CHAPTER- I

INTRODUCTION

“Continuous effort not strength or intelligence is the key to unlocking your potential” - Sir Winston Churchill, former British Prime Minister.

“Once we accept our limits, we go beyond them” - Albert Einstein

“Great ideas originate in the muscles” – Thomas Alva Edison

(Brainy quote 2001)

These were the quotes said by three great minds with certain learning disabilities. One thing they had in common was a striving towards success attitude and attaining it in spite of their disposition. They were able to overcome all the negatives and conquer not only their disability but also those who said they couldn’t succeed. These quotes show that their initial feelings of fear and depression were replaced with confidence. The above quotes exemplify hard work and perseverance.

"It is the ability that matters and not disability”; through proper training and evaluation of these children, it is able to improve their abilities, build confidence and self esteem so that they are able to come up to the forefront and display their true skills. Alphonse Karr had said "Some people are always grumbling because roses have thorns; I am thankful that thorns have roses.” Succeeding in life (despite of any disabilities) is how one sees life. It is clear that through proper motivation and effective training the differently able children may excel in the main stream along with any other child from their same peer group.
Disability is a physical or mental condition that limits a person’s movements, senses or activities. The term disability is conventionally used to refer to attributes that are severe enough to interfere with, or prevent, normal day-to-day activities. According to the UN Convention on the Rights of Persons with Disabilities, “persons with disabilities include those who have long-term physical, mental, intellectual or sensory impairments which, in interaction with various barriers, may hinder their full and effective participation in society on an equal basis with others.”

Deaf is a term which is used to refer people, with hearing impairment to indicate deaf people who cannot speak, or have some degree of speaking ability, but chooses not to speak because of the negative or unwanted attention atypical voice sometimes attract. Hearing impairment among children and adolescents can affect their psychosocial development and has been estimated that psychosocial developmental issues are prevalent in 20-50% of children and adolescents with hearing loss that is 3.7 times greater than the prevalence of psychosocial developmental issues in normal hearing children. (Bess, F. H. 1988).

These children can run the risk of becoming unfit and obese, but there is also a growing body of evidence to demonstrate that there are distinct physiological consequences of play deprivation which can lead to an increase in anti social behaviour and mental health problems. ‘An inability to engage in play can only result in behavioural instability, neurological dysfunction, unhappiness and a lack of mental well being in affected children’.
Disabled children need to play as much as their normal peers, and indeed the benefits of play and physical activity can be even greater than that of other children, so it is vital they do not miss out. Positive experiences of play and physical activity can also enhance children and young people’s mental health by building up their confidence, self-esteem and resilience. It is also through play, both in the community and at school, that children develop friendships and a sense of belonging to a peer group.

For school-age children, being able to form and maintain positive peer relationships are particularly critical aspects of social competence. A child must have adequate social skills to interact successfully with these peers, in order to fully integrate and reap the benefits of an inclusive education. Every physical defect, be it blindness or deafness, alters the child's attitude towards the universe and, primarily, towards its-his fellow beings. Deaf children have fewer natural opportunities for meaningful conversational interaction and, as a result, are less likely to acquire a full range of pragmatic skills.

Physical education is a planned program of motor activities that helps the individual to develop and control their body or it is a process through which favourable adaptation and learning (organic, neuromuscular, intellectual, social, cultural, emotional, and aesthetic) results from a fairly vigorous activity. Physical education is a formal area of educational activity in which the main concern is with bodily movements that take place in an educational establishment (Williams J. F. 1964).

Games improve the inclusion and well-being of persons with disabilities in two ways - by changing what communities think and feel about persons with disabilities and
by changing what persons with disabilities think and feel about themselves. The first is necessary to reduce the stigma and discrimination associated with disability. The second empowers persons with disabilities so that they may recognize their own potential and advocate for changes in society to enable them to fully realize it.

Sport has the power to reduce dependence and develop greater independence by helping individuals to become physically and mentally stronger. Sport also provides a forum to enable persons with disabilities to build the skills they need to advocate for and influence change. The awareness and confidence that persons with disabilities gain through sport are often the impetus for engaging in advocacy work, as the communication, leadership and teamwork skills they develop are easily transferred into this new arena.

