CHAPTER 2

2. LITERATURE REVIEW

Review of literature is one of the most important steps in research process. It is a broad, comprehensive, in depth systematic and critical review of scholarly publications, unpublished scholarly print materials, audio-visual materials and personal communications. The main purpose of literature review is to convey to the readers about the work already done and the knowledge and ideas that have been already established on a particular topic of research [97].

Literature review is a laborious task, but it is essential if the research process is to be successful. Research studies are usually undertaken within the context of an existing knowledge base, because research cannot be conducted in an intellectual vacuum. One of the most satisfying aspects of the literature review is the contribution it makes to the new knowledge, insight, and general scholarship of the researchers. Considering this fact, in this study, researcher has also tried to take some review of articles, published in books, journals, magazines, newspapers, Medline data base, EBSCO and CINAHL etc. [98].

The review of literature for the present study has organized under three sections:

2.1 Section A: Theoretical Literature on physical disability, quality of life and health promotion intervention

2.1.1 Part I: Theoretical Literature on physical disability and quality of life

2.1.2 Part II: Theoretical Literature on health promotion intervention for improving quality of life among physically challenged children
2.2 Section B: Empirical literature related to quality of life among physically challenged children and health promotion intervention

2.2.1 Part I: Literature related to physical wellbeing among physically challenged children

2.2.2 Part II: Literature related to psychological wellbeing among physically challenged children

2.2.3 Part III: Literature related to social wellbeing among physically challenged children

2.2.4 Part IV: Literature related to effect of health promotion intervention in improving quality of life among physically challenged children

2.3 Section C: Conceptual framework

2.1 Section A: Theoretical Literature on physical disability, quality of life and health promotion intervention

2.1.1 Part I: Theoretical Literature on physical disability and quality of life

2.1.1.1 Concept of physical disability

   According to WHO, the disability process is multidimensional. Any disease or injury causes physical impairment; physical impairment leads to functional limitation and functional limitation leads to disability. Impairment is any loss or abnormality of physiological or psychological function. Impairment may cause functional limitation which can be the partial or total inability to perform those activities necessary for motor, sensory or mental functions within the range and manner of which a human being is normally capable of. For instance, walking, seeing, speaking, writing etc. A functional limitation may last for a short time or long time, be permanent or reversible. Disability, in which functional limitation or impairment is a causative factor, is an existing difficulty to perform an activity in the manner or within the range considered normal for a human being [19, 99].
2.1.1.2 Types of physical disability

This group of disability includes: blindness, deafness, dumbness and locomotor disability. The prevalence of locomotor disability among these different kinds of physical disabilities is highest in younger population in the country [19].

2.1.1.2.1 Locomotor disability

Locomotor disability has been defined as “a person's inability to execute distinctive activities associated with moving, both personally and objects, from place to place, and such inability resulting from afflictions of musculo-skeletal and, or nervous system”[19].

2.1.1.2.2 Grades of locomotor disability

There are four grades of locomotor disability depending on the severity of impairment/functional limitation these are: mild: less than 40 per cent; moderate: 40 – 74 per cent; severe: 75- 99 per cent; and profound: 100 per cent [100].

2.1.1.2.3 Categories of locomotor disability

1. Permanent physical impairment of upper limb
2. Permanent physical impairment of lower limb
3. Permanent physical impairment of trunk (spine)
4. Permanent physical impairment in case short stature/ dwarfism
5. Permanent physical impairment in amputees
6. Longitudinal deficiencies
7. Permanent physical impairment in neurological conditions
8. Permanent physical impairment due to cardiopulmonary diseases [100].

2.1.1.2.4 Causes of locomotor disability

Causes of locomotor disability can be classified as: congenital and acquired. The common congenital causes are: cerebral palsy, Congenital Talipes Equino Varus (Club foot), meningocele, meningo myelocele, phocomelias, and congenital dislocation of hip. Causes of the acquired disability can be put within the
following jackets: infective and traumatic. The infective ones are: tuberculosis of spine or other joints, chronic osteomyelitis, septic arthritis, acute poliomyelitis, Guillain- Barre syndrome, leprosy, encephalitis, AIDS etc. Traumatic ones are: traffic accidents (air, water, road), domestic accidents, industrial accidents, agricultural accidents, fall from height, bullet injuries, explosions, violence, sports injuries, natural catastrophies like earthquakes, floods etc. Neoplastic conditions are yet another cause of locomotor disability. Take for example, brain spinal and bone tumors. Metabolism, as has been said earlier, too can be the villain. Common examples are: rickets, diabetes mellitus, gout etc.[19].

A brief numeration of common conditions causing locomotor disability is given below:

2.1.1. 2. 4.1 Poliomyelitis

Poliomyelitis is an acute infective disease caused by the poliovirus. There are three distinct serotypes of the virus, viz., 1, 2 and 3. Humans are the sole natural reservoir for poliovirus. Infection is transmitted by the oropharyngeal faecal circuit. The virus multiplies in the intestine. It then travels to the regional lymph nodes and reticulo endothelial structures. Viremia may occur for a short period. If conditions for spread of the virus are present, the virus involves the nervous system. Poliovirus selectively damages some special areas in the nervous system. The most commonly affected area being the anterior horn of the spinal cord.

The signs and symptoms of polio differ depending on the extent of the infection and can be divided into paralytic and non-paralytic polio. In non-paralytic polio, patients remain asymptomatic or develop only mild flu-like symptoms, including fatigue, malaise, fever, headache, sore throat, and vomiting. The symptoms, may only last 48-72 hours, though usually they last for one to two weeks. Paralytic polio occurs in about 2% of people infected with the polio virus and is a much more serious disease. Symptoms occur as a result of nervous system and spinal cord infection and inflammation. Symptoms can include - abnormal sensation, breathing difficulty, difficulty in swallowing, urinary retention, constipation, drooling, headache, mood swings, muscle pain and spasms, and paralysis.
2.1.1. 2. 4.2 Cerebral Palsy

Cerebral palsy is a "persistent disorder of movement and posture appearing early in life due to a developmental non-progressive disorder of the brain." The causes of cerebral palsy frequently cannot be pin-pointed. These include developmental defects, hypoxia and hemorrhage, infection, toxin and poisons, trauma, isoimmunisation reactions, defects of biochemical maturation and genetic defects. There are different types of cerebral palsy. Spastic type is most common and comprises 70% of all patients. Dyskinetic type is present in 10% of all patients, while mixed type (a combination of spastic and dyskinetic types) is present in 20% of all patients. Based on the topographic distribution of neuromotor involvement, classification is also made as (a) quadriplegia (b) diplegia (c) paraplegia (d) hemiplegia (e) triplegia and (f) monoplegia. Various problems frequently co-exist in cerebral palsy. Seizures occur in about half of the children, more often in those with spastic hemiparesis or quadripleasis and rarely in those with pure dyskinetic form. Mental retardation is more common in children with microcephaly, seizures and spastic quadripleasis. It is rare in dyskinetic type. Visual problems occur in about half the children with cerebral palsy. Most common problem is strabismus. Hearing problem occurs in 12% cases. Speech impairment is frequently associated with drooling and feeding problem. Attention deficits, easy distractibility, learning disabilities, emotional liability and behaviour problems are common in children with cerebral palsy. Other medical problems include failure to thrive, constipation, frequent colds, ear infection, wheezing etc. Common orthopaedic problems include joint contractures, hip dislocation and scoliosis.

2.1.1. 2. 4.3 Injuries of brain and spinal cord

It refers to traumatic insult to the brain or spinal cord that can result in alteration of normal motor, sensory or autonomic functions. These can result in paraplegia or quadriplegia. The involvement may be complete or incomplete. Common causes of brain and spinal cord injuries are fall from height (root, tree, stairs), motor vehicle accidents, gunshot injury, stab wounds, sports injuries and iatrogenic injuries of cord following surgical procedures. Brain and spinal cord
injuries of any kind may result in one or more of the signs and symptoms these are: loss of movement, loss of sensation, loss of bowel or bladder control, exaggerated reflex activities or spasms, changes in sexual function, sexual sensitivity and fertility, pain or an intense stinging sensation, difficulty in breathing, coughing or clearing secretions from lungs. At the same time, mental and emotional functions are affected.

2.1.1.2.4.4 Amputation

Amputation implies the absence of all or part of the limb. The causes of amputation may be broadly classified as congenital or acquired. Congenital skeletal deficiencies can be transverse or longitudinal. Transverse is defined as absence of all skeletal elements distal to the deficiency. It can further be described as total, upper one third, middle one third, distal one third. Longitudinal deficiency is an absence extending parallel to the long arm of the limb. The deficiency may be partial or total. Probable causes of congenital skeletal deficiencies are hereditary abnormalities, teratogenic agents, excessive radiation etc. The causes of acquired limb loss are: accidents, malignant tumors, tissue death due to peripheral vascular insufficiency and peripheral vasospastic diseases such as Buergers disease and Raynauds disease, thermal injuries both from heat and cold, long standing infections of bone and other tissues that leave no chance of restoration of function, uselessness of a deformed limb that is objectionable to the patient, neurogenic resorption. Traumatic amputation is the major cause followed by vascular diseases, infections, tumors, and congenital causes.

2.1.1.2.4.5 Muscular dystrophies

The muscular dystrophies are a heterogeneous group of inherited disorders with gradual degeneration of the muscle fibres. There are three main types of muscular dystrophies. These are: pseudohypertrophic or duchenne type, fascio scapulo humeral type and limb girdle type. The most common type is Duchenne muscular dystrophy. It occurs only in male children. Early development of the child is normal or slightly delayed. It starts with difficulty in walking, running and climbing stairs when the child is around 2 or 3 years of age. The child has difficulty in standing up from the recumbent position and classical "Gowers sign" may be
present in moderately severe disease. Waddling gait is present. There is hypertrophy of calf muscles. Weakness of shoulder girdle muscles occur subsequently. Eventually, all the muscles atrophy and the child becomes severely incapacitated and bed-ridden. Arnbulation usually ceases by 12 to 14 years of age, and death occurs prior to age 20 years in 75% of cases due to recurrent infection or associated cardiomyopathy. Intelligence is usually in the subnormal range. Fascio scapulohumeral type affects both sexes. Age of onset is around puberty. There is weakness of facial and shoulder girdle muscles. Forceful eye closure and whistling are not possible. Progress of weakness is slow and is compatible with a normal life span. Limb-girdle muscular dystrophy may start to appear during childhood, adolescence or adulthood. Pelvic girdle muscles are most commonly affected. Course of illness is slower and moderately progressive [19].

2.1.1.2.5 Impact of disability on quality of life of locomotor disabled children

WHO defines quality of life as individualized perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of their environment [48].

Health-related quality of life (HRQOL) is a multi-dimensional concept that includes domains related to physical, mental, emotional, and social functioning. It goes beyond direct measures of population health, life expectancy, and causes of death, and focuses on the impact of health status has on quality of life [49].

Various researchers had found that disability had a devastating effect on physical, psychological, social and spiritual wellbeing of a person which can be described as follows:
2.1.1.2.5.1 Impact of disability on physical wellbeing

Physical wellbeing includes aspects of physical health, personal hygiene, nutrition, exercise, grooming, clothing, and physical appearance. The physical wellbeing gets affected because of disability and the affected person may faces the following physical problems.

1. Functional limitation like difficulty in walking, dressing, maintaining personal hygiene, standing for prolonged period, inability to do certain jobs.
2. Dental problems like dental caries, dental fluorosis, malocclusion and tooth abscess.
3. Skin problems like infections, trauma and pressure sore.
4. Digestive problems like anorexia, constipation, flatulence etc.
5. High risk for development of cardiovascular disorders.
6. Prone to develop obesity. Obesity places additional strain on the joints of musculoskeletal system, contributing to early onset of osteoarthritis.
7. Greater risk of accidents, trauma, and physical abuse [10, 70,71].

2.1.1.2.5.2 Impact of disability on psychological wellbeing

Psychological wellbeing includes the person's psychological health and adjustment, cognitions, feelings, and evaluations concerning the self and self-control. The psychological wellbeing gets affected because of disability and the affected person may faces the following psychological problems.

1. Isolation and segregation.
2. Denial, anxiety, fear, anger, depression, guilt.
3. Lower self esteem,
4. Dependence, hostility, loneliness
5. Perception of disability as evidence of negative status.
6. Feeling of inadequacy, uselessness and a burden to the family and society. These feelings are often accompanied by severe bouts of depression, as the person refuses to accept the limitations of his/her disability [10, 72, 73].
2.1.1.2.5.3 Impact of disability on social wellbeing

Social wellbeing includes links with social environments and includes the sense of acceptance by intimate others, family, friends, co-workers, neighbourhood and community. Social wellbeing gets affected because of disability and the affected person may face the following social problems.

1. Worst stigma and social exclusion.
2. Bias, prejudice, and discrimination from individuals, community, and institutions.
3. Negative attitude and perceptions.
4. Gender differences
5. Rejection by society (laughed at, not included in social activities, isolated) even within their own families challenged children had problem in interacting with them.
6. Fear of transmitting disease / disability to family.
7. Negative effect on their marriage, educational attainment, employment, and emotional state.
8. Social injustice, marginality and poverty.
9. Little or no access to basic social services especially education and health [10, 72, 73].

