Abstract

Children with cerebral palsy (CWCP) were the focus of this study, which aimed to develop an interventional package to improve their fine motor skills (FMS). Study was applied research in its nature. In addition, it was a R & D study that utilized a qualitative research approach. The study's participants included physiotherapists and occupational therapists who work with children with cerebral palsy. A total of 100 professionals, including 50 physiotherapists and 50 occupational therapists, were selected for the study's data collection. Purposive sampling was used to pick the participants. A variety of exercises and therapies were the subject of in-depth interviews in order to compile a comprehensive intervention package. Incorporating the suggestions and recommendations of physiotherapists and occupational therapists, the package included a variety of exercises, activities, and practices aimed at improving FMS in CWCP. The package's validity, usability, and feasibility were verified by the opinions of experts. The package was developed for students in special education programmes ranging from public and private schools with CWCP ages 5 to ten. Thematic analysis was used to examine the study's qualitative data. The package developed by the researcher was found to be useful, feasible, and practical for teachers to implement for the development of the FMS of the C.W.C.P. The study's findings and conclusions will have a significant impact on future research.

Keywords: Cerebral Palsy, Fine motor Skills, Interventional Package, Development, Need Assessment, Validation, and Effectiveness
Introduction

Cerebral palsy (CP) is an umbrella term for a variety of non-progressive motor disabilities caused by damage to the developing brain. People with cerebral palsy have non-progressive movement impairments due to brain malformations that occur early in development. At times, it refers to abnormal motions and postures, which may limit or even prevent a person from doing what they were born to do. With CP, you're more likely to experience motor irregularities along with problems with your sensory, perceptual, cognitive, and communication systems. CP is more common among people who are physically disabled than in those who are not. Many newborns are born with CP, but the specific etiology remains a mystery (Powers, 2019). The everyday activities and academic performance of cerebral palsy children (CWCP) are both hampered by a number of significant developmental difficulties. Delaying the development of fine motor skills (FMS) is one of the most pressing of these problems. A rising corpus of research shows that children's fine motor skill development is extremely important. Fine motor skills include things like writing, cutting, painting, sketching, and tracing. Despite the influence of modern technology, learning how to print or compose letters and other written communications has not been fully replaced by the computer and the word processor. According to the authors (Sutapa & Suharjana, 2019).

Tuber (2018) explains that fine motor skills entail the ability to do a variety of tasks using the hands and fingers. These skills demand a high degree of hand muscle coordination in order to be effective. As a child gets older, his or her FMS continue to develop based on the amount of practice he or she receives, as well as the quality of his or her development. Cephalo-caudal pattern (from top to bottom) and proximal-distal pattern (from top to bottom). As a result, incorporating stomach time into a baby's routine is crucial for strengthening the shoulders and hips. So to speak. In order to develop abilities like cutting with scissors, self-feeding, and writing instruments, it is necessary to build strong shoulders and upper arms. As a kid develops, a solid foundation of abilities and milestones helps establish the groundwork for the more complex fine motor skills that will be necessary later on. Writing fluently and focusing on conveying information, thoughts, and ideas rather than the mechanics of writing are examples of advanced fine motor talents.

FMS has an effect on children’s academic performance, notably in the areas of arithmetic and reading (Dineheart & Manfra, 2013). Reading and math proficiency in elementary school can be predicted based on pre-school pencil handling skills, according to Dinehart and Manfra (2013). Youngsters may be developing "internal models for the symbol system" as a possible explanation. Participation is essential to the writing process. Son and Meisels (2006) used kindergarten data to study the link between FMS, reading and math skills and academic progress in first grade pupils. The age of a child affects both their ability to develop FMS and their academic performance. FMS become increasingly important to academic success as a kid progresses through the first year of school (Hamilton and Liu, 2018). Academic success and social and emotional skills are linked to fine motor skills. Children's social and emotional development is linked to their capacity to use fine...
motor skills, according to studies. To study effectively, students must be able to stay focused and concentrated throughout the course of the day. There is a correlation between the ability to focus and the prevalence of FMS in children. Elcombe (2017) found a link between subpar FMS and lower self-reported academic success. They found that children with delayed fine motor skills had lower self-esteem and lower levels of confidence in their siblings than their non-delayed peers. It is clear that early childhood education has a significant impact on a child's academic success, as well as their social and emotional development. Students' fine motor development has been found to have a substantial impact on their academic success (Ramey, 2004). Social and emotional problems were more common in children with poor FMS. People who struggle with fine motor skills may find it challenging to succeed in school and in other aspects of their lives.