Regular physical activity and physical fitness are especially important in maintaining the health and well being of people of all ages. Research clearly indicates that virtually all individuals, including those with disabilities, can gain health benefits from regular physical activity. The health promotion and disease prevention needs of people with disabilities who have secondary health conditions may be complicated by specific medical aspects of disabilities.

According to the National Institutes of Health (1993), approximately one of every thousand children is born with profound hearing loss. Many more are born with less severe degrees of loss, while others may develop hearing loss over time. Reduced hearing acuity during infancy and early childhood interferes with the development of speech and language skills. Communication difficulties may also adversely affect social, emotional,
cognitive, and academic development. Since physical activity and fitness are tied to these developmental constructs, hearing loss may influence physical activity patterns and levels of physical fitness.

The Deaf community has a significant history of involvement in sport. The oldest U.S. disability sport organization, the American Athletic Association for the Deaf, now recognized by the name, USA Deaf Sports Federation, was founded in 1945. Most of the research on physical activity programs for deaf individuals has focused on physical education in schools and sport programs for children and youth. However, the physical activity needs of the adult population have received little attention beyond competitive sport. Information on lifestyle and leisure activities, informal and unstructured physical activity and play, and active living is virtually non-existent. To achieve the physical activity health objective of the nation, there is a need to enhance physical activity levels of Deaf individuals, beyond school-based physical education and competitive sport programs. Promoting a variety of lifestyle physical activity opportunities, including embracing the concept of "Active Living," a way of life that integrates physical activity into daily routines, should become a health objective priority. (Chris Hopper 2002)

In India, the All India Deaf & Dumb Society (AIDDS) has been formed by public spirited persons for the benefit and welfare of deaf & mutes irrespective of gender, race, religion, castes, creed, and colour. It was registered in the year 1956 under the Societies Registration Act XXI of 1860 under no S 963 of 1956. The objective of the organization is to foster the spirit of goodwill, co-operation, self help among its members and others and thus to create and promote the spirit of fellowship brotherhood, co-operation and harmony among the deaf and dumb and the general public. (AIDDS 1956)
Parents of Special Olympians reported that their child's participation promoted social adjustment, life satisfaction, family support, and community involvement. Such events provide a much-needed venue for informal peer support and sharing of experiences among families of children with disabilities. Mildly strenuous exercise has been shown to reduce stereotypic movements, maladaptive behaviours, and fatigue in children with autism and other developmental disabilities. Lastly, participation in regular physical activity can foster independence, coping abilities, competitiveness, and teamwork among children with disabilities.

For a successful physical and mental development, new reforms have a two-pronged approach:

1. Information access and capacity building for the teacher by conducting seminars on new educational practices.
2. Motivational activities for the students which includes enriching the experience of school students by hosting events such as painting, quiz, dance, sports, camps etc.

Children with disabilities who participate in physical and recreational disabilities are less likely to suffer from depression, show improvement in their academics, increase their social lives, and are less susceptible to secondary health complications. The participation of children with disabilities in sports and recreational activities promotes inclusion, minimizes de-conditioning, optimizes physical functioning, and enhances overall well-being.

The term "participation" is defined by the World Health Organization as the nature and extent of a person's involvement in life situations and includes activities of
self-care, mobility, socialization, education, recreation, and community life. Participation in activities is the context in which the people form friendships, develop skills and competencies, express creativity, achieve mental and physical health, and determine the meaning and purpose in life. Children with disabilities tend to be more restricted in their participation than their peers: a gap that widens as children become adults. One way in which health care professionals can assist children with disabilities to participate fully in the lives of their families and communities is by promoting participation in games, recreation, and physical activities in the least restrictive environment. (World Health Organization 1946)

The primary goals for increasing physical activity in children with disabilities are to reverse de-conditioning secondary to impaired mobility, optimize physical functioning, and enhance overall well-being. Regular physical activity is essential for the maintenance of normal muscle strength, joint structure and function and it may slow the functional decline often associated with disabling conditions.

