INCLUSIVE TELE-PHYSIOTHERAPY FOR TREATMENT AND MONITORING THE PHYSICAL IMPAIRMENTS AMONG CHILDREN WITH CEREBRAL PALSY IN AN INCLUSION EDUCATION SETTING

Thesis Submitted for the Award of the Degree of

DOCTOR OF PHILOSOPHY

in

Physiotherapy

By

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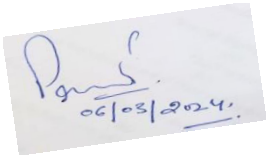
DECLARATION

I, hereby declared that the presented work in the thesis entitled "**INCLUSIVE TELE-PHYSIOTHERAPY FOR TREATMENT AND MONITORING THE PHYSICAL IMPAIRMENTS AMONG CHILDREN WITH CEREBRAL PALSY IN AN INCLUSION EDUCATION SETTING**" in fulfilment of degree of **Doctor of Philosophy (Ph. D.)** is outcome of research work carried out by me under the supervision of **Dr. Suresh Mani**, working as **Professor and Head**, in the **School of Allied Medical Sciences** of **Lovely Professional University, Punjab, India**. In keeping with general practice of reporting scientific observations, due acknowledgements have been made whenever work described here has been based on findings of other investigator. This work has not been submitted in part or full to any other University or Institute for the award of any degree.



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CERTIFICATE

This is to certify that the work reported in the Ph. D. thesis entitled "**INCLUSIVE TELE-PHYSIOTHERAPY FOR TREATMENT AND MONITORING THE PHYSICAL IMPAIRMENTS AMONG CHILDREN WITH CEREBRAL PALSY IN AN INCLUSION EDUCATION SETTING**" submitted in fulfillment of the requirement for the reward of degree of **Doctor of Philosophy (Ph.D.)** in the Department of Physiotherapy, is a research work carried out by Pardeep Kumar, 41700055, is bonafide record of his original work carried out under my supervision and that no part of thesis has been submitted for any other degree, diploma or equivalent course.

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ABSTRACT

Background: There is paradigm shift in the focus of integrating educational need of the special children into main stream of education under inclusive setting. The Ministry of Social Justice and Empowerment, Government of India has been committed to ensure every child with disability should not be denied education on the ground of zero rejection policy to get their educational goals. However, the management of physical disabilities is not being addressed sufficiently in such set up due to insufficient availability of physiotherapy services especially for children living in remote and rural areas. The management of physical impairments of these children should be given high priority to enhance learning in achieving educational goals.

Objective: The objective of study is to develop inclusive tele-physiotherapy (i-TelePT) based intervention and monitoring modules and to test its effectiveness for treatment of physical impairments among children with Cerebral Palsy (CP) in inclusive education setting.

Research Methodology: In phase I, the preliminary demographic data of children with CP was collected from the District Institution of Education & Training (DIET) Mandi, Himachal Pradesh. Each child with CP student was assessed individually using a questionnaire with assistance from class special educator. In phase II, Focus group discussions were organised with special educators of more than two years of experience in inclusive education setting to develop the content, structure and design of i-TelePT framework. Furthermore, the special educators were trained on evaluation and management of children with Cerebral Palsy. The whole face-to-face FGD sessions as well as the online FGD sessions were audiotaped and captured using the Zoom app. These recordings were afterwards transcribed, tagged, and analysed using a theme analysis model. The FGDs shows the dynamic effects of telephysiotherapy module development for children with cerebral palsy in educational settings, and this technological system appears to be more expressive towards meeting the needs of children as well as special educators and even therapists who cannot routinely see patients. In phase III, the clinical feasibility of inclusive tele-physiotherapy was determined for the management and monitoring the physical impairments among children with CP in inclusive education setting.

Results: In the initial phase of the study, a total of 20 CP children—11 boys and 9 girls were enrolled. A questionnaire was used to collect basic socio-demographic data on children with CP, including their age, sex, dominant side, afflicted bodily side and kind of CP. Spastic diplegic CP, with a prevalence of 40%, is by far the most common kind, followed by Spastic quadriplegic CP, with a prevalence of 25%, Spastic hemiplegic CP, with a rate of 15%, and two more clinical types, triplegic and paraplegic, with a frequency of 5% each. No known cases of ataxic, athetoid or mixed kinds were found, despite the fact that the research samples were still limited and only included children with CP in a certain age range.

With the help of a semi-structured question sheet, the second phase of the study—a qualitative focus group—invited a total of ten (n=10) special educators to participate in face-to-face and online FGDs to learn more about the rehabilitation requirements of children with CP in inclusive educational settings. The evaluations of FGDs highlight the significance of developing a conceptual framework for TP for children with CP in school settings. An innovative and clever typology created utilising educational digital platforms to meet the needs of and lessen the disability in children with cerebral palsy. By utilising teachers in various educational blocks, this TP plan will help and present a method for providing physiotherapy to the aforementioned students

In the third phase, a quasi-experimental research was done to evaluate the therapeutic viability of i-TelePT for CP children (n=20) between the ages of 6 and 12 in an inclusive learning environment. The average age of the participants in this study was (9.8±1.69), and they spent (68.1±32.8) online and (39.6±5.13) days offline on the website. By collecting information on the VAS, PBS, GMFM-88, GAS, MACS, WeeFIM, MAS, and CPQoL, subjects underwent baseline and post-intervention assessments (T0-pre and T1-post). The i-TelePT programme was delivered for one hour per session, for a total duration of 8 weeks, with the support of special educators. The data was analyzed using descriptive and inferential statistics by using IBM (20 version). There was significant improvement in balance score (‘t’= -3.976, SEM = 0.893, ‘p’ < 0.001).Similarly, in the pain intensity, a statistically significant improvement as compared with the baseline (p<0.001). Pre and post intervention score of motor functions demonstrated with a mean difference score -9.7±7.6

(p<0.001). MACS score (z value = -3.3 and p value ≤ 0.001 was also found statistical significant respectively. There was improvement in spasticity measured on MAS in most of all lower limb muscles with a statistical significant score (p value ≤ 0.001) except external of both sides and internal rotators of hip on left side (p value > 0.05). There was no improvement in of upper limbs of both sides (p value > 0.05). Significant improvement in WeeFIM function independence in all domains (p value ≤ 0.001) however, there was no improvement in communication level of WeeFIM among all CP children (p value > 0.05). There was also significant improvement ('p' ≤ 0.001) in all seven domains of quality of life (CPQoL). The study highlights the potential benefits of incorporating inclusive telephysiotherapy into special education programs for CP children. These findings will encourage further exploration and implementation of this innovative approach for children with disability.

Conclusion: To assist the integration of education and treatments, the special educators working with these kids can connect via this developed i-TelePT framework. The i-TelePT Framework is an innovative teletherapy model that empowers special educators to deliver physiotherapy services in rural areas where access to such services is scarce. This cost-effective solution is beneficial for children with CPs. In the difficult Himalayan areas of India, this framework might assist the children with CP. The i-TelePT was feasible and sustainable among the studied sample of CCPs. Inclusive Telephysiotherapy in school settings has the probable future to make these children independent by limiting disability in remote and far flung areas.

Keywords: Tele-physiotherapy, School based physiotherapy, Cerebral Palsy, Special educators,Telerehabilitation.

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LIST OF ABBREVIATIONS

Abbreviations	Full Form
APTA	American Physical Therapy Association
ADLs	Activities of Daily Living
CP	Cerebral Palsy
CCP	Children with Cerebral Palsy
CWSN	Children with Special needs
CT	Computerized Tomography
CRC	Composite Regional Centre for PWDs
COREQ	Consolidated criteria for reporting qualitative research
CP QOLc	Cerebral Palsy Quality of Life Questionnaire
DSE	Diploma in Special Education
DTRs	Deep Tendon Reflex
DIET	District Institution of education & Training
DD	Developmental Delay
DBMS	Data based management system
FGD	Focus group discussion
GMFM-88	Gross Motor function Measurement
GMFCS-E&R	Gross Motor Function Classification System
GAS	GOAL Attainment Scaling
HP	Himachal Pradesh
HI	Hearing Impairment
HAL	Home Android Lab
IDEA	Individuals with Disabilities Education Act
IQ	Intelligent Quotient
ID	Intellectual Disability
i-TelePT	Inclusive Telephysiotherapy
IEP	Information & Communication Technology
ISDN	Integrated services digital network
IP	Internet protocol

ICF CY	International Classification of Functioning,Disability and Health: Children and Youth version
ITP	IndividualizedTherapeutic Plan
IVH	Intraventicular Hemorrhage
IBM	International Bussiness Machine
ICP	Integrated Computer Projector
IIT	Individualized Inclusive Telephysiotherapy
LBW	Low Birth Weight
MHRD	Ministry of Human Resource Development
MSJE	Ministry of Social Justice & Empowerment
MRI	Magnetic Resonanc Imaging
MAS	Modified Ashworth Scale
MACS	Manual Ability Classification System
NGOs	Non Governmental Organisation
PBS	Pediatric Balance Scale
PVL	Periventricular Leucomalacia
PWDs	Persons with Disabilities
RTE	Right to Education
RCI	Rehabilitation Council of India
RPWD	Rights of Persons with Disabilities
SSA	Sarva Shiksha Abhiyan
SCCL	School Central Cluster Lab
SPSS	Statistical Package for Social Sciences
SBT	School Based Therapy
TeleOT	Teleoccupational Therapy
TORCH	Toxoplasmosis, Rubella, Cytomegalovirus, Herpes Simplex & HIV
VC	Videoconferencing
VI	Visual Impairment
VoIP	Voice over internet protocol
WHO	World Health Organisation
WeeFIM	Wee Functional Independent Measure

OPERATIONAL DEFINITIONS

Asphyxia- Lack of oxygen due to trouble with breathing or poor oxygen supply in the air.

Asynchronous- An action that takes place in different time frames according to user's convenience.

Bandwidth- A measure of the capacity of an electronic transmission medium to transmit data per unit of time – the higher the bandwidth, the more data/information can be transmitted.

Cerebral Palsy (CP)- A heterogeneous group of disorders of development of movement and posture causing activity limitation which is non progressive in nature occurring in developing brain. The disorder is often accompanied by poor cognition, communication, perception or behavior and by seizure disorders.

Children with Special Needs (CWSN)- Children with Special needs are special children who have some type of disability and require special care and assistance.

Disability- Disability is an umbrella term that covers impairments, activity limitations and restrictions in participation.

Impairment- Refers to loss or abnormality of psychological, physiological or anatomical structure or function.

ICT- defined as all the tools, devices, contents , resources and services delivered digitally deployed for teaching, learning and building of capacities.

Individualized Education Program (IEP) - IEP is a written document for each student with a process of planning and decision-making. Parents are an important and integral part of this IEP process and must know the rights of children.

Inclusive Education- means educating children with disabilities in regular classrooms with normal children.

ICF- International classification of Functioning, Disability and Health is a classification system of health and health related domains. It is framework for measuring health and disability at both individual and population levels.

Magnetic Resonance Imaging (MRI)- An imaging technique which uses radio waves, magnetic fields and computer analysis to create a picture of body tissues and structures.

Motor skills- Motor skill is a function that involves specific movements of body's muscle to perform a certain task.

Real Time- Refers to live videoconferencing link with patient where the provider and patient can see each other and can interact nearly as they would in face to face encounter.

Sarva Shiksha Abhiyan (SSA)- SSA is an programme which universalize elementary education by providing relevant elementary education for all children in 6-14 age groups.

Special Educators- The educators or teachers who provide special education to children with various disabilities.

Synchronous- A consultation where the client and physiotherapist are simultaneously present during the consultation and have synchronous audio-visual communication.

School Based Physiotherapy- According to the Individuals with Disabilities Education Act (IDEA 1997), school based physical therapy is defined as one of the supportive services which is required to assist a child with a disability in school settings to benefit from special education.

Tele-Physiotherapy (TelePT)- Tele-physiotherapy is tool used by health providers to deliver the traditional physiotherapy by using information technology through internet rather than manual hospital based settings.

Tele-Rehabilitation(TR)- Tele-rehabilitation is the delivery of rehabilitation service including assessment, consultation, monitoring, intervention and education by information and communication technology.

Videoconferencing- The ability to have meetings using high definition face to face communications from a personal workstation.

CHAPTER I

INTRODUCTION

1.1 Background

The term "Cerebral Palsy" (CP) portrays collection of persistent locomotion and postural abnormalities which limit activities and cause disabilities through unprogressive injury to the growing cerebrum [1]. It is reckoned that there were 50.0 million people with CP worldwide, a 159% rise from 1990 to 2019 with an average Disability weight of 0.21 in 2019. Based on number of Global burden disease, people with CP contributed to 11 million years of Disability (YLD) creating a challenge to rehabilitation [2]. The prevalence range of CP recorded in Indian subcontinent is larger, traversing between 2.08 to 3.88 per 1000 live child births, compared to the range found in globally published literature of 1.5 to 4 per 1000 live births [3].The new revised bill, RPWD ordinance, 2016 with amendments replacing the existing Persons with Disabilities Act (PWD, 1995) clarifies that CP is one of distinguished disorder under classification of Locomotor Disability in act [4].

Children with CP experience physical restrictions due to spasticity, posture challenges, balance concerns and movement impairments which limit their functional skills and prohibit them from engaging in school activities [5]. In addition to scissoring gait, children with CP also exhibit impaired fine motor abilities altering coordination negatively affects their ability to participate in school related extracurricular and curricular activities [6], [7], [8].

After the elimination of the childhood illness polio, CP remains solitary causative factor of paediatric impairment and disability in India [9]. The most common therapeutic approach used with children with CP is physical therapy, which is crucial in developing functional skills [10]. Recent studies have recognised the efficacy of physical therapy approaches for infants with CP, emphasising neuro-developmental therapy [11], [12], [13], muscular strengthening exercise [14], [15] biofeedback and other therapeutic modalities like conductive education [16], [17].

In India, programmes inaccessibility and expenses continue to be the main factors impacting the usage of physiotherapy rehabilitation for children with CP [18], [19]. Additional cost of transportation and lost working hours that lead parents to lose time with their children, are also involved because the kid must be carried to the physiotherapy clinic on a regular basis for a significant period of time [20]. The major purpose of physiotherapy for kids is to ameliorate their movement skills and coordination so they can achieve their academic goals and create an atmosphere that is more conducive to learning [21], [22].

Both within and outside the classroom, a child's educational experience depends heavily on their physical capabilities. Due to this, parents frequently experience shame, guilt and helplessness when presenting these children in front of others [9], [20], [23]. Studies evidenced that children with CP are managed through the combined efforts of all therapy professionals assuring a collaborative approach [24], [25], [26], [27].These children are not only handled by health professionals, but special educators also play a part in their management at schools [28], [29]. For CP children, this integrated inclusive school setting offers more opportunities to develop their potential [30], [31].

Therapeutic interventions are offered to children in mainstream and special schools in developed nations, but such benefits are not available to CP students in India [22], [32]. In a different situation, the physiotherapist works as a member of the educational group to determine & find out the eligibility of such children for special remedial education together with other associated services. The physiotherapists collaborate with the IEP team to assess the children's objectives for receiving related therapeutic services in school environments [33], [34].

Sarva Shiksha Abhiyan (SSA) is the successful project of Indian Government covering millennial ‘Education for All’ under umbrella programme for all education schemes including provision and catering of special related services like physiotherapy etc. [35], [36], [37]. The Sarva Shiksha Abhiyan (SSA) advocates for the implementation of a zero-rejection policy, introduces the idea of inclusive education for such children with impairments. The Shiksha Abhiyan is focusing on

these kids to ensure that every child, regardless of type or group of impairment, receives free education in the appropriate environment [38], [39], [40], [41].

According to the Right to Education Act (RTE) of 2009, all public and private schools are required to accept students with impairments or disabilities and to provide them with free, uninterrupted education up until completion [42]. Children with impairments are given priorities and equal oppurtunities for accessing literacy in inclusive education under the RTE and the PWD Act (1995). Therefore, Indian schools either public or private are not allowed to refuse entry or education to such disabled CP children [4], [43], [44].

Despite their high levels of intellect, many CP children struggle to perform well in school, and the parents, caregivers and instructors who work with them often feel frustrated and helpless. It is therefore appropriate that these kids be identified early and provided the appropriate physiotherapy management [45], [46].

Clinics and rehabilitation centres can now reliably implement the interdisciplinary concept of technology among kids with CP [47], [48] . Technology simplifies life for the majority of individuals and opens up new rehabilitation possibilities for individuals with impairments and disabilities [49], [50]. Students with motor disabilities can profit greatly from an assistive technology and inclusion programme enacted at an inclusive school as a wonderful option to traditional therapy [51]. Access to and utilisation of cost effective, accessible and affordable assistive technology is a human right recognised by notable governing draft as per the RPWD act, 2016 [4], [52]. Digital and advanced technical solutions are now standard and are being used more and more in rehabilitation. Millions of individuals with disability throughout the world effectively use online telerehabilitation programmes as assistive technology for rehablitation [53].

The main aim in management of CP is to increase functional independency by improving motor capabilities by maintaining the health in locomotion, cognitive development and social interactions [54]. In this situation, the therapist's collaboration with the special educator is crucial in modifying the setting for these children and giving them access to alternative therapeutic strategies using ICT to allow

involvement in routine classroom activities [55]. It is critical to adopt cutting-edge and affordable management which employ ICT in order to handle bodily impairments and disabilities in CP [56]. However, Governments still lack resources and have not given rehabilitation a high priority. This position is not surprising because rehabilitation is frequently viewed as a backup plan as preventative, promotive or curative management [57].

Rural and suburban areas are the priorities after the metropolitan cities regarding the access and delivery of rehabilitation and physiotherapy services via technology offering significant benefits to physiotherapists and the patients [58]. In the light of technology, video teleconferencing provides a low cost solution for screening in urban areas and also a mode to improve educational and therapeutic services to children in rural areas [59]. Telehealth service delivery model possess increased accessibility of services living in the remote or rural areas, also preventing unnecessary delay in care, reducing transportation barrier [54], [60]. CP children revealed the feasibility of training through internet by bringing neuroplastic changes in brain. CP children require a team approach by multifaceted management strategy to bring this change and this is possible by providing management through internet [46].

This increases the need to find these pupils and provide tele-physiotherapy in order to give them extra attention for their overall growth. The area of inclusive tele-physiotherapy has been least concern in India for children with CP based on Individualized Education Plan (IEP) objectives to get functional freedom and scholastic success by minimising physical disabilities in children. Tele-physiotherapy is a relatively new approach to treat and monitor bodily impairments in CP children in a classroom setting. The development of a stronger and more effective intervention strategy for tinies CP would take advantage from nature of tele-therapeutics in educational environments.

Finally, it is hoped that by including i-TelePT in their curricula, this study will provide data on treating CP children via telephysiotherapy in schools of District Mandi, Himachal Pradesh which is lacking at National and International platform and will help in closing the rehabilitation gap about this innovatory intervention. Children with CP enrolled under schools may benefit more from an individualised tele-

physiotherapy plan. By bridging the gap between physiotherapists and the inclusive education sectors in HP, findings of study will add to the body of knowledge and literature on inclusive tele-physiotherapy in India and internationally and will aid in the formulation of new policy for this category of children.

1.2 Research Problem

Cerebral Palsy is a physical disability particularly an umbrella term referring to a cluster of ailments and associated conditions influencing the child ability to move [50]. In contrast to many other disabilities, CP affects mobility which can be painful and exhausting for children [61], [62]. As a result, teachers may feel difficulty in making accommodations for CP students based on their physical traits and find it difficult to student's engagement in and performance at school [63], [64], [65].

To ensure proper development of crucial life skills, educational services and support must start as early as toddlerhood. Every parent hopes for their child to develop societal independence, but they don't want their special children to lose out on their education. Every parent prioritises the health through therapeutics and schooling of their kid in comprehensive manner.

For children with CP, there aren't enough cost effective, accessible physiotherapy programmes accomodating modifications and adaptation in schools and its environment. The lack of adequate physiotherapy programmes in schools for children with CP as a component of school-based physiotherapy, whether through management camps or programmes in schools, appears to be a significant gap for greater involvement of such kids in educational environments.

The majority of upper classes of society receive therapy from privatized health care centres while the wage earners receive care from public institutions. In context of rehabilitation of such children, Government aided physiotherapy clinics offer management that are comparably less expensive, however there is a substantial queues of patients and long hours waiting period. The difficulties to the rehabilitation of neurological disabilities in India include a lack of economic resources, transportation challenges, exigent climate and unfavourable geographic circumstances. All these factors bring a catalyst of thoughts of economically viable

management for children with CP via digital platform to enhance functional capacities in inclusive educational settings.

Individualized tele-physiotherapy therapy programme might be more appropriate for CP children in school settings. But there is no structure available of inclusive school based management of school going or home based CP children via technology around the globe. Therefore, to keep up with current school based physiotherapy management and ensure effective administration of RTE act (2009) to promote inclusiveness, it is necessary to create comprehensive tele-monitoring in physiotherapy programme by offering in inclusive education set up as Inclusive Telephysiotherapy (i-TelePT). The research will assist in developing an effective intervention strategy based on IEP objectives and managing these kids using technology in a classroom setting.

1.3 Rationale

According to WHO (2002), international categorization of Functioning, Disability and Health for school-aged peers with CP, their health problems and associated environmental variables like surroundings, i.e. school, interact dynamically [66], [67]. Based on the ICF paradigm, physiotherapist works closely with CP children promoting their participation, offering therapeutic management and coping with impairments in the pertinent setting through participation. Regarding therapeutic interventions for CP kids, ICF has served as shared forum for therapists as well as families [68], [69], [70]. Physiotherapy may have an influence on their scholastic achievement as well as their ability to meet their recreational, occupational and societal objectives [71], [72].

The RTE (2009) bill and the RPWD (2016) legislation both make primary school education compulsory and guarantee that every kid with a disability receives an education in a setting that is suitable for learning. As a result, it is suitable to identify these children as soon as possible and to provide them with the necessary physiotherapy care to resolve their problems [4], [42].

Today is time of technology and around the world; every organisation is favouring technology for Persons with Disabilities to optimise their functioning and forcing them to work independently with dignity. Recent studies have shown the impact and significance of technology in getting independent functional outcomes for such special children [73], [74], [75], [76], [77], [78], [79].

In India and other countries around the world, inclusive tele-physiotherapy for kids with CP who are working towards functional independence and scholastic success by minimising physical disabilities has not received much attention. This innovative ground breaking research is a move towards identifying unidentified and unmanaged children with CP in government schools and managing them in an inclusive manner through technology, all while bearing in mind the digital India campaign in school environments, particularly in hilly geographical areas of Dist. Mandi, Himachal Pradesh.

1.4 Research Significance

The field of Tele-physiotherapy as a mean to treat and monitor the physical impairments in CP children in the school environment is recent. The special educators especially recruited for these children can manage them well in school scenarios. Knowledge of nature of tele-physiotherapeutic in school settings would be helpful in developing better and efficient intervention plan for such kind of children with C.P. The understanding and knowledge of CP would make special teachers aware to take appropriate measures regarding such children and to maximize their potential in relation to those normal peers in classroom.

Telephysiotherapy could be effective and beneficial to children with CP residing and studying in far flung remote areas and boon for adverse weather conditions. The physiotherapist can give students with CP a thorough orientation about the workout programme, which can be accessed by mobile device, tablet, computer, video call, and pre-recorded video content. Through technology, the physiotherapist may precisely track the patient's improvement after each session. This makes it possible for the expert to observe the adherence of patient in respect to training regimen.

The research will assist in developing an effective intervention strategy based on IEP objectives and managing these differently abled children using technology in a classroom and school setting. Finally, it is anticipated that this research will cover a gap in the sparse literature and create an out-of-date body of knowledge on telephysiotherapy around the globe by serving as the foundation for digital therapy systems for the disabled in isolated and unfavourable geographic regions.

1.5 Research Questions

Question 1

What are the somatic disablements in children with CP in inclusive education environments of District Mandi (HP).

Question 2

What are the key requirements of implementing telephysiotherapy in inclusive education system.

Question 3

How does face to face special training & guidance on management through monitoring of special educators will help in reducing physical impairments in CP children?

Question 4

Will it be clinically feasible to implement i-TelePT in inclusive education system and evaluate its effectiveness in limiting physical impairments and developing movement skills to improve functional outcomes in general schools of Dist. Mandi, Himachal?

1.6 Research Objective

General Objective

To develop inclusive tele-physiotherapy (i-TelePT) based intervention and monitoring modules and to test its effectiveness for management of physical impairments among children with CP in inclusive education setting.

Specific Objectives

Phase - I

a) To determine the current status of physical impairments in children with CP in inclusive education system in district Mandi, Himachal Pradesh.

Phase - II

b) To determine the need, content and structure of i-TelePT module and development of module for management and monitoring physical impairments in children with CP through focus group discussion.

c) To provide face to face special training & guidance on management through monitoring and testing the satisfaction level of special educators.

Phase - III

d) To evaluate the clinical feasibility of i-TelePT in the management and monitoring the physical impairments of children with CP.

e) To evaluate the perception and satisfaction of special education teachers on i-TelePT in inclusive education system.

1.7 Research Hypothesis

Hypothesis 1:

Null Hypothesis(H_0): Does the somatic disablements in children with CP not improve with complexity of inclusiveness in education environments in District Mandi (HP).

Alternative Hypothesis(H_A): Does the somatic disablements in children with CP improve with complexity of inclusiveness in education environments in District Mandi (HP).

Hypothesis 2:

Null Hypothesis(H_0): Does special training & guidance on management through monitoring of special educators via developed module through FGDs not help in reducing physical impairments in CP children in District Mandi (HP)?

Alternative Hypothesis(H_A): Does special training & guidance on management through monitoring of special educators via developed module through FGDs help in reducing physical impairments in CP children in District Mandi (HP)?

Hypothesis 3:

Null Hypothesis(H_0): Inclusive Telephysiotherapy (i-TelePT) is not clinically feasible & effective for treating and monitoring the physical impairments of children with CP in inclusive education settings in District Mandi (H.P).

Alternative Hypothesis(H_A): Inclusive Telephysiotherapy (i-TelePT) is clinically feasible & effective for treating and monitoring the physical impairments of children with CP in inclusive education settings in District Mandi (H.P).

1.8 Novelty of Research

The contemporary research is expected to accentuate the uniqueness of i-TelePT for observing and managing physical deficits in CP children in school environs. This novice component in school atmosphere is in recessive mode despite the growing evidence of Telemedicine in India and across the world. Telephysiotherapy, which maximises the use of healthcare resources and enhances quality of life of patient, has been demonstrated in research to offer many advantages to both the health system and patients. The fundamental goal of telephysiotherapy is to remove the different obstacles that can prevent the child or patient from receiving management. Even in COVID 19 pandemic phase, Telephysiotherapy was a better therapeutic option to treat various ailments. The concept of i-TelePT will be a novel platform to improve physiotherapy services for children with disabilities through technology in schools

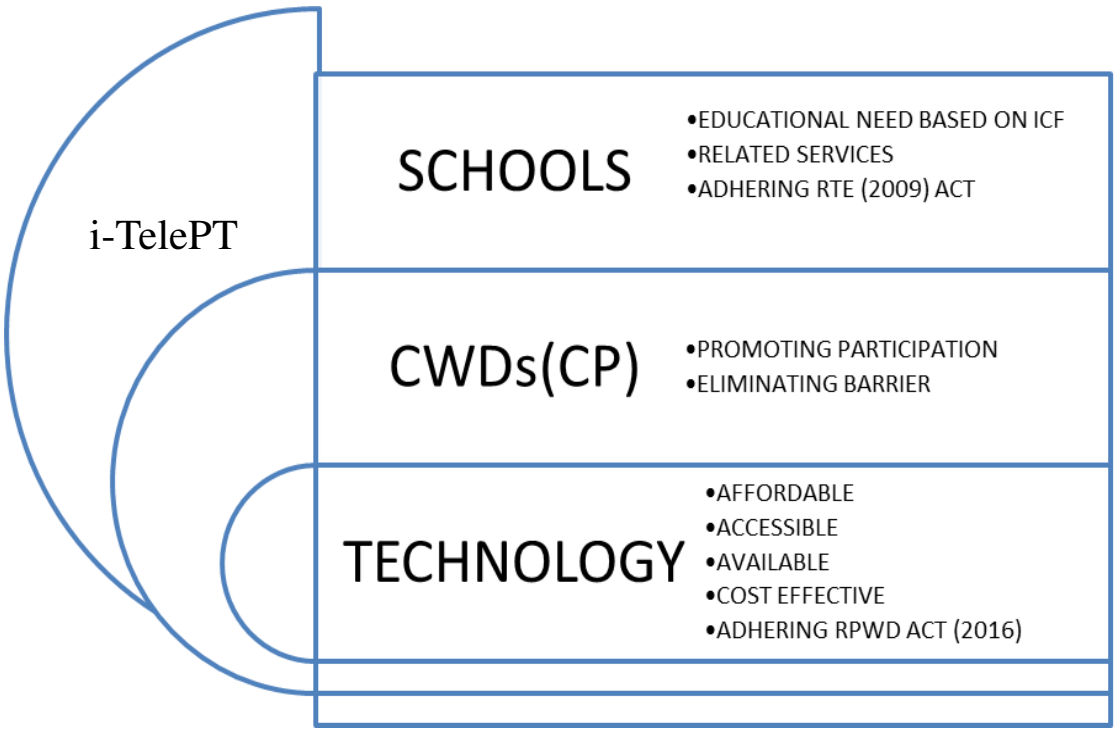


Figure 1. 1 Novelty of i-TelePT in Schools

Assessment and examination of children with CP in inclusive educational settings helps to find out a cross-sectional picture of present physical profile of these children

in educational settings. It is hoped that descriptive nature of phase I of study will help to identify the extent of different impairments experienced by children.

A qualitative focus group discussion (FGD) with special educators in phase II highlights the dynamic implications of content and structure of i-TelePT module for CP kids in educational environments appear to be further meaningful in relation to both therapist and educators who are unable to visit the children. In general considering the paucity of research studies in particular area of Telephysiotherapy, the findings of present study will provide much needed information for physiotherapists, special educators, parents and procedural implementation of i-TelePT framework in phase III for CP children as part of fulfilling therapeutic component activities in school settings.

CHAPTER- II

LITERATURE REVIEW

The aforementioned section provides the current evidence of the literary review related to epidemiology, classification, associated complications, Cerebral Palsy, ICF–CY framework of CP, physical assessment including gross and fine motor skills, management of CP encompassing adjunct therapies. Consequently, publications in the field of telephysiotherapy are very limited. This will be achieved by providing an overview of the scope of tele-physiotherapy and its significance in school settings. Summary of relevant points are presented here under various heads.

2.1 Epidemiology of Cerebral Palsy

The birth prevalence of preterm and periterm cerebral paralysis across countries with high incomes (HICs) had been 1.5 per 1000 (95% CI: 1.4-1.6) births that were live, reported in a meticulous systematic analytic study whereas in postnatal CP, birth rate expanded to 1.6 per 1000 (95% CI: 1.5-1.7) live deliveries. Earlier Global prevalence of CP has been reported 2.1 cases per 1000 live births and prevalence of this condition is particularly high in nations with low or middle incomes [80]. This prevalence rate in population based studies was approximate 1.8-2.3/1000 children in Europe, Australia and United States but was reported 2.9 & 3.6 cases per 1000 in Uganda and Egypt respectively [81], [82], [83].

National register on CP and population based studies in Europe, Australia and USA reported the CP cases arising due to preterm birth, birth asphyxia, obstetric complications, neonatal jaundice and infections [83]. In African communities, neonatal infections, perinatal complications due to poor medical infrastructure accounted as etiological factors of this neurological disorder [84]. This neuromuscular impairment is more frequent in countries with middle and low incomes owing to a higher percentage of early mortality together with associated morbidities and also because of the economic burden posed by the expensive nature of health services. All factors like economial, geographical and societal impediments hinder these children

with CP in these developing countries from accessing medical and rehabilitation therapies [85].

The incidence of CP within nations wherein Arabic is their primary language reported 1.8/1000 live births (95% CI: 1.2-2.5). The most common motorcategory owing to the collected information was spastic CP, resulting in 59.8% (95% CI: 46.2-72.7). Inclusion rates for children with spastic quadriplegia, diplegia, and hemiplegia were 25.1% (95% CI: 18.2-32.8), 16.2% (95% CI: 11.4-23.3), and 10.4% (95% CI: 7.3-13.8). The percentage of cases of high consanguinity as an etiological factor was estimated to be 37.7% (95% CI: 29.3-46.6) [86].

However, surveys carried out in Asian nations like China and Hong Kong have revealed an overall prevalence of CP between 1.3 and 1.6 instances per 1000 children, which is lower than that documented in western nations [87]. The data was retreived from low & middle income group nations covering Bangladesh, Ghana, Indonesia and Nepal between 2015 to 2019 revealed that proportion of CP cases are very high in these low middle income countries and the children don't have good accessibility of rehabilitation and medical facillities to fight againt infections at birth time [88].

Comparatively speaking to the rest of the globe, CP literature is scarce in emerging nations, particularly in India. In the Indian subcontinent, a number of factors, including discrimination based on gender, a weak familial assistance system and socioeconomic profile, exert an enormous effect on treatment revealing a connection between the sociodemographic profiles of CP patients families [3].

In the Indian subcontinent, the estimated prevalence of CP is in mostly urban (2.29), rural (1.83) and mixed (4.37) respectively [89], [90]. An Indian study was carried out in R.S. Pura, a locality in Jammu City, as part of a population-based, cross-sectional surveillance depicted a crude prevalence rate of 2.27/1000 live births [91]. According to a different Indian research, there are 3 instances of childhood CP for every 1000 live births. Due to many causative variables, the frequency and pattern of CP vary between different geographic locations [92]. Additionally, a different Indian study

from the state of Rajasthan stated that CP is the primary cause of impairment, with an incidence of 1–6 per 1,000 live birth [93].

2.2 Etiology of Cerebral Palsy

Cerebral Palsy also named as brain paralysis is one of eminent neuromuscular disability affecting locomotor ability of children in schools of developing country. Cerebral Palsy (C.P) term was initially used by *William Osler* in 1889 and it was described by the *William Little* in year 1862 [1], [94].The illustrative meaning of CP is "an abnormality of posture and locomotion consequence of a gash of immature brain".The recommended definition is 'CP encompasses an assortment of unprogressive wide-ranging persistent motion and posture-related deficits which impede activity limitation occurring in developing brain of fetus or infant' [95].

CP encompasses a range of neurological ailments which appear to be non progressing leading to motor ailment caused by injury to developing brain in first 3-5 years of life [96], [97]. Non progressive nature of this disorder signifies that brain lesion does not induce ongoing degeneration of brain. In lay terms, although brain itself does not get nasty, children with CP usually change over time [98], [99].The motor dysfunction is accompanied by activity limitation and restricted participation [100], [101], [102] accompanied with sensory disturbances, communication problems, cognition difficulties, poor perception, epilepsy and other associated musculoskeletal complications [103], [104], [105], [106], [107], [108].

The contributing factors which result in CP enncompass injuries in developing brains have been categorised as prenatal, perinatal and postnatal depending on the period of the insult [109], [110].The prenatal is most common but etiological factors for CP are multifactorial and diverse in terms of infectious, inflammatory, traumatic, congenital, metabolic and genetic [111], [112], [113], [114]. The prenatal risk factors involve placental complications, tetratogenic exposures, premature birth, intrauterine infections during pregnancy period are leading causes of CP [115], [116]. Perinatal risk factors encompass birth asphyxia, hyperbilirubinemia, ischemic attacks, brain haemorrhages and low birth weight [117], [118]. In last, postnatal causing factors include trauma, infections, meningitis, jaundice leading to serious complications [119].

In accordance with research conducted by Hollebrandse L. N. et al., (2021), preterm newborns experienced a greater probability of developing CP due to complications like intraventricular haemorrhage (IVH) and Periventricular leucomalacia (PVL) [119], [120], [121]. Birth asphyxia or hypoxia is condition which interferes with oxygen supply to brain causing to premature delivery leading to diplegic CP [122], [123]. Preterm birth and other conditions are often caused by intrauterine infections and protracted membrane rupture leading to CP [124], [125], [126]. In CP, the probability of preterm delivery is exacerbated by exposure to pathogens such as cytomegalovirus, hypertension and foetal growth restriction [127]. Considering other possible causes of CP, that include chromosomal defects, pathogens that lead to foetal growth restriction which include malaria or HIV, preeclampsia, systemic maternal vascular illness or thrombophilia [128]. Toxoplasmosis, rubella, cytomegalovirus and herpes virus infections can be passed from mother to child and harm the brain of infant resulting in CP [126], [129], [130]. Likewise to the mechanism of CP, meconium transit is frequently brought on by the same inflammatory process [131], [132]. Perinatal ischemic strokeis an cerebrovascular accident which has been found as major causative factors of CP during foetal life as evidenced in CTs/MRI imaging except hemorrhagic stroke [133], [134], [135]. Preterm deliveries are the primary cause of congenital abnormalities in CP children [136]. Multiple gestations as monozygotic twin or triplets deliveries and their presentation are having higher risk for developing CP than singletons [137], [138].

2.3 Classification of Cerebral Palsy

The typical unprogressive motor disorder CP is linked to issues with cognition, sensation, and related musculoskeletal gross and fine motor functions [139]. Children with CP have stiffness along with tremors, weakness, abnormal posture, a lack of voluntary movements and weakness of the movement [140], [141]. Additionally, the child is having characteristics of scissoring, W sitting position and various gait deviations [142], [143], [144]. Despite various symptoms, the impairment in CP children broadly can be classified into spastic, athetoid or ataxic type [101], [145], [146], [147]. Evidently, Spastic type of CP occurring due to damage in motor cortex with symptoms of muscle tightness [148]. The overwhelming majority of kids with CP exhibit muscle stiffness or spasticity and clonus featuring main clinical symptoms in spastic variety. The velocity-dependent boost in the tone of muscles known as spasticity is also accompanied by hyperreflexia, which is brought on by the stretch reflex's excessive excitability [149], [150].

In contrast, injury to the basal ganglia, a region of the midbrain, results in athetoid CP manifested by poor tone in muscle with floppy limbs and ataxic CP is due to injury in the cerebellum resulting in shakiness, poor balance [151], [152], [153]. A smaller percentage of children with CP demonstrate extra pyramidal features including athetosis, chorea and dystonia despite normal intelligence [149], [150]. The child can be hemiplegic, diplegic or quadriplegic based on number of limbs involved [101], [154]. Apart from the main features, CP children can have associated visual, hearing, epilepsy, growth issues, dental defects and intellectual problems [155], [156], [157].
Classification of CP categorizes the children into groups to find the characteristics, severity of problem based on symptoms and limbs affected to predict the prognosis and functional status of children [146]. CP is mainly classified into four broad categories on specific components of clinical manifestations are commonly described as:

Topographical classification- The allocation of how many body limbs are used forms the basis of this categorization. The most common descriptive terms used for

classifying CP are Monoplegic, Diplegic, Triplegic, Tetraplegic/Quadriplegic, Paraplegic and Hemiplegic [158], [159].

Physiological classification- Functionally, CP can be divided into spastic and non spastic types which affects corticospinal tracts [148], [160].

A) Spastic type (Pyramidal) – The lesions or injury which affects the corticospinal tracts occurs in motor cortex of frontal lobe of brain. It is one of the most prevalent kinds of movement dysfunction and it is distinguished by increased muscular tension due to resistance in passive stretch, exaggerated deep tendon reflexes [145], [161], [162].

B) Non Spastic (Extra Pyramidal) – This type of CP affects other regions of developing brain and can be further classified into Athetoid, Ataxic and Mixed varieties [163], [164]. The symptoms of athetoid or dyskinetic CP include uncontrollable movements and variable muscle tone. It occurs due to injury in basal ganglia region of mid brain [164], [165]. On the other hand, ataxic CP occurs in 5-10 percent of individuals and is characterised by ataxic movements, drunken gait, poor balance It occurs due to lesion in cerebellum, a part of hind brain [153], [164]. Mixed CP occurs due to involvement of spastic and dyskinetic movement disorder [162], [164].

Based on severity of symptoms- The CP can be further classified into three types based on severity noticed as degree of involvement of motor impairments as mild, moderate and severe [166]. In mild CP, the child can move unaided and can engage in all of his or her regular activities. A youngster with moderate to moderate CP will require braces, drugs and adaptive technology to carry out daily tasks. A child with severe CP will need a wheelchair and face great difficulties performing basic everyday tasks [167], [168].

2.4 Associated Complications with Cerebral Palsy

Understanding heterogeneous nature of disorder, these kids can have associated co-morbid conditions along with motor impairments which hamper the complete physical development of child. The various associated anomalies are:

Visual impairment- Damage to the visual cortex of the occipital lobes can cause cortical visual abnormalities. Children suffering from CP have the risk of acquiring visual impairment, especially retinopathy of prematurity [169], [170], [171], [172], myopia, strabismus, glaucoma. Children who have strabismus may develop amblyopia, a permanent loss of monocular vision. Ophthalmologic screenings are frequently suggested for these CP youngsters, especially when vision loss is suspected [173], [174].

Hearing & Speech impairment- The risk of hearing loss is exacerbated by a number of etiological factors including kernicterus [175], post-meningitis and congenital rubella [176]. If hearing loss fails to be recognised and treated at an early stage, it can delay growth and make rehabilitation more difficult [177].

Intellectual Disabilities- All children with CP are not cognitively impaired [103] but youngsters with spastic quadriplegic CP have more severe intellectual issues [50], [157], [178], [179]. Similar to this, epilepsy and cortical abnormalities are two additional variables linked to higher cognitive impairment [105], [108], [180]. David Cummins and colleagues (2021) in their study found that children with bilateral spastic CP have a considerably greater rate of severe intellectual impairment than children with unilateral spastic CP [181].

Epilepsy- A study done by Piero Pavone and others in (2021) evidenced that epilepsy with onset in the first year of life affects up to 36% of children with CP [106]. The most typical signals detected in investigational measurements with abnormalities in the EEG include focal seizures, which can occur either with or without subsequent generalisation [182]. When an individual experiences quadriplegic or hemiplegic CP, epilepsy could represent an indicator severity of neurological impairment. Because the pathology in children with spastic diplegic CP mostly affects the periventricular white matter, they are less likely to develop epilepsy [180], [181].

Swallowing problems- Oropharyngeal dysphagia (OPD) affect between 19% to 99% of children with CP can have impact on a child's general health, development and nourishment [183]. During oral feeding, children typically remain at risk for aspiration, which might have negative effects on their lungs. A larger swallowing problem is probably to be expected in kids with spastic quadriplegia [184].

Drooling of Saliva- Drooling is a serious issue which affects up to 30% of children with CP [185]. Saliva production has increased because to various discomforting lesions including dental caries and throat irritation and secondarily because of pseudobulbar palsy [186] . Aspiration, irritation to the skin and difficulties with articulation may culminate from drooling, which is not socially acceptable [187].

Stunted growth- Children with CP may have growth and nutrition issues putting effect on psychological and physiological health function [188]. Hence, it would be a mistake to undervalue the preponderance and effects of eating issues in these kids. A study conducted by PB Sullivan in (2013) depicted that 85% of children with spastic quadriplegia had eating problems and it was founded that $2/3^{rd}$ of these kids were stunted and 44% had poor fat storage [189].

Behaviour problems- Children with CP were more likely to experience emotional & peer issues, social disengagement, attentional issues or antisocial conduct. These psychological problems might have an adverse effect on their standard of life for the kids and their family members [190]. Due to CNS damage, children may exhibit behavioural, emotional and withdrawal symptoms as well as increased reliance, according to carers or parents [8], [89].

Learning difficulties & Cognitive problem- Since learning difficulties develop throughout childhood and adolescence as a result of cognitive decline that adversely impacts their well-being in life engagements and later on socio-professional integration [191]. Children with diplegic and quadriplegic spastic CP develop learning problems more frequently than other children [192]. Although the majority of CP patients demonstrate mild to moderate deficits in attention, executive functions and

visuo-spatial ability and these deficits impede academic growth and the majority of CP patients still do better on verbal than on non-verbal tasks [193], [194].

Sleep disturbances- The difficulties embracing beginning and maintenance of sleep, the transition from sleep to wakefulness, excessive drowsiness and arousal are more common in kids with CP [195], [196]. The most common type of sleep issue affects the standard of life of children includes problems in the beginning and ongoing maintenance of sleep [197], [198]. Sleep issues may be caused by muscle spasms, other musculoskeletal discomfort and a reduced capacity to change position throughout the night and antiepileptic medications can produce daytime drowsiness and epilepsy, linked with CP, is known to disrupt sleep physiology and dispose to sleep disorders [199], [200].

Gastrointestinal (GIT problems)- The onset and progression of musculoskeltal impairments like oral gut motor functions due to spasticity in muscles consequence the well being of children with CP. The common examples of this problem are gastric reflux illness and constipation in children [201], [202].

2.5 ICF– CY Framework and Cerebral Palsy

International Classification of Functioning, Disability & Health is bio psychosocial model reported by WHO as a guide for representing health status of children & youth suffering from CP (ICF-CY) gripped from basic ICF model, which was introduced by the World Health Organization in 2001, was unquestionably innovative [203]. This model is used as conductor for evaluation and treatment programme for children with CP [66], [204]. This specific model highlights the human functioning (body functions and structures, activities and participation) due to consequences of inter linkage among circumstances of health (diseases/disorders) and accompanying factors [68].

The main aim of the ICF Core sets for children and youth with CP is to delineate level of functioning of children with barriers and facillitators. This ICF –CY model outlines the performance of daily activities of children and their participation in school or at home environment [205]. The particular standardised frame is rooted on alphanumeric coding system where letter b denotes body functions, s stands for body structure, d for activities and e stands for environmental factors as shown in figure 2.1 The age group of children and youth with CP is between 0-18 years in ICF core sets including 135 codes [70]. The fundamental terms applied in ICF-CY are as follows:

- Physical impairments are changes in bodily structures and functions that are caused by anatomical, physiological or psychological factors.
- Bodily functions are physiological processes carried out by bodily systems. Body structures are anatomical parts of body.
- Activity is any specific task performed by the individual.
- Participation is to be with in life.
- Activity limitations are the difficulty during activities in the life of individual.
- Restriction in the participation is the problem that an individual may encounter.
- Environmental factors builds up physical, social or intellectual factors in the environment of individual.

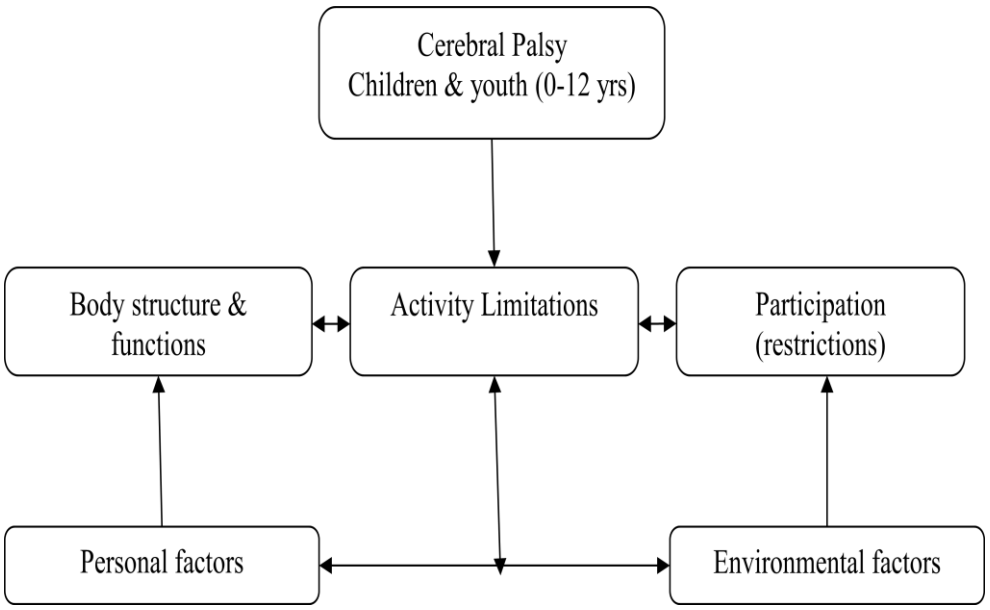


Figure 2. 1 International Classification of Functions and Disability- Children & Youth Framework for CP

This figure generally encompasses various core sets of body functions(b), body structure(s) wherein body structure of ICF-CY, the structure of brain is assessed via various imaging techniques while category of body functions reveals severe to complete impairments of CP, activities performed by children and their involvement in situations of daily living associated with environmental and personal factors [68], [205].

The ICF also considers the dynamic effects of environmental and individual factors on functions [206]. This inclusion emphasizes how a student's health status can have an impact on both their academic achievement and involvement, just like environmental and personal impediments do. By removing these obstacles, the student is able to perform and engage in class as expected, perhaps with some modifications [207]. As a consequence, the primary focus of the PT examination should focus on the pupil's capability to engage in activities regardless any disease, disability or activity restriction. The PT must additionally evaluate the influence of the student's situations, especially physical obstacles, school routines, academic and extracurricular expectations and personal behaviours such as motivation, interests and preferences on the student's capacity to participate [208].

2.6 Physical Assessment of Cerebral Palsy

The most vital component in the clinical examination is the child's medical and surgical history. The history contains details on the birth, developmental milestones, related medical issues, surgical history, continuing medicines and physical therapy treatments. The birth history contains significant information on pregnancy issues, perinatal issues such as whether the kid was born preterm, full term or post-term and whether there were any other linked risks causing hypoxic damage to the brain such as protracted labour, meconium aspiration etc.[101], [209].

Presenting complaints by the parents as motor and sensory problems in the children, delayed milestones and other associated problems, examination and brain imaging makes the base of diagnosis of CP Child [53]. The child should not be diagnosed till the age of 2 years due to alterations in the tone. History taking is important aspect of diagnosis revealing prenatal, perinatal or post natal injury to brain along with others causes [16], [210].

Blood tests and other significant test for associated problems such as vision testing, hearing and speech assessment, IQ testing, neuroimaging and therapeutic assessments are also tools for diagnosis of CPchild [117], [145], [210]. The standardised tests or tools are used in diagnosing CP children which are as below:

2.6.1 Gross motor skills

Gross motor capabilities in children with CP constitute actions of bigger muscle groups which include legs or arms, whereas fine motor skills entail movements of smaller groups of muscles [211], [212]. The assessment of these skills typically includes examination of motor functioning and development [213]. The standardized measures for these skills should be utilized to measure gross motor abilities and a few have been employed to measure gross motor abilities, as follows:

Gross Motor Function Classification System (GMFCS)

GMFCS presents a brief description of the degree of impairment, focusing sitting and walking (with assistance if necessary) and adopting age-dependent parameters. It is a five-level ordinal rating scale that evaluates a child's lower limb mobility functioning

ranging from being able to walk without support (level I) to being incapable to sustain an antigravity head and trunk posture (level V). The original GMFCS, which described children younger than 12 years old's gross motor functional skills and limits, was published in 1997 by Palisano et al. The restriction of the initial edition of this scale was that it could only be used until the age of 12 years, thus it was improved and enlarged in 2007 for the age group of 12-18 years [213], [214].

Gross Motor Function Measurement (GMFM-88)

The GMFM-88 is a clinical tool incorporating criterion-reference envisioned to measure alterations in the function of the gross motor among kids with CP [215]. This test evaluates gross motor abilities in five distinct modes: lying down and rolling about, sitting, crawling, kneeling, standing, walking, running and jumping. These measurements are trustworthy and valid. The 88 items are suitable for kids with limited motor abilities and has strong reliability and validity. In CP kid evaluations, the GMFM-88 requires forty-five to sixty minutes to administer [215], [216]. GMFM evaluates and tracks improvements in children gross motor functions from birth to 16 years of age. This applies to individuals with CP who are still developing normally at these earlier periods. However, people who are seriously impaired and unable to complete any of the test items should not take the GMFM-88. The GMFM does not evaluate hand function and only assesses the attainment of motor function. Comparatively, the GMFM-66 which has 66 test items, is a difficult instrument that requires more analytical skill and takes nearly 45 minutes [215], [217].

Modified Ashworth Scale (MAS)

This scale is a muscle tone measurement tool that does not require any special equipment and can be finished quickly. It is intended to assess the resistance experienced during passive range of motion [218], [219]. A spastic child's resistance to soft tissue stretching is measured using scale from 0 to 4 and validity and reliability of scale have been established [219], [220].

2.6.2 Fine Motor skills

Manual Ability Classification System (MACS)

The MACS are five-level classification scales for dexterity in CP children among the ages of 4 and 18 that classify both arm and hand function as manual abilities. The capacity of CP children to handle things in everyday routine activities at school or at home is primarily defined by the instrument with excellent reliability and validity. The MACS, which was developed in 2006 by Eliasson et al. has been proven to be reliable and valid and proved via several investigations [221]. Children on MACS levels I and II are able to handle things without the need of an adapted device. For autonomous object handling, level III students sometimes need support and adapted equipment. Level IV children require ongoing assistance and adaptive equipment while those on level V need total assistance.

2.7 Management of Cerebral Palsy

Since the elimination of Poliomyelitis, the childhood disorder, CP is among the most prevalent causes of childhood disabilities and impairments in Indian subcontinent [9]. Physiotherapy is most popular therapeutic intervention in CP children and plays key role in the management of CP [168], [222], [223].

Physiotherapists focus primarily on mobility and progress in gross motor abilities such as positioning, sitting, standing and moving about regardless of assistance aids in CP children. The physiotherapist plans the home treatment programmes, provide therapy and act as mediator between school environments by recommending assistive devices [224], [225], [226].Various reviews in recent time have acknowledged the physiotherapy interventions and its effectiveness in CP children emphasising on neuro-developmental therapy, muscle strengthening exercises, biofeedback and various therapeutic approaches like conductive education [16], [32], [101].

The primary goal of physiotherapyis to enhance capabilities and posture to increase educational goals of the child, making more facilitating environment in educational settings. This is gained by goal based assessment, interventions, supply of assistive devices and modifications in environment to increase the child performance to enhance educational outcome [227], [228].The management of CP children is by efforts of all rehabilitation professional making team approach [16], [101]. CP children not only managed by health professional alone but special educators also have their role in educating the children. This integrated school environment provides the greater chances to explore their potentials for CP children [55], [229], [230]. A kid with CP needs to be treated and managed for with a customised treatment strategy which involves a range of therapy [152], [231], [232]. The CP children can be managed clinically with following techniques as given below;

Musle Strengthening excercise- Children with CP can benefit from strength training by increasing their balance, flexibility, muscle strength and posture [233]. A systematic review study conducted by Merino-andrés in (2022) reveals that resistance training has been additionally associated with greater mobility and improved locomotion in CP patients. Physical therapy for CP patients may benefit from adding strength training to their regimen [15], [233], [234]. A different investigation

employed modelled musculoskeletal movements to examine children walk patterns and determine the effect of conditioning on dynamic forces generated by muscles and their contributions to whole-body motion [10]. Other findings from studies indicate that high velocity strength training is more beneficial for walking improvement than conventional resistance training. According to the findings, functional power training is a successful method for enhancing juvenile CP patient's muscular strength and ability to walk [235], [236].

Muscle Stretching exercise- Several CP patients reported flexibility and improved capacity to carry out an activity following stretching sessions [237]. In children with CP, preventive interventions like extended muscular stretching and functional training lower the chance of abnormalities because slackening muscle fibres allow for greater space for movement [238]. Stretching techniques should improve everyday function as a result of improved range of motion (ROM), postpone the onset of contractures and reduce the need for surgical intervention. This is predicated on the idea that the muscle has the capacity to produce forces throughout a wider range of motion [239], [240].

Neurodevelopment Therapy- NDT is one of the interactive, renowned problem solving therapeutic approach orthodoxed by Berta and Bobath in 1940 [241]. The NDT concept is compatible with ICF –CY model and is based on theory of inhibiting abnormal patterns and facilitation of normal patterns along with communication to limit down the motor sensory impairments to ensure normal postural reflexes and to increase functional independency in such children [11], [242]. A similar study used the NDT technique of stimulating to CP infant with motor, sensory, communication and cognitive activities [243]. In another study, it was noted that NDT is a concept of improving gross motor functional level, activity and participation level according to ICF [241], [243], [244].

Goal Directed Therapy- This therapy to CP child is hinged on the principle of motor learning [245]. In this therapy, any functional activity is organised according to the selected goal and therapist ensures the active participation of child. For kids with CP, GDT showed measurable improvements in Quality of Life (QoL) and gross motor function [246], [247], [248]. In a study done by Turker et al., in year (2015) revealed

that the execution of training for the chosen goal-directed activities by the physiotherapists who underwent basic Bobath training for 8 weeks was the study greatest benefit [249].

*Constraint Induced movement Therapy (CIMT)***-** The therapeutic approach blossomed by Edward Taub emphasising on repetitive use of upper limb. Initially the technique was used for hemiparetic adults patients for breaking learnt non use pattern [250], [251]. The key principle of CIMT verging in therapies constitute constraining healthy upper limb movements; hard practice and shaping of behaviour [252]. According to a study by Roberts et al., in (2022), CIMT administered repeatedly to children with CP resulted to improved hand functions and bimanual ability, this study investigates the dose-response relationship in the CIMT protocol [253]. Based on ICF–CY model, CIMT increases the participation of child in particular activity and brings functional changes in CP hemiparesis patients [254], [255]. Moreover, a research investigation carried out by Durand et al., (2018) demonstrated that CIMT is beneficial in improving the functional capacity of the afflicted upper limb and occupational performance of children with hemiparesis [256].

*Virtual technology (VR)***-** Virtual technology is component of technology emphasising on interactive games reinforcing motor learning and cortical plasticity [257], [258]. VR improves both motor skills in CP children with repetitive task training based on specific parameters and motivates the CP child to participate in activity which the child cannot perform in natural environment [259]. In a research carried out by Luna Oliva et al., described an Xbox 360 KinectTM-based technology was employed for making upright position and day to day work in CP children for 8 weeks, yielding positive benefits [260].

*Hydrotherapy***-** Hydrotherapy is the intervention applied by using the mechanical properties of water under the supervision of therapist [261], [262]. Although the term hydrotherapy can be replaced with other key terms as; aqua therapy, aquatic rehabilitation, pool therapy [263]. CP children can perform various slow and gentle movements allowing themselves in controlling postural movements and improving quality of life [264]. Also, it was discovered that a hydrotherapy programme significantly improved GMFM dimensions, walking speed and step length-related

characteristics. Children with CP who can walk on their own have also shown it to develop power, operational range of movement and cardiac fitness [265], [266].
A study conducted by Dimitrijevic (2012) yielded the consequence of hydrotherapy on gross motor capacity in CP children. A therapy protocol was applied for 6 weeks duration having a significant result on motor skills [267].

2.7.1 Institutional or School Based Management

To maximise function across the lifespan, CP children need attention from a variety of disciplines in school contexts. Educational institutions or schools are the place where services are required to be offered to children and families without charge [4]. Children with CP frequently get therapy at schools, despite the fact that this environment is sometimes misinterpreted [268].

CP children experience various physical impairments and disabilities in the form of pain, spasticity, in-coordination, postural problems, poor balance and gait affecting functional capabilities. The particular physical impairments hurdle the children in various curricular & cocurricular activities in schools [5], [8], [228]. In an integrated rehabilitation process for children with CP, the involvement of the school is crucial [269]. The processes of education and rehabilitation both are complementary and sneaks the novel way of communicating, functioning and growing academic and motor content of children [270], [271].

Students with CP do both academic and non-academic activities while functioning in educational institutions. The practical autonomy in kids with CP in mainstream education settings is measured through inclusive educational environments [272], [273]. The phrase "inclusive education" adopted by ‘UNESCO’ and is derived from the phrase "education for all," including gifted special children [30], [274], [275]. For all children, regardless of background and disability, in the mainstream school, inclusive education promotes all-way participation through suitable policies, providing good infrastructure, positive approach and necessary adaptation in curriculum [276], [277]. Therapist and educators both support the children with CP who have academic issues [274], [278] along with physical, intellectual and social problems in school in achieving functional independence [6], [279]. Physical

development, cognition, social integration & communication abilities are crucial in school participation. In order to achieve all physical domains for school readiness, an early identification through proper assessment and intervention is required at school for the children [279], [280].

The School-based Physiotherapy assessment based on 4 pillars provide deep conceptual foudation for clinical judgement as shown in figure 2.2. The first part of pillar is the elements of patient management in which the student strengths, limitations and needs are determined by the physiotherapist using clinical judgement by proper examination [24], [210], [281]. The second pillar, particularly relies on the ICF, promotes the participation of students based on their strength and abilities over impairments and disabilities. The various environmental factors plays a key role as facillitator and barrier of their participation in activities [203].Third pillar is the collaboration of therapist with the IEP team to discuss the child performance with other members at school under Individuals with Disabilities Education Act (IDEA) to evaluate the pupils compatibility for special education services as well as the curriculum of the students individualised educational programme [281], [282]. Last but not least, when conducting assessments or providing school based therapeutic intervention, specific rules must be observed by each school and school system to abide the state and district laws, policies and guidelines which is advantageous to develop a standard method of recording assessments in school as shown in figure 2.2 [283], [284], [285], [286].

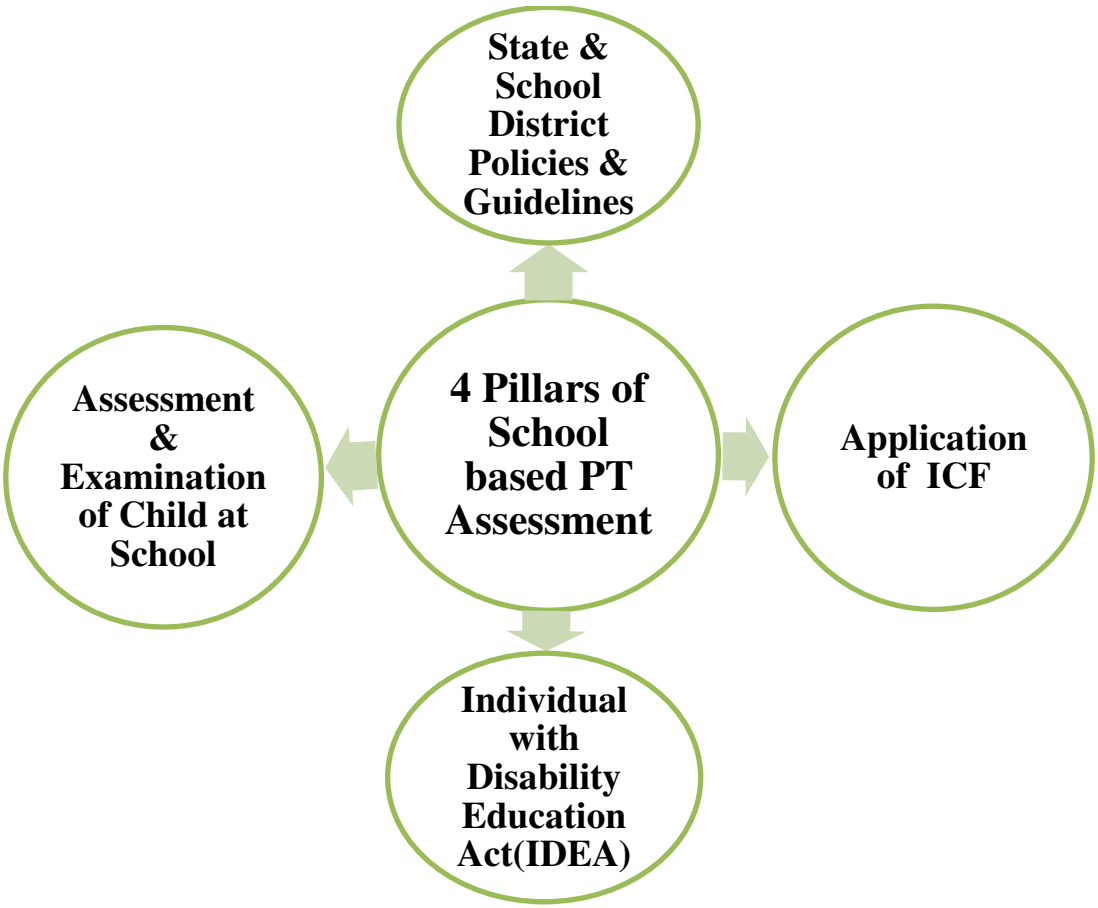


Figure 2. 2 Pillars of School Based Assessment

In consonance with RTE Act (2009), the Indian Government contended that each and every special child with diverse need should be given education in mainstream schools but certain body impediments in such children put obstacles in fully participating in academic as well as non academic activities in school environs [18], [35], [287]. The literature proclaimed the betterment in neurological impairments when these special children join numerous activities in school with other normal peer group [288], [289], [290]. Nonetheless, special educators play an significant role in handling and managing C.P children in proper sitting posture, modyifying hand grip for writing and assist in employing certain useful techniques inside the classroom that foster fine as well as gross motor abilities [6], [191], [291], [292]. Regardless of it, special educators design individualised education plans (IEP) for CP kids but rather lack a handful practical strategies for executing rehabilitative activities and excercises [281], [293], [294].

Therapists play an essential members of rehabilitation programmes in communities (CBR) that provides instructions and knowledge pooling to educators at educational institutions for the care and treatment of pupils with CPs in managing their difficulties with movement [295], [296], [297].Teachers and other staff may receive indirect instructions and consultations from physical therapist for children in the classroom regarding diverse problems [298], [299]. Similar study conducted by A Haris in (2018) revealed that teachers acquired new techniques from the occupational therapist and found ways to incorporate these techniques into their regular routines for students with special needs in their classrooms [300]. In school environment, the physiotherapist fraternizes with teaching faculty for their advice and endowment facilitating inclusion and adaptation of these children [301]. Nevertheless, this kind of instruction does not possess premium amenities that incorporate broad examinations of the body, rehabilitation exercise implementation and continuous observation of bodily abnormalities [302].

Earlier, the findings of study done by Kotze (2009) disclosed that therapists were combining the medical model of support with an encompassing strategy based on the ideas of the framework for promoting health. Some therapists claimed that they were unsure of their responsibilities when delivering duties in regular schools. Therapists were unsure of whether to provide direct help as one-on-one therapy or indirect support like counselling with educators at schools [303].

Musculoskeletal requirements and demands for students can be addressed & accommodated within educational contexts through providing frequent therapy sessions within an unimpeded atmosphere [304]. The physiotherapist collaborates with school teachers and indulge these children in individual or group activities to promote physical and social well being [305], [306].

Educators need physical therapy expertise to expedite and enable the integration among pupils experiencing mobility challenges in accessible educational surroundings. The implementation of therapy support to educators in the context of practicable managing techniques and clinical expertise would come handy in the support of students. Therapists might have a significant part in delivering necessary

instructions to teachers with the aim of enhancing their capacity to deal with students who have physical challenges in the learning environment [28], [307].

CP children can go to normal regular school along with other normal children in inclusive set up [27], [38]. The children attending regular school can have normal intelligent quotient level with restricted physical impairments and disability. The curricular and co-curricular training including therapeutic services provided to children in school settings flourish their personal and social life [308]. Physiotherapist in school settings solves the various issues of children specific to their need and imparts mobility skills training, balance activities training etc. The therapeutic services are imparted based on IEP of child designed by the combined efforts of team having special educators, therapist and psychologists etc [282].

Rehabilitation Council of India (RCI) , an apex body of Ministry of Social Justice & Empowerment contributing in development of human resources in special education, rehabilitation of CP and other disabled children in India [309]. Numerous Government and non government organisations (NGOs) institutions affiliated with RCI imparting approved training programme like diploma in special education in CP (DSECP) and other streams throughout the country to provide trained teachers so called special educators as resources to cater the number of CP children under inclusive or special set ups [309], [310].

Therapeutic interventions in the form of related services as physiotherapy, occupational therapy services are dispensed to children with CP in regular as well as special schools in developed countries [4], [311], [312], [313]. In India, such kind of benefits to this population are minimal, reason being cost of services, travelling issues, economical situation of parents [18]. An investigation done by Hurkmans HL et al., (2010) advocated that children with CP with near normal intelligent quotient, having good communication abilities and mild physical impairments can be incorporated with other normal students in general schools. Results of study revealed that these CP children achieve success when integrating with normal children in regular school [314]. Indulging CP children under inclusive education set up would

provide opportunities in achieving curricular goals easily and help in maximising their functional capacities by limiting physical impairments and disabilities [37], [315].

CP children manifest little assignation and involvement in school activities or other activities of daily living (ADLs) due to existing physical impairments and poor control on muscles. Being heterogeneous nature of CP, such kind of children should be provided the services of education, therapeutics at school level by early admission in inclusive set up [44], [228]. The major objective of rehabilitation of school going CP children is to increase functional independency in self care, mobility and limiting the physical impairments [308], [316].

2.7.2 Home Based Management

In order to support home-based education and management for exceptional children with motor difficulties, parents should involve their kids in social situations and collaborate with health specialists [317]. Numerous individual factors such as a caregiver's attitude towards CP, lack of knowledge about the condition, lack of motivation and low family involvement in the process of choosing the activities and setting goals, all contributed to a decrease in the adherence to home-based therapy [318]. A cross-sectional research investigation evaluating the effect of residential treatment programmes for kids with CP established a relationship between the parental educational attainments, their age, where they live, their knowledge of domestic support for children with spastic CP. In order to improve their understanding on how to care for children with spastic CP at home, mothers must complete educational courses [319].

Physiotherapists also use relatively limited strategies and improperly monitor and evaluate the adherence of the home-based therapy [19]. Home-based rehabilitation regimens for children with CP are feasible option according to a systematic review research done by Beckers et al., published in (2020) and revealed that parent coaching is a key element of these programmes [320]. Using a randomized control experiment, Goswami et al., (2021) illustrated that activity-based home therapy is a practical and effective way to treat people with CP, but they also argued that more extensive institutional based therapy is necessary [321].