As teachers and parents, we should take into account students' fine motor skills performance and how they perceive it in relation to classmates. In addition, it has the ability to affect the child's overall behaviour in school. In order to reach mature skill levels in a number of key fine motor skills, the author writes that "personalized, developmentally appropriate practices are required for the large majority of children." "The researchers were concerned that this was not going according to plan. Physiotherapists and occupational therapists are uniquely qualified to help children with cerebral palsy improve their fine motor skills through rehabilitative treatment. Occupational therapists and physiotherapists are recruited for this purpose in special educational institutions. Although there is a shortage of therapists for children with cerebral palsy, there are still many institutions in Pakistan that do not have enough physiotherapists and occupational therapists. Teachers dealing with CWCP are frequently noted to be unable to enhance the fine motor abilities of these children on their own. CWCP fine motor skills can't be taught without some help from supportive or assistive materials. A rising number of people believe that children's FMS development should be improved. An intervention for teachers was developed in this study to help them foster the FMS of CWCP and thus improve their academic activities. An interventional package for CWCP to improve their FMS was the goal of the research.

Significance of the Study

Cerebral palsy (CP) affects the physical, emotional, and social development of children and adolescents. There is a direct correlation between these problems and the lack of physical activity, which sets in motion a cascading process of physical deterioration. First of its kind in Pakistan, this study supports children with CP in their fine motor development. Teachers of children with cerebral palsy can use this manual, which includes authentic resources, to help them improve their fine motor skills and academic performance. This study's findings could have a significant impact on the social, emotional, and academic well-being of children with cerebral palsy. Parents may reap some of the benefits of this as well. Pre-service and in-service teacher training programmes that prepare educators to work with students who have cerebral palsy may see an increase in demand as a result of this study. Additionally, this study is likely to serve as a launching pad for future research in this area of investigation.
Research Methodology

Almost all previous studies on cerebral palsy are descriptive in nature. Research on fine motor abilities in CWCP has been limited to a few of studies. Based on the broad examination of literature, it appears that FMS of CWCP can be encouraged with a well-designed instructional or interventional package. This study was an example of what is known as "applied research." As a result, it was a qualitative research design for the R&D study. 50 physiotherapy and 50 occupational therapy professionals from Lahore division of Punjab province in Pakistan were interviewed for information on various exercises and activities that were included in an interventional package for the development of FMS among CWCP. Detailed descriptions of these therapies and activities can be found in the table below.

Table: List of Exercises, Activities and therapies identified by the stakeholders to be included in the interventional package:

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Stages of Fine Motor Skills</th>
<th>Activities, Exercises and Therapies Suggested by Physiotherapists</th>
<th>Activities, Exercises and Therapies, Suggested by Occupational Therapists</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Warm-up Skills</td>
<td><strong>Strengthening Exercises:</strong></td>
<td><strong>Push up Exercises:</strong></td>
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<tr>
<td></td>
<td></td>
<td>i. Standing on Toes</td>
<td>i. Big Push up Exercise</td>
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<tr>
<td></td>
<td></td>
<td>ii. Standing on one leg</td>
<td>ii. Wall Push up Exercise</td>
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<td></td>
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<td></td>
<td>iii. Chair Push-up</td>
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<tr>
<td>2.</td>
<td>Functional Skills</td>
<td><strong>Lower Limbs Exercises:</strong></td>
<td>Development of Gross Muscles:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>i. Standing Leg Exercise</td>
<td>i. Ankle Pump Exercise</td>
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<tr>
<td></td>
<td></td>
<td>ii. Stretching Exercise</td>
<td>ii. Combing Exercise</td>
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<td></td>
<td></td>
<td></td>
<td>iii. Clapping Exercise</td>
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<td></td>
<td></td>
<td><strong>Upper Limbs exercises:</strong></td>
<td>iv. Holding the Big Ball</td>
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<tr>
<td></td>
<td></td>
<td>i. Flexion and Extension Exercise</td>
<td>v. Holding the hardball</td>
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<td></td>
<td></td>
<td>ii. Pronation and supination exercise</td>
<td>vi. Catching the Big Ball</td>
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<td></td>
<td></td>
<td>vii. Throwing the Ball</td>
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<td></td>
<td></td>
<td></td>
<td>viii. Controlling over the Ball (Big Ball)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>ix. Controlling over the Ball (Small Ball)</td>
</tr>
</tbody>
</table>
Focus on Bilateral:
  x. Prone lying looking backward
  xi. Neck Flexion Exercise