Sport participation can also help in dealing with social anxiety. It has been found that those children who participate on team sports experience less social anxiety over time. Given the increased prevalence of psychosocial development issues in hard of hearing adolescents, sport participation can benefit this population in two ways, through increased social support and elevated self esteem. (Schumacher et.al 2011)

Minor games is defined as that the games rules are modified for the convenience of the players and necessity of the needed skills. Minor games require little, if any equipment and can be played almost anywhere. Players need a variety of skills and little
prior knowledge. With a very few rules, they are played for shorter duration and can be modified according to convenience.

They are classified under games because all the movements involved are natural movements and unrestricted free expression of the big muscles receive the richest, benefit in playing minor games. These games are taught invariably at the elementary school level. They are tag games and relay games. Almost every game involves chasing and tagging. Hopping, Jumping, skipping, leaping and running are the movements insisted on each game and the effect of these exercises are well seen flowing through the muscles.

As stated above, minor games have psychological, physiological and physical effects on deaf children.

I. The psychological effects are reduction in depression and anxiety and thus results in enhanced self efficiency.

Depression is a state of low mood and aversion to activity that can affect a person's thoughts, behaviour, feelings and physical well-being. Depressed people may feel sad, anxious, empty, hopeless, helpless, worthless, guilty, irritable or restless.

Depression is a type of disorder under affective mental illness (the other type being Mania). Depending on its severity, depression is classified as major depression or minor depression. Major depression may feature psychotic symptoms such as delusions. Minor depression, also called Neurotic depression is often associated with anxiety symptoms. Major Depressive Disorder (MDD), more commonly referred to as
“depression,” is a psychological condition that taxes the emotional, cognitive and physical resources of an individual.

Leigh and Anthony-Tolbert (2001) assessed the reliability of the Beck Depression Inventory- II (BDI-II) with deaf college students without modifying the self-report in any way. A total of 63 college students were administered the BDI-II and 53 returned a week later to retake this measure. The general findings support using the BDI-II in research with deaf college students based on an internal consistency of .88, full-sample split-half reliability of .76, and a test-retest correlation of .74.

Anxiety is a psychological and physiological state characterized by somatic, emotional, cognitive, and behavioural components. It is the displeasing feeling of fear and concern. The root meaning of the word anxiety is ‘to vex or trouble’; in either presence or absence of psychological stress, anxiety can create feelings of fear, worry, uneasiness, and dread.

Anxiety and related disorders are mental disturbances in which a person experiences unreasonable fears. The five chief types of anxiety disorders are: Generalized anxiety, Phobias, Panic disorder, Obsessive compulsive disorder, and Dissociative disorders.

Disabled students who are experiencing difficulties in class, or are? Continuously unable to meet course and social demands may find themselves experiencing clinical levels of anxiety. Ellis’ A-B-C theory of dysfunctional behavior may explain how the manifestation and maintenance of anxiety may occur in these students. Ellis argued that stressors or activating events (A) do not cause psychopathology or emotional
consequences (B) rather it is their rational beliefs (C) that cause emotional disturbances in people’s lives (Compas & Gotlib, 2002).

When students consistently engage in erroneous beliefs about the self, or abilities thereof, this behavior may result in a cyclical pattern. Negative self-thoughts may then become aggrandized to such a degree that students find confirmation of their faulty beliefs in all situations. Some students then complicate these perceptions by engaging in behaviors that unwittingly result in negative consequences that reinforce their erroneous views and increase or maintain levels of anxiety. This type of self-sabotaging behavior promotes the continuation of negative behaviors and thoughts, while providing a protective function for the ego. (Tice D.M. & Baumeister R.F. 1997).

Several researchers have explored the developmental factors impacting self concept within the deaf and hard of hearing populations. Self-concept has been defined as a generally constant group of self-attitudes centering on a description and evaluation of one's own behavior and attributes (Piers, 1984). Hard of hearing and deaf students' self-concepts were inversely related to the ratings of peer acceptance from other hard of hearing and deaf students.