Home-based action observation therapy and child-to-child interaction are beneficial for children with unilateral CP [322] . In the mean time, it is imperative to attend to the needs and problems of these CP children, especially those who lack access to or the financial means to pay for medical care. Nurses can instruct the community's primary carers on how to use the resources at their disposal to rehabilitate the children. In order to treat these children and prevent further problems, nurses can be responsible for identifying their requirements and fulfilling those needs [323]. Severely disabled children with CP seem to follow home exercise plans more faithfully. Carers should obtain social and medical support for the success of a home exercise routine for such children [324]. Children with CP reacted to and benefited from home programmes in a different study that examined the use of action observation therapy with this population of kids [325].

The biggest issue was persuading the frontline staff to deliver high-quality therapy services, which needed careful, professional approach. In a research study conducted in southern part of India, focused on an effective remedy for the serious issues of childhood impairment in the rural underprivileged population, where locals offered counselling to kids with neuro developmental issues at their homes as a more workable alternative. This was accomplished by collaborating with an NGO that was committed to a programme of CBR [326].

The effectiveness of the programme is strengthened when a home-based programme is combined with routine meetings with the rehabilitation team members as well as counseling and support for parents [327]. A study operated by Lorentzen et al., (2015) concluded that kids who get interactive sessions of therapy at home have better functional motor abilities and are more active when performing daily tasks [47].

The common movement disorder, CP causes long-term harm to the developing child's brain, resulting in long-term handicap [328]. A research investigation was conducted in Saudi Arabia to determine rate of adherence of mothers of CP children to home-based exercise programmes. The findings of the study indicated that therapist-assisted therapy altered the attitude of mothers of these children about home exercises [329].

Technology in the form of video-based home management programmes can help to reduce some of the difficulties associated with providing home treatment, including

the absence of frequent interaction with specialists and the requirement for support continuity [330]. Another author Chen et al., (2015) carried out a further pilot investigation on the effectiveness of VR for these CP kids at home. The objectives of this pilot investigation sought to figure out the efficacy of a home-based virtual reality (VR) intervention for kids with CP and the feasibility of using Super Pop VR, a cheap VR system, to monitor these kids progress over the course of eight weeks. The research based on Super Pop have demonstrated that kids with CP who receive VR therapy at home found it a useful diagnostic tool [331].

In a brief research done by Lamdan et al., (2020) hypothesised that the growth of telemedicine programmes would lead to efficient workflows for children with CP and advised using the "Guide-lined and Structured Continuous Care" (TGSCC) platform. Families may experience less anxiety and less irreparable physical, functional, emotional and behavioural impairment by employing such amenities on the tele-media platforms for CP [332].

2.8 Insufficient Physiotherapy Workforce in Remote Region of India

Physiotherapy plays an essential role in the delivery of both social welfare because it helps people stay healthy and fit. In order to prevent, achieve, maintain or restore optimal function and quality of life, physiotherapists work with patients who suffer mobility loss and diseases. Additionally, they operate separately from other healthcare and service providers within interdisciplinary rehabilitation or habilitation programmes. Physiotherapists uphold a set of moral principles while considering their patients' ability to live healthy lives [333].

Therefore, physiotherapists support exercise and physical activity while advancing the health welfare of both children and the general population. The therapist guards against disabilities, activity restrictions, participation restrictions and impairments in people who are at risk of changed movement behaviours because of health or medically linked issues, socioeconomic stresses, environmental variables and lifestyle factors [334], [335], [336].

Developing country like India is facing numerous problems in delivering therapeutic and rehabilitation services to people of India especially children with disabilities. Trained therapists and good rehabilitation facilities are often concentrated in urban and metropolitan cities. The geographical conditions, limited transport facilities, distance, poor economic condition are hurdles in delineating rehabilitation services to kids in school communities in rural and tough hilly geographical conditions. Patients living in remote areas cannot afford transportation facilities to nearest therapy centre or cost effective clinics [337], [338], [339].

Physiotherapy being an allied health professional with wide cognizance & large scope in India where a population of around 1.37 billions has only 0.59 physiotherapist for every 10,000 people [340]. According to the WHO, a population of 1.29 billion which is expanding continually, where there is expenditure of only 30 percent of total on public health. The physiotherapy services are dispersed mostly in urban and metro cities and yet to reach the interiors and remote areas of country as community services [338], [341].

In India, awareness is not as great as it is in other developed nations like Europe, USA, etc. despite changing lifestyles, increased trauma and other injuries. The potential for physiotherapy in India is enormous and this area of allied health that has not yet been fully explored is advancing like the sun for patients who have lifestyle problems, sports injuries etc. According to WHO statistics, there should be one physiotherapist for every 10,000 citizens in India. However, there are only 0.59 physiotherapists for per 10,000 citizens, despite the country's 1.4 lac physiotherapist requirement. As a result, there is a significant shortage of therapists in India [342], [343].

According to the overall country rating of India among 27 nations, there are 1.1 physiotherapists for every 1,000 people, with Norway having the greatest percentage at 2.5 physiotherapists for every 1,000 people and Turkey having the lowest at 0.08 physiotherapists for every 1,000 people. South Korea had the highest rate of 0.84 per 1,000 inhabitants among Asian nations and Israel had the lowest value of 0.78 percent [344]. Considering this global statistic, the minimum and highest average numbers of physiotherapists in India were found to be 0.00 per 1,000 persons.

Speaking specifically of the Indian state HP, where the current study is being conducted, it is a dispersedly inhabited state with 12 districts and an estimated population of 7,503,010 as per the statistical data for the years 2022–2023 [345]. The availability of physiotherapists in HP is extremely low compared to demand, with only 100 therapists covering the population in all districts at a percentage rate of 0.01 [346]. which is very less as compared to demand. For such children with CP in remote and hilly areas of HP, there is a great requirement for other qualified experts or interventions due to the economic load, resource constraints and physiotherapist shortage.

2.9 Technology in Inclusive Education System

Students with disabilities are given easier access to instructions and experience for reduced academic and social isolation via usage of educational technology in the classroom. The advantages of a technology gives chance to students with special needs to participate in activities in diverse educational settings [347]. With the use of technology, impaired students can engage more actively in class discussions, become more autonomous in their academic and career obligations and finish difficult academic assignments [348]. As the number of children with disabilities rises, schools making the shift to inclusive classrooms are worried about making sure all students are engaged in same set up. Previous research has found that digital technology in the classroom increases chances for participation and achievement [349]. Special education along with related services ought to be accessible to kids in contexts like educational settings, as mandated by the Individuals with Disabilities Education Improvement Act of 2004 [350], [351]. Children with CP who are in preschool age are at a crucial point in their life when it comes to physiotherapy and rehabilitation. As a result, the family and physiotherapist work together to achieve the goals of getting youngsters moving, keeping them engaged and using a goal-oriented technique [246].

2.9.1 Theories of Acceptance of New Technology in Rehabilitation

This section find the requirement to develop a Telemodel of technology for special children like CP to adopt therapies and developed model which is applicable to disability sector by considering various factors. In order to monitor and treat a variety of medical disorders, it has become necessary to accept technology in its early stages [352].

Rehabilitation has been defined as utilsation or use of existing capacities of a person or individual to do the functional activities of ADLs [353]. Various theories have been employed to explain the acceptance of technology to measure health outcomes. The Technology Acceptance Model (TAM), The Unified Theory of Acceptance and Use of Technology (UTAUT) & Innovation of Diffusion Theory (IDT) are among the archetypes applied to assess and predict the adoption and usage of telemedicine.

Technology Acceptance Model (TAM)

This Model was designed to provide the explaination of acceptance of technology in the form of computers [354]. The technology acceptance model (TAM), a theory of information systems, simulates how consumers adopt and make use of a technology as shown in figure 2.3.

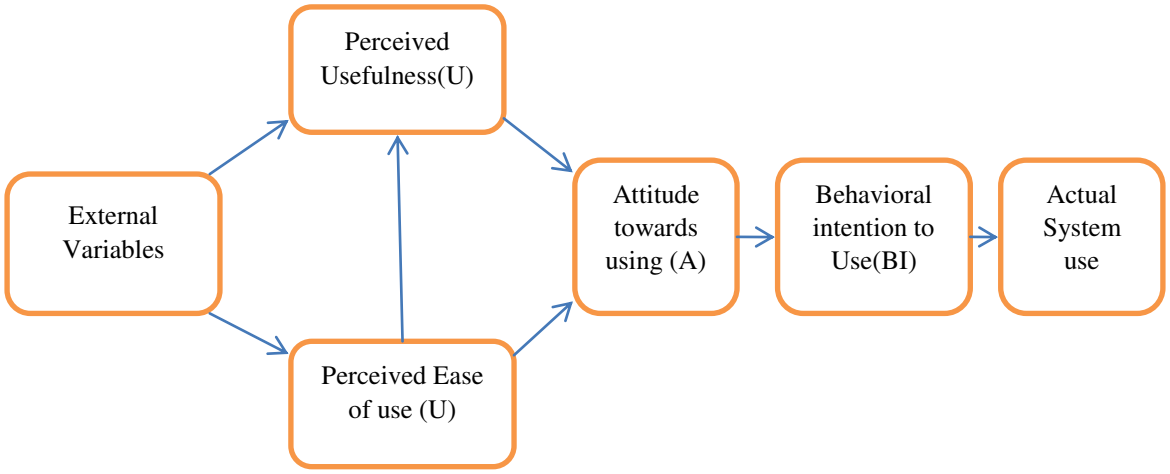


Figure 2. 3 Technology Acceptance Model

The point at which people really utilise a system is the end-user. A element that influences people's decision to use technology is their behavioural intention. The attitude (A) or general opinion of the technology, has an impact on the behavioural intention (BI). According to the concept, when consumers are exposed to new technology, a variety of factors, including the following, affect their choice of how and when to utilise the technology notably:

Perceived usefulness (PU) – According to Fred Davis, this is "the level of a person's belief that using a particular system would enhance their ability to perform their job". It refers to a person's perception of the utility of technology for their intended use.

Perceived ease-of-use (PEOU)– The degree to which a person thinks utilising a given system would be effortless. Davis percepted that if the technology is simple to use, then the obstacles have been removed. No one is fond of technology if it is difficult to use and has a confusing interface.

The two most significant modifications to the TAM constitute TAM 2 [355] and the Unified theory of Acceptance and Use of technology. The TAM has been constantly researched and extended. The impacts of perceived risk and trust on system usage have been included in a TAM 3 that has also been developed in the area of e-commerce [356]. The most often used model in the literature on technology adoption has been identified as Davis Technology adoption Model (TAM). The Technology Acceptance Model (TAM) developed by Davis has been shown to be the most prevalent model in the literature on technology acceptance [354].

The Unified Theory of Acceptance and Use of Technology (UTAUT)

The UTAUT was created to address the need for a unified viewpoint on user acceptability of technology. As part of the meticulous process used to create UTAUT, eight rival models of technology acceptance were rigorously examined. As a result, these models were effectively integrated into one model based on their conceptual and empirical similarities. The TAM, among other models created prior to UTAUT, often accounts for 40% of technology adoption. According to UTAUT, behavioural intention is directly impacted by expectations for performance, expectations for effort and the impact of society, whereas use behaviour is directly impacted by enabling factors [357].

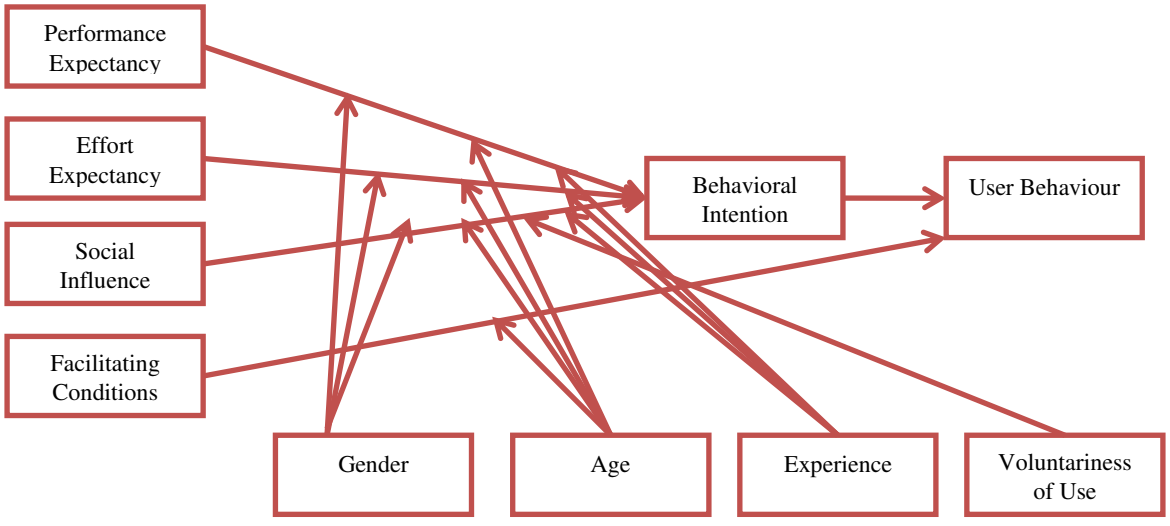


Figure 2. 4 The Unified Theory of Acceptance and Use of Technology Model

There are four moderating variables that affect the central relationships in the model. Age is considered to affect all four key components and ties to intention or use. Gender has a moderating role in the relationships among behavioural intention, social influence, performance expectancy and effort expectancy. The linkages between facilitating conditions and use, as well as those between behavioural intention, effort anticipation and social impact are influenced by computer experience [357].

Innovation Diffusion Theory (IDT)

Also called as diffusion of innovations was penned by Everett Rogers in 1962 elaborating the adoption of new innovation by group of people over time. The innovation theory does provide the insight into chracterstics of individuals affecting rate of adoption of new innovation. IDT classifies those who accept innovations or ideas as innovators, early adopters, the early majority and the late majority. The rate of adoption of an innovation is impacted by five chracterstics of an innovation: Relative advantage, Compatibility, Triability, Observability and Complexity [358].

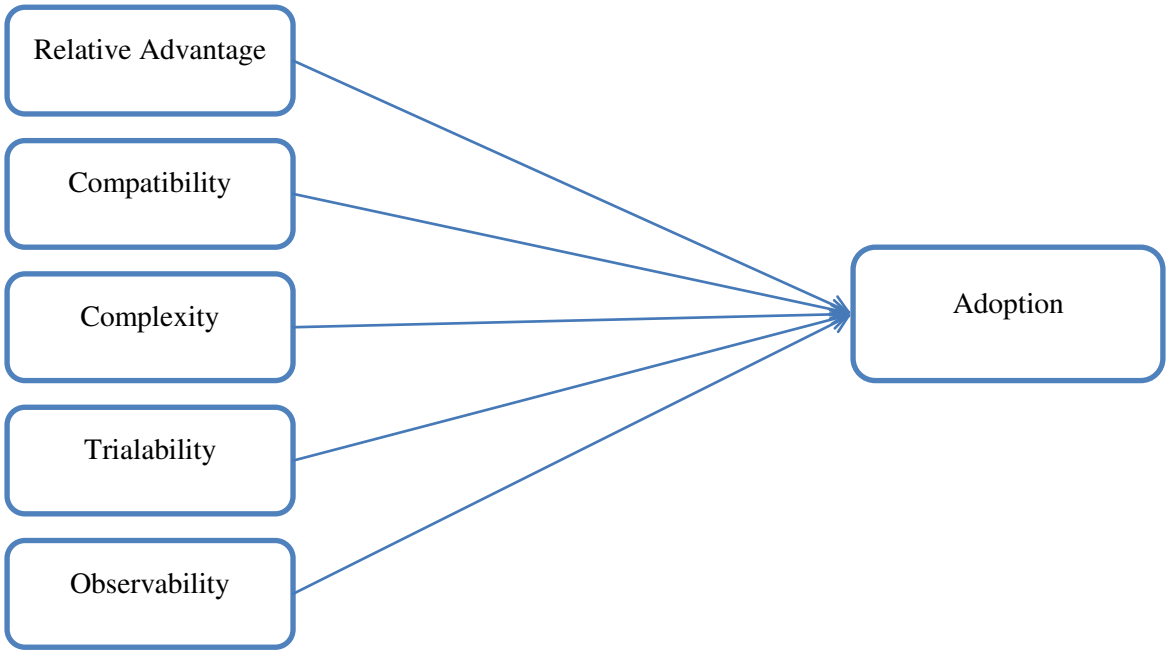


Figure 2. 5 Diffusion of Innovation Theory Model

Telerehabilitation Adoption Process Model

Despite the huge benefits of Telerehabilitation, the need for its widespread use and adoption was not fully appreciated until the COVID-19 crisis [359]. When engaging in TR, the factors like age, education and technical experience are all crucial which should be considered. Telerehabilitation technology and treatment environments should follow universal design principles to be usable, efficient and accessible to all people. Patients with different levels of injury, impairments and disabilities would therefore have better access to a wider range of TR services, which will facilitate and improve their rehabilitation and recovery [360].

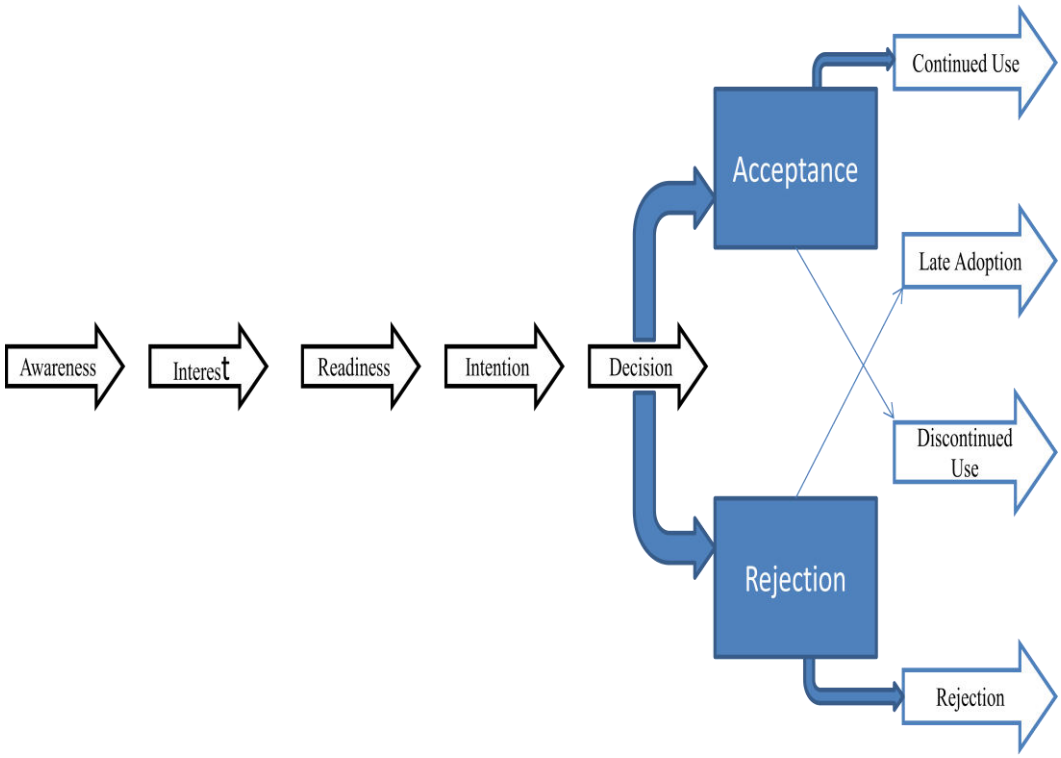


Figure 2. 6 Telerehabilitation Adoption Process Model

Health care researchers should pay more attention to the early-stage studies on TR adoption, especially in countries with few resources. In fact, research on the adoption of TR are crucial to minimising implementation failure since they will serve to teach patients and healthcare professionals on effective adoption tactics.

2.10 Adjunct Therapy

The component of adjunct therapy for children with CP is important aspect of management as only a single therapeutic intervention is not sufficient in dealing such children. Adjunct therapy in the form of posture support programmes, strength training and other goal directed rehabilitation programmes [361], Orthosis support [362], Virtual reality games [363] Hyperbaric Oxygen Therapy [364] for kids with CP may improve ability to do tasks.

By bringing together different specialities in the area where children naturally live, telemedicine makes it easier to achieve a multidisciplinary therapeutic occupancy. Because these children with CP may experience related complications, they need to be continuously monitored through digital care [332]. Other cutting-edge technological methods such as telemedicine and telerehabilitation with outreach activities for physiotherapy are advantageous [365], [366]. Humanoid robots with software-enabled telerehabilitation capabilities may be helpful to the therapist in helping CP youngsters with their coordination and balance [367]. Additionally, as a contemporary piece of technology, virtual reality games (VRG) can be utilized as supplemental tools for upper extremity functions in spastic CP [368].

Telerehabilitation (TR) is an effective technology that can momentarily substitute face to face therapy. It can help the patient or carer learn how to execute exercises at home and incorporate and carry out activities done at the rehabilitation centres. TR has several positive benefits on gross motor abilities and general health among kids with CP [369]. Another study conducted by Cason (2011) revealed that TR has the potential to improve the early intervention services provided to children by dispensing access to therapies that are inaccessible in remote areas. The goal of TR is not to replace existing face-to-face treatments, but to provide people access to specialist providers or disciplines that are not readily available in their local area. TR can help with evaluation, communication, cooperation, role-release and care coordination when utilised with a consultative paradigm [370].

The use of games for this group of children during home rehabilitation and through interactive games is supported by the fact that the kids with CP liked playing,

performing at par with their peers in some activities and boosted both their hand performance and physical activity intensity when using the games [371]. In a systematic review and metaanalysis study done by Cottrell et al., (2017) ascertained that services delivered by physiotherapist through TR for treatment and management of musculoskeletal conditions are efficacious in revamping pain and other physical functions [372]. For musculoskeletal conditions, TR may be equally as effective as or even superior to traditional methods of rehabilitation in terms of reducing pain and enhancing physical functions.Through technologically assisted interventions, physical therapists may be able to reduce obesity and overweight and enhancing physical capacity and life standards in cancer survivors [373], [374].

By connecting families with healthcare practitioners, services and supports, TR may, in the current situation, improve families ability to fulfil the needs of their child with a disability and ensure continuity of care. While strategies to address this unusual scenario are still being developed, TR shows promise as an alternative rehabilitation technique, reducing the negative effects of social exclusion on disadvantaged children [375]. Providing remote accessibility and flexible scheduling, TR is a cost-effective health care paradigm. However, a number of drawbacks in the present paediatric TR model, such as a dearth of teleassessments and empirical evidence, may restrict post-COVID utilisation of TR [376].

2.10.1 Telephysiotherapy as an Adjunct Therapy

American Telemedicine Association (2010) pointed out that Telephysiotherapy (TelePT) is a specific type of Telehealth and TR that provides the delivery of physiotherapeutic services through means of ICT. As a method of service delivery, TelePT is receiving support for its efficacy in the treatment of a number of musculoskeletal and neurological problems, according to American Physical Therapy Association, 2013a. TelePT can offer services for assessment, intervention, monitoring, supervision, prevention and consulting in all fields of physical therapy [377], [378]. Australian Physiotherapy Association (2020) & American Physical Therapy Association (2017) advocated that TR is unorthodox model of physiotherapy service delivery [377], [379]. In a study carried out by Vukovac (2016) also found

that physical therapy, a subset of TR which is the delivery of therapeutic services to patients in remote locations using information and communication technology [380].

Brennan et al., (2010) documented several terms like TelePT, TeleOT and TeleSpeech are used to describe TR for various patient types. The specific teletherapies make use of information and communication technology for patient assessment, monitoring, supervision, treatment and education. Teletherapy services offered by different professionals in people's homes, clinics, schools and communities can assist people of all ages, including kids and adults, to promote wellbeing [381]. Similarly again, study framed by Bernard MM et al., (2009) investigated the use of telecommunication technologies as a mode for conveying therapeutic exercises to the patients living in remote far flung areas [382]. Dillman et al., (2011) and Hui (2009) also highlighted that TelePT, a subtype of TR, can be utilised for patient assessment, examination and diagnosis in addition to treatments and other teaching programmes via videoconferencing. The authors suggested that this technological system of VC is much more beneficial in rural and remote areas to deliver TelePT services [383], [384].

ICT is used to deliver physiotherapy services through the TelePT, subspeciality of telemedicine. The use of ICT for rehabilitation as TelePT is viewed as an alternative technique that allows health care providers to help and care for children studying in remote places [385]. One other method of providing rehabilitation is known as "TelePT ", which targets deficiencies in both gross and fine motor skills and is carried out using tablets and smart phones via VC [386].

In a research furnished by Indian authors Kulshrestha S et al., (2022) included randomised control trial studies explored that, TelePT was found to be effective in treating a variety of diseases such as osteoarthritis of the knee, fibromyalgia, stroke and multiple sclerosis during the COVID-19 period. As hands- on modes of treatment were uneven in this widespread pandemic, the study emphasised the quick development of technology in the form of TelePT delivered through various platforms including Skype, Zoom and Microsoft Team [387]. In a different Indian study, it was

examined how TelePT may be used to give physioyoga in order to reduce discomfort in the neck and shoulder and to improve functional ability. Where advanced technology is out of the reach of most people and literacy levels are poor, this intervention through social media platforms like WhatsApp, Instagram and Zoom seems to be a workable solution [388].

A further literary analysis study conducted by Harshika Gupta in the COVID-19 pandemic in 2022 revealed that TelePT heightens conventional person-to-person treatment and enhances compliance and satisfaction with this form of technological treatment [389]. After the COVID-19 pandemic, a cross-sectional conducted by Arzani P et al., (2022) highlighted the continuous usage of TelePT. The study illustrated how to advance TelePT by training provided to therapists and enhancing the infrastructure for this digital intervention [390].

TelePT may be beneficial for persons with lymphedema, according to a study based on a case report where self-complete decongestive therapy used through TelePT helps in educating patients and promote lymphedema self-management [391]. Another study by Kristian Joseph et al., (2022) found that using an exercise programme based on TelePT to strengthen the neck and shoulders is an excellent substitute for in-person physical therapy for undergraduates [392]. Gosai A.H et al., (2021) designed another intervention trial in India and discovered that TelePT significantly increases capacity of the patients suffering from asthma for doing exercise and improves overall quality of life [393]. An additional study by Shambhu et al., (2020) found that telephone-based TelePT interventions are beneficial and significantly reduce pain brought on by musculoskeletal problems.The findings of the retrospective study demonstrated that it is good for people with these conditions who live in rural and isolated places and have limited access to medical services [394]. Dighe P and Dabholkar T (2020) in India did a further comparative analysis on the feasibility and effectiveness of TelePT in OA knees in contrast to standard treatment. The 4 week TelePT treatment that authors employed a smartphone application demonstrated a considerable improvement in functional outcomes and impairments when juxtaposed with conventional supervised care [395].

Similar to this, Odole A et al., (2014) investigated the impact of a 6-week TelePT intervention in osteoarthritis cases and came to the conclusion that the intervention, delivered via a TelePT group using an online telephone mode, improved patients quality of life [396]. According to Odole A. et al., (2013), TelePT enables patients to receive independent rehabilitation for a variety of medical conditions at home. Patients can interact with this TelePT through telecommunications and receive professional guidance while staying at a distance [397].

Jachak (2020), an Indian researcher, found that the use of a number of smartphone applications and websites for online consultations has revealed the positive impact of TelePT around the world. The review study emphasised that considering TelePT confining variety of services including counselling, diagnosis, monitoring and detection using telecommunication technology for rehabilitation exercises to patients at home who are far from physiotherapy clinics, should be taken into account in order to address these issues [398].

Anton et al., (2018), admitted that geriatric people and people with disabilities, can receive comprehensive TR services, including physiotherapy, from anywhere at any time. Technology-based therapy delivery is well-organized, effective and improves the well being for these People with Disabilities and old age population [399]. According to Criss (2013), a variety of musculoskeletal and neurological illnesses and disabilities such as Joint replacements, Multiple Sclerosis, Parkinsonism, CP and Spinal Cord Injuries can benefit from the use of ICT through telerehabilitation [400]. In a similar vein, Golomb MR et al., (2010) in their pilot study revealed that adoloscents with chronic disabilities who practise frequently appear to have improved function of hand and bone health in upper limbs especially forearm as a result of using remotely monitored virtual reality videogame TR [401].

According to a probing investigation done by Bilde et al., (2011) illustrated that CP , a neurological condition that can be effectively treated online utilising a variety of therapeutic modalities for children. These treatments caused profound neuroplastic alterations in the brain of such children [46]. Similar research conducted by Ameer & Ali (2017) significantly supported the usage of contemporary digital devices like i-

Pads and tablets that are connected to the internet for the benefit of many hospitalised patients. In their investigation, the motor abilities of stroke patients showed a promising improvement after therapy utilising i-Pads [402]. A comprehensive review research finished by Van Egmond et al.,(2018) illustrated that physiotherapy delivered via TR is helpful in improving life standards and postoperative functional outcomes in surgical cases [403].

In a different investigation, Biswas J et al., (2008) assessed the suitability of a cutting-edge platform for telephysiotherapy with elderly patients [404]. In other study, Narvaez et al., (2017) found that physiotherapy delivered via telemonitoring is a successful method of offering rehabilitation services to people with congenital defects, neurological disability, and musculoskeletal problems [405]. A study formulated by M.C Cuervo et al., (2015) experienced that TelePT impart services to patients having motor problems in upper limbs at a distance. They emphasised that TelePT encapsulates and captures the human movements through biomechanical analysis of different parts of body. The authors also draws attention on effectiveness of TelePT via interactive sessions for motor disorders of upper limbs allowing capture of movement for different body parts [406], [407].

Physiotherapists have found a variety of telehealth applications that can be used to deliver services to children, adoloscents, adults and older persons through monitoring, videoconferencing and email [408], [409]. However, there are certain elements that need to be assessed for therapy services to support telehealth as an effective delivery method. In order to meet the growing demand for treatment of CP to lower the cost of rehabilitation, ICT is used in conjunction with traditional therapy [410].

It is imperative that multiple benefits and limitations of TelePT are reported in literature. The advantages of TelePT include improved patient outcomes and satisfaction, access to services for patients in rural and hilly locations, decreased cost and time and increased patient adherence to treatment plans [60]. TelePT is beneficial in remote and rural areas or where the patients cannot travel the long distance. Access of TelePT services helps to reduce the cost and time linked with travel to hospital or rehabilitation centre and also in situations where therapist visit the patient at home for

scheduled appointment [378]. Also another researcher Holland (2017) disclosed the potential benefits of this digital option is providing cost effective care & timely delivery of therapeutic interventions by removing all the barriers like transportation, waiting time [386].

TelePT has a great benefit in adhering or increasing compliance to set plan of treatment. The constant supervision and monitoring provides increased access to rehabilitation therapeutic services which allow the therapist to maintain the health and fitness through information and communication technology [411], [412].Technology has both its advantages and disadvantages and TelePT has several technical shortcomings in terms of its licence, technological difficulties, lack of understanding of its working among professionals, privacy concerns and some issues with payment [413], [414].

According to a study done by Victor Foo Siang Fook et al., (2008) revealed that TelePT provides opportunities to obtain rehabilitation services by utilising ICT in India, where access to health and rehabilitation treatments is hampered by distance and subpar transportation infrastructure. TelePT becomes an economically viable option in case of increased expenses of travelling to visit rehabilitation centres for geographically isolated or segregated patients and professionals [415]. Furthermore, study by author reviewed that physiotherapy excercises delivered via telemonitoring system to eldery population living in remote areas is good option for rehabilitation. Physiotherapy services constantly requires regular follow ups of patients as a part of intervention in clinical or hospitals set up. TelePT is a novel technological platform to address such follow up issues by using interactive session with patients. The author experienced that telemonitoring decreases the length of hospitalisation and provides the rehabilitation servies at door steps. It was documented that this mode of delivering therapeutic intervention to the patients where face to face visit is not possible [412]. The development of a novel integrated platform for TelePT provides synchronous and asynchronous physiotherapeutic interventions to users along with electronic recording of physiotherapy compliance, rating of physiotherapy exercise and visual feedback is a unique feature of this platform [416].

TelePT can be provided to patients at distant via real mode through VC in virtual settings and web page i.e. asynchronous mode using mobile applications. These intervention programme may include assessment of joint range of motions in various orthopedical disorders. The smart phones or android provides new opportunities for recording interventional programmes and advising excercise and their progression [417].

A randomized controlled trial study designed by Holland AE (2017) identified the advantages of TelePT via using VC between patients and therapist. Virtual treatments in this way has increased the capacity of physiotherapist to deliver therapy at a distance rather than using hands on techniques in some health problems. In today's digital world, TelePT programmes can be delivered by various sophisticated android phones, laptops through real time i.e. synchronous and asynchronous mode. The results of the study showed that TelePT has many advantages over face to face conventional therapy as in decreased waiting time, cost of transportation and other hurdles [386]. Furthermore, another study conducted by author shown that physiological parameters of patients such as joint range of motion, oxygen saturation, electrocardiograms etc. may be evaluated via VC in a TelePT setup using android phones [418], [419].

A study undertaken by an Indian author Gupta S (2017) disclosed the multidisciplinary nature of TelePT involving banks, contact centres and particularly in school settings for various pupils suffering from postural dysfunctions, overweight difficulties and some developmental challenges. The author discovered that the field of TelePT serves as a flexible and varied substitute in schools for kids with a variety of illnesses. Also, the field of TelePT is applicable in deskjob offices and healthcare system around the world and it is beneficial in patients who cannot avail conventional therapy [420].

TelePT may encourage individuals to access specialised rehabilitation amenities in outlying and rural areas [394]. Another study conducted by Gibbs (2017) evidenced that TelePT entailing the communication technology is a convenient way for delivering therapeutic excercise to patients at their homes to facilitate independent

rehabilitation practice. This mode of telemonitoring abstain travelling of patients from home to clinic and provides best health care facilities at their doorsteps [421]. The survey conducted by Krupa M. Soni & Khatri S (2020) concluded that the physiotherapist in state Gujarat, India are having less awareness and knowledge about telephysiotherapy. However, they prefer TelePT over conventional physiotherapy indicating limiting use of TelePT [422].

Another study conducted by Multani et al., (2006) revealed effectiveness of telemedicine for patients suffering with low back ache through VC in rural part of India. In study, they documented that this aspect of treatment via technology in the form of TelePT services is very minimal and is in budding stage [423]. The efficiency of telemedicine technology in regulating individuals physiotherapeutic requirements while maintaining superior care and amenities has been investigated in a research published in an Indian scholarly publication [387], [422]. The viability of providing such treatments remotely is an effective concept of using TelePT in India, which has been widely promoted due to the shortcomings in the provision of health care in country. Few studies have shown that TelePT is good option and may be applicable in various conditions [420], [423]. Conversely, studies regarding Telemedicine solutions adopted in Indian physiotherapeutic system of healthcare are scarce [423]. Currently, research is minimal to support the full use of TelePT services and further research is needed to a greater degree of evidence to support its claim & use of TelePT services in all areas of therapeutic service.

2.10.2 Significance of Telephysiotherapy in School Settings

Over the last 10 years, there has been an increase in research on TR in various disorders and disabilities. However TelePT, a subset of TR has been less explored and under investigated area especially in school settings. In the past, school based therapy has been fostered for special children under various acts and schemes to make children independent in curricular and co-curricular programmes. TR and TelePT are regarded as viable and sophisticated tools for delivering rehabilitation and therapeutic services to such special children in rural and remote schools or educational settings.

The TelePT for children with CP in educational settings abide in recessive mode despite the growing evidence of Telemedicine in India and across world. However in school scenario, TelePT could be effective options for children with disabilities and only few studies have been documented for kids with diversified needs in educational contexts.

American Telemedicine Association in (2010) explored the standard of telepractice in areas of therapeutic system involving physiotherapy [381]. In accordance to previously reported research, that OT & PT stipulated via the internet have been documented to benefit kids who have special needs within educational systems to address issues such as body position, endurance, writing skills and balancing deficits [60], [421]. A study by Majnemer A (2014) explored the physical therapy, occupational therapy and speech therapy as preferred management in school atmosphere by using online medium of communication technology at obscure places [98].

Mahon and Cusack (2002) conducted a study on role of physiotherapist in integration of kids with CP amid 6-11 years in mainstream schools revealed pivotal and responsible role for therapists in the school context [226]. Furthermore, it was noted that TR might be expanded for the management of intellectual challenges, disabilities related to learning, autism spectrum disorders, communication problems as well as other visuomotor abnormalities deemed crucial to successful learning in educational settings [424], [425]. Similarly, another review study done by Mani S & Pahwa P (2018) on TelePT as a channel of improving movements abilities of kids with CP revealed some scattered outputs from India in school settings [426].

Gross and fine motor skills of CP children can be improved by providing TR motion capture programme in school settings via two-way interactive videoconferencing technology. The outcomes of research demonsrated that kids with CP had improved fine and visual motor skills who attended an online programme at school with six sessions of 30 minutes duration and impacted success with handwriting [421]. Similarly, in other study in school settings, where handwriting skills of CP children

showed the improved response via virtual TR through web camera with dosage of 30 minutes session per week [400]. A feasibility study encompassing computer assisted arm rehabilitation games conducted on CP children in schools with age of 6-12 years. The study showed the significant results in hand speed of children by using the games [427].

CP children in school settings showed a positive outcomes with Wii sports games through software with 11 training sessions of 60-90 minutes [428]. A preliminary study in school environment carried out by Luna Oliva et al., on CP children using Virtual reality Kinect box 360 for 8 weeks duration showed a improvement in balance and ADLs skills in children [260]. In another study conducted by Omar A Cando (2019) pointed out the use of eye tracking technology based educational software to evaluate problem solving approach for CP kids at educational atmosphere. Students using an augmentative and alternative communication system based on eye tracking shown improvement in their school performance [429].

A feasibility study done by Juliet A Rosie et al., (2015) on rural school going CP children revealed the possibilities of putting the IREX into practise in a classroom environment under supervision of teacher. This gives parents of children a choice of physiotherapy who live in remote places and don't receive ongoing therapy. Rehabilitation consequences in a school-based context by virtual rehabilitation programmes employing the IREX equipment are possible [430].

The cost effectiveness of telehealth in school based settings is effective and cogent mechanism for school children. The results of study revealed that students with various chronic ailments got benefitted with technology health programme along with improved curriculum along with decreased travel time [431]. Children in these schools received acute paediatric care with the help of telehealth technology. School-based telehealth was rated favourably by paediatric specialists, nurses, parents and kids in comparison to conventional health care delivery systems [432].

Further in learning settings like schools, TelePT for kids with CP is an efficient means to commence therapy for developing movement skills besides education. For children with CP, there appears to be a substantial gap in the availability of adequate

physiotherapy programmes and expensive rehabilitation treatments that are concentrated only in large cities and less in schools. In India, digital therapy especially TelePT has received the least attention. With particular goals in mind, such as increasing functional independence and academic success by minimising physical impairments in children, it can be utilised for CP patients. The recent literature documented about rapid development of information ICT in recent years that has made it possible to give rehabilitative treatments online. Through the use of ICT, TelePT in educational settings may be a practical way to address these problems, particularly for CP children and to close the gap between therapists and school-aged disabled children.

CHAPTER III

RESEARCH METHODOLOGY

Overview

This stated segment will dispense outline of methodology which will be incorporated into the present study. Methodology is the outline the way of undertaking a project to solve a research problem. It is critical section where procedures, methods and techniques of collecting primary data are discussed. Here a research design is prepared which gives a conceptual structure for conducting research in a discipline. The study is a qualitative study and was carried out in 3 phases consisting of research study design, participant characteristics as well as the procedures involved in data collection.The study received approval from institutional ethical committee, LPU with (approval no. LPU/CRDP/EC/230219/58 in Feb 2019) and the protocol was not registered in the Clinical Trials Registry- India. All respondents provided written informed consent and were notified that their participation in this study was voluntary and could withdraw at any time. Finally, the ethical considerations incorporated into the present study are outlined.

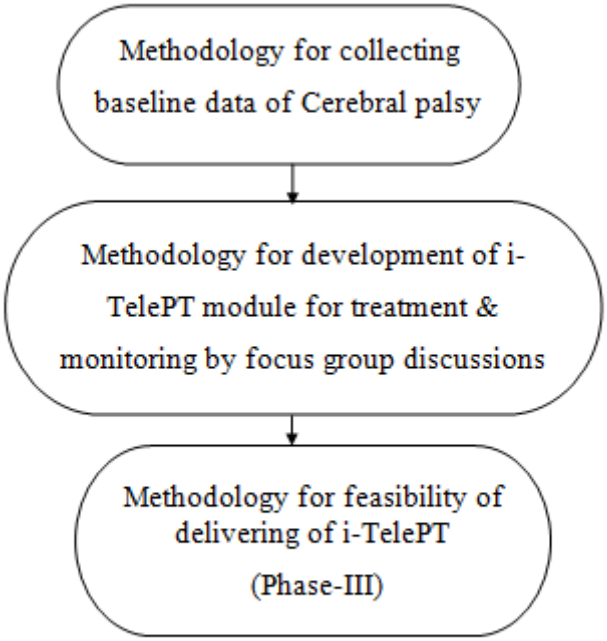


Figure 3. 1 Flowchart of Three Phases of study in School Settings

3.1 Methodology for Determining Current Status of Physical Profile of Cerebral Palsy Children (Phase-I)

3.1.1 Research Design

The present phase of the study is a descriptive in nature which is conducted to ascertain the existing state of physical disabilities in children with CP in the inclusive education system in the district Mandi, HP. Research that aims to designate the characteristics of the population or phenomena under study is referred to as descriptive research. It is employed to characterise a subject; it is not utilised to investigate any particular connections or to associate two or more variables [433].

3.1.2 Study Population

The students with CP from class first to eight (I –VIII) of various Government schools under Sarva Shiksha Abhiyan (SSA) of District Mandi, HP were taken as subjects in present research.

3.1.3 Sampling Method

The nature of sampling used this study was purposive sampling method. This particular non-probability sampling technique focuses on gathering data from population members who can be readily and quickly contacted by the researcher [434], [435].

3.1.4 Sample Size

Study sample consists of (N=20) C.P children of age between 6-12 years in Government school in inclusive education under Sarva Shiksha Abhiyan (SSA) in District Mandi were included in the study. The inclusive education system served students of a variety of age groups and of different categories of disabilities. The total no. of identified children as per data (2017-18) with special needs received from District Project Office (DPO) as (N=1276); Boys (N=663); Girls (N=613) of Sarva Shiksha Abhiyan (SSA) from primary to middle class (1-8^{th}) in District Mandi. The total number of CP children were (N=74) as per data in district Mandi. But the study had only (N=20) CP children in inclusive education set up (at 95% CI, Error 0.05) out of which (N=14) received from data and rest (N=6) were collected during survey of selected educational blocks in district Mandi. Particularly for CP Children, data obtained from different DIET's and other sources is shown in table 3.1,

Table 3. 1 Data pertaining to CP children from all districts of H.P

S. No	Districts in HP	CP children	CP children with Ass. disabilities	Home based CP	Special schools /NGOs based	Health & Family welfare based	Total
1	Mandi	14	14	14	32	00	74
2	Kullu	28	00	00	00	76	104
3	Chamba	00	00	00	04	66	70
4	Bilaspur	71	71	50	22	06	220
5	Una	11	11	10	36	00	68
6	Kinnaur	02	01	00	00	00	03
7	Sirmour	17	00	08	00	25	50
8	Solan	03	03	00	00	00	06
9	Hamirpur	32	15	06	17	08	78
10	Shimla	17	17	00	22	00	56
11	Kangra	33	33	02	00	00	68
12	Lahaul & Spiti	00	00	00	00	00	00
	Total						**797**

Sample size was calculated by adopting the formula for finite population;

$$n = \frac{\frac{z^2\, p\,(1-p)}{e^2}}{1+\frac{z^2\, p\,(1-p)}{e^2 N}}$$

$$n = \frac{\frac{(1.96)^2 \times 0.5(1-0.5)}{(0.05)^2}}{1+\frac{(1.96)^2 \times 0.5(1-0.5)}{(0.05)^2 \times 797}}$$

$$\frac{(1.96)^2 \times 0.5(1-0.5)}{(0.05)} = 384.16$$

n = Sample Size

Z = Z Score ~ (1.96)

E = Margin of Error (CI) ~ (0.05)

P = Standard Deviation ~ (0.5)

N = Population Size ~ (797)

$$1+\frac{3.84 \times 0.5 \times 0.5}{0.0025 \times 797} = 1+\frac{0.9604}{1.9925} = 1+0.482 = 1.482$$

384.16/1.482= 259.21

The total number of sample population to be included for study is 259 but due to limited number of participants in district Mandi in inclusive education system, the researher managed with limited number of participants (n=20). Research advisors (2006) in study illustrated that whole population should be included in case of small sample size [436], [437]. The information retrieved through literature on TelePT for CP children had not been assessed in precious studies. However, other studies involving school based therapy utilising technology were limited to small observational studies or case reports.

3.1. 5 Selection Criteria

3.1.5 .1 Inclusion criteria

1. Students with CP of all types and categories diagnosed with minimum forty percent on medical certificates by Chief Medical Officer.
2. Children with mild intellectual disability (I.Q level 50-70%) [438].
3. Classified with all grades of GMFCS for CP children [213].
4. All male and female students in class between age group of 6-12 years.
5. Primary and middle public school CP kids from all sections in the district of Mandi are covered by SSA.
6. Consent to participate in the study given by the parents or legal guardians.

3.1.5.2 Exclusion criteria

1. High and senior secondary school pupils with CP.
2. Children with additional developmental problems such as Autism, Down syndrome and developmental delay (DD).

3. Students who have epilepsy or seizure disorder and who are not responding to therapy.

4. Children with CP had surgery or had Botox injections or having any drug/therapy for six months prior to treatment.

5. Associated disorders such as CP with hearing (HI) and visual impairments (VI), moderate, severe or profound intellectual disability.

3.1.6 Study Location

The CP students were recruited from various Government schools of Mandi District, HP. District Mandi formerly known as Mandav Nagar is central district of HP located in Northern part of India. Being an first heritage city of HP, it is situated at an average altitutde of 880 meters has good infrastructure foreducation in all 12 subdivisions [439].

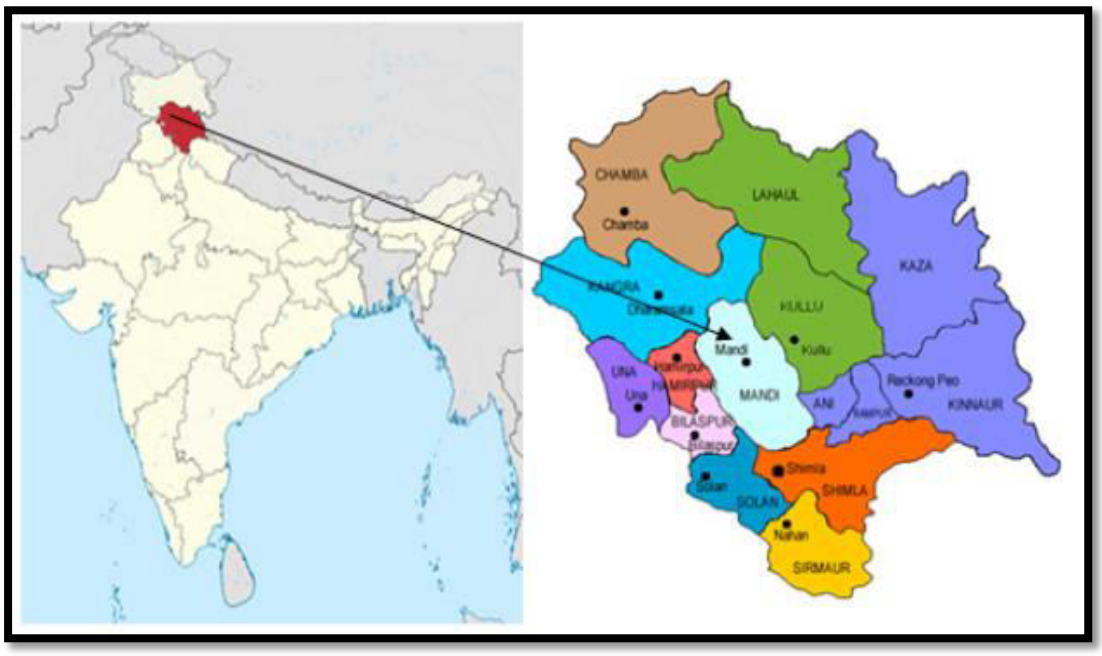


Figure 3. 2 Map showing District Mandi (HP) in Northern India

The enrolment of children with CP for study was facillitated from various Government schools of Mandi District, Himachal Pradesh as shown in figure 3.2 & 3.3 enlisted as below;

1. Government Senior Secondary School, Badog, Dist. Mandi
2. Government Middle School, Gamohu, Dist. Mandi
3. Government Primary School, Dugain, Gohar, Dist. Mandi
4. Government Middle School, Kehri, Dist. Mandi
5. Government Senior Secondary School, Khaneol bagra, Dist. Mandi
6. Government Middle School, Sadoh (Gopalpur-1), Dist. Mandi
7. Government Primary School, Khandla, Dist. Mandi
8. Government Primary School, Sainji, Dist. Mandi
9. Government Primary School, Ratti, Dist. Mandi
10. Government Senior Secondary School, Majiath, Dist. Mandi
11. Government Middle School, Jatohu, Dist. Mandi
12. Government Primary School, Mamel, Dist. Mandi
13. Government Middle School, Bagail, Dist. Mandi
14. Government Middle School, Dodwan, Dist. Mandi
15. Government Primary School, Paurakhothi, Dist. Mandi
16. Government Primary School, Chai ka dhora, Dist. Mandi
17. Government Senior Secondary School, Porla, Dist. Mandi
18. Government Primary School, Tipridhar (Janjheli), Dist. Mandi
19. Government Middle School, Dodwan, Dist. Mandi
20. Government Primary School, Trifalghat, Dist. Mandi

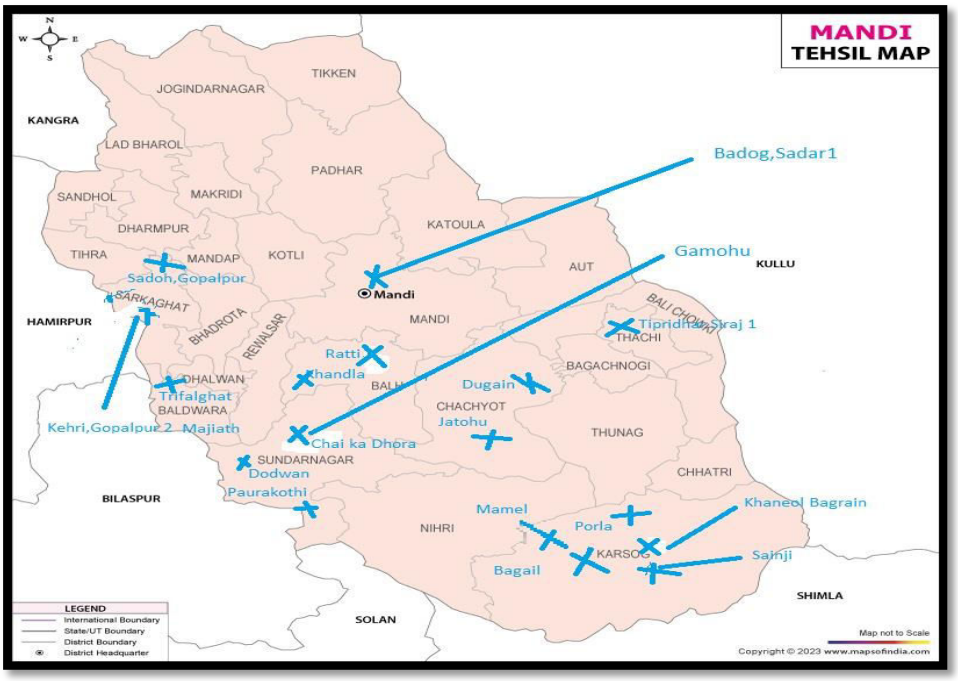


Figure 3. 3 Recruitment of CP students from various Govt. schools of District Mandi

3.1.7 Outcome Measures

The consequential outcome measure used in the present study-

1. Gross Motor Function Measurement – 88

Gross motor functions are evaluated using a valid and dependable instrument in five dimensions. A clinical measure with criterion-reference called the GMFM-88 is used to assess how children with CP have changed in terms of their gross motor functions [215].

2. Cerebral Palsy Quality of Life Questionnaire (CP QOL)

With appropriate psychometric qualities, the CP QOL questionnaire was created for kids with CP to assess quality of life. The following are the dimensions of the CP QOL-Child: social acceptability and wellbeing; participation and physical health; feeling about one's functioning; emotional wellbeing and self-esteem; pain and impact of disability; access to services and family health [440].

3. Visual Analogue Scale (VAS)

For both acute and persistent pain, the visual analogue scale (VAS) is an established, ostensible measurement. Scores are kept by putting a handwritten mark along a 10-cm

line that depicts a pain spectrum between "no pain" and "worst pain and can be utilized for children with Cerebral Palsy" [441], [442].

4. GOAL Attainment Scaling (GAS)

Having excellent levels of validity, reliability and responsiveness, GAS is a standardised instrument. Based on the accomplishment of specific goals, it is used to assess services or a customised programme. A five point goal scale is created, often through an interview with the client or family and each objective is given a graded degree of accomplishment along with an explaination of the expected result. With an expected outcome level in the centre, goals are graded from least favourable to most favourable outcomes [443].

5. Modified Ashworth Scale (MAS)

In a youngster with spasticity, MAS assesses resistance during soft tissue stretching. Spasticity is measured on a scale from 0 to 4 with established reliability and validity. The use of Modified Ashworth Scales to grade is referred as as Grade 0: there is no tone-up; Grade 1: Slightly increased muscle tone with little to no resistance at the end of the range of motion when the afflicted part(s) is/are moved in flexion or extension; Grade 1+: A catch that signals a slight increase in muscular tone, followed by little resistance through the remaining (less than half) of the range of motion; Grade 2: Although there has been a noticeable improvement in muscle tone over the majority of the range of motion, the afflicted part(s) is/are still easily movable; Grade 3: Significant increased tone in muscle along with difficult passive movements; Grade 4: The effected parts rigid in flexion or extension [219].

6. Manual Ability Classification System (MACS)

MACS with good reliability and validity basically describes the ability of CP to handle the objects in daily routine activities at school or home in age between 4-18 years. The 5 levels in this classification system are as below: Level I: The child handles objects easily and successfully; Level II: The child handles most objects but with somewhat reduced quality and speed of achievement; Level III: The child handles objects with difficulty; needs help to prepare and/or modify activities; Level

IV: The child handles a limited selection of easily managed objects in adapted situations; Level V: The child does not handle objects and has severely limited ability to perform even simple actions [221].

7. Wee FIM Functional Independent Measure

WeeFIM is an performance based instrument with a good reliability and validity containing 18 items on seven level ordinal scale and is derived from functional independent measure scale describes functional activities skills like eating, bathing, toileting etc. in children with neurodevelopment disabilities involving CP. Initially this instrument was designed for children up to age of 8 years but recently it has been validated in adolescent CP children up to 16 years of age.

The 18 items that make up WeeFIM are divided into two subscales: motor and cognitive. The motor subscale covers the following activities: Eating, Grooming, Bathing, Dressing- Upper Body, Dressing- Lower Body, Toileting, Bladder Management, Bowel Management, Transfers- Bed/Chair/Wheelchair, Transfers-Toilet,Transfers-Bath/Shower,Walk/Wheelchair,Stairs.Comprehending,expressing, interacting with others, solving problems and remembering are all part of the cognitive subscale. Each item is graded on a 7-point ordinal scale, with scores ranging from 1 to 7. The patient is more independent in completing the task linked to that item, as indicated by a higher score [444].

8. Pediatric Balance Scale (PBS)

Bergs Balance Scale, which is modified into the PBS and used to test balance in children with CP between the ages of 5 and 15, has been shown to be valid and reliable. The current scale includes the following items: standing to sitting, standing to standing, transfers, standing unsupported, sitting unsupported, standing with eyes closed, standing with feet together, standing on one foot, turning 360 degrees and turning to gaze behind. Getting something off the floor; putting the other foot on the stool; extended arm reaching forward [445]. Validity and Reliability of tools used as outcome measure is shown in table 3.2 as below;

Table 3. 2 Reliability & Validity of Tools as outcome measure of the study

S.NO	TOOLS	VALIDITY	RELIABILITY
1.	GMFM-88 [215]	GMFM shown rich validity with ICC(0.99) at 95% Confidence Interval	Highly reliable with (ICC) >0.98 at 95% CI
2.	CPQOLc [440], [446]	Internal consistency (0.74-0.92) for all primary caregivers & (0.80-0.90) for child self report with test retest reliability (0.76-0.89)	Validity supported by correlation pattern between CPQOL & CHQ & GMFCS.
3.	GAS [443]	Good Content validity	Good Inter-rater Reliability(ICC=0.98)
4.	VAS [442]	Moderate to strong validity	Good reliability
5.	WeeFIM [444], [447]	Strong concurrent validity (ICC>0.83) with barthel Index.	Good Acceptable psycholocal properties with Inter-Rater reliability of FIM (ICC 0.86 to 0.88)
6.	MAS [219], [448]	Good Criterion & Construct Validity	Moderate to Good ICC (0.36 -0.83)
7.	MACS [164], [221]	Good validity (ICC=0.95-0.98)	Well established Reliability ICC value=0.97; K=0.90)
8.	PBS [445], [449]	Good inter-observer reliability, construct validity	Good Intra-rater & inter-rater (ICC=0.998) (ICC=0.997).

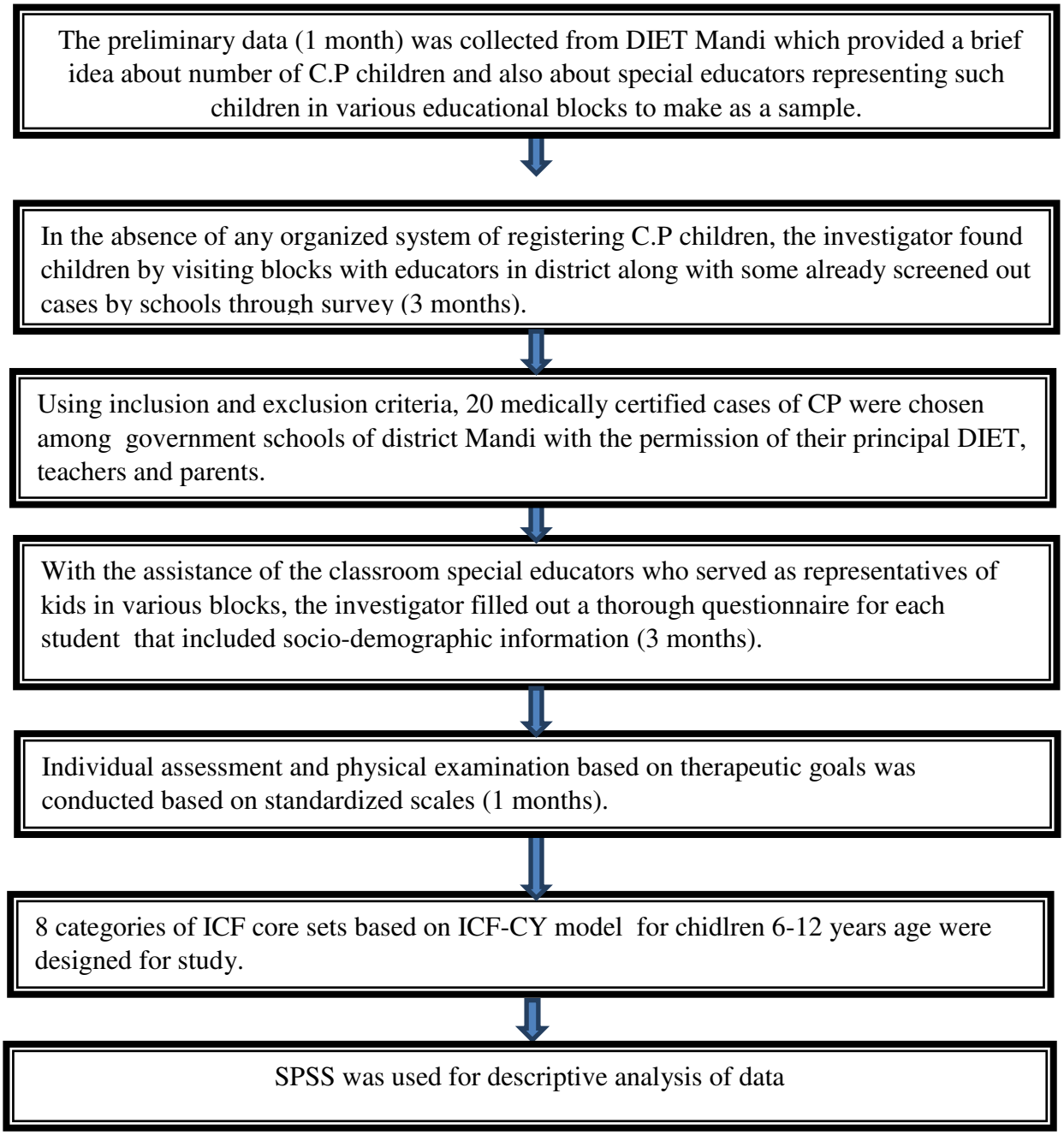
3.1.8 Equipment

A. Sociodemographic Questionnaire- Information on the sociodemographic characteristics was desired from the parents including basic information of family, birth histories, type of CP based on medical certificates. This was based on self designed questionnare (Appendix F) prepared by researcher with the guidance of supervisor based on review of literature [450], [451].

B. Cerebral Palsy Assessment Performa- Questions related to medical history based on history of pregnancy, trauma was retrieved from parents. The history was followed by detailed clinical aseessment with standardised neurological examination completed by researcher (Appendix E).

3.1.9 Procedure

3.1.9.1 Protocol



A total of 20 students from different government schools of Mandi District, HP were selected by the researcher. The relevant authorities i.e State coordinator, Shimla as

well as from principal of DIET Mandi provided official written permission. The preliminary data was collected from DIET Mandi which provided a brief idea about number of CP children and also about special educators representing such children in various blocks having certified CP children to make as a sample. These youngsters were chosen among those who had previously been screened by the special educator based on disability certificate and having poor motor skills in class and who were perceived to have a high risk of motor inefficiency in school leading to academicals difficulties after getting permission from head of schools individually. In the absence of any organized system of registering CP children, the investigator found children by visiting blocks with educators in district along with some already screened out cases by schools through survey. After outlining the study's goals, purpose and methodology, parents and subjects each provided their own informed permission via consent and assent form respectively figure 3.4.

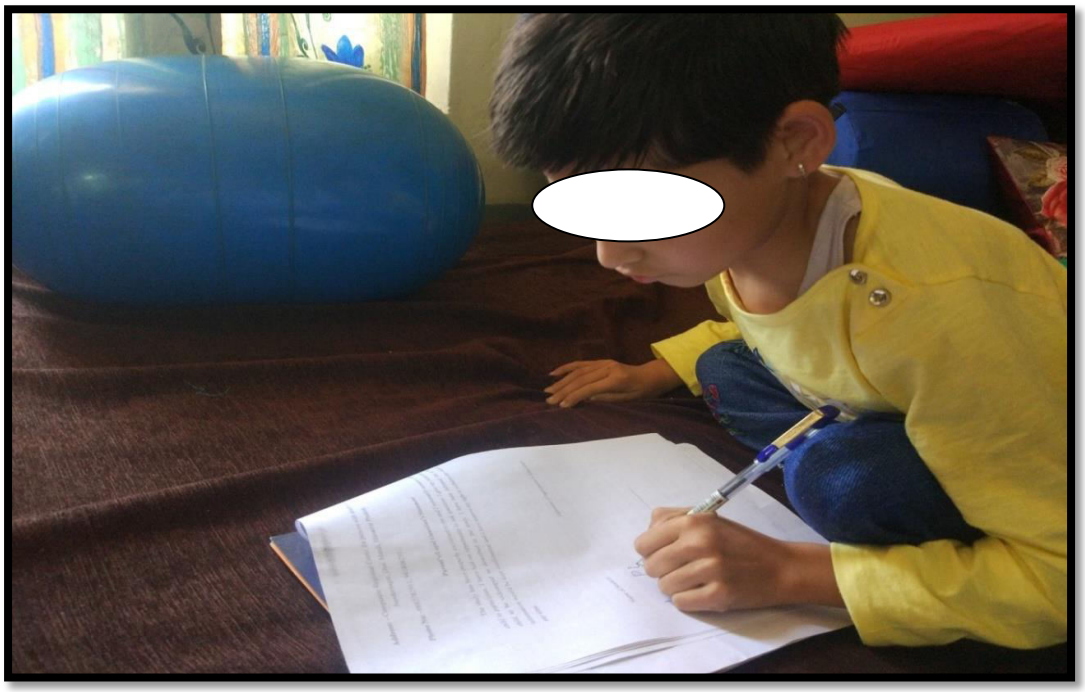


Figure 3. 4 CP child with Poor grasp filling Consent Form

Base set of ICF based on the ICF-CY prototype which affirmed physical deficits in children with CP between the ages of 6 and 12 were taken into consideration. Four categories were added from body struture & function with codes i.e. sensation of pain

b280, muscle tone function b735, voluntary movement functions control b760. In next group of activities & participations, again 4 categories with codes i.e. maintaining a body position d415, walking d450, toileting d530, eating d550, fine hand use d440 and in participation restriction , one category with school education and participation d 820 are added as illustrated in figure 3.5 [68].

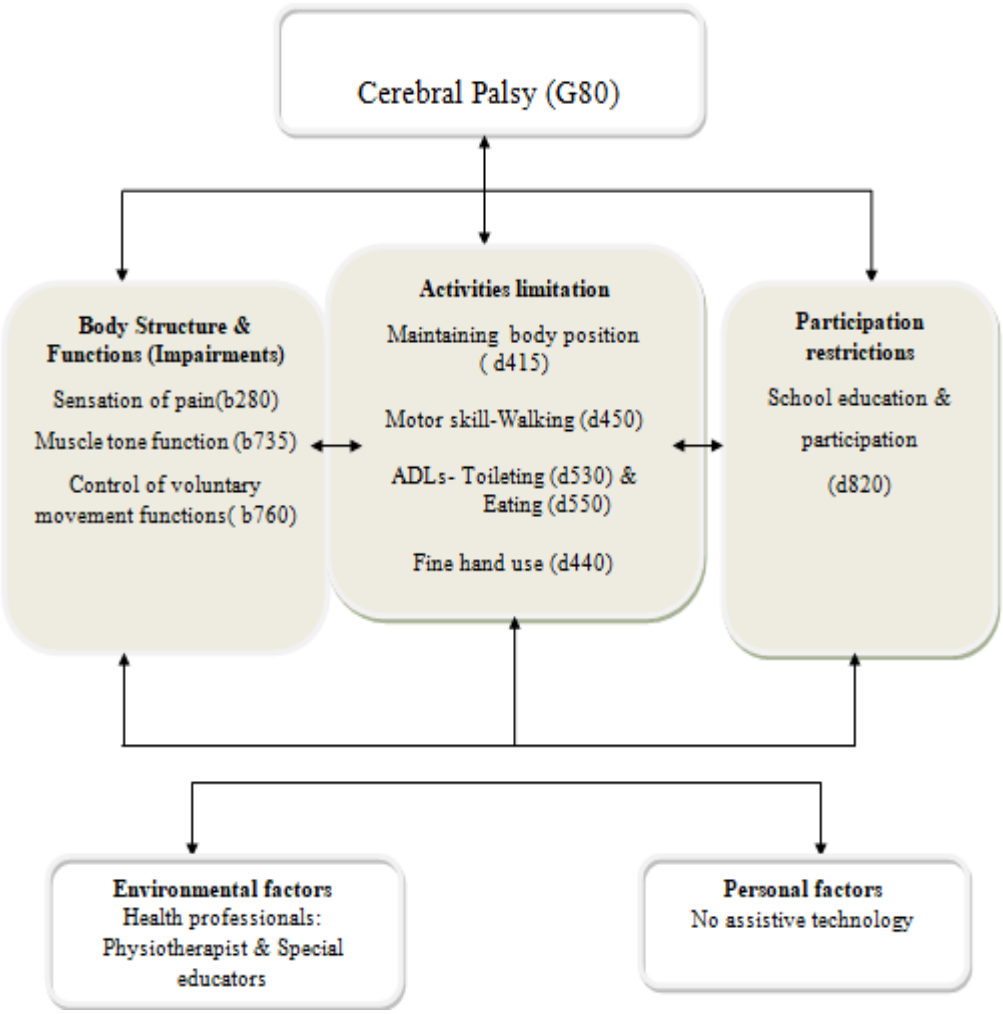


Figure 3. 5 ICF-CY Codes

Outcome categories were included for monitoring physical impairments profile for better functioning, quality of life along with educational performance of CP children as in figure 3.6.