Visual Integration:
  xii. Showing Toys Left and Right
  xiii. Chasing Exercise

Grasping Skills

Release and transferring objects between hands

i. Beads Exercises

taking out the beads from a big bowl

iii. Putting the beads in Bowl

iv. Put the big beads in straw

v. Beads Activity

vi. Rice Scoop and Transfer

Release and transferring objects between hands

i. Beads Exercises

Taking out the beads from a big bowl

iii. Putting the beads in Bowl

Grasping Exercises

i. Blocks Building Activity

ii. Squeezing/Strengthening Activity

Reaching Activities

i. Paper clip activity

ii. Playing with playdoh

iii. Shape fixing activity in Pegs

iv. Puzzle activity

Grooming skills

i. Un-Zip and Zip-up

ii. Un lacing and Lacing

iii. Undress and dress up
The activities, exercises, and therapies shown in the table above are part of interventional package for FMS development in CWCP. On an open-ended opinion questionnaire, physiotherapists (PTs) and occupational therapists (OTs) each provided a variety of suggestions. Stage one of the package included Exercises to increase warm-up skills were recommended by physiotherapists. PTs said that standing on one leg and standing on one toe would help with the development of FMS in CWCP warm-up abilities. Table reveals that occupational therapists recommended CWCP warm-up skills include push-up exercises. Warm-up activities for CWCP can be as simple as big or wall push-ups, according to occupational therapists. The functional skills stage made up the bulk of the second phase of the programme. Occupational therapists and physiotherapists recommended a variety of exercises to help CWCP improve their functional mobility and stability. Standing Leg Exercise, Stretching Exercise, and Ankle Pump Exercise were all advised by physiotherapists as Lower Limb Exercises. Flexion exercise are recommended for upper limb exercises. There are several exercises recommended by occupational therapists for the development of gross muscles in order to help patients improve their functional abilities and motor control. These include exercises like clapping and combining together as well as exercises like holding a large ball or a hardball while throwing it (Small Ball). Occupational therapists promoted
Focus on Bilateral therapy, including prone lying backward gazing and neck flexion exercises. Playing with toys on both sides of the room and chasing them were suggested by the occupational therapist in order to help the child develop visual integration.

The final stage of the package involved learning the implementation skills. PTs and OTs recommended a variety of activities to help children improve their grasping abilities at this stage. These skills include Beads Exercises, Beads Activities, Bead Scoop and Transfer, and Rice Scoop and Transfer to improve CWCP's grasping ability. Physiotherapists recommend these activities to enhance FMS for CWCP. Occupational therapists recommended grasping and reaching activities to help children improve their grasping abilities. Block Building, Squeezing/Strengthening, and other Grasping Exercises are examples. Activities such as playing with playdoh, shape-fixing with Pegs, and puzzles were recommended as ways to improve FMS while attaining activities. As part of the programme, transitional skills were included in stage 4. A variety of exercises were recommended by physiotherapists and occupational therapists at this point. Children should begin their writing journey by engaging in pre-writing activities such as scribbling or colouring or painting or tracing. Grooming tasks such as unzipping and zipping, unlacing and lacing, undressing and dressing, putting on socks, unbuttoning and buttoning, and unbuckling exercises were recommended by occupational therapists to help children develop fine motor skills.

Exercises such as Holding the pencil, Imitating, and Shaping were prescribed by PTs to help patients go through the manipulation stage more quickly. When it comes to developing FMS for CWCP, OT recommended a wide range of activities including performing Hand Manipulation Activities such as Warming Up Your Hands, English Alphabets, and Numbers (1-10) to help you get better at manipulating the fingers.

**Salient Features of the Interventional Package for FMS development of CWCP:**

The package's goal was to improve the FMS for children in the CWCP age range of five to ten years. In order to improve their academic abilities, cerebral palsy youngsters can benefit from these exercises. CWCP who lack pre-academic skills can benefit from these activities. CWCP teachers in mainstreamed, inclusive, or general education settings will benefit from the package, which was created to support them in their studies. Teachers from the CWCP programme, parents, physiotherapists, and occupational therapists all contributed significantly to this study's data collecting.