Using the Piers-Harris Children’s Self-Concept Scale, compared the self-concepts for a wide range of handicapped children, including the hard of hearing, to their age appropriate, non-handicapped students. He found that handicapped students had significantly more negative self-concepts, higher levels of anxiety, and more negative perceptions of their social status and popularity.
II. The physiological effects include change in VO$_2$max.

VO$_2$max is defined as the greatest amount of oxygen that can be consumed from inspired air during exercise involving a large part of the total muscle mass of the body. It represents the sum of oxygen used in cellular metabolism expressed in milliliters of oxygen per kilogram of body weight per minute (ml/kg/min). VO$_2$max (also maximal oxygen consumption, maximal oxygen uptake, peak oxygen uptake or maximal aerobic capacity) is the maximum capacity of an individual's body to transport and use oxygen during incremental exercise, which reflects the physical fitness of the individual.

The name is derived from V - volume, O$_2$ - oxygen, max - maximum. Research in medicine and exercise physiology has indicated that VO$_2$max testing is a good predictor of fitness level and potential. VO$_2$max is properly defined by the Fick’s equation:

\[
\text{VO}_2\text{max} = Q (\text{Cao}_2 – \text{Cvo}_2); \text{ where these values are obtained during an exertion at a maximal effort Developed by Adolf Eugen Fick. (Keinanen et.al 1992)}
\]

Q is the cardiac output of the heart

\[
\text{Cao}_2 \text{ is the arterial oxygen content}
\]

\[
\text{Cvo}_2 \text{ is the venous oxygen content.}
\]

(Cao$_2$ – Cvo$_2$) is also known as the arterial venous oxygen difference.

The level of maximal oxygen uptake (VO$_2$max) was established as a marker of physiological health status since the groundbreaking work of Kenneth H. Cooper (1968) who posited that regular training at 65-70% maximal heart rate is a meaningful target for
cardiovascular fitness. It was asserted that training at less than this level would yield no biochemical or anatomical change associated with fitness. Kenneth H. Cooper wrote that fitness level is determined by the ability of the individual to accomplish more work at similar levels of oxygen consumption and heart rate. While maximal oxygen uptake is largely determined by genetic enzymes which fuel the cardio-pulmonary system, change of mass (and related function) of the heart and capillary density can also affect VO$_2$max, hence VO$_2$max could conservatively fluctuate in the individual (Mujika et.al 2004).

According to Kenneth H. Cooper, in short, maximal oxygen uptake is a measure of the body’s ability to realize the most benefit from consumed oxygen in its efforts toward cellular metabolic functioning. Along these lines, VO$_2$max is the greatest amount of oxygen an individual can consume from inspired air while performing physical exercise which involves a significant portion of the body’s muscle mass. Roca et al. (1989), Fleg et al. (1994) and Tanaka and Seals (2003) all determined that maximal oxygen uptake in individual decreases with age, and accordingly VO$_2$max measurements will reflect such a normal decrease.

Comprehensive study of cardiovascular responses to physical stress established a solid framework for utilizing VO$_2$max as a marker of cardiovascular fitness. The study indicated that VO$_2$max is a good predictor of cardiovascular function by detecting that this measure allowed researchers to reasonably quantify that aerobic exercise may decrease beta-adrenergic myocardial response to physical and behavioral stimulus. Moreover, solidifying the value in studying maximal oxygen uptake and VO$_2$max measures as a predictor of cardiac capacity and fitness, Light et.al (1987).
To better understand oxygen consumption in the body it is worthwhile to consider the function and role of vasodilatation and constriction and oxygen utilization in the body tissue. Londereee and Moeschberger (1984) posited that in addition to the level of exercise, position of the body, medications, presence of disease and environmental concerns, sinus node function and blood volume are key determinants in the body’s ability to uptake oxygen.

A study determined that key parameters in the effective and systemic oxygen transport apparatus and oxidative enzyme activity as well as circulatory capacity affected the ability of an individual to deliver oxygen to the body tissues and added that VO₂max is an indicative test of cardiopulmonary health at the tissue level. Perhaps one of the most evident impediments of oxygenation of body tissue at the circulatory level which factors into VO₂max is the onset of blood lactate accumulation. Walsberg et.al (1986).