2.1.1.2.5.4 Impact of disability on spiritual wellbeing

Spiritual wellbeing reflects personal values, personal standards of conduct, and spiritual beliefs which may or may not be associated with organized religions. These are affected because of disability and the affected person faces the following spiritual problems.

1. Less faith in God.
2. Negative attitude toward religious and social activities.
3. Transcendence.
4. Less hope of recovery with worship.
10. Negative feeling of inner strength [10, 72, 73].
2.1.1.2.6 Disability prevention

Disability prevention includes all actions taken to reduce the occurrence of impairment (first level prevention) and its development into functional limitation (second level prevention), and to prevent the transition of functional limitation to disability (third level prevention). It includes intervention in the health sector plus a wide range of social interventions, acting upon the individual, his immediate surroundings and the society as a whole.

2.1.1.2.6.1 First level prevention

First level prevention of locomotor disability may be accomplished by measures designed to promote general health and wellbeing and quality of life of the people, or by specific protective measures. The following measures are used:

1. Prevention of congenital diseases through prospective counselling (high risk cases) or retrospective counselling (by MTP, contraception etc.).
2. Prevention of communicable diseases by immunisation, hygiene, health education
3. Prevention of malnutrition and vitamin deficiency.
4. Prevention of accidents by provision of safety measures at home and work place, and enforcement of legislation to exemplify wearing of helmets to prevent head injury.
5. Elimination of exposure to situations in which locomotor disabilities may occur, in particular, war and other forms of violence, and chemical and environmental pollution.

Reduction of incidence of locomotor disability at first level primarily calls for health education for the general public and also at the level of health personnel, especially attached to a primary health centre, village workers and anganwadis. Information, education and communication (IEC) activities are essential to accomplish proper health education to the masses.
2.1.1.2.6.2 Second level prevention

When impairment occurs, it is necessary to try to prevent any long term functional limitation from occurring. To achieve it, measures are required specifically in the following three areas:

1. Ability to identify the impairment that might lead to functional limitation i.e. development of diagnostic ability.
2. Proper and prompt care of impairment in the acute stage to avoid subsequent functional limitation i.e. care of acute cases take for example administration of first aid measures, proper nursing care etc.
3. Proper care of impairment in the chronic stage to avoid functional limitation i.e. care of chronic cases. This includes provision of appropriate drugs for chronic diseases and provision of therapeutic exercises and proper positioning to avoid deformities take for example in poliomyelitis, stroke etc.

In order to achieve it, proper diagnostic and treatment facilities should be uniformly available at all levels of health care. In the case of accidents, facilities for immediate evacuation and transfer to the proper place of treatment are essential. Adequate follow up and two way referral systems are also required to be developed in order to provide the patients continuous care and prevent complications, if any, at the earliest.

2.1.1.2.6.3 Third level prevention

When long term functional limitation has developed, measures instituted should aim at prevention of disability. Such measures may be divided into medical, psycho-social, educational and vocational. Third level prevention of locomotor disability aims at enabling the individuals to perform the varying roles expected by the family, community and society at large to the extent possible and thereby restore the patient back to normal or near normal condition. The measures include training to increase independence in self care (ADL), educational and vocational measures aimed at achieving economic independence and psycho-social measures aimed at
restoration of personal dignity and to ensure full integration and acceptance in the
community [100].

2.1.1.2.7 Early identification of locomotor disability

If locomotor disability has occurred inspite of preventive measures early
identification becomes important. Earlier, the identification and treatment, better are
the chances of postponing, or at least, reducing the occurrence or severity of
locomotor disability. A regular medical check up of the child or adult will help in
identifying weakness, deformities etc. at an early stage, so that, corrective measures
could be instituted promptly to prevent further deterioration.

Early identification of the locomotor disabled person can be done at
health centres, at schools and even at homes. Some important signals which will help
in identification of locomotor disability in a child or an adult are:

1. Any deviation or slowness in a child's developmental milestones.
2. Excessive stiffness or floppiness of child.
3. Use of limbs of only one side of the body.
4. Difficulty or abnormality observed when the patient is asked to lift arm overhead,
   pick a small object lying in front of him/her, pick a stone from the ground, walk a
   few steps, run a short distance
5. Difficulty in standing up from sitting position.
6. Range of motion of joint decreased or excessively increased.
7. Absence of limb in part or full.
8. Use of appliances for instance sticks crutches, wheelchair, and tricycle.

Besides, early detection of locomotor disabling diseases based on early
biochemical, morphological and functional changes that precede the occurrence of
manifest signs and symptoms is of particular importance in chronic diseases [19].
2.1.1.2.8 Rehabilitation of locomotor disabled children

The World Health Organisation has defined rehabilitation as 'all measures aimed at reducing the impact of disabling and handicapping conditions, and enabling the disabled and handicapped to achieve social integration. The locomotor disabled person requires medical and psychosocial rehabilitation to reduce the impact of the disabling and handicapping conditions and improve the quality of life.

2.1.1.2.8.1 Medical Rehabilitation

The person with locomotor impairment encounters the various physical problems and treatment/interventions depends on the nature of problem as discussed below:

2.1.1.2.8.1.1 Motor weakness/paralysis

Before embark on the treatment, a total assessment of the affected limb has to be done in addition to muscle charting and the examination of functional status of the limb. After the assessment, the treatment starts in the form of passive full range of movement of the joints, gentle massage to improve venous and lymphatic drainage and muscle strengthening exercises. Electrical stimulation is also used to stimulate the muscles. Appliances like calipers and splints are useful to prevent deformity due to muscle imbalance, stabilize unstable joints affected by muscle weakness, provide relief from weight bearing, facilitate walking and maintain a stable posture. Surgical intervention is also used to correct deformities.

2.1.1.2.8.1.2 Spasticity

For controlling spasticity, passive range of movement exercises are carried out. Drugs like Diazepam, Baclofen, Dantrolene etc. can be prescribed and, also procedures like nerve blocks can be contemplated. Surgical methods like release of tight tendons and selective cutting of nerve roots and nerves are undertaken, wherever indicated.
2.1.1.2.8.1.3 Sensory loss

Sensory loss often accompanies motor weakness. Loss of sensations leads to loss of sensory feedback. This leads to incoordination and loss of dexterity. Loss of sensations also cause injuries, pressure sores etc. in the affected area. Patients are educated to avoid any further injury by undertaking appropriate care and are also taught self inspection of the skin of the affected area so that they can prevent any pressure sore from developing. They are also advised protective gloves, footwear, padding, and frequent change of posture in bed to avoid constant pressure on particular part especially bony prominences. "Sensory consciousness" is to be inculcated in the mind of the patient to prevent the complications arising out of the sensory loss. If pressure sores develop, daily dressing and removal of dead tissue should be done. If there is any infection, proper antibiotic coverage is to be instituted. After the wound is clean, skin grafting or flaps are applied.

2.1.1.2.8.1.4 Deformities and contractures

Appliances are used to prevent and correct deformities and contractures are called orthoses. Surgical correction of deformities and contractures can also be done, if these are not correctible by non operative means.

2.1.1.2.8.1.5 Amputations

Loss of a limb in part or whole can be due to trauma or disease. Artificial limbs or prostheses are fitted to the stump at the earliest and the patient is trained in their use. Use of artificial limb usually restores functional independence in lower limb amputation. In upper limb amputation, unilateral amputee usually manages with one limb. In bilateral amputations of upper limbs, artificial upper limb and good training in their use is needed.

2.1.1.2.8.1.6 Neurogenic bladder and bowel

Bladder and Bowel problems are common in paraplegia and quadriplegia. These include retention of urine, loss of voluntary control over
urination, overflow, recurrent infections of the urinary tract, constipation etc.
Repeated infection can lead to kidney failure.

Bladder management is aimed at avoidance of over distension, prevention of infection and restoration of continence by bladder training. For preventing infection the patient should have abundant water intake, antibiotics, if needed, bladder wash daily. Self intermittent catheterisation is now a commonly used method, in which patient or attendant is trained to catheterise himself at regular intervals so as to remain continent.

Bowel care includes softening of stools by laxatives, digital evacuation, use of suppositories and enemas. High roughage diet and plenty of fluids help in easy bowel evacuation.

2.1.1.2.8.1.7 Pain

Pain is nature's warning that there is some imminent damage to the system. In addition to drug treatment, various physical modalities can be used to control pain. They can be either heat in the form of hot water bags, hot fomentation, hot packs, wax baths, electrical sources of heat like diathermy, ultrasound. It can be cold in the form of cold packs, ice massage, ice baths, ice towels etc. Drugs used are mainly of two types. They can either be non steroidal anti inflammatory drugs or opioid analgesics. Of these non steroidal anti inflammatory drugs are commonly used either in the form of tablets or as gels combined with counter irritants for topical application [i.e. application over skin]. Local injections of steroids are a highly effective method to combat pain in conditions like plantar fascitis, tennis elbow, dequervain's disease etc.

2.1.1.2.8.1.8 Daily living activities

Activities of daily living are those tasks which a person does regularly to prepare or adjust for participating in his or her day to day work. These include toileting, grooming and other such self care activities. The disabled person is trained in actual performance of these activities. Use of modifications in the instruments and
implements a person uses in his day to day work also is a part of management of activities of daily living.

**2.1.2.8.1.9 Aids and appliances**

Aids and appliances are very important component in rehabilitation of locomotor impairments.

**2.1.2.8.1.9.1 Orthotics**

Orthosis is an appliance which is added to the patient to enable better use of a body part and to prevent and correct deformity. There are a variety of dynamic hand splints which help in function take for example dynamic cock up splint for wrist drop due to radial nerve palsy, knuckle bender splint and opponens splints for median nerve palsy. Spinal orthoses are used in spinal injury of the spine. A common orthosis used is the Taylor's brace which is a thoracolumbosacral orthosis which immobilizes the thoracolumbar spine. A cervical collar limits neck motion in cervical spondylosis, cervical injury etcetera. A four post brace or SOMI [sterno occipito mandibular immobilizer] can also be used to immobilise the cervical spine.

**2.1.2.8.1.9.2 Prosthetics**

Any artificial substitute for a lost body part is called prosthesis. Prosthesis can be for external or internal use. Internal prosthesis are the joint replacements etc. External prostheses are used for upper and lower limbs which have been amputated. Take for example: Jaipur foot, SACH (Solid Ankle Cushion Heel) foot.

**2.1.2.8.1.9.3 Walking aids**

Walking aids are used to increase the mobility of a patient as they enable some of the body weight to be supported by the upper limbs. The different types of walking aids are parallel bars, walking frames, crutches and sticks etc. Selection criteria of a walking aid suited to a patient depends on stability of the patient, strength of the upper limbs and lower limbs, degree of co-ordination of movement of upper and lower limbs, degree of relief from weight bearing that is required. A
parallel bar or walking frame is used when the patient starts gait training. This is useful in a patient who lacks confidence to walk as he can concentrate entirely on moving his lower limbs without having to bother about moving the walking aid. Commonly used crutches are the axillary, elbow and gutter crutches. While axillary crutches make possible all degrees of weight relief, elbow crutches are for patients who can bear some weight on the feet, but need an aid for balance and confidence. Walking sticks assist in balance, provide moderate support for a lower limb to improve gait and help in the relief of pain. Wheel chair is used when ambulatory capacity is permanently lost due to total paraplegia. Nowadays power driven wheel chairs and even stair climbing wheel chairs are available. Outdoor mobility aids are hand propelled three wheelers which are very useful in Indian conditions.

2.1.1.2.8.1.10 Sports and recreation, a must

Sports is a wonderful medium for the all round development of human personality. Sports and recreational activities provide opportunities for social interaction, fun, health and fitness in addition to bringing cheer and happiness in life. For a person with locomotor impairment in addition to above mentioned aspects sports and recreational activities have therapeutic value as well. These activities act as rehabilitation interventions as they help in regaining lost muscle power, improve balance and equilibrium and develop neuromuscular coordination [19].

2.1.1.2.8.2 Psycho-social rehabilitation

Rehabilitation of the locomotor disabled would not be complete unless the physical rehabilitation is accompanied by their psycho-social rehabilitation. The main difficulty faced in this regard is that a disabled person is not acceptable to the society in whatever position he or she is in. Conflicting societal attitudes ranging from pity/charity to aversion confront physically challenged persons. The attitude of the family also greatly influences the psycho-social dimensions of the problem of the disabled. The common reactions of an individual to his/her disabled condition are: feelings of inferiority, self-devaluation, fear, hostility, resignation and a tendency to accept the role of a recluse.
2.1.1.2.8.2.1 Change of attitudes

Change in social attitudes is essential for psycho-social rehabilitation of the disabled. The public should be educated about the abilities and handicaps of the disabled with regard to their contribution to the society. Particularly those, like doctors, nurses, social workers, employers, government officials, etc. need intimately be connected with the disabled. In our country where a vast majority of people are illiterate, audio-visual methods such as exhibition of films and documentaries would be more effective. Moreover, use of television and radio, seminars and cultural programmes, holding of exhibitions depicting problems of the disabled and focusing on their achievements would create general awareness of the predicament of the disabled. Parental attitudes too need a change. They must be advised to avoid extremes of attitudes, and accept the disabled child as it is, fully recognising his/her handicap. Proper understanding of the child by the parents would make adjustment with the family and society easier.