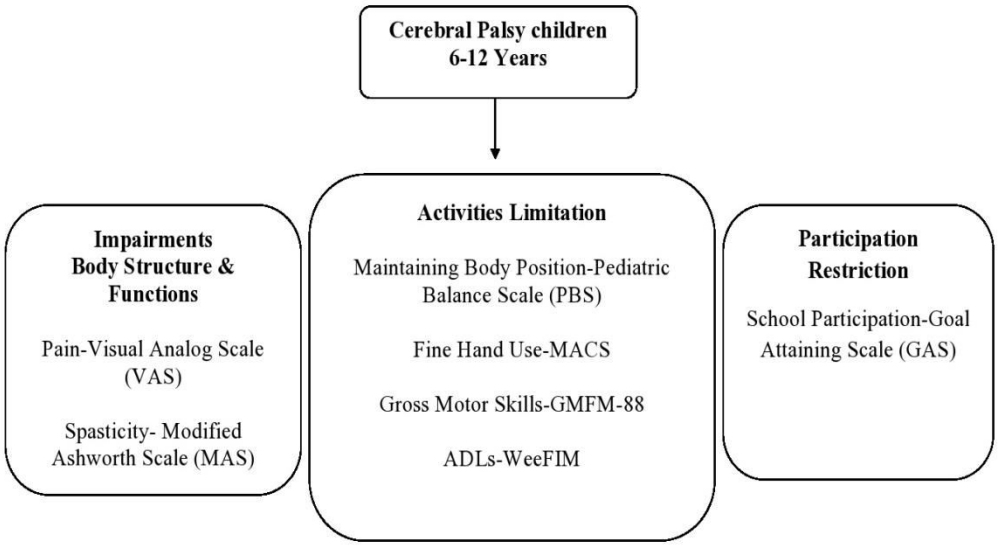


Figure 3. 6 Outcome measures using ICF-CY Model in CP

The participants were assured confidentiality of their response. For the students who were not able to come at CRC Sundernagar, the investigator personally visited the schools for filling up of demographic questionnaire of the individual students and rest other students were called off at CRC Sundernagar (figure 3.9). The purpose, aim, objective and relevance of the study were thoroughly explained to a class special teacher of each individual kid. After making appointments with special teachers, physiotherapist asked about individualized educational and therapeutic goals of C.P child by giving the visual and auditory perception which were firstly explained by the investigator. Based on the inclusion criterion, each student was evaluated and examined on an individual basis. First, the investigator completed comprehensive questionnaires with the assistance of the class special educator which includes demographic data, personnel details, class performance, social behaviour, participation in classroom (figure 3.10). Prior to the physical examination (figure 3.11), each child weight, height was measured with standard instruments. The electronic personal scale having high precision strain gauge sensor system with strong bamboo platform with power of 1x 3V CR 2032 lithium battery was used to measure weight of children (figure 3.7) and height statutometer was utilised for measuring height (figure 3.8).

Figure 3. 7 Digital Electronic Weighing Scale

Figure 3. 8 Measuring Height of Child with Height Statuometer

They were made explicitly clear that the information given by them will not be utilized for any purpose other than this research.

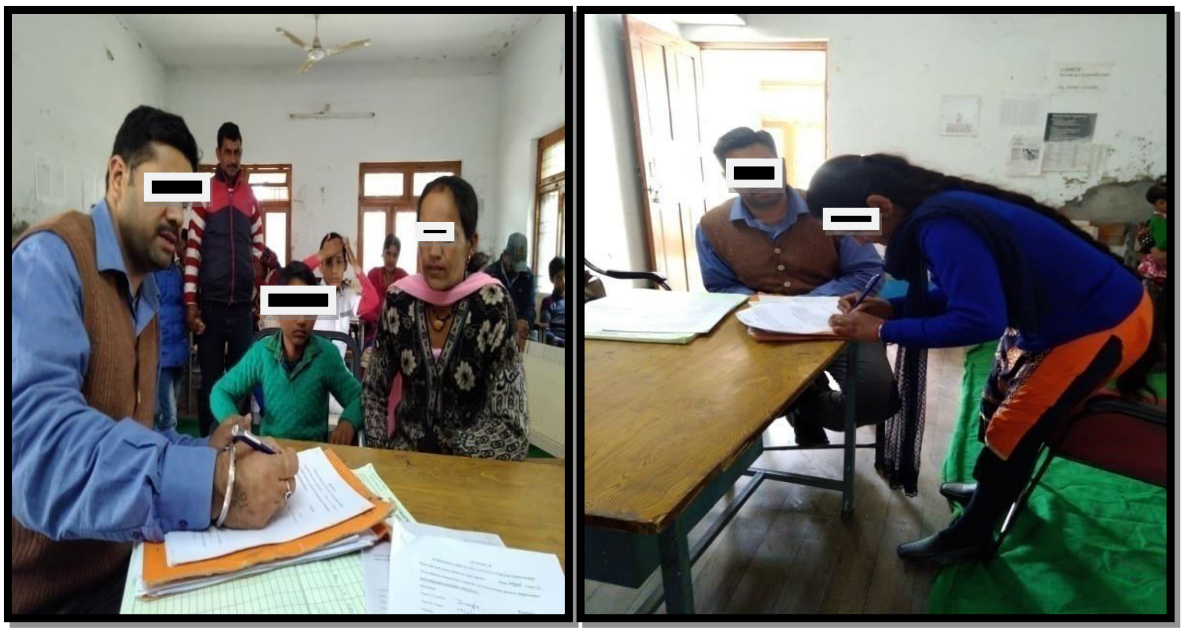


Figure 3. 9 Assessment of Child in Sitting & Standing Position

Figure 3. 10 Filling of Assessment & Consent Form of CP children

Figure 3. 11 Examining the Spasticity of CP child in Supine Position

3.10 Data Analysis

The data was collected, coded and tabulated and analyzed statistically using the descriptive statistics by using SPSS. To calculate the statistically significant difference between the variables in this study, the mean and standard deviation were employed. It was deemed significant when the probability of error (p-Value) was less than 0.05.

3.2 Methodology for Development of i-TelePT Framework for Treatment and Monitoring by Focus Group Discussions (Phase- II)

It is essential to evaluate the requirement for such services amidst special educators, before developing a new i-TelePT module. But as of right now, there is no such edifice system in place to allow educators to deliver effective physiotherapy treatments under the guidance of physiotherapists in school environs.

Thus, for the management of physical impediments in children with CP in school settings, this phase of the study attempted to ascertain the necessity, content, and composition of the i-TelePT module. Focus group discussion (FGD) was used to explore special educator's perceptions on TelePT training and identify training needs associated with use of it in school settings. Keeping in mind the scope, we have developed a platform for implementing TelePT which simplifies distance between special educators and school children in India. So, perceptions regarding TelePT implications at school level is required through focus group study. Focus group discussion among special educator was required for module development and for delivering TelePT for such CP children in educational settings.

3.2.1 Research Design

Focus group discussion is an exploratory tool in the qualititative study of representative sample. In this approach, data is collected by interviewing with the participants in short period of time allowing flexibillity and spontaineity of interaction [452]. This exploratory focus group technique was used in the current FGD, a qualitative study design, to get a comprehensive cognizance & knowledge of special educators on i-TelePT. The focus group method is a useful technique of data collection aiming to explore attitudes, experiences, beliefs and concerns as this approach is based on frameworks of group interaction and discussion [453]. The present study was reported employing Consolidated Criterion for Reporting the Qualitative Research (COREQ) items [454].

3.2.2 Study Population

Conveniently selected special educators having experience of 2 years or more representing each educational block in District Mandi participated in FGDs.

3.2.3 Sampling Method

Understanding that participants were in close contact with CP children and were convinient. Participants were approached by first reaching out to them via email and requesting their consent to take part in talks. The individual consent form was submitted along with information about FGDs by email flyers inviting all special educators.

3.2.4 Sample Size

A sum total 10 participating candidates (n=9 females, n=1 male) working as special teachers with average age (35.4±3.9) years possessing not less than 2 years of experience, occupied in divergent teaching blocks of Mandi district, HP. All educators committed with CP children in the school environment were included, a straight forward convinient sampling approach was accustomed [455] as illustrated in table 3.3. Participants had an average experience of (8.55± 2.24) years.

Table 3. 3 Special educators demographic profile endured in the FGDs

Organized Codes	Sex	Age	Teaching blocks	Teaching Experience (Years)
Participant P1	Female	34	Sundernagar	8
Participant P2	Female	33	Karsog	6
Participant P3	Male	36	Balh	8
Participant P4	Female	40	Gohar	8
Participant P5	Female	31	Gopalpur-1	8
Participant P6	Female	32	Sundernagar	8
Participant P7	Female	36	Sadar Mandi	8.5
Participant P8	Female	44	Sundernagar	15
Participant P9	Female	34	Sundernagar-1	8
Participant P10	Female	34	Janjheli	8

3.2.5 Selection Criteria

3.2.5.1 Inclusion criteria

1.The Special educators serving CP children in various educational blocks of District Mandi.

2.The Special educators having minimum two years of experience of teaching in inclusive education system.

3. The Special educators giving consent to participate in study.

3.2.5.2 Exclusion criteria

1. The Special educators not serving CP children in educational blocks of District Mandi.

2. The Special educators having less than two years of experience of teaching in inclusive education system.

3. The Special educators not willing to participate in study.

3.2.6 Study Location

Two focus group discussions were clutched in total, one in person and the other via online channel [455], [456] employing the Zoom platform [457]. The first FGD was carried out at private venue, Sundernagar, District, Mandi with prior permission from educators in September 2019. The second FGD was conducted virtually in august 2020 keeping in mind the COVID pandemic. It was a qualitative study design to gain in-depth understanding and perceptions regarding inclusive TelePT and CP children. All the participants were briefed on the purpose of FGD on module development of inclusive TelePT.

3.2.7 Equipments

The tools and equipments that were used in the first FGD of the present study consisted questions, sign in sheet papers, audio-video recorder, pencils or pens, plain A4 paper sheets, name plates of educators with codes. In the second FGD, the

technology devices like laptop fixed with webcam, Zoom application [457], Pen/pencil/paper were used.

3.2.8 Procedure

All educators were solicited through the medium of emails that had a personal consent performa holding all details about focus group sessions. After obtaining

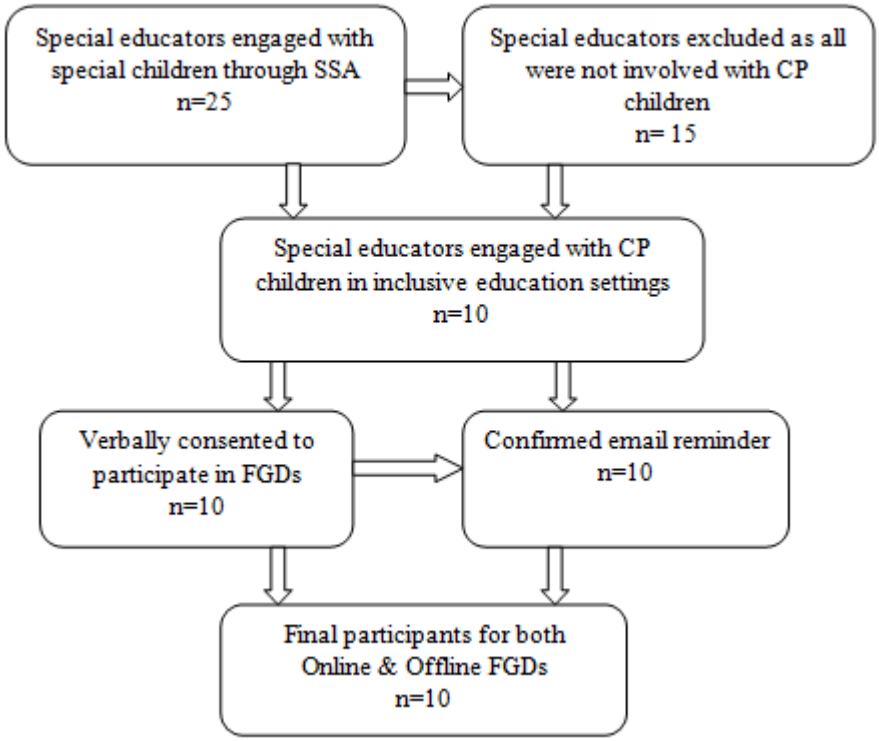


Figure 3. 12 Sample size flowchart of Special Educators recruited for FGDs

educators confirmation of their consents, the date, time and location for the first face-to-face FGD were set. Confirmation of date and location was acknowledged by email as well as telephone from all the educators participating in discussion and contact sheet of all participants were filled (Appendix Q) and process of recruitment of special educators took place around 2 weeks. A discussion was held with all special educators and investigator to develop need, content and structure based module on inclusive TelePT for CP children in school settings.

Figure 3. 13 Sitting arrangements for FGDs with Tripod mounted camera

Special educators were contacted to confirm their attendance and to provide with further information i.e. their educational block on given performa (Appendix S). Light refreshment was served to all participants after reaching at venue. Participants completed and submitted signed consent form along with attendance sheet prior to start of FGD1.

The FGDs was the second phase of study approved by Ethical committee of Lovely Professional University, Phagwara, Jalandhar (Appendix K). A total of 10 special educators, attended as participants covering all educational blocks having CP children from primary to middle schools in district Mandi, Himachal Pradesh. Except all participants, A facilitator, moderator as note taker, ICT manager and general observer were included in FGDs. A series of promptly questions served to educators as the beginning point for each session's and facilitator sought participant comments on various issues in FGDs. In FGD1, the ICT lab manager supervised with cameras (figure 3.13) & tape recorders and the entire session was videotaped for all around two hours. A round chair sitting was arranged for all participants with facilitator and moderator sitting on front chairs. Upon arrival to table, participants were checked in

and received a coded name plate as per sitting arrangements respectively. The participants were referred by their special identifier coded numbers and not by their names to protect their identity and responses and to prevent unbiasness. Participants were provided with demographic performa regarding their profile i.e. age, gender, educational level, educational block and years of experience along with their child profile.

Figure 3. 14 Special Educators engaged in FGDs with Moderator

Once all participants completed and submitted the performa, the facilitator along with moderator initiated the formal group discussion (figure 3.14). Facilitator prepared with questions and sub questions on CP, special education diploma experience and Telephysiotherapy structure etc. which were asked from every participants during the discussion (Appendix G). The guided discussion consisted of performa containing questions which were prepared and explored based on literature to accommodate the targeted population for FGDs [458]. For the FGD performa, the term CP was defined as non-progressive neurological disorder leading to motor dysfunctions [1] and

Telephysiotherapy was defined as branch of telerehabilitation and ICT to increase accessibility in distant remote areas [378], [386]. Focus group perceptions received from all special educators on C.P, its management, handling of CP children in schools tele-physiotherapy its structure and feasibilityfor development of i-TelePT module. All participants were given the opportunity to share and voice their personal thoughts and opinions during group discussion. Three digital audio recorders were kept on table to records the verbatim of the discussion.Written notes with facial expressions, observations were recorded by moderator. The focus group sessions lasted for approximate two hours and ends with a few words of thanks from facilitator and a light refreshment/lunch was served to all participants and team members. The outputs of every discussion were recorded with audio as well as video and analyzed to give a snapshot of our discussion. The discussion was then transcribed verbatim later on and this transcription took approximately 2 months .

The FGD2 was held in online mode due to COVID pandemic (Appendix T) and similarly date and time were once again adjusted after acquiring educators confirmation of consent and participants were requested to take part from their homes or places of employment and allured to log on prior to the scheduled inception of FGD2 to give themselves time to tune with microphones and cameras. All the educators were given codes rather them calling by their names P1-P10 as done earlier in FGD1. The same individual (PK) moderated all educators and effort was forged to maintain consistency across both FGDs. The online FGD endured for around one hour and thirty minutes since a quick instruction on how to use various aspects of ZooM was prescribed at the beginning of the online FGD. The verbatim were transcribed after completion and proceess turned around in time span of one month.

3.2.9 Training of Special Educators

Immediate after completion of FGDs, two days training (figure 3.15) of special educators regarding delivery of inclusive Telephysiotherapy (i-TelePT) for CP children in school settings was carried out in virtual way (Appendix C). It was a good platform to address the individualized therapeutic programme (Appendix U) and technological issues for delivering TelePT. It was also a requisite for special

educators as a part of research project to experience such platform from which they figured out few solutions to overcome the incomplete rehabilitation.

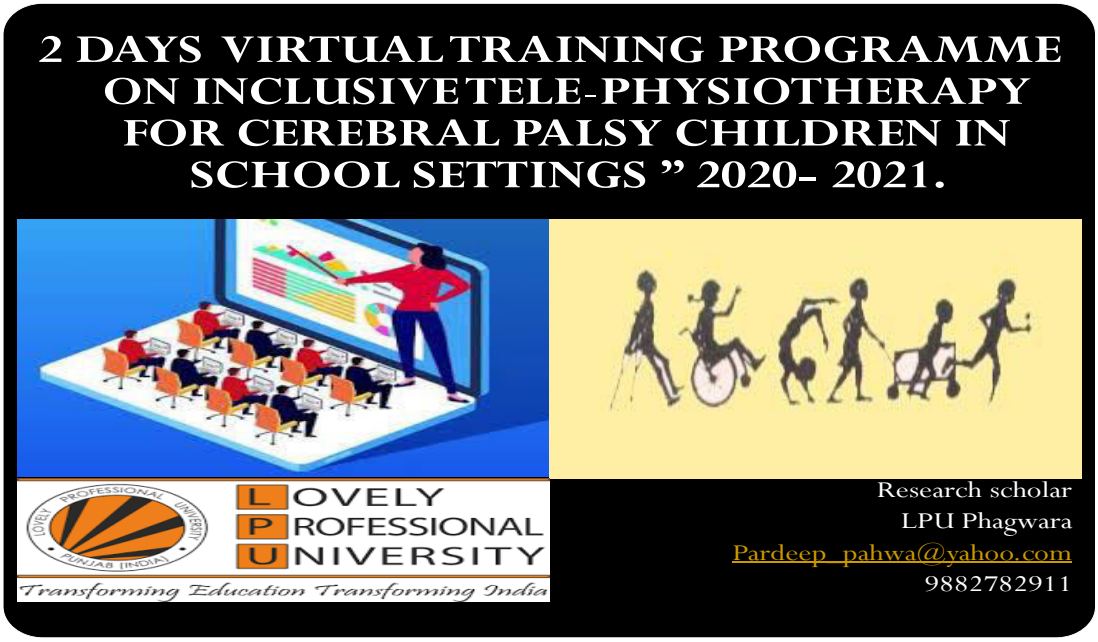


Figure 3. 15 Two days training programme on i-TelePT

3.2.9.1 Rationale of training

There is weighty inadequacy of physiotherapy services for CP & other disabled children in school settings especially in remote, hilly areas of HP. To compensate this situation in school settings which is prime environment of accommodations and learning of special skills for these special children, the special educators continuously polish these children in such environment. Upgrading the proficiency of special educators bound together with these children in school scenario will enrich the well being of children with CP. Consequently, a conceptual framework of i-TelePT to upgrade the therapeutic skills of educators has been developed. This will in turn contribute enormously to the improvement of physical impairments of CP children in state and in the country. Training report focuses on imparting technological familiarity and practical contentions regarding CP children for delivery of TelePT in school settings. This was prior effort of workshop which put a sturdy base for special educators on planning, learning of pragmatical things and visualizing technological issues related to TelePT. It has been noticed that specialized competencies are

required among special educators for sound practice and delivery of rehabilitation and therapeutic services at school settings. Targeted educator training is therefore important to ensure the competencies of all special educators to facilitate standardized practice to have positive effect on attitudes to ICTs in rehabilitation of children with CP.

3.2.9.2 Objectives of Training

To impart the knowledge & specific skills to special educators about CP and use of ICT for delivering i-TelePT based on FGDs.

Aims

- To determine program requirements, rehabilitation equipment, technical requirements.
- To undertake an "orientation to technology" to special educators.
- To discuss patient's rehabilitation VC schedule at cluster level schools or at home.
- To promote integration of theory and practice regarding CP.
- To facilitate education and training in special education with reference to CP.

Date & Venue

The schedule date for training workshop was 17th & 18th April, 2021 via virtual mode on Zoom [457] application keeping in mind the COVID-19 scenario. All the special educators were supposed to join from their home at given time for this training programme. An invitation mail flyer was sent to all educators depicting time and platform for training.

Training team

The training was clutched under good guidance of Dr. Suresh Mani, Associate Professor & Head of Department, Lovely Professional University, Punjab. The other representatives of training team were Mr. Pardeep. K. Pahwa, Research scholar at LPU and Mr. Shakti Singh, ICT Lab Manager at CRC Sundernagar.

Curriculum

The training adhered to curriculum designed specifically for educators based on various topics pertaining CP, its management via digital platform which is elaborated in Appendix D. The training team accepted the invitation of training workshop sent via mail and agenda was discussed prior to training workshop which was approved by supervisor.

Participants

The training workshop was punched in by ten (n=10) same special educators as participants. Conveniently selected special educators of more than 2 years of experience representing CP children in their educational blocks of District Mandi, HP participated in training workshop. The cofirmation of the online training programme was clasped as consent from the educators and afterwards time and date was specified along with instructions to join before time to avoid technical glitches. Following is the list of attendees along with their educational blocks in Dist. Mandi, H.P as in table 3.4.

Table 3. 4 List of participants along with their educational blocks and experience in Dist. Mandi, H.P

S.NO	Online Participants Codes	Gender	Age(Y)	Academic block (Mandi, H.P)	Experience (Years)
1	OP1	G	34Y	Sundernagar	8Y
2	OP2	G	33Y	Karsog	6Y
3	OP3	B	36Y	Balh	8Y
4	OP4	G	40Y	Gohar	8Y
5	OP5	G	31Y	Gopalpur-1	8Y
6	OP6	G	32Y	Sundernagar	8Y
7	OP7	G	36Y	Sadar Mandi	8.5Y
8	OP8	G	44Y	Sundernagar	15Y
9	OP9	G	34Y	Sundernagar-1	8Y
10	OP10	G	34Y	Janjheli	8Y

Schedule of Training workshop

Day 1 (17th April, 2020) - The present training workshop was the part of research project entitled 'Inclusive tele-physiotherapy for children with CP in school settings'. On the start of day 1, Mr. Pardeep Pahwa, researcher addressed the first introductory session which was immediately chaired and supervised by Dr. Suresh Mani. After addressing theme, aims & objectives of workshop, the individualized therapeutic plan of all twenty (20) CP children were discussed theoretically as well as practically by demonstrating with pictures (figure 3.16). Going into diverse inquisitiveness, various contrivance were accomplished involving linkages of therapeutic delivery via digital platform. Everything which was discussed & elaborated during the session is already been provided in reference booklet delivered via mail to special educators.

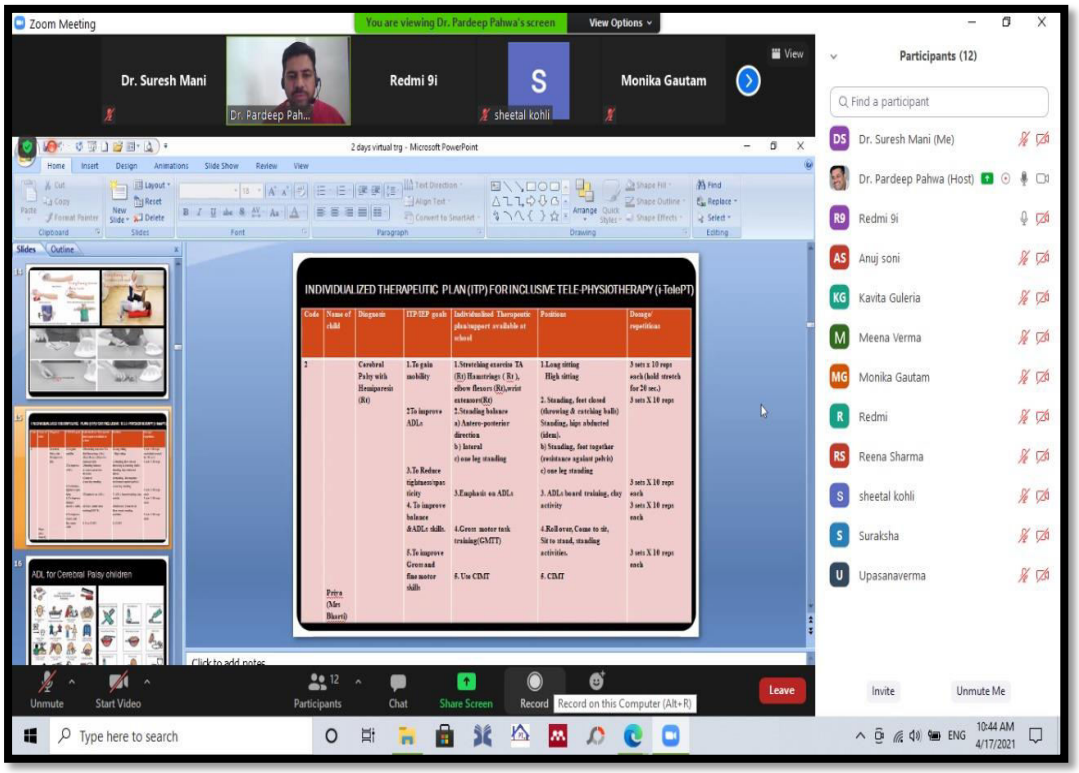


Figure 3. 16 Exercise demonstration to educators during training session

Day 2 (18th April, 2020) - On the second day of workshop, first session was started by Mr. Shakti Singh, an ICT Lab manager at Composite Regional Centre (CRC) for Persons with Disabilities, Sundernagar. He provided the knowledge to special educators on diverse technological equipments, setting up VC room layout using

ISDN/IP links, other technological equipments (speakers, microphones etc.) and basic troubleshooting during delivery of Telephysiotherapy. Details of various apps including Zoom Google meet, their operations was being explained in details. Later on, second sessions of day was concealed by Pardeep. K. Pahwa on Conceptual i-TelePT framework along with CP evaluation tools. In the last hour, special educators were narrated about synchronous and asynchronous mode of TelePT delivery protocol specifically designed for each block of special educator along with time table. In the end, Hands on approach for patients was demonstrated to special educators via virtual mode and asked about any enquiry or questions from their side (figure 3.17).

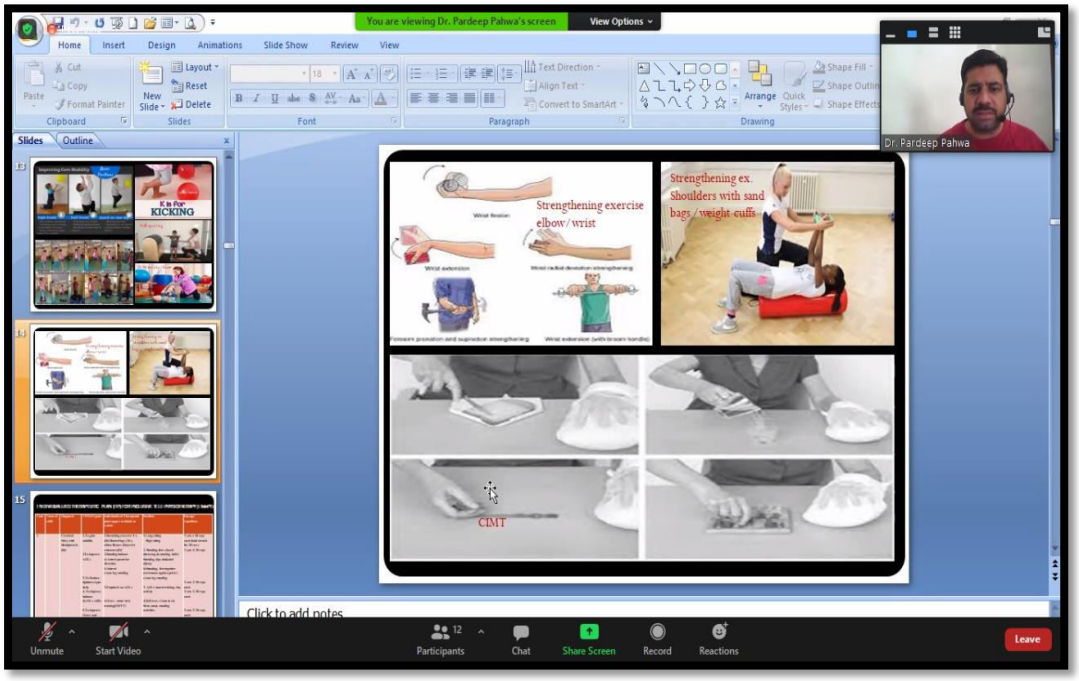


Figure 3. 17 Virtual training session for educators with demonstration of exercises

In the last session, thanks was conveyed to Dr. Suresh Mani, Mr. Shakti Singh and to all educators participated in virtual training programme. All the educators were requested to fill the feedback form in online mode (Appendix R) and submit it as early as possible.

Outcomes of training workshop

- Able to understand the Telephysiotherapy service delivery in school settings.
- Able to conduct & mark-up procedure for all standard therapeutic techniques.
- Able to advise on appropriate positions, postures and other abnormalities.
- Able to understand the treatment planning in the Telephysiotherapy process.
- Able to learn practical issues regarding use of Telephysiotherapy activities.
- Able to integrate therapeutic approach in educational settings.
- Understanding challenges and advantages of telephysiotherapy delivery mode.
- Structuring the session to maximize success.

3.2.10 Data Analysis

A framework method was used for analysis of qualitative data based on discussions and results were interpreted for developing the module. Both FGDs conducted through online & offline way relied completely on four key steps notably Planning, Recruiting, Analysing and Reporting [459]. The participants answered and percepted with responses against key probe questions as manifested in table 3.5.

Table 3. 5 Guide Questions for Focus group discussions

S.N	Probe key questions as guide for both FGDs
1	Special educator role in managing children with CP.
2	About Cerebral Palsy, causes & management
3	Liasoning with C.P children and their parents via technology
4	Percepting about the Telephysiotherapy for C.P children?
5	Elements of Telephysiotherapy layout ?
6	Database of patients, Reporting system and Adherence to therapy

The focus group talks captured in audiotapes were transcribed into Hindi and then handwritten transcripts were translated from Hindi to English and transformed to

electronic form using Microsoft Word. After that, the data was transferred to Microsoft Excel spreadsheets, creating columns with all of the remarks (figure 3.18). After then, the facilitator and other researcher who weren't participating in the study evaluated and analysed the transcripts qualitatively [460].

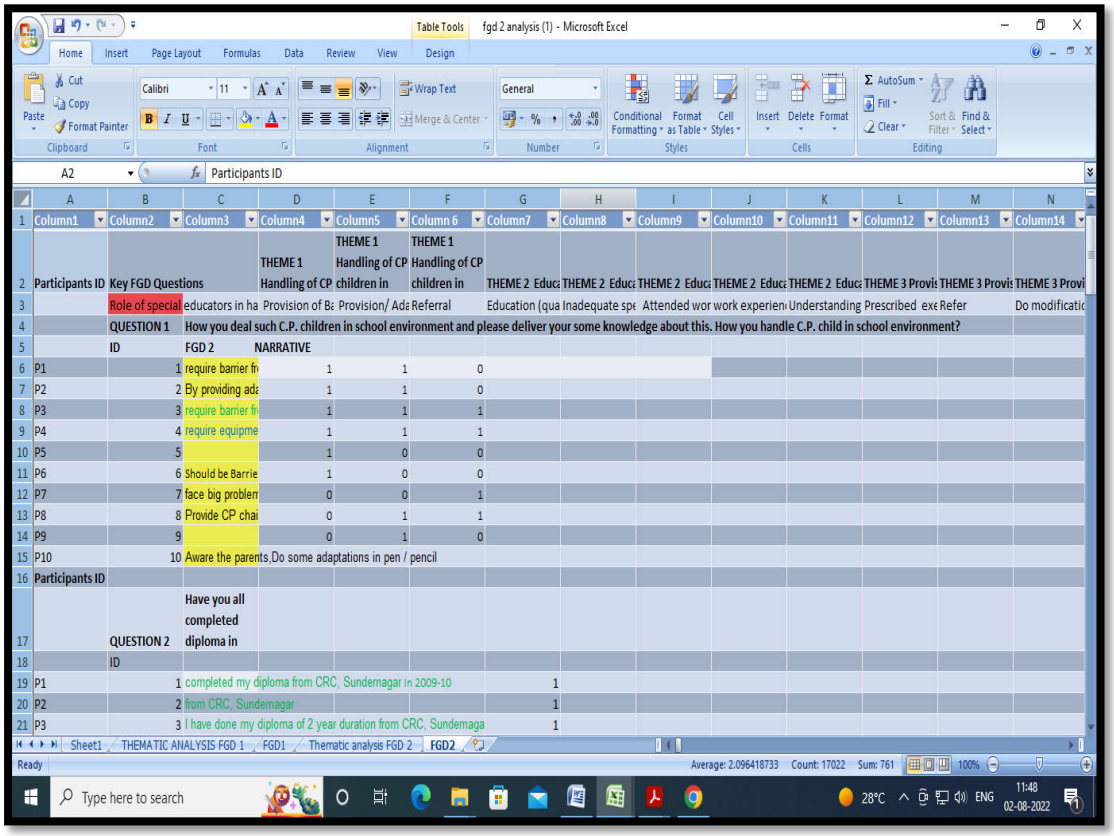


Figure 3. 18 Migration of Transcribed data into Excel Sheet

Participant's responses from prescribed questions performa were examined. Significant ideas and common themes were identified and coded utilizing Microsoft excel (figure 3.19). Thematic content analysis, an element of the framework were employed for analysing the data obtained during the FGDs immediately after the transcribed version of the FGDs became accomplished [63], [460]. Each response was labelled and designated with codes following analysis and the general themes and subthemes in order that evolved there from this had been subsequently grouped as displayed [455] in figure 3.20.

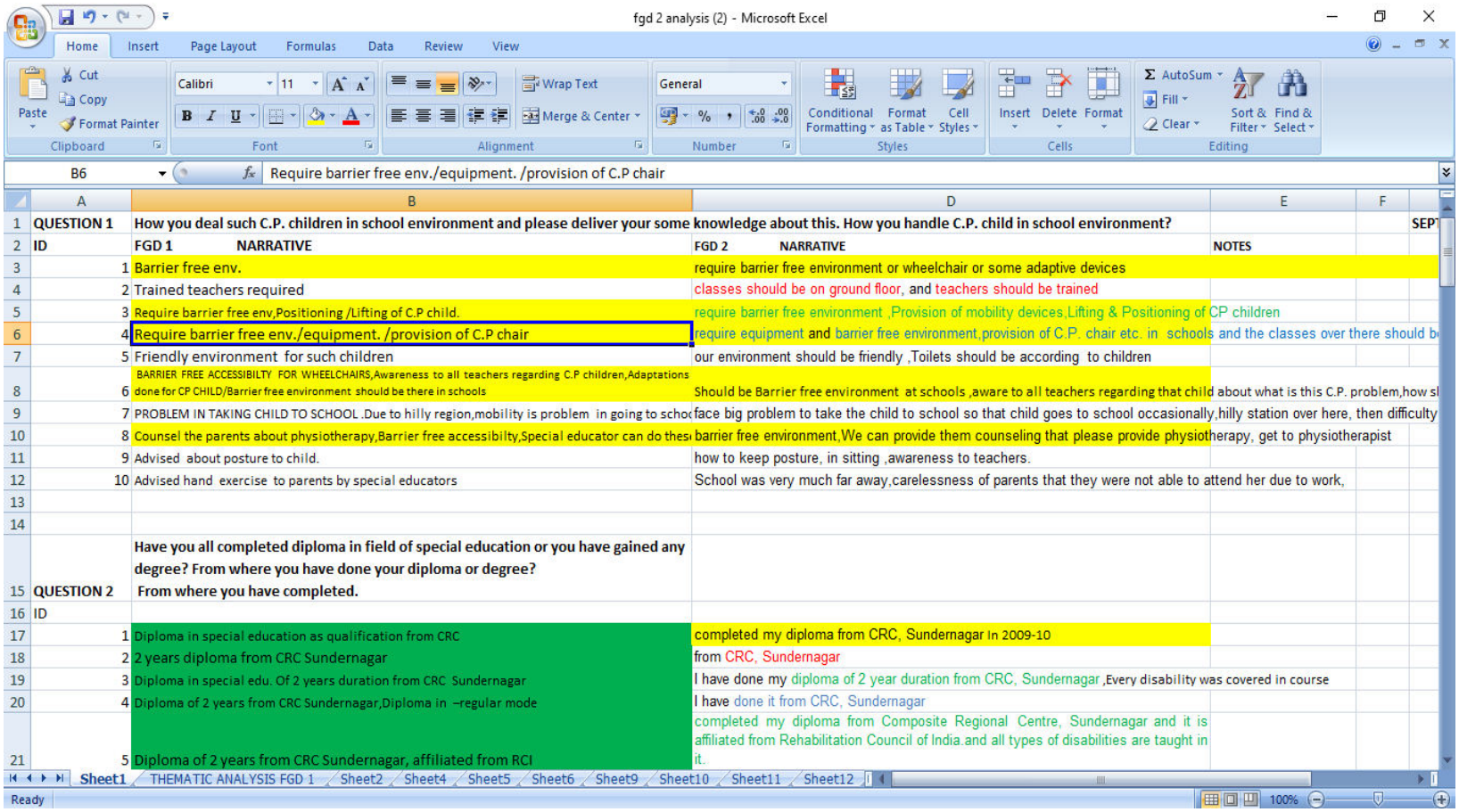


Figure 3. 19 Common Themes with color codes into Excel sheets

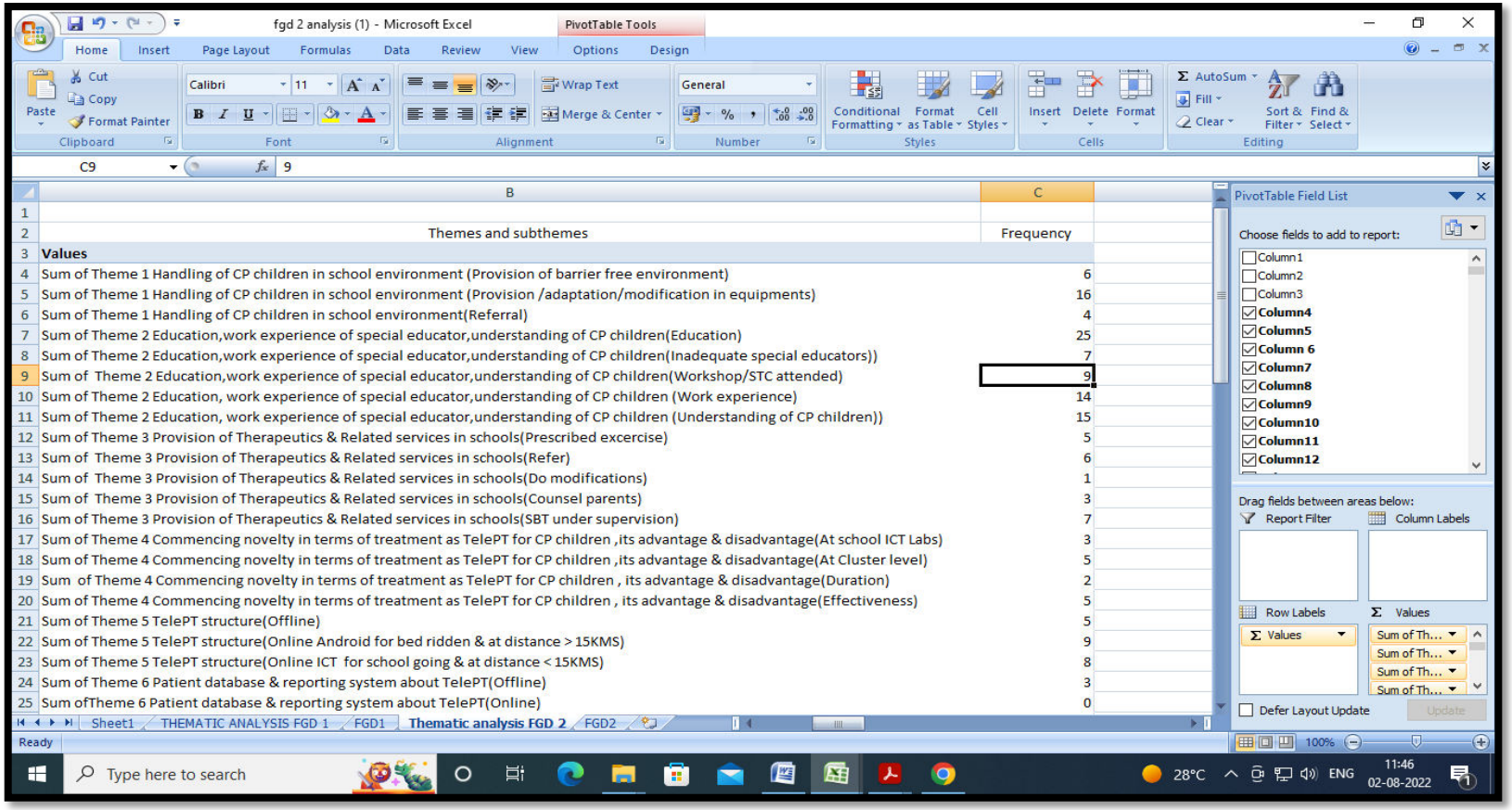


Figure 3. 20 Sum of Themes & Subthemes of FGDs into Excel Sheets

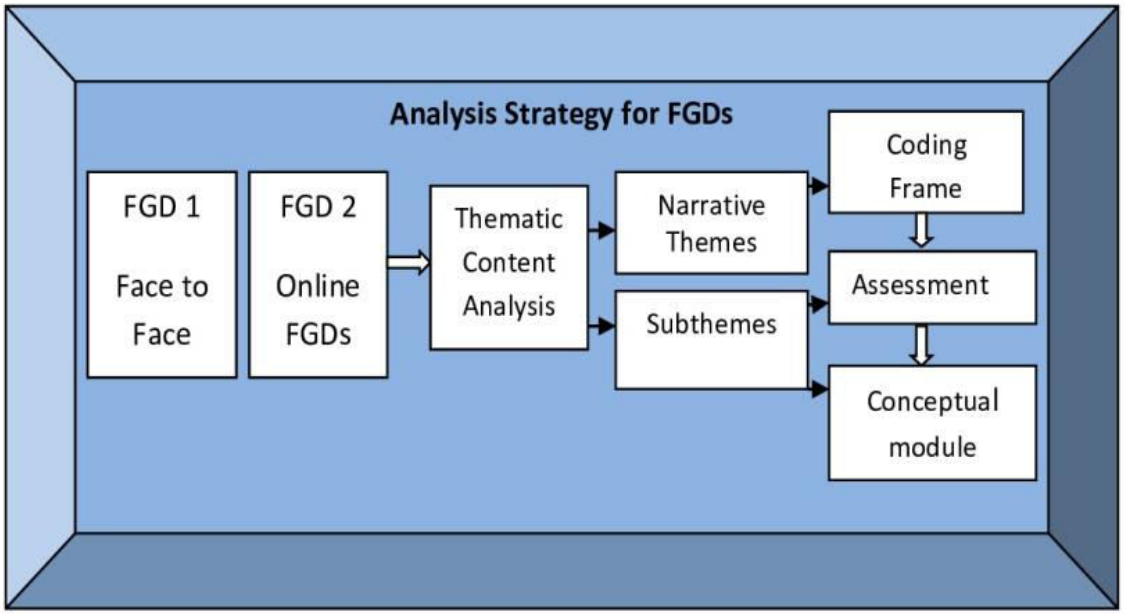


Figure 3. 21 Analysis Strategy followed for FGDs

The data was cross checked multiple times for effective analysis (figure 3.21). A final report was prepared of the FGDs revealing key questions and findings and final reporting of both focus group discussions timelined round two and half months.

3.3 Methodology for Feasibility of Delivering of i-TelePT (Phase- III)

3.3.1 Research Design

The present third phase is a pre & post intervention single group non randomized study design without control group.

3.3.2 Study Population

The students with CP from class I to VIII (Primary and middle classes) of various government schools under Sarva Shiksha Abhiyan (SSA) of District Mandi, Himachal Pradesh were recruited as the subjects in this phase simlar to phase 1.

3.3.3 Sampling Method

The sampling used in this phase of study was purposive sampling method. It was a particular kind of non-probability sampling technique that relied on data collecting from population members that the researcher could simply and conveniently access.

3.3.4 Sample Size

However, the study is focused on CP children in inclusive set up which are limited in numbers. A total number of (n=20) certified CP children which were recruited as sample as in phase 1 of the study. The study had only (N=20) CP children in inclusive education set up (at 95% CI, Error 0.05).

3.3.5 Selection Criteria

3.3.5.1 Inclusion criteria

1. Students with CP of all types and categories diagnosed with minimum forty percent shown in medical certificates authorised by Chief Medical Officer.
2. Mild intellectual disability associated with CP children (I.Q level 50-70%) [438].
3. Classified with all grades of GMFCS for CP children [213].
4. All male and female students in class between age group of 6-12 years.
5. Students of first to eight classes of all sections in Government schools under SSA in district Mandi.
6. Consent to participate in the study is given by the participants, parents or legal guardians.

3.3.5.2 Exclusion criteria

1. Secondary and senior secondary school-aged CP adoloscents.

2. Various other kids with autism, down syndrome and developmental delay.

3. Intolerant to treatment students with epilepsy or seizure disorders.

4. Within months of starting therapy, CP youngsters had surgery or received Botox injections or having any drug/therapy in six months.

5. CP is linked to hearing and vision problems, moderate and severe/profound intellectual disability and other diseases.

3.3.6 Study Location

The students were treated and monitored at their home via home android labs and at school cluster labs at schools in district Mandi(HP).

3.3.7 Equipments

Various tools and equipments required at therapist end and at school for video call presentation as shown below;

- Desktop including web camera, mic & loudspeakers.
- Zoom videoconferencing software application installed on desktop & mobile.
- Proper 4 G connectivity.
- Adequate space for therapy sessions with chair/weights or plinth.
- Regular school resource room for tele-monitoring and telephysiotherapy.
- Single CP student with his or her ITP plan (Appendix U) in resource room.
- CP Student managed by special educator in school and by physiotherapist at distant videoconferencing system.

The equipments for CP child at home & schoolare android or desktop with 4G capability loaded with suitable Zoom app, adjustable android stand with charger and appropriate therapy equipments– weight cuffs, gym ball, medicne balls etc.

3.3.8 Outcome Measures

Diversified standardized questionnaires were adopted as outcome measures for clinical feasibility of i-TelePT. The standardized tools of assessment for this phase are

the valid & reliable instruments (GMFM-88) [217], [461]; (CPQOL) [440]; (GAS) [443]; (WeeFIM)[444]; (MAS)[219]; (MACS)[221] (PBS) [445]; (VAS) [441], [442] and Telehealth Usability Questionnaire (TUQ) [462], an all inclusive and valid questionnaire to assess the patient's insight into use of it and satisfaction with several categories of telehealth systems encompassing the conventional video systems as well as mobile gadgets. It has 21 items rooted on 6 criteria comprising usefulness; easy for use and learnability; interface & interaction quality; reliability; future use & satisfation.

3.3.9 Procedure

Prior to start of third phase of feasibility of i-TelePT all special educators were trained in implementation of TelePT including both synchronous as well as asynchronous delivery of therapeutics under supervision. The basic information was asked from all the special educators by sending the google form as shown in Appendix M. The individualized telephysiotherapy groups (TP-1 to TP-10) were constituted for special educators, parents of CP children of different educational blocks to disseminate information about TelePT and its delivery. The instructions were given to parents as well as subjects regarding compliance with the telephysiotherapy programme and refrain from other therapeutic manuvers or interventions during this period. The days, time and individualized therapy plans were shared with some basic information to each group as shown in figure 3.22.

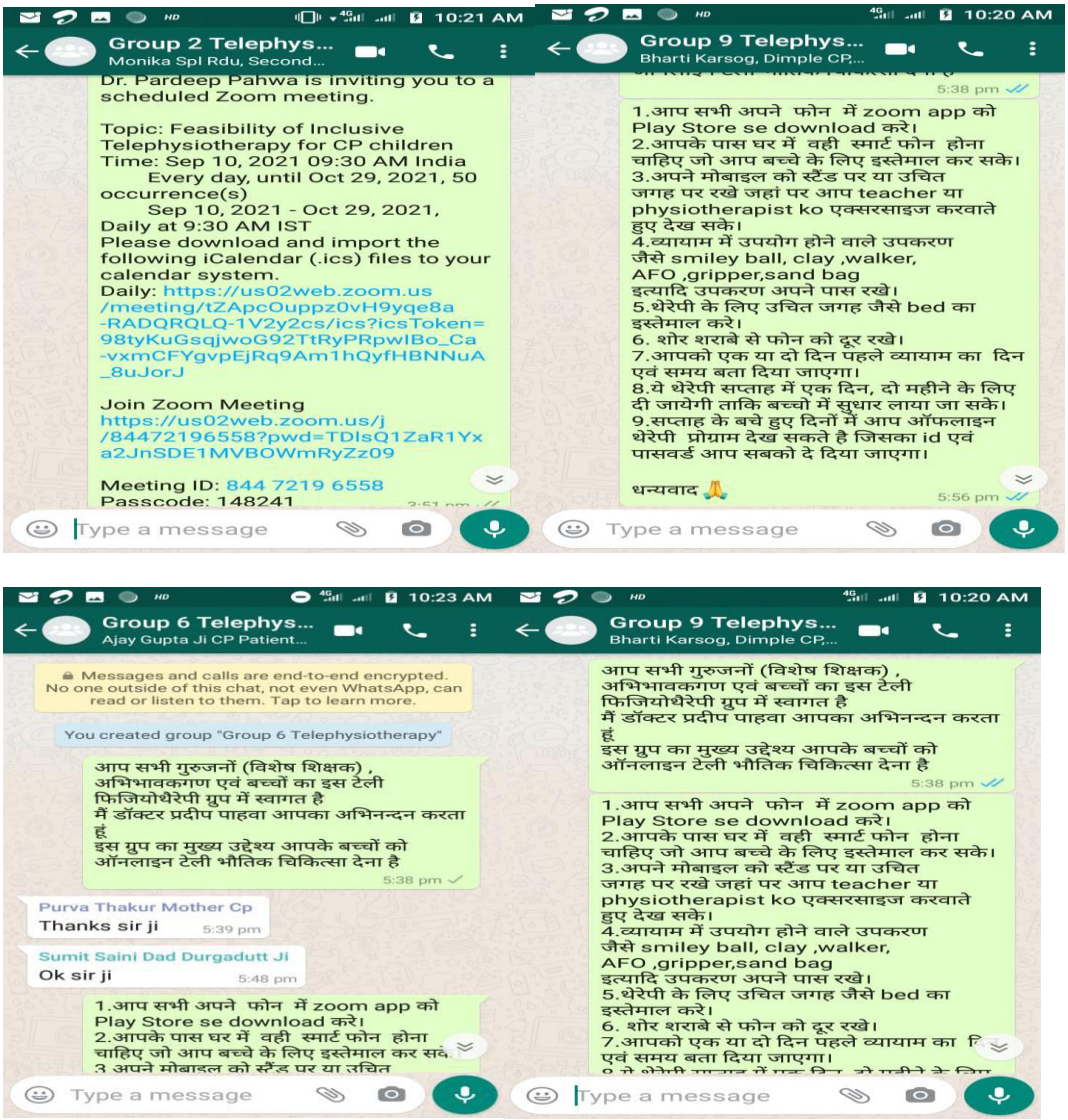


Figure 3. 22 The Individualized TelePT Groups (TP-1 to TP-10) on Whats App

Preliminary with zoom testing was done on one child to see response of TelePT in remote area. Therapy session recording form were filled and kept for each and every child after every TelePT session as shown in (Appendix N). The ethical aspects including privacy, confidentiality for both patients as were as of therapist were followed. The ascent form, consent performa (Appendix I) and Telephysiotherapy agreement (Appendix O) was taken from children and parents prior to start of i-TelePT.

As a part of Service provider and administration, licensing app Zoom was purchased with monthly subscription for collecting, organizing, structuring, storing of data. The

services were offered by licensed Zoom video communications which comply with applicable law [457]. Instruments used for TelePT were maintained and regulated in each and every online session. Reimmenuration was not a criterion however the patients were given some equipments free of cost purchased by researcher. Reimbursement to patients was done for purchasing few equipment used for telephysiotherapy at home. Therapist along with educators used standard protocols to deliver telephysiotherapy services to children.

Children were randomly assigned for one or two conditions due to COVID pandemic as it was not possible to call children at school or to visit at their home for i-TelePT. Visits were scheduled by the special educators under direction of therapist as a part of their existing duties of home visits for educational purpose following COVID protocols as shown in time table (Appendix P). The communication from therapist at one end and special educators going with therapeutic procedure under supervision were conducted through VC via 384kb/s over ISDN using desktop or laptop based VC channel at home. Employing conventional assessments, every children with CP completed examination during both the TelePT basal (3 weeks) and after treatment session (3 weeks approx.) (figure 3.23) (Appendix B).

Figure 3. 23 Post TelePT Assessment & Examination of CP child

The i-TelePT intervention was composed of one session per week for one hour duration delivered over an 8 weeks period [408]. Each virtual meeting was witnessed

by special educators, parents, by including toddlers with CP. A simultaneous interactive digital reality connectivity enabled to ensure secure and productive involvement amongst the client, their therapists, even educators. The therapist at one end via conversational and monitoring mode from CRC or at home while the special educators along with children were primarily based on activity or therapy (figure 3.24).

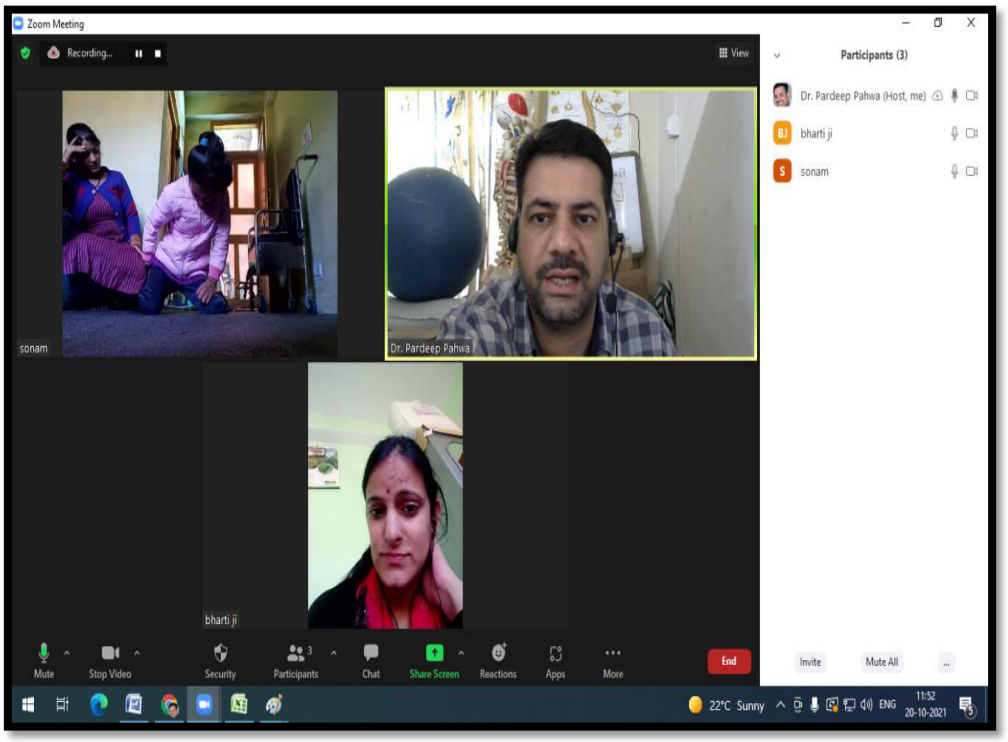


Figure 3. 24 Online VC with educator and CP child on ZooM App

The Physiotherapist delivered the i-TelePT keeping in mind the individualised therapeutic plan (ITP) of child with assistance of special educators based on i-TelePT framework developed by FGDs in phase II. Overall i-TelePT approach prioritised effective treatments to alleviate motor weaknesses along with improving their standard of life among kids experiencing cerebral paralysis through progressive exercises which was based on therapeutic approaches on basis of ICF-CY model having neuro-developmental therapy, goal directed therapy, constraint induced movement therapy, muscle strength training and stretching exercises [205].

Baseline assessment was done at zero weeks of all CP children. The i-TelePT system, presently being used at CRC Sundernagar, incorporates features which encourage offline as well as real-time communication among therapists, educators and pupils with CP. Under the watchful eye of a physical therapist, an exercise rehabilitation session between an educator and child gets underway in real time in an internet-based environment. The home visit by special educators via HAL was composed of single visit per week. A list of projected therapeutic tasks was handed out to parents and educators who discussed with a therapist by means of a video conversation with the goal to streamline and assure that the therapy session proceeded at their homes. Children with CP completed an exercise programme at home or school in COVID phase of 1 hr sessions supervised by special educator in school and remotely by physiotherapist who was located at CRC or home as per convenience. The treatment and monitoring of i-TelePT was performed via video-conferencing system using real-time tablet/mobile videoconferencing software ZOOM via a desktop having in-built camera connected to a 4G cellular data network at both ends. The exercise programme was delivered individually to each patients at home/school through TelePT, carried out by special educators under direct supervision of physiotherapist (figure 3.25).

Figure 3. 25 Interactive Session with CP child demonstrating Exercise

The physiotherapist registered the consultation record regarding each child as documentation during supervision (figure 3.26 & 3.27).

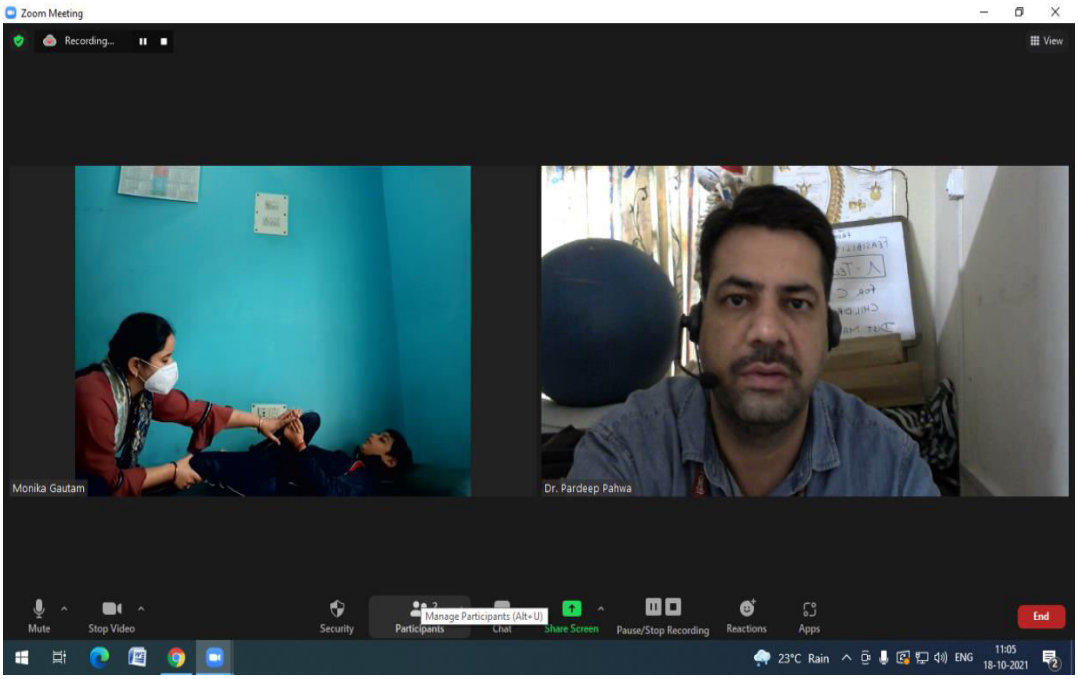


Figure 3. 26 Special Educator performing exercise under supervision of therapist

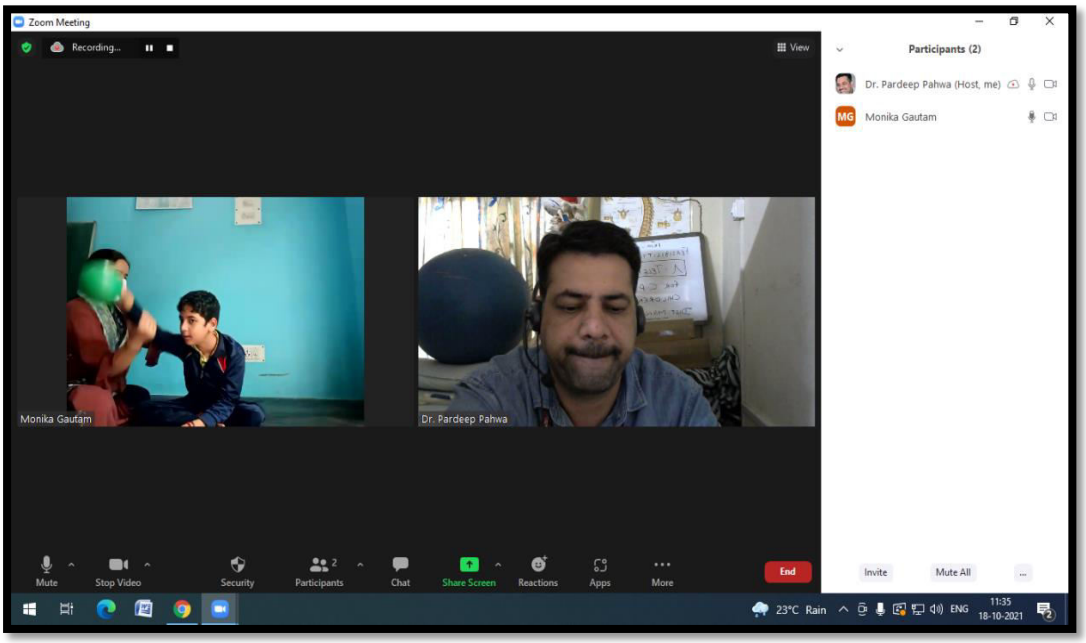


Figure 3. 27 Supervising educator and CP child on ZooM App

3.3.9.1 Components of platform -

The following software as well as hardware components constitute up the Inclusive Telephysiotherapy Infrastructure:

System for video communication- Additionally, there is customised teleconferencing (VC) devices accessible at each centralised station. Employing voice method through an internet protocol (VoIP) VC structure, a particular audio and visual network for communication is established. The VC framework, that is equipped with superior-quality video cameras and microphones, starts a conference call including everyone involved (educators and patients), puts up the patient and therapist perspectives in the viewing window layout and commences sessions capturing (figure 3.28).

Figure 3. 28 Videoconferencing System with Webcam at CRC lab

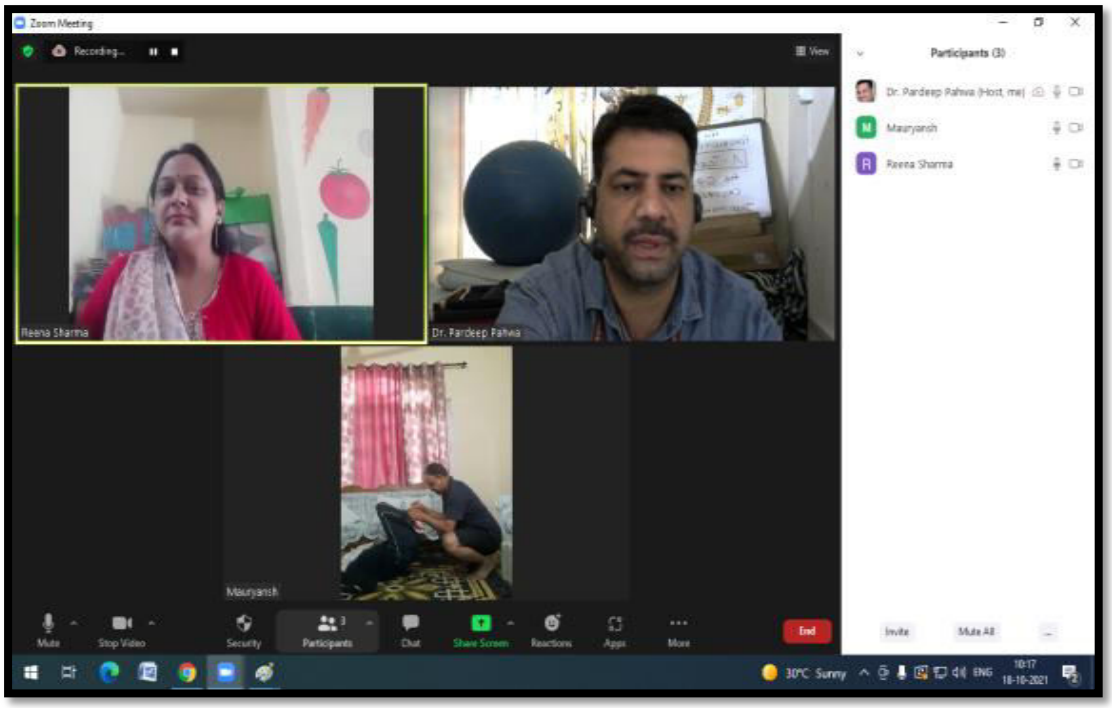


Figure 3. 29 Guiding parents and educator on ZooM App

Each session consisted of short prepatory phase encompassing stretching exercise, balancing exercise followed by different individually designed activities which are repeated at certain number of times (Figure 3.29).The individualized approach was adopted based on each patient's ability and capacity to avoid any injury and to gain functional independency as a result of prescribed programme. The delivery of i-TelePT to CP children via SCCL/HAL is shown in flowchart (figure 3.30) as below:

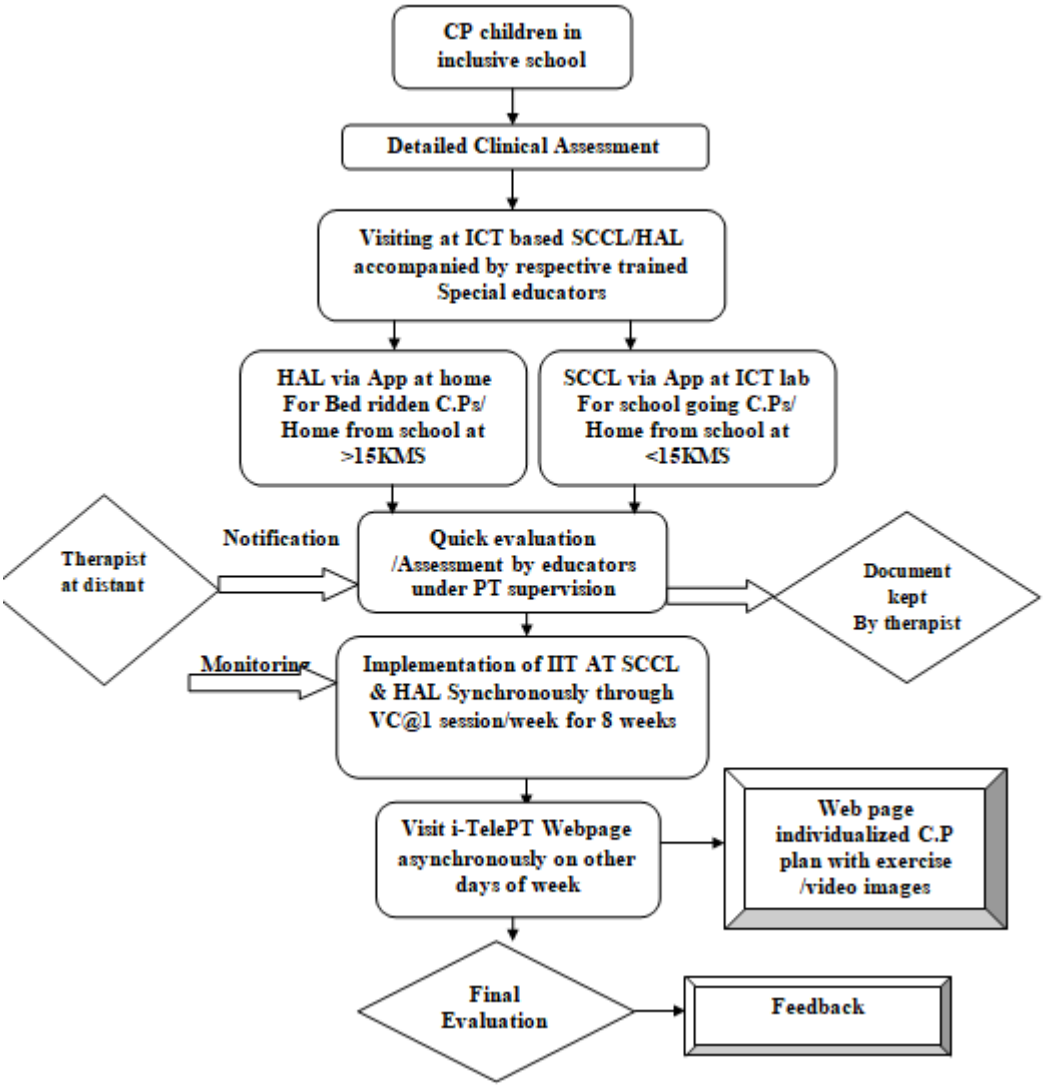


Figure 3. 30 Flowchart for delivery of i-TelePT to CP children in school settings

The delivery of TelePT delivered via ICT labs at schools and school cluster central model (SCCL) equipped with technology at various educational blocks of District Mandi is shown here in figure 3.31. There are (n=7) educational blocks equipped with ICT labs in Government senior secondary schools and schools under these blocks covered the primary & middle schools. The children availed the benefit of ICT labs by visiting there or at their tributaries schools when the distance of schools is less than 20 Kms from home and if the distance is 20 Kms or more, the children with CP were connected by HAL through android.