III. The physical effects include improvement in the overall fitness level of the student.

Physical fitness refers to the capacity of an athlete to meet the varied physical demands of their sport without reducing to a fatigued state. Physical fitness is the ability to carry out daily tasks with alertness and vigor, without undue fatigue, and with enough energy reserve to meet emergencies or to enjoy leisure time.

The physical effects mainly take into account the impact of AAHPER Youth Fitness Test on the students. The measurement objective is to assess fitness through test items measuring muscular strength and endurance, cardio respiratory endurance, agility, and speed.
The test measure body composition, agility, coordination, upper body strength and aerobic endurance. The tests were designed so that they could be administered by professionals and clinicians in the field who lack specialized measurement equipment, training and resources.

The AAHPER youth fitness test was developed in America in 1957 to test physical fitness. These include motor, organic and physique measure. Motor fitness variables include: Pull-Ups/Flexed Arm Hang, Sit-Ups, Shuttle-Run, Standing Broad Jump, 50 meter dash, 600 meter run/walk.

The organic efficiency tests included heart rate and maximal oxygen intake determination. These measurements are taken when the person performs a treadmill run till he could no longer continue. Physique measures involved measurement of bone, muscle and fat. Also lean body mass is also estimated.

**Statement of the Problem**

The purpose of the study was to find out the effect of twelve week minor game programme on selected psychological, physiological and physical fitness components of deaf students.

**Research Questions**

1. Does participation in minor game have an impact on the physical variables of deaf students?

2. Does participation in minor game have an impact on the physiological variables of deaf students?
3. Does participation in minor game have an impact on the psychological variables of deaf students?

**Hypotheses**

The following Hypotheses were formulated on the basis of available literature, the subject knowledge and experience of the research scholar.

1. It was hypothesized that “deaf students show significant decrease in both anxiety and depression after minor game programme, as compared to participants in the control condition”.

2. It was hypothesized that “deaf students in the minor game condition show significant increase in VO\textsubscript{2max} after completing minor game programme”.

3. It was hypothesized that “there will be significant difference in the selected physical fitness components of agility, abdominal strength, cardio respiratory endurance, arm power, leg power and running speed of the experimental group due to minor game programme”.

**Delimitations**

1. The study was delimited to challenged deaf students (n=104) studying in schools for the deaf, Govt. V&HSS for the Deaf Jagathy, Thiruvananthapuram, Kerala, India.

2. The age of the subjects is ranged from 14 to 19 years.

3. The selected subjects were classified randomly into four groups; group-A and B were the experimental and control groups for boys and group-C and D were that of the girls.
4. The study is further delimited to two psychological variables namely depression and anxiety, physiological variable like VO$_2$max and physical fitness variables which include speed, abdominal strength, shoulder strength and cardiovascular endurance.

**Limitations**

1. Since the children were from different socio-economic status, different dietary habits, different mode of living and their different in terms of interaction with peers could not be controlled by the researcher, which might have had some effect on the improvement of selected physical, physiological and psychological were considered as the limitation.

2. No special motivation technique was used by the researcher while taking pre and post tests, which might have influenced the performance of the subject, and is considered as one of the limitations.

3. The interaction of the research scholar with the subjects while administrating the programme and conducting pre and post tests might be considered as another limitation of the study.

4. Questionnaire research has its limitations, any bias that may have entered into mind of the subject on this account may be considered as limitation of the study.

5. Factors like life styles, habits, heredity, study habits, nutritional intake, general activity levels, motivation and psychological traits of subjects were beyond the control of the investigator and hence considered as a limitation for the study.

6. Socio economic and religious factors, which could not be controlled by the research scholar, might have affected the study.
Definition and Explanation of Terms

Deaf

Hearing impairment is the inability to hear as well as someone with normal hearing. Hearing impaired people can be hard of hearing (HOH) or deaf. If a person cannot hear at all, then they have deafness. (WHO)

Minor game

Minor games require little, if any equipment and can be played almost anywhere. Players need a variety of skills and little prior knowledge.