2.1.1.2.8.2.2 Acceptance of disability and factors causing it

For proper psycho-social rehabilitation, a disabled person must accept his disability, realize limitations resulting from it and accordingly modify his/her goals. Acceptance of disability implies that the individual does not overestimate his disability nor does he underestimate it. The physically disabled person can be made to accept his/her disability in the following ways:

A disabled person naturally gets a very friendly reception amongst other disabled people. Therefore, close interaction between disabled people will encourage acceptance of their disability. Self help organisations of disabled person can facilitate this process. Moreover, depicting of success stories of the handicapped or exhibiting films/documentaries relating thereto also helps in this regard.

Lack of proper knowledge of the cause of their disablement creates a sense of insecurity, anxiety and confusion amongst the disabled persons. Armed with adequate knowledge of the real cause of their disability, they will develop a realistic attitude which is conducive to acceptance of disability.
Cultural activities like dance, music and debates, etc., contribute towards the process of acceptance of disability. Moreover, recreation has a socializing influence making the disabled feel socially secure. Sports and recreation afford an outlet for the conserved energy and general opening up of the disabled, thereby enabling them to overcome the agony of their disabled situation and to recapture the sense of enjoying bounties of life. Similarly, camping and other outings improve their morale, heighten their spirit and promote better inter-personal relationships that widen their horizon.

2.1.1.2.8.2.3 Setting up of realistic goals and feeling of security

Like normal people, the disabled also have goals in life. But these goals should essentially be realisable; otherwise they will face frustration and disappointment. Moreover, to ensure that a disabled person achieves more success than failure, he/she should aim at a variety of goals in various fields. As we have seen, a disabled person suffers from physical, emotional and social insecurity. The physical insecurity can be reduced by making a disabled person independent in regard to his/her daily activities by appropriate medical rehabilitation interventions. He/she will feel more secure psychologically, if his/her achievements have increased. In this respect, education of the disabled person and the members of his/her family in all aspects of the disability and the role of the social worker and psychologist who helps the disabled person to give vent to his feelings will greatly promote psychological security. Regarding social security, the society must have a positive attitude towards his/her disability. The social worker's help should be enlisted in making the community at large aware of the problems of the disabled.

2.1.1.2.8.2.4 Spiritual outlook

A physically handicapped person is not physically free and independent. It is therefore, desirable that he/she should inculcate freedom of spirit. This is where the concept of spirituality comes in. Swami Vivekananda has expressed the view that "A spiritually strong and sound man will be strong in every other respect, if he so wishes. Until there is a spiritual strength in man even physical needs cannot be well satisfied". He further points out that there is always the necessity of spiritual religion
for mankind adding that man cannot always think of matter how pleasurable it may be. According to him, the mainspring of strength of every race lies in its spirituality and the death of that race begins the day that spirituality wanes and materialism gains ground. There is no doubt that the view a disabled person takes of his/her life, and its purpose will influence in a profound manner his/her reactions to disability. Religion has been found to be one of the strongest forces in the acceptance of disability. This also leads to reconciliation of the disabled to his/her disability [19].

2.1.1.2.9 Rehabilitation approaches

Various approaches are being used to provide rehabilitation services to disabled persons as discussed below:

2.1.1.2.9.1 Institution based services

In this system, a disabled person comes to the institute and receives training from the professional personnel there. This is the prevailing system in the developing countries.

2.1.1.2.9.2 Reach-out institutional based delivery system

In a reach-out system the professional goes out from the institution to the home of the disabled person and deliver training or other interventions there. If necessary, disabled person is referred to an institution. This approach is likely to lead to better and more practical results.

2.1.1.2.9.3 Community based rehabilitation

Community based rehabilitation strategy was developed by the World Health Organisation after 1978 Alma Ata Declaration. In this community health worker or other community volunteer, who has undergone training in community based rehabilitation identifies people with disabilities and provide basic information about promotive, preventive, curative and rehabilitative services within their communities and their societies at village, block, district, state and central level [19].
2.1.2 Part II: Theoretical Literature on health promotion intervention for improving quality of life among physically challenged children

Health promotion intervention is a person’s sustained participation in managing their health in a way that creates the necessary self-efficacy to achieve physical, psychological and social wellbeing. It includes intake of healthy diet, maintenance of personal hygiene and regular performance of exercises, encouragement and continuous capacity building to ensure confidence in self representation and understanding of own potential [49].

2.1.2.1 Healthy diet

A nutritious diet is the foundation of good health and an essential ingredient for quality of life. Disabled children have the same basic nourishment needs like that of other non-disabled children for maintaining efficient body functioning. A well balanced diet should contain 60% of carbohydrates, 20-25% proteins, 15-20% fats and sufficient amount of vitamins and minerals which help the body to operate and recuperate properly from a disability.

Proteins are needed to build and maintain muscles, skin, tissue and bones throughout the body. It also required for proper absorption and utilization of calcium that helps to make bones stronger and more compact. Dietary sources of protein include both animal and plant-based foods. Animal sources are red meat, poultry, fish and dairy foods. Plant-based dietary sources are grains, seeds, nuts, vegetables and legumes.

Essential fatty acids play an important role in bone health by increasing mineral absorption of bone - healthy selenium, iron, silica and potassium. Dietary sources of fatty acids include salmon, wheat germ, pecans, soy, sardines and cod.

Whole Grains provide many nutrients such as dietary fibre, vitamins B and minerals. Eating a diet high in whole grains may help with weight management; reduce the risk of constipation and coronary artery disease. Folic acid from the whole grains helps the body to form blood cells and Magnesium from whole grains helps to
build bones and release energy from muscles. Dietary sources of whole grains include bread, cereals, pasta, rice, potatoes, and chapattis.

Fruits and vegetables are a great source for potassium, dietary fiber, folic acid, vitamin A, vitamin E, and vitamin C. Eating a diet high in fruits and vegetables reduces the risk for cardiovascular diseases, kidney stones, some forms of cancer and provide immunity. Some of the recommended options include blueberries, strawberries, cantaloupe, honeydew melon, broccoli, peas, spinach, carrots and bananas etc.

Body is made up of approximately 60 per cent water and uses it to supply the nutrients to organs and to eliminate toxins from organs. The amount of water that should drink depends on specific needs, but most of the doctors recommend 2000 to 3000 ml of water in 24 hours. Unhealthy diets are typically high in fat, sugar and sodium and low in nutrients and are associated with nutritional deficiency diseases, obesity and systemic diseases [101-104].

2.1.2.2 Personal hygiene

Personal hygiene refers to the personal care and grooming of an individual's body. This includes regular healthy habits of brushing teeth, washing hair, washing hands, bath and keeping cloth clean. The regular habit of maintaining good personal hygiene helps to prevent contracting or spreading known diseases, promotes social acceptance and interaction, promotes a good perception of one's self-image, and boosting self-esteem. Whereas lack of proper personal hygiene can cause various diseases like – scabies, folliculitis, stomatitis, dental caries, conjunctivitis, diarrhoea, reproductive tract infections etc. and social ostracized from friends and family [105, 106].

2.1.2.3 Exercises

All children need exercise to keep their bodies strong, flexible, and healthy. Most children get all the exercise they need through ordinary daily activity: crawling, walking, running, climbing, playing games, lifting things, carrying the baby, and helping with work in the house and farm. As much as possible physically
challenged children should get their exercises performed in these same ways. Sometimes disabled child may need help with these exercises but as much as possible, he should be encouraged to do these independently.

Exercise is defined as purposeful physical activity, which is often structured, and pursued for health and fitness benefits.

2.1.2.3.1 Types of exercises

Different kinds of exercise can be done depending on the purpose and deformity as follows:

1. Range of motion (ROM) exercises

Range-of-motion exercises are regularly repeated exercises that straighten or bend one or more joints of the body and move them in all the direction in that a joint normally moves. The purpose of carrying out these exercises is to maintain or increase joint motion. These exercises includes: complete range of motion exercises of upper limbs, lower limbs, neck and trunk.

2. Stretching exercises

Stretching is a form of physical exercise in which a specific skeletal muscle (or muscle group) is deliberately stretched, often by abduction from the torso, in order to restore movements in locked joints and prevent contractures in paralyzed limbs. These exercises includes: common upper body stretches and common lower body stretches.

3. Strengthening exercises

Strengthening exercise is defined as “the use of progressive resistive exercise methods to increase one’s ability to exert or resist force in a controlled manner throughout range of motion in order to maintain or increase muscle strength. These includes: strengthening exercises for weak muscles of upper extremity, lower extremity, hip, stomach and lower back [63].
2.1.2.3.2 Benefits of exercises

2.1.2.3.2.1 Physical benefits

The physical benefits of regular physical exercises include maintenance of movements of the joints and tone of muscles; prevention and treatment of physical deformities; reduction in the risk of lower back pain, cardiovascular diseases like hypertension, heart attack etc, obesity, type 2 diabetes; helps in regulation of body temperature; strengthens the lungs and improves ventilation; improve appetite and digestion; prevents constipation and flatulence problem; facilitates the urine formation and help in excreting the waste products [65].

2.1.2.3.2.2 Psychological benefits

The psychological benefits of regular physical exercises include improved mood, confidence and self esteem, reduction of anxiety and depression and increase in a person’s ability to cope with a range of stressors [90, 107].

2.1.2.3.2.3 Social benefits

The social benefits of participation in regular physical exercises include promotion of team spirit and social integration [107].

2.2 Section B: Empirical literature related to quality of life among physically challenged children and health promotion intervention

2.2.1 Part I: Literature related to physical wellbeing among physically challenged children.

Law M, et al conducted a longitudinal study on health related quality of life of children with physical disabilities in Hamilton, Canada. The purpose of this research study was to describe overall patterns of HRQoL, examine changes in parent’s perceptions of child’s HRQoL across 18 months and explore factors that predict these changes. Participants in this study included 427 parents of children (229 boys and 198 girls) with a physically-based disability between the ages of 6 to 14 years. The Child Health Questionnaire (CHQ) was administered three times, at
nine months interval. Child’s factors were measured by the Activities Scale for Kids, Strengths and Difficulties Questionnaire, and general health measured by SF-36, family characteristics were measured by the Impact on Family Scale and environmental barriers were measured by the Craig Hospital Inventory of Environmental Factors. The result demonstrated that children with physical disabilities differ from the normative group on parent ratings of their physical and psychosocial health. While there was little average change in CHQ scores over 18 months, there is evidence of heterogeneity among children. Factors such as environmental barriers, family functioning/impact, child physical functioning and behavioural difficulties and general health significantly influence QoL scores as measured by the CHQ [108].

Saini KS, et al conducted a descriptive study to assess the prevalence of disability and its impact on individual and family in Dhanas village, Chandigarh. Total enumeration sampling of village Dhanas was done. Data was collected by interviewing the subjects and their family. The prevalence of disablement in Dhanas village found to be 10.37 per 1000 population (41 cases of disablement out of 3951 population). The prevalence of disability among 3-5 years; 6-11 years; and 12-17 years children was 10.7, 3.8 and 7.4 per 1000 children respectively. Maximum disability 9 (21.9%) had occurred due to polio. Most of the subjects reported impact on their physical wellbeing (difficulty in performing activities of daily living); psychological wellbeing (irritation, anger, sadness, stress) and social life. In most of the families, the family members strived hard to meet the needs of the disabled and they were struggling to cope up with their disability. So, it was strongly recommended that people must be made aware regarding the help offered to the disabled persons by NGOS and Government and awareness regarding prevention and management of disability must be promoted [109].

Blume HK, et al conducted a cohort study to find the prevalence of headaches, 3 and 12 months after mild, moderate or severe traumatic brain injury in children ages 5 to 17 years. The study indicated that headache was a significant problem for some children (ages 5 to 12 years) after TBI. Three months after a mild TBI, 43 % of children reported headaches, compared to 37% of children who had a
moderate to severe TBI. Study authors concluded that the response to and recovery from TBI is different for children, adolescents and adults, and that males and females are likely to have different symptoms and recovery [110].

**Kaka B, et al** conducted a cross sectional survey study to assess Quality of Life (QOL), and examine its association with occupation and level of education among polio survivors in Nigeria. The study sample were 54 polio survivors registered with the Post Paralytic Polio Survivors Association, living in Gusau, North Western Nigeria. The World Health Organization (WHO) QOL BREF 26 items english version was used to assess QOL, while a bio data form was used to assess demographic variables. The study result depicted that the mean age of the participants was 22.4 ± 5.4 years and mean QOL scores were 45.2 ± 9.7, 54.8 ± 11.4, 41.3 ± 10.9 and 44.4 ± 12.1 in physical, psychological, social relationship and environmental domains, respectively. The participants overall perception of their QOL and health averaged 3.3 ± 0.8 and 3.6 ± 0.7, respectively. No significant association was observed between all the domains. Occupation status (P > 0.05) and educational level had no significant relationship with all the domains (P > 0.05). The study concluded that the QOL of polio survivors is not associated with their occupational status and level of education. There is a need of follow-up research to clarify whether improving occupational and education status raises the QOL of polio survivors [111].