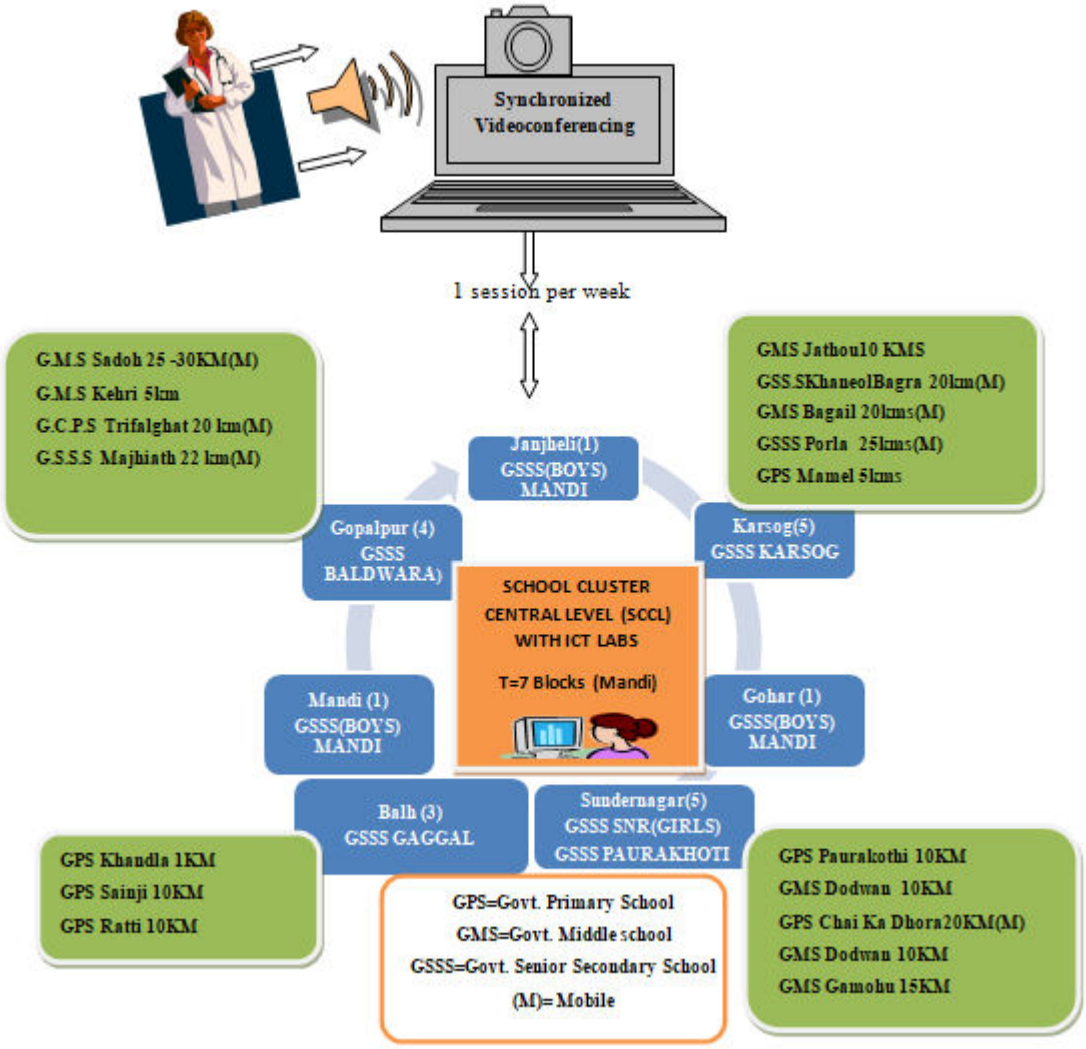


Figure 3. 31 School Cluster Central Model (SCCL) with ICT labs in educational blocks at Dist. Mandi (HP)

The interface fosters the real-time, reciprocal interchange of high-resolution videos with audio as well as photographs in between the CRC's centralized therapeutic station and the collaborating educator's workstations at participating educational institutions and residences for children suffering cerebral paresis.

Figure 3. 32 Therapist Supervising & Monitoring the online session of i-TelePT from Central Station Lab (Front & Rear View)

A computerized process permits educators as well as pupils to gain access to the web-based environments and engage in the one-hour session of exercise with convenience. The central workstations at CRC have been equipped and designed exclusively for the purpose of tracking and establish the TelePT activities (figure 3.32). The central platform at CRC Sundernagar is furnished with high-speed internet connection, a videoconferencing audiovisual system, featuring microphone and loud speakers, especially is linked to a network web server utilizing a network broadband infrastructure with a download speed of 94.46 Mbps and a static internet Protocol (IP) (figure 3.33).

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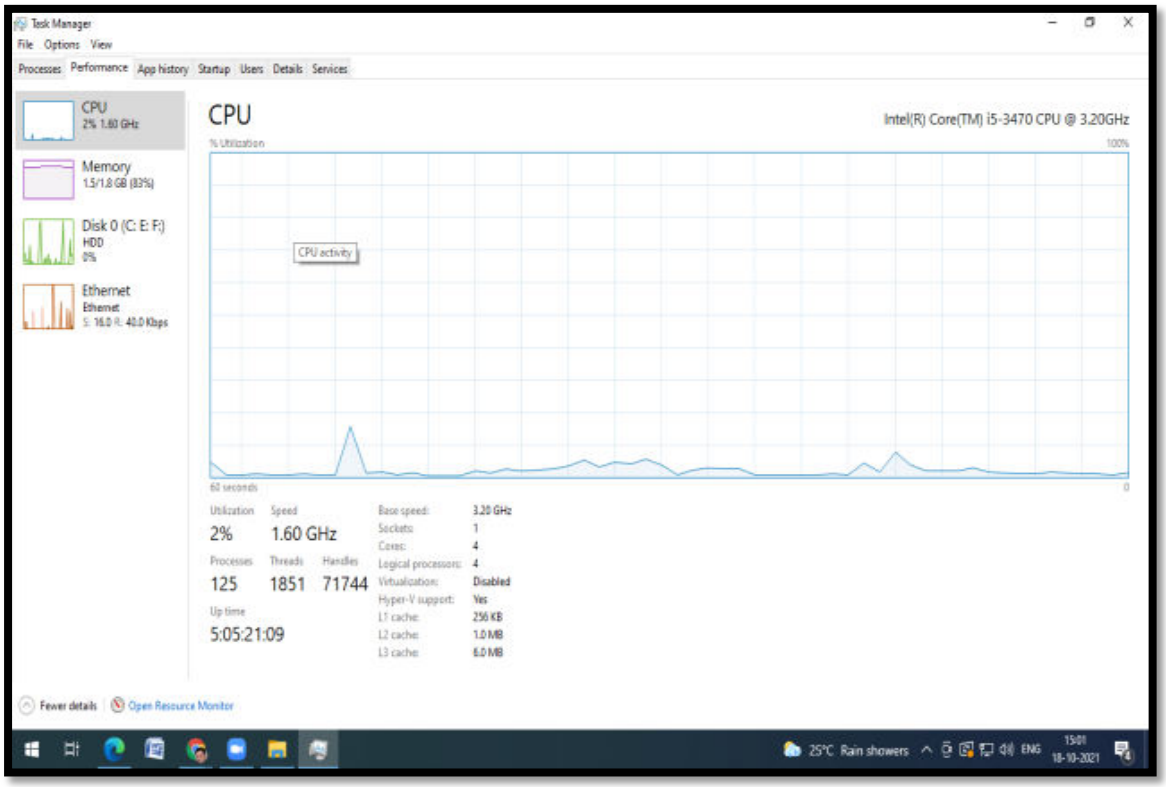


Figure 3. 33 Network Speed during Videoconferencing Session

Moreover, the patient's off-line communications with the website enable them to explore physical rehabilitation sessions, primarily ensuring programme continued progress. Besides trained TelePT members such as therapists, educators and parental authority, monitored off-line rehabilitation group and sessions while spotting pictures and videos tailored exclusively intended for kids with CP during days in addition to VC. For asynchronous mode i-TelePT services, a user ID and passcode were distributed to all educators, carers and CP children. Apart from this online real VC, a web page was designed for exercise record as well as for layout of physiotherapy instructions. Web based individualized exercise programmes and instructions regarding accommodations and adaptations in class and school or home environment were uploaded and advised to educators for asynchronous monitoring of CP children who can easily access the webpage by logging in. The exercise page has a written explanation with video and audio description. The physiotherapist contacted participants via phone or email in order in order to verify their exercise diaries or

reports over distant locations. Eventually, parent's opinions and satisfaction with TelePT have been assessed with the support of educators utilizing the Telehealth Usability Questionnaire (TUQ) [462] as shown in (Appendix V). Together with the help of participants, the TUQ was implemented to determine the effectiveness of this telehealth platform. Comments were graded on the basis of a Likert scale (1: strongly disagree; 2: disagree; disagree; 3: slightly disagree; 4: neutral; 5: somewhat agree; 6: agree; and 7: strongly agree). All eligible parents were contacted individually by telephone. Keeping in mind the educational level as non-english speaking parents, the TUQ was administered by visiting all parents along with educators who had also been present during the question and answer session and data was collected within span of 2 months. The questionnaire was dictated in local language by therapist. Questionnaire responses were anonymously collected and entered with help of special educators accompanying parents and child.

3.3.10 Data Analysis

Demographic data and proportion of responses to the TUQ were compiled using descriptive statistics, which include mean, standard deviation, frequency and percentages. utilising IBM SPSS Ver. 20 for SPSS (IBM Corp., Armonk, NY, USA).

CHAPTER IV

RESULTS

Overview

This chapter outlines the data procedures undertaken to evaluate the feasibility of developed conceptual framework of i-TelePT for this study. The entire model development was based on 3 phases of study as shown in results.

1. Sociodemographic traits among CP students from the elementary and middle grades at government-run educational institutions in the region of Mandi, the state of Himachal Pradesh.
2. In the system of inclusive education in the district of Mandi in Himachal Pradesh, the clinical characteristics of CP students in both the elementary and middle grades in government educational institutions.
3. Development of i-TelePT framework through FGDs with special educators of District Mandi.
4. Feasibility of employing the i-TelePT architecture for discerning physical constraints in children with cerebral paralysis.

4.1 Results - Phase I

The socio-demographic background of parents of children with CP in district Mandi is displayed in Table 4.1. A total of 20 school-age youngsters CP children in primary and middle classes in Government schools made up the research population, with 9 girls (45%) and 11 boys (55%) as shown in figure 4.1. Table 4.1 shows the various educational blocks of C.P children in District Mandi studying under inclusive education under SSA, with highest percentage of CP children noticed in Karsog & Sundernagar educational blocks each (25%), followed by Balh & Gopalpur-2 block each (15%) and rest (5%) each in Gohar, Janjheli, Gopalpur -1 & Sadar Mandi as shown in table.

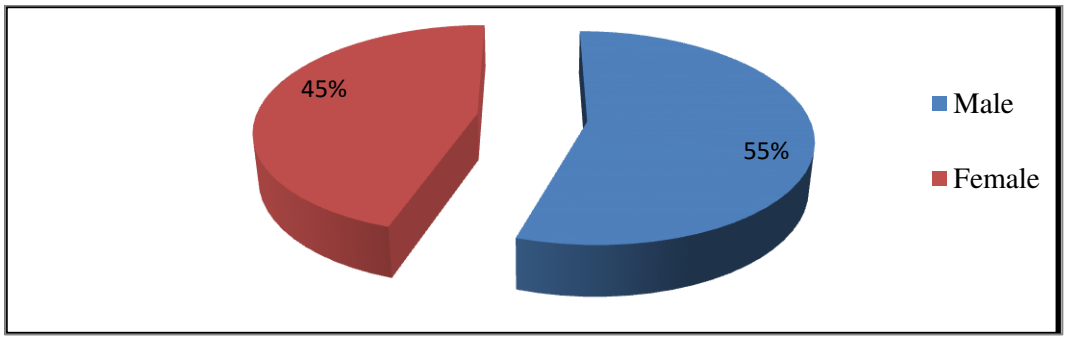


Figure 4. 1 Percentage showing distribution of male & female school children

The age distribution of C.P children with highest percentage in age group of 8-10 years (55%), followed by >10 years (35%) and in age of less than 8 years (10%) as depicted in figure 4.2.

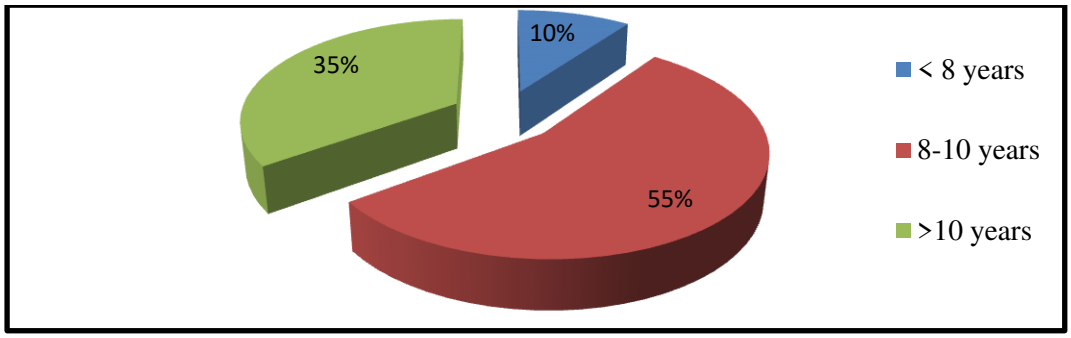


Figure 4. 2 Age group (Years) distribuion of CP children

Table 4. 1 Sociodemographic attributes of elementary and middle class CP school students and their guardians in a system of inclusive schooling in district Mandi, HP.

Demographic Variables	**Category**	**Frequency (n)**	**Percentage(%)**
Gender CP children	Male	11	55
	Female	9	45
Age group(Years) CP children	< 8 years	2	10
	8-10 years	11	55
	>10 years	7	35
Educational Blocks			
(District Mandi)	Balh	3	15.0
	Gopalpur -1	1	5.0
	Gopalpur -2	3	15.0
	Gohar	1	5.0
	Janjheli	1	5.0
	Karsog	5	25.0
	Sadar Mandi	1	5.0
	Sundernagar	5	25.0
Economic class variables	Upper class (b/w 5-10 Lac/annum	1	5
	Middle class (below 2 Lac/annum)	3	15
	Lower class (below 1 Lac/annum)	16	80

Mother Educational qualification	Illiterate	1	5
	Middle completed	3	15
	High completed	10	50
	Senior secondary completed	4	20
	Graduation completed	1	5
	Post graduation completed	1	5
Father Educational qualification	Illiterate	0	0
	Middle completed	2	10
	High completed	7	35
	Senior secondary completed	6	30
	Graduation completed	3	15
	Post graduation completed	0	0
Mother's occupation	Housewives	18	90
	Anganwari workers	1	5
	Farmer	1	5
Father's occupation	Private jobs	11	55
	Farmers	8	40
	Govt job	1	5

Most of parents (80%) of children with CP belong to lower economic class based on their income which is below one lac per annum. 15% of parents belong to middle class i.e. their income is between 5-10 lac per annum and 5% parents are in lower income group revealed in figure 4.3.

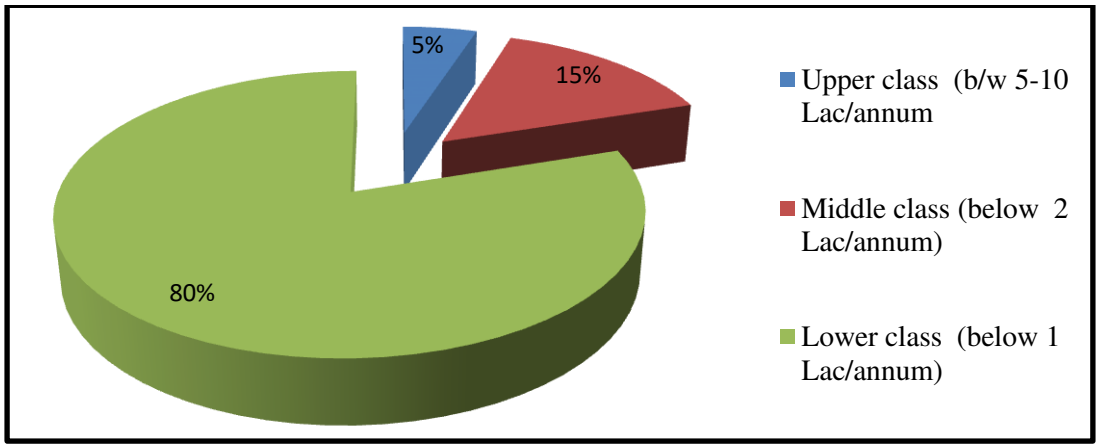


Figure 4. 3 Socioeconomic background of parents of CP children

The educational level of mothers of children with CP i.e. only single mother was Illiterate 5% (N=1), Middle completed 15% (N=3), High class completed 50% (N=10), Senior secondary completed 20% (N=4), Bachelor completed 5% (N=1) and Master completed 5% (N=1) as manifested in table 4.1 & labelled in figure 4.4.

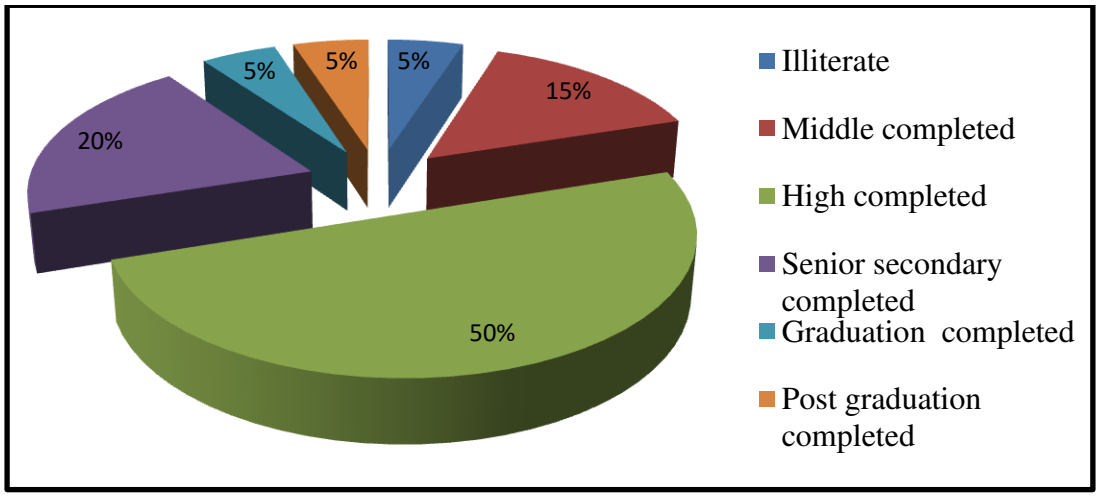


Figure 4. 4 Percentage of educational qualification of Mothers of CP children

According to studies, no father of these children was found Illiterate 0% (N=0), Middle completed 10% (N=2), High completed 35% (N=7), Senior secondary completed 30% (N=6), Bachelor completed 15% (N=3), Master completed 10% (N=2) as exhibited in figure 4.5.

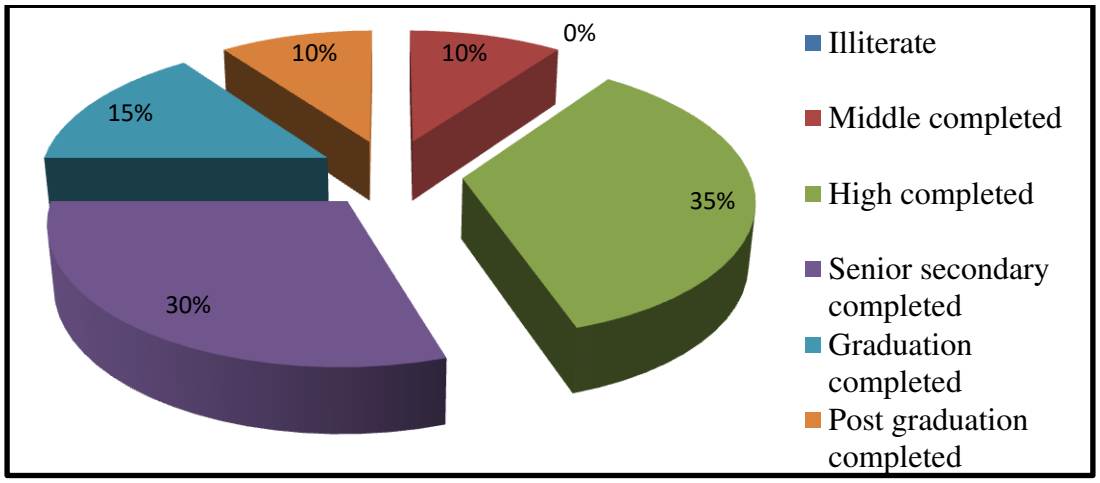


Figure 4. 5 Percentage of educational qualification of Fathers of CP children

The figure 4.6 displayed that most of mothers of these 20 participants were housewives 90% (N= 18) and others were anganwari worker 5% (N=1) and farmer 5% (N=1) as also revealed in table 4.1.

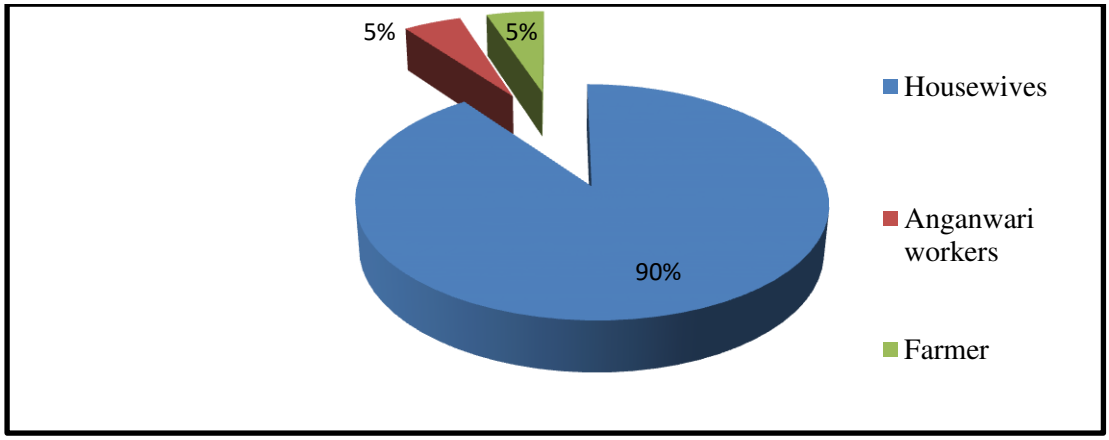


Figure 4. 6 Percentage of occupation profile of mothers of CP children

On the contrary, most of fathers were having private jobs 55 % (N=11), having occupation of farming 40 % (N= 8), and possessing govt jobs 5 % (N=1) flashed in figure 4.7.

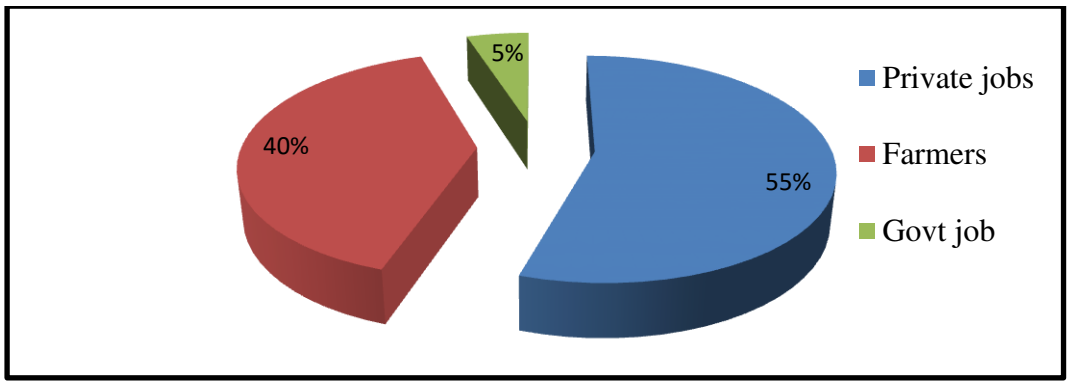


Figure 4. 7 Percentage of occupation profile of fathers of CP children

The demographic details regarding the study's population, which had a mean age of 9.85 years, weight of 26.45 kg and height of 125.30 cm, is outlined in Table 4.2.

Table 4. 2 Demographic characteristics of the sample

S. No.	Demographic Variables	Mean ± SD
1.	Age (in years)	9.85 ± 1.69
2.	Weight (in kg)	26.45 ± 10.5
3.	Height (in cm)	125.30 ± 18.28

The comprehensive clinical profile of children with Cerebral palsy in inclusive education system in District Mandi is shown in table 4.3.

Table 4. 3 Clinical Portrait of CP pupils located in district Mandi, HP comprehensive school system

Birth history	Categories	Frequency (n)	Percentage(%)
	Preterm (< 37 weeks)	8	40
	Term (37 weeks)	11	55
	Post Term (> 37 weeks)	1	5
History of delivery			

	Doctor	11	55
	Nurse	1	5
	Midwives	8	40
Mother complication during pregnancy			
	Anaemia	2	10
	Hypotension	1	5
	Hypertension	1	5
	Fever	1	5
	Nil complications	15	75
Mother's labour period			
	Prolonged labour pain	3	15
	Caesarean delivery	1	5
	Sudden birth	1	5
	Normal	15	70
Prenatal Complications	No	14	70
	Anaemia	2	10
	Hypotension	1	5
	Meconium Aspiration	1	5
	Fever	1	5
	Hypertension	1	5
Perinatal			

complications	No	14	70
	Birth asphyxia	1	5
	Caesarean delivery	1	5
	Prolonged labour	3	15
	Sudden birth	1	5
Post natal Complications			
	Low Birth Weight (LBW)	2	10
	Jaundice	3	15
	Delayed birth cry	7	35
	Birth asphyxia	2	10
	Fever	1	5
	Others	1	5
	No complications	4	20
Mobility Aids & appliances used			
	Wheelchair	5	25
	Crutches	2	10
	Rollators	4	20
	CP chair	2	10
	No appliances	7	35

The birth histories of the research participants who had CP are shown in Table 4.3. Out of 20 participants, 40% (N=8) were Preterm (< 37 weeks), 55% (n=11) were

Term (37 weeks) and 5% (N=1) were Post-term (> 37 weeks) as expressed in figure 4.8.

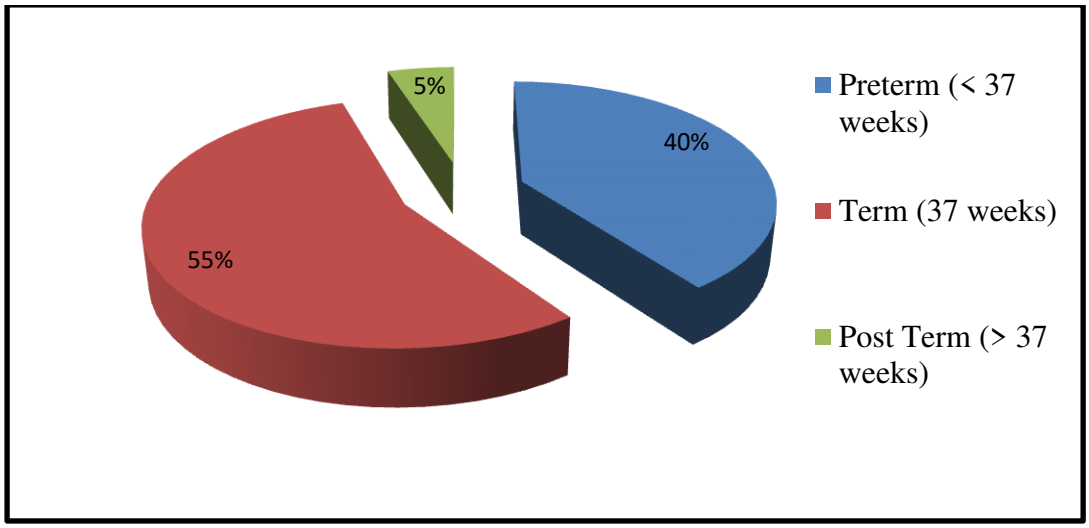


Figure 4. 8 Percentage of Birth history of CP children

As illustrated in table 4.3, the history of deliveries of children, out of 20 participants, 55 % (N=11), deliveries were attended by doctor, 5 % (N=1) by nurse, 40 % (N=8) by midwives. The mothers got complications during pregnancy of children with CP as showed in table that 10 % (N=2) mother had Anaemia, 5% (N=1) mother had hypotension, 5% (N=1) mother had high blood pressure, 5% (N=1) had fever and 75% (N=15) had no complications. Table showed that 15% (N=3) mother had prolonged labour pain, 5% (N=1) mother had caesarean delivery, 5% (N=1) mother had sudden birth and 75% (N=15) had no problems during labour period.

No complication noticed in 70% (N=14) of cases, 10% (N=2) of cases were having anemia, while hypotension, muconium aspiration, fever and hypertension were noticed in 5% cases (N=1) each during prenatal period. On the other hand during perinatal period, there was no complication seen in 70% (N=14) of cases, 15% of cases (N=3) were facing prolonged labour pain and 5% cases were suffereing from birth asphyxia, sudden birth and caesarian delivery (N=5) cases each. Table showed that after birth 10% (N=2) child developed LBW, 15% (N=3) developed jaundice, 35% (N=7) developed delayed birth cry, 10% (N=2) developed birth asphyxia, 5%

(N=1) developed fever, 1% (N=5) had others problems and 20% (N=4) had no complications among 20 participants as depicted in figure 4.9.

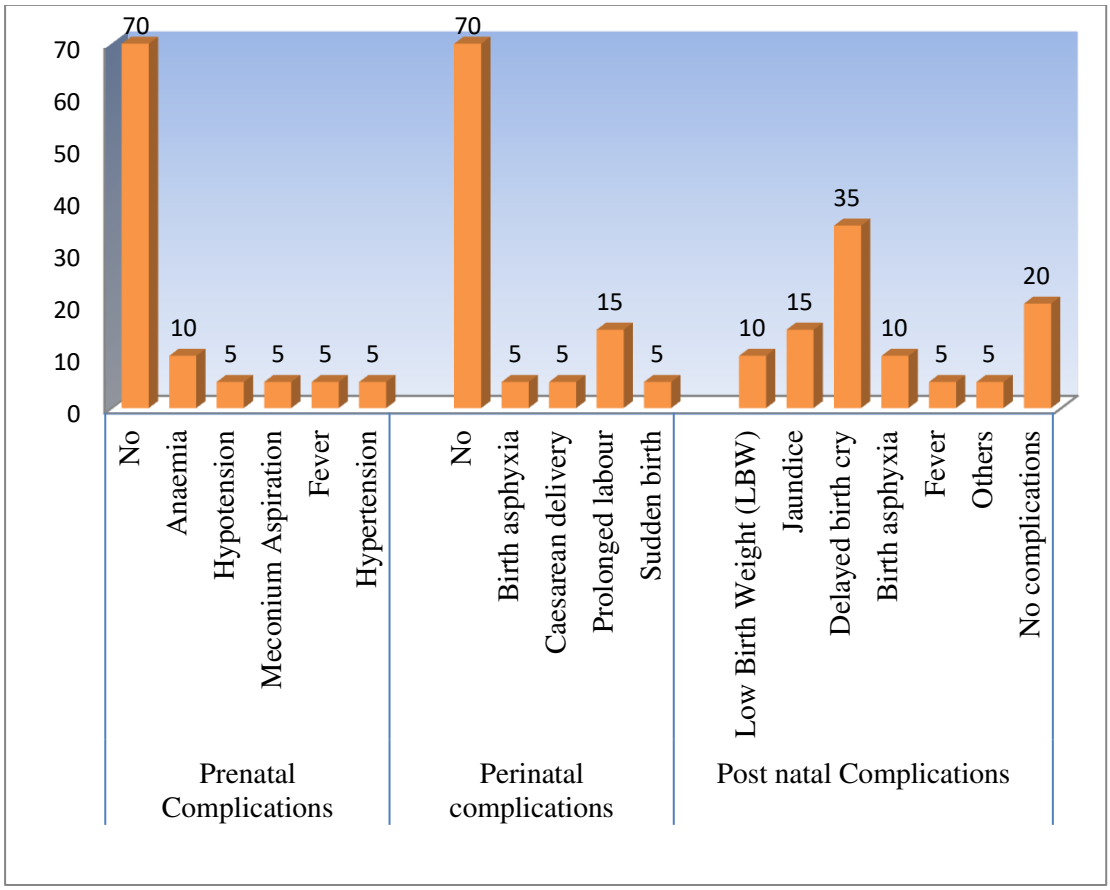


Figure 4. 9 Percentage distribution of Pre/Peri/Post natal complications

Table 4.3 also illustrated that 25% (N=5) CP children had wheelchair for mobility, 10 % (N=2) had crutches, 20% (N=4) had rollators, 10 % (N=2) had CP chair and rest others 35 % (N=7) CP children had no aids or appliances for mobility. Based on their medical endorsements several different clinically distinct types of CP have been outlined in Table 4.4.

Table 4. 4 The Clinical dissemination for CP kids in District Mandi (n=20)

Clinical type of C.P	Total (n=20)		Boys (n=11)		Girls (n=9)	
	Freq. (n)	Percent (%)	Freq. (n)	Percent (%)	Freq. (n)	Percent (%)

Spastic Diplegic (SD)	8	40	4	20	4	20
Spastic Quadriplegic (SQ)	5	25	3	15	2	10
Spastic Triplegic (ST)	1	5	0	0	1	5
Spastic CP (S)	1	5	1	5	0	0
Cerebral Palsy (CP)	1	5	1	5	0	0
Cerebral Palsy Paraplegic (P)	1	5	1	5	0	0
Cerebral Palsy Hemiplegic (H)	3	15	1	5	2	10

Spastic diplegic CP represents by far the most ubiquitous variety (with a statistic of 40%), subsequently followed by Spastic quadriplegic CP (with a percentage of 25%), Hemiplegic CP (with a rate of 15%), followed by two additional clinical forms-Triplegic, Paraplegic, Spastic CP & CP with a rate of 5% each of them based on disability certificates. Although the research samples remained restricted and encompassed solely a particular age range of children with CP, no reported cases of Ataxic, neither Athetoid nor mixed types were detected as presented in figure 4.10.

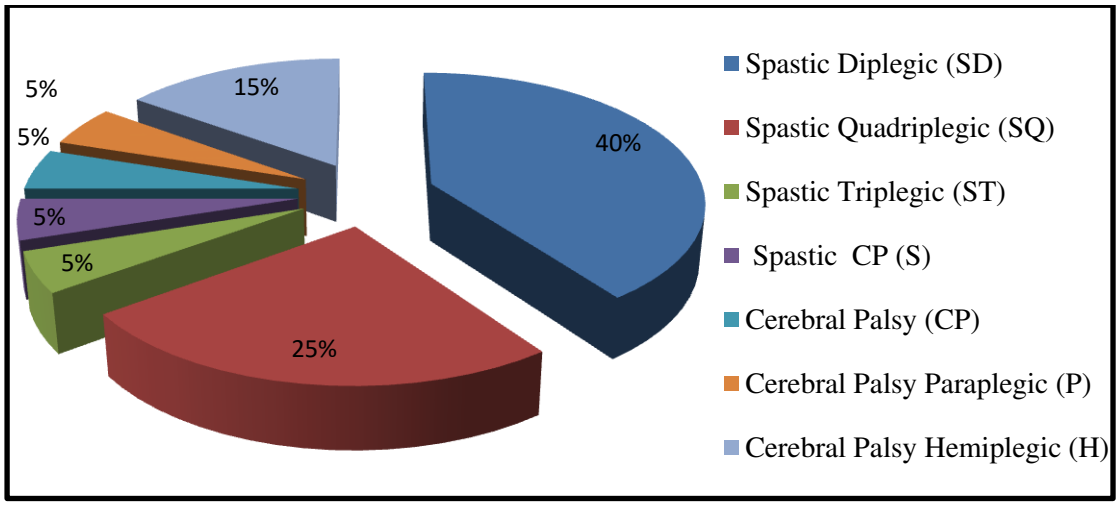


Figure 4. 10 Percentage distribution of types of CP

Table 4.5 revealed the comorbidites as associated problems along with main features of CP and noticed that 40% (n=8) CP children had mild intellectual disability, 15 % (n=3) had drooling of Saliva, 10% (n=2) had speech problems, 5 % (n=1) had

respiratory problems, swallowing and Gastrointestinal problems each and rest others 20 % (n=4) CP children had no complications displayed in figure 4.11.

Table 4. 5 Co morbidities of CP children in District Mandi (n=20)

Associated Problems	Total (n=20)		Male (n=11)		Female (n=9)	
	Freq. (n)	Percentage (%)	Freq. (n)	Percentage (%age)	Freq. (n)	Percentage (%age)
Intellectual disability	8	40	6	30	2	10
Drooling of saliva	3	15	2	10	1	5
Speech problems	2	10	1	5	0	0
Respiratory problems	1	5	0	0	0	0
Swallowing problems	1	5	1	5	0	0
Gastrointestinal	1	5	1	5	0	0
No complications	4	20	0	0	6	30

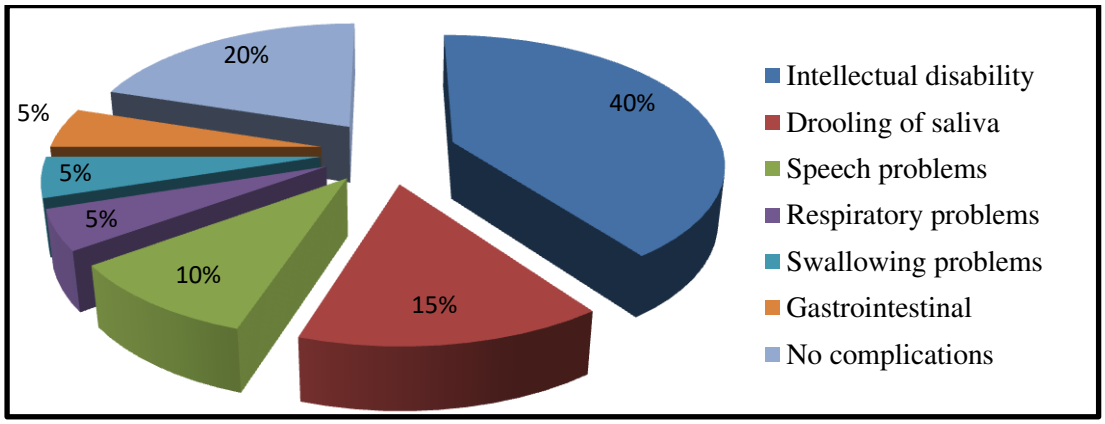


Figure 4. 11 Percentage distribution of associated complications of CP children

In all, a total of 35% kids have been found in grade II of the GMFCS (E&R), 30% of whom are in grade IV, 20% in grade I, none of them have been detected in grade III, and 15% of students are in grade IV as shown in figure 4.12.

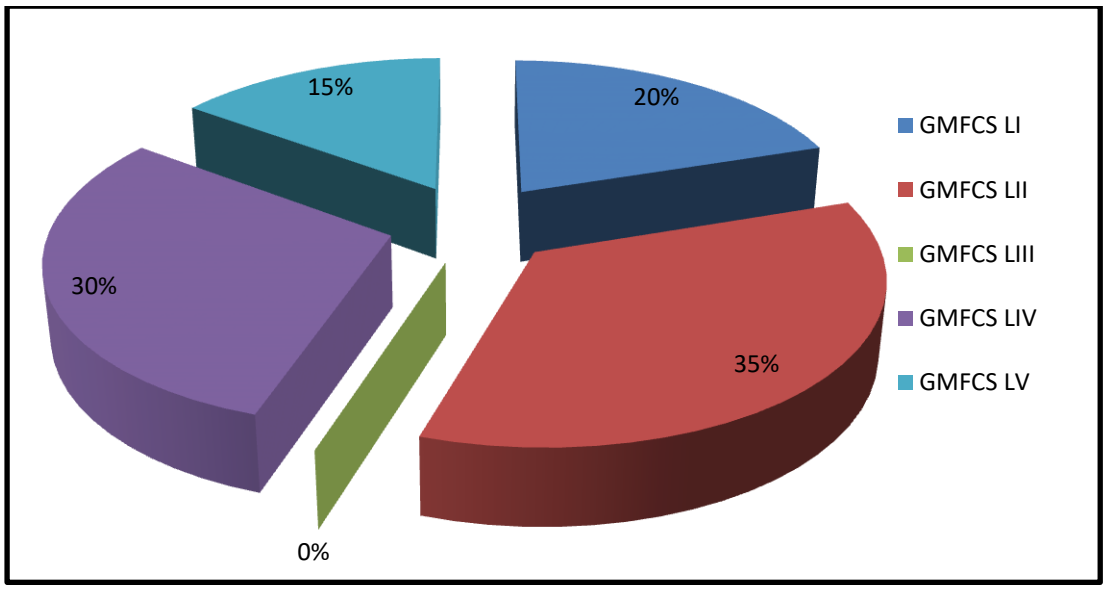


Figure 4. 12 Percentage distribution of GMFCS Level (I-V)

Every single one of the twenty children possessed their fine motor abilities evaluated with the help of MACS shown in figure 4.13, which at first determined that 15% (n=3) of these kids experienced Grade I skills, 45% (n=9) of the total CP cases were having Grade II competencies, 15% (n=3) endured Grade III capacities, 20% (n=4) encountered Grade IV competencies, and 5% (n=1) were having Grade V skills, highlighted in table 4.6.

Table 4. 6 Levels of disability distribution among children with CP (n=20)

MACS Level	Levels	Frequency (n)	Percentage(%)
	LI	3	15
	LII	9	45
	LIII	3	15
	LIV	4	20
	LV	1	5
GMFCS Levels			
	LI	4	20
	LII	7	35
	LIII	0	0
	LIV	6	30
	LV	3	15

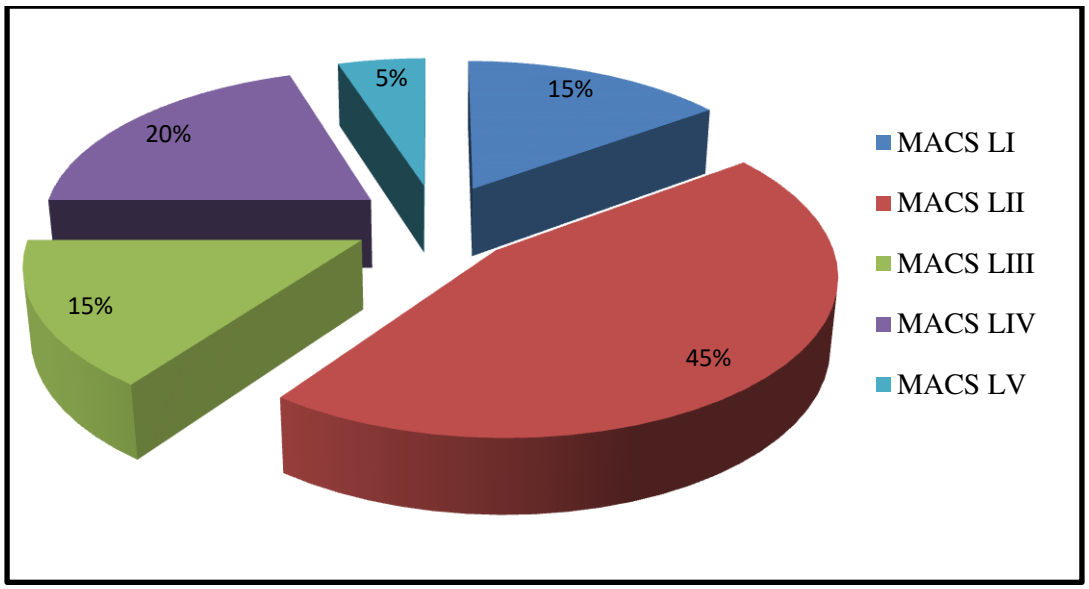


Figure 4. 13 Percentage distribution of MACS Level (I-V)

ICF-CY illustrations investigate the forms, degree of severity, and limitations of function in children with CP by employing specific briefly basic sets in place. They successfully achieve this level by charting the unique features of a growing child in context of his or her surroundings. The percentages of the ICF Sub parameters, including body structures (s), body functions (b) and activities & participation (d), that were a part of the study's core set are shown in Table 4.7. ICF Qualifications for activities, participation and bodily structures is as follows: ICF qualifiers: 0 = no issue, 1 = minor issue, 2 = moderate issue, 3 = severe issue, and 4 = major issue 9 is not relevant, and 8 is not mentioned.

Body functions (b)

In total, there were 10 ICF-CY identifiers featured in this group. No impairment in children with CP was noticed in category of pain (70%) while only 30% impairment was noticed in mild to moderate category of pain (b 280). Mild to moderate impairment around 90 % of muscle tone function (b735) seen in category 1 and 2 and same for control of voluntary movement functions (b760). The subsequent sections gained scores for severe complete impairment: 10% for voluntarily functioning of control as well as 10% for tone of muscles ability (b735).

Body structure (s)

The only component of the brain's structure (s-110) that was evaluated in this category was established by brain scanning reports. Eleven kids who suffered from moderate to severe disability possessed their brains scanned implementing a computerized tomography (CT) or a magnetic resonance imaging.

Activities and Participation (d)

There were actually an overall of 6 ICF-CY codes utilised within this grouping. The subsequent sections exhibited severe to total impairment: Only 5% impairment was detected as completely impaired in the school education & involvement category (d 820), in contrast with 40% in maintaining a body posture (d 415), 35% in walking (d 450), 20% in toileting (d 530), 5% in eating (d 550), and 5% in fine hand usage (d 440). In the present study all environmental factors (e) are labelled as not definable (nd) as the available information is not sufficient for making a decision about the category.

Table 4. 7 Statistics on ICF Codes and sub parameters in conjunction with the percentage of the sample group of kids with CP in inclusive contexts

STRUCTURS & FUNCTION	ICF CATEGORY SUB PARAMETERS	ICF CODE	0	1	2	3	4	8	9
	Structure brain	s 110	-	-	-	-	-	-	-
Body Functions	Sensation of pain	b 280	14(70%)	3(15%)	3(15%)	0	0	0	0
	Muscle tone function	b 735	0	15(75%)	3(15%)	2(10%)	0	0	0
	Control of voluntary movement functions	b760	0	7(35%)	11(55%)	2(10%)	0	0	0
Activities	Maintaining a body position	d 415	0	5(25%)	7(35%)	8(40%)	0	0	0
	Walking	d 450	0	5(25%)	8(40%)	7(35%)	0	0	0
	Toileting	d 530	3(15%)	2(10%)	11(55%)	4(20%)	0	0	0
	Eating	d 550	4(20%)	11(55%)	4(20%)	1(5%)	0	0	0
	Fine hand use	d 440	2(10%)	10(50%)	7(35%)	1(5%)	0	0	0
Participation	School education & Participation	d 820	0	11(55%)	8(40%)	0	1(5%)	0	0

Table 4.8 showed that 30% (n=6) CP children had Good performance and below average each in class, 25 % (n=5) had average performance in class, 15% (n=3) had poor class performance. Table 4.8 also revealed that 55% (n=11) CP children had rarely participated in sports activity, 25 % (n=5) had occasionally participated in sports, 15% (n=3) had frequently participated, 5% (n=1) children with CP participated all times in co-curricular or sports activity.

Table 4. 8 Current class performance of CP children in District Mandi

Current Class Performance		Sum Total (n= 20)		Boys (n= 11)		Girls (n= 9)	
		No.	% age	No.	% age	No	% age
	Poor	3	15	2	10	1	5
	Below average	6	30	2	10	4	20
	Average	5	25	4	20	1	5
	Good	6	30	3	15	3	15
		20	100	11	55	9	45
Level of Participation in sports/co-curricular activities							
	All the times	1	5	1	5	0	0
	Frequently	3	15	2	10	1	5
	Occasionally	5	25	2	10	3	15
	Rarely	11	55	6	30	5	25
		20	100	11	55	9	45

4.2 Results - Phase II

Focus group results were accustomed to comprehend the phenomenon of inquisitiveness from outlook perspectives of all the participants and to escalate and acknowledge the quantitative results. The results of both FGDs here furnish a great deal of perception into relted aspects of issues discussed.

Data was encapsulated by summing up the number of times a matter was stated, regardless of which participant enumerated it once or many times by the participants named as frequencies. Taking into account the objectives of this research is to find out element from text data by using the themes by thematic analysis. In the analysis, the researcher initially familiarizes and scrutinizes the text data by coding into brief illustrations called code generations [460]. Following initial data collection, the comments from participants were fabricated during transcription of data of FGD-1 & FGD-2 in english language. The coding process commenced by adding all the paragraphs of text into short narrations by effectively redeeming the codes by highlighting the main points of paragraphs.

4.2.1 Thematic analysis

Immediately following the transcription of the FGDs, thematic analysis of content, an element of the framework were employed to investigate the data obtained during the course of FGDs. Codes are beneficial in retrieving the relevant information, the thematic analysis provides the context for a deeper understanding of the data. Six prevailing themes across the two FGDs have been identified through the study's qualitative investigation analysis. Several sub-themes were identified contained within every one of the primary themes. In accordance with the frequency of each theme as given in table 4.9, sub-themes were presented within the outline of every category.

Table 4. 9 Overall frequency of themes discussed in FGDs

Themes	Subthemes	Freq. (%) FGD1	Freq.(%) FGD2	Sim.	Diff.
Theme 1 Handling of CP children ..	Provision of Barrier free environment	6	6		
	Provision/Adaptation/ Modification in equipments	2	16		
	Referral	1	4		
	Sum of theme 1 (Total)	9 (7.68%)	26 (16%)	35	17
Theme 2 Education, work experience of Special educators..	Qualification	10	25		
	Workshops/STC attended	10	7		
	Inadequate no. special educators	6	9		
	Work experience	10	14		
	Understanding of CP children	10	15		
	Sum of theme 2 (Total)	46 (38.6%)	70 (42.4%)	116	24
Theme 3 Provision of Therapeutics & Related …	Prescribed ex.	0	5		
	Refer	1	6		
	Do modifications	3	1		
	Counsel parents	4	3		
	SBT under supervision	12	7		
	Sum of theme 3 (Total)	20 (16.8%)	22 (13.3%)	42	2
Theme 4 Launching	At school ICT labs	2	3		
	At cluster level	1	5		

distinctiveness in terms of TelePT treatment...	Duration	0	2		
	Effectiveness	9	5		
	Sum of theme 4 (Total)	12 (10.08%)	15 (9.09%)	27	3
Theme 5 TelePT Structure	(Offline mode)	6	5		
	Online via android for bedridden at a distance >15 KMS	7	9		
	Online ICT for school going children at a distance < 15 KMS	9	8		
	Sum of theme 5 (Total)	22 (13.3%)	22 (13.3%)	44	0
Theme 6 Patient database & Reporting system	Offline	4	3		
	Online	0	0		
	Both	6	7		
	Sum of theme 6 (Total)	10 (6.06%)	10 (6.06%)	20	0
	Sum of Themes 1+2+3+4+5+6 (Total)	119	165		

The formula developed by Miles and Huberman (1994) was used to assess the reliability of themes in FGDs [463]. So, reliability is calculated by formula = opinion association / opinion association + opinion separation. The computation of this value yielded the following results i.e 67% for theme 1, 82% for theme 2, 95% for theme 3, 90% for theme 4 and 100% for theme 5 & 6. This ratio can be deemed adequate for the reliability of FGDs functioning when it exceeds 70%.

The subsequent figures downwords showing themes (1-6) along with subthemes and the frequencies of both FGDs. The figure 4.14 displayed the theme one i.e handling of CP children in school environment along with subthemes of referral,

provision/adaptation/modification in equipments and provision of barrier free environment with frequencies of both FGDs.

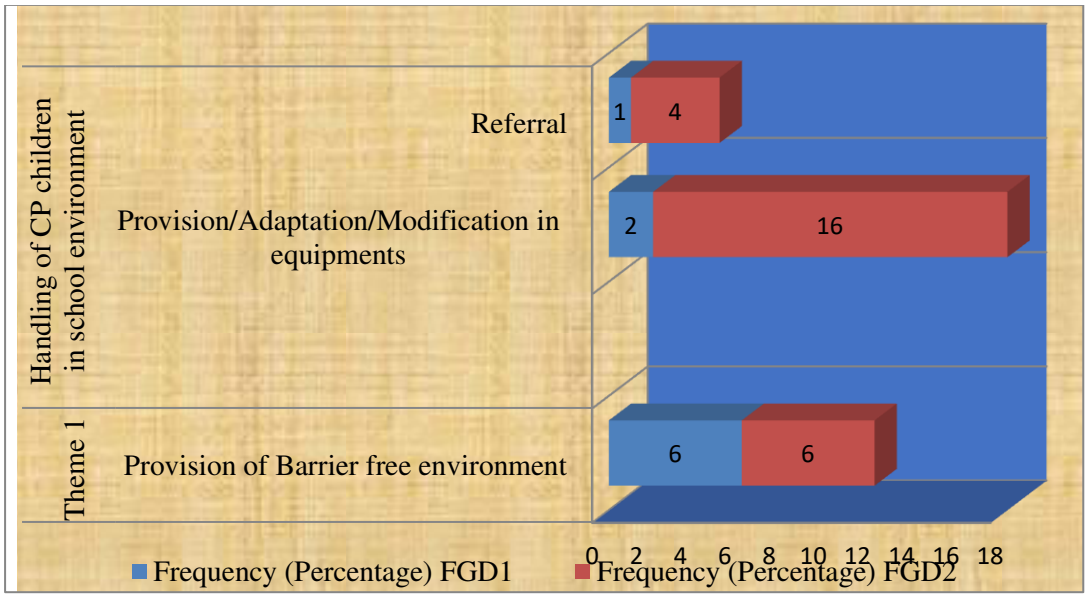


Figure 4. 14 Frequencies of Theme 1 of FGD1 & FGD2

Second theme of education, work, experience of special educators, and understanding of these CP children with various subthemes is displayed in figure 4.15.

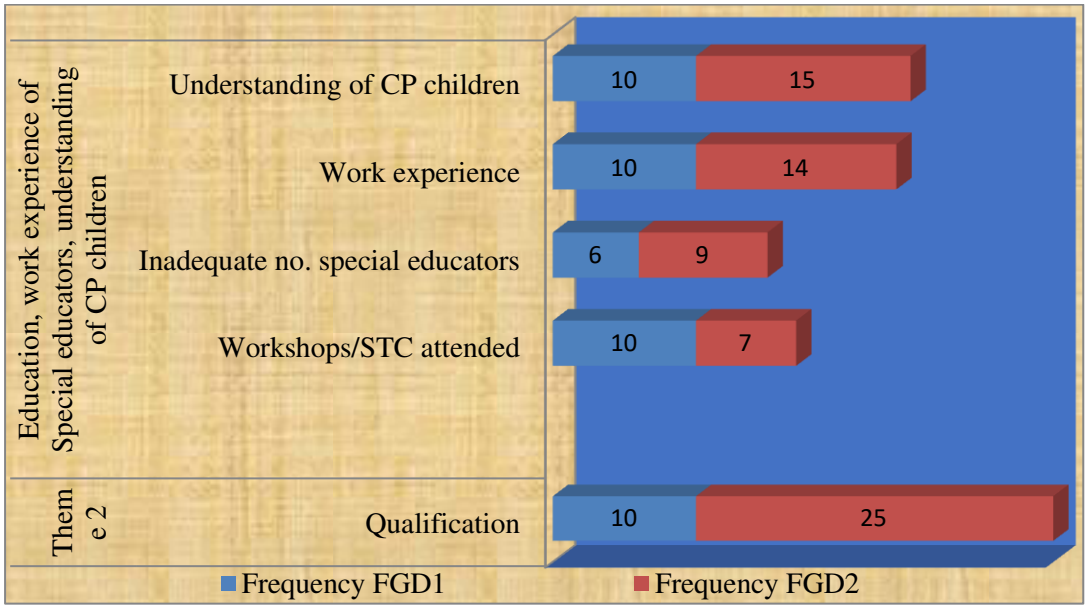


Figure 4. 15 Frequencies of Theme 2 of FGD 1 & FGD

Third theme of both FGDs i.e. provision of therapeutic & related services in schools along with frequencies is shown here in figure 4.16.

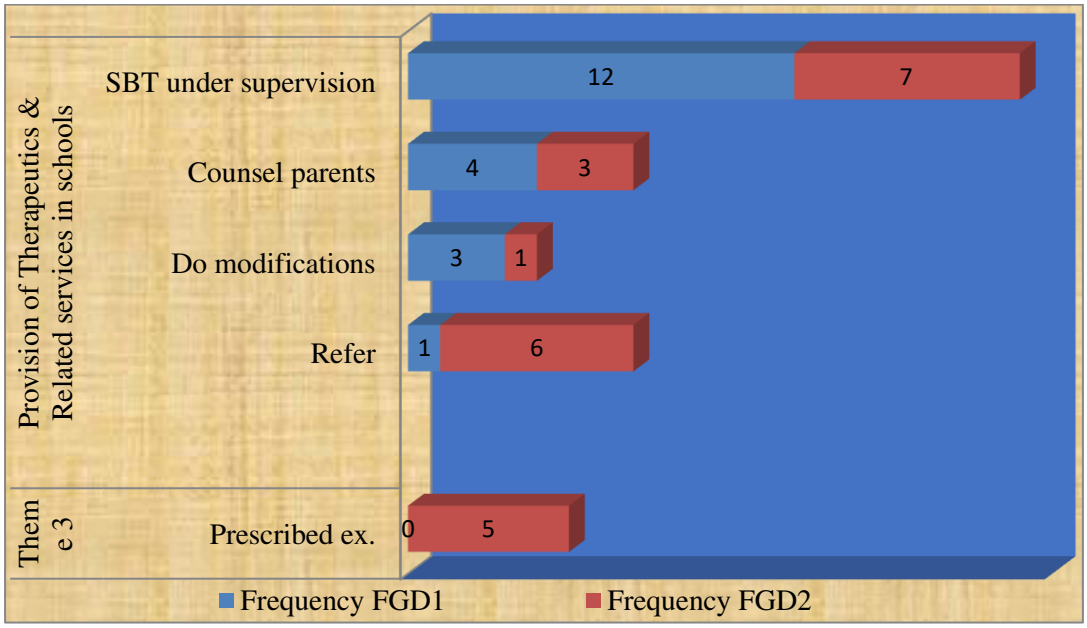


Figure 4. 16 Frequencies of Theme 3 of FGD1 & FGD 2

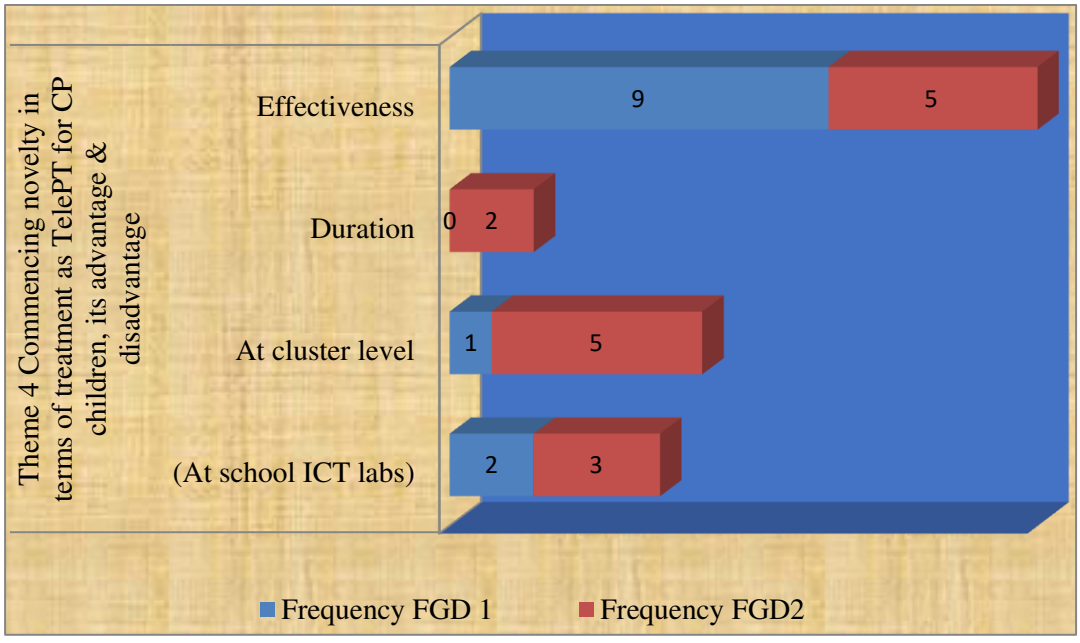


Figure 4. 17 Frequencies of Theme 4 of FGD1 & FGD 2

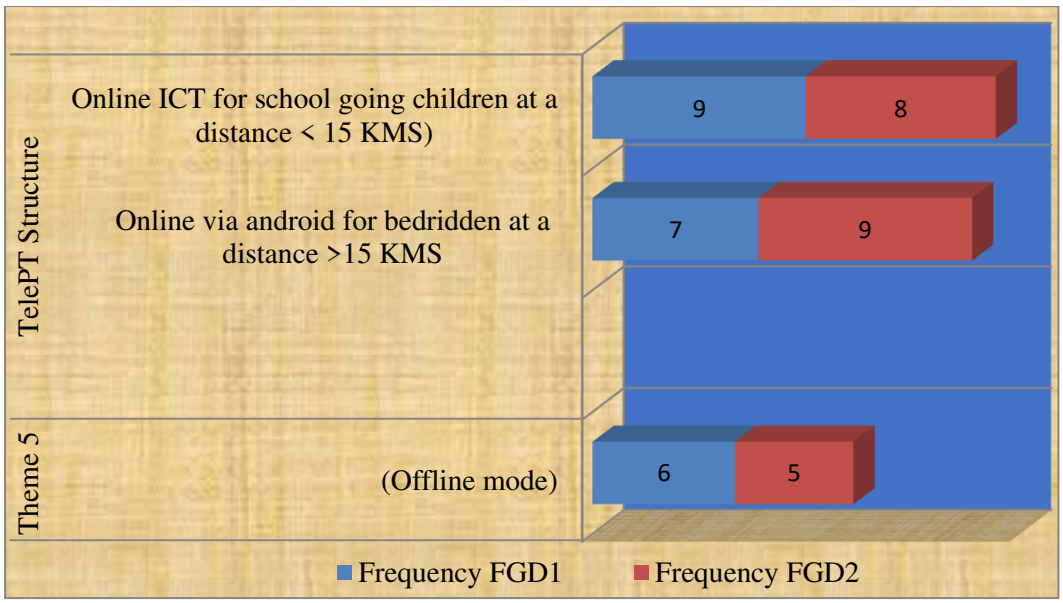


Figure 4. 18 Frequencies of Theme 5 of FGD1 & FGD2

Subsequently fourth theme of commencing novelty in terms of treatment as TelePT for CP children, its advantage and disadvantage (fig. 4.17), fifth theme about Telephysiotherapy structure (fig. 4.18), and last theme of patient database and reporting system of Telephysiotherapy (fig.4.19), along with subthemes depict the frequencies of both first and second FGDs as shown in figures.

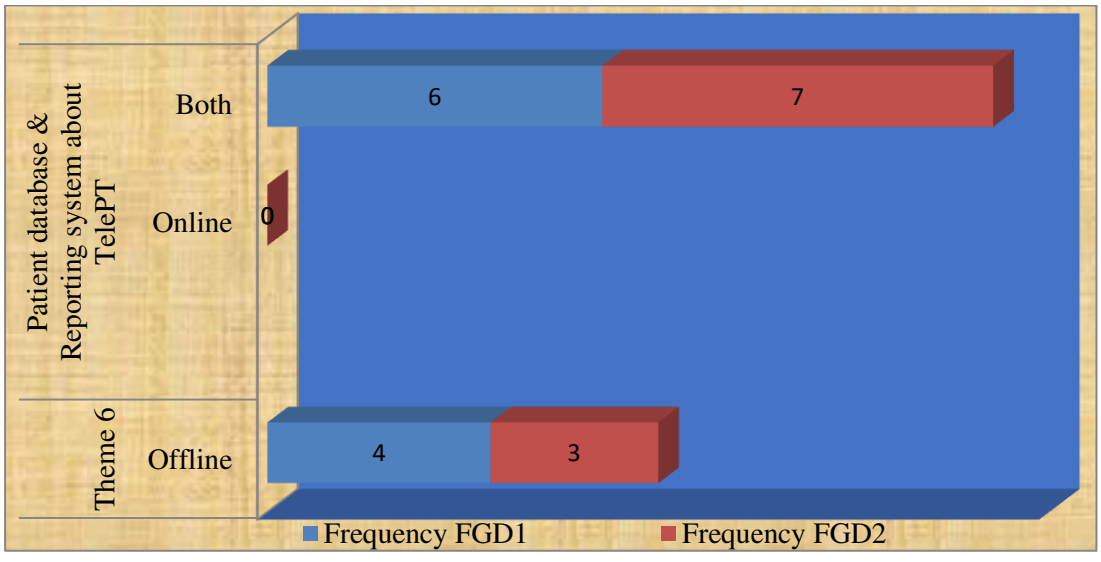
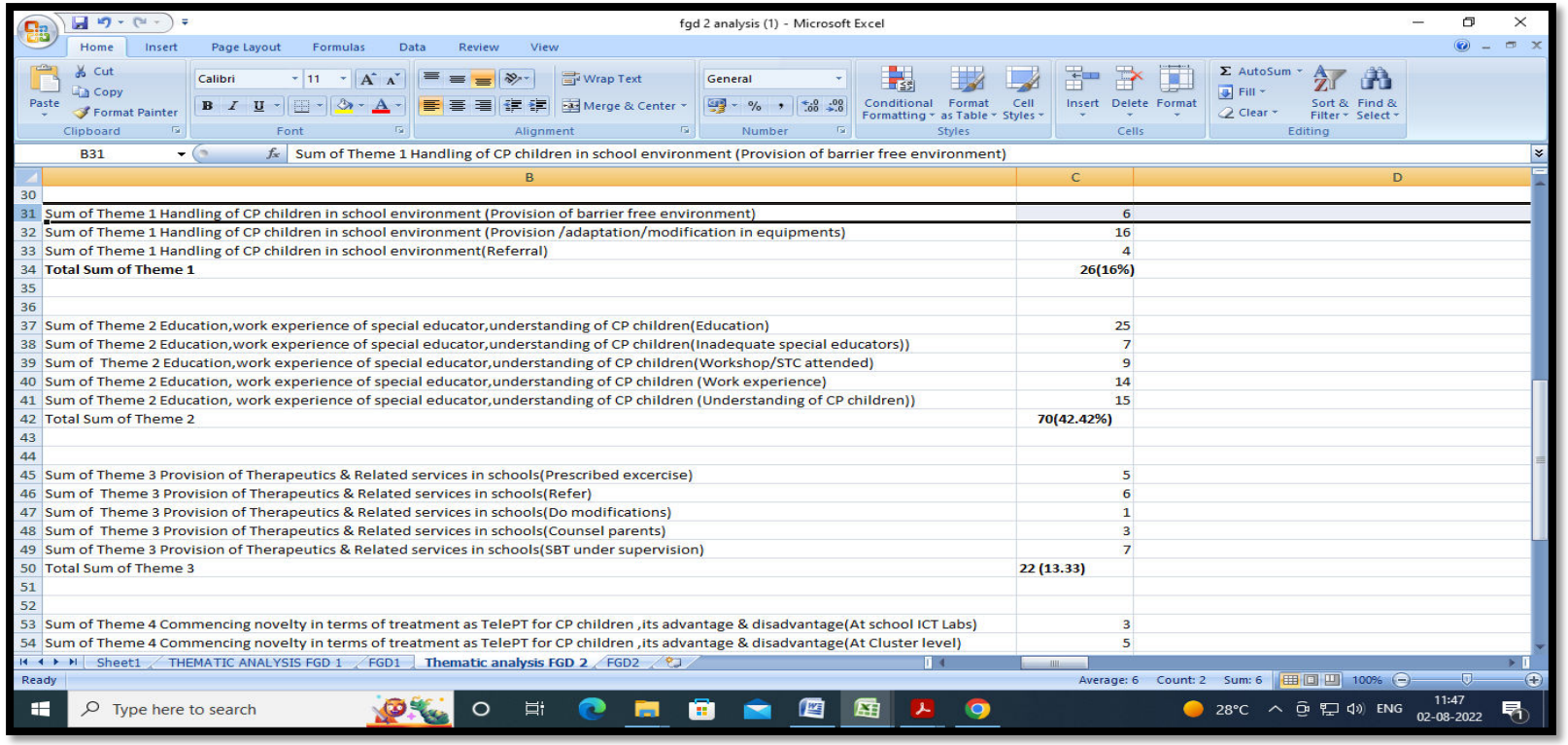


Figure 4. 19 Frequencies of Theme 6 of FGD 1 & FGD 2

Significant ideas and common themes were identified and coded utilizing Microsoft Excel. The outcomes were organised into distinct themes attributed to the COREQ paradigm and flourished in conversations in focus groups [454]. These themes include (1) Handling of CP children in school environment (2) Education, work experience of special educators and understanding of CP children (3) Provision of therapeutics and related services in schools (4) Launching distinctiveness in terms of TelePT treatment for children with CP, its benefits and drawbacks (5) Telephysiotherapy structure (6) Patient database and reporting system about TelePT.

The sum of themes (1-6) of both focus group discussions with frequencies embarked in excel sheets for thematic analysis are exhibited in figure 4.20.