These games promote learning and growth for every child who participates. The games have been revised and tested in order to ensure that each game is easy to follow and contributes to the holistic development of the child.

Psychology

Psychology is the science of the activity of an individual in relation to his environment.

Sports psychology

Sport psychology is “the scientific study of people and their behaviors in sport contexts and the practical application of that knowledge.

Depression

Depression is a common mental disorder that presents with depressed mood, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, low energy, and poor concentration. These problems can become chronic or recurrent and
lead to substantial impairments in an individual's ability to take care of his or her everyday responsibilities.

**Anxiety**

Agility may be defined as the physical ability which enables an individual to rapidly change body position and direction in a precise manner.

**Physiology**

Physiology is “the branch of biology dealing with the functions and vital processes of living organisms or their parts and organs”.

**Exercise physiology**

Exercise physiology is “the study of the function of the human body during various acute and chronic exercise conditions”.

**VO$_2$max (maximal oxygen uptake)**

VO$_2$max is the greatest amount of oxygen that can be consumed from inspired air during exercise involving a large part of the total muscle mass of the body. It represents the sum of oxygen used in cellular metabolism expressed in milliliters of oxygen per kilogram of body weight per minute (ml/kg/min).

**Fitness**

Fitness is the state which characterizes the degree to which a person is able to function efficiently. Fitness is an individual matter. It implies the ability of each person to live most effectively within potentialities.
**Physical Fitness**

Physical fitness is the ability to do daily task with vigour and alertness, without undue fatigue, and with ample energy to engage in leisure pursuit and to meet emergency situations.

**Speed**

Speed is the rapidity with which one repeat successive movement of the same pattern.

**Agility**

Agility may be defined as physical ability, which enables one individual to rapidly change body position and direction in a precise manner.

**Strength**

Strength is defined as the ability of the body, or particular parts of it to apply force. It is important to overall body performance in sports and everyday life

**Strength Endurance**

It is the muscle's ability to perform a maximum contraction, time after time.

**Shoulder Girdle**

Shoulder Girdle is the bony or cartilaginous arch that supports the forelimbs of a vertebrate called also pectoral girdle

**Power**

It is the ability to exert maximum muscular contraction instantly in an explosive burst of movements. The components of power are strength and speed.
**Cardio respiratory endurance**

Cardio respiratory endurance refers to the ability of the body to perform prolonged, large-muscle, dynamic exercise at moderate-to-high levels of intensity. Cardio respiratory endurance is an important part of overall physical fitness.

**Significance of the study**

The significance of this study is to establish the indispensability of selected minor game programme for deaf students to develop the skills to contribute and to meet the physical demand of daily life through recreations. The study also substantiate the demand of adequately prepared adapted physical education teachers to be placed in the school system of this country to deliver quality assured physical education to challenged students. The finding of this study will be useful for those involved in educating deaf students, training them to live as worthy citizens within the limitations of their disabilities.

Psychological variables including anxiety and depression, along with the physiological variable VO$_2$max, were examined as potential predictors of the reductions in anxiety and depression that are associated with minor game. Alternatively it may also help to determine significant changes in physiological variable (VO$_2$max) by monitoring the changes in the psychological ones. The minor game programme results in a significant change in the physical fitness variables of the deaf students and can be foreseen that it increases the fitness variables. The study also determines whether the significant changes in the physical fitness variables help to predict the relationship between physiological (VO$_2$max) and psychological factors (anxiety & depression) of the study.
Findings from this study may assist the educational community, parents, educators, and special service providers to make placement decisions for deaf students. These findings may not only provide further insight into educational placement and curriculum development but also focus on environmental factors that enhance development of physical, physiological and psychological factors which includes as part of the personality, physical, mental, social and emotional development for deaf students.

The educators can understand and help for the development of the physical, mental, social, emotional, and academic needs of deaf students more effectively through the minor game programme. These findings may further benefit special education administrators to review current policies and practices for the placement and implementation of the programs, and to assist staff, parents, and deaf students for the successful education integration.