**Neter JE, et al** conducted a comparative study on the prevalence of overweight and obesity and nutrition and physical activity behaviour between primary school children with and without disabilities in the city of Zwolle, Netherlands. Body weight and height were measured in 4072 children from regular primary schools and in 85 children from a school for children with disabilities. The result revealed that the prevalence of overweight and obesity among disabled children was 30.6% and 10.6%, respectively, which is three and six times higher than in nondisabled children (P < .001) also there was statistically significant differences in nutrition and physical activity behaviour between disabled and nondisabled children. The study concluded that there is a need to promote a healthy lifestyle to reduce the prevalence of overweight and obesity in disabled children [112].
Purohit BM, et al conducted a cross sectional study to assess and compare oral health status and treatment needs of children with special healthcare needs (SHCN) between the ages of 5 and 15, with a matched group of healthy children, in Udupi District of South India. The sample comprised of 265 children with SHCN and 310 healthy children to assess differences in periodontal status, dentition status, treatment needs, and dentofacial anomalies using the WHO criteria. Chi-square, t-test, and Z-tests were performed to compare different variables. The result showed a significantly higher prevalence of caries (89.1%), malocclusion, and poorer periodontal status among children with SHCN compared to the healthy control group. The study concluded that for Improving the oral health of these children will require maintaining good oral hygiene practices, which can be achieved with appropriate target-based oral health approaches [113].

Neyestani TR, et al conducted a descriptive cross sectional study on nutritional status of the Iranian children with physical disability. A total of 290 physically disabled children aged 6-12 years old, of both sexes, and from all specialized schools in Tehran, Meshed and Rasht were enrolled in study. Dietary assessment was performed for disabled children using 24hours and food-frequency questionnaires. Weight and height were assessed and body mass index (BMI) was calculated for all subjects. The study found that in disabled children, the mean energy intake was more than 90% of the amount required; mean calcium and iron intakes were 75.8% and 58.7% of the corresponding required amounts. Despite absence of significant difference in energy and fat intake, the intakes of protein, calcium and riboflavin were significantly lower in girls than in boys. Z score of weight showed that over 40% of disabled girls and boys were underweight. Comparison with anthropometric data from other studies showed that low weight was more prevalent in disabled than in non-disabled children (p<0.001). Moreover, both disabled boys and girls had significantly shorter statures than their non-disabled counterparts. The study concluded that malnutrition (low weight and stunting) is quite prevalent among Iranian children with motor disabilities and it is more prevalent in girls than in boys. It seems that poor food composition is a more important contributing factor than total low calorie intake. These data warrant further studies [114].
Rekand T, et al conducted a comparative study on level of fatigue, pain and muscle weakness among Guillain-Barré syndrome and poliomyelitis patients. The sample were 50 patients with previous GBS, 89 patients with a history of poliomyelitis and a reference group of 81 people with similar sex and age and no history of poliomyelitis or GBS. The data was collected by using the fatigue severity scale, self-reported pain and muscular weakness Disability Rating Index, and Positive and Negative Affect Schedule (PANAS-X). The result revealed that the mean score on the Fatigue Severity Scale was significantly higher in the GBS and poliomyelitis patients than in the reference group. This was true also in the subgroups of mild disease, i.e., nonparalytic polio and initial Hughes score less than 3 in the GBS group. 34% of GBS patients and 63 % of poliomyelitis patients reported pain; 13 % of GBS and 36 % of poliomyelitis patients reported residual muscle weakness. Fatigue, pain, and muscle weakness interacted in both diseases. Perceived health problems influenced all aspects of the quality of life except mental health in both diseases. The study concluded that fatigue, pain, and muscle weakness are common sequelae after GBS and poliomyelitis. The symptoms interact with each other and contribute to long-term disability [115].

Hennequin M, et al conducted an observational cross sectional study to assess inequalities in oral health for children with disabilities in special schools of France. The samples were 2,487 children with disability (DC group), 4,772 adolescents with disability (DA group) and 1,641 children without disability (NDC group). Five algorithms ranked the subjects according to clinical criteria in three original oral health indices: the Clinical Oral Health Index (COHI), indicating the level of oral health problems, the Clinical Oral Care Needs Index (COCNI) giving dental care need levels, and the Clinical Oral Prevention Index (COPI) determining possible needs in terms of dental education initiatives. The results revealed that DC-group children had poorer oral health and greater needs in both treatment and preventive oral health actions than NDC-group children (OR = 3.97, 95% CI = 3.25-4.86 for COHI; OR = 2.01, 95% CI = 1.77-2.28 for COCNI; OR = 5.25, 95% CI = 4.55-6.02 for COPI). These conditions were worse again in the DA group comparing to the DC group (OR = 3.52, 95% CI = 2.7-4.6 for COHI; OR = 1.52, 95% CI =
The study concluded inequalities in oral health for children with disabilities schooling in institutions. Questions need now to be addressed as to the measures that could be taken to compensate for this situation [116].

**Rimmer JH, et al** conducted a descriptive study to assess prevalence of Obesity and secondary conditions in adolescents with disabilities at Department of Disability and Human Development, University of Illinois at Chicago, and found that children and adolescents with physical and cognitive disabilities have a higher prevalence of overweight compared to their non-disabled peers. This health risk can lead to a greater number of obesity-related secondary conditions (e.g., fatigue, pain, deconditioning, social isolation, difficulty in performing activities of daily living) and can impose significant personal and economic hardship on the child and family; so effective strategies for reducing the risk of overweight/obesity in adolescents with disabilities must begin with greater awareness of the behavioural and environmental antecedents that lead to higher rates of obesity in this underserved segment of the youth population. Research on interventions to reduce obesity among adolescents with disabilities is an important area of future research for public health scientists. A range of interventions will be necessary to overcome the many barriers that youth with disabilities experience in achieving and maintaining a healthy weight [117].

**Naseem S, et al** conducted a study to find out the problems faced by children with different disabilities in day to day oral hygiene maintenance and seeking oral health care services. In order to take a feedback on the problems faced by subjects with different disabilities in day to day hygiene maintenance and seeking oral health care services, an interview based questionnaire was designed for the disabled, their primary care takers and school teachers. Another questionnaire was designed for oral health care providers to find out about their knowledge, attitude, practices and training in handling persons with various disabilities. The result showed that most of the subjects (88%) were cleaning their teeth but 61% required assistance from caregivers. Only 27% of them brushed twice daily and 45% practiced rinsing after every meal. 40% of the subject had suffered from some dental problems in the past. Only 8% of the disabled subjects reported to be getting regular dental
checkups through the school/Institution of those who went to seek dental care, few reported difficulty in access, communication and dentist's hesitation to provide treatment [118].

On AY, et al conducted a cross-sectional case control study on impact of post-polio-related fatigue on quality of life at Department of Physical Medicine and Rehabilitation, Ege University Medical School, Izmir, Turkey. The samples were patients without additional health problems that may induce fatigue were selected from 82 polio survivors. Twenty-six patients with post-polio syndrome and 10 without post-polio syndrome were included. Control group consisted of 30 healthy volunteers. The presence and severity of fatigue was assessed by Fatigue Severity Scale, quality of life by Nottingham Health Profile, and impact of fatigue on quality of life by Fatigue Impact Scale. Leg muscle strength was measured by manual muscle testing. The result revealed that strength of leg muscles showed no differences between the patients with and without post-polio syndrome. Patients with post-polio syndrome reported significantly higher levels of fatigue and reduced quality of life compared with both patients without post-polio syndrome and control group. Fatigue Impact Scale revealed that fatigue did not significantly impair mental health, but had a negative impact especially on physical and psychosocial functioning of the patients with post-polio syndrome. The study concluded Post-polio-related fatigue seems to be an important factor for further impairment of quality of life in polio survivors [119].

Seddon PC, et al conducted a descriptive study to determine incidence and cause of Respiratory problems in children with neurological impairment at Royal Alexandra Children's Hospital, Brighton, UK. The result showed that children with severe neurological impairment have a high incidence of respiratory problems which are multifactorial and may be related to or dependent on the underlying disability. In addition, a common respiratory condition such as asthma was represented in this group as in the general paediatric population. In order to maximise quality of life and reduce morbidity and mortality, each child should be carefully assessed and treated, making adjustments where necessary in the treatment regime to take account of the disability [120].
Schanke AK, et al conducted a study to examine the characteristics of polio survivors reporting severe fatigue versus those reporting mild or no fatigue at research unit of Sunnaas Rehabilitation Hospital, University of Oslo, Nesoddtangen, Norway. The total subjects were 276 polio survivors. Out of 276 polio survivors, 43 reported mild, 113 moderate and 118 severe fatigue (2 were missing). Only 12 with mild fatigue, 21 with moderate and 14 with severe fatigue had no other diseases and health problems related to fatigue. However, a larger group of polio survivors suffer from additional diseases, and such diseases should be ruled out during a comprehensive rehabilitation programme [121].

Schanke AK & Stanghelle JK conducted a study to examine the incidence of perceived fatigue among a sample of Norwegian polio survivors, and to examine the association between the level of fatigue and socio-demographic and health variables. A mailed questionnaire containing fatigue questionnaire, fatigue severity scale, socio-demographic and health variables were sent to a representative group of 312 Norwegian polio survivors. 276 subjects (88%) answered the questionnaire. The incidences of fatigue among the polio survivors were considerably higher than in the normative data. Physical fatigue, more than mental fatigue, represented the major problems. Polio subjects who reported severe fatigue had significantly more other diseases and health problems than the normative group. The study concluded that diagnosis and treatment of other or related physical conditions should be given higher priority in the management of persons with late effects of poliomyelitis, as these conditions probably can be the reasons for fatigue more than poliomyelitis sequelae alone [122].

Tompsett J, et al conducted a cross sectional survey study to compare the nutritional status of disabled children in Nigeria with their non-disabled siblings and neighbours and to investigate anthropometric techniques appropriate for disabled children in this situation. The samples were 311 children under 10 years of age. Out of 311 children, 112 children were suffering with various disabilities and 199 were healthy children (87 siblings and 112 neighbours). The data were collected through anthropometric measurements, (height, weight, mid-upper arm circumference (MUAC), demispan and halfspan), and blood haemoglobin levels estimation. The
result revealed that the disabled subjects had mean height for age (ht/age) and weight for age (wt/age) significantly lower than the control group (P<0.05). These differences were due largely to the very low Z scores in children with neurological impairments, (ht/age= 3.07 (S.D. =1.6); wt/age= 2.0 (S.D. =1.2)). Measurement difficulties contributed to low height values in disabled children and halfspan was found to be a useful proxy for height in these children. MUAC results were higher for the children with disabilities due to polio than for controls. The mean haemoglobin levels were slightly but significantly lower (P<0.05) in the disabled and sibling groups compared to the neighbourhood group. The study concluded that disabled children with neurological impairments and consequent feeding difficulties are nutritionally at risk, but others are no worse off than their non-disabled peers in this area. Halfspans may serve as a useful proxy indicator for estimating height in some children with physical impairments [123].

Based on the review of above numerous studies conducted by various researchers throughout the world regarding physical wellbeing among physically challenged children it can be concluded that physically challenged children because of disability had substantial difficulty in performing activities of daily living and suffer with various physical health problems including dental caries, dental plaque, poorer periodontal status, malnutrition (overweight and obesity or underweight), fatigue, pain, muscular weakness, contractures, cold intolerance, asthma, constipation, pressure sore etc. Most of the researchers had strongly recommended for bringing awareness in this population regarding healthy life style practices i.e. for intake of nutritious diet, maintenance of good personal hygiene practices and active engagement in various physical activities like walking, exercises, swimming etc. to combat the impact of disability on physical wellbeing.

2.2.2 Part II: Literature related to psychological wellbeing among physically challenged children

Holtzer LA, et al conducted a cross sectional study to analyse the impact of lower limb amputations on aesthetic factors such as body image and self-esteem as well as quality of life (QoL). 298 patients (149 uni- or bilateral lower-limb amputees
and 149 controls) were included in this study from three centres. The data were collected through Multidimensional Body-Self Relations Questionnaire (MBSRQ), the Rosenberg Self-esteem (RSE) scale and the SF-36 Health Survey (QoL). The result depicted that Unilateral lower-limb amputees had a significant lower MBSRQ score of 3.07±0.54 compared with 3.41±0.34 in controls (p<0.001) and a lower score in the RSE compared to controls (21.63±4.72 vs. 21.46±5.86). However, differences were not statistically significant (p = 0.36). Patients with phantom pain sensation had a significantly reduced RSE (p = 0.01). The SF-36 health survey was significantly lower in patients with lower-limb amputation compared to controls (42.17±14.47 vs. 64.05±12.39) (p<0.001). The study concluded that lower-limb amputations significantly influence patients' body image and QoL [124].

**Jena PC** conducted a comparative study on perceived control, self-esteem and academic performance of orthopedically handicapped adolescents in integrated and non-integrated school settings in Punjab, India. The sample were 80 orthopedically handicapped adolescents of 12-17 years age selected through purposive sampling technique from two educational level (5th - 6th and 7th - 8th) and two type of school settings ( integrated and non-integrated) from Jalandhar and Ludhiana district of Punjab. The data were collected through Kanungo perceived control questionnaire, Cooper smith’s self esteem scale, review of examination marks and person information schedule. The result depicted that the school setting and educational level do not have significant effect on orthopedically handicapped adolescents perceived control, self-esteem and academic performance. However, integrated school students showed higher perceived control, self-esteem and academic performance than their counterparts in non-integrated school setting [125].