- This package includes six steps that can help youngsters with cerebral palsy improve their fine motor abilities. Warm-up activities for the development of fine motor skills comprise the first step. The second stage of FMS development for CWCP comprises of functional skills. Exercises to strengthen the lower limbs (Lower limbs exercises), the shoulder girdle, the head control, and visual tracking are included in these basic abilities (Upper limbs exercises). Learning how to release and transfer objects between hands, grasping and reaching practices are further developed in this stage. Pre-writing exercises, grooming skills, and finger exploration are all listed in the Transitional Exploratory/Pre-academic stage, the
fourth step in the process. Refinement is the fifth step, and it deals with fine-tuning pencil control, tools, and object manipulation. Handwriting and fine motor skills are further developed in the sixth stage. All children with CP and fine motor difficulties can benefit from these activities. Pre-academic-level CWCP students will benefit from these exercises, which are meant to improve their fine motor skills as well as their ability to learn. If you have CP students, you might want to have them perform these exercises in the classroom, and then have them practice them at home with their parents, as you build up their time and independence. The following characteristics set this bundle apart from the rest:

- Pictorial elaboration of activities
- Description About what, how and when to do
- Precautions for various types of cerebral palsy
- Directions for mild to Profound levels of Cerebral Palsy Children

**Discussion**

Motor, sensory, perceptual, cognition, communication, and behavioural difficulties can limit the ability to perform everyday tasks. As a general rule, CWCP require adaptive equipment or parental assistance in order to carry out their daily routines. The study's findings revealed that daily life tasks should be mastered using an interventional package in order to develop FMS in children with CP. A study by Basit, Qureshi and Arif (2021) determined that the development of an interventional package for instructors was required in order to develop the FMS of CWCP. An interventional package for FMS of children with cerebral palsy is still proving to be a necessity, according to the researchers’ findings so far. Professions such as physical and occupational therapists have focused on the cognitive (receiving, responding, thinking and applying), social (shaking hands and greeting) and physical deficiencies of C.W.C.P. All of these CWCP characteristics must be taken into account when putting together an intervention plan to help children with C.W.C.P. improve their fine motor skills so they can do better in school.

Research on how physical activity can benefit children with FMS has been limited to a few research. Children as young as 5-6 years old who were otherwise healthy were the subjects of an interventional study by Brown (2010). In an experiment that lasted for five months, children were taught basic hand gestures while singing and reciting the rhymes of action songs. Fine motor skills in a copying fine motor activity were substantially more developed in the exercise group than in the non-exercise control group. Using the Montessori method, a group of normally developing five-year-old was educated in educational gymnastics to improve their fine motor skills. Children in the treatment group performed much better on the flag posting test than the control group after eight months of training. The findings of prior studies show that a variety of training methods can help enhance motor abilities, as demonstrated by these findings. C.W.C.P.’s fine motor skills can be improved with the help of a variety of activities, exercises, and therapies that experts in the field of cerebral palsy recommend to teachers. The researcher spent a lot of time developing C.W.C. P’s fine motor skills intervention package. The interventional package contained all of the activities, exercises, and therapies recommended by the physiotherapists and occupational therapists for
improving C.W.C. P’s fine motor abilities. Interventional Package activities and exercises are effective; the Interventional Package is organized and disciplined; language utilized in the Interventional Package is clear and understandable; and the package's orientation is acceptable. Children with cerebral palsy appear to benefit from the use of the Interventional Package. Using the delivery method advised for the Interventional Package is a good idea. Helpful is the explanation of all of the activities, exercises, and therapies that are included of the Interventional Package. Children with cerebral palsy will find the activities, exercises, and therapies included in the Interventional Package appealing. In addition, the interventional package can easily be employed in the absence of physiotherapists and OTs.

Suggestions & Recommendations

This study's interventional package was designed for children in the CWCP age range of 5 to 10 years. The FMS of the CWCP of older kids can be improved with a more sophisticated interventional strategy, as has been demonstrated and is now recommended for use. Gross Motor Skills and FMS are two significant components of CWCP that have a direct impact on CWCP's academic achievement. Only fine motor skills were examined in the study. Children with Cerebral Palsy should be taken into account when conducting research. In order to prove the efficacy of an Interventional Package in enhancing fine motor skills in children with cerebral palsy, a suitable experiment should be conducted. A Pre-test/Post-test Control Group design should be used for this purpose. The interventional package was developed by occupational and physiotherapists who are professionals in their field. Therefore, it is advised that the CWCP curriculum incorporate this bundle of FMS-enhancing interventions.

References