	B	C	D
30			
31	Sum of Theme 1 Handling of CP children in school environment (Provision of barrier free environment)	6	
32	Sum of Theme 1 Handling of CP children in school environment (Provision /adaptation/modification in equipments)	16	
33	Sum of Theme 1 Handling of CP children in school environment(Referral)	4	
34	**Total Sum of Theme 1**	**26(16%)**	
35			
36			
37	Sum of Theme 2 Education,work experience of special educator,understanding of CP children(Education)	25	
38	Sum of Theme 2 Education,work experience of special educator,understanding of CP children(Inadequate special educators))	7	
39	Sum of Theme 2 Education,work experience of special educator,understanding of CP children(Workshop/STC attended)	9	
40	Sum of Theme 2 Education, work experience of special educator,understanding of CP children (Work experience)	14	
41	Sum of Theme 2 Education, work experience of special educator,understanding of CP children (Understanding of CP children))	15	
42	Total Sum of Theme 2	**70(42.42%)**	
43			
44			
45	Sum of Theme 3 Provision of Therapeutics & Related services in schools(Prescribed excercise)	5	
46	Sum of Theme 3 Provision of Therapeutics & Related services in schools(Refer)	6	
47	Sum of Theme 3 Provision of Therapeutics & Related services in schools(Do modifications)	1	
48	Sum of Theme 3 Provision of Therapeutics & Related services in schools(Counsel parents)	3	
49	Sum of Theme 3 Provision of Therapeutics & Related services in schools(SBT under supervision)	7	
50	Total Sum of Theme 3	**22 (13.33)**	
51			
52			
53	Sum of Theme 4 Commencing novelty in terms of treatment as TelePT for CP children ,its advantage & disadvantage(At school ICT Labs)	3	
54	Sum of Theme 4 Commencing novelty in terms of treatment as TelePT for CP children ,its advantage & disadvantage(At Cluster level)	5	

Figure 4. 20 Sum of Themes in Excel Sheet of both FGD 1 & FGD 2

The concluded verbatims based on analysis of themes with preliminary codes are ilustrated in table 4.10 and qualititative analysis with themes is displayed in table 4.11.

Table 4. 10 Conclusion based on Thematic analysis of FGDs

Topic	Preliminary codes	Conclusion based on Thematic Analysis
How you deal C.P. children in school environment?	BARRFREE	Provide easy accessible environs in schools. Provide assistive aids to such CP children like wheelchairs, CP chair etc. Classes should be on ground floor for such children. Teachers should have knowledge or awareness on CP. We do adaptations /modifications in materials for CP children. We do refer children to specialist. We supply parents with child-related recommendations on safe lifting and position, as well as ergonomics, along with information on certain basic activities. These kids have an array of difficulties with mobility owing of the difficult terrain. Getting training from physiotherapist, we can apply the same to children.
Handling C.P. child in school environment	REFFRAL	
Education & experience in special education	EXP.	Every special educator had done diploma in Special education of 2 years in disability field from CRC Sundernagar in regular mode, affiliated from RCI through NIVH. All disabilities including CP/OH, VI, HI, MR are covered in diploma programme. Everybody having average experience of 6-8 years as special educator working with such children in schools.
Do all schools have special educator in Dist. Mandi?	SCARCITY	Special educators are not available in all schools of dist Mandi. Special educators are placed only at Block educational level, so less in numbers and

		required adequate number of special educators in schools. So overburdened by work as special educators also have to look after other blocks also. Blocks which are formed by collecting 4-5 schools depending upon area. In Mandi District, there are 24-25 blocks .Difficult to deal such children due to climatic conditions and overburdening, Insufficient special educators, distance of hilly areas. We meet such children, particularly in 1-2 months gap. Not able to reach, so could not provide services. Not regular visits to such children. Poor or no transport facility.
What related services (PT/OT) you provide?	GOOD KNWLDG	We provide or aware parents first as they are having less/poor knowledge and facility about child disability and not accepting such children. We get them hospitalized. We first identify the problem or condition of child and tell their problem to parents. Help children and parents in making their medical certificates. Refer the children to doctor or therapist available at CRC for therapeutic services. We advice adaptation in materials for such children. We check need or requirement of child first in term of ADLs based on their disability or academics. We sometimes provide PT/OT services also. We prepare Individualized education plan (IEP) for 1-2 months duration, select goal discuss with team members as parents, teachers. Both academic and

		therapeutic goals are included. Then we refer the cases. If goal not achieved in specific time, we repeat the goal .Therapeutic services to such CP children are provided by us along with academics which we learnt from CRC regarding the child. Both theoretical and practical portions are taught to us regarding CP and associated disabilities. We advice the child not to sit in W sitting position , we ask them to do beads activity or flour making , clay ex. for children having fine motor difficulties or writing problems. Also sometimes stretching excercise of finger, hand to improve writing or by providing smiley ball or acupressure ball to children. We do modify, or make adaptations in pen /pencils to improve writing. For gross motor problems, we advice cycling activities to such children.
Any short term course/professional development prog. besides 2 years diploma?	WORKSHP	We have attended workshop on cerebral palsy at CRC, SNR of 3, 5 days as it is a Govt. agency conducting such courses. Both theory and practical portions are described to us in these workshops along with new updates regarding CP. We get certificates for attending these workshops. And we are benefitted by discussion how to handle CP children.
Cerebral palsy child and their treatment.	CPKNWLDG	Everybody elaborated about cerebral palsy, its types causes, complication and management showing good knowledge on CP.

Understanding of CP child , causative factors, types of CP		
Provision of therapeutics in schools. Who provides?	SCHOL THERAPY	We ask for furniture modifications of such children. Camp is a way to deliver therapeutic services. Physiotherapy provided by physiotherapist in camps but sometimes camps are not organized properly or arranged accordingly. We do stretching to prevent tightness in such children. We ask them to use railing, do cycling in resource rooms of school at block level. DIET also provides therapeutic services. Whatever we learnt as therapeutics, we deliver in exercise programme or recommendations. For such children, therapeutics camps are organized. Children are not benefitted much in such therapeutic camps as Mandi is large district with lots of blocks in it and everything cannot be described in one day event of camp. Even children could not reach in camps due to geographical conditions of HP. So there should be novel things and children could take benefits. Children not getting benefitted from Services of CRC /DIET as due to distance /far away from blocks like Gopalpur, Dharampur and Karsog areas of Mandi district. So there should be something new. Also parents are unaware of physiotherapy services for such children. We advice some furniture modifications or

	provide aids and appliances at camps. We sometimes do hands on for tight muscles of hand /feet as in scissoring of legs. Due to much distance, whole day is wasted in travelling, So therapy could not be delivered in continue manner in one day camp event. If they go for routine work of physiotherapy and other therapeutic services, then results will be good. To discard spasticity, we deliver exercises and train neck/face muscles as in drooling of saliva or keeping neck on one side. Stretching given for tight hand. We provide positioning and stretching in school settings at DIET also. We identify CP children with poor neck control, children with walking difficulties due to scissoring as we taught from training workshops conducted at CRC, Sundernagar. We provide stretching for tight muscles and strengthening exercise for weak muscles of limb along with active or passive movements. We correct positioning or posture of child as by corner sitting and discarding w sitting. Advice the parents and children to put small pillows between legs to avoid scissoring and advice them to sit in cross leg sitting position or use CP chair.
Tele-physiotherapy for CP children.	We heard/read about this tele technology in news paper. Telephysiotherapy is effective both at school and at home, as there are computerdesigned programmes .We can commence this tele- PT by videoconferencing and can

Advantage and disadvantage of TelePT		get much improvements by this. TelePT could be started at school and could be good option in future for such children. Drawbacks are networking and improper technique of delivery through videoconferencing. Everybody including parents, teachers have androids phones so easy for children as they do not have to travel much for clinical sessions .Due to hilly areas, there could be signal problems. We can arrange tele at cluster level for every school by arranging their workshop at cluster level which is composition of 4-5 school. By composing clusters at block levels as these educational blocks are big. Consequently, cluster construction for CP children involves zonal elementary schools in the centre since Mandi has 7-8 schools, and by joining them, we can offer Telephysiotherapy. Carrying such children to CRC/DIET is big problem and children also get frustrated ,it would be effecting in managing such impairments and disability in cp children .It will cut travel cost, distance and will save time. Children who are left behind from therapy, we can deliver therapy to them by this method.
Requirement for TelePT	TELEPTSTR	For telephysiotherapy, Need of smart phones or ipad and ICT labs. By video calling, it would be easy.Any physiotherapist at one end demonstrating exercises and at other end, we can receive protocol from him. There are more benefits than hazards or barrier of this technique. Physiotherapists are

		not possible at every place and especially in such hilly conditions. Today its time for smart phones, Google services, software which we use in mobile phones and so easy for us.
TelePTstructure	REQTELE	There should be ICT labs for telephysiotherapy. Every single one senior secondary schools possess Wi-Fi-equipped ICT simulated environments. There should be online and offline modes as these are hilly areas. We can do it at cluster level by clubbing 3/4/5 schools in weekly /monthly mode. TelePT could be commenced at resource room also but it would not be possible to call them in resource rooms because some children are from very far distance. Make a cluster central level for all 24 blocks by clubbing 4-5 or 5-10 schools having such children weekly where signals are good. And daily it is not possible. Could be requirement of laptops but not available to everyone and everywhere however DIET can provide us depending on financial budgets and others issues. This mode of i-TelePT would be beneficial if delivered weekly and daily it is not possible. This new technique would be beneficial as 4G/5G network with good software's options in androids for therapeutic services We can deliver it by online as well as offline mode.
Patient database and	OFFONLINE	Both offline/online modes are good. Offline is a permanent record and we

reporting system about telePT. Data base and reporting function of i-TelePT. Do we need web page? **Out of synchronized/ Asynchronised which method is better?**	can explain more to children by reading diaries or maintaining excercise log books or by using web pages. In online, we can discuss lively that what therapy is delivered in what way And in offline we can visualize back scenes what protocol was previously given. If there is networking problem, then offline mode is good and electronic data will be useful regarding children symptoms.

Table 4. 11 Qualitative data analysis with themes and categories

Themes	Categories	Sub categories	Participant's Perceptions FGD1	Quotes FGD1	Participant's Perceptions FGD2	Quotes FGD 2
THEME 1 **Handling of CPchildren in school environment**	Roles and responsibility of specialeducators	Provision of Barrier free environment	Provide barrier free environment in schools	For them to navigate their way up and down effectively, we must provide an unhindered surroundings, wheelchairs, or different tailored devices."	Should be Barrier free environment at schools	Aware the parents, Provide barrier free atmosphere
		Provision/ Adaptations /Modifications in equipments	Provide mobility devices to such CP children like wheelchairs, CP chair etc.	"One card board was given to her that how she keeps the notebook and her hand comes over	We do adaptations /modifications in materials for CP children.	Do some adaptations in pen / pencil

				it and she writes, we have done some changes for that child.''		
		Referral	We do refer children to specialist.	'Refer the children to doctors and therapist''	Make aware to all teachers & parents regarding that child, refer	Do Referral of such children
THEME2 Education, work experience of specialeducatorsand understanding of CP children	Teachers knowledge, understanding and skills	Education	Every special educator had done diploma in Special education of 2 years in disability field from CRC Sundernagar in regular mode,	Sir, I have completemy diploma from Composite Regional Centre, Sundernagar and it is affiliated from Rehabilitation Council of India. This diploma is of 2 years and my diploma is of 2 years	I have done my diploma of 2 year duration from CRC, SNR , Every disability was covered in course.	Sir, I have done diploma in Visual Impairment from CRC, Sundernagar Hm…….

		affiliated from RCI.	and all types of disabilities are taught in it”		
	Inadequate special educators	Special educators are placed only at Block educational level, so less in numbers	Sir, There is block wise placement in dist. Mandi of all special educators. Block wise and there are some blocks where there is no special educator”	Required adequate number of special educatorsin schools.	‘’Block wise placement of all special educators in Mandi district. “Special Teachers are less in numbers”
	Workshop /Short term course	We have attended workshop on cerebral palsy at CRC, SNR of 3, 5 days as it is a Govt, agency conducting such courses.	“Sir, I have done a three days workshop and we are taught how it is related to brain, its types and provided knowledge about such kind of things”	STC through DIET attended at CRC.5 Days course On CP.	Both theory and practical portions are described to us in these workshops along with new updates regarding CP.

	Work experience	Everybody having average experience of 6-8 years as special educator working with such children in schools.	"Sir, it has been of 8 years, attached with this field"	Experience of 8-9 years in disability	"8-9 years experience as special educator in dealing such children"
	Understanding of CP children	Everybody elaborated about cerebral palsy, its types causes, complication and management showing good knowledge on cerebral palsy.	"Sir, as the name indicates, cerebral palsy is caused by injury to a portion of the brain called the cerebrum. As a result, cerebral palsy manifests as a kid who is paralysed..... and	Prenatal , perinatal and postnatal causes and types	And in prenatal – Exposure of X-rays Um….. much exposed to sonographies and sometimes Mother is alcoholic and even drugs in today's life and ….. and …..

				unable to walk.....Um		Rh factor also and Lack of nutrition or accident and this is in Natal
Provision of therapeutics and related services in schools.	In inclusive educational environments, there is access to physiotherapy as related therapies.	Prescribe exercise	Parents have poor knowledge ,Treat according need of child	We ask the kids to undertake bead activities to develop their fine motor skills, and we stretch their fingers to improve their writing.”	Aware the parents first as related services	Help children and parents in making their medical certificates.
		Refer	We first identify the problem or condition of child and tell their problem to parents. Refer	We initially prohibit such youngsters from using the w-sitting and instruct them not sit down in this way.	Refer the children to doctor or therapist available at CRC for therapeutic	Our first duty is to indentify such child, then counsel his/her parents and after that we refer the

		the CP children to CRC SNR		services.	child to CRC
	Do modifications	We advice adaptation in materials for such children.	"Do Adaptation/ Modification in pencil.''	We check need or requirement of child first in term of ADLs based on their disability or academics and do modify their equipments.	Do adaptations and modifications.
	Counsel parents	We provide or aware parents first as they are having less/poor knowledge and facility about child disability and not	"Yes, for that, first we have to make parents aware and Hospitalized the child till then child is not recognized about problem and get certified."	Teach to parents, ask for writing in sand activities	''we guide the parents that kindly take children to doctors''

			accepting such children.			
		SBT under supervision	We sometimes provide PT/OT services also. We prepare Individualized education plan (IEP) for 1-2 months duration, select goal discuss with team members as parents, teachers.	"First, we will put emphasis on academics, suppose personally child is not independent then we will try to make him independent and after that we provide physiotherapy, occupational therapy side by side in schools"	Explain Gross and fine motor skill activities	"Prescribe beads, ball activities for fine and gross motor skills, Therapy advice"
Launching distinctiveness in terms of TelePT treatment for	Obstacles to rehabilitation services and the start of	ICT lab school	Everybody including parents, teachers have androids	"We can commence this tele- PT by videoconferencing and can get many	Require continue PT under supervision,	"And this therapy,should be in continue

children with CP	innovative treatments for children with CP		phones so easy for children as they do not have to travel much for clinical sessions .Due to hilly areas, there could be signal problems.	improvements by this. TelePT could be started at school and could be good option in future for such children."	requires some novelty	manner and in a single day camp event, there is no benefit."
Launching distinctiveness in terms of TelePT treatment for children with CP		At Cluster	We can arrange tele at cluster level for every school by arranging their workshop at cluster level which is composition of 4-5 school .	"Sir, as our centre schools, and under that there are 4-5 schools and then a cluster is made and such kind of children are called a centre school in a week."	ICT labs at cluster level - school lab through android weekly home visit through android	"So that everybody means those 4 or 5 schools in cluster and composing these Schools at Cluster"

	Duration	Make a cluster central level for all 24 blocks by clubbing 4-5 or 5-10 schools having such children weekly where signals are good.	“By clubbing 4-5 school and making cluster level weekly ”	And daily it is not possible.	“Weekly it is possible”
	Effectiveness	It will cut travel cost, distance and will save time.	“ Tele-physiotherapy is wonderful and should only be accessible through schools with ICT laboratories.”	ICT labs Telephysiotherapy via VC will be very effective both at school as well as at home	“Tele-physiotherapy is good . This telephysiotherapy will save the time ,Could be more benefits as patient will come from a distance with

						how much fare”
Telephysiotherapy structure	Ranges of technology modes for physiotherapy-	Offline	There should be ICT labs for telephysiotherapy. There are ICT laboratories with WiFi in every senior secondary school. There should be online and offline modes as these are hilly areas.	“Telephysiotherapy is very helpful for CP children. Everybody has this smart phone , it will be easy for us.’’	In offline mode, we want to know about new disability ,what we can do for that ,If we require knowledge about CP children or new symptoms ,then web page data will be useful.	“Sir, Telephysiotherapy will be good.For C.P. child. It is a good option where Physiotherapist cannot reach. networking, could be a barrier.”
		Online android for bed ridden & at > 15 kms	Physiotherapists are not possible at every place and especially in such hilly	“By doing videoconferencing Hm……..we can ask regarding condition of that child	10-15 kms distance at cluster level and more than 15 kms via android	‘’could be through Android mobile for bedridden children and not

			conditions.	and how to deliver the exercise, we can ask from physiotherapist"	phones at home online .Should be offline mode also	able to cme at school at > 15 kms distance''
		Online ICTfor school goingchildren school < 15 kms	Telephysiotherapy could be commenced at resource room through ICT	Every child from 10-15 kms ,we cannot call off every child to resource room ,We have to deliver by own self	At Cluster level via ICT labs having WiFi for less than 10-15 kms , for bed ridden child-use android at home. Should be offline mode also	"In those schools, we have every facility as there are ICT Labs and whey not the children should be called over there and deliver tele-physiotherapy to them."
Patient database and reporting system about	Deployment of Tele-physiotherapy in educational	Offline	Offline is a permanent record and we can explain more	"Sometimes, it is noticed that, there is networking problem in	Offline is a permanent record for these children	"In offline mode,we want to know about new disability ,what

TelePT	environments utilising ICT labs		to children by reading diaries or maintaining excercise log books or by using web pages. If there is networking problem, then offline mode is good and electronic data will be useful regarding children symptoms.	online and if we are not conducting online contact then we can go for offline mode through webpage, as you are telling that could be handy"		we can do for that ,If we require knowledge about CPchildren or new symptoms ,then web page data will be useful."
		online	In online, we can discuss lively that what	"Everybody has Android Phone and it will be easy for	In online mode ,we can deliver live exercise	ICT labs for children who can come to school.

		therapy is delivered in what way	children as they don't have to travel much distances for this physiotherapy or therapy."	programmes through videoconferencing	For bed ridden cases online mode via android a t home
	Both	Both offline /online modes are good.	"Sir, Because the primary goal of this tele-physiotherapy is to assist children, it would be highly effective.....Hm..... f or C.P. youngsters in both offline and online modes."	Both offline and online modes will be good ,4G NETWORK GOING ON	"Then both offline and online ……. Hm…..Can benefit much. Yes, somewhere ONLINE and somewhere OFFILINE"

Key findings:

Qualitative study analysis revealed six overarching and related themes across the focus group with some subthemes. Finding across among all participants revealed challenging and knowledgeable experiences of special educators in dealing cerebral palsy children in educational settings along with telephysiotherapy structure for module development. The key findings were:

- Handling of cerebral palsy children is done by special educators by facilitating barrier free accessibility for mobility and provision of mobility aids/appliances along with adaptations or modifications in equipments in school premises in hilly areas.
- Every special educator involved with such CP children are qualified and having average experience of 6-8 years in dealing such children in school settings. In addition every educator has participated in workshop or professional development programme of three or five days done on CP with good theoretical and practical knowledge.
- Special educators do referral of CP children to specialist, do prescribe modification/adaptation in writing materials, do some stretching, strengthening exercises under guidance of therapist, do advice posture correction, positioning, lifting and carrying of CP children in school environment as part of related services after setting academic and therapeutic goals.
- Special educators were eager to include some novelty as a component of therapy or treatment as school-based camps were not particularly beneficial and transporting children to rehab Centre CRC /DIET for clinical therapy sessions became quite challenging and due to a heavy workload, even special educators are unable to visit such youngsters every day in schools due to geographical climatic conditions of Himachal Pradesh.
- From point of view of special educators, telephysiotherapy is good option and will be beneficial in treating their physical impairments in school settings. This telephysiotherapy could be delivered in both offline (through web pages/recorded diaries) and online mode (through videoconferencing) via

android or smart phones/ipads. The limiting factors they ruled out could be network problem and improper technique on delivery of telephysiotherapy.

- This telephysiotherapy could be conducted at cluster level for every school by clubbing them and arranging workshop having ICT labs and Mandi has 7-8 schools at the block level, there is a solid network at cluster level of all educational blocks for children with special needs that includes zonal primary schools in the centre.

Key finding# 1: Handling of cerebral palsy children is done by special educators by facilitating barrier free accessibility for mobility and provision of mobility aids/appliances along with adaptations or modifications in equipments in school premises in hilly areas.

Focus group participant were asked to speak about the duties of special educators in managing children with CP in class as well as school environment like how they deal such children. Nearly all participants described provision of barrier free environment in school premises and some adaptations /modifications in materials with provision of mobility aids like wheelchair or C.P chair. A special educator who took part in FGD observed the following:

"To enable them to navigate their way up and down properly, we require a unhurduled environment, a wheelchair, or other adapted devices".

Similarly other participant was discussing about a CP child in school premises and she noted about that child:

> *"One card board was given to her that how she keeps the notebook and her hand comes over it and she writes, we have done some changes for that child over there in this way but now we want that government should do something so that it becomes barrier free."*

Another participant in group acknowledged about problems of mobility in such geographical conditions:

"I have also a same type of child, C.P. child, then they face big problem to take the child to school so that child goes to school occasionally, the child has gained weight so parents face difficulty bringing in and out. a hilly tation over here, then difficulty to come and go in the school."

One of participant discussed about awareness among general teacher regarding such CP children along with friendly environment in schools:

"Sir, first of all, those our teachers, general teachers, we will describe the disability and how to deal with such kind of children, will describe to them and also to our normal children in schools, we will aware them about how to deal such children and our environment should be friendly according to the child and there should be ramp."

Another participant quoted:

"There should be provision of C.P. chair etc. in schools and the classes over there should be at ground floor."

Key finding# 2: Every special educator involved with such CP children is qualified in special education and having average experience of 6-8 years in dealing such CWSN children in school settings. In addition every educator has participated in workshop or professional development programme of three or five days done on CP with good theoretical and practical knowledge. Also there is scarcity of special educators in Dist. Mandi and every body placed at block level and can not cover all children due to overburdening and climatic conditions.

Participant in focus group discussed about their qualification as:

"I have completed my diploma from CRC, Sundernagar."

Another participant talked about curricular part and qualification from Government agency and aspects of different disabilities in their course curriculum.

"Sir, I have completed my diploma from Composite Regional Centre, Sundernagar and it is affiliated from Rehabilitation Council of India. This diploma is of 2 years and my diploma is of 2 years and all types of disabilities are taught in it"

In group discussion, one of participant quoted about recognition of their course qualification

"This course is recognized from RCI, India and through NIVH at CRC"

One of lady participant completed Diploma in Mental retardation and her dealing with such CWSN children as:

"I have done diploma in M.R of 2 years duration from Prem Ashram Institute, UNA. In that we have mainly focus on M.R. but with M.R, others disabilities are covered a bit. We have dealt with children of all categories, means of multi category."

Another participant talking about associated condition with cerebral palsy along with diploma in specific field

"Sir, I have done diploma in Visual Impairment from CRC, Sundernagar Hm……. The children with VI- Low Vision and children with other disabilities as C.P. and V.I. we have worked a little with such children"

Most of participants discussing their experience in special education and their placements in schools or block levels

"8-9 years experience as special educator in dealing such children"

"Sir, it has been of 8 years, attached with this field"

"Special Teachers are less in numbers"

"Yes, there are lots of schools and teachers are block wise[ ]"

A different attendee talks about a cerebral palsy workshop they attended.

"Sir, I have done a three days workshop and we are taught how it is related to brain, its types and provided knowledge about such kind of things"

In the focus group discussion, the special educator provided detailed descriptions of C.P., its causes, factors, and treatments as follows:

"Sir, as the name implies, cerebral palsy refers to a condition in which a child's legs are ……..paralysed and they are unable to walk due to injury to the cerebrum, a component of the brain. ……. *Um Um. Means in layman language we can say that child does not walk or he/she is bed-ridden Um the maximum causes of disability, same are here for C.P. cases like Natal, Prenatal and Postnatal"*

"And in prenatal – Exposure of X-rays Um….. much exposed to sonographies and sometimes Mother is alcoholic and even drugs in today's life and ….. and ….. Rh factor also and Lack of nutrition or accident and this ……. is in Natal i.e. problem comes during birth. [ ] Big head size of baby forceps delivery and many times hypoxia Um ……. means supply of oxygen to brain."

In Dist Mandi, special educators describing their position in schools or at block level as not all the blocks or schools having special educators:

"Sir, There is block wise placement in Distt. Mandi of all special educators. Block wise and there are some blocks where there is no special educator"

"Sir, In Distt Mandi, there is block wise placement and there are some blocks which are vacant and require fresh appointments. And they ask to do double work because others blocks are vacant and require more fresh appointments"

One participant quoted about geographical condition as barrier in handling CP children

"And it is very difficult to deal with them because of Um…. Climate Um….. Hilly states"

"Sir, in a block, there are only one or two special educators. So, it becomes very difficult for us to deal children and to reach such children."

"The children are very far. We special educators are not able to reach and could not provide services."

Key finding# 3 Special educators do referral of CP hildren to specialist, do prescribe modification/adaptation in writing materials, do some stretching, strengthening exercises under guidance of therapist, do advice posture correction, positioning , lifting and carrying of CP children in school environment as part of related services.

Participant detailed about experience of related service which they deliver in school settings starting from referral of children to other therapeutic services based on needs.

"Yes, for that, first we have to make parents aware and Hospitalized the child till then child is not recognized about problem and get certified."

"We guide the parents that kindly take children to doctors and"

"If, we talk about services, then after watching the condition of child if depends that what problem child is having, suppose there are children, they require ADL's activities"

"We provide services based as disability of children"

As team members, one of participant focussed on priority, need of child ,ADLs skills and plan preparation for child mentioned as:

> *"Yes sir, when we go to school, visit the schools, different schools, then we go to normal teachers, to our normal teachers……. and besides that we keeping in mind the disability of child, suppose any child having visual Impairment or suffering from mental retardation, whatever is his disability and his/her need."*
>
> *"What is their priority first as which is indeed and it is not necessary that only education should be given. Might there anything required before education such as ADL, our activities of daily living skills, sir. Then, about this, we with parents call parents as a team members in schools, right, their teachers, we will tell them and for that we will prepare a plan, might be of one month and for a time period."*

Inclusive education system provides basic necessary education to all disabled through SSA and special educators are part of this inclusive education setting. In this setting there are different job profiles of special educators for such children presented in view as:

> *"Sir, since SSA started, Sarva Shiksha Abhiyan started, many people got knowledge about disability, before that such children perhaps not accepted in schools."*
>
> *"Such kind of children got recognition in Inclusive School Education System and special educators came into schools first of all, Govt. provides training to normal teachers through CRC. Lots of cases are referred to us by those general teachers that there is a case in their school. Our first duty is to indentify such child, then counsel his/her parents and after that we refer the child to CRC for I.Q assessment and for other any disability…"*
>
> *"Yes sir, Hm……Like this, the parents and sometimes, we take the children to CRC for Physiotherapy. There we are taught some exercises as*

advised to parents, we are taught in same way when we visit over there, and therapeutic services are provided by us to those children."

One of the participants concentrated on providing therapy services and giving advise on how to place the kid as part of related services, and they also abandoned some seating postures since they were not appropriate for children.

"Initially, we deny w-witting to such children who have adopted this position and advice not to have such sitting."

"First, we will put emphasis on academics, suppose personally child is not independent then we will try to make him independent and after that we provide physiotherapy, occupational therapy side by side in schools"

"We ask the children to engage in a bead activity to develop their fine motor skills, and we stretch their fingers to improve their writing."Rest others, who are with poor fine motor, where were two students, one not able to make fist and not able to grasp, give smiley ball."

Sir, in camps or at CRC from where we got training or seminar, we are also provided training on physiotherapy then on that basis, we in schools, to school children like stretching um ……. stretching exercise to these children if there is tightness.

Besides that, we can try to correct his positioning such as corner sitting, w-sitting and advice not to sit in w-sitting. If the child is having problem of scissoring, then in between that Hm ……. legs.

We can work as a Bridger because we are not specialized in Physiotherapy. No, we under the supervision, we can come to you or in camps. We are not authorized but under same supervision.

Key finding# 4: "Special educators were very eager to embark on something unique as a part of rehabilitation or therapeutics as camps planned at schools didn't help much and it becomes very challenging to take children to rehab centres like CRC / DIET for therapeutic sessions. Even special educators are unable to visit such children in schools on a regular basis due to hectic

schedules and the geographically challenging climate of Himachal Pradesh to combat issues described as:

"As there are Physiotherapy services available at CRC and in Mandi, there you see that our Mandi District is too large and so blocks, so "Not all of the children benefit, and for a camp, you cannot deliver everything to all of these youngsters in just one activity, and even that couldn't get there staying up with the geographical situation of ours as well. Then there should be such things that every child should get benefit of it."

"Sir, as there are Gopalpur and Dharampur how big are there areas and Karsog also, it is very difficult for them to came here at district Mandi at DIET so, there should be something like that everybody should get benefit at one place."

"What knowledge we have about physiotherapy, according to that, we told them and if we don't know all other things, then we refer them to you."

"And this therapy, should be in continue manner and in a single day camp event, there is no benefit."

Key finding #5:From point of view of special educators, telephysiotherapy is good option and will be beneficial in treating their physical impairments in school settings. This telephysiotherapy could be delivered in both offline (through web pages/recorded diaries) and by maintaining and adhering to electronic data and online ode (through videoconferencing) via android or smart phones/ipads. The limiting factors they ruled out could be network problem and improper technique on delivery of telephysiotherapy.

In today life, everybody having androids, mobile phones say digital world, one female participant discussing and speaking about telephysiotherapy, how it could be implemented and what are hurdles or barriers in delivering it as:

"It would be very successful in my opinions for those children who are left behind from therapy, we can give, sir."

"In essence, this tele-physiotherapy may be provided over the phone.. have Smart Phone and Google also., these are some software in mobiles"

"So…….today as it is time of Smart Phone everybody has, then we…..hm……hm for us, for children it will be easy Hm…….m."

"Sir, Telephysiotherapy will be good. For C.P.child. It is a good option where Physiotherapist cannot reach. networking, could be a barrier."

Other participant mentioning the Telephysiotherapy option by using android phones and installed software with good network like 3G,4G along with barriers as

"Barriers are those if same body is learning or using technology in wrong way Hm……Hm. Barriers are less. Hm……Not using properly, yes and there will be more benefits, and perhaps less drawbacks."

"Everybody has Android Phone and it will be easy for children as they don't have to travel much distance for this physiotherapy or therapy."

"Sir, it could be because it is a new facility, new facility has arrived, 4G, 5G, digital networking and there are good software."

"Sir, Tele-physiotherapy will be very good because every child can't reach to Physiotherapist at Sundernagar and Physiotherapist also could not each over that and as the children are certified with different percentage and accordingly by assisting the children, by carrying them we bring them over there. So for them it will be very useful."

Modes of telephysiotherapy to commence better results either in online or offline manner, revealed by one participant during discussion as:

"And, benefit will such as the children which are very far and could not access physiotherapy service so, they can easily start this. Harm will be only networking system as many places."

''Sir, because our first goal is to assist children, video in either an offline or online format, sir, this tele-physiotherapy would be highly useful for C.P.

youngsters as every time Hm……. hm if we talk that we get the child today itself and same type of child we can get at other place also and if these things, we want to watch at offline then we will apply at same place."

"Then both offline and online ……. Hm….. Can benefit much. Yes, somewhere ONLINE and somewhere OFFILINE"

"Sometimes, it is noticed that, there is networking problem in online and if we are not conducting online contact then we can go for offline mode through webpage, as you are telling that could be handy"

"Sir, both online or offline mode are equally important but it is seen that when we hm….. give therapy then after some time, we forget every thing that this, by which means, we have to do Hm……. the therapy – it should be in different way like way of save Hm…… save or any webpage, we have or that video ……o ……. conferencing."

Key finding # 6: This telephysiotherapy could be conducted at cluster level for every school by clubbing them and arranging workshop having ICT labs and good network at cluster level of all educational blocks for CP children involving zonal primary schools in central, as there are 7-8 schools at the block level in Mandi.

Commencement of this telephysiotherapy could be possible at a central level where all facilities like ICT lab or good network connectivity as told by one of male participant

If we talk about signal, as there are hilly areas, there is a problem of signal, there we can leave every school and at cluster level [ ] by arranging a workshop at Cluster level. So that everybody means those 4 or 5 schools in cluster and composing these Schools at Cluster, we…….

It is possible at cluster level, cluster level. Yes sir, as there is a centre having five schools and children ever there by clubbing all those children, we can provide such services.

Sir, as our centre schools, and under that there are 4-5 schools and then a cluster is made and such kind of children are called a centre school in a week

.As by this Smart Phone, there are stations where children can't come, then cluster level or cluster level or take 4-5 schools or 10 schools and keep them at centre where signal should be proper.

"As There are ICT labs with free Wi-Fi available in every senior secondary school. and at the central level, we can easily utilise it for all youngsters." "In those schools, we have every facility as there are ICT Labs and whey not the children should be called over there and deliver tele-physiotherapy to them."

Telephysiotherapy is an good option and it should lie where the full fledged ICT labs exists.

Based on two FGDs with educators, technology oriented novel i-TelePT module has been developed for limiting physical impairments and disabilities in CP children in educational settings (figure 4.21).

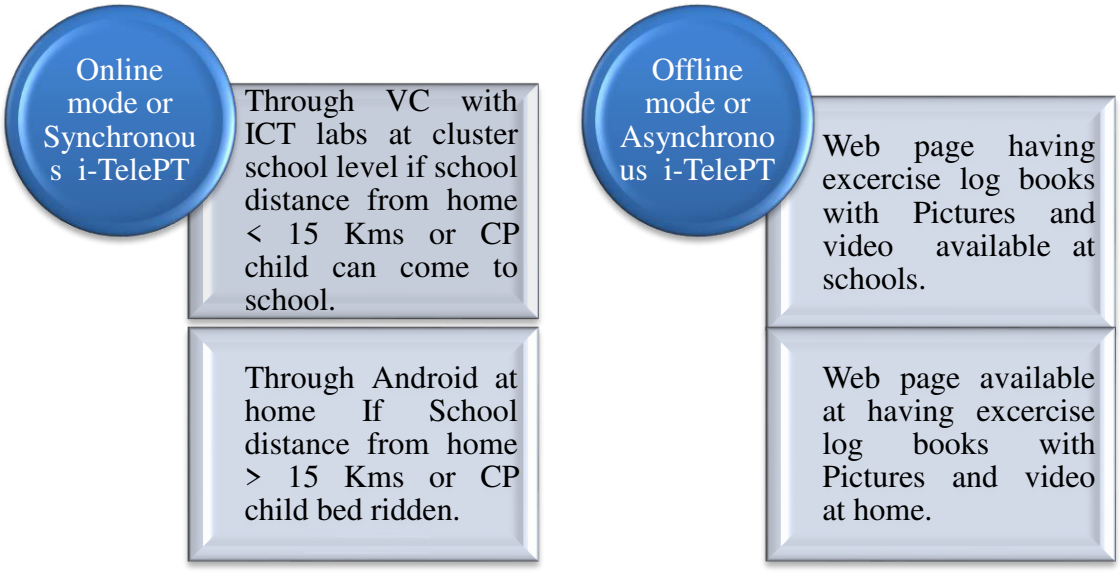


Figure 4. 21 Simplified Module of i-TelePT based on FGDs in educational settings

The framework enables the correlational interaction between therapist and CP children facilitated by special educators The framework of individualized inclusive telephysiotherapy (IIT) via individualized therapeutic plan for CP children enables

synchronous and asynchronous monitoring through school central clustral lab (SCCL) & home android lab (HAL) monitored by therapist and bridged by special educators in inclusive education settings.

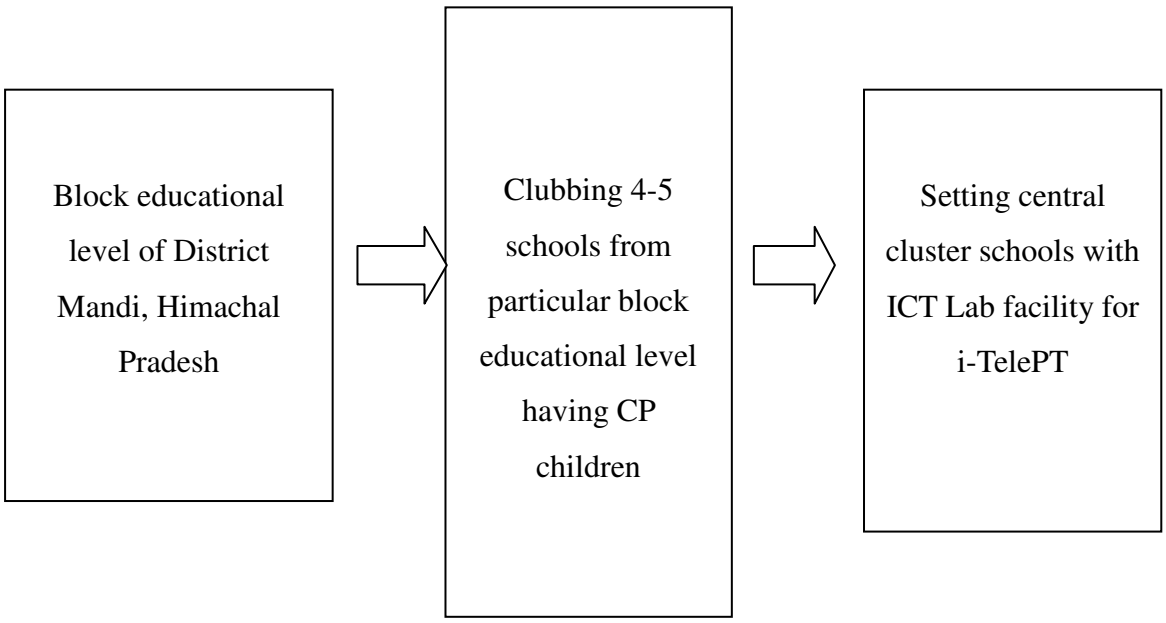


Figure 4. 22 Fabrication of School Central Cluster Model based on FGDs

The framework inculcates in depth understanding of Home based Android labs (HAL) and School Central Cluster Level (SCCL) modes of delivering TelePT via online and offline ways. This technological module at this platform for CP children will reflect wider digital rehabilitation approach inclusively in school settings (figure 4.22).

4.2.2 Conceptual framework of Inclusive Telephysiotherapy (i-TelePT)

Sketch diagram of conceptual inclusive telephysiotherapy framework for managing kids with CP in inclusive learning environmentsis displayed in figure 4.23. The proposal consists of three components namely patient-therapist component, ICT lab system component and Central system component integrated with special educators. The interconnections of these components are shown in figure 4.24. The therapist at HUB centre will communicate the C.P children through Special educators and demonstrate exercises as shown in figure 4.23. The CP children will interact with therapist via ICT labs of senior secondary schools and at home. Every nugget of information regarding to the child will be noted down or entered into an android phone before being transferred over GPRS to a central system. The data will be delivered to the therapist's smartphone as soon as it has been uploaded in the central system. A special educator at each ICT lab will assist the children and parents by providing necessary information.

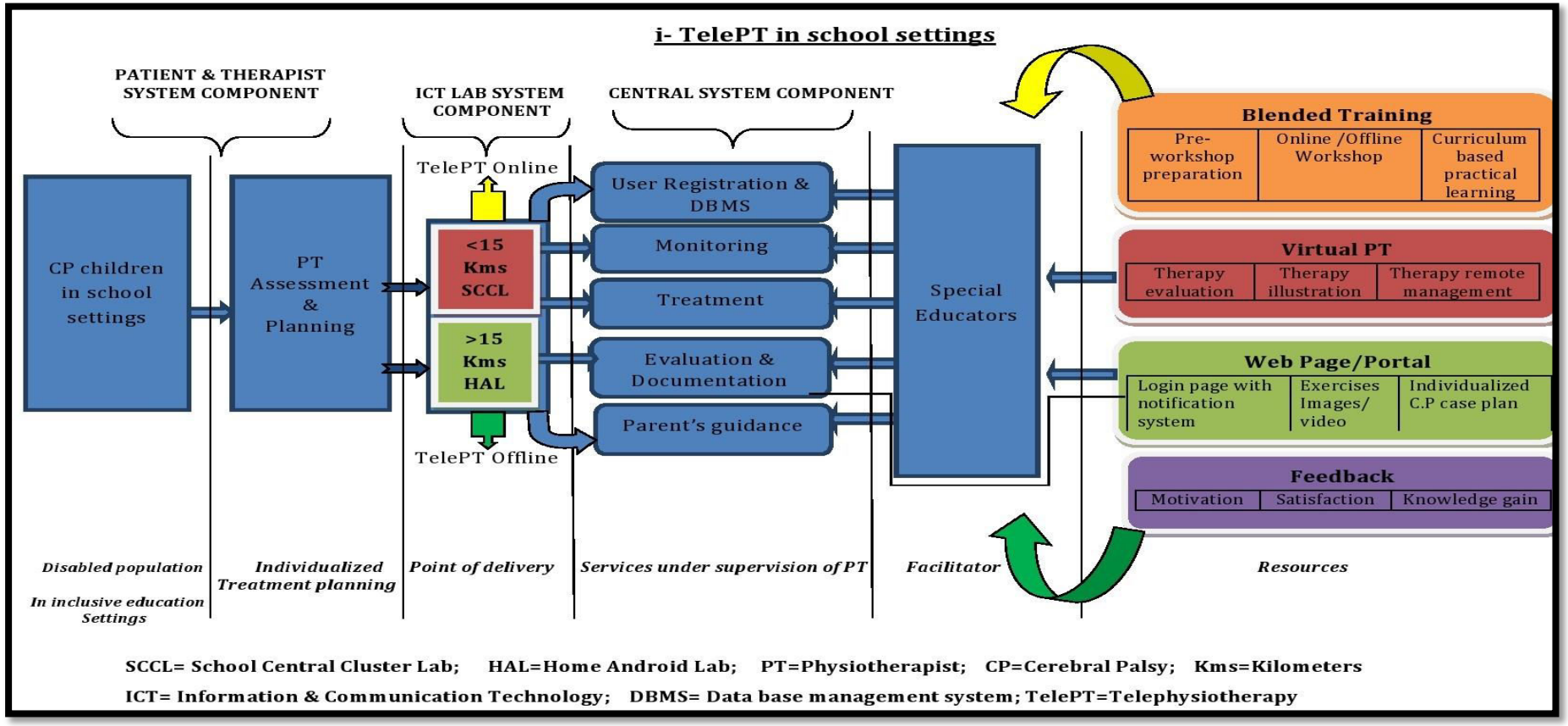


Figure 4. 23 An overview of developed sketch diagram of inclusive Telephysiotherapy (i-TelePT) © for management of physical impairments of children with Cerebral Palsy in inclusive education settings

Here is a presentation of the proposed system's individual components in detail;

I. <u>Patient & Therapist Component</u> The Patient components are the CP children in inclusive education system dichotomized into two sub components:

<u>Home based CP children</u>- Home base CP children enrolled under inclusive education settings who are bed ridden due to physical disabilities and not able to attend school because of physical distance between school and home.

<u>School based CP children</u>- School based CP children enrolled under inclusive education settings and going to school to achieve education after all physical impairments or distance.

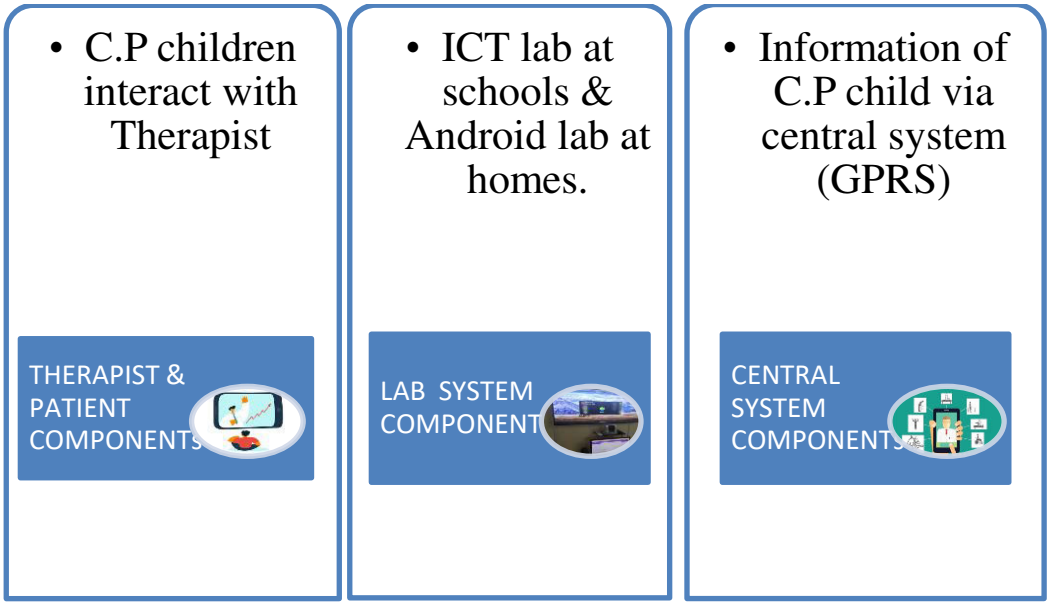


Figure 4. 24 Conceptual diagram of system components

Therapist Component- The therapist is already enrolled with the system when using ICT equipment from a distance. He would be able to get the patient's information as an alert from the given app, and he could then prescribe the patient based on that information.

II. Lab System Component

Home Android Lab (HAL)– This lab setup is for CP children who are home based i.e. bed ridden and unable to come to schools due to long distance of more than 15 Kms from Home.

School Cluster Central Lab (SCCL)– Since there are 4-5 schools at the block level, this central lab, which has ICT facilities, serves as a cluster for all educational blocks for children with special needs. This lab is for all those CP children who can attend the school and are within the premise of 15 Kms.

III. Central System Component With the following supporting components, this system is web-based.

Module for User Registration- This module is accountable for enrolling patients and special educators to the database's records in order to compile the necessary information. Consequently, by employing this centrally located mechanism, the C.P. youngsters as well as special educators and therapists enrol via internet.

Database Server Manager- A database server houses a computerised database management platform (DBMS) which is in responsible for preserving data arranged in stipulated data tables as well as responding to enquiries whenever they pop up. The online therapeutic events related files, containing images, audio and clips are archived in folder.

Monitoring & Treatment- The treatment and monitoring of i-TelePT @ of single session weekly of an hour duration for 8 weeks will be performed via video-conferencing system supervised by special educator in school and remotely by physiotherapist via 4G cellular data network at both ends.

a) Evaluation & documentation- The physiotherapist will register the consultation record regarding each child as documentation. Evaluation of each CP child shall be conducted based on individualized therapeutic goals & individualised i-TelePT sessions delivered.
b) Guidance to parents- All the parents will be advised to continue the therapeutic sessions on specific goals for their CP children what they have

noticed during on line sessions or through web page which will empower the parents and child.

Resources for Special educators- Special educators will act as facilitator between therapist, patient and all technological system to effectively deliver therapeutic services who will get input from following modes;

a) Training- Special educators will get properly planned curriculum based online, offline or blended training regarding delivery of inclusive Telephysiotherapy services for CP children. Knowledge of the special educators will be expanded by providing training related to the use of information technology, CP & related to physiotherapy.
b) Virtual PT- The Physiotherapist assesses type, frequency and duration of exercise, supervises and reviews the student's physical function and discuss daily exercise regimen designed for child. Therapist will virtually evaluate, illustrate the exercise and manage the whole session weekly in remote manner for 8 weeks.
c) Web page- Web portal may be used by special educators, parents by visualization of individually designed exercises uploaded with videos, images or exercise clips for fulfilling goals and the patients also have the opportunity to keep an offline diary.
d) Feedback- A questionnaire will be circulated among parents, special educators to evaluate the services of delivered i-TelePT through videoconferencing. The knowledge & satisfaction gained through training, its implementation for C.P children will motivate patients, educators to implement the same for other disabled children.

4.2.3 Development Process of i-TelePT framework

Development of this framework in educational settings will serve as a motivational drive for special children and compliance aspects of TelePT regimen. An i-TelePT framework (figure 4.25) was developed for C.P children in an inclusive education setting. This i-TelePT framework development process consists of mainly 5 sections

namely: Planning phase; Concept development or proposed architecture; Training phase, Implementation, Documentation & Monitoring.

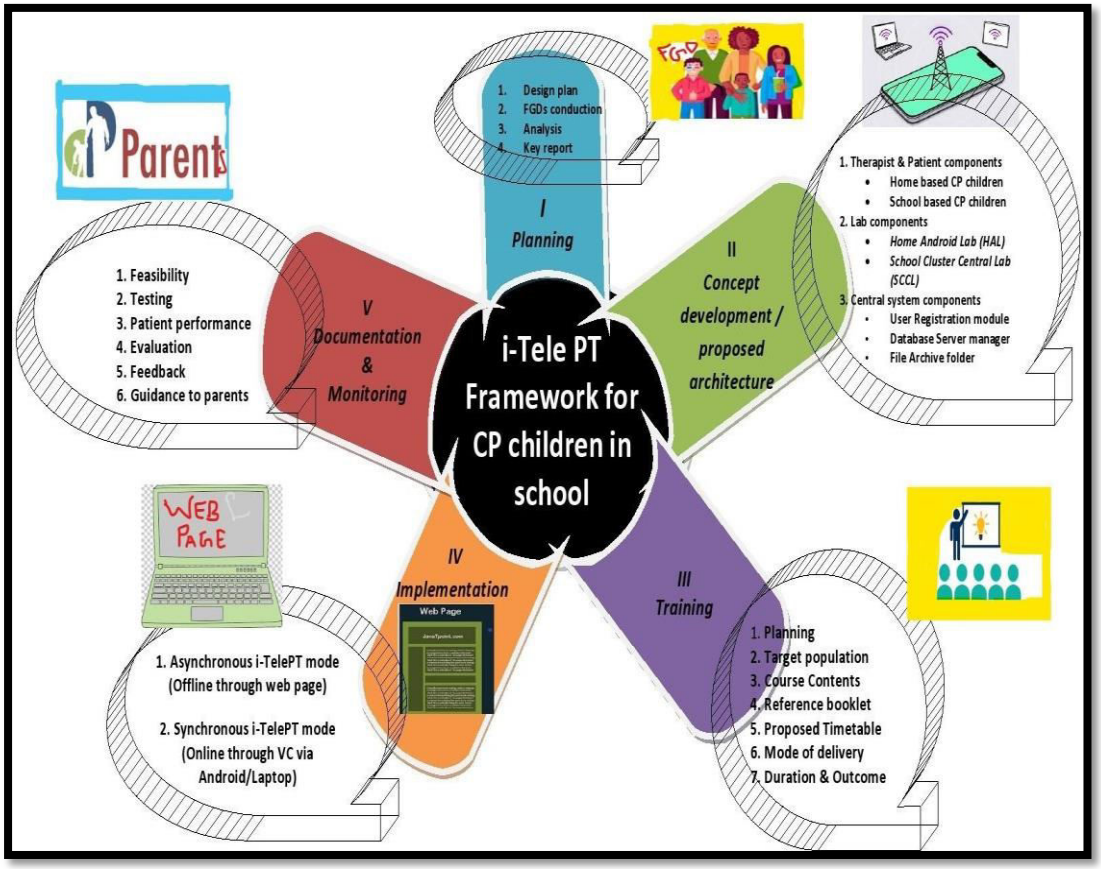


Figure 4. 25 Development process of i-TelePT Framework in school settings

1. Planning phase- The planning phase consists of 4 subsections:

a) Design plan- CP children in school settings require therapeutic approach to full fill their curricular or co-curricular demands and upgrade living standards. Assessment and examination of each child were carried out by physiotherapist in school settings along with special educators catering C.P children in particular educational block of district to develop individualized therapeutic plan (ITP).

b) FGD conduction- Focus groups discussions were held with experienced teachers, with a minimum of two years, working in several educational blocks based on cerebral palsy and tele-physiotherapy to develop need based module.

c) Analysis- Each comment has been designated and interpreted with codes via analysis and then grouped into themes and subthemes.

d) Key report- An i-TelePT framework was developed based on FGDs analysis report with perceptions of special educators engaged in schools for inclusive education of these children.

2. Concept development- The proposal consists of three components namely patient-therapist component, ICT lab system component and Central system component integrated with special educators as discussed in figure 4.24.

3. Training component –

a) Planning**-** The training of special educators regarding delivery of TelePT services for CP children in their educational block was properly planned.
b) Target population**-** Conveniently selected special educators of more than 2 years of experience representing each educational block were part of training.
c) Course contents**-** Module or course contents for in-service special educator's training programme on inclusive tele-physiotherapy for CP children in school settings developed for training.
d) Reference booklets**-** Booklets having reference material were provided to special educators in training having individualized therapeutic programme for each CP children.
e) Proposed timetable**-**The proposed time table for special educators dealing with CP children of their educational blocks along with suitability of ICT labs were provided.
f) Mode of delivery**-** The training was conducted by face to face or virtual mode as participants will get benefitted by some practical demonstration on CP as well as technical issues.
g) Duration & outcome**-** A two days short term workshop at official schedule was carried out for special educators.

4. Implementation of IIT proposed system-

The intended and created system was put into practise as a prototype. The enactment of technology structure for CP children and therapists for the inclusive "i-TelePT online" and "i-TelePT offline" versions are illustrated below.

Asynchronous support system setting- Technically "web page portal service through Asynchronous mode" bridges the database and the end users i.e. Special educators, parents & C.P children. This module of system is an informatics application which allows registering the basic clinical information of child including name, age, sex, address, diagnosis and individualized therapeutic information [464]. Apart from online real VC, web portal named as 'i-TelePT' is a digital tool that functions as an interactive module and participants can access to the website, the logo of which is illustrated in figure 4.26.

Figure 4. 26 An i-TelePT Website logo displayed in Website

A main page and many informational sections are present on the website regarding individual therapeutic exercise plan as strengthening, stretching, balancing exercise and mat activities etc. via images and individual videos exercise program for each

child and resources to support exercise dosage in accordance with recommendations as shown in figure 4.27.

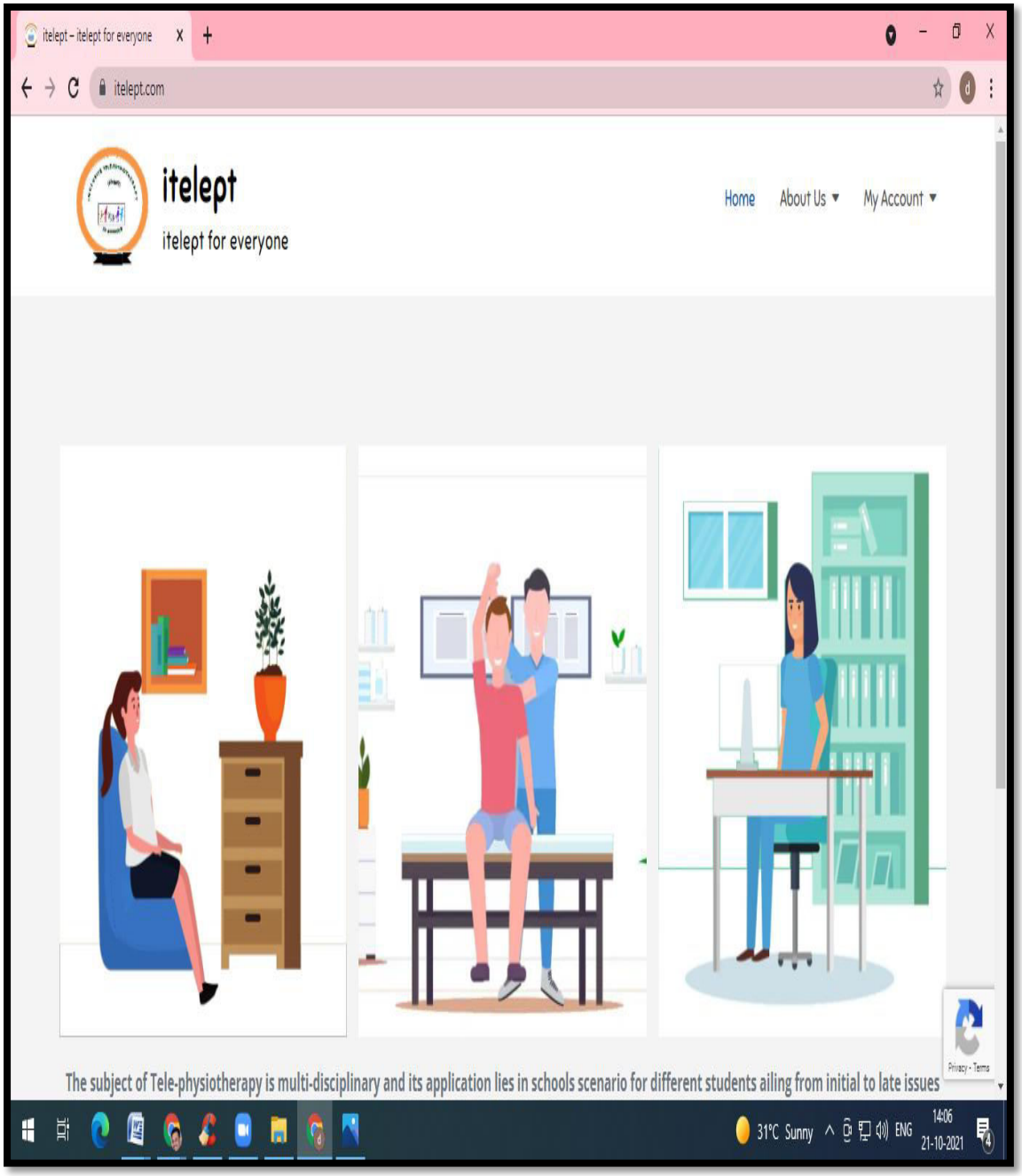


Figure 4. 27 Website homepage for Asynchronous mode of i-TelePT

This website was designed in compliance with the standards established up within the Health on the Net Foundation's Code of Professional Conduct and this determines an ethical benchmark for the legitimacy of health information transmitted across the

worldwide web [465], [466]. Participants can access the website for visualization of individually designed exercises as shown in (figure 4.28) by using the URL and their unique username and password at home or school on their own device (figure 4.29).

Figure 4. 28 Individualized i-TelePT Therapeutic plan of CP child

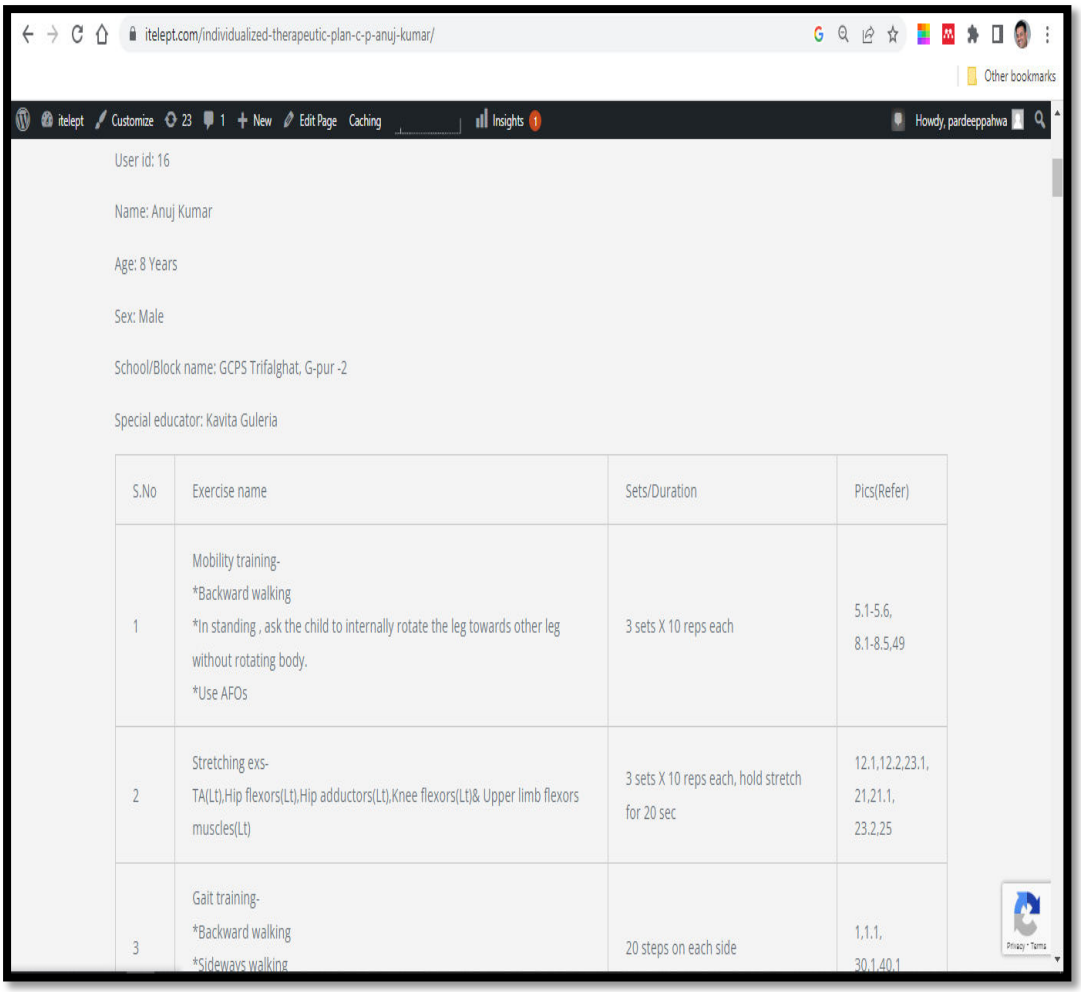


Figure 4. 29 Designed Exercise lay out plan of CP child on i-TelePT website

Exercise reports or diaries were reviewed remotely by the physiotherapist who contacted participants by email or phone. Progress were discussed and updates to exercise programmes were made, as appropriate, by adding or removing exercises or changing the number of repetitions/sets.

Synchronous (ICT SCCL lab) based support system setting at school- An online support system by setting up a cluster level of schools for TelePT is integrated in the proposed system. In online support system, an Integrated Computer Projector (ICP) in smart class room with one LCD TV and computer system was provided as given in figure 4.30 herewith;

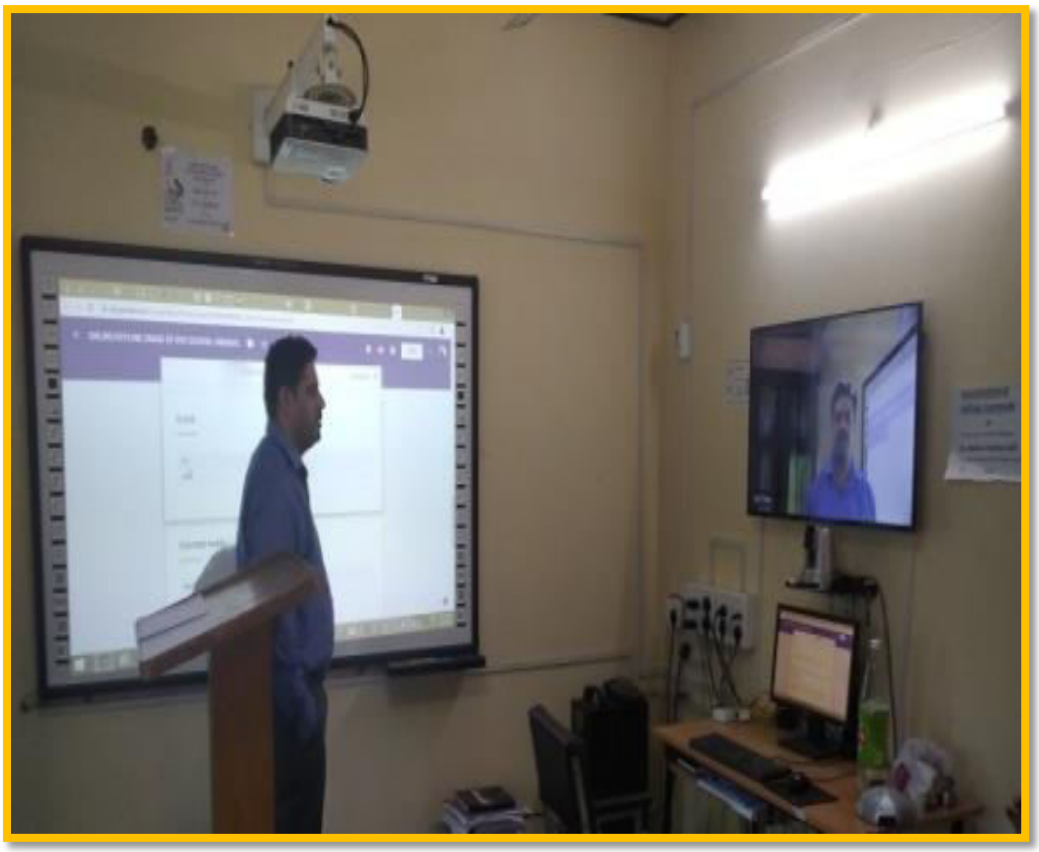


Figure 4. 30 Integrated Projector & VC System in ICT labs at schools

A central cluster school VC system with broadband connectivity catered the services. The therapy room have a standard treatment plinth, a chair and other exercise equipments could be positioned over there by special educators allowing the therapist to observe and direct the commands for TelePT. The therapist communicated with CP students through this internet-based mode of operation, which is only restricted to online exercise representation. This service requires that both therapist and C.P children use their communication system [417]. The therapist at office or home outfitted with VC equipments using laptop, webcam, microphone and software provided access to physiotherapy services. On the other hand, Synchronous home android lab is a communication platform enabling the children to communicate directly with androids [467].

It is main hub point of ICT including videoconferencing (VC) system at therapist end and android based smart phones system at user end as shown in figure 4.31.

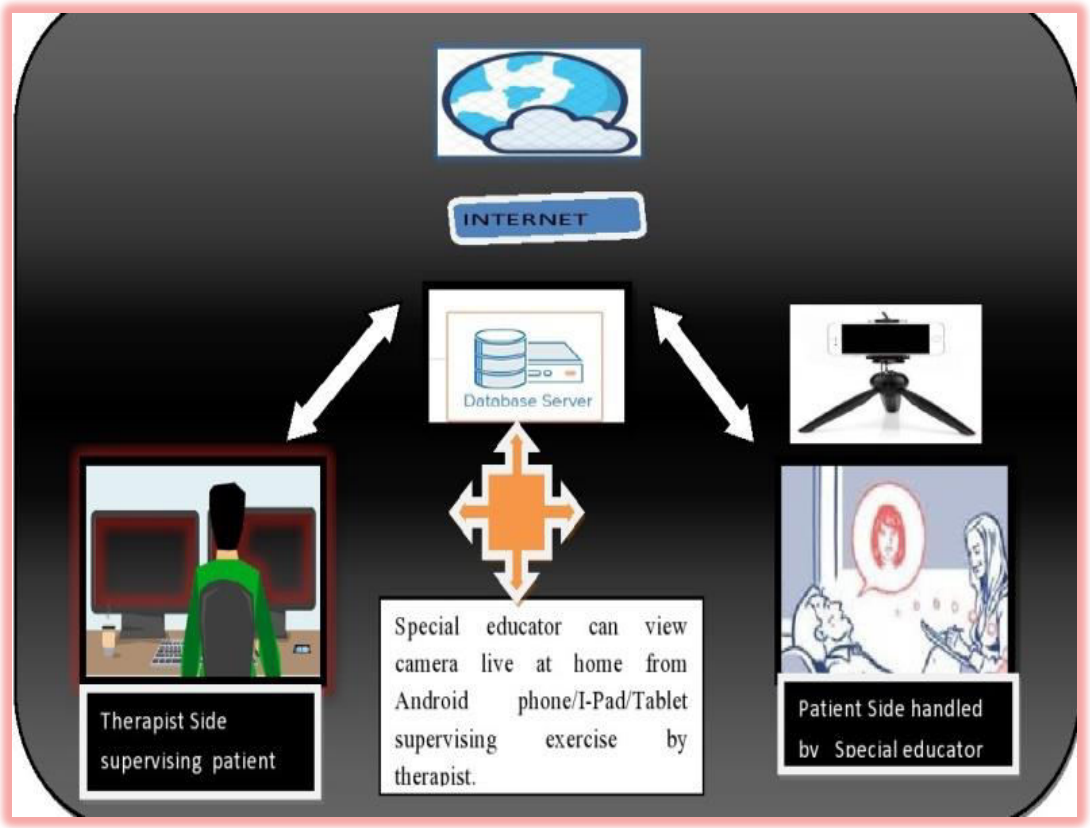


Figure 4. 31 Online HAL based setting at home

5. Documentation & Monitoring- The VC archiving tool captured each session conducted online for the purpose to monitor adherence to intervention and highlight facilitators and barriers. Written record were maintained summarizing all interventions consistent with the standards of practice. Digital or non digital records utilized in the TelePT consultations, phone logs, email records, chat/text speech records, video interaction etc. patient records, documents, images, video or audio records were retained by PT. Evaluation of each CP child was conducted based on individualized therapeutic goals & individualized i-TelePT sessions by using an evaluation performa.

In order to correctly evaluate the validity and benefit of this architectural proposal, 8 weeks programmes will focus on testing our proposal in school based settings for CP restricted to well define environments; the evolution of project is based on previous school based therapies, incomplete reach of rehabilitation and FGDs with special educators of the school. From this pilot experiment, we will iteratively evaluate and

improve the functionalities of therapist, active participation of special educators and children with in the loop.

Feedback on 2 days Training for Special educators:

The feedback was taken at the end of the training workshop held with special educators (n=10) before commencing the implementation of i-TelePT framework. All 10 participants shared their views and submitted feedback in week time span against the following questions shown in graphs.