**Lin JH, et al** conducted a longitudinal study to investigate the changes in self-perceived quality of life (QOL) of children and adolescents with physical disability (PD) in Taiwan. Two hundred students aged 10-18 with PD were recruited from primary and high schools in Taiwan. The Student Version of the Comprehensive Quality of Life Scale (COMQOL-S) was used to measure self-perceived QOL, which was recorded at baseline, and 6, 12 and 18 months post-baseline. Statistically, linear mixed models were used to compare the QOL scores
among the four time points. The result showed significant changes over time in overall objective and subjective QOL scores (slope=0.8, p=0.002 and slope=-1.3, p<0.001, respectively). Specifically, significant reductions of the subjective QOL scores over the period of the four visits were observed in five domains, namely, productivity (slope=-1.7, p=0.005), intimacy (slope=-1.6, p=0.004), safety (slope=-1.6, p=0.008), place in community (slope=-1.4, p=0.019) and emotional wellbeing (slope=-2.5, p<0.001). Age was negatively correlated with the change of overall subjective score. Positive correlation was found between the change in mean objective scores and mean subjective scores in the intimacy and productivity domains. The study concluded that even though the conditions of material wellbeing and health can be kept steady, the overall QOL of children and adolescents with PD could still decline over time. This might be attributable to the fact that social life becomes more sophisticated when children become older [126].

Ju YH, et al conducted preliminary study to explore the effect of physical disabilities (PD) on the quality of life (QOL) of adolescents aged from 10 to 18 years. Sixty-three adolescents with PD (aged 14.9 +/- 2.4 years) from primary (5th grade or above) to high schools in Kaohsiung City volunteered to participate in this research; 282 children without disability (aged 13.8 +/- 2.3 years) attending schools in the same geographical region were recruited as controls. The Student Version of the Comprehensive Quality of Life Scale was used in this study. This is a multidimensional self-report, global measure of subjective and objective QOL. Multivariate analysis of variance revealed that the two groups were significantly different in objective QOL (F = 11.53, p < 0.001). Material wellbeing was substantially lower in the PD group when compared to the control group. In contrast, domains such as productivity, safety, and emotion were higher in the PD group. Among the subjective scales, the PD group showed higher productivity and better emotion when compared to the control group. No significant correlation was observed between objective and subjective overall QOL scores (r = 0.20, p = 0.12) in the PD group. These findings showed that subjects with PD in regular schools demonstrate different patterns in objective and subjective QOL when compared to
those without PD. Both subjective and objective domains are important when measuring QOL of adolescents with PD [127].

**UK Essays** published a descriptive study on psychosocial problems and coping level of children with polio conducted at CSI Clara Olive Polio Home, Melur, Madurai, Tamil Nadu. The sample were 60 poliomyelitis children with varying degree of paralysis in the age group of 13-18 years. The structured questionnaire was used for data collection. The result revealed that majority 46 (77%) of children’s with polio had moderate level of psychosocial problems and 9(15%) of polio affected children’s had mild, and 3(5%) of polio affected children’s had severe psychosocial problems. The psychosocial problems affect the physical health and these problems may be due to lifestyle, family situation, social contacts, living conditions, and future expectations. There was no significant association found between the psychosocial problems and age, educational status, occupation, family type, staying with family and use of support devices. The study concluded that there is a need for health education programs, counselling services and compatible social support system [128].

**Lin JH, et al** conducted a study to examine what extent physical disabilities (PD) affect self-perceived quality of life (QOL) among adolescents. A survey was conducted on 157 adolescents (aged 15.6 +/- 1.6 years) with PD, who were attending high schools in Taiwan; 855 students (15.3 +/- 1.6 years) from the same geographic regions and without a disability were recruited as controls. The Student Version of the Comprehensive Quality of Life Scale (COMQOL-S) was used to assess their subjective and objective well-being. The result revealed no significant differences in overall objective QOL score between the two groups but the PD group was poorer in health and material well-being. Adolescents with PD scored significantly higher in overall subjective QOL and all the seven domains examined. Statistical analysis showed that older students and female students with PD had lower life satisfaction in some domains. There were no significant differences in overall objective (62.1 +/- 8.3 vs. 60.9 +/- 6.4; p = 0.55) or subjective (72.3 +/- 12.6 vs. 74.4 +/- 13.6; p = 0.15) QOL between students in mainstream and special schools. The study concluded that with national health care and educational
coverage, the QOL of adolescents with PD do not seem to be affected by the disabilities, regardless of whether they are in mainstream or special schools. However, the negative effect of PD on QOL becomes a concern with increasing age; females with PD also appear to have a lower subjective QOL in health and emotion [129].

Michael W & Johanna S conducted a study on psychosocial adaptation to determine the psychodynamic of disability among orthopedically disabled children and their siblings in Mexicali, Baja California, Mexico. The data were collected by an examination of disabled-nondisabled differences through comparison of children with disabilities and their siblings on a wide range of psychosocial variables and assessment of the relationship of disability, school and family factors to behaviour problems and self-esteem. The investigator used multiple methods of evaluation, including assessment of physical, behavioural, social, and psychological adaptation. The findings revealed many predicted differences between disabled and non-disabled children on measures of adjustment, self-esteem and professional expectations; negative correlation of self-esteem with disability; an increase in behaviour problems with poor self-esteem; and a decrease in behaviour problems with improved self-esteem and increased family and social activities [130].

Ciortan I, et al conducted a study to assess the psycho-social impact of the locomotor deformations in school-aged children, Roman and reported that depending on severity, congenital or acquired, the deformations of the locomotor system affect more or less the child's mental status. Adolescence is the time when their impact is most important. When the physical, mental or functional sufferings become a disability, professional and psycho-social integration problems occur. The role of the team treating such a patient is to orientate him toward a specific job corresponding to his abilities, while the social services must support him in achieving this goal. The psychotherapist is the most important person in his fight against depression and, more important, suicide [131].
Marco M & Tihana B conducted a study on correlation of happiness level with some life satisfaction factors among persons with and without physical disability. The result showed both groups has positive happiness level and satisfaction with the majority of life aspects. However, happiness level of persons with disability was significantly lower. Forty-eight per cent of the variance in happiness among persons with disability and 30% of the variance in happiness among the person without physical disability can be assigned to various life satisfaction aspects. Satisfaction with health, relationships, and achievements contribute to happiness in both groups, while satisfaction with physical safety and acceptance by the community are significant happiness predictors only for persons with disability. Economic status is the only significant predictor for the person without physical disability [132].

Hosain GM, et al conducted a descriptive study on "Impact of disability on quality of life of rural disabled children" in Bangladesh. The purpose of the study was to collect information on disability and how it affects their life. The data were collected from the disabled children and from their caregivers by interview questionnaire. The study revealed that disability had a devastating effect on the quality of life of the disabled children with a particularly negative effect on their educational attainment, employment, marriage and emotional state. Disability also jeopardized their personal, family and social life. More than half of the disabled children suffered more from negative attitudes than their male counterparts, resulting in critical adverse effects on their psychological and social health. The study concluded that a combination of educational, economic and intensive rehabilitative measures should be implemented urgently to make them self-reliant. Collaborative communication between professional and parents, behavioural counselling and comprehensive support to families will reduce their suffering [133].

Schanke AK conducted a study on psychological distress, social support and coping behaviour among polio survivors: a 5-year perspective on 63 polio patient and found that there is a significant correlation between psychological distress, social support and coping behaviour of polio survivors compared to previous studies, low psychological distress, and normal type-A scores, high
adjustment and problem-focused coping characterized the respondents, pointing to the importance of timing in psychosocial research of post-polio [134].

Based on the review of above numerous studies conducted by various researchers throughout the world regarding psychological wellbeing among physically challenged children it can be concluded that physical disability has devastating effect on psychological wellbeing of physically challenged children. The most commonly reported psychological problems includes fear, anxiety, depression, lower self esteem, perceived self control, behavioural disorders, low level of happiness and poor satisfaction with life. The prevalence of psychological problems in physically challenged female children in comparison with male children is high one and it increases with advanced age. The most commonly reported reasons were poor life style, family situation, poor social contacts, poor living conditions and future expectations. The studies had strongly recommended for early identification of psychological problems and provision of health education programmes, counselling services and compatible social support system to children and their families to reduce sufferings

2.2.3 Part III: Literature related to social wellbeing among physically challenged children

Liaqat S & Akram M conducted a study to investigate the relationship and gender differences between self-esteem and social anxiety in physically handicapped people in Pakistan. The sample were 150 disabled (75 males, 75 females) of 18 to 25 years studying in government schools for special learners and other vocational training institutes from 3 cities of Southern Punjab, Rahim-yar-khan, Bahawalpur, Multan through purposive sampling technique. Rosenberg Self-esteem scale (Rosenberg, 1965) and Leibowitz social anxiety scale (Liebowitz, 1987), were applied to access self-esteem and social anxiety of participants. The results indicated that self-esteem is negatively correlated with social anxiety (r = - .321**, p=.000) in physically handicapped. The physically handicapped women have low self-esteem [t= 7.720, p< 0.05] and high levels of social anxiety [t= -8.094, p<0.05] as compared to male [135].
Lenka KS & Kant R conducted a descriptive survey study on problems of orthopedically impaired students in relation to their gender, achievement and locality at Moradabad and Bareilly, Utter Pradesh, India. The sample were 100 orthopedically impaired children of 8-14 years. The social problems were assessed through self structured data collection. The result showed that gender plays no vital role on the social problems but female impaired children have more problem than male. High achiever students have less social problems in comparison to their counterparts. Locality has no significant effect on social problems but rural children have much more problems in comparison to urban children and this is due to unawareness and ignorance [136].

Choudhary K conducted a descriptive exploratory study on psychological perspectives among physically disabled children studying in selected schools of Sriganganagar, Rajasthan. The sample were 200 students (100 physically disabled students from special schools and 100 normal students from general schools). Self made questionnaire and picture frustration test were used as tools for data collection. The findings revealed that that most of the people try to help the disabled people. Most of people think that education is useful for them. Indian people do not hate them and they are ready to take them as leader or team-mate if they can prove themselves. Disabled individuals have limited social relationship due to their functional impairments and also to limited and constrained interpersonal interactions available to them. It is further implied that by virtue of these limitations, the disabled possess less social competence than their non disabled counter parts [137].

Vignes C, et al conducted a cross sectional study to explore factors associated with students' attitudes towards their peers with disabilities. All 7th grade students aged 12-13 years from 12 schools in the Toulouse area were invited to participate (n=1509). Attitudes were measured using the Chedoke-McMaster Attitudes Towards Children with Handicaps (CATCH) questionnaire. Personal characteristics, including KIDSCREEN quality of life scores, were recorded. Responses from 1135 students (612 females, 523 males) were studied (75.2% of the students approached). Result revealed factors independently associated with more positive attitudes were being a female, having a good quality of life, being friends
with a child with disabilities, or having received information about disabilities from parents and the media. Presence in the school of a special class for children with cognitive disabilities was independently associated with more negative attitudes [138].

Parnes P, et al conducted a Meta analytical study on disability in low-income countries: issues and implications at the International Centre for Disability and Rehabilitation at the University of Toronto, Canada. Most of the data were collected from existing literature in the academic and practice settings and from the publications of key NGOs and government. The study first, examined disability in the context of low-income countries, and then discusses key critical issues: disability and poverty, disability and health, disability and education, disability and gender, disability and children/youth, disability and conflict/natural disasters and disability and human rights. In all these areas the various study reports of discrimination, stigmatisation and marginalisation. The study concluded that, as we address issues of multi-cultural disability services in developed countries, it is important to bear in mind the various issues that many people with disabilities and their families bring with them as the result of immigrating from a developing country. Although we should address these issues within our own countries, we must bear in mind the changes that are occurring due to globalisation [139].

Allen C of Newcastle University, UK reviewed the findings of studies that have measured quality of life among disabled children. Studies tend to show that quality of life of disabled children is similar to that of the general population and that pain and some impairments influence some domains of quality of life. There is widespread acceptance of the need for disabled children to be fully integrated into society but there needs to be further attitudinal change that pity and sorrow should not be directed to disabled children as they experience most of life as nondisabled children do. Maximum efforts are needed to support social and educational policies that recognize the similarity of the lives of disabled children to those of other children and that ensure their right as citizens, rather than as disabled children to participate as fully in society as other children [140].
Dalal AK conducted a review study on attitude of people towards persons with disabilities in India and found that disability attitudes are major barriers in improving life conditions of physically challenged people in developing countries. Studies have shown that people, in general, harbour negative and paternalistic attitudes towards persons with disabilities. Myths, legends, scriptures and folklores are all part of the cultural belief system that shape such attitudes. The physically challenged frequently suffer more due to societal prejudices than due to their disabling physical conditions. The social and physical environment in which these physically challenged live is often designed without much consideration of their special needs. There is a need of social interventions to change attitude of people towards disabled population especially in rural India [141].

