group not exercising Mallakhamb by considering the Pre- Emotional Intelligence as a covariate.

1.6.1 a. Intrapersonal Scale: To compare the pre intervention and post intervention scores of Intrapersonal component of group exercising Mallakhamb and group not exercising Mallakhamb by considering the Pre- Intrapersonal component as a covariate.

1.6.1 b. Interpersonal Scale: To compare the pre intervention and post intervention scores of Interpersonal component of group exercising Mallakhamb and group not exercising Mallakhamb by considering the Pre- Interpersonal component as a covariate.

1.6.1 c. Stress Management Scale: To compare the pre intervention and post intervention scores of Stress Management of group exercising Mallakhamb and group not exercising Mallakhamb by considering the Pre- Stress Management as a covariate.

1.6.1 d. Adaptability Scale: To compare the pre intervention and post intervention scores of Adaptability of group exercising Mallakhamb and group not exercising Mallakhamb by considering the Pre- Adaptability as a covariate.

1.6.1 e. General Mood Scale: To compare the pre intervention and post intervention scores of General Mood of group exercising Mallakhamb and group not exercising Mallakhamb by considering the Pre- General Mood as a covariate.

1.6.1 f. Emotional Quotient Scale: To compare the pre intervention and post intervention scores of Emotional Quotient of group exercising Mallakhamb and group not exercising Mallakhamb by considering the Pre- Positive Impression as a covariate.
1.6.1 g. **Positive Impression Scale:** To compare the pre intervention and post intervention scores of Positive Impression of group exercising Mallakhamb and group not exercising Mallakhamb by considering the Pre- Positive Impression as a covariate.

1.6.2 **Executive Functions:** The objectives for Executive Functions are as follows,

To compare the pre intervention and post intervention scores of various aspects of Executive Functions of group exercising Mallakhamb and group not exercising Mallakhamb by considering the Pre- Executive Functions as a covariate.

1.6.2 a. **Focused Attention:** To compare the pre intervention and post intervention scores of Focused Attention of group exercising Mallakhamb and group not exercising Mallakhamb by considering the Pre- Focused Attention as a covariate.

1.6.2 b. **Sustained Attention:** To compare the pre intervention and post intervention scores of Sustained Attention of group exercising Mallakhamb and group not exercising Mallakhamb by considering the Pre- Sustained Attention as a covariate.

1.6.2 c. **Response Inhibition:** To compare the pre intervention and post intervention scores of Response Inhibition of group exercising Mallakhamb and group not exercising Mallakhamb by considering the Pre- Response Inhibition as a covariate.

1.6.2 d. **Goal setting and Planning:** To compare the pre intervention and post intervention scores of Goal setting and Planning of group exercising Mallakhamb and group not exercising Mallakhamb by considering the pre - Goal setting and Pre - Planning as a covariate.

1.6.2 e. **Speed:** To compare the pre intervention and post intervention scores of Speed of group exercising Mallakhamb and group not exercising Mallakhamb by considering the Pre - Speed as a covariate.

1.6.3 **Explanatory Style:** The objectives for Explanatory Style are as follows,

To compare the pre intervention and post intervention scores of Explanatory Style of group exercising Mallakhamb and group not exercising Mallakhamb by considering Pre-Explanatory Style as a covariate.

1.6.3 a. **Optimism:** To compare the pre intervention and post intervention scores of Optimism of group exercising Mallakhamb and group not exercising Mallakhamb by considering Pre- Optimism as a covariate.

1.6.3 b. **Hope:** To compare the pre intervention and post intervention scores of Hope of group exercising Mallakhamb and group not exercising Mallakhamb by considering Pre-Hope as a covariate.