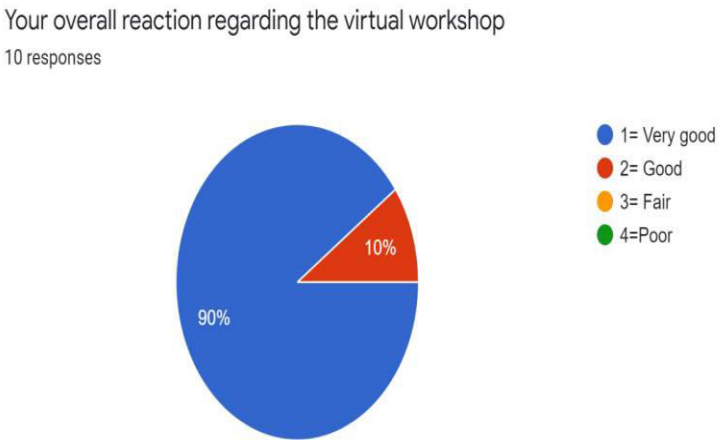


Figure 4. 32 The overall reaction from educators regarding the workshop

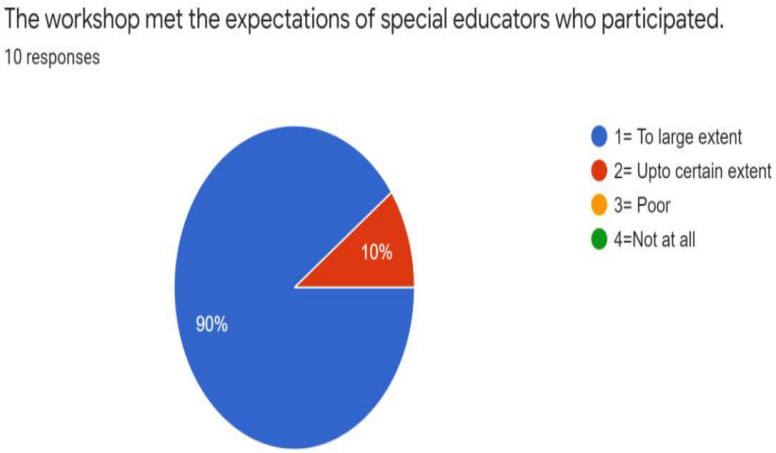


Figure 4. 33 Expectations of all educators regarding workshop

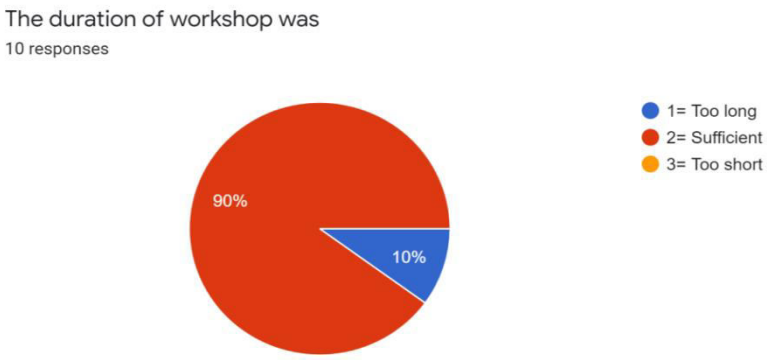


Figure 4. 34 The Time duration of Workshop

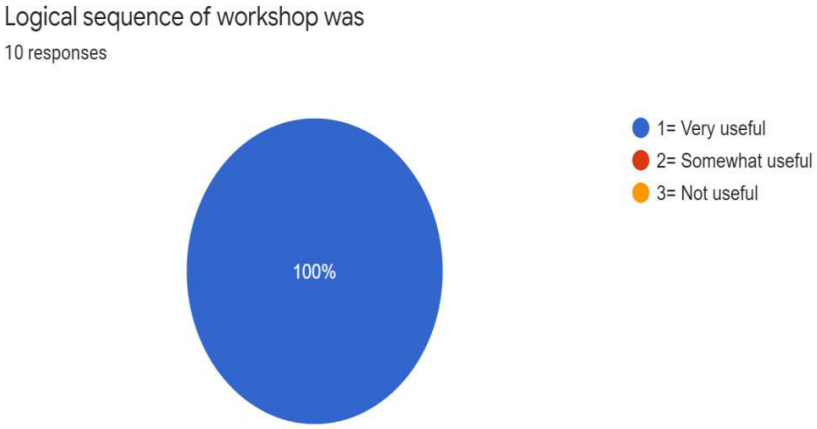


Figure 4. 35 Usefulness of workshop held with educators

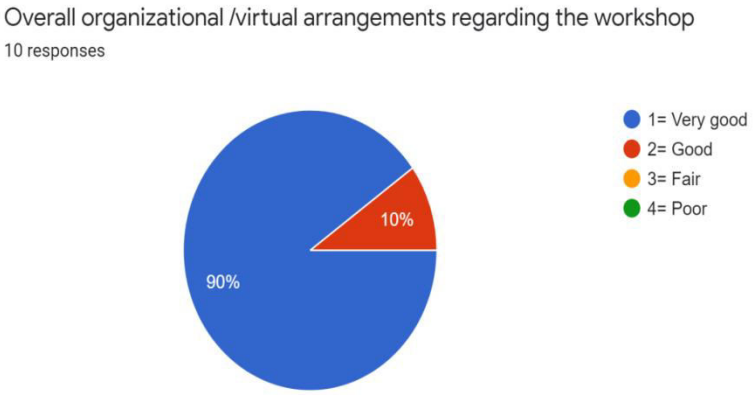


Figure 4. 36 Responses about overall arrangement of Virtual training workshop

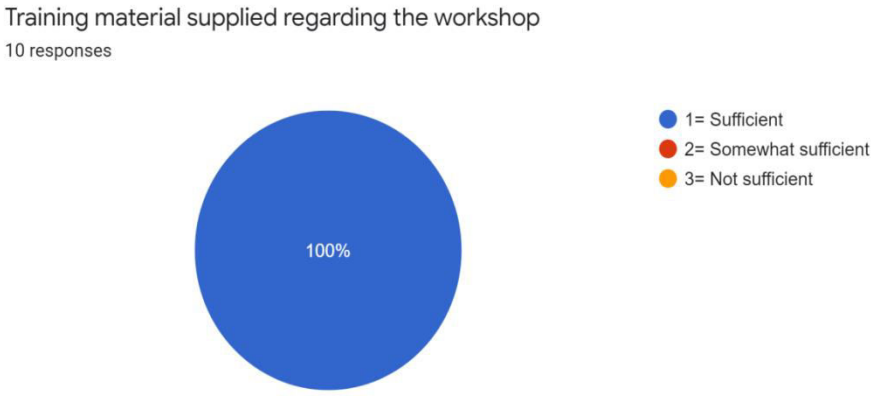


Figure 4. 37 Teaching material supplied for the workshop

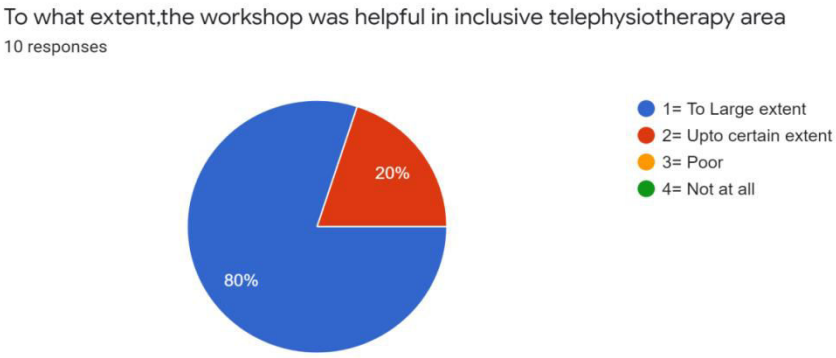


Figure 4. 38 Extent of benefit of virtual workshop

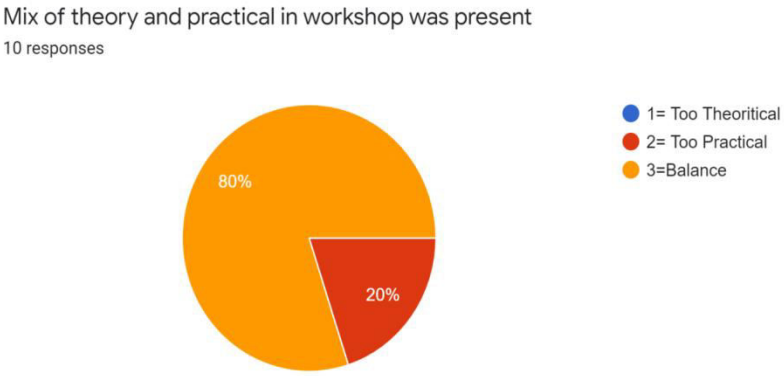


Figure 4. 39 Content structure of the workshop

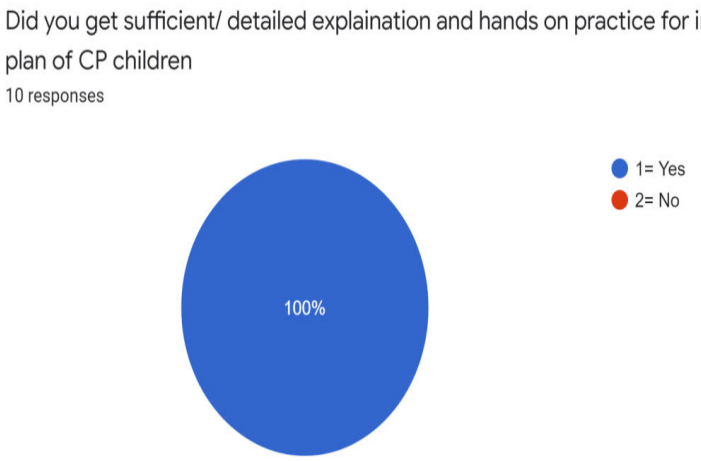


Figure 4. 40 Responses about practical exposure in the workshop

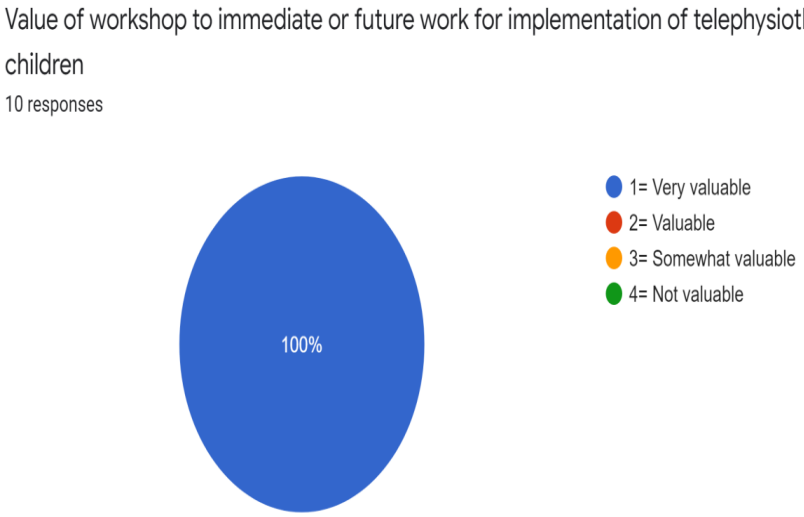


Figure 4. 41 Future work about implementation of i-TelePT

4.3 Results - Phase III

The key objective of the third stage is to determine the viability as well as the efficacy of implementing an 8-week i-TelePT curriculum. A baseline assessment (T0-pre) was performed with subjects, collected data on the VAS, PBS, GMFM-88, GAS, MACS, WeeFIM, MAS and CPQoL. A new evaluation of the outcome variables was conducted after the intervention (T1-Post). This study ought to shed light on the viability of i-TelePT implementation in educational settings in mountaineous regions.

Sample characteristics- Table 4.12 presents characteristics of all study participants. Total of twenty CP children under inclusive education were enrolled in the phase 3 of the study. In the currently ongoing investigation, a total of nine female (45%) and eleven male (55%) pupils with CP with a mean age of (9.8±1.69) years were included.

Table 4. 12 Characteristics of sample (N=20) in phase 3 of study

S. No	Variables	Subcategories	N (%)
1	Sex	Male	11(55%)
		Female	9 (45%)
2	Age	6 Years	1(5%)
		7 Years	1(5%)
		8 Years	2(10%)
		9 Years	3 (15%)
		10 Years	6 (30%)
		11 Years	3(15%)
		12 Years	4(20%)

Scores for the different linked domains of CP are shown in Table 4.13 as VAS with (6.5±0.82), PBS (21.4±17.1), MACS (2.5±1.1), GMFM-88 (56.40±22.94), GAS (35.9±0.40) with total WeeFIM score (75.7±31.4).

Table 4. 13 Baseline Score (Mean &SD) of Physical Impediments in kids with CP

S. No	Domains of Physical impairments (C.P)	Outcome Measures Tools	Mean	Std. Error	Std. Dev.
1	Pain	VAS	6.50	0.18	0.82
2	Balance	PBS	21.4	3.83	17.1
3	Fine Motor Funtions	MACS	2.55	0.25	1.14
4	Gross Motor Functions	GMFM-88	56.4	5.13	22.9
5	Goals	GAS	35.9	0.09	0.40
6	ADLs	Wee FIM Sphincter Control	10.4	1.53	6.88
		Wee FIM Transfers	11.4	1.55	6.93
		Wee FIM Locomotion	7.30	0.96	4.32
		Wee FIM Communication	10.7	0.62	2.78
		Wee FIM Self care	20.5	2.06	9.24
		Wee FIM Social cognition	15.2	0.98	4.39
		Wee FIM Total score	75.7	7.03	31.4

The average score for the seven quality-of-life subscales for children with CP is shown in Table 4.14. The first subscale of the CPQoL (Social wellbeing & acceptance) shows mean/Std.Dev. (55.2±19.7), 2nd subscale (functioning 52.9±19.1), 3rdsubscale (participation and physical health 48.8±19.8), 4th subscale (emotional

wellbeing and self esteem 52.9±17.6), 5th subscale (access to services 50.6±16.9), 6th subscale (pain and impact of disability 46.3±15.4) and last subscale of (family health 61.7±13.6) for all 20 children of CP as base line score.

Table 4. 14 Baseline score (Mean & SD) of CPQoL

Sl	Subscales of CPQoL	Min. Score	Max. Score	Mean	Std. Error	Std. Dev.
1	Social well being & acceptance	14.6	94.7	55.209	4.405	19.703
2	Functioning	0.0	78.12	52.976	4.286	19.171
3	Participation & physical health	3.4	81.8	48.883	4.449	19.899
4	Emotional wellbeing & self esteem	14.6	77.08	52.996	3.945	17.646
5	Access to services	2.08	73.9	50.601	3.795	16.975
6	Pain and impact of Disability	1.5	73.4	46.395	3.464	15.492
7	Family health	31.25	78.1	61.734	3.060	13.685

Figure 4.42 presents further information on CPQol through displaying the mean of all subscales as well as the Cronbach's alpha score for each one. Internal consistency and dependability are seen to be strong when Cronbach's alpha is greater than 0.7. Cronbach's alpha demonstrated a high connection in all CPQol categories, with values greater than 0.7 suggesting good quality in CP subscales.

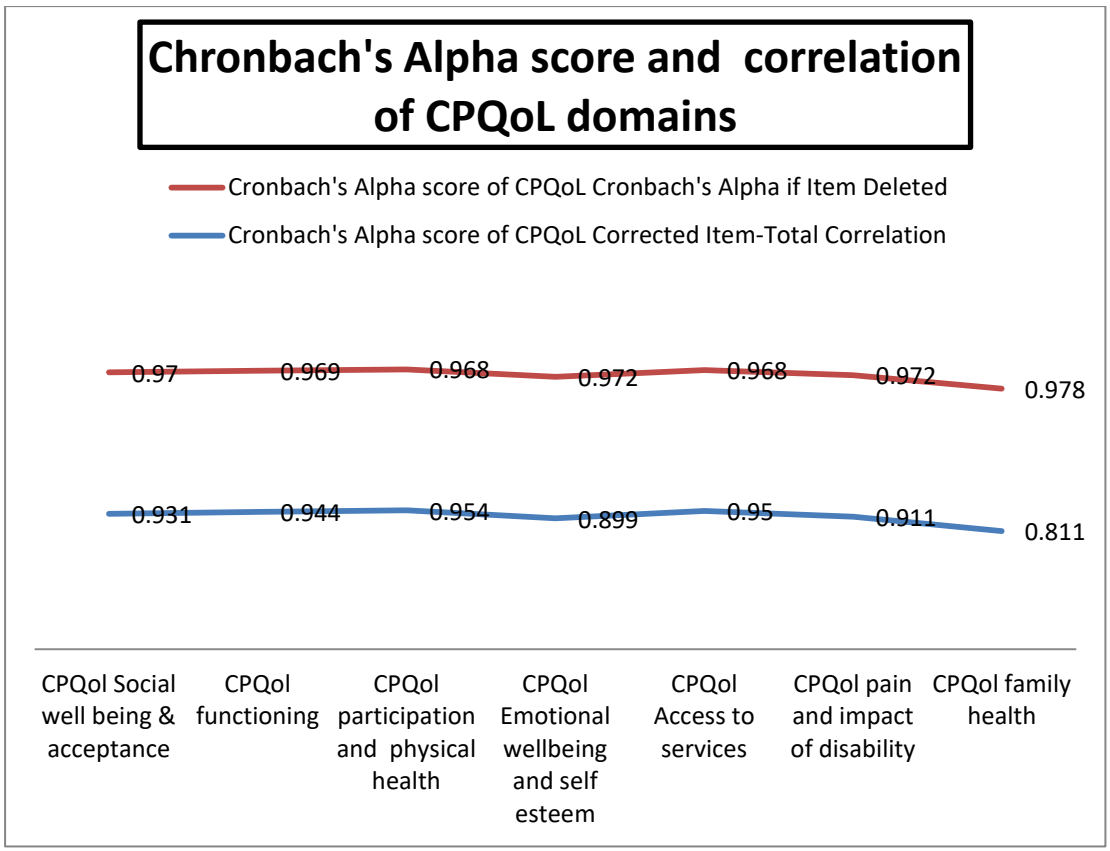


Figure 4. 42 Cronbach's Alpha score and correlation of CPQoL domains

This clinical feasibility of i-TelePT was measured through safety, adherence, technical feasibility, clinical efficacy and satisfaction of parents/patients.

Adherence: Adherence to the program was assessed by diary log specifying dropout rate and no. of session completed. All Twenty (100%) participants completed the full intervention resulting in a dropout rate of 0% except single case who could not connect via online session because of suffering from COVID-19; however he joined asynchronously. First, we calculated an adherence rate [468] by dividing the number of response days of i-TelePT online by 8 days@1 session/week and multiplied by 100 with mean attendance online (68.1±32.81) days. The participants along with their parents logged on to the website *(www.itelept.com)* for asynchronous treatment visited the web page and calculated adherence rate by no of days visiting the i-TelePT webpage offline by 56 days (8 weeks) with mean attendance offline (39.6±5.13). The average duration of the session was 55-60 minutes. No adverse event (AE) was

reported during the sessions. However, one or two participants got some weather allergy and some participants got tired.

Technical Feasibility: Technical feasibility depends upon resources like internet, software and hardware and VC system installed. Only two minor technical issues related to poor audio quality from a participant's gadget were noticed during the course of i-TelePT online exercise sessions of therapy and both of these issues were fixed by the physical therapist addressing to the participants on their mobile phones while simultaneously looking at them through the computer screen. The Physiotherapist reported that delivery of i-TelePT was ideal and superlative as the therapist was supervising from the cabin and educators at the schools and at home as per case requirement to serve all CP children all around district. All the sessions were carried out with planning and collaborations with educators, family and children with little technical difficulties.

Some technical issues were encountered during the supervised intervention. The bandwidth was not sufficient for two or three participants as living in remote areas or weathered conditions in HP. There are some places where network issues were noticed during the delivery of i-TelePT. Few responses were noticed in terms of time of TelePT for one hour is more for these children which should be nearly 45 minutes. Only mild cases of CP children should be considered. The parents who are in very critical condition (hand to mouth/poor family) were keen to earn daily bread (doing farming etc.) rather than spending times on children.

Safety & adverse events: Following the home safety evaluations, participants were monitored both verbally and visually. In accordance with the number of unfavourable events which each participant experienced whilst exercising, we considered their level of in-home safety. A human study subject encountering adverse consequences is defined as anything undesirable that happens to them physically or psychologically [468], [469]. No negative consequences associated with exercising were reported during the study and no harmful incidents of safety happened during investigation methods. More specifically, we requested participants regularly as captured in i-TelePT recording session form, whether they encountered any sensation of pressure or agony; dizziness; throughout the most current exercise session.

Clinical efficacy: Total of 20 participants i.e. CP children were recruited and allocated i-TelePT intervention. All participants provided written ascent forms keeping in mind the disability and taken back after signing by them or parents. All these participants were assessed at baseline and intervened throughout for 8 weeks via i-TelePT. All participants along with educators also visited the web page with mean attendance offline (39.6±5.13) days and with mean attendance online (68.1±32.81) for 8 weeks duration. The details of attendance as carried out in online & offline i-TelePT is shown in table 4.15.

Table 4. 15 Attendance (Online & Offline) i-TelePT of the participants

Characteristics	**Mean ±SD**
Attendance (i- TelePT Online)	(68.1±32.81)
Attendance (i- TelePT Web Page/Offline)	(39.6±5.13)

The characteristics of sample population with level of Gross motor functional measurement (Pre & Post) score on GMFM-88 scale are described in table 4.16.

Table 4. 16 GMFM-88 Pre & Post i-TelePT intervention results after 8 weeks (Paired –T test)

GMFM-88 DIMENSIONS	Pre		Post								
	Mean	**SD**	**Mean**	**SD**	**Mean Diff.**	**SD**	**SEM**	**95% CI Upper**	**95% CI Lower**	**t value**	**P value**
Lying & Rolling	72.68	19.8	82.15	15.91	-9.465	9.2	2.0	-5.158	-13.77	-4.599	0.001*
Sitting	72.91	22.99	81.91	20.57	-8.992	8.6	1.9	-4.948	-13.03	-4.654	0.001*
Crawling & Kneeling	58.39	28,25	71.42	27.26	-13.02	11.8	2.6	-7.459	-18.59	-4.898	0.001*
Standing	46.4	33.89	54.35	37.08	-7.944	10.2	2.2	-3.147	-12.74	-3.466	0.003*
Walking, Running & Jumping	31.66	30.88	40.96	35.03	-9.303	10.4	2.3	-4.402	-14.2	-3.973	0.001*
Total score	56.40	22.94	66.13	23.98	-9.732	7.6	1.7	-6.129	-13.3	-5.653	0.001*

GMFM-88= Gross Motor Function Measure -88, SD=Standard deviation, SEM= Standard error of mean, CI=Confidence Interval

Five characteristics of the Gross Motor Function Measure -88 were used to compare the motor function scores before and after the intervention. Following an 8-week i-TelePT intervention, baseline and follow-up assessments were obtained. A paired t test was used to evaluate motor function values before and after the intervention and the results are presented in table 4.16. Significant improvements were found in the lying, rolling over, sitting, crawling, kneeling, standing, walking and running positions. After 8 weeks of i-TelePT intervention, there was a significant difference in the alterations in Gross Motor Functions, with the mean difference in GMFM-88 total score being -9.7±7.6 (P <0.001).

During a passive movement of the relevant extremity, the degree of resistance the spastic muscle displays is measured as a measure of spasticity in the clinic. As a result, Ashworth created a 5-point scale. This scale assigns a point value between 0 and 4 to represent the resistance experienced during passive motions of the extremities.

Categories 1+ to 4 were assigned the numbers 2 to 5 for analysis. Prior to beginning the programme, that is, eight weeks before [pre-1] and immediately after [pre-2] the stretching programme, two assessments of the patients were carried out.

Table 4. 17 MAS Pre & Post i-TelePT intervention results after 8 weeks (Wilcoxon Signed Rank Test)

	Right								Left							
MAS	**Pre**			**Post**					**Pre**			**Post**				
	Mean	**Median**	**Mode**	**Mean**	**Median**	**Mode**	**Z Value**	**P value**	**Mean**	**Median**	**Mode**	**Mean**	**Median**	**Mode**	**Z value**	**P value**
TA	2.1	2.0	1	1.5	1	1	-3.05	0.002*	2.1	2.5	3	1.4	1.0	1	-2.75	0.006*
HIPFL	1.3	1.0	1	0.8	0	0	-2.64	0.008*	1.4	1.0	1	0.8	0.0	0	-2.97	0.003*
HIP EX	0.9	0.5	0	0.3	0	0	-2.414	0.016*	0.9	0.5	0	0.3	0.0	0	-2.22	0.026*
HIPADD	1.4	1.0	0	0.9	1	1	-2.714	0.007*	1.5	1.0	0	0.9	1.0	1	-2.59	0.009*
HIPABD	1.3	1.0	1	0.1	0	0	-3.44	0.001*	1.1	1.0	1	0.0	0.0	0	-3.30	0.001*
HIPIR	0.8	0.0	0	0.6	0	0	-2.236	0.025*	0.8	0.5	0	0.6	0.0	0	-1.89	0.059
HIP ER	0.6	0.0	0	0.3	0	0	-1.403	0.161	0.5	0.0	0	0.4	0.0	0	-0.59	0.55
KNEFL	2.0	2.5	3	1.3	1	0	-2.913	0.004*	1.9	1.5	1	1.4	1.0	1	-2.49	0.013*
KNEEX	1.4	1.0	0	0.4	0	0	-3.002	0.003*	1.2	1.0	0	0.2	0.0	0	-2.90	0.004*
SHFLEX	0.0	0.0	0	0.0	0	0	-1.0	0.317	0.2	0.0	0	0.1	0.0	0	0.00	1.000
SHEXT	0.1	0.0	0	0.0	0	0	-1.00	0.317	0.1	0.0	0	0.0	0.0	0	-1.00	0.317
ELBFL	0.3	0.0	0	0.2	0	0	-1.00	0.317	0.2	0.0	0	0.2	0.0	0	-1.00	0.317
ELBEX	0.2	0.0	0	0.1	0	0	-1.414	0.157	0.2	0.0	0	0.1	0.0	0	-1.41	0.157
WRFL	0.3	0.0	0	0.3	0	0	0.00	1.00	0.3	0.0	0	0.3	0.0	0	-1.00	0.317
WREX	0.0	0.0	0	0.0	0	0	-1.00	0.317	0.0	0.0	0	0.0	0.0	0	-1.00	0.317
PRON	0.1	0.0	0	0.0	0	0	-1.00	0.317	0.0	0.0	0	0.3	0.0	0	-1.63	0.102
SUP	0.0	0.0	0	0.0	0	0	0.0	1.0	0.1	0.0	0	0.0	0.0	0	-1.41	0.157
FINGFL	0.1	0.0	0	0.1	0	0	0.0	1.0	0.1	0.0	0	0.1	0.0	0	0.0	1.00

MAS =Modified Ashworth Scale; TA =Tendoachillies; FLEX =Flexors; EXT =Extensors; ADD=Adductors; ABD=Abductors; IR=InternalRotators; ER=ExternalRotators; SH=Shoulders; ELB=Elbow; WR=Wrist; PRON=Pronators; SUP=Supinators; FING=Finger.

In order to analyse the data, SPSS (IBM 20 Inc., New York, NY, USA) was employed. We calculated the average MAS scores for all muscles at both the joints in the upper and lower limbs. The Wilcoxon Signed Rank Test was applied to quantify the degree of spasticity and the results showed that the muscles in the TA, hip flexors, hip extensors, hip abductors, hip internal rotators & knee extensors had improved on right side. There was no improvement in the hip external rotators of lower limb on right side of body. On the opposite side i.e left side, there was also no improvement in hip internal & external rotators apart from other muscles. Also no significant impovement was noticed in muscles of upper limbs of both sides measured through Modified Ashworth Scale as shown in table 4.17.

The Functional Independence Measure for children (WeeFIM) is an assessment tool that aims to evaluate the functional status of patients throughout the rehabilitation process. WeeFIM is comprised of 18 items, grouped into 3 subscales – Self-Care, Mobility and Cognition. Each item is scored on a 7-point ordinal scale, ranging from a score of 1 to a score of 7. The higher the score, the more independent the patient is in performing the task associated with that item. 1- Total assistance with helper; 2- Maximal assistance with helper; 3- Moderate assistance with helper; 4- Minimal assistance with helper; 5- Supervision or setup with helper; 6- Modified independence with no helper; 7- Complete independence with no helper The total score for the WeeFIM Self-care subscale (the sum of the individual Self-care subscale items) will be a value between 8 and 56. The total score for the WeeFIM Mobility subscale (the sum of the individual Mobility subscale items) will be a value between 5 and 35. The total score for the WeeFIM Cognition subscale (the sum of the individual cognition subscale items) will be a value between 5 and 35. The total score for the WeeFIM instrument (the sum of the Selfcare, mobility and cognition subscale scores) will be a value between 18 and 126.

Table 4. 18 WeeFIM Pre & Post intervention after 8 weeks follow up (Wilcoxon Signed Rank Test)

Subdomain WeeFIM	Negative rank				Pre	Positive rank				Post	Z value	P value
	Mean (SD)	**Mean Rank**	**Sum of Rank**	**% age**	**WeeFIM Levels (1-7)**	**Mean (SD)**	**Mean Rank**	**Sum of Rank**	**% age**	**WeeFIM Levels (1-7)**		
Selfcare	20.5 (9.2)	6.0	6.0	58.2	3 (50% or more) Moderate assistance	22.2 (9.1)	6.55	72.0	63.5	3 (50% or more Moderate assistance	-2.60	0.009*
Sphincter control	10.4 (6.8)	0.0	0.0	49.7	2 (25% or more) Maximal assistance	11.3 (6.6)	4.5	36.0	59.0	3 (50% or more) Moderate assistance	-2.55	0.011*
Transfer	11.4 (6.9)	2.5	5.0	59.5	3 (50% or more) Moderate assistance	12.4 (6.7)	6.25	50.0	59.5	3 (50% or more) Moderate assistance	-2.31	0.021*
Locomotion	7.3 (4.30)	5.5	5.5	52.1	3 (50% or more) Moderate assistance	8.4 (4.4)	8.18	114.5	73.9	3 (50% or more) Moderate assistance	-3.20	0.001*
Communication	10.7 (2.78)	0.0	0.0	76.7	4 (75% or more) Minimal assistance	10.9 (2.7)	2.0	6.0	78.2	4 (75% or more) Minimal assistance	-1.63	0.102
Social Cognition	15.2 (4.3)	0.0	0.0	72.5	3 (50% or more) Moderate assistance	15.6 (4.4)	3.5	21.0	74.5	3 (50% or more) Moderate assistance	-2.27	0.023*

The statistical package for social science version 20 (IBM Corp.,) was utilized to analyze the data. The level of statistical significance was set at <0.05% with 95% confidence interval. Descriptive statistics were applied to acquire mean and standard deviation (SD) values for each domain of WeeFIM. A Wilcoxon Signed Rank Test was used to compare the pre and post score. Wilcoxon Test also known as "Wilcoxon matched pair signed rank test'' is an alternative to the paired t test, when the assumption of normality or equality of variances is not met. When there are just two measures to be compared from the same case, and the data are normally distributed or the sample size is large, we apply a paired samples t test (also known as a related sample t test). In this same situation if the data are not normally distributed we use Wilcoxon test. The descriptive statistics were used to obtain mean (SD) values of the WeeFIM total scores and all sub domains (Self care Mobility and Cognition). Table 4.18 gives the statistic i.e. Mean (SD) pre and post values of the WeeFIM total scores and all sub domains with calculated p values of the studied sample.

The Cerebral Palsy Quality of Life Questionnaire (CP QoL- Child) was used for the study. It was designed for children aged 4-12 years. The CPQOL- Child is a condition-specific measure, designed for children with CP, that evaluates the well-being of children across seven areas of a child's life: social well-being and acceptance, functioning, participation and physical health, emotional well-being, access to services, pain and impact of disability and family health [440], [446]. In this study, the primary caregiver-proxy report version for children aged four to 12 years was used which contains 65 items. Almost all items start with 'How do you think your child feels about...' or 'How do you feel about…' and are scored on a nine-point rating scale (1 =very unhappy, 3 = unhappy, 5 = neither happy nor unhappy, 7=happy, and 9=very happy). Only the items on pain were assessed differently and begin with 'How does your child feel about the amount of pain that they have and scored as 1=not upset at all to 9=very upset. All items of each area were transformed to a score ranging from 0 to 100. The CPQOL-child has a high internal consistency (0.70 – 0.95) and good test-retest reliability (0.76-0.89) [440]. According to the review study by Carlon et al., (2010) , the CP QOL-Child demonstrated the strongest psychometric properties and clinical utility for school aged children with cerebral palsy [470]. The

CP-QoL used for data collection has seven domains with 65 items. Each item is rated 1-9 except item 4 under pain and impact of disability domain which is rated 1-5. If an item is scored 1, then it is recorded as 0%, if the score is 2, it is recorded as 12.5%, and so on with an interval of 12.5, until it gets to 9 which is recoded as 100%. For item 4 however, a score of 1=0%, 2=25%, 3=50%, 4=75%, 5=100%.

Table 4. 19 CPQoL Domains Pre & Post intervention after 8 weeks follow up (Paired T-Test)

Dimensions CPQoL	Pre		Post		Mean Diff.	SD	SE M	95%CI Lower	95%CI Upper	t value	P value
	Mean	SD	Mean	SD							
Social Wellbeing & Acceptance	55.2	19.7	59.7	18.2	-4.53	4.27	0.95	-6.53	-2.53	-4.7	0.001*
Feeling about functioning	52.9	19.1	58.1	18.8	-5.16	4.1	0.91	-7.08	-3.24	-5.6	0.001*
Participation & physical health	48.8	19.8	53.5	19.8	-4.63	4.68	1.04	-6.82	-2.43	-4.4	0.001*
Emotional well being & Self esteem	52.9	17.6	57.2	17.7	-4.29	4.02	0.90	-6.17	-2.40	-4.7	0.001*
Access to services	50.6	16.9	56.2	17.3	-5.63	5.39	1.20	-8.15	-3.10	-4.6	0.001*
Impact of disability	46.3	15.4	46.2	13.4	-2.84	4.92	1.10	-5.14	-0.53	-2.5	0.018*
Family health	61.7	13.6	65.1	12.8	-3.41	4.51	1.01	-5.53	-1.30	-3.3	0.003*

The mean score in each domain or the overall mean score was calculated as the overall score for the health-related quality of life of the participant. The data collected were analysed using SPSS version 20. Descriptive statistics of frequency, percentage, and mean and standard deviation were used to summarize the data collected. The t-test was used to test for significant difference on QoL of children with CP. Paired t test was used to analyse the significant difference of each domain of health-related quality of life of the participants and level of significance was set at 0.05. The outcome of this study revealed that children with CP had improved quality of life (QoL) as shown in table 4.19.

The pre intervention mean CPQoL (Social well being & acceptance) score was 55.20 ± 19.7 and the post intervention mean CPQoL (Social well being & acceptance) score was 59.74 ± 18.2. The difference in pre and post intervention mean difference CPQoL (Social well being & acceptance score (-4.53) was statistically significant ('t' = -4.7, SEM = 0.95, 'p' ≤ 0.001) as shown in table 4.19.

The pre intervention mean CPQoL (Feeling about functioning) score was 52.95 ± 19.17 and the post intervention mean CPQoL (Feeling about functioning) score was 58.12 ± 18.8. The difference in pre and post intervention mean difference CPQoL (Feeling about functioning) score (-5.16) was statistically significant ('t' = -5.6, SEM = 0.91, 'p' ≤ 0.001) as shown in table 4.19.

The pre intervention mean CPQoL (Participation & physical health) score was 48.88 ± 19.8 and the post intervention mean CPQoL (Participation & physical health) score was 53.31 ± 19.8. The difference in pre and post intervention mean difference CPQoL (Participation & physical health) score (-4.63) was statistically significant ('t' = -4.4, SEM = 1.04, 'p' ≤ 0.001) as shown in table 4.19.

The pre intervention mean CPQoL (Emotional well being & Self esteem) score was 52.99 ± 17.64 and the post intervention mean CPQoL (Emotional well being & Self esteem) score was 57.28 ± 17.7. The difference in pre and post intervention mean difference CPQoL(Emotional well being & Self esteem) score (-4.29) was statistically significant ('t'= -4.7, SEM = 0.90, 'p' ≤ 0.001) as shown in table 4.19.

The pre intervention mean CPQoL (Access to services) score was 50.64 ± 16.09 and the post intervention mean CPQoL (Access to services) score was 56.27 ± 17.3. The difference in pre and post intervention mean difference CPQoL (Access to services) score (-5.63) was statistically significant ('t'= -4.6,SEM = 1.20, 'p' ≤0.001) as shown in table 4.19.

The pre intervention mean CPQoL (Impact of disability) score was 46.39 ± 15.49 and the post intervention mean CPQoL (Impact of disability) score was 46.23 ± 13.4. The difference in pre and post intervention mean difference CPQoL (Impact of disability) score (-2.84) was statistically significant ('t'= -2.5, SEM=1.10, 'p' ≤ 0.018) as shown in table 4.19.

The pre intervention mean CPQoL (Family health) score was 61.73 ± 13.68 and the post intervention mean CPQoL (Family health) score was 65.15 ± 12.8. The difference in pre and post intervention mean difference CPQoL (Family health) score (-3.41) was statistically significant ('t'= -3.3, SEM = 1.01, 'p' ≤0.003) as shown in table 4.19. The outcome of the study shows that more than half of the children with CP showed improvement after series of i-TelePT programme.

The Visual Analogue Scale was used to measure the severity of the individually formulated problems. The VAS is a valid and reliable measure in rating pain intensity in CP children [230], [471]. The VAS used in pain assessment is a straight 10 cm horizontal line with anchor points of no pain (score 0) and unbearable pain (score 10). We changed the anchor points into very satisfied (score 0) and very dissatisfied (score 10) in order to use the VAS uniformly for the individually defined problems. The instrument used to score the VAS score is shown in Table 4.20.

Table 4. 20 VAS score Pre & post intervention after 8 weeks follow up (Paired T-Test

VAS	**Pre**		**Post**								
	Mean	SD	Mean	SD	Mean Diff.	SD	SEM	95% CI Upper	95% CI Lower	t value	P Value
	6.5	0.82	3.40	1.4	3.10	1.5	0.355	3.84	2.35	8.74	0.001*

The data were analyzed using SPSS 20. We used a paired sample t-test to compare the pre- and post-treatment i-TelePT VAS scores. In Table 4.20, the results of a paired sample t-test are shown, comparing pre- and post-treatment related to the outcome variables. A statistically significant effect is found for improvement of pain (p value≤0.05) with statistically significant effect is found for pain (p =0.001).

Paediatric Balance Scale (PBS) was used in study, purpose of which is to examine functional balance in the context of daily life's activities in the paediatric population. It contains functional measured items, which are sitting to standing, standing unsupported, standing to sitting, sitting unsupported, transfer standing with eyes closed, standing with feet together, standing with one foot in front, standing on one foot, turning 360°, turning to look behind, retrieving object from floor, placing alternate foot on stool and reaching forward with outstretched arm. The score level of each item will be recorded on a five-point likert scale (from 0 to 4), depending on the quality of performance with total score ranged from 0 to 56. Paediatric balance scale was used to assess balance for all children participated in this study. It contains 14-item & scoring for each item is scored 0 points (lowest function) to 4 points (highest function), with a maximum score of 56 points. Calculation of the total score was done by summation of the score of the 14 items [445].

Table 4. 21 PBS pre & post intervention score after 8 weeks follow up (Paired T-Test)

PBS	**Pre**		**Post**		**Mean Diff.**	**SD**	**SEM**	**95% CI Upper**	**95 % CI Lower**	**t value**	**P Value**
	Mean	SD	Mean	SD							
	21.40	17.14	24.95	19.51	-3.55	3.99	0.893	-1.681	-5.419	-3.976	0.001*

Data were statistically described in terms of (mean ± SD), or frequencies (number of cases) and percentages. Numerical data were tested for the normal assumption using Kolmogorov Smirnov test and Shapiro Wilk test. Paired t- test was used to compare the pre and post treatment results of the study group. P values less than 0.05 was

considered statistically significant. All statistical calculations were done using computer program IBM SPSS (Statistical Package for the Social Science; IBM Corp, Armonk, NY, USA) release 20 for Microsoft Windows.

The balance of CP children was measured with the help of the PBS score. The pre intervention mean PBS score was 21 ± 17.1 and the post intervention mean PBS score was 24.4 ± 19.5. The difference in pre and post intervention mean difference PBS score (-3.55) was statistically significant ('t' = -3.976, SEM = 0.893, 'p' < 0.001) as shown in table 4.21.

The Manual Ability Classification System (MACS) is a classification system judging how children with CP use their hands when handling objects in daily life. These daily activities are for example eating, dressing, writing, playing, etc. The classification system is designed to classify the typical manual performance and not the maximal capacity of the child. An ordinal five point scale is used to score the abilities of the child. The pre & post intervention of i-TelePT grades of MACS has been revealed in table 4.22.

Table 4. 22 Pre and Post intervention MACS score

Participants	MACS PRE	MACS POST
P1	II	II
P2	III	II
P3	I	I
P4	II	I
P5	II	I
P6	III	III
P7	I	I
P8	II	II
P9	II	II
P10	II	II
P11	V	IV
P12	IV	III
P13	II	I

P14	IV	III
P15	I	I
P16	IV	III
P17	III	II
P18	II	I
P19	II	I
P20	IV	IV

Table 4. 23 Manual Ability Classification System Pre & Post intervention score after 8 weeks follow up (Wilcoxon Signed Rank Test)

MACS	**Negative rank Pre**			**Positive rank Post**			**Z value**	**P value**
	Mean (SD)	Mean Rank	Sum of Rank	Mean (SD)	Mean Rank	Sum of rank	-3.317	0.001*
	2.55 (1.146)	6.0	66.0	2.00 (1.026)	0.0	0.0		

The pre intervention mean MACS score was 2.55±1.1 and post intervention mean MACS score was 2.0±1.0 with a statistical significant (z value = -3.3 and p value ≤ 0.001 as shown in table 4.23.

Goal Attainment Scaling (GAS) is an individualized, criterion-referenced outcome measure that can be used to evaluate change in individuals or change in groups. It consists of a 5-graded scale from -2 to +2, where -2 is baseline performance, 0 the expected goal, and +2 much more than the expected goal. The procedure involves describing baseline performance and specifying a range of outcomes for a specific goal, using the scale to evaluate the individual change. When multiple goals are evaluated, ratings of goal achievement can be summarized and calculated into an

overall goal attainment score i.e. T-score. A T-score of 50 corresponds to achievement of the expected goal (level 0) and indicates a clinically significant change in goal attainment [443], [472].

Table 4. 24 Goal Attainment Scaling Pre & Post intervention score after 8 weeks follow up (Wilcoxon Signed Rank Tests).

GAS	**Negative Rank**		**Positive Rank**				
	Pre		**Post**				
Mean (SD)	Mean Rank	Sum of Rank	Mean (SD)	Mean Rank	Sum of Rank	Z value	P Value
35.99 (0.40)	0.0	0.0	56.26 (9.28)	10.5	210.0	-3.920	0.001*

One individualised goal was determined for each CP child using the GAS, to highlight the focus of ongoing goal-directed i-TelePT Intervention. Follow up of GAS outcomes were evaluated 8 weeks post-intervention of inclusive Telephysiotherapy. Statistical analysis was conducted using the IBM Statistical Package for the Social Sciences (SPSS) version 20. Descriptive statistics were used to summarise participant characteristics. Wilcoxon signed rank tests were applied to post-test GAS T-scores to determine any significant difference from the expected mean (T=50). The pre interventions mean GAS pre T score was (35.99 ± 0.40) and the post intervention mean GAS T score was (56.26 ± 9.28). The difference in pre and post intervention mean was statistically significant (‘z’ = 3.920, ‘p’ < 0.001) as shown in table 4.24.

Parents perception and satisfaction about TelePT was evaluated by using Telehealth Usability Questionnaire (TUQ) which is a comprehensive, validated questionnaire that can be used to evaluate a patient’s perception of the usability of and satisfaction

with various types of telehealth systems, including the traditional video systems as well as the newer generation of mobile devices [462]. It has 21 items that are based on 6 criteria including Usefulness, which is the patient's perception of how the system works overall to provide the health care service, and the advantages it offers in relation to traditional health care delivery; ease of use and learnability, which refers to how easy it is to learn and use the system; interface quality, which evaluates the interaction of the patient with the computer system and how easy it is to navigate the system with its graphical interface; interaction quality, which evaluates the interaction of the patient with the physician, including the audio-visual quality; reliability, which refers to how easily the patient can recover from any error and whether the system offers steps on how to correct the error, and also whether the patient thinks the virtual visits are same as in-person visits; satisfaction and future use, which refer to the satisfaction with and the willingness of the patient to use the telehealth medium in the future (Table 4.25). The TUQ was used to assess the usability of this telehealth system with patients using a Likert scale to rate responses (1: strongly disagree; 2: disagree; 3: somewhat disagree; 4: neutral; 5: somewhat agree; 6: agree; 7: strongly agree). The TUQ gives information on usability of the telehealth system.

All eligible parents were contacted individually by telephone. Keeping in mind the educational level as non-english speaking parents, the TUQ was administered by visiting all parents along with educators who had also been present during the question and answer session. Questionnaire responses were anonymously collected and entered with help of special educators accompanying parents and child.

IBM SPSS ver. 20 (IBM Corp., Armonk, NY, USA) was used for all statistical analysis. Descriptive statistics in the form of mean, standard error, deviation and percentage of responses received were used to describe the TUQ.

The TUQ total average scores ranged from 4.30 to 6.15 on the 7 point scale with a mean total average score of 5.37 out of 7. A score of 7 represents the most favourable score related to us of TUQ. Table 4.25 reveals the mean, standard error, deviation, range and variance and total average score for all the twenty participants on each items (Q1-Q20) of all the participants. Usefulness and satisfaction both with a mean score of 5.61 out of 7, Ease of use with a mean score of 5.78 out of 7, Effectiveness

with a mean score of 5.0 out of 7, Reliability with lowest mean score of 4.5 out of 7 and Satisfaction scale summary with a mean score of 5.57 out of 7 as shown in table 4.25. The TUQ includes one open-ended item that asks class leaders to provide comments on the telehealth system. Most educators with parents reported an overall positive experience. The subjects rated the intervention content as useful (mean 5.61, SD 0.98) and the website as ease of use (mean 5.78, SD 1.15). In addition, parents indicated that they were satisfied with the program overall (mean 5.57, SD 1.02).

Table 4. 25 Telehealth System Usability responses of all participants (N=20) as indicated by Telehealth Usability Questionnaire (TUQ

Item	Mean	SD	Std. Error	Range	Variance
Q1. Telehealth improves my access to services such as powerful tools for caregivers.	5.35	0.988	0.221	4	0.97
Q2. Telehealth saves me time travelling to get to services.	6.15	0.671	0.15	2	0.45
Q3. Telehealth met my need to attend an educational programme for caregivers.	5.35	1.137	0.254	5	1.29
Usefulness scale summary (Item Q1-Q3)	**5.61**	**0.98**	**0.20**	**3.67**	**0.90**
Q4. It was simple to use this system	6.05	0.945	0.211	4	0.89
Q5. It was easy to learn this system.	6.05	1.099	0.246	5	1.20
Q6. I believe I could become productive quickly using this system.	5.60	0.754	0.169	3	0.56
Q7.The way I Interact with this system is pleasant	5.55	1.395	0.312	6	1.94
Q8. I like using this system.	5.75	1.333	0.298	6	1.77

Q9.The system is simple and easy to understand	5.70	1.38	0.309	6	1.90
Ease of use scale Summary (Item Q4-Q9)	**5.78**	**1.15**	**0.25**	**5.0**	**1.38**
Q10 This system is able to do everything I would want it to be able to do.	4.90	0.912	0.204	4	0.83
Q11. I can easily talk to other caregivers using the telehealth system.	5.10	1.21	0.27	6	1.46
Q12. I can hear others clearly using the telehealth system.	5.35	1.348	0.302	6	1.81
Q13.I felt I was able to express myself effectively.	4.95	1.146	0.256	5	1.31
Q14. Using the telehealth system, I can see others as well as if we met in person.	5.00	1.257	0.281	5	1.57
Effectiveness Scale Summary(Items Q10-14)	**5.00**	**1.17**	**0.262**	**5.2**	**1.40**
Q15. I think the classes provided over telehealth are the same as in person classes.	4.30	1.031	0.231	5	1.06
Q16. Whenever I made a mistake using the system, I could recover easily and quickly.	4.70	1.342	0.3	6	1.80

Q17. The system gave error message s that clearly told me how to fix problems.	4.70	1.302	0.291	6	1.69
Reliability scale summary (Items Q15-Q17)	**4.50**	**1.22**	**0.27**	**5.67**	**1.51**
Q18. I feel comfortable communicating with others using the telehealth systems	4.80	1.576	0.352	6	2.48
Q19. Telehealth is an acceptable way to receive services.	5.50	0.889	0.199	4	0.78
Q20. I would use telehealth service again.	5.95	0.826	0.185	2	0.68
Q21. Overall, I am satisfied with telehealth system.	6.05	0.826	0.185	3	0.68
Satisfaction scale Summary (Items Q18- Q21)	**5.57**	**1.02**	**0.23**	**3.75**	**1.15**
Total average	**5.37**	**1.11**	**0.24**	**4.71**	**1.29**

CHAPTER V

DISCUSSION

Overview

This chapter gives an insight into the major findings of the study followed by circumscriptions and injunctions for forthcoming explorations. The outcomes of this groundwork are discussed in this chapter in relation to the research inquiries put forth to accomplish the study's goals. Furthermore, a conceptual framework for i-TelePT was developed to be adopted for kids with CP in comprehensive universal school environs rooted on the explorations of present work.

5.1 Discussion

With reference to literature studied, the data on the prevalence of CP in India is very limited especially in government school going children. Thereby children studying in government schools often remain undiagnosed due to the lack of the awareness, lack of the co-curricular activities or excercise. As the result, these children have difficulties in normal functional activities and their academic performance due to undiagnosed CP and further leading to their drop outs from the school. So, early detection and intervention of these children amongst children at the school level is very necessary for their better future. In terms of rehabilitation of such children, there is extensive still stand periods in these physiotherapy clinics and rehabilitation centers. Economical constraints and poor transportation facility, climatic & geographical conditions are the barriers for rehabilitation of CP children and other related disorders in India.

Phase 1: The first phase of the present study was conducted with the aim to know the cross sectional picture of present physical profile of these children among Government primary and middle school children in Mandi District, HP. Therefore, the primary objective of first juncture of the contemporary existing investigation was to determine the cross-sectional physical profile of these kids among government primary and middle school students in District Mandi, HP.

CP is globally associated with locomotor issues namely cuddling, getting upright positioning along with ambulatory challenges. The steady abuse and castigation in diverse regions of encephalon induce disablements analogous to spasmodic, dyskinesia and dyssynergic variations in CP teens [96], [473], [474]. In developed world, lot of literature on CP is available but in emergent nations especially in Asian continent and Indian subcontinent, this literary works is deficient and limited. Societal concerns embracing gender specific prejudice, the family reinforcement and economical situations have a critical consequences on therapy, indicating a association amidst the sociodemographic characteristics of families of CP patients and treatment outcomes [90], [475], [476].

In first frame of reference, the majority of instances of CP nearly 80% are from lower wage earning categories having emoluments under one lac per annum, exhibiting that below par social and finacial capacity of parents is vigorously associated with CP undoubtly supplementing that advanced parental educational ranks were bridged with curtailed incidence of disorder [476]. Furthermore, more than half of CP cases (55%) in the study had surgeon-assisted term childbirth with a arrays of complexities. Adding to it, a study embellished that periterm births give rise to preponderance of newborns with CP [118], [477]. Farther, other fact findings established that male (55%) to female (45%) ratio of CP patients, which is consistent with other research showing that boys are more likely than girls to have CP [478].

According to previous investigations, the spastic category of CP was the most prevalent across all topographical classifications [479]. Nonetheless, there were no precedent of paralysis of one limb, untidiness, dyskinetic or blended CP observed in the medical documentation of children. This imbalance is detected owing to inconsequential lean sample of CP in educational institutions in District Mandi. Notably, the appalling geomorphological attributes of Himachal Pradesh, the indigence financial portrait of parents and the inadequacy of familiarity of medical and educational resources available among rural residents in Dist. Mandi are other factors.

Despite above, the motor abilities and regulating skills have a strong correlation with quality of life for children with CP. The contemporary study disclosed a good interrelationship in all spheres of CPQoL with Cronbach's alpha score. Affirming the above, results of an research manifested that motor skills does not influence the living standards of children but in spite of that it fluctuates with educational level and age group of children backing up and reinforcing the results of study [480].

The contemporaneous physical status of children with CP in educational context was determined to know the level of advantage of enrolment of special children in schools as Indian Government propelling disabled children and their families to acquire admission and thus education under Right to Education law (2009) [34], [36]. The registeration of CP children under inclusive education, not only help to accomplish their schooling but fosters the physical development through therapeutics and other assistive devices at school. Undeniably, the strengths and limitations deterined of children in first phase will foster to empower their additional co-curricular or comprehensive therapeutic activity in accessible environment of school [481].

The research claimed that engaging in divergent school based ventures with other typical peer group assist these kids in curtailing and abolishing the neurological anomalies [23], [28]. The special teachers engaged with these chldren encourage their upright positions, correct the handgrips to hold objects in classrooms. In addition, they construct IEP for CP children, but possess just a small number of manual methods for therapeutic exercises [282], [297]. The various therapies used for such children have manifested refinement and upgradation in postures, strength and fine skills abilities of hand writing in school habitat [100], [400], [482]. But at the time of writing, there was no such system in place to enable special educators to provide efficient physiotherapy treatments in educational settings while being goverened and supervised by physiotherapists.

Phase 2: Special educator's in the second phase of study percepted about adoption of novel technological structure to mitigate the physical maladies of children. The therapeutic habits at the school level can be enhanced by using special educators expertise and experience as a key component of the TelePT system. The

implementation of this programme of treatment in schools for children with CP has sparked an increase in enthusiasm and curosities in the creation of technologically advanced remedy that can discharge and track physiotherapy facillity obscurely using ICT.

The application of this regimen of school based therapeutics to CP children has fostered a growing interest in development of new technology based therapy, able to provide remote delivery and monitoring of physiotherapy services through information and communication technology (ICT). An alternative physiotherapy method entails using TelePT which allows physiotherapy services to be delivered directly to school have the potential of providing anywhere and anytime physiotherapy support improving quality of life [378], [482].

The present qualitative study in second phase built up on six themes wherein educators put their views about development of novel digital framework. Specifically, the educators handle these special children by providing brief activities relied on IEP to fullfill their educational requirements. Besides they help in modification of furniture, adjust classrooms based on disabilities, brief about techniques of their good posture and specify some exercise of hand in barrier free school environment. Evidently, an research study focussed on the duties of these professionals as educators their role in providing assistive aids for mobility in barrier free access in classes & school buildings with safety features to enhance their learning and teaching process [291], [483].

Elaborating the knowledge and expertise, all special teachers who are qualifed with courses affiliated with RCI having good experience and workable knowledge of CP. Furthermore they are well versed with ongoing workshops and short term bridge programme for knowledge updates about CP children. Educators briefed their level of skills about CP and their role of managing this condition which they learnt during their diplomas. Concurring the same, the diploma courses designed by Rehabilitation Council of India assures about upgradation of practical and theortical skills to manage such children in schools [309], [315].

In this way, the apex body like MHRD, Govt of India builds an platform and create oppurtunities and disseminate infrastructure by exposing them so that teachers can deliver better services of rehabilitation to children [484]. Indeed, the special teachers percepted limitations regarding buiding barrier free infrastructure, lack of resource rooms, inadequacy of professionals which hinder their job to do in perfect manner. Affirming it, these special teachers should be given necessary infrastructure, adequate training and securities to improve the knowledge and thus condition of our special children [485], [486].

When discussing similar services, educators in particular discussed parallel therapeutic related services relied on children therapeutic requirements which they suffice under supervision in educational settings. These perceptions are analogous to the results of study indicating that educators can provide related services apart from education to special kids in mainstream schools [40], [487], [488]. As these associated services are part of universal school education, but educators feel that lack of supervision and overburdened schedule allocated by authorities create hinderance in their liability with regard to these CP children. Decidely, in summary, special educators are trained rehabilitation specialists with solid understanding of CP who can provide therapeutic services to kids under the supervision of therapists and address physical disabilities in educational settings.

Phase 3: While discussing cutting-edge technology, special teachers frequently expressed excitement about video chats techniques using smart phones, labs equippd with technology and contended on services for CP children in school settings set up under the guise of (i-TelePT). This advance technical solution assured the uniquness of novel technological framework which could be endowing for our gifted children as stated by educators in FGDs. Encouraging the unfamiliarity and modernity in treatments, that therapy specifically delineated to CP children via TR could be efficacious amenity for enhancing motor abilities in CP kids [489].

Two modes of telecommunications online and offline were derived from FGDs with educators. Inclusive telephysiotherapy in comprehensive school environment can be made functional by uniting four to five schools of an specific educational block with

enrolled chldren with CP. The block of clubbed school equipped with ICT laboratory and WiFi facillity formulate a central cluster level from where TelePT can be launched sucessfuly once a week through online mode and rest other days via offline manner.

The children with CP inhabiting in periphery of fifteen kilometers distance from school and have ability to attend cluster school take advantage of VC route for one hour once in a week with educator at school and therapist at distant catering children. In contrast, the special educator visited at the home of CP children who are cohabiting far from schools with more than 15 Kilometers distance and are incapacitated on bed. From home, the educator with the guidance of therapist connect a call by using zoom app and implement predesigned therapeutic plan for that child of one hour duration.

Besides online method, other channel of communication i.e. offline customs can be processed by logging into web page specifically designed for childrn and educators. Through Web page, patients as well as educators can log into their composed individual therapeutic plan. Anlogous study on technology carried out by researcher displayed that communication technologies could be convenient and beneficial gadgets for treatment in far spread zones [415], [490]. This shows possibilities of ICT labs in schools can cater the disabilities along with education counterpart in schools proclaiming the qualitative phase of study.

The compiled and accomplished present study is peculiar and one of few qualitative studies nuzzling the involvement of skills of special educators under control of therapist [229], [491], [492]. This digital therapeutics in the form of inclusive telehysiotherapy will amplify and act as catalyst in rehabilitation of special children at school level in future. In recent years, different TelePT approach has been developed to cater the needs of patients. The development of a novel integrated platform for TelePT provides synchronous and asynchronous physiotherapeutic interventions between different users [378], [386], [387].

A more holistic approach to school based rehabilitation is introduced on the basis of user driven innovation to accommodate the need of children and parents as well as educators. Proposed TelePT architecture constitutes an emerging area of research

where aim is to include development of conceptual framework and its applicability as school based therapy for CP children. TelePT can offer several key advantages. Moreover apart from providing physical assistance in physiotherapy, recent studies postulated the effects of school based therapies for disabled children. But poor geographical conditions and remote areas are hurdling the proper rehabilitation of such children. Hence active engagement towards therapy is typically implemented by incorporating the i-TelePT model in schools. Within this context, i-TelePT, emerged as a new field of technology whose aim is to develop systems that assists disabled children through technology rather than physical interaction. TelePT is usually restricted to provide an effective remote supervision of therapy at home and at clinics. Developed i-TelePT framework can be utilized as tools and therapeutic strategies via ICT to minimize barrier of distance and time for the purpose of intervention convenient for all CP children of school.

Provision of Telephysiotherapy service for children with disabilities in school settings is a complex and challenging intervention. Travelling to school or rehabilitation centre is very difficult for CP children studying in remote areas. These technological advances are expected to lead to a more disabled children therapeutic care in school settings. This will suffice the demand of rehabilitation of disabled children (CP) under inclusive set up education as these disabled children are inclusively enrolled in schools under RTE act (2009) [36].

5.1.1 Limitations

This study has successfully exhibited that proposed conceptual framework on i-TelePT for children with CP in school settings has a significant impact on outcomes.There are certain limitations that need to be acknowledged.

First, this study was restricted to only one district of Himachal Pradesh i.e Mandi which is small geographical area represnting the study. In future, all district of Himachal along with other hilly states terrains can be covered.

Also the study is limited to children with CP i.e only one type of disability among others. So, future research could replicate this study on other disabilities as given in

RPWD act (2016) [4] in school settings in other geographical areas to have more generalized results.

Second, this study used data of CP children and educators only from inclusive education settings. As such, future studies can be conducted by including responses from other Non Governmental Organisations (NGOs) , Special schools working with such children with special needs to find out their views on i-TelePT framework and to complement the results obtained in the study.

Thirdly, it would be worthwhile to verify the same sample with other alternative valid and reliable scale to establish the validity of the present findings in future studies.

Lastly, the sample size of CP children should be increased before making any generalization at National or State level.

5.1.2 Clinical Implications

Schools often call professionals including physiotherapist for therapeutic activities but the visits for therapeutics are seldom. School management committee often provides such kind of orientation of therapeutics via camps as a strategic tool to improve their performance. But this is not sufficient and standardised strategy to cater such special children. Thus from technological and cost effective point of view, the empirical results of the study provide several implications for special children with respect to implementation of i-TelePTframework in school settings.

First, the study showed that i-TelePT framework strengthen technology orientation on the improvement of physical impairments and disabilities and thus functional performance in school settings in children with CP. If this Telephysiotherapy framework is implemented in conjuction with other rehabilitational professionals in inclusive settings at national level, it may yield wonderful performance at school level. Therfore, school management can uptake i-TelePT framework as a catalyst to achieve a greater degree of parental satisfaction and to enhance performance in such children living in far flung and tough areas. In such dynamic school environment where every children with disability is enrolled to get better education and so future,

implementing a quality framework together with educators may serve as a foundation of advantage in terms of independency. So, any improvement and implementation of current framework by school management would seem to improve performance of our special children in inclusive education settings globally.

Secondly, the team work is a vital factor in imroving technology oriented activites for children with disabilities around the world. Hence, it becomes imperative to recognize that it is responsibility of each and every employee of school and other alliance professionals to coordinate each other to meet the needs of children with disability satisfactorily. Thus, it is worth highlighting that educators along with therapist should address TelePT practice seriously and further evaluate TelePT system on periodical basis. Further, findings of this study have several implications for strategy makers in making it a part of module of technological therapeutic alliance activity for such children.

5.1.3 Recommendations

The primary and middle school going CP children is better age for their registry of CP and to know physical impairments and disabilities for further intervention. Special educators can act as a bridge between access to education and therapeutic approach. i-TelePT is feasible mode of treatment for all such childrenin educational settings in poor climatic and geographical area. Implementation of i-TelePT level for our children with special needs shall be worthy in delieating their physical impairments and disabilities. Improved Children with i-TelePT can be empowered and can be pushed further for vocational training to make them independent.

CHAPTER VI

CONCLUSION

6.1 Conclusion

Earlier, the children with CP were treated with multidisciplinary team approach in rehabilitation centres and clinics to gain independent in functional skills. Recentlly school based therpeutics for such special children provided a peculiar mode of rehabilitation along with academic functions but during COVID Pandemic, it became very diffcult for children to attend school and get therapeutics. Also assistive technology came into light to enable the participation of CP children in various activities. This technology based intervention into school for both academics and therapeutics in the form of i-TelePT is a really novel platform to deal such children in educational settings.

The findings of the study show that the earlier technology for therapies encompassing i-TelePT for children with CP has been least concern area but the present results of the study concluded its presence. The physical characteristics of CP children in school ambience in District Mandi, HP, are spotlighted in the first phase. The physical defects and ailments in particular age group hinder scholastic acheivemnt. So it is now more appropriate to implement therapeutic measures based on digitalised channel in educational settings that might aid these children in achieving functional autonomy.

Special educators who are engaged with these children fullfilling their special needs of education and functional independence, recognised by Rehabilitation Council of India can be advantageous for children in inclusive education set up. All educators handle such children in schools but geographical conditions and feasibility in arriving at schools made their perceptions in both FGDs to include novelty treatment in form of technology. The educators have positive perceptions about practice of novel digital platform in the form of TelePT at a distance in educational settings for CP children.

The fact that we are working to evaluate technologies demonstrates our commitment and passion for creating an i-TelePT system for such CWSN especially CP children in school setting aiming both educational and therapeutic concerns. Based on themes of focus groups with emerged perception of educators in different key areas illustrated that TelePT is good option and effective means in litting down the physical impairments of such CP children. This digital structure require androids or smart phone for which every body is having with good softwares to operate it. This mode of therapeutics will cut travel cost, save time and quick resposnse of recovery in CP children in tough geographical conditions of Himachal Pradesh. However, signal or networking could be problem in such conditions but viability of i-TelePT is proved dramatically as it can be operated in both offline and online mode at cluster level by clubbing schools at blocks level in vicinity. However, in certain situations, real time synchronous meeting may face practical limitations and in such condition, portability and usability of framework was enhanced by utilizing technology in an asynchronous mode of communication with web page transferring the required physiotherapeutic provisions to CP children and special educators.

Thus, second phase of the study concludes that the CP children receiving Teletherapy in school discipline abide in recessive mode despite the growing evidence of Telemedicine in India and across world. Hence the objective of second phase to determine the requisite and design of i-TelePT framework and its development is clearly fullfilled.

Phase 3 presents a novel idea of i-TelePT to facilitate disabled children especially CP children in schools where rehabilitation facilities are poor to overcome physical limitations and disabilities. This framework connects special educators of schools in different educational blocks especially in remote and geographically hilly areas of Himalayan region in India through information and communication technology. For this sake, the children will visit SCCL and HAL and so will be visited by special educators to support individualization within the TelePT regimen. Implementation of this conceptual platform will develop a therapeutic technological modality for CP children in school settings.

Poor geographical conditions and remote areas are hurdling the proper rehabilitation of such children. Hence active engagement towards a therapy is typically implemented by incorporating the TelePT framework in inclusive education system for different impairments. The stiffness in CP children has noticeably dwindeled and their motor abilities have greatly enhanced. Similarly, goals attained by children, the functional independency and quality of life of children revealed a marked improvement in 8 weeks regimen of i-TelePT. Though this framework, the special educators engaged with these children can be connected in TelePT to facilitate the education with therapeutics under supervision of therapist. By this way, the CP children would be benefitted by cost effective approach in tough Himalayan regions in India.

Physical impairments and disablements in children with Cerebral palsy are barrier to inclusion in the educational system. Treatment along with schooling for such children can be difficult, especially with limited resources and low parental adherence. Because the parents of these children come from a low-income family, are less educated and have limited access to therapeutic interventions in their surroundings. Children with CP in school settings must have good gross and fine motor skills, better ADLs for independent activities in class environment and have good balance to walk on. Study results showed that improvement in somatic disablements like pain (p value $<$ o.oo5), Spasticity (p value $<$ o.o5), improved balance (p value $<$ o.o5), WeeFIM (p value$<$ o.oo5), except communication eased out the complexity of inclusiveness and reject null hypothesis 1(H0) " Does the somatic disablements in children with CP not improve with complexity of inclusiveness in education environments in District Mandi (HP)" and accept alternative hypothesis (p value $<$ o.o5).

Special educators participated in such a platform as part of study in order to devise few strategies to overcome the incomplete rehabilitation. Skilled special educators working with these children in the classroom will benefit the well-being of children with cerebral palsy. As a result, an i-TelePT conceptual framework was established to utilize the therapeutic skills of educators under supervision. This made a significant contribution to the improvement of physical

deficits among CP youngsters in the state. The aforementioned workshop efforts provided special educators with a strong foundation in planning, practical knowledge acquisition and the visualization of technology issues pertaining to TelePT. The reliability ratio exceeding 70 percent of all themes except first theme seems to be deemed adequate for the reliability of themes in focus group discussions proving the alternative hypothesis “Does special training & guidance on management through monitoring of special educators via developed module through FGDs help in reducing physical impairments in CP children in District Mandi (HP)?”.

The PBS score ('t' = -3.976, SEM = 0.893, 'p' < 0.001), VAS (p<0.001), GMFM-88 with a significant difference of -9.7±7.6 (p<0.001),The MACS score (z value = -3.3, p value ≤ 0.001) exhibited statistically significant scores. Similarly, Spasticity in most lower limb muscles improved significantly on MAS (p value ≤ 0.001), with the exception of external and internal hip rotators on the left side (p value > 0.05). The upper limbs on both sides showed no improvement (p value > 0.05) in Modified Ashworth scale score.The WeeFIM function independence score improved significantly in all categories (p < 0.001), however communication level did not improved across all CP children (p > 0.05). All seven areas of quality of life (CPQoL) showed significant improvement ('p' < 0.001). The difference in pre and post intervention mean GAS score was statistically significant (‘z’ = 3.920, ‘p’ < 0.001). All values of outcome variables in phase 3 reject null hypothesis (H0) 3 (p value < o.o5) stating “Inclusive Telephysiotherapy (i-TelePT) is not clinically feasible and not effective for treating and monitoring the physical disfigurement and disabilities of children with CP in inclusive comprehensive education set up in District Mandi (H.P) and accepts the alternative hypothesis 3 showing feasiblity and effectiveness of i-TelePT for CP children in school settings.

In future, this framework could be incorporated for other locomotor and neuromuscular disabilities which will help the nation a cheaper solution of rehabilitation. This is a creative concept for a cyberspace that uses a TR strategy to facillitate CP kids in school settings in Himalayan region where therapeutics and rehabilitation facilities are far from availability due to ill geographical conditions.

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LIST OF APPENDICES

APPENDIX A ETHICAL CONSIDERATIONS

1. The identity and integrity of all subjects was protected throughout the study and in the publications so made.
2. Each subject randomly was allocated a one digit secret code number throughout and after the study.
3. A decoding note was made on the subject's first appearance and was retained by me in full secrecy.
4. All subjects were briefed about legal obligations to observe any act of data protection.
5. After briefing only about their rights, I made them sign the ascent & consent form.
6. Subjects were free in any stage of the project to walk out of it, if they feel the need.
7. All the potential hazards of the research that can come are seriously being looked upon by thorough study.
8. All information collected shall pertain to the study.