Nowicki EA conducted a cross-sectional multivariate analysis of children's attitudes towards disabilities. One hundred elementary school children between 4 and 10 years old were assessed for attitudes towards target children with no disability, a physical or an intellectual disability, and a combined intellectual/physical disability. Measures were completed in an interview format. Result revealed that attitudes towards a target child with physical disabilities and a target child without disabilities did not differ. There was a significant interaction for age and disability. Attitudes towards target children with intellectual and intellectual/physical disabilities were negatively biased, and were negatively associated with age. Results were consistent across measures except for a main effect of gender in one measure and a gender by age interaction in another. The study concluded that children’s attitudes appear to be associated with several factors, including age and the presence or absence of disability [142].

Morgan SB & Wisely DW conducted a study to assess stereotypic attitudes and behavioural intentions of 217 elementary school children toward a peer presented on a slide as physically handicapped (in a wheelchair) or non handicapped (in a regular chair). On two measures of behavioural intentions (Activity Preference List and a Likert-format acceptance scale) and a measure of stereotypic attitudes (Adjective Checklist), the children consistently rated the child in the wheelchair significantly more positively than they rated the same child in a regular chair.
However, highly significant negative correlations were found between age and ratings on the three measures for the handicap condition but not for the non-handicap condition. No gender differences were obtained. The findings indicate that these children showed a high degree of acceptance of a peer presented with a handicap; however their ratings became less positive as a function of age [143].

**Law M, et al** conducted a study to assess patterns of participation in recreational and leisure activities among children with complex physical disabilities in Ontario, Canada. Using the Children's Assessment of Participation and Enjoyment (CAPE) measure, data on participation patterns were collected from 427 children (229 males, 198 females) in the age group of 6-14 years with physical limitations and from their families. Findings indicate a broad range of diversity and intensity of participation, with proportionately greater involvement in informal rather than formal activities. Significant differences in participation and enjoyment were found between males and females and for children more than 12 years of age. Children's participation was less diverse in families reporting lower income, single-parent status, and lower respondent parent education. These findings provide a foundation for an improved understanding of the participation of children with physical disabilities, which can assist families and service providers in planning activities that fit with their child's preferences and ensure active participation [144].

**Malkowska A, et al** conducted a study to determine the influence of perceived social support on health related quality of life (HRQL) in children and adolescents in Poland. The representative sample comprised of 1718 children and adolescents aged 8-18-years. Full version of the KIDSCREEN questionnaire including 52 items grouped into 10 dimensions was used. A short, 3 items Oslo social support scale was used and three levels of social support were defined. The results showed that 46% of Polish children and adolescents reported high, 44% middle and 10% low level of perceived social support. Girls perceived social support better than boys and children better than adolescents. The study showed that the level of perceived social support had essential and positive influence on the quality of life in children and adolescents in all ten dimensions (p<0.001). Children with insufficient social support reported lower quality of life in comparison to well
supported, especially in parents relations and home life dimension, h²=0.186. Difference between boys and girls and three age groups under study was the highest in the low supported group and then levelled out when social support increased. The study concluded that social support, especially provided by parents, increases the quality of life in children and adolescents [145].

Kim SJ & Kang KA conducted a descriptive study to understand how adolescents with physical disabilities see meaning in their lives in Korea. Eighty-eight adolescents with physical disabilities were interviewed in depth. The result showed that adolescents with physical disabilities experience meaning in their lives when society accepts their existential problems and allows them to live a normal life. This normality includes helping others (as a friend or as a volunteer) and creating opportunities to achieve their own goals in life. The main categories in the findings were 'accomplishment', 'social adaptation', 'improvement of the quality of life', 'good deeds', 'sincerity', 'satisfaction', 'having a relationship', 'achievement of self', 'perception of one's own usefulness', 'rehabilitation', and 'gain recognition by others'. The study concluded that adolescents with physical disabilities can understand the meaning of their lives when meaning is framed in the context of being a social issue, and when they are allowed to clarify their own values. Nursing intervention programmes need to be developed to improve the quality of physically disabled adolescents' lives [146].

Aitchison C studied leisure patterns of 11 -15 years old children with disabilities in South West England through leisure diaries and focus groups. The main finding was that these children shared many of the same leisure priorities (primarily sedentary) as other children. Information Communication Technology (ICT) was the number one leisure activity for all children. There were differences in both the amount of leisure activity and in the social circumstances of their activity between children with and without disabilities. With the exception of ICT, children with a disability spent less time on all other leisure activities. They did more on their own or with their parents than with friends. In spite of their reduced leisure activities and opportunities for socialising in comparison to their peers, these children and their parents put a very high value on leisure as an opportunity for social interaction [147].
Richardson PK conducted a qualitative study to investigate the characteristics of the school social environment and social interaction among children with physical disabilities in the school environment of California. Naturalistic observation and participant interviews were used to collect data on social interaction patterns of three children with physical disabilities 5 to 8 years of age who were enrolled in age-appropriate regular education classrooms. Descriptive codes were obtained through constant comparative analysis. In the study findings four themes were identified that characterized aspects of the social environment affecting the social interactions of children with disabilities: reciprocity, characteristics of social and play interactions, effects of adult involvement, and quality of occupational engagement. The study suggested the need for occupational therapists to focus intervention on multiple aspects of the social environment to facilitate children’s socialization [148].

Tamm M & Prellwitz M conducted a study to examine what notions there are among ordinary preschool children and schoolchildren about physically handicapped children using wheelchairs in Sweden. Forty-eight children-16 children of preschool age (half boys, half girls, aged around 6), 16 children in primary school class 2 (half boys, half girls, aged around 8) and 16 children in class 4 (half boys, half girls, aged around 8)-constituted the investigated group. The data were collected by combination of drawings produced by the children themselves serving as a projective image, interview questions in connection with the drawings and a self-assessment scale, based on Osgood's semantic differential technique. The results showed that most children had favourable attitudes towards a child in a wheelchair. They were willing to include the disabled child in their games and recreational activities, and they considered that the disabled child would have many friends and a high self-esteem. However, they saw real obstacles for the disabled child both in play situations and in other environmental settings. No tangible differences between the sexes could be found; however, differences by age were present [149].

Bult MK et al conducted a systemic review to find out what influences participation in leisure activities of children and youth with physical disabilities in Netherlands. The result revealed that frequency of participation in leisure activities for
children and youth with physical disabilities is associated with a variety of variables. Gross motor function, manual ability, cognitive ability, communicative skills, age and gender are the most important variables. The current evidence suggests that similar variables seem to apply to children with different diagnoses. Age is an important variable in participation of children and youth. However, evidence about those variables associated with children at different ages is still lacking [150].

Based on the review of above numerous studies conducted by various researchers throughout the world regarding social wellbeing among physically challenged children it can be concluded that societal attitude towards people with disability is changing however the people from developing countries especially of rural areas still do not fully understand the needs of the disabled that put them at the risk of certain social problems including negative societal attitude, discrimination, stigmatization, marginalization and poor social support etc. Girls perceive social support better than boys and children better than adolescents. Most of the studies recommend that maximum efforts are needed to bring social awareness and support social and educational policies that recognizes the similarity of the lives of disabled children to those of other children and that ensure their rights as citizen rather than as disabled children to participate as fully in society as other children.

Based on synthesis of above literature reviewed regarding physical, psychological and social wellbeing domain of quality of life among physically challenged children it can be concluded that physically challenged children suffer with various forms and varying degree of physical, psychological and social problems that had devastating effect on overall quality of life. There is strong need of multiple physical, psychological and social interventions to minimise the impact of disability and improve the quality of life among physically challenged children.
2.2.4 Part IV: Literature related to effect of health promotion intervention in improving quality of life among physically challenged children

Shrader JA, et al conducted a randomized controlled trial study to determine the safety and efficacy of a home-based functional exercise programme in spinal and bulbar muscular atrophy (SBMA) subjects at Bethesda, Maryland. Subjects were randomly assigned to participate in 12 weeks of either functional exercises (intervention) or a stretching program (control). A total of 54 subjects enrolled and 50 completed the study with 24 in the functional exercise group and 26 in the stretching control group. The primary outcome measure was the Adult Myopathy Assessment Tool (AMAT) total score, and secondary measures included total activity by accelerometry, muscle strength, balance, timed up and go, sit-to-stand test, health-related quality of life, creatine kinase, and insulin-like growth factor-1. The result showed that functional exercise was well tolerated but did not lead to significant group differences in the primary outcome measure or any of the secondary measures. The functional exercise did not produce significantly more adverse events than stretching, and was not perceived to be difficult. Although these trial results indicate that functional exercise had no significant effect on total AMAT scores or on mobility, strength, balance, and quality of life, post hoc findings indicate that low-functioning men with SBMA may respond better to functional exercises, and this warrants further investigation with appropriate exercise intensity [151].

Shresta A et al conducted a study to evaluate the impact of health education on the knowledge and practice regarding personal hygiene among primary school children in urban area of Karnataka, India. Out of 7 schools Government Urdu Primary School was selected by simple random sampling. All the students of grade 3rd, 4th and 5th were included. Baseline and end line survey was done in February and September 2013. Health education sessions were conducted once a week for six weeks. The result showed that there was significant increase in knowledge and practice score of school children after health education intervention (p<0.05) [152].
Alemdaroglu I, et al conducted a randomized controlled trial study to investigate the effects of trainings including two different types of exercises for upper extremity (aerobic and strengthening) on respiratory function and quality of life in children with Duchenne Muscular Dystrophy (DMD). The sample were 24 children (8–15 years of age) with DMD whose upper extremity functional status were between Grade1–3 according to the Brooke Upper Extremity Functional Classification included in the study. Children were divided into 2 groups randomly as study (N = 12) and control group (N = 12). T-Shirt wearing time (s) which is one of the timed performance tests was recorded. Peak Expiratory Flow (PEF) were recorded by using Microlife PF 100 – Asthma Management System, Peak Expiratory Flow (Microlife AG, Switzerland) electronic respiratory muscle strength measuring device. Quality of life of children was assessed with The Pediatric Quality of Life Inventory (PedsQL)-Neuromuscular Module Turkish version (child and parent forms). Children in the study group received 45-minutes exercise sessions with electronic arm ergometer, 3 days a week for 8 weeks. Strengthening exercises for upper extremity were given as home programme to control group during 8-weeks. Assessments were repeated after trainings. The result showed that the time elapsed for T-Shirt wearing decreased after training in study group (mean ages 9.50 ± 1.38 years) compared to control group (mean ages 9.3 ± 1.4 years) (z = −2.281; p < 0.05). There was a statistically significant increase in PEF values after training in study group (z = −3.059; p < 0.01); while no difference in control group (z = −1.844; p > 0.05). There were negative, strong correlation between PEF-T-Shirt wearing time (r = −0.629; p < 0.05) and positive, moderate correlation between PEF-PedsQL-child form (r = 0.590; p < 0.05). Hence, it was concluded that upper extremity aerobic exercise training has positive effects on respiratory performance and quality of life of DMD children [153].

Voet NB, et al conducted a meta-analytical study to examine the safety and efficacy of strength training and aerobic exercise training in people with a muscle disease. The researcher searched the Cochrane Neuromuscular Disease Group Specialized Register (July 2012), CENTRAL (2012 Issue 3 of 4), MEDLINE (January 1946 to July 2012), EMBASE (January 1974 to July 2012), EMBASE
The selection criteria included Randomised or quasi-randomised controlled trials comparing strength training or aerobic exercise programmes, or both, to no training, and lasting at least six weeks, in people with a well-described diagnosis of a muscle disease. The study included five trials (170 participants). The findings reported that moderate-intensity strength training in myotonic dystrophy and FSHD and aerobic exercise training in dermatomyositis and polymyositis and myotonic dystrophy type I appear to do no harm, but there is insufficient evidence to conclude that they offer benefit. In mitochondrial myopathy, aerobic exercise combined with strength training appears to be safe and may be effective in increasing submaximal endurance capacity [154].

Kehn EM, et al conducted a prospective nationwide survey study to examine the effect of physical activity on the incidence of secondary conditions in spinal cord injury (SCI) patients living in the United States. The sample were all people who had a spinal cord injury at least one year back and were of at least 18 years of age selected through convenience sampling technique. A self report survey was conducted regarding chronic and secondary conditions, health risk behaviours, skin break down, chronic pain, functional capacity, exercise activities and perceived exercise self efficacy two times over 2 years. The study result depicted that majority (70%) of respondent identified themselves as exercise active. Non exercisers were 1.6 times more likely than exercisers to develop skin breakdown and were 1.8 times more likely to report a respiratory infection. Statistical significant differences (p<0.05) were found between exercisers and non exercisers in terms of co-morbid conditions (hearing impairment/deafness, osteoporosis, bladder/kidney stones, respiratory infections, skin breakdown). Perceived exercise self efficacy was significantly higher among exercise active people than inactive people (p<0.001). The study concluded that exercise is associated with decreased risk of secondary conditions regardless of age at injury, gender, injury level/severity and completeness of injury [155].
**Hatami K et al** conducted a study to investigate the effect of physical activity on sleep disorder and symptoms of anxiety and depression in female students. In this study, 50 female students were randomly divided into two groups; the mental health of students was evaluated by a general health questionnaire containing 28 questions. Results showed that there were significant differences in the symptoms of anxiety, depression, and impaired sleep between the experimental and control group (P < 0.01). The average score of anxiety symptoms and impaired sleep in the experimental group before and after physical exercises were 7.08 and 4.6, respectively, and the average score of depression in the experimental group before and after physical exercises were 4.16 and 1.96, respectively (P < 0.05), which could indicate better mental health and the positive effect of physical activity on mental health in experimental students. On the other hand, the control group did not differ in mentioned parameters. Hence, it was concluded that physical activity is an appropriate strategy for improving mental health [156].