APPENDIX B STANDARDIZED TOOLS OF ASSESSMENT

1. Gross Motor function Measurement (GMFM-88)
2. Cerebral Palsy Quality of Life Questionnaire (CP QOLc)
3. Visual Analogue Scale (VAS)
4. Goal Attainment Scaling (GAS)
5. WeeFunctional Independent Measure (WeeFIM)
6. Modified Ashworth Scale (MAS)
7. Manual Ability Classification system (MACS)
8. Pediatric Balance Scale (PBS)

1. **Gross Motor Function Measurement (GMFM-88)**

The Gross Motor Function Measure GMFM is a criterion referenced clinical measure designed to evaluate change in gross motor function in children with cerebral palsy. It is reliable and valid instrument which assesses gross motor function in five dimensions:

A- Lying and rolling
B- Sitting
C- Crawling and Kneeling
D- Standing
E- Walking, Running and Jumping

The GMFM-88 consists of 88 items and is appropriate for children with poor motor skills with good reliability and validity. GMFM-88 takes approximately 45 to 60 minutes to administer.

2. Cerebral Palsy Quality of Life Questionnaire (CP QOLc)

The Cerebral Palsy Quality of Life Questionnaire (CP QOL) is a questionnaire developed for children with cerebral palsy to measure quality of life with acceptable psychometric properties. The CP QOL-Child domains include:

• Social wellbeing and acceptance

• Participation and physical health
• Emotional wellbeing
• Pain and impact of Disability
• Access to services and family health.

3.Visual Analogue Scale (VAS)

It is standardized scale with good reliability and validity provides information about the severity of the pain based on the child's musculoskeltal problems. The scale was used to measure the severity of the individually formulated problems. The VAS is a valid and reliable measure in rating pain intensity in CP children. The VAS used in pain assessment is a straight 10 cm horizontal line with anchor points of no pain (score 0) and unbearable pain (score 10).

4. GOAL attainment scaling (GAS)

Goal Attainment Scaling (GAS) is a standardized tool having high validity, reliability and high responsiveness. It is used to evaluate services or an individualized program based on the attainment of individualized goals. A five point goal scale is developed, usually via interview with the client/family and graded levels of possible goal attainment with descriptions of anticipated outcome are described for each goal. Goals are scaled from least favorable to most favorable outcome, with an expected outcome level in the middle.

5. Modified Ashworth scale (MAS)

Modified Ashworth scale measures resistance during soft tissue stretching in spastic child. The scale quantifies the spasticity from grade 0 to 4 with proved reliability & validity.

6. Manual ability classification system (MACS)

Manual ability classification system with good reliability and validity basically describes the ability of cerebral palsy children to handle the objects in daily routine activities at school or home in age between 4-18 years.

7. WeeFIM

WeeFIM is an performance based instrument with a good reliability and validity containing 18 items on seven level ordinal scale and is derived from functional independent measure scale describes functional activities skills like eating, bathing, toileting etc. in children with neurodevelopment disabilities involving cerebral palsy. Initially this instrument was designed for children up to age of 8 years but recently it has been validated in adolescent cerebral palsy children up to 16 years of age.

8. Pediatric Balance Scale (PBS)

Pediatric balancescale is modification of Bergs balance scale which is used for cerebral palsy children of age 5-15 years with proved reliability and validity to measure balance.

APPENDIX C MODULE/COURSE CONTENTS FOR IN-SERVICE SPECIAL EDUCATOR'S TRAINING PROGRAMME ON INCLUSIVE TELE-PHYSIOTHERAPY FOR CEREBRAL PALSY CHILDREN IN SCHOOL SETTINGS " 2019- 2020.

Days	Timing	Topic/Activities	Resource Person
Day 1	9:30 -10:00 AM	Registration of participants	…….
	10:00-11:15 AM	Overview of Cerebral Palsy	Pardeep Pahwa
	11:15-11:30 AM	Tea Break	
	11:30-1:00 PM	Causes, Types, Associated conditions of cerebral palsy	DO…….
	1:00-2:00PM	Lunch Break	
	2:00-3:15 PM	Physiotherapy Mx of C.P	Do……
	3:15-3:30 PM	Tea Break	
	3:30:5:00 PM	Contd……	…….
Day 2	10:00-11:15 AM	Overview of Inclusive Physiotherapy as related service for C.P Children.	Pardeep Pahwa
	11:15-11:30 AM	Tea Break	……
	11:30-1:00 PM	Adaptation, Accommodation and Barrier free access with aids for C.P children in school environment.	
	1:00-2:00PM	Lunch Break	
	2:00-3:15 PM	Overview of Tele-physiotherapy and its concepts	
	3:15-3:30 PM	Tea Break	
	3:30:5:00 PM	Hands on approach for handling C.P children in classroom.	

APPENDIX D TRANSACTION CURRICULUM FOR 2 DAYS VIRTUAL TRAINING OF SPECIAL EDUCATORS

Days /Timing	Topic/Activities	Components of Training	Resource Persons
Day 1 **9:30-10:00 AM**	Registration of participants	Introduction of participants	Pardeep .K. Pahwa
10:00-11:00 AM	Physiotherapy Management of C.P	❖ Concepts of CP children in school settings. ❖ Management of CP children enrolled under inclusive education in schools in Dist. Mandi.	Pardeep .K. Pahwa
11:00-12:00 PM	Discussion of individualized therapeutic plan.	❖ Discussion on Management with individualized therapeutic plan for CP children in schools.	Pardeep .K. Pahwa
12:00-1:00 PM	Overview of TelePT and components of i-TelePT framework	❖ Concepts, definition of TelePT. ❖ Discussion about TelePT framework & its contents. ❖ TelePT based Evaluation. ❖ Synchronous & Asynchronous based training for educators. ❖ Timetable for i-TelePT module for CP children.	Pardeep .K. Pahwa
Day 2 **10:00-11:00AM**	Training of equipments used for TelePT	❖ Setting up venues, location and access. ❖ Setting up of point to point or multipoint using VC using ISDN/IP links. ❖ Equipments used for VC, VC Room layout. ❖ Basic Troubleshooting etc.	Shakti Singh ICTmanager, CRC Sundernagar
11:00-12:00 PM	Elaboration of Therapeutic items for CP children.	❖ Discussion about equipments used for CP children in VC room	Pardeep Pahwa Research scholar, LPU.
12:00- 1:00 PM	Hands on approach for handling C.P children in classroom.	❖ Practical demonstration of individually designed exercises for CP children.	Pardeep Pahwa Research scholar LPU.

APPENDIX E CEREBRAL PALSY ASSESSMENT PROFORMA

Name …… Age (D.O.B) ……GENDER……Code……

Chief Complaint ……..

H/O Complaint

- Prenatal History:
- Perinatal History:
- Postnatal History:

Past History……

Family History……

Drug History…….

Assessment (Observation) Findings Yes No

- Head control
- Floppiness, Hypotonia
- Stiffness/ Hypertonia
- Lie or sit in awkward positions or posture
- Delay in sitting, crawling, walking
- Persistence of primitive reflexes
- Early handedness (prefer one hand by 1 year of age)
- Poor coordination and balance
- Involuntary movements
- Exaggerated reflexes/hyperreflexia
- Gait –Slouched , Scissoring, Equinus ,Crouch gait ,others
- Any deformity present
- Present ADL activities : Dependent /Independent

Present Functional status:

- Quadruped position
- High sitting/Long leg sitting
- Cross leg sitting/W sitting
- Kneel standing /Kneel walking/Half kneeling
- Squat to stand
- Standing Balance/Single leg standing
- Straight line walking

Examination by using standardized test

- Range of motion (goniometry)
- Spasticity (MAS)
- Deep Tendon Reflexes(DTR's)
- Strength (MMT)
- Coordination U/L , L/L

Function and associated impairment

Please indicate Gross Motor Function Classification System E&R level

(Palisano et al, 2007):

GMFCS**:** Level I ☐ Level II ☐ Level III ☐ Level IV ☐ Level V ☐

Please indicate associated impairments present in this child:

- Intellectual 1= Yes 2= No (Specify…….)
- Hearing and speech 1= Yes 2= No
- Epilepsy 1= Yes 2= No
- Drooling of saliva 1= Yes 2= No
- Swallowing 1= Yes 2= No
- Others

  ……..

Type of C.P…….

Any Special point……

Signature of Physical therapist

APPENDIX F SCREENING CHECKLIST CUM DATA COLLECTION FORM

Please fill /tick items which are appropriate. Date: …….. Code: ……..

To be filled by Researcher. Appropriate instructions given to child/teacher.

SOCIODEMOGRAPHIC PROFILE

Questions **Response**

Name of student ……

Age (in years) …… (Years)

Gender ……...1= Male ☐ 2= Female ☐

Class/Grade……

Name of school……..

Name of Special Teacher……..

Mode of Teaching Instructions Eng ☐Hindi ☐ Others ☐

Current Physical Exam - Wt.…… (In Kgs.) , Ht...…….. (In Cms)

PERSONAL DETAILS

Father's Name……

Mother's Name……

Occupation of Father……..

Occupation of Mother…….

Qualification of Father 1= Illiterate ☐ 2= Primary ☐3= Middle ☐ 4= High ☐

5= Bachelor or above ☐6 = Others ☐ (Specify)……

Qualification of Mother 1= Illiterate ☐ 2= Primary ☐3= Middle ☐4= High ☐

5= Bachelor or above 6 = Other (Specify)…… ☐

No. of Siblings Brothers ……...Sisters……

ECONOMIC PROFILE:

Family income less than 1 lakh / Annum ☐

Family income less than 2 lakh / Annum ☐

Family income between 2-5 lakh / Annum ☐

Family income less than 5-10 lakh /Annum ☐

Do child have Disability Certificate 1=Yes 2= No if yes Specify percentage (…….)

Any aids /Appliances used by child at Home/School 1= Wheelchair 2= Crutches 3= Rollator 4= Orthosis 5= others

Language Spoken at Home: HINDI ☐ ENG ☐ HIMACHALI ☐ OTHERS ☐

Language Spoken at School: HINDI ☐ ENG ☐ HIMACHALI ☐ OTHERS ☐

Birth History 1=Premature ☐ 2= Term ☐ 3=Post term ☐

Delivery of baby performed by 1=Doctor 2=Nurse 3= Midwife

During Pregnancy any H/O 1= Anemia 2=High B.P 3= Diabetes 4=Trauma 5=other

During Birth Time 1=Prolonged Labor 2=Short labor 3=Sudden birth

Any Birth Injury/Asphyxia 1=Present 2=Absent

Delayed birth cry 1=Present 2=Absent (specify time)……

Post natal complication 1=Jaundice 2=LBW 3= Fever 4=pneumonia 5=Others 6=Nil

CLASS PERFORMANCE: Number of Special children in the class: Girls _ Boys __ Total =

a) Current class performance: **Good / Average / Below Average / Poor**

b) Last class performance: **Good / Average / Below Average / Poor**

Motor skills:

a) Gross motor skills -

- Does child learns new physical skills? Yes/No

If yes, mention grades: No difficulties /Moderate difficulties / Great difficulties

- Does the child Participates in team games? Yes/No

  If Yes, mention grades: **No difficulties/Moderate difficulties/Great difficulti**es

  b) Fine motor skills-

- Does the child grips pencil during writing properly? Yes/No

If yes, mention grades: No difficulties /Moderate difficulties/ Great difficulties

Interaction of child:

a) With teachers: 1= Cooperative /2= Non cooperative/ 3= Withdrawn

b) With Peer groups: 1= Cooperative/ 2=Non cooperative/ 3= Withdrawn

c) With others (staff members): 1= Cooperative/2= Non cooperative/3= Withdrawn

Participation of child in Play activities:

- Does the child participate in indoor/outdoor games? Yes/No

If yes, mention the grade: 0= Never/1=occasionally/2=frequently/3=All the times

REHABILITATION, MEASURES UNDERTAKEN: (Asked from teachers)

- Does the Teacher manage child socially? Yes/No

If yes, mention the grades: 0=Never/1= occasionally /2=frequently /3=All the times

- Does the School teacher have referral for child problem to specialists? Yes/No

If yes,mention the grades: 0= **Never/ 1=occasionally 2=/Frequently/3=All times**

- Does the teachers counseled /guided the parents? Yes /No

If yes,mention the grades: 0=**Never/ 1=occasionally/2=Frequently/3=All times**

- Does school follows guidelines of Inclusive/Special education? Yes /No

If yes, mention the grades:0= **Never/ 1=occasionally /2=Frequently/3=All times**

- Is there Proper adaptation for child in the classroom environment? Yes /No

If yes, mention the grades:0= **Never/ 1=occasionally /2=Frequently/3=All times**

TREATMENT/INTERVENTION

	NA (0)	YET TO GIVE (1)	GIVEN (2)
MEDICAL	☐	☐	☐
PHYSICAL EXAM	☐	☐	☐
LAB INVEST	☐	☐	☐
MEDICINE	☐	☐	☐
REHABILITATION	☐	☐	☐
SOCIAL SKILL MANAGEMENT	☐	☐	☐
PHYSIOTHERAPY	☐	☐	☐
PARENT TRAINING	☐	☐	☐
SPECIAL EDUCATION	☐	☐	☐
CLASSROOM ADAPTATION	☐	☐	☐
HOME ADAPTATIONS	☐	☐	☐

SIGNATURE: DATE:

NOTE: Student being assessed should have at least 1 years of adequate schooling.

Appropriate instructions given to child/educator

APPENDIX G CEREBRAL FOCUS GROUP DISCUSSION PROFORMA

Dear Colleagues,

I am carrying out research in the area of Tele-physiotherapy in school settings for cerebral Palsy children. The working title of the Research Project is: '**Inclusive tele-physiotherapy for treatment and monitoring the physical impairments among children with cerebral palsy in an inclusion education setting'**. Please complete/discuss the following questions. Can you tell me about the role of inclusive tele-physiotherapy (i-TelePT) for cerebral palsy children in your school?

Discussion on Special educator's opinion on inclusive tele-physiotherapy

S. No	Questions	Remarks
1	How many children with physical disability mainly Cerebral Palsy you look for?	
2.	What is the age(s) of the children that you care for?	
3.	How many full time Special teachers are there in school?	
4	What are the major roles and responsibilities of the Special teachers in schools?	
5	What do you think about benefits and challenges of including children with special needs /disability in your school?	
6	What in-service professional development programmes are you aware of in the area for CWSN?	
7	What are the related services provided to CWSN in inclusive settings?	
8	Do you feel need of adequate training to work with CWSN students?	
9	What do you understand by CWSN? Name the different types of disabilities children have in school system?	
10	What do you understand by Cerebral Palsy child?	
11	Is physiotherapy a good option for cerebral palsy children?	
12	What is role of special educator in handling C.P child in class as well as school environment In accommodation or treatment?	

13	What are the obstacles and challenges you have been confronted?
14	Does a physical disabled child or children with cerebral palsy get physical therapy in school? if Yes then explain by which means?
15.	Have you got any training i.e short term or long term training course in managing C.P child in school cenario? Explain
16	Which of the following devices do you most often use to connect to the internet?
17	How often do you access the internet?
18	From which of the following locations do you regularly access the internet?
19	For what purpose/s do you use the internet? Please select all responses that apply to you.
20	How often do you log into social media networks (e.g. Face book, Google+, etc.)?
21	What forms of other online media do you currently use?
22	Please rate how comfortable you are with using the following methods of communication: • Facebook private group • Facebook private messaging • Skype • Jabber • Teleconferencing • Telephone call • Online chat rooms • Online noticeboards • Text messaging
23	What problems do you regularly experience when using the internet?
24	Which of the following are personal barriers to using the internet?
25	Have you ever heard about telephysiotherapy for CWSN ?
26	What do you think might be some of the benefits of accessing a tele-physiotherapy training programme online?

27	If you were to undertake an online telephsiotherapy parenting programme, would you prefer (self-directed, self-directed + therapist contact, self-directed+ therapist contact + telehealth parent group).
28	If you were to undertake an online parenting programme that included additional 'one-on-one' support with a therapist, in which ways would you be happy to receive that support?
29	What suggestions do you have to improve this model along with duration ?
30	Do special education teachers have a new role with respect to handling cerebral palsy children with education in school environment?

APPENDIX H INFORMATION LEAFLET FOR FOCUS GROUP DISCUSSION

Project title

Inclusive tele-physiotherapy for treatment and monitoring the physical impairments among children with cerebral palsy in an inclusion education setting.

Purpose: To develop inclusive tele-physiotherapy (i-TelePT) based intervention and monitoring modules and to test its effectiveness for treatment of physical impairments among children with cerebral palsy in inclusive education setting.

What would this involved

If you agree to take part in the study, you will be part of a focus group discussion. During the discussion, you will be requested to answer questions by sharing your knowledge and understanding on the best structure and content of inclusive tele-physiotherapy based intervention and monitoring module for cerebral palsy children.

Potential benefits to subjects: This study will help in reducing the physical impairments via tele-physiotherapy delivered in school settings to help them in achieving educational success.

Potential risks and discomforts: There are no potential risks or harms to students. However stretching exercise delivered during therapeutic sessions may have momentary discomfort.

Payment/compensation for participants: You will not receive any compensation or payment for study.

Confidentiality

The results of the discussion data obtained will be reported in a collected manner with no reference to a specific individual. Hence, the data from the each individual will remain confident.

The right to withdraw

The participants have the right to withdraw from the study at any time without affecting the future discussion.In case of any inconvenience, you can contact

researcher in one of following ways: telephoning or emailing the researcher directly at (9882782911, pardeep_pahwa@yahoo.com)

APPENDIX I CONSENT FORM & ASSENT FORM IN BILINGUAL MODE

Title

INCLUSIVE TELE-PHYSIOTHERAPY FOR TREATMENT AND MONITORING THE PHYSICAL IMPAIRMENTS AMONG CHILDREN WITH CEREBRAL PALSY IN AN INCLUSION EDUCATION SETTING

Invitation to participant

You are invited to participate in the research study which is being done as a partial fulfilment of doctor of philosophy PhD in physiotherapy at L.P.U University, Phagwara, Punjab.

Purpose of Study

To develop inclusive tele-physiotherapy (i-TelePT) based intervention and monitoring modules and to test its effectiveness for treatment of physical impairments among children with cerebral palsy in inclusive education setting.

Benefits of participation

You will avail the therapeutic services for your child at the school by tele-physiotherapy which will help in reducing the physical impairments in the child.

Risk of participation

There is no risk involved; only the mild discomfort can be felt during exercise.

Right to withdraw

You have right to withdraw at any moment from the research without stating any reason for this. This will not affect you in any way.

Confidentiality

All the information revealed by you will be kept strictly confidential and limited to the research guide Dr. Suresh Mani and me and will not be shared to any other person without your consent. If you have any queries regarding this research, contact me at -

Address: - Composite Regional Centre for persons with disabilities,
Sundernagar, Dist. Mandi, Himachal Pradesh.

Phone No: - 9882782911, 9418082911.

Parent's/Legal Guardian's Statement

The study has been properly explained to me and I voluntarily consent to allow my child to participate. I have had on opportunity to ask questions. I give my permission for child to be videotaped as described in the study. I have been informed that all the information would be kept confidential and I have reserve my right to withdraw my child at any time.

Name of Student Signature of legal parent's /Guardians

CONSENT FORM (IN HINDI)

शोध में शमिल होने के लिए सहमति पत्र लधु प्रारूप -

शीर्षक

समावेशी शिक्षा प्रणाली में प्रमस्तिष्कीय पक्षाघात बच्चों की शारीरिक क्षति में टेली भौतिक चिकित्सा के द्वारा उपचार एवं अनुवीक्षण।

शोध में भाग लेने के लिए आमंत्रण

आप से अपने बच्चे को शोध में भाग लेने देने के लिए कहा जा रहा है जोकि एलमें पीएचडी .यू.पी. है। की आंशिक पूर्ति के लिए

अध्ययन का उद्देश्य

टेली भौतिक चिकित्सा आधारित हस्तक्षेप एवं माडयूल विकसित करना तथा समावेशी शिक्षा वातावरण में शिक्षा ले रहे प्रमस्तिष्कीय पक्षाधात बच्चों की शारीरिक क्षति में टेली भौतिक चिकित्सा के प्रभाव को जाँचना मुख्य उद्देश्य है।

शोध में भाग लेने के लाभ

आपके बच्चे को विद्यालय प्रारूप में ही टेली भौतिक चिकित्सा की सुविधा मिल जाएगी जोकि बच्चे की शरीरिक क्षति को कम करने में सहायक होगी।

शोध में भाग लेने के जोखिम

व्यायाम के दौरान होने वाली पीड़ा को छोड़ कर शोध में और कोई जोखिम नहीं है।

शोध से वापस लेने का अधिकार

शोध अध्ययन में भाग लेना स्वैच्छिक है यदि आपका बच्चा अध्ययन के बीच में ही छोड़ने के लिए कहे तो कोई हर्ज नहीं तथा कहने या छोड़ने के लिए बच्चे को कोई दंड नही दिया जाएगा और न ही किन्ही सुविधाओं से वंचित किया जाएगा।

गोपनीयता

आपकी और आपके बच्चे की शोध से संबधित जो भी जानकारी है वह मेरे एवं मेरे मार्गदर्शक गुरू श्री सुरेश मणी जी के मध्य गोपनीय रहेगी तथा शोध में भाग लेने वाले विशेष शिक्षक भी बच्चे से संबंधित जानकारी को गोपनीय रखेगें। यदि आपको शोध अध्ययन के विषय में कोई जानकारी चाहिए तो आप निम्न पते पर मुझे सम्पर्क कर सकते हैं।

पता..... :

दूरभाष ..... :9882782911

प्रतिभागी /माताअभिभावक का वक्तव्य/ पिता-

मुझे शोध अध्ययन के बारे में एक मौखिक वर्णन दिया गया है तथा मैं अपने बच्चे के अध्ययन में भाग लेने देने के लिए स्वेच्छा से सहमत हूँ तथा स्वीकृति देतादेती हूँ। मुझे शोध अध्ययन के बारे में / सवाल पूछने के अवसर दिए गए। मैं अपने बच्चे की अध्ययन के लिए प्रयोग में होने वाली वीडियो रिकार्डिंग की स्वीकृति देता हूँ। मुझे बताया गया है कि बच्चे से संबंधित जानकारी गोपनीय रखी जाएगी तथा मैं अपने बच्चे को किसी भी समय अध्ययन से निकालने के पूरे अधिकार दिए गए हैं।

विद्यार्थी का नामः- **माताप-िताअभिभावक का नाम एवं हस्ताक्षरः/**

Ascent form for CP children in Hindi

स्वीकृति / सहमति प्रपत्र

प्रमस्तिष्कीय पक्षाघात ग्रसित बच्चों के लिए

शोध में शमिल होने के लिए स्वीकृति / सहमति प्रपत्र

शीर्षक – समावेशी शिक्षा प्रणाली में प्रमस्तिष्कीय पक्षाघात बच्चों की शारीरिक क्षति में टेली भौतिक चिकित्सा के द्वारा उपचार एवं अनुवीक्षण।

1. हम आपको क्या बताना चाहते हैं?

मैं ड़ा0 प्रदीप पाहवा, प्रवक्ता भौतिक चिकित्सा, सी0 आर0 सी0, सुन्दरनगर एवं पी0 एच0 डी0 शोध छात्र – एल0 पी0 यू0 (पंजाब) जो कि एल0 पी0 यू0 संस्थान के भौतिक चिकित्सा विभाग के प्रमुख एवं एसोसिएट प्रोफेसर, पर्यवेक्षक ड़ा0 सुरेशमणि के मार्गदर्शन में आपको अनुसंधान अध्ययन के बारे में कुछ बताना चाहता हूँ। एक शोध अध्ययन तब होता है जब चिकित्सक स्वास्थ्य और बीमारियों / दिव्यांगताओं तथा इनके उपचार के बारे में अधिक जानने के लिए बहुत सारी जानकारी एकत्र करते हैं। इस शोध के बारे में आपको बताने या समझाने के बाद, हम पूछेंगें कि आप इस अध्ययन में रहना चाहते हैं या नहीं।

2. हम यह अध्ययन क्यों कर रहे हैं?

हम इस बात का पता लगाना चाहते हैं कि टेली भौतिक चिकित्सा आधारित माडयूल विकसित करके समावेशी शिक्षा वातावरण में शिक्षा ले रहे प्रमस्तिष्कीय पक्षाघात ग्रसित बच्चों की शारीरिक क्षति में टेली भौतिक चिकित्सा के प्रभाव को जाँचना मुख्य उद्देश्य है।

अतः हम जिला मण्डी, हिमाचल प्रदेश की समावेशी शिक्षा प्रणाली में 6–12 साल के प्रमस्तिष्कीय पक्षाघात से ग्रसित लड़कों एवं लड़कियों से जानकारी प्राप्त कर रहे हैं।

3. अगर आप इस अध्ययन में हैं तो आपको क्या होगा?

अगर आप इस शोध में भाग लेने के लिए सहमत हैं तो दो चीजें होगी (जैसा कि शोध अध्ययन पर लागू होता है) इस शोध में आपको कोई जोखिम नहीं हैं, केवल व्यायाम के दौरान होने वाली पीड़ा / असुविधा को छोड़ कर शोध में और कोई जोखिम नहीं है।

i) आपके शरीर पर जाँच एवं पडताल की जाएगी और फिर टेलिफिजियोथेरैपी के माध्यम से आपको उपचार प्रदान किया जाएगा।

ii) चिकित्सक आपके ऊपर कुछ परीक्षण करेगा.....

iii) आपको कुछ सवालों के जवाब देने होगें.....

4. इस शोध में शामिल होने के लिए क्या बुरा या खतरनाक है? क्या यह अध्ययन दुख देगा?

इस शोध में भाग लेने के लिए एवं भाग लेने से आपको कोई तकलीफ नहीं होगी। आपसे कुछ जानकारी ली जाएगी तथा शरीर क्षति के लिए जाँच एवं पडताल की जाएगी तथा टेली भौतिक चिकित्सा प्रदान की जाएगी।

5. यह शोध अध्ययन आपके लिए कैसे उपयोगी होगा?

यह अध्ययन आप बच्चों की दूरस्थ टैक्नोलोजी भौतिक चिकित्सा के द्वारा शारीरिक क्षति को कम करके आपको बेहतर महसूस करवाएगा ताकि आप कार्यात्मक रूप से स्वतंत्र हो सके। इस शोध के बाद चिकित्सक कुछ ऐसा जान सकते हैं जो बाद में आप जैसे बच्चों की मदद करेगा।

6. क्या आपकी हालत के बारे में सबको पता चल जाएगा?

हम अन्य लोगों को यह नहीं बताऐंगें कि आप इस शोध में है और हम आपके बारे में उन लोगों को भी जानकारी सांझा नहीं करेंगें, जो शोध अध्ययन में काम नहीं कर रहे हैं।

7. क्या आपको शोध में शामिल होने के लिए कुछ मिलेगा?

हम आपको कुछ शैक्षणिक सामग्री (पैन, पेंसिल, कॉपी इत्यादि) उपहार में प्रोत्साहन स्वरूप प्रदान करेंगें।

8. क्या आप हमें इस शोध के परिणाम के बारे में अवगत कराऐगें?

हम आपको, आपके माता पिता और विशेष शिक्षकों को प्रासंगिक परिणामों के बारे में बताऐंगें जो कि इस शोध से समबन्धित होगें। आपका और आपके शिक्षकों का नाम शोध प्रकाशनों में गुप्त रखा जाएगा।

9. क्या आपके शोध से समबन्धित कोई प्रश्न हैं?

तो आप जानकारी ले सकते हैं? आप अभी या बाद में किसी भी समय कुछ भी शोध से समबन्धित सवाल पूछ सकते हैं?

10. क्या आपको इस शोध अध्ययन में होना जरूरी है?

यदि आप शोध में शामिल नहीं होना चाहते हैं तो कोई भी निकाय आपको अध्ययन में हिस्सा लेने के लिए बाध्य नहीं करेगा। आप हमें बता सकते हैं कि आप इस शोध का हिस्सा नहीं बनना चाहते, यह आप पर निर्भर है। यह किसी भी तरह से अस्पताल में आपके उपचार को प्रभावित नहीं करेगा।

11. इस शोध के बारे में आप किन लोगों से बात कर सकते हैं या उनसे सवाल पूछ सकते हैं?

आपको उन लोगों का सम्पर्क प्रदान किया जाएगा जो आपसे सम्पर्क कर सकते हैं

ड़ा0 सुरेश मणि

ड़ा0 प्रदीप पाहवा

बच्चे को बताएँ कि वे भी इस शोध से समबन्धित (अपने शिक्षक, अभिभावक, मित्र) किसी से भी, कभी भी बात कर सकते हैं।

सहमति/स्वीकृति पत्र पर चर्चा आयोजित करने वाले व्यक्ति के हस्ताक्षर

हमने शोध अध्ययन के बारे में प्रमस्तिष्कीय पक्षाघात बच्चों को साधारण भाषा में समझाया है और बच्चे एवं अभिभावकगण इस अध्ययन के लिए सहमत हैं।

सहमति चर्चा की तारीख .....

आयोजन करने वाले व्यक्ति के हस्ताक्षर .....

सहमति चर्चा

मैनें (हमने) यह जानकारी पढ़ी है तथा मैनें अपने सवालों के जवाब दे दिए हैं तथा बाद में सवाल भी पूछ सकता हूँ।

मैं ..... (बच्चे का नाम) इस शोध अध्ययन में भाग लेने के लिए सहमत हूँ।

बच्चे का नाम .....

बच्चे/अभिभावक के हस्ताक्षर .....

तिथि : .....

अथवा

मैं शोध में हिस्सा नहीं लेना चाहता और मैनें उपर्युक्त दिए गए स्वीकृति/सहमति पत्र पर हस्ताक्षर नहीं किए हैं।

(बच्चे/नाबालिग द्वारा हस्ताक्षर.....)

मैनें बच्चे को स्वीकृति/सहमति पत्र का सटीक वाचन करते हुए आत्मसात किया है।

मैं इस बात की पुष्टि करता हूँ कि बच्चे ने स्वतंत्र रूप से शोध अध्ययन के लिए सहमति दे दी है।

साक्षी का नाम (माता–पिता नहीं) .....

प्रतिभागी के अंगूठे का निशान .....

ग्वाह/साक्षी के हस्ताक्षर..... तिथि .....

जांचकर्ता/चिकित्सक का नाम .....

जांचकर्ता/चिकित्सक के हस्ताक्षर .....

बाल सूचना पत्र/सहमति पत्र की प्रतियां विधिवत रूप से भरकर तथा बच्चे के हस्ताक्षर के साथ माता–पिता/अभिभावाकगण को सौंप दी जाए।

APPENDIX J LETTER OF CANDIDACY

LOVELY PROFESSIONAL UNIVERSITY
Transforming Education Transforming India

Center for Research Degree Programmes

LPU/CRDP/EC/230219/38
Dated: February 23, 2019

Pardeep Kumar
Registration Number: 41700055
Program Name: Ph.D. - Physiotherapy (Part Time)

Subject: Letter of Candidacy for Ph.D.

Dear Candidate,

We are very pleased to inform you that the Department Doctoral Board has approved your candidacy for the Ph.D. Programme on September 21, 2018 by accepting your research proposal entitled: "INCLUSIVE TELE-PHYSIOTHERAPY FOR TREATMENT AND MONITORING THE PHYSICAL IMPAIRMENTS AMONG CHILDREN WITH CEREBRAL PALSY IN AN INCLUSION EDUCATION SETTING" under the supervision of Dr. Suresh Mani.

As a Ph.D. candidate you are required to abide by the conditions, rules and regulations laid down for Ph.D. Programme of the University, and amendments, if any, made from time to time.

We wish you the very best!!

In case you have any query related to your programme, please contact Center for Research Degree Programmes.

Head
Center for Research Degree Programmes

Jalandhar-Delhi G.T.Road, Phagwara, Punjab (India) - 144411
Ph : +91-1824-444594 E-mail : drp@lpu.co.in website : www.lpu.in

APPENDIX K INSTITUTIONAL ETHICS COMMITTEE APPROVAL LETTER

INSTITUIONAL ETHICS COMMITTEE
Lovely Professional University, Punjab
Ph: +91-1824-444039; E-mail: ao_pharma.lit@lpu.co.in

Chairperson:
Dr. H. S. Gill

Deputy Chairperson:
Dr. Monica Gulati

Members:
Dr. Shivani Tandon
Dr. Naresh Kundra
Dr. N. K. Gupta
Dr. Meenu Chopra
Mr. Dharminder Singh Dhillon
Dr. Sasmita Kaur
Sardar Nagina Singh

Member Secretary:
Dr. Navneet Khurana

LPU/IEC/2019/01/ 09

Date: 01/03/2019

To

Pardeep kumar

Dear Sir/Madam,

The Ethics committee has studied the research proposal submitted by Mr./Ms./Dr. Pardeep Kumar on research topic Inclusive Tele-Physiotherapy for the Treatment/Monitoring the Physical Impairements Among Children with Cerebral Palsy in an Inclusion Education Setting

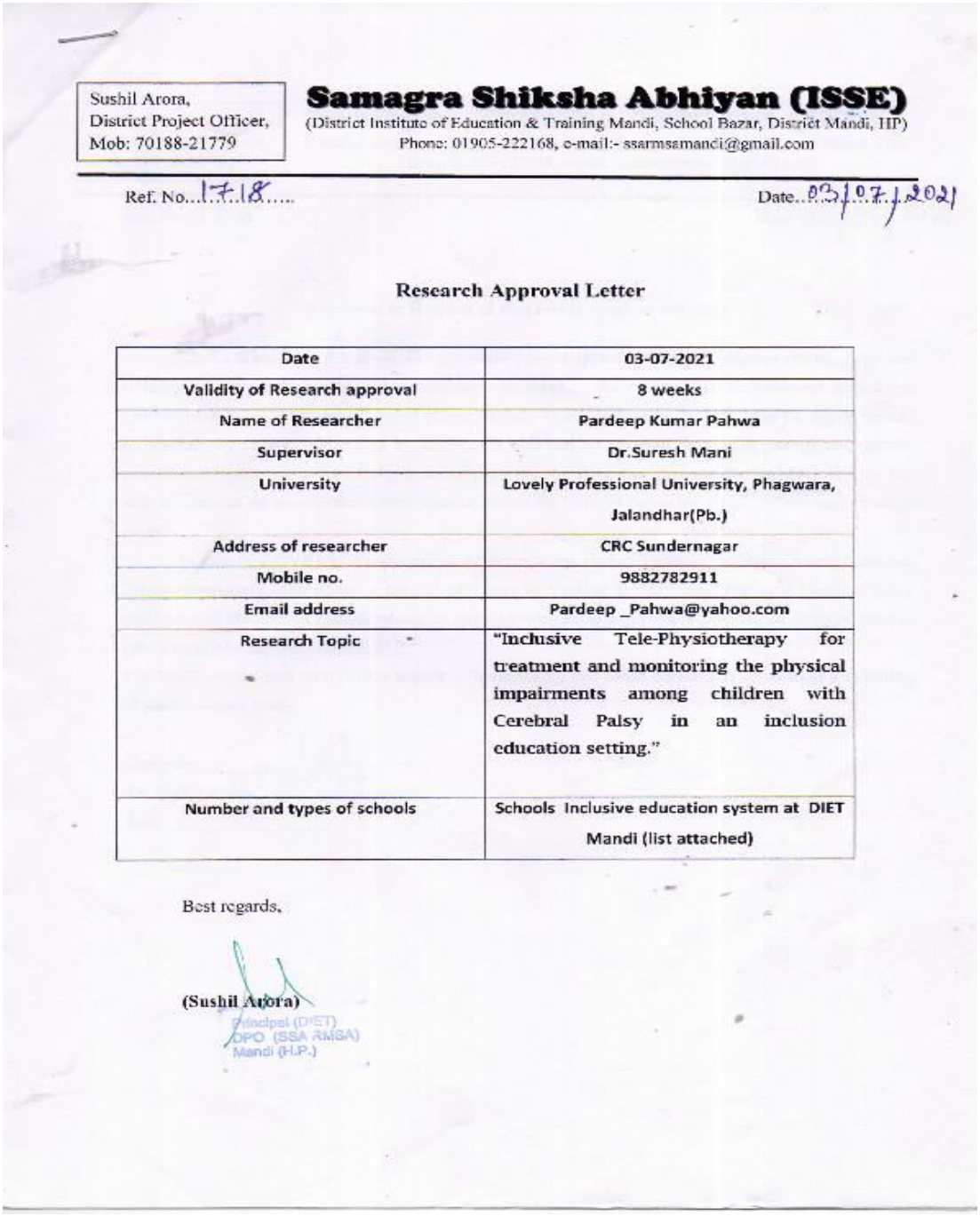
It has been decided to accord approval to this study protocol.

Thanking You.

Your sincerely

(Chairperson) (Deputy Chairperson) (Member Secretary)

APPENDIX L APPROVAL LETTER FROM DIET MANDI



Sushil Arora,
District Project Officer,
Mob: 70188-21779

Samagra Shiksha Abhiyan (ISSE)
(District Institute of Education & Training Mandi, School Bazar, District Mandi, HP)
Phone: 01905-222168, e-mail:- ssamsamandi@gmail.com

Ref. No. 17-18 Date. 03/07/2021

Research Approval Letter

Date	03-07-2021
Validity of Research approval	8 weeks
Name of Researcher	Pardeep Kumar Pahwa
Supervisor	Dr.Suresh Mani
University	Lovely Professional University, Phagwara, Jalandhar(Pb.)
Address of researcher	CRC Sundernagar
Mobile no.	9882782911
Email address	Pardeep _Pahwa@yahoo.com
Research Topic	"Inclusive Tele-Physiotherapy for treatment and monitoring the physical impairments among children with Cerebral Palsy in an inclusion education setting."
Number and types of schools	Schools Inclusive education system at DIET Mandi (list attached)

Best regards,

(Sushil Arora)
Principal (DIET)
DPO (SSA RMSA)
Mandi (H.P.)

To

The Principal

DIET Mandi

Sub: Request for permission to conduct research in schools of Dist. Mandi

R/sir,

The undersigned employed at Composite Regional Centre for Persons with Disabilities, Sundernagar wish to conduct a research project on title "Inclusive physiotherapy for Cerebral Palsy children in schools of Himachal Pradesh." I am hereby seeking your consent to visit a number of middle and primary schools in Dist. Mandi (H.P) to approach cerebral palsy children schools.

I will also take consent from parents and staff of school regarding study. Upon completion of the project, I undertake to provide the Dist. institute of education and training (DIET) Mandi with a copy of the research report and outcome in regard to Cerebral Palsy children. This study would be helpful for planning further strategies for such special children in school environment. I request to your good self to permit me to conduct the proposed research.

Thanking you

Yours Truely,

Pardeep Panwa 7/4/18

CRC Sundernagar

9882782911

Allowed

7/4/2018

Principal (DIET)
DPO (SSA / RMSA)
Mandi (H.P.)

To

The Principal

DIET Mandi

Sub: Request for data pertaining to cerebral palsy children and educators in schools.

R/sir,

This is in reference to research that myself has proposed to your good self to carry out in schools of dist. Mandi. Keeping in mind the proposal of research and to prepare a research report, I need some primary data regarding Cerebral Palsy children and Special educators which are as below;

1. Total no of primary and middle schools in dist. Mandi. Please provide details?
2. Total no. of educational blocks in dist Mandi. Please provide details?
3. Total numbers of Cerebral Palsied children (OH) enrolled in such schools. Please provide details?
4. How many Cerebral Palsy children getting home based education and how many coming for school based education?
5. Does every school have basic computers or assistive technology devices?

The undersigned request your good self to provide or help me in providing the data to carry out research. I shall be highly obliged to you.

Dr. Tale chand ji
Pl. help him

Thanking you,

Yours truely

Pardeep Panwa 7/9/18

9882782911

7/9/2018

Certificate

I.....Dr.....Shikha Sharma.....State Project Director/State coordinator(IED/ IEDSS)/ Principal hereby give permission to Mr. Pardeep Kumar Pahwa to conduct the research in Government schools at District Mandi (H.P) requested for the project entitled **'INCLUSIVE TELE-PHYSIOTHERAPY FOR TREATMENT AND MONITORING THE PHYSICAL IMPAIRMENTS AMONG CHILDREN WITH CEREBRAL PALSY IN AN INCLUSION EDUCATION SETTING'**.

Signature _____

Date 16-11-2018

APPENDIX M INFORMATION & CONSENT FORM FOR COMMENCING (i-TELEPT) FROM SPECIAL EDUCATORS /PARENTS

INCLUSIVE TELE-PHYSIOTHERAPY FOR TREATMENT AND MONITORING THE PHYSICAL IMPAIRMENTS AMONG CHILDREN WITH CEREBRAL PALSY IN AN INCLUSION EDUCATION SETTING

Inclusive Telephysiotherapy information & Consent form -Special educators, Parents/patients(CP)

* Required

1. Name of Special educators विशेष शिक्षक का नाम *

2. Name of CP child/children selected for research study आपके अन्तर्गत इस शोध में भाग् लेने वाले प्रमस्तिष्कीय पक्षाघात से ग्रसित बच्चे/बच्चों के नाम *

3. Father's name of CP child/children selected for research study इस शोध में भाग् लेने वाले प्रमस्तिष्कीय पक्षाघात से ग्रसित बच्चे/बच्चों के पिता का नाम *

4. Which type of Phone Patient/Parents using now a days. बच्चों के अभिभावाकगन आजकल किस फोन का इस्तेमाल कर रहे हैं *

Mark only one oval.

- ◯ Android/Smart Phones
- ◯ Basic phone
- ◯ Tablet /ipad

5. Available network connectivity of phones in your area ?आपके क्षेत्र में फोन का उपलब्ध नेटवर्क संचालन ? *

Mark only one oval.

- 3G
- 4G
- 5G

6. Can you download zoom application from play store in your smart phone? क्या आपअपने स्मार्ट फोन में प्ले स्टोर से ज़ूम एप डाउनलोड कर सकते हैं "? *

Mark only one oval.

- Yes
- No

7. Do you know to open Google webpage or browsing webpage with id and password? क्या आप आपको दिए गए आईडी एवम पासवर्ड से गूगल वेब पेज को खोल सकते हैं ? *

Mark only one oval.

- Yes
- No

8. 1. I hereby authorize Therapeutic Services to use the telephysiotherapy platform for treating and monitoring the medical condition of child . मैं बच्चे की मेडिकल स्थिति के इलाज एवम निगरानी के लिए टेली भोतिक चिकत्सीय सेवाओं को अधिकृत करता हू! *

Mark only one oval.

- Yes
- No

9. 2. I understand that technical difficulties may occur before or during the physical therapy sessions and my appointment cannot be ended as intended. मैं समझता हु कि इस टेली भोतिक चिकत्सीय सेवाओं में तकनिकी समस्या भी आ सकती है और मुझे इससे मिलने वाले लाभ को बंद नही किया जाए *

Mark only one oval.

- ◯ Yes
- ◯ No

10. 3. I accept that the professionals can contact interactive sessions with video call; however, I am informed that the sessions can be conducted via regular voice communication if the technical requirements such as internet speed cannot be met.मैं यह स्वाकीर करता हूँ कि पेशेवर विडियो कॉल के तेहत संपर्क कर सकते हैं परन्तु अगर तकनिकी समस्या आती है तो साधारण आवाज़ संचार या फोन से संपर्क कर सकते हैं *

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Maybe

11. 4. I agree that medical records on telephysiotherapy can be kept for further evaluation, analysis and documentation, and in all of these, my information will be kept private. I agree to terms and conditions मैं टेली भोतिक चिकत्सीय सेवाओं से सम्बन्धित दस्तावेजों को आगे के लिए जाँच पड़ताल एवम रखरखाव के लिए स्वीकृति प्रदान करता / करती हूँ तथा मेरी जानकारी गुप्त राखी जाए *

Mark only one oval.

- ◯ Yes
- ◯ No

12. Other thoughts or comments, if any यदि कोई अन्य विचार हैं तो सांझा करे

APPENDIX N INCLUSIVE TELEPHYSIOTHERAPY (i-TELEPT) SESSION RECORDING FORM

Case no._____

THERAPIST SESSION NOTES

Patient name:
Father's name:
Special educator's name:
Educational block:

Age: Gender Diagnosis:

Session number & date: Duration of session:

Therapy method:

- Individualized therapeutic plan

Objectives of the therapy session:

1.
2.
3.

Key issues/themes discussed:

Therapy techniques used:

Therapist observations and reflections:

Plan for next session:

Date for next session:

Supervised by (if applicable)

Name: Date:
Qualification: Signature:

APPENDIX O TELEPHYSIOTHERAPY AGREEMENT FORM

Date of Effectivity:

Name of service provider:

Address:

Purpose of agreement:

The purpose of this agreement is to utilize the technology that enables inclusive Telephysiotherapy in order to provide patients living in the hilly remote areas in schools of Dist. Mandi to get proper rehabilitation and therapeutic care by Therapist and educators at school without any inconvenience and expense both financially and timely to travel to the children address or location.

Terms of agreement:

1. Provider's responsibility- Providers shall ensure that only licensed personnel shall provide therapeutic services to the patients. The provider shall have complete authority, management, and control over including, but not restricted to, clinical diagnosis, procedure treatment required or any other professional health care services necessary in connection with the provision of the telephysiotherapy services in accordance with laws.

2. Provider shall remain entirely independent of client as to

i) Diagnosis and treatment of patient

ii) Prescription, order, or administration of any exercise, therapeutic protocol and

iii) all other rehabilitation, professional and ethical affairs of provider.

1. Limitation against practice of telephysiotherapy

Notwithstanding any provision contained herein, this agreement is not intended to

i) Supervise any non licensed medical or educational professional or individual in the practice of telephysiotherapy.

ii) Constitute the use of the physiotherapy license by anyone other than licensed therapist.

iii) Perform any act that is contrary to state laws.

Client's responsibility

The client shall not control, direct, interfere, nor supervise provider in connection with the provision of therapeutic services.

Client, when engaging or being utilized by provider shall ensure that only properly licensed medical professionals shall be employed and utilized in conducting a diagnosis, procedure, treatment, or the rehabilitation services necessary in connection with the inclusive telephysiotherapy service agreement.

Confidential information- Any proprietary information such as ,but not limited to relating to such therapeutic operations, services, technology, software, among others, that the service provide may accure from the client through performance and within the effectivity of this agreement which is not considered public knowledge shall be recognized as confidential information. Service provider shall not in any way disclose the confidential information without the prior written consent of the client. In case of uncertainty weather such information is considered confidential, it shall always be presumed confidential for the benefit and protection of the parties.

Name of service provider Name of client

Date Date

APPENDIX P TIME TABLE FOR ONLINE /OFFLINE i-TELEPT FOR CP CHILDREN

S.No	Days	Time (Real/ Synchronous)	Areas	CP children in educational blocks	Distance	IST Point of delivery	2ND Point of delivery	Non real/ Asynchronous	Special Educators
1	Mon	10:00-11:00 AM	MANDI	G.S.S.S BADOG (MANDI)	5KMS (M)	Virtual from home W1-W6	HAL (2 visits in 2 weeks W7 &W8)	Log in i-TelePT website	Mrs. Reena
		11:00-12:00 AM	SNR	GMS GAMOHU	15KMS(M)	DO…	DO…	DO…	Mrs. Monika
		12:00-1:00 PM	GOHAR	G.P.S DUGAIN (GOHAR)	5 KMS	DO…	DO…	DO…	Mrs. Meena
2	Tue	10:00-11:00 AM	GOPALPUR-1	GMS KEHRI	5 KMS	DO…	DO…	DO…	Ms. Kavita
		11:00-12:00 AM	KARSOG	GSSS KHANEOL BAGRA	20KMS(M)	DO…	DO…	DO…	Mrs Bharti
		12:00-1:00 PM	BALH	GPS KHANDLA	1 KMS	DO…	DO…	DO…	Mr Anuj
3	Wed	10:00-11:00 AM	GOPALPUR	GMS SADOH (GOPALPUR-1)	25-30 KMS(M)	DO…	DO…	DO…	Ms Kavita
		11:00-12:00 AM	KARSOG	GPS MAMEL	5 KMS	DO…	DO…	DO…	Mrs Bharti
		12:00-1:00 PM	BALH	GPS RATTI	10 KMS	DO…	DO…	DO…	Mr Anuj
4	Thu	10:00-11:00AM	GOPALPUR	GSSS MAJIATH	22 KMS (M)	DO…	DO…	DO…	Mr Kavita

		11:00-12:00AM	KARSOG	GMS JATOHU	10KMS	DO…	DO…	DO…	Mrs Bharti
		12:00-1:00 PM	BALH	GPS SAINJI	10 KMS	DO…	DO…	DO…	Mr Anuj
5	Fri	10:00-11:00AM	SNR	GMSSS DODWAN	10 KM	DO…	DO…	DO…	Mrs Sheetal
		11:00-12:00AM	KARSOG	GMS BAGAIL	20 KMS(M)	DO…	DO…	DO…	Mrs Bharti
		12:00-1:00 PM	SNR	GPS PAURAKHOTHI	0 KMS	DO…	DO…	DO…	Mrs Upasana
6	Sat	10:00-11:00AM	SNR	GPS CHAI KA DHORA	20 KMS(M)	DO…	DO…	DO…	Mrs Suraksha
		11:00-12:00AM	KARSOG	GSSS PORLA	25 KMS(M)	DO…	DO…	DO…	Mrs Bharti
		12:00-1:00 PM	JANJHELI	G.P.S TIPRIDHAR (JANJHELI)	10 KMS	DO…	DO…	DO…	Mrs Sunanda
		1:00-2:00PM	SNR	GMS DODWAN	10KMS	DO…	DO…	DO…	Mrs Sheetal
		2:00-3:00 PM	GOPALPUR-1	GPS TRIFALGHT	20 KMS(M)	DO…	DO…	DO…	Ms Kavita

APPENDIX Q SAMPLE PARTICIPANT CONTACT SHEET

Focus group.....

Participants name & address	Email address	Contact notes	Yes /No	Reminder phone call	Confirmation letter	Thanks letter

APPENDIX R FOCUS GROUP EVALUATION/FEEDBACK FORM

Your feedback will help us to plan for the next focus group.

Name of Participant:……

School/Block……

Year of experience……

□ Male □ Female

Beside each of the following statements, Please place a tick in the appropriate box.	**Yes**	**No**	**Not Sure**
The focus group was better than I expected			
The topics discussed were interesting			
The questions were easy to understand			
I enjoyed discussing this topic with my classmates			
We were given enough time for discussion			
The facilitators encouraged participation			
I got a chance to have my say			
I felt that I was listened to			
A focus group is a good way of consulting withstudents			
I would participate in another focus group			

Please tick the response you agree with:

Overall, the focus group was.....	□ Great	□ Good	□ OK	□ Poor
The facilitators were.....	□ Great	□ Good	□ OK	□ Boring

Was there something you think we should have discussed but didn't?

_____

_____

Any other comments? (*e.g. what you liked or didn't like; how the group could be improved*)

_____

_____

_____

Thank you.

Signature and Date:……

APPENDIX S FOCUS GROUP DISCUSSION ATTENDANCE SHEET

Facilitator details:

Date FGD:

Place/Venue:

Facilitator Group	**Facilitator Name**	**Contact**	**Email Id**

S. No	Name of Participants	Designation	School/Block	Contact No.	Signatures

APPENDIX T INVITATION FOR ONLINE FOCUS GROUP DISCUSSION

Dr. Pardeep Pahwa is inviting you all to a scheduled Zoom meeting.

Topic: Online focus group discussion (OFGD) to develop i-TelePT Module for CP children in inclusion education settings.

Time: Aug 11, 2020 11:00 AM India

Join Zoom Meeting

https://us02web.zoom.us/j/87193486567?pwd=QWptaktmUW84Q0xhVExDVUNsdmkzUT09

Meeting ID: 871 9348 6567

Passcode: 071711

LOVELY PROFESSIONAL UNIVERSITY

Transforming Education Transforming India

Pardeep K. Pahwa
Research scholar
41700055

Supervisor: Dr Suresh Mani
Associate Prof. & Head
Dept. of Physiotherapy
LPU(PB)

APPENDIX U INDIVIDUALIZED THERAPEUTIC PLAN FOR CP CHILDREN

Code	Name	Complaints (present level) Body structure and function /activity limitation.	Diagnosis	Environmental factors	Personal factors	ITP/IEP goals	Participation&access to educational programme	Individualised Therapeutic plan	Position	Dosage/rep
1.	Tilak Raj	1. Poor balance. 2. Handles most object but with somewhat reduced quality. 3. Poor balance. 4. Tightness in TA (B/L), Hip flexors (B/L),Hip extensors (B/L), knee flexors RT , hip adductors (B/L), Hip Int. Rot. (B/L). 5. Child uses assistance for mobility.	C.P Diplegic with GDD	Special educator knows Tilak Raj well; they manage his daily self-care, requiring infrequent equipments adjustments and consultation from related services.	1. Strong social skills. 2. Poor attention to task. 3. Cognitive delays. 4. Has supportive family.	1. To improve balance, mobility and reduce spasticity. 2. To improve gait.	1. Access school campus by using wheel chair. 2. Participates in schooleducation programme.	Stretching Exs. TA, Hamms, Hip adductors Pelvic control- 1.Hip extension (bridging) 2. Trunk rotation 3.Strengthening knee/hip extensors 4.Strengthening hip abductors	Long sitting 1.Supine, knee extension with hip adduction 2. Prone lying, hips extended, thighs on ball. 3. Supine, knee extension. Standing against the wall, squatting. 4 .Strengthening Excercise for knee/hip 5 a) Standing, feet closed (throwing &	3 setsx10 reps each 3 setsx10 reps each 3 setsx10 reps each 3 setsx10 reps each 3 setsx10

								5.Standing balance a) Antero posterior direction b) lateral c) one leg standing 6. Gait training side wards walking backwards walking exercise 7. R.O.M exs. hand and fingers.	catching balls) Standing, hips abducted b) Standing, feet together (resistance against pelvis) c) one leg standing 6. Sidewards walking against a wall 20 steps backwards walking Standing, feet closed. Standing, feet closed. Standing, feet closed. Jumping forwards ,backwards, side wards 7. Put your forearm on a table.Start with your fingers bent, then slowly straighten your fingers until your hand is flat on the table. (James P. Russell Programme.)	reps each 10-15 steps on both sides. 3 setsx10 reps each
2	Priya	1. Handles object with difficulty.	Cerebral Palsy Hemi (Rt)	Special educator knows Priya well; She manages	1. Supportive family. 2. With	1. To gain mobility. 2. To improve	Poor adaptation in classroom for Priya. But manages outdoor activities.	1.Stretching exercise TA (Rt) Hamstrings (Rt), elbow flexors (Rt)), wrist	1.Long sitting High sitting	3 setsx10 reps each

		2. Poor balance. 3.Tightness TA, knee flexors, elbow flexors, wrist extensors (RT)		herself in classroom and not using any aids of mobility.	drawn from teachers. 3. Non cooperative with per groups and staff members.	ADLs. 3. To Reduce tightness/spasticity 4. To improve balance & ADLs skills. 5.To improve Gross and fine motor skills		extensors (Rt) 2.Standing balance a) anteroposterior direction b)lateral c) one leg standing 3.Emphasis on ADLs 4. Gross motor task training (GMTT). 5. CIMT.	2. Standing, feet closed (throwing & catching balls) Standing, hips abducted (idem). b) Standing, feet together (resistance against pelvis) c) one leg standing 3.Clay activities, Squeezing ball 4. Roll over, Come to sit, Sit to stand, standing activities. Standing and then squat with arm free. pick up objects from floor and returns to stand with arms free. Kicking ball with right /left, hoping on right, left foot. walk up 4 steps with alternating feet. Standing-unsupported, standing on one leg, turning 360, placing alternate foot on stool.	3 setsx10 reps each 3 setsx10 reps each 3 setsx10 reps each

3	Rohit Kumar	1. Tightness in TA (LT) Hip internal rotators), Hip flexors (LT),Hip Internal rotators(LT)Hamstrings(LT). 2. Forward bent posture. 3. Poor balance, poor single standing. 4.Equinus gait seen 5. W-sitting present. 6. Difficult in squatting.	C.P Spastic diplegia	He is using crutches.	Child is cooperative with peer group and others	1. To improve outdoor mobility especially running. 2. To Improve ADLs. 3.To improve posture	Child does not participate in outdoor activities & games.	1. Stretching exercise TA (LT)(LT Hip internal rotators), Hip flexors (LT), Hip Internal rotators(LT) Hamstrings (LT). 2. Posture correction 3.Balance	1.Long sitting 2.Supine lying 3.High sitting 2. Overhead activities to improve posture. The sitting exercise was performed on a Swiss ball, with support from student therapist on the patient's pelvis. While seated the patient played catch with mother to encourage reaching to catch the ball. 3. Standing, feet closed (throwing & catching balls) Standing, hips abducted (idem). b) Standing, feet together (resistance against pelvis) c) one leg standing 4. Backward walking	3 setsx10 reps each 15 min. /session 3 setsx10 reps each

								4. Equinus 5. W sitting 6. Squats. 7.Outdoor mobility (Running)	to improve equinus 5. Advice to discontinue w sitting and emphasis on cross leg sitting 6. Emphasis on wall squats. 7. Walk backward, forward 10 steps while carrying large object. Kicking ball with (Rt) and Lt. foot. Hopping on (Rt) foot and Lt. foot. walks up and down. Single leg standing, tandem walking.	15 min. /session 3 setsx10 reps each 10-15 steps on both sides.
4	Dimple	1.Difficulty in independent walking 2.Spasticity /Tightness in TA(b/l), Knee flexors (b/l), knee extensors (b/l), hip adductors(b/l), hip flexors (b/l), hip Int.rot (b/l),ext rot (b/l) 3. Stooped posture 4.Crouch gait 5.Poor squat to stand 6.Incomplete range of motion Hip, knee, , ankle	C.P Spastic diplegic	She is using Rollator for home activites but in school manages with help of special educator. She is cooperative with all.	1. Child learns new physical skills with moderate difficulties. 2. Child is socially active.	1 To improve walking by improving Balance, coordination of the child. 2. To reduce the Spasticity/tightness in Lower limb muscles. 3.To improve gait and posture 4.To increase range of motion hip, knee and	Child never participates in any indoor or outdoor activities due to limited mobility.	1.Stretching exercise- TA(b/l), Knee flexors (b/l), knee extensors(b/l),hip adductors(b/l), hip flexors(b/l) ,hip Int.rot (b/l),ext rot (b/l) 2.Mobility training-GMTT 3.Gait training 4.Posture correction	1. Long sitting Supine lying 2. Roll over, crawling fwd , backward, kneeling, Sit to stand (supported) activities.	3 setsx10 reps each 15 min. /session

		7. Poor standing balance. 8.Poor coordination in lower limb 9.Not able to do squat to stand, poor standing balance and single leg standing, not able to do straight line walking.				ankle.		and training- 5.Balance & coordination exs –	3.Wall walking 4. a) Overhead activity to correct posture. b) Upper limb activities for posture 5. a) Emphasis on prone on all four with proper position. b) Emphasis on kneel standing, kneel walking and half kneeling on rt and lt. knee alternatively for 10 sec. c) Single leg standing with chair support. In standing, lift rt/lt foot with arm free for 10 sec. Attains standing from sitting without using arms. In standing, lowers transition to floor with control, arm free, wall squats, kicking with rt/lt foot, hopping activities, jumping activities. Turning 360 degrees, retrieving objects from floor, placing alternate foot on stools, reaching forward with outstretched arms. 6. ROM exs hip, knee,	15 min. /session 15 min. /session

								6. ROM exs. Hip, knee, ankle	ankle in supine lying.	3 setsx10 reps each
5	Reetu	1. Poor balance standing balance is poor on right leg. ❖ Static & dynamic balance poor. Walking on straight leg poor. ❖ Poor strength in Shoulder/elbow, wrist flexors. 2. Difficulty in walking. 3. Mild tightness in Rt TA, Hip flexors, Extensor muscles. 4. Poor gripping and writing skills.	C.P Hemi (Rt)	Poor writing abilities in classroom. Not using any mobility device or any adaptation for writing.	Her class performance is below average. But socially active.	1.To improve mobility, Balance of the child. 2.To improve the Strength of U/L Muscles (Rt. shoulder, elbow ,wrist) 3. To improve the writing skills by improving gripping.	Participation in class room indoor and outdoor activity, very limited or poor.	1.Balancing exercise 2.Stretching exercise- 3.Strengthening exercise for weak shoulder, elbow and wrist flexors 4.Gripping/writing exercise by using exercise ball, gripper.	1. Single leg standing activities, Kicking activities. 2. Passive Stretching exercise for TA, Hip flexors (Rt) in long sitting. 3. Strengthening exercise for weak shoulder, elbow and wrist flexors. 4. Putty / Playdough Exercises- Roll a sausage – use both hands together to gradually roll an even sized length of dough approx. 30 – 40 cms long. Ensure the body remains still, the shoulders relaxed and the arms move from shoulders. Writing- Tripod Grasp- Placing and removing large pegs in/out of peg boards. Puzzles with large knob handles. Removing and	3 setsx10 reps each 3 setsx10 reps each 3 setsx10 reps each 15 min. /session 15 min. /session

								5.Gait training 6. CIMT	replacing lids from large marker pens, Square blocks. 5. Single leg (effected) wt. bearing. Sideward walking against a wall 20 steps backwards walking.	15 min. /session
6	Sonam	1. Not able to walk. 2. Foot deformity. 3. Dependent ADLs activities. 4.Quadruped position with difficulty 5.Poor high sitting/long leg sitting 6.Attains w sitting 7. Poor kneel standing, walking and half kneeling. 8. Spasticity /Tightness in TA(b/l), Knee flexors (b/l), knee extensors(b/l), hip adductors (b/l), hip flexors(b/l) ,Wrist flexors b/l),wrist extensors (rt) and finger flexors (b/l)	C.P Quadriplegia	Poor mobility. So using Wheelchair for outdoor and indoor mobility at school and home environment.	Not socially interactive with staff and teachers. Having below average class performance	1. To make independent in standing. 2. To improve walking by improving Balance, coordination of the child. 3. To reduce the Spasticity/tightness in upper, Lower limb muscles. 4. To improve gait and posture. 5.To improve	No Participation in outdoor and indoor activities. Proper adaptation for child in class room.	1.Stretching exercise 2.Mobility training 3.Gait training	1. TA/ Hamstrings, hip adductors, hip flexors, knee muscles of both side and U/L muscles. 2. Mat activities, sitting activities and emphasis on quadruped, kneeling and other gross motorskills, ADLs board activities, holding objects, gripping activities. 3. (Standing perambulation)- Kneel walking, wall walking, corner standing. 4. Overhead activity to correct posture. Upper limb activities	3 setsx10 reps each 3 setsx10 reps each 3 setsx10 reps each

		9. Poor sitting balance 10. Poor coordination in upper limb and lower limb 11. Poor ADLs 12. Poor fine motor skills				ADLs 6.To improve fine motor skills		4.Posture training 5. Discontinue w sitting 6. Balance & coordination Ex.	for posture. 5. Emphasis on cross leg sitting. 6. Emphasis on prone on all four with proper position. Emphasis on kneel standing, kneel walking and half kneeling standing with wall /chairs.	15 min. /session 15 min. /session 15 min. /session

7	Sumit Saini	1.Child is not able to stand and walk independently 2.W- sitting 3. Equinus deformity. 4.ADLs dependent 5. Kneel standing with kneel walking with support. 6.Incomplete hip, knee, ankle range of motion 7.Squat to stand with support 8.poor balance 9.Spasticity of TA in b/l ,hip flexors b/l, hip extensors b/l, hip adductors b/l, knee extensors b/l, knee flexors b/l	C. P Spastic Diplegia	He is using Rollator for supportive mobility.	Good performance at class. Cooperative with teachers and peer groups.	1.To make gain independent standing and walking 2. To reduce the spasticity/tightness in muscles. 3.To improve ADLs and fine motor skills 4.To discontinue w sitting. 5.To increase range of motion hip, knee and ankle	Does not participate in door and outdoor activities.	1. Mobility training 2.Stretching exercise 3. Gait training. 4. ADLs & fine motor skills 5. Balance & coordination ex. 6. W -siting avoidance. 7. ROM Exs. hip, knee and ankle 8.Avoid equinus	1. GMTT 2. TA/ Hamstrings, hip adductors, hip flexors, knee muscles of both side in long sitting and supine. 3. Wall walking - 20 steps to left & rt. 4. ADLs board training, clay activity. 5. Emphasis on prone on all four with proper position .Emphasis on kneel standing, kneel walking and half kneeling. Single leg standing with chair support. 6. Discontinue w sitting by asking child to sit in cross leg. 7.Supine lying –ROM Exs hip, knee, ankle 8. Use AFOs.	3 setsx10 reps each 3 setsx10 reps each 15 min. /session 3 setsx10 reps each 3 setsx10 reps each

8	Purva Thakur	1.Not able to walk independently 2.Stooped posture 3.Spasticity in knee flexors b/l, TA (b/l, Knee flexors), Hip adductors B/L, Hip flexors b/l, hip internal rotators B/L, Hip ext rot b/l, knee extensors b/l, FA pronators b/l 4.Clonus 5.ADLs- Dependent except eating 6. W-sitting. 7.Range of motion restricted. 8.Bottom shuffling present 9.Poor posture	C. P Spastic Triplegia	She is using CP chair and performs her ADLs on CP chair	Good class Performance. Keen to learn new physical skills.	1. To make walking and improve walking by improving Balance, coordination of the child. 2. To reduce the Spasticity/tightness in muscles. 3.To improve gait and posture 4.To improve ADLs and fine motor skills 5.To discontinue w sitting 6.To increase range of motion hip, knee and ankle.	Participates in indoor and outdoor skills. Socially active.	1.Mobility training- 2. Stretching exercise -TA/ Hamstrings, hip adductors, hip flexors, knee muscles of both side. 3.Gait training 4. Posture training. 5.ADLss board training, clay activity, 6. Avoid w sitting. 7. Balance & coordination exs –	1. Mobility training- GMTT (Bed mobility & perambulation exs.) 2. Long sitting /supine lying. 3. Side walk on wall on both sides (20 steps) 4. Overhead activities to correct posture in long sitting .Upper limb activities throwing ball in sitting. 5.ADL board training 6. Discontinue w sitting by asking child to sit in cross leg. 7. Emphasis on prone on all four with proper position .Emphasis on kneel standing, kneel walking and half kneeling. Single leg standing with chair support.	3 setsx10 reps each 3 setsx10 reps each 3 setsx10 reps each 3 setsx10 reps each 15 min. /session

9	Mokshita	1. Child is not able to walk independently. 2. Poor ADLs 3. TA likely to be contractured, clonus seen. 4.Range of motion not complete due to spasticity 5.Coordination upper limb and lower limb – poor 6.Able to write but not clear 7.Slouched posture 8. Tightness in TA, Hamms. ,Hip adductors, Hip flexors (b/l)	C.P spastic Quadriplegia	Wheelchair as a mode of indoor and outdoor mobility.	1. Good class performance and keen to learn new physical skills. 2. Cooperative with teachers and peer groups	1. To make gain independent standing and walking. 2. To reduce the Spasticity/tightness in muscles. 3. To improve ADLs and fine motor skills. 4.To increase range of motion hip, knee and ankle	Does not participate in indoor and outdoor games.	1. Mobility training. 2. Stretching exercise -TA/ Hamstrings, hip adductors, hip flexors, knee muscles of both side. 3. Posture training 4. Discontinue w sitting 5. Balance & coordination exs 6. ROM exs Hip, knee , ankle	1. Mobility training-GMTT (Bed mobility & perambulation exs.).Use AFOs. 2. Long sitting /supine lying. 3. Overhead activities to correct posture in long sitting .Upper limb activities throwing ball in sitting. 4. Discontinue w sitting by asking child to sit in cross leg. 5. Emphasis on prone on all four with proper position .Emphasis on kneel standing, kneel walking and half kneeling. Single leg standing with chair support. 6. Supine lying-ROM exs Hip, knee and ankle.	3 setsx10 reps each 3 setsx10 reps each 15 min. /session 15 min. /session 15 min. /session 3 setsx10 reps each

10	Mauryansh	1. Poor mobility, dependant in walking with crouch gait. 2. Presently flex both knees while walking. 3. Difficulty in walking, not attained independent walking. 4.Poor balance and coordination, No straight line walking 5.W sitting position, child sits intermittently 6.Crouch gait present 7.Foot deformity seen 8.Poor squat to stand 9.No independent standing 10.Poor slouched posture 11.Handles most	Cerebral Palsy spastic quadriplegia	Using Wheelchair. But good IQ level. Keen to attend classes.	1. Average performance in class. 2.Cooperative with staff and peer groups	1.To improve balance, mobility and reduce spasticity 2. To improve gait. 3. To discontinue wrong postures and positions 4.To make him stand –wall standing, corner standing 5.To improve fine motor skills	Child participates in indoor /outdoor games occasionally.	1.Mobility training- 2. Stretching exercise-TA/ Hamstrings, hip adductors, hip flexors, knee muscles of both side. 3.Gait training 4. Posture training 5. Grasping activities & Fine motor skills 6. Discontinue w sitting 7.Balance & coordination exs	1. Mobility training-GMTT (preambulation exs.) Also advice to use gaiters KAFO. 2. Long sitting /supine lying. 3. Side walk on wall on both sides (20 steps).Backward walking(20steps) 4. Overhead activities to correct posture in long sitting .Upper limb activities throwing ball in sitting. 5. ADL board training, clay activity, Squeezing activities. 6. Discontinue w sitting by asking child to sit in cross leg. 7. Emphasis on prone on all four with proper position. Emphasis on kneel standing, kneel walking and half	3 setsx10 reps each 3 setsx10 reps each 15 min. /session 15 min. /session 15 min. /session 15 min.