**Sanadhya YK, et al** conducted a pre-experimental study to assess the effectiveness of oral health education on oral health knowledge, attitude, practices and oral hygiene status among 12–15-years old school children of fishermen of Kutch district, Gujarat, India. The sample was 205 children of 12–15 years of age selected from two schools of Bhadreshwar village of Mundra taluka of Kutch district, Gujarat, India. At baseline, children were assessed for oral health knowledge, attitude and practices using a self-administered structured questionnaire and oral hygiene was assessed using Oral Hygiene Index-Simplified (OHI-S). Oral health education was provided after baseline assessment, at 3 months and at 6 months. Follow up study was done after 1 year from baseline. The result revealed that mean OHI-S scores were reduced significantly at 1 year follow up interval. All the questions showed statistically significant improvement in knowledge, attitude and practices except the frequency of change of toothbrush which showed no improvement. The study concluded that oral health education lead to significant improvement in students’ oral hygiene to ultimately enhance their oral health [157].
Wise EK, et al conducted an study to examine the effect of exercise intervention on exercise maintenance, depression, quality of life and mental health at 6 months for people with Traumatic Brain Injury (TBI) with at least mild depression. The participants were 40 people with self reported TBI for 6 months to 5 years prior to study enrolment and a score of 5 or greater on the patient health questionnaire -9. The participants were assessed at baseline, after a 10 week exercise intervention and 6 months after completion of the intervention. 10 week exercise intervention programme consisting of supervised weekly 60 minutes sessions and unsupervised 30 minutes of aerobic exercises 4 times each week. Telephone follow-up was conducted every 2 weeks for an additional 6 months to promote exercise maintenance for individuals randomized to the intervention group. The main outcome measures were Beck Depression Inventory (BDI) comparing participant outcomes overtime. Post hoc analyses included comparison among those who exercised more or less than 90 minutes per week. The result showed that participants reduced their scores on the BDI from baseline to 10 weeks and maintained improvement over time. Many participants (48%) demonstrated increased physical activity at 6 months compared with baseline. Those who exercised more than 90 minutes had low scores on the BDI at the 10 weeks and at 6 months assessments reported higher perceived quality of life and mental health. The study concluded that exercise may contribute to improvement in mood and quality of life for people with Traumatic Brain Injury and should be considered as part of the approach to depression treatment [158].

Ward A, et al conducted a cross-sectional survey study on exercise, life satisfaction and depressive symptoms among individuals with paediatric onset spinal cord injury at Chicago. The sample were 457 current and former patients of a paediatric speciality health care system participating in a longitudinal study on outcomes of paediatric onset SCI. The structured interviews were conducted regarding physical activity/exercise participation, life satisfaction and depressive symptoms. The result showed that 33% participant never exercised, 20% participant exercise daily, 11% participant exercise 4-6 times/week, 18% participant exercise 2-3 times/ week, 9% participant exercise 1-3 time/week and 9% participant exercise
one time/week. Frequency of exercise did not differ between those with paraplegia and tetraplegia. Increased frequency of exercise was significantly positively associated with depressive symptoms for individuals with paraplegia only [159].

Kehn EM & Kroll T conducted a study to detail the exercise regimens of community dwelling adults with spinal cord injury (SCI) and identify associated health characteristics with their exercise active life style in United States. The sample were 627 individuals with SCI from across the United States selected through convenient and snowball sampling technique. The data were collected regarding exercise status, exercise activities (aerobic, strengthening and flexibility), incidence of chronic and secondary conditions, high risk behaviours, incidence of pressure sores, chronic pain, functional capacity, perceived exercise, self efficacy and demographic information through a self reported mail in survey. The result showed that among persons with spinal cord injury 70% were exercisers and 30% were non exercisers. Among exercisers 40% exercise at home only, 10% exercise outside the home only and 20% exercise both at home and outside the home. Most frequently reported exercise activities of exercisers include aerobic (wheel chair pushing, arm cycle and walking), strengthening (weight lifting and elastic bands) and flexibility (stretching and range of motion) activities averagely 4 times per week for the median length of 45 minutes. Incidence of certain secondary conditions (UTI, incontinence, chronic pain, bowel problems, skin breakdown, depression, arthritis, osteoporosis and high blood pressure) was significantly lower among adults with SCI who exercise when compared to those who do not. The functional capacity and perceived self efficacy was significantly higher among exercise active people with SCI who exercise when compared to those who do not. Self identified exercisers show higher therapy (physical therapy and occupational therapy) utilization rates than non exercisers [160].

Werven V I conducted a study to evaluate the effect of health and hygiene school programme initiative among adolescents from September 2010 to November 2010 in Dhaka, Bangladesh. The two trainers organized interactive and participatory classroom sessions, providing adolescents with information ranging from basic hygiene to the effects of drugs and menstrual hygiene. The result
revealed that the programme has resulted in an increased health and hygiene awareness among students and changes in behaviour related to food intake and hygiene [161].

**Kroll T, et al** conducted a study on physical activity and secondary health conditions in veterans with spinal cord injuries. The sample were 157 people with spinal cord injuries recruited through convenient sampling technique. The self-report mail survey collected a wide range of information, including exercise status, exercise activities, prevalence of chronic conditions and incidence of secondary conditions, health risk behaviours, functional capacity, community integration, perceived exercise self-efficacy, therapy utilization, and socio-demographic information. The result showed that among 157 veterans with SCI, 108(69%) were exercise active and 49(31%) were non-exercise active veterans. Among active veterans, 65% exercise at home only, 31% exercise at home and at a gym, 4% exercise at a gymnasium only. Most frequently reported exercise activities of active veterans include aerobic activities (walking, wheel chair pushing, arm cycle, and exercise bike), strengthening activities (weight lifting, elastic bands, and weight machines) and flexibility activities (stretching, range of motion and leg/foot stretches). The exercisers reported fewer chronic and secondary health conditions, greater level of functional capacity and exercise self efficacy but the differences with non-exercisers were not always significant. The top reasons for inactivity reported by non-exercise veterans were cost of gymnasium membership or equipment and lack of motivation [162].

**Gursel F & Koruc Z** conducted a study to determine the influence of physical activity on body image in people with and without acquired mobility disability at Ankara, Turkey. The sample were 58 adolescents, aged 16 to 18 years, half of them were having some form of acquired mobility disability while the other half were healthy. Body image was evaluated with the Multidimensional Body Self Relations Questionnaire (MBSRQ) before and after 6 weeks of playing darts. The result revealed that people with acquired mobility disability evaluate their health and fitness levels as being lower than healthy adolescents and they are less concerned with fitness as compared with healthy adolescents. Six weeks of playing darts as a
physical activity had no effect on improving the body image self perceptions of the acquired mobility disability group [163].

Archer T conducted a review study on influence of physical exercise on Traumatic Brain Injury (TBI) deficits: Scaffolding effect and reported that TBI may be due to a bump, blow, or jolt to the head or a penetrating head injury that disrupts normal brain function; it presents an ever growing, serious public health problem that causes a considerable number of fatalities and cases of permanent disability annually. Physical exercise restores the healthy homeostatic regulation of stress, affect and the regulation of hypothalamic–pituitary–adrenal axis. Physical activity attenuates or reverses the performance deficits observed in neurocognitive tasks. It induces anti-apoptotic effects and buttresses blood–brain barrier intactness. Exercise offers a unique non-pharmacologic, non-invasive intervention that incorporates different regimes, whether dynamic or static, endurance, or resistance. Exercise intervention protects against vascular risk factors that include hypertension, diabetes, cellular inflammation, and aortic rigidity. It induces direct changes in cerebrovasculature that produce beneficial changes in cerebral blood flow, angiogenesis and vascular disease improvement. The improvements induced by physical exercise regimes in brain plasticity and neurocognitive performance are evident both in healthy individuals and in those afflicted by TBI. The overlap and inter-relations between TBI effects on brain and cognition as related to physical exercise and cognition may provide lasting therapeutic benefits for recovery from TBI. It seems likely that some modification of the notion of scaffolding would postulate that physical exercise reinforces the adaptive processes of the brain that has undergone TBI thereby facilitating the development of existing networks, albeit possibly less efficient, that compensate for those lost through damage [164].

Broberg S conducted a pre - experimental study to evaluate the outcome of physiotherapy as part of a multidisciplinary rehabilitation. The sample were 50 patients with late effects of polio. Patients were tested at baseline; 3 months after the start of rehabilitation and at one-year follow-up for functional capacity, fatigue and quality of life. The result revealed that the patients showed significantly better functional capacity on all measurements 3 months after start of intervention and at
one-year follow-up. The patients showed significant improvement in 3 of the SF-36 dimensions regarding quality of life, but only the improvement in "general health" remained after one year. The study concluded that patients with late effects of polio, who experience new problems related to polio, can benefit from an individually planned multidisciplinary intervention with emphasis on physiotherapy, and the improvement in physical capacity and general health can remain at one-year follow-up [165].

Agre JC & Rodriquez AA conducted a meta-analytical study on the role of exercise in the patient with post-polio in USA and stated that recent studies have shown that judicious exercise can improve muscle strength, cardio-respiratory fitness, and the efficiency of ambulation in post-polio patients. It may also add to the patient's sense of well-being. These benefits appear to occur when the patients stay within reasonable bounds while exercising in order to avoid overuse problems. In particular, the patients should be instructed to avoid activities that cause increasing muscle or joint pain or excessive fatigue, either during or after their exercise programme. The literature indicates that exercise within these constraints leads to a number of beneficial physiologic and psychologic adaptations in patients with post-polio syndrome. Judicious exercise should be viewed as important adjuvant in the overall therapeutic programme of the patient. Patients seen in post-polio clinics frequently complain of new fatigue, weakness, muscle pain, and/or joint pain. The most frequent complaints involving activities of daily living include new difficulties with walking and stair climbing. The therapeutic benefit of exercise in these patients to minimize or reverse decline in function is an important question frequently asked by patients with post-polio syndrome. In the general population, physical activity is known to be an important adjunct to good health, bestowing both physiologic and psychological benefits leading to a reduction in the risk to develop a number of serious ailments as well as leading to better psychological adjustment. On the other hand, limitation in physical activity results in a number of deleterious effects. Patients with post-polio syndrome have unique problems, however, which need to be considered when prescribing an exercise programme for an individual patient. A number of functional etiologies for declining function have been hypothesized
including disuse weakness, overuse weakness, weight gain, and chronic weakness. Because of the variability in which the motor neurons to different muscle groups may have been affected in a particular patient, both asymmetric and scattered weakness may be present. The challenge in prescribing exercise for the patient with post-polio syndrome comes in recognizing these unique factors in each patient and modifying the prescription accordingly. One must protect muscles and joints experiencing the adverse effects of overuse or body areas with very significant chronic weakness (in general, in areas where the muscles have less than antigravity strength on manual muscle testing) while exercising those body areas experiencing the deleterious effects of disuse. Weight gain is to be avoided if at all possible in this population, because increased weight only leads to further difficulty in the performance of daily activities [166].

Odiango, et al conducted a pre-experimental study to evaluate the effect of physical education programmes on health related fitness components of physically challenged pupils. The sample were 31 students (17 boys and 14 girls) from class five, six and seven. Health related fitness levels of persons with physical disabilities who participated in an 8 weeks physical education programme were measured using the project UNIQUE physical fitness battery of Winnick and Short. The findings showed that the pupils had a lower fitness level at pre test compared to after PE program and there were significant improvements on cardio respiratory endurance and low back flexibility. However, improvements on body composition were not statistically significant at p< 0.05 level. This study further established that in cardio respiratory endurance boys performed better than girls, while in low back flexibility both boys and girls demonstrated an improvement across all age groups. The study concluded that physical education improves health related fitness of persons with physical disabilities. Hence, physical education should be encouraged in all schools even in those involving persons with physical disabilities and physical education should be allocated more time on the school time table than currently available [167].

Wilson Kathryn E conducted a randomized control trial study to evaluate the effect of exercise on physical activity level, self perceptions and quality of life of sedentary children. The sample were 40 sedentary children of 8-11 years
age randomly assigned to an exercise intervention (n = 26) and control (n = 14) condition. Exercise participants were required to exercise for one hour, supervised, at least 3 days/week over a 16-week period. Children exercised one-on-one or in small groups. Participants were required to average > 140 bpm per activity bout as measured by heart rate monitors. The control group consisted of a no treatment condition. The result revealed no significant association between physical activity and any of the psychological variables. Obese children were found to have impaired perceived body attractiveness and HRQOL physical functioning when compared to healthy weight participants. There was no effect of the exercise intervention on any of the outcome variables for healthy weight or obese participants. The study concluded that moderate to vigorous physical activity level may lack association with global self-esteem, physical self-worth, physical self-perceptions and HRQOL among inactive 8-11 year olds. Additionally, basic exercise interventions may be insufficient to increase moderate to vigorous physical activity level, and improve global self-esteem, physical self-worth, physical self-perceptions, and HRQOL among inactive healthy weight or obese children [168].

Wilson PE & Clayton GH conducted a systematic review on sport/physical activity and disability to improve the learner's knowledge of the positive impact that active lifestyles can have on overall health in the disabled youth population and, as a result, modify their practice by incorporating recreational and competitive sport activities as part of improving overall patient care. The study found that participation in recreational and competitive sports at an early age has long been touted as a positive influence on growth and development, and for fostering lifelong healthy lifestyles. The benefits of an active lifestyle include not only fitness, but the promotion of a sense of inclusion and improved self-esteem. These benefits are well documented in all populations, and their importance has been summarized in the recent Healthy People 2010 guidelines. The American Academy of Paediatrics has recently produced a summary statement on the benefits of activity for disabled children. They note that children with disabilities tend to have an overall lower level of fitness and an increased level of obesity. For this population, developing a lifelong desire to be active can be a simple means for limiting illness and much of the
morbidity associated with sedentary lifestyles often associated with disability. For disabled youth, participation in disabled sports programmes available nationally and internationally can be an effective means to promote such precepts [169].

**Siwach M** conducted a randomized controlled trial study on impact of health education programme on the knowledge and practices of school children regarding personal hygiene in rural Panipat, Haryana. The sample were 60 rural school going children aged 8-10 years. For action research, a group of 30 respondents was taken as the control group and the other 30 was taken as the experimental group. The knowledge and practices regarding personal hygiene were assessed by a self structured pre-tested interview schedule. At the pre-testing stage the existing status of personal hygiene a component of health education was assessed with a pre structured interview schedule. At the second stage, only the experimental group was exposed to the intervention package for 8 weeks. Intervention programme on health education was a complete package on activities related to personal hygiene. The helping aids were developed with easily available, low cost material .To make an assessment of the intervention post testing was done after 3 weeks of completion of health education programme on both the control as well as experimental group. After the intervention of health education programme the results showed an impact of the programme as the scores of the children after post-testing improved in the experimental group and they were found to be significant on various aspects of personal hygiene (p<0.05). The study concludes that if a need based school health education programme is developed for different age groups and classes, it definitely leads to improvement in the knowledge and practices of school children regarding personal hygiene [170].

**Oncu J** conducted a prospective, randomized controlled trial study on short-term effects of aerobic exercise on functional capacity, fatigue, and quality of life in patients with post-polio syndrome. The sample were 23 patients. The result revealed that polio survivors experience improved fatigue and quality of life following an aerobic exercise programme. Strengthening exercise can result in improved strength, but exercise should be carefully monitored and prescribed to avoid any potential exacerbation of muscle weakness [171].
**Ekeeland E et al** conducted a Meta-analytical study to determine whether exercise alone or exercise as part of a comprehensive intervention can improve self-esteem among children and young people. Computerised searches in MEDLINE, EMBASE, The Cochrane Controlled Trials Register (CENTRAL), CINAHL, PsycINFO and ERIC were undertaken and reference lists from relevant articles were scanned. Relevant studies were also traced by contacting authors. The results indicated that exercise has positive short-term effects on self-esteem in children and young people. Since there are no known negative effects of exercise and many positive effects on physical health, exercise may be an important measure in improving children’s self-esteem [172].

**Murphy NA & Carbone PS**, from American Academy of Paediatrics Council on children with disabilities conducted a study on promoting the participation of children with disabilities in sports, recreation, and physical activities and reported that the benefits of physical activity are universal for all children, including those with disabilities. The participation of children with disabilities in sports and recreational activities promotes inclusion, minimizes deconditioning, optimizes physical functioning, and enhances overall well-being. Despite these benefits, children with disabilities are more restricted in their participation, have lower levels of fitness, and have higher levels of obesity than their peers without disabilities. Paediatricians and parents may overestimate the risks or overlook the benefits of physical activity in children with disabilities. Well-informed decisions regarding each child's participation must consider overall health status, individual activity preferences, safety precautions, and availability of appropriate programmes and equipment. Health supervision visits afford pediatricians, children with disabilities, and parents’ opportunities to collaboratively generate goal-directed activity “prescriptions.” Child, family, financial, and societal barriers to participation need to be directly identified and addressed in the context of local, state, and federal laws. The goal is inclusion for all children with disabilities in appropriate activities [173].
**Fragala P & Goodgold S** conducted an experimental study to "Evaluate the effectiveness of community based group fitness programme for children with disabilities" in Israel. The purpose of this study was to examine the feasibility, safety and effectiveness of a community based group fitness programme for children with disabilities. The samples were children with neuromuscular and developmental disabilities between 6 to 14 years of age. The sample size was 28. The 16 weeks community based program, held twice weekly, consisted of strengthening, aerobic conditioning and flexibility exercises. A pretest-post design was used, and the following outcomes were measures isometric muscle strength of the knee extensors, hip abductors, and ankle plantar flexors, walking energy expenditure, functional mobility and fitness. The result showed that the mean programme attendance was 75.3% improvement in all-clinical outcomes was observed. The study concluded that the physical therapist partnering with community centers may feasibly and safely shift group fitness programs for school-aged children with disabilities from the medical setting to the community [174].

**Hill KK** conducted a non-randomized survey to examine the effect of physical activity on the amputee’s body image at Atlanta, Georgia. The sample were 53 male and female lower extremity amputees, ages 25-56 of at least 18 months experience with his/her prosthesis. Each subject completed a 10-item demographic profile, a 20 item amputee body image scale survey (ABIS) and a variable item physical activity and disability scale (PADS). The result showed a significant difference between physically active and non-physically active ABIS (p<.01) and also there was a significant negative correlation between exercise and body image (r=-0.681, p<0.01), total activity and body image (r=-0.681, p<0.01) and physical activity and body image (r=-0.616, p<0.01). The study concluded that there is a significant relationship between physical activity and body image in the amputee population [175].

**Robinson W, et al** conducted a study to examine the efficacy of a health promotion programme on improving the health and health behaviours of children with physical disabilities in Italy. A sample of 137 children with physical disabilities was randomly assigned to either an 8-week health promotion programme (or) to a
wait list control group. Both groups completed questionnaires before, immediately after, and 3 months after the intervention. The result showed that relative to children in the control group, children in the health promotion programme demonstrated improvement in health behaviours, most of which were maintained at follow up. The intervention group showed some improvement as measures of physical health, but there was little evidence of improvement in psychological health outcomes [176].

**Carmona RH, et al** conducted an experimental study to determine the effect of health education and exercise programme on improving the health and wellness of children with disabilities in Netherlands. 30 volunteers were randomly assigned to the intervention group (or) a control group. The intervention group engaged in exercise for 12 weeks. Pre and post exercise testing was conducted to assess body fat, lipid profile, and cardio-vascular fitness. Educational seminars were held weekly. The result showed that intervention group evidenced greater weight loss than the control group, although not statistically significant. Significant differences were observed in ratings of general health and empowerment. The study concluded that exercise intervention may encourage weight loss and also such interventions may contribute to "perceived" well-being even among those with sub-clinical participation [177].

**Ilika AL & Obionu CO** conducted a randomized controlled trial study to assess the effect of school-based health education on the practice of personal hygiene by children in primary schools in Anambra State, Nigeria. The sample were three hundred and ninety-five (395) and three hundred and ninety-eight (398) primary school pupils randomly recruited as intervention and control groups were rated on five key personal hygiene practices before, immediately after and three months after school-based hygiene health education. The result indicated that Less than 45% were rated clean before health education in both groups. Immediately after health education, more than 65% in the intervention group were rated clean. There was no change in the control group. The difference was statistically significant. However, there was a statistically insignificant decline in those rated clean three months after cessation of health education. The study concluded that the school-
based health education improved the personal hygiene practice of the pupils. There is a need for regular reinforcement to sustain the gains [178].

**Hassmen P, et al** conducted a cross sectional study to explore the association between physical exercise and psychological well-being in a large population-based sample in Finland. A total of 3403 participants (1856 women and 1547 men) completed the questionnaires. Besides answering questions concerning their exercise habits and perceived health and fitness, the participants also completed the Beck Depression Inventory, the State Trait Anger Scale, the Cynical Distrust Scale, and the Sense of Coherence inventory. The results of study suggested that individuals who exercised at least two to three times a week experienced significantly less depression, anger, cynical distrust, and stress than those exercising less frequently or not at all. Furthermore, regular exercisers perceived their health and fitness to be better than less frequent exercisers did. Finally, those who exercised at least twice a week reported higher levels of sense of coherence and a stronger feeling of social integration than their less frequently exercising counterparts. The study concluded that there is a consistent association between enhanced psychological well-being, and regular physical exercise [179].

Based on the review of above numerous studies conducted by various researchers throughout the world regarding effect of health promotion intervention in improving quality of life among physically challenged children it has been noticed that health education on diet, personal hygiene and performance of exercises leads to a significant improvement in dietary habits, maintenance of personal hygiene and regular performance of exercises. Most of the studies result has shown that regular practice of well planned exercises under the guidance of health professionals improves the physical fitness, cardio-respiratory fitness, muscle strength, efficacy of ambulation, appetite, self esteem, body image, participation level, sense of coherence, feeling of social interaction, participation in socio-cultural activities and decreases fatigue, cold intolerance, constipation, anger, stress, depression, cylindrical distress etc.
Hence, based on synthesis of above literature, it can be concluded that regular practice of health promotion intervention leads to a significant improvement in physical wellbeing, psychological wellbeing, social wellbeing and overall quality of life among physically challenged children.

2.3 SECTION C: CONCEPTUAL FRAMEWORK

Sampalli T, et al proposed model of integrated care to improve health outcomes for individuals with multimorbidities 2012 (Source: Dove Press Journal: Patient preference and adherence) is designed to address the specific needs of complex patient population [180]. In the present study this model is applied to evaluate the effectiveness of health promotion intervention in improving the quality of life among physically challenged children. This model comprises of four key phases as follows:

**Intake phase**

The aim of this phase is to gather knowledge of the individual’s multifaceted needs through a comprehensive and multidisciplinary assessment. This phase of care includes an intake screen by a physician and nurse to determine the diagnostic and symptom profile of the patient and information about self-management needs. Based on the outcome of this phase, the care team develops an individualized integrated care plan with the involvement and engagement of the patient.

In the present study the aim of this phase is to assess the quality of life among physically challenged children in study and control group at base line (pre interventional). The nurse researcher orients the study subject by providing information about research process and takes informed consent/assent for participation in the study. The nurse researcher performs intake screen through structured questionnaire. Quality of life assessment includes the assessment of physical wellbeing psychological wellbeing and social wellbeing. The physiotherapist identifies the care coordination and type of exercise needs across the period of research study.
Integrated care phase/ intervention phase

The aim of this phase is to provide treatment, education, and support for integration of the physical, psychosocial, and vocational needs identified for individuals in the intake phase of care to improve overall functionality and quality of life.

In the present study, aim of this phase is to provide integrated health promotion intervention to physically challenged children in study group for the duration of 24 weeks based on needs identified for individuals in intake phase of care. The nurse researcher provides health education on diet, personal hygiene, importance of exercises, review and motivates to practice healthy lifestyle practices. The physiotherapist assisted by nurse researcher provides range of motion, stretching and strengthening exercises depending on the need of type of exercises 3 times in a week. The quality of life outcomes are judged at 12\textsuperscript{th} weeks (post interventional I) in both the groups through quality of life questionnaire.

Transition phase

During this phase of care, the multidisciplinary team assesses the patient’s readiness to be discharged and identifies any other pending care needs or gaps essential for the patient to self-manage their health.

In the present study during this phase of care, the nurse researcher assesses the quality of life outcomes at 24 weeks (post interventional II) through quality of life questionnaire in both the groups. The nurse researcher and physiotherapist held discussion with physically challenged children in study group and formulate of self management action plan for the duration of 12 weeks.

Discharge phase

The discharge phase involves completion of the transition phase and final appointments that are essential to complete care for the patient including follow up then the care of the patient is transferred to their family physician or primary care provider.
In the present study discharge phase includes 12 weeks post intervention follow up of physically challenged children in study group by nurse researcher then transfer of care to their family physician or primary care provider. The nurse researcher judges the quality of life outcomes through quality of life questionnaire at 36 weeks (post interventional III) in both study and control group.

**Outcome measures**

Outcome parameters measures meaningful health outcomes of relevance and importance to individuals with multimorbidity and enable evaluation of patient perspectives of their own health and the care received.

In the present study the outcome parameters are quality of life outcome criterion measures which enable evaluation of effectiveness of health promotion intervention in improving quality of life among physically challenged children.

**Chapterization**

**Chapter II:** It dealt with review of literature and conceptual framework

**Chapter III:** It deals with research approach, research design, variables, setting of the study, population, sample, criteria for sample selection, sampling technique, sample size and sample size calculation, development and description of tool, development and description of intervention, translation and back translation of the tool, content validity of the tool, pilot study, reliability of the tool, ethical considerations, data collection procedure, drop out and its analysis, and data analysis.
Fig 1. Conceptual framework based on Sampalli T, et al proposed model of integrated care to improve health outcomes for individuals with multimorbidities (2012)