		objects but with somewhat reduced quality 12.Tightness in hip adductors(b/l), Knee flexors b/l, TA(b/l)						8. ROM exs Hip, knee, ankle	kneeling. Single leg standing with chair support. 8. Supine lying- ROM exs Hip, knee and ankle.	/session 3 setsx10 reps each
11	Nishant	1. Bed ridden 2.Tightness in TA(b/l), Hip adductors, hip flexors, Hip internal rotators ,hip external rotators, knee flexors, knee extensors(B/L) – All b/l 3. Dependent in motor skills /ADLs skills. 4.Child transported in wheel chair in all settings. 5. Does not handle objects and having severe limitations in fine motor skills. 6.No balance in sitting 7.Awkward posture	Cerebral Palsy with MR	Mobility performed by CP Chair in home. Bed ridden case .Enrolled in school but due to tough geographically conditions, not able to go.	Poor class performance with poor social skills	1.To improve gross mobility 2.To Improve ADLs 3.To Reduce tightness/spasticity and pain 4. To improve balance & ADLs skills. 5.To improve bed mobility/motor skills	Participation /access is very poor as child is bed ridden.	1.Mobility training- 2. Stretching exercise-TA/ Hamstrings, hip adductors, Int rotators hip flexors, knee muscles of both side. 3. Posture training 4. Grasping activities & Fine motor skills 5. Discontinue w	1. Mobility training-GMTT (Bed mobility & perambulation exs.). Emphasis on prone lying position. 2. Long sitting /supine lying. 3. Overhead activities to correct posture in long sitting .Upper limb activities throwing ball in sitting. 4. ADL board training, clay activity. 5. Discontinue w sitting by asking child to sit in cross leg. 6. Emphasis on prone on	3 setsx10 reps each 3 setsx10 reps each 15 min. /session 15 min. /session

								sitting 6.Balance & coordination exs 7. ROM exs. Hip, knee , ankle	all four with proper position. Emphasis on kneel standing, kneel walking and half kneeling. 7. Supine lying- ROM exs. Hip, knee and ankle.	15 min. /session 15 min. /session 3 setsx10 reps each
12	Shubham	1.Spasticity /Tightness in hip adductor(B/L),TA, Knee flexors (b/l),hip flexors (B/L) 2. Scissoring noticed. 3. Poor ADLs activities and dependant. 4. Poor balance and coordination. 5.Not able to do squat to stand, poor standing balance and single leg standing, not able to do straight line walking.	Cerebral Palsy paraplegic	He is using Crutches for mobility at school and at home.	1. Below average class performance. 2. Cooperative with class teachers.	1To improve walking by improving Balance, coordination of the child. 2. To improve the ADLs skills. 3. To reduce the Spasticity/tightness in lower limb muscles. 4.To improve gait	Participates in games.	1.Mobilitytraining- 2. Stretching exercise -TA/ Hamstrings, hip adductors, hip flexors, knee muscles(B/L) 3.Gait training 4. Grasping activities & Fine motor skills. 5.Balance & coordination exs	1. Mobility training. 2. Long sitting /supine lying. 3. Side walk on wall on both sides (20 steps). 4. ADL board training, clay activity. 5. Emphasis on kneel standing, kneel walking 15 min. /session and half kneeling. Single	3 setsx10 reps each 3 setsx10 reps each 15 min. /session 15 min. /session

		6. Drooling of saliva.						6. To break drooling	leg standing with chair support. Crawling forward and backward walking. Kneeling, half kneeling on rt and lt. Hands on large bench and cruises 5 steps to rt and lt leg. Walk forward 10 steps with support and then without support. Sitting to standing activities with support. and vice versa. In sitting, overhead activities- throwing ball, turning and looking back. 6. Use Straw, Tongue excercise.	15 min. /session
13	Shanvi Gupta	1. Attains w sitting sometimes. 2. Squat to stand difficult. 3.Poor balance Standing balance is poor 4.Static & dynamic balance poor. 5. Walking on straight leg poor. 6. Difficulty in walking. 7.Mild tightness in TA(b/l), Hip Adductors(b/l) ,Hip	Spastic diplegic C.P	Using Rollator for mobility.	1.Average class performance. 2.Cooperative with staff members and peer groups.	1. To improve mobility especially walking , Balance of the child. 2. To improve the ADLs skills. 3. To reduce the Spasticity in Lower limb muscles.	Does not participate in games.	1. Mobility training 2. Stretching exercise -TA/ Hamstrings, hip adductors, hip flexors, knee muscles of both sides. 3.Gait training	1. Passing hurdles during walk. 2. Long sitting /supine lying. 3. Side walk on wall on both sides (20 steps).Use Rollators for indoor mobility. Backward walking(20steps) 4. ADLs board training.	3 setsx10 reps each 3 setsx10 reps each

		flexors(b/l),Hip extensors(b/l) Knee flexors(b/l) ,knee extensors(b/l) & Hip rotators(B/L) muscles. 8.Poor ADLs						4. Grasping activities & Fine motor skills 5. Discontinue w sitting 6.Balance & coordination exs	5. Discontinue w sitting by asking child to sit in cross leg. 6. Emphasis on Single leg standing with chair support. Emphasis on standing with feet together. and with eyes closed. Standing with one foot. Turning 360 degrees in standing position. Placing alternate foot on stools.	3 setsx10 reps each 15 min. /session
14	Sabnam Verma	1.Not able to walk independently 2.Tightness in TA(b/l),hip flexors (b/l),hip ext (b/l),hip add(b/l), Hip abd (b/l),Hip int rot (b/l, hip ext (b/l), knee flexors(b/l),knee extensors(b/l),shoulder flexors (b/l) , shoulder extensor(b/l),elbow flexor b/l, elbow extensor, wrist flexor(b/l) wrist extensors(b/l), pronators, supinator, finger flexors b/l). 3.Poor balance	C. P spastic quadriplegia with MR	Using Rollator	Below average class performance.	1. To improve balance, mobility and reduce spasticity. 2. To improve gait. 3.To discontinue wrong postures and positions. 4. To make him stand–wall standing, corner standing. 5.To improve fine motor	Participation in indoor /outdoor activities good.	1.Mobility training- 2. Stretching exercise-TA/ Hamstrings, hip adductors, hip flexors, knee muscles of both side along with U/L muscles. 3.Gait training	1. Mobility training-GMTT (perambulation exs.) 2. Long sitting /supine lying. 3. Side walk on wall on both sides (20 steps).Use rollator for indoor mobility. Backward walking (20steps)	3 setsx10 reps each 3 setsx10 reps each 15 min. /session

		4.Poor ADLs 5.Poor posture				skills		4. Posture training 5. Grasping activities & Fine motor skills 6. Discontinue w sitting 7 .Balance & coordination exs 8. ROM exs Hip, knee, ankle.	4. Overhead activities to correct posture in long sitting. Upper limb activities throwing ball in sitting. 5.ADL board training, clay activity, 6. Discontinue w sitting by asking child to sit in cross leg. 7. Emphasis on prone on all four with proper position .Emphasis on kneel standing, kneel walking and half kneeling. Single leg standing with chair support. 8. Supine lying-ROM exs Hip, knee and ankle. By side walking, hip adductors stretching exs. and wall squats. 9. Strengthening exercise for U/L muscles.	15 min. /session 15 min. /session 15 min. /session 15 min. /session 3 setsx10 reps each

								9.Strengthening exercise for weak shoulder, elbow and wrist Muscles		
15	Riya Kumari	1. Poor balance. 2.Tight TA(b/l),Hip add(b/l),hip flexors(b/l),hip extensors (b/l),hip Int. rot(b/l),hip ext. rot(b/l),knee flexors (b/L),Knee extensors(b/l) 3.Crouch gait 4.Squat to stand with difficulty ,standing with support, No single leg standing 5. Incomplete range of motion due to muscle tightness 6.Straight line walking-poor	C.P spastic diplegia	Not using any aids and appliances	1. Good performance in class. 2. Cooperative child.	1. To improve balance, mobility and reduce spasticity. 2.To improve gait	Occasionally participates in outdoor /indoor games.	1.Mobility training 2. Stretching exercise TA/ Hamstrings, hip adductors, hip flexors, knee muscles of both side. 3.Gait training	1. Mobility training-GMTT (perambulation exs.). Also advice to use gaiters KAFO. Wall squatting. Emphasis on corner standing, wall standing, half kneeling alternatively on rt and lt foot. Backward crawling. In standing with wall, ask to lift object from floor. 2. Long sitting /supine lying. 3. Backward walking (20steps) 4. ADL board training, clay activity.	3 setsx10 reps each 3 setsx10 reps each 15 min. /session

								4.Grasping activities & Fine motor skills 5. Balance & coordination exs 6. ROM exs Hip, knee, ankle.	5 Emphasis on prone on all four with proper position. Emphasis on kneel standing, kneel walking and half kneeling. Single leg standing with chair support. Stepping over stick rt foot leading and then lt foot leading. Turing 360, placing alternate foot on stool. Reaching forward with outstretched arm. 6. Supine lying-ROM exs Hip, knee and ankle.	15 min. /session 15 min. /session 3 setsx10 reps each
16	Anuj kumar	1. Lt. Hip in external rotation, No heel strike 2. Wrist & fingers flexion left side. 3. Dependent in ADLs Activities. 4. Not able to attain quadruped position, kneel standing, Kneel walking and half kneeling. 5.Grade 1 spasticity in U/L & L/L Muscles (left)	Cerebral palsy (Hemi lt.)	Not using any aids and appliances.	1. Average class performance. 2. Child learns new physicalskills. 3.Cooperative child	1.To improve mobility especially walking, Gross motor skills like quadruped, kneeling, half kneeling, 2. Balance of the child. 3. To improve the ADLs skills. 4.To reduce the Spasticity in Upper limbs especially wrist, Lower limb	Participates occasionally in indoor / outdoor activities.	1.Mobility training- 2. Stretching exercise -TA/ Hamstrings, hip adductors, hip flexors, knee muscles, U/L Ms. of left side. 3.Gait training	1. Mobility training-Backward walking, Ask child to peruse Internal rotation hip exercise as advised. Use AFOs 2. Long sitting /supine lying. 3. Side walk on wall on left sides (20 steps). 4. ADL board training,	3 setsx10 reps each 3 setsx10 reps each

						muscles.(left)		4. Grasping activities & Fine motor skills 5.Balance & coordination exs 6. ROM exs Hip, knee, ankle.	clay activity, Use CIMT 5. Emphasis on prone on all four with proper position .Emphasis on kneel standing, kneel walking and half kneeling. Single leg standing with chair support. 6.Supine lying- ROM exs Hip, knee and ankle (LT)	15 min. /session 15 min. /session 3 setsx10 reps each
17	Vishal	1.Difficulty in ADLs activity 2.W- sitting present 3.Difficult in kneel standing/kneel walking/half kneeling 4.Squat to stand – difficult 5.Difficult in handling object 6.Poor balance 7.Tightness in TA(b/l),Hip adductors, hip flexors, knee flexors, knee extensors (B/L) –All b/l	CerebralPalsy with developmental delay with microcephaly.	Not using any aids and appliances. Carries out work with help of educator.	Average class performance. Withdrawn type of nature with teachers ,peer groups.	1. To improve mobility. 2.To Improve ADLs 3.To Reduce tightness/spasticity 4. To improve balance & ADLs skills. 5. To discontinue w sitting	No active participation in activities.	1.Mobility training 2. Stretching exercise -TA/ Hamstrings, hip adductors, hip flexors, knee muscles of both sides. 3.Grasping activities & Fine motor skills 4. Discontinue w sitting 5. Balance &	1. Mobility training-GMTT (pre ambulation ex 2. Long sitting /supine lying. 3. ADL board training, clay activity. 4. Discontinue w sitting by asking child to sit in cross leg. 5. Emphasis on prone on all four with proper position .Emphasis on kneel standing, kneel walking fwd and backward direction, and half kneeling. Single leg	3 setsx10 reps each 3 setsx10 reps each 15 min. /session 15 min. /session

								coordination exs	standing with chair support, standing with foot together, standing with one foot in front, retrieving objects from floor. wall squats.	15 min. /session
18	Manisha	1. Spasticity /Tightness in hip adductor (right), Hip extensors (right) and hip external rotators (rt). 2. Difficulty in jumping, poor proprioception. 3. Poor standing balance and single leg standing, not able to do straight line walking. 4.Handles objects but with some reduced quality	Cerebral Palsy spastic diplegic with MR	Not using any aids and appliances. Difficulty in playing activities and likes to have dance.	1. Below average class performance. 2. Cooperative nature.	1. To improve walking by improving Balance, coordination of the child. 2. To improve mobility (jumping) and fine motor skills. 3. To reduce the Spasticity/tightness in Lower limb muscles. 4. To improve gait.	Frequently participates in indoor/outdoor activities.	1.Mobility training 2. Stretching exercise - hip adductor (right), Hip extensors (right) and hip external rotators (rt). 3.Gait training 4. Grasping activities & Fine motor skills. 5. Balance & coordination exs	1. Mobility training- GMTT (jumping activities, putting alternate foot on steps. 2. Long sitting /supine lying. 3.Tandem walk, Backward walking (20steps) 4 Squeezing ball activities. 5. Emphasis on kneel walk, half kneeling. Single leg standing. Turning 360 degrees, tandem walking, hopping activities, kicking ball on rt and lt, jumping off simultaneously on both feet. 6. Supine lying- ROM	3 setsx10 reps each 3 setsx10 reps each. 3 setsx10 reps each 3 setsx10 reps each 15 min. /session

								6. ROM exs Hip, knee, ankle.	exs Hip, knee and ankle.	3 setsx10 reps each
19	Ishan	1. Foot deformity. 2. Dependent ADLs activities as in buttoning. 3.Spasticity /Tightness in TA(left), hip flexors left, hip extensors left , knee flexors b/l, knee extensor lt, sh flexors lt, sh ext lt, elbow flex lt, elbow extensor left, wrist flexors left ,wrist extensors lt and left foot goes into plantar flexion. 4. Manage standing, squatting and walking. 5.Running,jumping independtly with some difficulty 6. Poor coordination and balance 7. Poor fine motor skills.	Cerebral Palsy quadriplegia	Not using any aids and appliances.	Good class performance. Cooperative nature.	1. To make independent in gross motor skills as in running, jumping. 2. To improve walking by improving Balance, coordination of the child. 3. To reduce the Spasticity/tightness in upper, Lower limb muscles. 4. To improve gait and posture 5.To improve ADLs 6.To improve fine motor skills 7. To delineate deformity foot.	Frequently involved in school indoor and outdoor activities.	1.Mobility training- 2. Stretching exercise – TA(left), hip flexors left, hip extensors left ,knee flexors b/l, knee extensor lt, sh flexors lt, sh ext lt, elbow flex lt, elbow extensor left, wrist flexors left ,wrist extensors lt 3.Gait training 4. Posture training 5.Grasping activities & Fine motor skills 6.Balance & coordination exs	1. Mobility training- Hopping with alternate legs. jumping activities 2. Long sitting /supine lying. 3. Backward walking (20steps), walking over hurdles like stick. 4. Overhead activities to correct posture in long standing. Throwing ball in sitting/standing. 5. ADL board training, clay activity. 6. Emphasis on kneel standing, kneel walking and half kneeling. Single leg standing, kicking ball, hopping activities.	3 setsx10 reps each 3 setsx10 reps each 15 min. /session 15 min.

								7. ROMexs. Hip, knee, ankle. 8. Strengthening exercise for weak shoulder, elbow and wrist flexors.	Tandem walking. Placing alternate foot on stool, retrieving objects from floor, standing with eyes closed. 7.Supine lying-ROM exs Hip, knee and ankle 8. Strengthening exercise for shoulder, elbow and wrist muscles -Wall push ups.	/session 15 min. /session 3 setsx10 reps each 3 setsx10 reps each
20	Jeevanshu	1. Not able to walk independently. 2.Tightness in TA(b/l), hip flexors (b/l), hip, ext (b/l), hip add (b/l),Hip abd (b/l),Hip int rot (b/l, hip ext (b/l), knee flexors(b/l),knee extensors(b/l),shoulder flexors(b/l) ,shoulder extensor(b/l),elbow flexor b/l ,elbow extensor, wrist flexor(b/l)wrist extensors(b/l), pronators , supinator, finger flexors B/l). 3.Poor balance	Cerebral Palsy spastic quadriplegia with MR	Using wheelchair for mobility.	Poor class performance. Withdrawn kind of nature, non-cooperative.	1. To improve balance, mobility and reduce spasticity. 2. To improve gait. 3. To discontinue wrong postures and positions 4.To make him stand –wall standing, corner standing 5.To improve fine motor skills	Never participates in activities.	1.Mobility training- 2. Stretching exercise -TA/ Hamstrings, hip adductors, hip flexors, and knee muscles of both side and upper limb muscles. 3.Gait training 4. Posture training	1. Mobility training-GMTT (Bed mobility & perambulation exs.) 2. Long sitting /supine lying. 3. Emphasis on wall/corner standing if possible, wall walking should be started. 4. Overhead activities to correct posture in long sitting. Upper limb activities throwing ball in sitting. 5. Fine motor activities,	3 setsx10 reps each 3 setsx10 reps each 3 setsx10 reps each

		4.Poor ADLs 5.Poor posture						5. Grasping activities & Fine motor skills 6. Discontinue w sitting 7. Balance & coordination exs 8. ROM exs Hip, knee, ankle. 9.Strengthening exercise for weak shoulder, elbow and wrist flexors	clay activity. 6. Discontinue w sitting by asking child to sit in cross leg. 7. Emphasis on kneel standing, kneel walking and half kneeling. 8. Supine lying- ROM exs Hip, knee and ankle. 9. Shoulder Spirals-Hold both arms out horizontally to the side and start to circle them, initially making small circles but gradually getting larger until the circles are as large as possible. Wall Push Ups- Stand facing a wall about 1½ arms length away from it. Stretch your arms out in front (keeping them at shoulder level) to place your hands flat on thewall. Then bend your arms to try to bring yourface to the wall, without moving your feet. Keeping your body straight, straighten your arms, Pushing yourself away from the wall.	15 min. /session 15 min. /session 3 setsx10 reps each 3 setsx10 reps each

APPENDIX V TELEHEALTH USABILITY QUESTIONNAIRE (TUQ)

#	Statements	N/A	1 2 3 4 5 6 7
1.	Telehealth improves my access to healthcare services.	☐	DISAGREE ☐ ☐ ☐ ☐ ☐ ☐ ☐ AGREE
2.	Telehealth saves me time traveling to a hospital or specialist clinic.	☐	DISAGREE ☐ ☐ ☐ ☐ ☐ ☐ ☐ AGREE
3.	Telehealth provides for my healthcare need.	☐	DISAGREE ☐ ☐ ☐ ☐ ☐ ☐ ☐ AGREE
4.	It was simple to use this system.	☐	DISAGREE ☐ ☐ ☐ ☐ ☐ ☐ ☐ AGREE
5.	It was easy to learn to use the system.	☐	DISAGREE ☐ ☐ ☐ ☐ ☐ ☐ ☐ AGREE
6.	I believe I could become productive quickly using this system	☐	DISAGREE ☐ ☐ ☐ ☐ ☐ ☐ ☐ AGREE
7.	The way I interact with this system is pleasant.	☐	DISAGREE ☐ ☐ ☐ ☐ ☐ ☐ ☐ AGREE
8.	I like using the system.	☐	DISAGREE ☐ ☐ ☐ ☐ ☐ ☐ ☐ AGREE
9.	The system is simple and easy to understand.	☐	DISAGREE ☐ ☐ ☐ ☐ ☐ ☐ ☐ AGREE

10.	This system is able to do everything I would want it to be able to do.	☐	DISAGREE ☐ ☐ ☐ ☐ ☐ ☐ ☐ AGREE
11.	I can easily talk to the clinician using the telehealth system.	☐	DISAGREE ☐ ☐ ☐ ☐ ☐ ☐ ☐ AGREE
12.	I can hear the clinician clearly using the telehealth system.	☐	DISAGREE ☐ ☐ ☐ ☐ ☐ ☐ ☐ AGREE
13.	I felt I was able to express myself effectively.	☐	DISAGREE ☐ ☐ ☐ ☐ ☐ ☐ ☐ AGREE
14.	Using the telehealth system, I can see theclinician as well as if we met in person.	☐	DISAGREE ☐ ☐ ☐ ☐ ☐ ☐ ☐ AGREE
15.	I think the visits provided over the telehealth system are the same as in-personvisits.	☐	DISAGREE ☐ ☐ ☐ ☐ ☐ ☐ ☐ AGREE
16.	Whenever I made a mistake using the system, I could recover easily and quickly.	☐	DISAGREE ☐☐☐☐☐☐☐AGREE
17.	The system gave error messages that clearly told me how to fix problems.	☐	DISAGREE ☐☐☐☐☐☐☐AGREE
18.	I feel comfortable communicating with the clinician using the telehealth system.	☐	DISAGREE ☐☐☐☐☐☐☐AGREE

19.	Telehealth is an acceptable way to receive healthcare services.	☐	DISAGREE ☐☐☐☐☐☐☐AGREE
20.	I would use telehealth services again.	☐	DISAGREE ☐☐☐☐☐☐☐AGREE
21.	Overall, I am satisfied with this telehealth system.	☐	DISAGREE ☐☐☐☐☐☐☐AGREE

In this questionnaire, 1 - strongly disagree, 2 – disagree, 3 – somewhat disagree, 4 – neitheragree nor disagree, 5 – somewhat agree, 6 – agree, 7 – strongly agree

To determine the usability of the telehealth system, calculate the total and determine the averageof the responses to all statements. The higher the overall average, the higher the usability of the telehealth system.

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LIST OF PUBLICATIONS

Publication 1

Title	Current Profile of Physical Impairments in Children with Cerebral Palsy in Inclusive Education Settings: A Cross-Sectional Study
Journal	Journal of Neurosciences in Rural Practice
Indexing	Scopus Indexed
Status	Published

Publication 2

Title	The Content and Structure of Tele-physiotherapy module (i-TelePT) for the management of children with Cerebral Palsy in an inclusive educational settings: A Qualitative Study
Journal	European Journal of Molecular & Clinical Medicine
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Publication 3

Title	Efficacy of Tele-Rehabilitation for the Management of Physical Impairments of the Children with Cerebral Palsy in the Inclusive Educational Settings: A Protocol for a Systematic Review
Journal	Indian Journal of Public Health Research and Development
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Publication 4

Title	Telephysiotherapy as a Mode of Enhancing Motor Skills of Cerebral Palsy Children in School Settings: A Review
Journal	Indian Journal of Public Health Research and Development
Indexing	UGC
Status	Published

Publication 5

Title	Clinical feasibility of Inclusive Telephysiotherapy (i-TelePT) in therapeutic monitoring of the Physical Impairments in Children with Cerebral Palsy in an Inclusive Education Setting
Journal	NeuroQuantology
Indexing	Scopus Indexed
Status	Published

Publication 6

Title	Individualized Inclusive Telephysiotherapy (i-TelePT) Framework for Optimizing Rehabilitation Outcomes of Physical Impairments in Children with Cerebral Palsy in School Settings
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MANUSCRIPT PROOF

Current Profile of Physical Impairments in Children with Cerebral Palsy in Inclusive Education Settings: A Cross-Sectional Study

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J Neurosci Rural Pract

Abstract

Introduction Cerebral palsy (CP) excerpts a heterogeneous corral of neurological disorders occurring due to injury to the developing brain leading to motor dysfunctions. The CP children enjoy success and progress in normal school education and curriculum program. The principle of inclusive education has been acknowledged over recent decades in all countries supporting the schooling of children with disabilities into mainstream settings for constructing an inclusive society.

Objective The objective of this study was to determine the current status of physical impairments in children with CP in inclusive education settings in district Mandi, Himachal Pradesh.

Materials and Methods A survey using the physical examination of all CP children ($n = 20$) between the age group of 6 and 12 years in inclusive education settings with an organized interview of special educators in school settings was conducted. Descriptive analysis was conducted by using SPSS IBM 22.

Results A total of 20 CP children (11 boys and 9 girls, with the mean age of 9.8 ± 1.69) were enrolled in the study. Mean and standard deviation of Visual Analog Scale (6.5 ± 0.82), Pediatric Balance Scale (21.4 ± 17.1), Gross Motor Function Classification System, Expanded and Revised (2.8 ± 1.46), Manual Ability Classification System (2.5 ± 1.1), Gross Motor Function Measurement-88 (36.40 ± 22.94), and Goal Attainment Scale (35.9 ± 0.40) with the total WeeFIM score (75.7 ± 3.4) were analyzed as the score of all outcome measures.

Conclusion Right to Education act promotes the compulsory education of such children, and limiting disability by knowing the current profile of impairments could help in improving physical and functional status in children.

Keywords

- therapy programs
- neurological disorders
- inclusive education
- cerebral palsy
- rehabilitation
- ICF core sets
- spastic
- non-progressive motor disorder
- topographical

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The Content and Structure of Tele-physiotherapy module (i-TelePT) for the management of children with Cerebral Palsy in an inclusive educational settings: A Qualitative Study

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Abstract

Background: Preliminary evidence showed that school-based therapeutic interventions as related services implemented by special educators under s•R ervision of therapists Proclaims effectiveness to prevent physical ailments in Cerebral Palsy children. Apparently,barriers addressed by special educators in delivering physiotherapy sewices hinder the Progress of children in curricular & co-curricular activities. Assuming the barriers, •Recial educators intercepted about substitutive technological therapeutic approach delineating content and module of novelty in terms of inclusive TelephysiotheraRs (i-TelePT) to combat physical ailments in educational settings.

Purpose: To develop content and structure of i-TelePT module for treatment and monitoring the physical impairments in children with brain disorder i.e C.P through focus group discussions.

Method: Two FGDs (offline & online) were conducted with special educators. Inqualitative focus group study, a total of ten same special educators wereinvited for both face to face and online FGDs to gather an in-depth understanding of the rehabilitation needs of the children with CP in the inclusive educational settings using a semi-structured question sheet. The entire sessions of FGD were audiotaped in face to face and recorded via zoom app in online FGD and after that transcribed, coded and analyzed employing a thematic analysis model.

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Telephysiotherapy as a Mode of Enhancing Motor Skills of Cerebral Palsy Children in School Settings: A Review

Pardeep K. Pahwa and Suresh Mani

Abstract

Aim: The aim of this review article was to the discuss about role of telephysiotherapy for cerebral palsy children in school settings by searching all relevant data. **Method:** A total of 46 journal articles were selected first. With the different combinations of Key terms, articles were screened on relevance based on the inclusion and exclusion criteria which resulted in 11 articles for this review.**Results:** Various researchers reported the effect of telephysiotherapy on gross and fine motor skills along with ADLs in cerebral palsy children in school settings. **Conclusion:** Review of articles revealed that telephysiotherapy for Cerebral Palsy children is effective mode of treatment in enhancing motor skills along in educational settings.

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Key Words: Cerebral Palsy, Telerehabilitation, Virtual Reality, Physical, Technology

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Introduction

The Telerehabilitation is an emerging field and its scope is very vast in medical and other related fields, since it faces challenges related to both medical and community care settings. In the last few years, research has demonstrated the potential for improving telerehabilitation processes based not only on mobile technologies and the internet in general, but also on virtual reality. The aim of telerehabilitation is to provide rehabilitation services at a distance to help people to regain their psycho-physical functions through the use of new technologies. Medical telerehabilitation is more focused on curative medicine and involves intensively trained clinicians and different health professionals particularly physiotherapists (Thais et.al, 2014). Cerebral palsy is a neurodevelopment disorder characterized by movement and posture abnormalities. Incidence of CP in countries of the western world is approximately 2-3 per 1,000 births. Children with CP usually show signs of muscle weakness, sensory deficits as well as spasticity and accompanied by loss of functionality and dependence on others for many daily activities. Children with cerebral palsy, as well as other motor disabled individuals, have different motor abilities and thus the capabilities of learning a new skill (Josip et. al., 2016). A cure for CP, which means repair of the underlying brain damage, is not currently available; therefore, the management of children with CP usually focuses on maintaining and improving quality of life and function and preventing secondary complications. Patients with CP are at a high risk of developing musculoskeletal problems that are mainly related to physical growth, abnormal muscle tone, a weakness, lack of mobility, poor balance and loss of selective motor control. (Cristinia et al., 2016). Telerehabilitation techniques mimic virtual reality and rehabilitation for neurological conditions by using robotics and gaming techniques. Telerehabilitation allows for treatment of the acute phase of diseases by substituting the traditional face-to-face approach in the patient rehabilitation interaction (Alessandro et al., 2017). Families are choosing educational programming for their students that provide learning opportunities using

DOI Number: 10.37506/v11/i2/2020/ijphrd/194821

Efficacy of Tele-Rehabilitation for the Management of Physical Impairments of the Children with Cerebral Palsy in the Inclusive Educational Settings: A Protocol for a Systematic Review

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Abstract

Introduction: Cerebral palsy (CP) elucidates a group of permanent disorders of movement and posture disorders caused by non-progressive damage to developing brain with a prevalence rate of about 2-2.5 per 1000 live births in the world. Despite the effectiveness of tele-rehabilitation in various physical ailments, there is a paucity of the literature of tele-rehabilitation for CP in inclusive educational settings. Therefore, the aim of the present review is to identify the efficacy of tele-rehabilitation in limiting down and managing these physical impairments of CP children in educational settings.

Method and Analysis: This protocol for a systematic review is based on principles of the preferred reporting items for systematic reviews & meta-analysis protocols (PRISMA-P). Published literature in the English language on the efficacy of tele-rehabilitation in improving physical impairment among CP children between ages 3-18 years will be included in the review. The *electronic databases such as PubMed, Scopus, Pedro, EMBASE, and MEDLINE (Ovid) will be used for literature search* between 2000 to 2018 years. The *Rev Man 5.3 software will be used to extract the data.* Down and Black critical appraisal checklist will be employed to evaluate the risk of bias. The guidelines for grading of Recommendations, Assessment, Development, and Evaluation (GRADE) will be used to assess the quality of research evidence.

Ethics & dissemination: This review does not inculpate the collection of primary data, so no ethical approval is required for the study. Findings of the review will be disseminated through peer-reviewed publication and conference presentation. Criteria for the review were set a priori and the present protocol got registration from PROSPERO (International Prospective Register of Ongoing Systematic Review) with ID: 42019130555.

Keywords: *Tele-rehabilitation, Information and communication technology, inclusive education setting, videoconferencing and physiotherapy.*

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Introduction

Cerebral palsy (CP) is a group of non-progressive permanent movement and posture disorders caused by damage to developing the brain.[3] Globally, the prevalence of the CP is 2 to 2.5 per 1000 live births,

NeuroQuantology| | August 2022| Volume20 | Issue 8 | Page 10141-10153| doi: 10.48047/nq.2022.20.8.NQ221037
Pardeep K. Pahwa / Clinical feasibility of Inclusive Telephysiotherapy (i-TelePT) in therapeutic monitoring of the Physical Impairments in Children with Cerebral Palsy in an Inclusive Education Setting.

Clinical feasibility of Inclusive Telephysiotherapy (i-TelePT) in therapeutic monitoring of the Physical Impairments in Children with Cerebral Palsy in an Inclusive Education Setting

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[2]Lecturer in Physiotherapy, Composite Regional Centre (CRC) for Skill development, Rehabilitation &Empowerment of Persons with Disabilities, Sundernagar, Mandi, Himachal Pradesh(H.P),India, Department of Empowerment of Persons with Disabilities (Divyangjan),Ministry of Social Justice & Empowerment, Govt. of India.

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Abstract

Introduction Tele-physiotherapy has been shown to be beneficial in improving physical limitations in children with cerebral palsy. However, inclusive telephysiotherapy (i-TelePT) based monitoring and interventions for children with CP in school settings are scarce. This study aimed to assess the feasibility of a novel framework of i-TelePT for children with cerebral palsy in school settings in the Mandidistrict of Himachal Pradesh, India.

Methods A quasi-experimental study was conducted to assess the clinical feasibility of i-TelePT for children with CP (n=20) aged between 6-12 years in an inclusive education setting. The i-TelePT programme was delivered for one hour per session, for a total of 8 weeks, with the support of special educators.

Results The mean age of the participants in this study was 9.8±1.69.There was significant improvement in balance score ('t'= -3.976, SEM = 0.893, 'p' < 0.001). Similarly, in the pain intensity, a statisti- cally significant improvement as compared with the baseline (p<0.001).Pre and post intervention score of motor functions demonstrated with a mean difference score -9.7±7.6 (p<0.001). MACS score (z value = -3.3 and p value ≤ 0.001 and GMFCS score (z value= -2.236 and p value ≤ 0.025) was also found statistical significant respectively. There was improvement in spasticity measured on MAS in all lower limb muscles with a statistical significant score (p value ≤ 0.001) except external and in- ternal rotators of hip as well as knee flexors on left side (p value > 0.05). There was no improvement in of upper limbs of both sides (p value > 0.05). Significant improvement in WeeFIM function inde-

LIST OF CONFERENCE PRESENTATIONS

1. Research Paper titled "International Conference on expanding domains of Physiotherapy" presented in international conference (12-13th April) 2019 held at LPU, Punjab.

2. Research e-Paper presented in 3rd international conference of physiotherapy professionals and students in PhysioHarcon (26th Sept.2020).

3. Research Poster titled "Current Profile of Physical Impairments in children with Cerebral Palsy in Inclusive education setting in Himachal Pradesh" presented in international conference on (21-22 Dec.) 2019 at AIIMS, Delhi.

Conference presentation –Proof

10/18/2020 PARDEEP.JPG

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Haryana Chartered Association of Physiotherapists (Regd.)

in collaboration with

Jagannath University, Bahadurgarh, Haryana, India

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This is to Certify that

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Theme:- Independent Professional Practice- Autonomy through Innovation

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Issued on:-30/09/2020

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This is to certify that Dr./Mr./Ms. **Pardeep K. Pahwa**

has participated in Poster Presentation / Paper Presentation in the **"International Conference on Expanding Domains of Physiotherapy"** held from 12th to 13th April 2019, organized by School of Physiotherapy and Paramedical Sciences, Lovely Professional University, Punjab.

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Scientific Paper/Poster titled Current profile of physical impairments in children with Cerebral Palsy in inclusive education setting in Himachal Pradesh

in Senior/Junior category and was adjudge First/ Second/ Third / at
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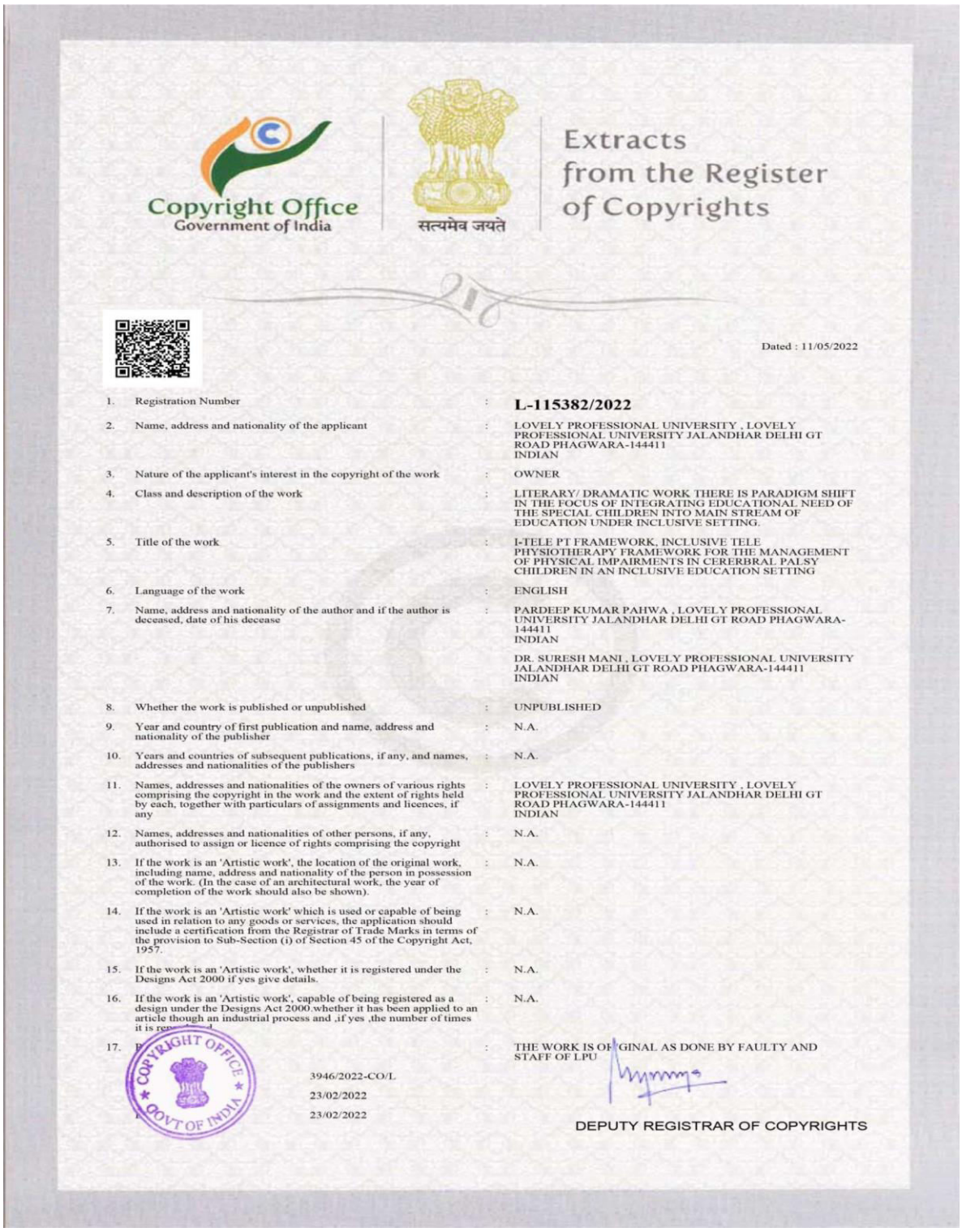

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5.	Title of the work	:	I-TELE PT FRAMEWORK, INCLUSIVE TELE PHYSIOTHERAPY FRAMEWORK FOR THE MANAGEMENT OF PHYSICAL IMPAIRMENTS IN CERERBRAL PALSY CHILDREN IN AN INCLUSIVE EDUCATION SETTING
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BUDGETING & FUNDING

The Project on inclusive telephysiotherapy was self funded by the researcher and no grants or sponsorships was sought /provided by the university or any external agency. The expenditure detailed for the research project is shown here;

S.No	Item	Cost
1	Designing of i-TelePT website (2023-24)	US$131.88
2	Designing of i-TelePT website (2020-23)	US$ 95.40
3	Zoom Application (Paid version)	US$14.15
	Total	US$241.43

Taxes, Fees & Other Charge Details

CHARGE NAME	TAX, FEE OR SURCHARGE NAME	JURISDICTION	CHARGE AMOUNT	TAX, FEE OR OTHER CHARGE AMOUNT
Discount	IGST (Communications) 18.000%	Federal	($3.00)	($0.54)
Standard Pro Monthly	IGST (Communications) 18.000%	Federal	$14.99	$2.70
			Total Tax	$2.16

Transactions

Invoice Total	**$14.15**

TRANSACTION DATE	TRANSACTION NUMBER	TRANSACTION TYPE	DESCRIPTION	APPLIED AMOUNT
Oct 1, 2021	P-121929118	Payment		($14.15)
			Invoice Balance	**$0.00**

Payment Details

Payment Method:

Status: Paid

Transaction Type: PayPal - [sumitarora.kp@gmail.com]

Receipt Details

Invoice Number: 74141881

Date: 23 March 2023

Description	Domain	Term	Expiration	Price
SiteLock Security - Free	itelept.com	0 month	23 March 2024	$0.00
Basic	itelept.com	12 months	23 March 2024	$131.88

SiteLock Security - Free

Domain itelept.com

Tax Invoice

Original for Recipient and Duplicate for Supplier

zoom

Zoom Video Communications Inc.
55 Almaden Blvd, 6th Floor
San Jose, CA 95113

Invoice Date:	Oct 1, 2021
Invoice #:	INV110554629
Payment Terms:	Due Upon Receipt
Due Date:	Oct 1, 2021
Account Number:	3004665337
Currency:	USD
Account Information:	iTELEPT

Zoom GSTIN: 9921USA29007OSG

Name of Consignee (Place of supply):	Pardeep Pahwa COMPOSITE REGIONAL CENTRE FOR PERSONS WITH DISABILITIES,NEAR MAHAMAYA TEMPLE, SUNDERNAGAR, HIMACHAL PRADESH 175018 (State Code: 2) India
	pardeep_pahwa@yahoo.com
Name of Recipient (Billed to):	Pardeep Pahwa COMPOSITE REGIONAL CENTRE FOR PERSONS WITH DISABILITIES,NEAR MAHAMAYA TEMPLE, SUNDERNAGAR, HIMACHAL PRADESH 175018 (State Code: 2) India

Purchase Order Number:

Customer GSTIN:
Customer PAN:

Whether tax is payable on reverse charge basis - No.

Zoom W-9

Question about your Digital Signature?

Receipt Details

Invoice Number: 52821856

Date: 23 March 2020

Description	Domain	Term	Expiration	Price
Basic Web Hosting	itelept.com	36 months	23 March 2023	$95.40
SiteLock Security - Free	itelept.com	36 months	23 March 2023	$0.00

Basic Web Hosting

Domain itelept.com

Term 36 months

Expiration 23 March 2023

Price $95.40

MASTER CHART- I

Name	Code	School Name	Block	Special edu	Std	Sex	Age	Ht. Cms	Wt. (Kg)	Econ. status	C.P Subtype	Qualification of mother	Qualification of father	Occupation of father	Occupation of mother	Disability %	Aids & appliances	Language spoken	Birth history	Delivery by	Pre comp	Peri comp	Post comp	Rehab.
Tilak Raj	1	G.P.S Tipridhar	Janjheli	Mrs Sunanada	4	M	8	125	9	< 1 lacs	Spastic Diplegic	Middle	Middle	Farmer	Farmer	75%	Wheelchair	Hindi	Premature	Midwife	Anemia	No	Jaundice	yes
Priya	2	G.M.S Jathou	Karsog	Mrs Bhart Sharma	6	F	10	117	26	< 1 lacs	Rt. Hemiplegic	secondary	secondary	Farmer	House wife	50%	No aids	Hindi	Postterm	Midwife	NO	No	Delayed birth cry	no
Rohit Kumar	3	G.S.S.S Khaneol Bagra	Karsog	Mrs Bhart Sharma	8	M	12	127	37	< 1 lacs	Spastic diplegic	secondary	secondary	Farmer	Anganwari worker	75%	Crutches	Hindi/ Himachli	Term	Midwife	No	No	Delayed birth cry	no
Dimple	4	G.M.S Bagail	Karsog	Mrs Bhart Sharma	6	M	10	120	29	< 1 lacs	Spastic diplegic	higher secondary	higher secondary	Farmer	Housewife	75%	Rollator	Himachli	Premature	Nurse	No	yes,Birth aspyxia	No	Yes
Reetu	5	G.S.S.S Porla	Karsog	Mrs Bhart Sharma	6	F	10	120	25	< 1 lacs	Rt.Hemiplegic	Middle	higher secondary	Farmer	Housewife	50%	No	Hindi	Term	Doctor	No	No	No	Yes
Sonam	6	G.P.S Mamel	Karsog	Mrs Bharti Sharma	5	F	10	109	23	< 1 lacs	Quadriplegic	higher secondary	Post graduation	Farmer	Housewife	100%	Wheelchair	Hindi/ Himachli	Term	Doctor	No	No	Delayed birth cry	Yes
Sumit Saini	7	G.P.S Khandla	Balh	Mr. Anuj Soni	2	M	6	90	18	< 1 lacs	Spastic Diplegic	secondary	higher secondary	Private job	Housewife	75%	Rollator	Himachli	Premature	Doctor	No	No	Delayed Birth cry,Jaundice	Yes
Purva Thakur	8	G.P.S Sainji	Balh	Mr. Anuj Soni	4	F	10	112	22	<2 Lacs	Spastic Triplegic	higher secondary	higher secondary	mechanic operator	Housewife	75%	C.P Chair	Hindi	Premature	Doctor	hypotension	no	LBW	Yes
Mokshita	9	G.P.S Paurakothi	SNR	Mrs Upasana Verma	2	F	7	102	12	< 1 lacs	Spastic Quadriplegic	higher secondary	graduation	Operator	Housewife	80%	Wheelchair	Hindi	Premature	Doctor	Anemia	No	No	yes
Mauryansh	10	G.S.S.S Badog	Sadar Mandi	Mrs Reena Sharma	8	M	12	142	50	5-10 Lacs/annum	Spastic Quadriplegic	Post graduation	Post graduation	Govt. Job	Housewife	100%	Wheelchair	Hindi	Premature	Doctor	No	Caesarian del.	Birth Asphyxia	Yes
Nishant	11	G.P.S Chai Ka	SNR	Mrs Suraksha	5	M	9	122	32	<2 Lacs	Spastic	secondary	secondary	Shopkeeper	Housewife	100%	C.P Chair	Hindi	Term	Doctor	Muco	No	Birth asphyxia	Yes

		Dhora		Thakur																				
Shubham	12	G.M.S Gamohu	SNR	Mrs Monika	5	M	9	134	25	< 1 lacs	Paraplegic	secondary	secondary	Driver	Housewife	75%	Crutches	Hindi	Premature	Doctor	No	Prolonged Labour	Delayed Birth cry	yes
Shanvi Gupta	13	G.P.S Ratti	Balh	Anuj Soni	2	F	9	115	20	<2 Lacs	Spastic diplegic	graduation	graduation	Private job	Housewife	72%	Rollator	Hindi	Term	Doctor	Yes ,Fever	No	Fever	Yes
Sabnam Verma	14	G.M.S Sadoh	G.Pur-1	Ms. Kavita Guleria	8	F	12	126	26	< 1 lacs	Spastic diplegic	Uneducated	higher secondary	Water guard	Housewife	75%	Rollator	Hindi	Term	Midwife	No	No	Jaundice	Yes
Riya Kumari	15	G.M.S Kehri	G.Pur-2	Ms. Kavita Guleria	7	F	11	122	28	< 1 lacs	Spastic diplegic	secondary	secondary	Driver	Housewife	50%	No	Hindi	Term	Doctor	Hypertension	No	Delayed birth cry	Yes
Anuj kumar	16	G.C.P.S Trifalghat	G.Pur 2	Ms. Kavita Guleria	4	M	8	120	22	< 1 lacs	Lt.Hemiplegic	secondary	secondary	Farmer	Housewife	72%	No	Hindi	Term	Midwife	No	No	Delayed birth cry	Yes
Vishal	17	G.M.S, Dodwan	SNR	Mrs Sheetal	6	M	12	122	35	< 1 lacs	Cerebral Palsy	Middle	Middle	Barbar	Housewife	90%	No	Himachli	Premature	Midwife	No	prolog labour pain	LBW	yes
Manisha	18	G.S.S.S Majhiath	G.Pur - 2	Ms.Kavita Guleria	7	F	11	122	20	< 1 lacs	Spastic diplegic	secondary	secondary	Labourer	Housewife	50%	No	Hindi	Term	Midwife	No	No	jaundice,LBW	yes
Ishan	19	G.M.S.S Dodwan	SNR	Mrs. Sheetal	6	M	11	145	50	< 1 lacs	Spastic Quadriplegic	secondary	graduation	Private job	Housewife	60%	No	Hindi	Term	Doctor	No	Prolong labour pain	Others	Yes
Jeevanshu	20	G.P.S Dugain	Gohar	Mrs. Meena	3	M	10	115	20	< 1 lacs	Spastic Quadriplegic	secondary	higher secondary	Farmer	Housewife	100%	Wheelchair	Himachli	Term	Midwife	NO	Sudden birth	NO	yes

MASTER CHART-II

Pre and Post Teleassessment data (Outcome Measures)

Name	Code	PBS_Pre	PBS _Post	MACS_Pre	MACS_ Post	GMFM88_ Pre	GMFM-88_ Post	GAS_Pre	GAS_Post	VAS_Pre	VAS_Post
Tilak Raj	1	6	4	2	2	42.78	40.75	35.8	56.99	7	4
Priya	2	30	30	3	2	66.63	80.30	35.8	57.14	7	4
Rohit	3	46	55	1	1	92.77	97.22	36.9	61.1	6	1
Dimple	4	24	25	2	1	59.70	76.99	36.4	63.2	6	2
Reetu	5	46	51	2	1	85.68	94.37	35.8	61.0	7	2
Sonam	6	5	6	3	3	45.85	50.45	36.5	38.7	6	3
Sumit Saini	7	11	18	1	1	58.55	69.56	35.8	62.89	7	3
Purva	8	3	3	2	2	23.00	22.69	35.6	35.63	6	6
Mokshita	9	2	3	2	2	31.89	37.02	35.8	52.47	6	4
Mauryansh	10	5	6	2	2	47.85	53.84	35.6	63.57	7	5
Nishant	11	1	1	5	4	17.39	22.53	35.8	39.68	7	5
Shubham	12	4	7	4	3	52.48	62.19	35.8	62.3	6	4
Shanvi	13	29	33	2	1	74.40	87.05	35.8	63.5	7	5
Sabnam	14	20	31	4	3	38.97	71.13	35.8	61.44	8	4
Riya	15	36	49	1	1	86.85	92.84	36.5	61.9	8	1
Anuj	16	26	30	4	3	43.86	59.73	35.8	56.45	7	3
Vishal	17	23	27	3	2	46.87	62.63	35.8	57.85	6	2
Manisha	18	52	55	2	1	94.80	96.38	36.9	63.19	5	2
Ishan	19	47	53	2	1	78.79	93.94	35.8	63.18	5	3
Jeevanshu	20	12	12	4	4	38.97	51.12	35.8	43.02	6	5

WeeFIM Pre and Post data

WeeFIM_Sub	WeeFIM_SelfCare_Pre	SelfCare_Post	Sphinctercontrol_Pre	Sphinctercontrol_Post	Transfers_Pre	Transfers_Post	Locomotion_Pre	Locomotion_Post	Communication_Pre	Communication_Post	SocialCogn_Pre	SocialCogn_Post
Code1	15	13	5	6	7	6	7	6	6	6	8	8
Code2	23	25	9	12	17	18	11	12	11	11	16	16
Code3	34	35	21	21	21	21	13	14	14	14	19	19
Code4	21	26	9	11	7	10	5	7	10	12	13	13
Code5	30	30	18	19	18	18	12	13	14	14	21	21
Code6	12	12	3	3	3	3	2	3	8	8	14	15
Code7	22	26	9	9	9	11	4	9	12	12	17	18
Code8	16	17	3	3	6	5	3	3	10	10	16	16
Code9	8	8	3	3	3	4	3	3	9	10	17	17
Code10	22	23	14	15	14	14	3	4	12	12	19	19
Code11	5	5	3	3	3	3	2	3	6	6	5	5
Code12	20	22	3	3	3	3	2	2	10	10	14	14
Code13	21	27	9	12	14	17	10	13	12	12	18	18
Code14	10	19	3	9	4	12	7	9	7	8	14	14
Code15	33	34	21	21	21	21	13	14	14	14	21	21
Code16	11	11	11	12	15	17	8	10	14	14	9	11
Code17	12	17	9	9	7	9	6	7	8	8	10	10
Code18	35	35	21	21	21	21	14	14	14	14	18	19
Code19	30	30	21	21	21	21	14	14	14	14	19	21
Code20	30	30	14	14	15	15	7	8	10	10	17	18

CPQoL Pre and Post tele data

CPQoL	Socialwelbeing_Pre	Socialwelbeing_Post	Functioning_Pre	Functioning_Post	Participation_Pre	Participation_Post	Emotionalwelbeing_Pre	Emotionalwelbeing_Post	Acessservice_Pre	Acessservice_Post	Painimpactdisability_Pre	Painimpactdisability_Post	Familyhealth_Pre	Familyhealth_Post
Code1	27.08	31.25	35.41	36.45	30.68	31.81	31.25	31.25	36.45	37.5	28.12	26.56	31.25	31.25
Code2	68.7	68.7	67.7	70.83	69.3	69.3	68.7	68.7	59.3	68.75	59.3	59.3	71.8	71.8
Code3	94.7	87.5	78.12	85.41	71.59	77.27	70.8	77.08	70.8	73.95	62.5	62.5	78.1	84.37
Code4	53.12	60.41	57.2	64.58	43.1	52.27	58.3	62.5	56.2	64.58	51.5	57.81	59.3	68.75
Code5	83.3	87.5	73.1	85.42	81.8	86.36	77	77.08	72.9	77.08	73.4	73.44	75	78.12
Code6	33.3	34.37	33.3	35.41	27.2	27.27	33.3	35.41	35.4	36.45	39	47.91	56.2	56.25
Code7	63.5	69.79	65.6	67.7	51.1	55.68	37.5	50	47.9	56.25	53.1	51.56	71.9	71.87
Code8	54.1	57.29	48.9	52.08	45.4	50	47.9	50	41.7	43.75	43.7	48.43	48.1	62.5
Code9	43.7	54.16	35.4	42.7	37.5	40.9	45.8	50	41.7	48.95	37.5	50	50	53.12
Code10	43.7	52.08	55.2	56.25	34	38.63	50	56.25	37.5	38.54	37.5	42.18	75	75
Code11	14.6	19.79	0	12.5	3.4	5.68	14.6	14.58	2.08	13.54	1.5	10.41	40.06	50
Code12	50	58.33	44.8	52.08	44.3	47.72	43.7	54.16	52.08	54.8	45.3	48.43	62.5	62.5
Code13	59.3	65.62	68.7	71.87	57.9	62.5	66.6	70.87	64.5	69.79	59.3	57.81	78.1	78.12
Code14	43.5	56.25	35.4	46.87	26.1	44.31	45.8	52.08	41.6	53.12	42.1	43.75	53.1	62.5
Code15	77.08	80.45	73.9	78.12	65.9	78.4	75	81.25	61.4	77.08	53.1	57.81	68.7	75
Code16	45.8	48.95	52	58.33	50	51.13	62.5	62.5	51.04	65.62	39.6	39.06	53.1	56.25
Code17	48.9	53.12	50	55.2	36.3	45.45	37.5	50	44.7	50	32.8	45.31	50	53.12
Code18	82.2	85.41	72.9	77.08	73.8	78.4	70.8	75	69.7	75	54.6	54.68	78.1	78.12
Code19	63.5	69.79	66.6	72.91	70.4	69.31	77.08	81.25	73.9	76.04	54.68	50	71.87	75
Code20	54.1	54.1	44.8	40.62	57.9	57.9	45.8	45.8	52.08	44.79	59.3	57.81	62.5	59.37

MAS Pre & Post assessment L/L data

Code	TA_R_Pre	TA_R_Post	TA_L_Pre	TA_L_Post	HIPFL_R_Pre	HIPFL_R_Post	HIPFL_L_Pre	HIPFL_L_Post	HIPEX_R_Pre	HIPEX_R_Post	HIPEX_L_Pre	HIPEX_L_Post	HIPADD_R_Pre	HIPADD_R_Post	HIPADD_L_Pre	HIPADD_L_Post	HIPABD_R_Pre	HIPABD_R_Post	HIPABD_L_Pre	HIPABD_L_Post	HIPIR_R_Pre	HIPIR_R_Post	HIPIR_L_Pre	HIPIR_L_Post	HIPER_R_Pre	HIPER_R_Post	HIPER_L_Pre	HIPER_L_Post	KNEEFL_R_Pre	KNEEFL_R_Post	KNEEFL_L_Pre	KNEEFL_L_Post	KNEEEX_R_Pre	KNEEEX_R_Post	KNEEEX_L_Pre	KNEEEX_L_Post
1	1	1	1	1	1	1	1	1	2	1	1	1	2	1	1	1	1	0	1	0	2	1	2	1	0	1	0	1	1	1	0	1	0	0	0	0
2	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0
3	0	0	4	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1	1	0	0	0	0
4	3	3	3	3	1	0	1	0	0	0	0	0	1	1	1	1	1	0	0	0	2	1	1	1	1	1	1	1	3	3	3	3	1	1	1	1
5	2	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	5	4	4	4	4	4	4	4	4	4	4	4	4	3	4	3	4	0	4	0	0	0	0	0	0	0	0	0	3	3	4	3	4	3	3	0
7	4	3	3	2	1	1	2	1	1	1	1	1	2	1	2	1	1	0	1	0	0	0	0	0	0	0	0	0	3	1	2	1	2	1	1	1
8	3	3	3	3	2	1	3	3	0	0	0	0	3	3	4	3	3	3	1	1	2	1	1	1	0	1	0	1	3	3	3	3	3	3	1	2
9	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0	1	0	1	0	1	1	1	1	1	0	1	0	1	1	1	1	1	0	2	0
10	2	1	2	1	0	0	0	0	0	0	0	0	2	1	2	1	1	0	1	0	0	0	0	0	0	0	0	0	3	2	3	2	3	0	2	0
11	4	4	3	3	4	4	3	3	0	0	0	0	4	4	4	4	4	0	3	0	3	3	3	3	3	3	0	3	4	3	4	3	3	0	3	0
12	4	3	4	3	3	1	3	1	0	0	0	0	3	1	3	1	3	0	3	0	0	0	0	0	0	0	0	0	4	3	4	3	3	0	2	0
13	1	1	1	0	1	0	1	0	2	0	2	0	0	0	1	0	1	0	1	0	2	1	1	1	2	0	2	0	2	1	2	1	1	0	1	0
14	2	1	3	1	1	0	1	0	0	0	2	0	2	1	3	1	1	0	1	0	1	1	3	1	1	1	1	1	1	1	1	1	1	0	2	0
15	3	1	3	1	3	1	3	1	3	0	3	0	2	1	3	1	3	0	3	0	1	0	1	0	1	0	2	0	3	1	3	1	2	0	2	0
16	0	0	2	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	0	0
17	1	0	1	0	1	0	1	0	1	0	1	0	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	0
18	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
19	1	0	1	1	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	1	0
20	3	3	3	3	3	3	3	3	3	0	3	0	1	1	1	1	1	0	1	0	3	3	3	3	3	0	3	0	4	3	4	3	3	0	3	0

MAS Pre and Post tele MAS U/L data

Code	SHFLEX_L_Pre	SHFLEX_L_Post	SHFLEX_R_Pre	SHFLEX_R_Post	SHEXT_L_Pre	SHEXT_L_Post	SHEXT_R_Pre	SHEXT_R_Post	ELBFL_L_Pre	ELBFL_L_Post	ELBFL_R_Pre	ELBFL_R_Post	ELBEX_L_Pre	ELBEX_L_Post	ELBEX_R_Pre	ELBEX_R_Post	WRFL_L_Pre	WRFL_L_Post	WRFL_R_Pre	WRFL_R_Pre	WREX_R_Pre	WREX_R_Post	WREX_L_Pre	WREX_L_Post	PRON_L_Pre	PRON_L_Post	PRON_R_Pre	PRON_R_Post	SUP_L_Pre	SUP_L_Post	SUP_R_Pre	SUP_R_Post	FINGFL_R_Pre	FINGFL_R_Post	FINGFL_L_Pre	FINGFL_L_Post
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	2	3	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0	0	1	1	1	1	1	0	1	0	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
19	1	0	0	0	1	0	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
20	3	3	1	1	1	1	1	1	3	3	3	3	3	2	3	2	2	2	2	2	1	0	1	0	1	1	1	1	1	0	1	1	2	2	2	2

Final attendance offline (Asynchronous) Mode

Date	Mauryansh	Shubham	Jeevanshu	Riya	Sabnam	Manisha	Anuj	Vishal	Ishan	Sumit	Sanvi	Purva	Mokshita	Tilakraj	Rohit	Sonam	Priya	Dimple	Reetu	Nishant
10-09-2021	A	A	P	A	A	A	A	A	A	A	A	A	P	A	A	A	A	P	A	A
11-09-2021	A	A	P	A	A	A	A	P	A	A	A	A	P	A	A	A	A	P	A	A
12-09-2021	A	A	A	A	A	A	P	P	P	A	A	A	P	P	A	A	A	P	P	A
13-09-2021	A	A	A	A	A	A	P	A	P	A	A	A	P	P	A	A	A	P	P	P
14-09-2021	P	A	P	A	A	A	P	A	P	A	A	A	P	P	A	A	A	P	P	P
15-09-2021	P	P	P	A	A	A	P	P	P	P	A	A	P	P	P	A	P	A	P	P
16-09-2021	P	P	A	P	P	A	P	P	P	P	P	A	P	P	P	P	A	P	P	P
17-09-2021	P	P	P	A	P	P	P	A	P	P	A	P	A	P	P	P	P	A	P	P
18-09-2021	P	P	P	P	P	P	P	P	A	P	P	P	P	A	P	P	P	P	A	A
19-09-2021	P	P	A	P	A	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P
20-09-2021	A	A	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
21-09-2021	P	P	P	P	P	P	P	P	P	P	A	P	P	P	A	P	P	P	P	P
22-09-2021	P	P	P	P	A	P	P	P	P	A	A	P	P	P	P	A	P	P	P	A
23-09-2021	P	P	P	P	P	A	P	P	P	P	P	A	P	P	A	P	P	P	P	P
24-09-2021	P	P	A	P	P	P	P	A	P	P	P	P	A	P	P	P	P	A	P	P
25-09-2021	P	P	P	P	P	P	A	P	P	P	P	P	P	A	P	P	P	P	A	A
26-09-2021	P	P	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
27-09-2021	A	A	A	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P
28-09-2021	P	P	P	A	P	P	P	P	P	A	P	P	P	P	A	P	P	P	P	P
29-09-2021	P	P	A	P	A	P	P	P	P	P	A	P	P	P	P	A	P	P	P	P
30-09-2021	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P	P	A	P	P	P
01-10-2021	P	P	P	P	A	P	P	A	P	P	P	P	A	P	P	P	P	P	P	P
02-10-2021	P	P	P	P	A	P	A	A	A	P	A	P	P	A	P	A	P	P	A	A
03-10-2021	P	P	A	P	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P
04-10-2021	A	A	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
05-10-2021	P	P	P	A	P	P	P	P	P	A	P	P	P	P	A	P	P	P	P	P
06-10-2021	P	P	P	P	A	P	P	P	P	P	A	P	P	P	P	A	P	P	P	P
07-10-2021	A	P	P	P	P	A	P	P	P	P	P	A	P	P	P	P	A	P	P	P
08-10-2021	P	P	P	P	A	P	P	A	P	P	A	A	A	P	P	P	P	A	P	P
09-10-2021	A	P	P	A	A	A	P	A	P	P	A	A	P	A	P	P	P	P	A	A
10-10-2021	P	P	A	P	P	P	P	P	P	P	A	A	P	P	P	P	P	P	P	P
11-10-2021	A	A	A	P	P	P	P	P	P	P	P	P	P	A	P	A	P	P	P	P
12-10-2021	A	P	P	A	P	P	P	P	P	P	P	P	P	P	A	P	P	P	P	P
13-10-2021	A	A	P	P	A	P	P	P	P	P	A	P	P	P	P	A	P	A	P	P
14-10-2021	A	A	P	A	P	A	P	A	A	A	A	A	A	A	A	P	A	P	P	A

15-10-2021	P	P	A	P	P	P	P	A	P	P	A	A	P	P	P	P	P	A	P	P
16-10-2021	P	P	P	P	P	A	A	P	A	P	A	A	A	A	P	A	P	P	A	A
17-10-2021	P	P	A	P	A	P	P	P	P	P	A	A	P	P	A	P	P	P	P	P
18-10-2021	P	A	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
19-10-2021	P	P	P	P	P	P	P	P	P	A	A	A	P	P	A	P	P	P	P	P
20-10-2021	P	P	P	P	A	A	P	P	P	P	A	P	P	P	P	A	P	P	A	P
21-10-2021	P	P	P	P	A	A	P	P	P	A	P	A	P	P	P	A	A	P	P	P
22-10-2021	P	P	P	A	A	P	P	A	P	P	P	A	A	P	P	P	P	A	P	P
23-10-2021	P	P	P	P	A	P	A	P	A	P	P	P	P	A	P	P	A	P	A	A
24-10-2021	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
25-10-2021	A	A	A	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
26-10-2021	P	P	P	A	P	P	P	P	P	A	P	P	P	P	A	P	P	P	P	P
27-10-2021	P	P	P	P	A	P	P	P	P	P	A	P	P	P	P	A	P	A	P	P
28-10-2021	P	P	P	P	P	A	P	P	A	P	P	A	P	P	P	P	A	P	P	P
29-10-2021	P	A	P	P	P	P	P	A	P	P	P	P	A	P	P	P	P	A	P	P
30-10-2021	P	P	P	P	P	P	A	P	A	P	P	P	P	A	P	P	P	P	A	A
31-10-2021	P	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	P
01-11-2021	A	A	A	P	P	P	P	P	P	P	A	P	P	P	P	P	P	P	P	P
02-11-2021	P	P	P	A	P	P	P	P	P	A	P	A	P	P	A	P	P	P	P	P
03-11-2021	P	P	P	P	A	P	P	P	P	P	A	P	P	P	P	A	P	P	P	P
04-11-2021	P	P	P	P	A	A	P	P	P	P	P	A	P	P	P	P	A	P	P	P
	P=40	**P=39**	**P=36**	**P=39**	**P=31**	**P=37**	**P=47**	**P=41**	**P=45**	**P=41**	**P=28**	**P=31**	**P=45**	**P=43**	**P=39**	**P=37**	**P=41**	**P=45**	**P=44**	**P=43**
	A=16	**A=17**	**A=20**	**A=17**	**A=25**	**A=19**	**A=9**	**A=15**	**A=11**	**A=15**	**P=28**	**A=25**	**A=11**	**A=13**	**A=17**	**A=19**	**A=15**	**A=11**	**A=12**	**A=13**

Final attendance offline (Percentage)

Participants	**Visited i-TelePT webpage (Attendance)**	**Total no.of days**	**Percentage**
Mauryansh	40	56	71.42857143
Shubham	39	56	69.64285714
Jeevanshu	36	56	64.28571429
Riya	39	56	69.64285714
Sabnam	31	56	55.35714286
Manisha	37	56	66.07142857
Anuj	47	56	83.92857143
Vishal	41	56	73.21428571
Ishan	45	56	80.35714286
Sumit	41	56	73.21428571
Sanvi	28	56	50
Purva	31	56	55.35714286
Mokshita	45	56	80.35714286
Tilakraj	43	56	76.78571429
Rohit	39	56	69.64285714
Sonam	37	56	66.07142857
Priya	41	56	73.21428571
Dimple	45	56	80.35714286
Reetu	44	56	78.57142857
Nishant	43	56	76.78571429
MEAN	**39.6**	**Average**	**70.71428571**
MEDIAN	**40.5**		
MODE	**39**		
STD DEV	**5.133994034**		

Final attendance online (synchronous) Mode

Name of child	**Sep 10**	**Sept 17**	**Sept 24**	**Oct 1**	**Oct 8**	**Oct 15**	**Oct 22**	**Oct 29**
Friday								
Vishal 10:00-11:00 AM	✓	✓	✓	✓	✓	✓	✓	x
Dimple 11:00-12:00 AM	✓	✓	✓	✓	✓	✓	✓	x
Mokshita 12:00-1:00 PM	✓	✓	✓	✓	x	x	✓	✓
	Sept 11	**Sept 18**	**Sept 25**	**Oct 2**	**Oct 9**	**Oct 16**	**Oct 23**	**Oct 30**
Saturday								
Anuj 10:00-11:00 AM	✓	✓	✓	✓	✓	✓	x	✓
Ishan 11:00-12:00 AM	✓	✓	✓	✓	✓	✓	✓	✓
Tilakraj 12:00-1:00 PM	✓	✓	✓	✓	✓	✓	✓	x
Reetu 1:00-2:00 PM	✓	✓	✓	x	✓	✓	x	x
Nishant 2:00-3:00 PM	✓	✓	✓	x	x	x	x	x
Sunday								
	Sept 13	**Sept 20**	**Sept 27**	**Oct 4**	**Oct 11**	**Oct 18**	**Oct 25**	**Nov 1**
Monday								
Mauryansh 10:00-11:00 AM	✓	✓	✓	✓	✓	✓	✓	✓
Shubham 11:00-12:00 AM	✓	✓	✓	✓	✓	✓	✓	✓
Jeevanshu 12:00-1:00 PM	✓	x	x	x	x	x	x	x
	Sept 14	**Sept 21**	**Sept 28**	**Oct 5**	**Oct 12**	**Oct 19**	**Oct 26**	**Nov 2**
Tuesday								

Riya	10:00-11:00 AM	✓	✓	✓	✓	✓	✓	✓	✓
Rohit	11:00-12:00 AM	✓	✓	✓	✓	✓	✓	✓	✓
Sumit	12:00-1:00 PM	✓	x	x	x	x	✓	✓	x
		Sep 15	**Sept 22**	**Sept 29**	**Oct 6**	**Oct 13**	**Oct 20**	**Oct 27**	**Nov 3**
				Wednesday					
Sabnam	10:00-11:00 AM	✓	✓	✓	✓	✓	✓	x	x
Sonam	11:00-12:00 AM	✓	✓	✓	✓	✓	✓	✓	✓
Sanvi	12:00-1:00 PM	x	x	x	✓	x		✓	✓
		Sept 16	**Sept 23**	**Sept 30**	**Oct 7**	**Oct 14**	**Oct 21**	**Oct 28**	**Nov 4**
				Thursday					
Manisha	10:00-11:00 AM	✓	✓	✓	x	x	✓		x
Priya	11:00-12:00 AM	✓	x	x	✓	x	x		x
Purva	12:00-1:00 PM	**COVID +**	x	x	x	x	x		x