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Iqra Khan

Institute of Physical Therapy, the University of Lahore, khan_iqra88@yahoo.com

Samreen Sadiq

Lahore College of Physical therapy, LM&DC

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ROLE OF MANUAL ACTIVITIES AMONG CEREBRAL PALSY CHILDREN

Iqra Khan¹, Samreen Sadiq²,

¹Senior Lecturer, Institute of Physical Therapy, the University of Lahore

²Lecturer, Lahore College of Physical therapy, LM&DC

Corresponding to: Dr. Iqra Khan, Institute of Physical Therapy, the University of Lahore, 442, BLOCK TIP, Khayaban.e.amin, Defence Road Lahore **Email:** khan-iqra88@yahoo.com

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ABSTRACT

Objective: Determine the role of manual activities in children presenting with spastic type of Cerebral Palsy.

Methods: A Quasi experimental study was conducted in Children Hospital and Compass. A sample of 30 children with cerebral palsy aged between 6 to 12 years was studied and assessment was made before and after the implementation of treatment through ABILHAND kids Questionnaire. The duration of this study was 6 months from December 2014 to May 2015. The recruiting strategy used was convenience sampling. Intervention was given for a period of 90 hours for 9 weeks. Qualitative variables were expressed as proportions (percentages). Before and after comparisons were made using non-parametric Wilcoxon signed rank test since the data was obtained as scores. A p-value less than 0.05 were taken as significant.

Results: Bimanual Therapy had significant effect on manual abilities of a child presenting with spastic type of cerebral palsy. The P value was calculated as 0.000 which was less than 0.05.

Conclusion: HABIT appears to be effective in improving the manual ability of spastic cerebral palsy children.

KEYWORDS:

Spastic Cerebral Palsy, Manual activities

INTRODUCTION

Cerebral palsy (CP) is an umbrella term encompassing group of permanent, irreversible posture and motion disorders. This motor disorder is sometimes associated with defects in sensory system, awareness, thinking, speech and language, behavior and musculoskeletal problems.¹ The prevalence of this disorder ranges from 2 to 2.5 per thousand children, being the most prevailing neurodevelopmental disorder in children.^{2,3} Similarly a study in Faisalabad, Pakistan was done which showed that 75% were diagnosed with CP.⁴ Cerebral palsy can result from brain injury occurring during the prenatal, perinatal, or postnatal stages.⁵ Birth problems, including low oxygen concentration, choking, are presently estimated to be 6% in patients with congenital CP.⁶

A great attention is being provided to intensive functional therapy for improving the motor disabilities in pediatric population. One form of intensive training is CIMT, which targets the upper limb movement. Bimanual training is a new class of interventions

aimed at increasing the efficiency of movement by using both hands together. In recent times a new protocol known as Hand-Arm Bimanual Intensive Training (HABIT) has been established. It is tested with coordination of United CP Research and Education Foundation.⁷

HABIT is also an intensive practice like CIMT, but it does not comprise of restraining the not much affected upper limb. It uses structured part and whole task practice rooted in bimanual functional tasks.⁸ Recent literature has shown that the reduced hand function does not remain static throughout development⁹ and the progression rate of the involved hand of CP child is same as that of children with normal development. A key to therapy is to change the progression rate that makes the CP child resemble with children with normal development in terms of performing activities of daily living independently or with minimal assistance and active social participation.¹⁰

The aim of this study was to evaluate the role of manual activities in spastic Cerebral Palsy child by using ABILHAND-Kids Questionnaire.

MATERIAL AND METHODS

The study was a Quasi Experimental and conducted at Children Hospital & Institute of Child Health and Compass for a period of 6 months. A sample of 30 patients was taken via convenient sampling technique. Children with spastic Cerebral Palsy, between the ages of 6 to 12 years, with the ability to follow instructions and to grasp light objects were included in the study. Children with uncontrolled seizures and those in which visual problems could hinder the treatment were excluded from the study. Written informed consent was obtained from the parents to allow their children to participate in the study. These children were assessed pretest and after implementing HABIT. Then data was collected from the children aged between 6-12 years from 2 settings. Therapy was given for total 90 hours for 9 weeks. The Gross motor functional classification scale III-IV and Manual Ability Classification System III-IV were used as a baseline measure to identify level of severity of patients to include in the study. The children were assessed before and after the implementation of manual activities through ABILHAND-kids questionnaire. Data was analyzed using SPSS version 20. Qualitative variables were expressed as proportions (percentages). Before and after comparisons were made using nonparametric Wilcoxon signed rank test since the data was obtained as scores. A p-value less than 0.05 were taken as significant. Manual ability was measured with a well-designed and detailed ABILHAND-Kids questionnaire. 21 bimanual activities were graded on a three point scale (0=impossible, 1=difficult, 2=easy) for each child by their parents/attendants. Readings were recorded both before giving the treatment and after the treatment.

RESULTS

Before the implementation of intervention 16.7%, n=5 patients were able to open the jar easily but after the treatment that percentage raised to 70%, n=21. Out of 30 children, putting on backpack/schoolbag was easy for 26.7%, n=8 children and after treatment the number increased to 80%, n=24. 43.3%, n=13 patients found it impossible to open cap of tooth paste tube but after performing bimanual activities only 3.3%, n=1 patient reported impossible opening of cap. Un-wrapping a chocolate bar was easy for 73.3%, n=22 patients after treatment. Only 10%, n=3 of 30 patients were able to perform rolling up sleeve easily before treatment but after treatment 33.3%, n=10 children found it easy to perform this activity.

Table 1: Frequency of sharpening a pencil

	Before		After	
	Frequency	Percent	Frequency	Percent
Impossible	21	70.0	2	6.7
Difficult	9	30.0	22	73.3
Easy			6	20.0
Total	30	100.0	30	100.0

Chart 1: percentage of taking off a t-shirt before intervention

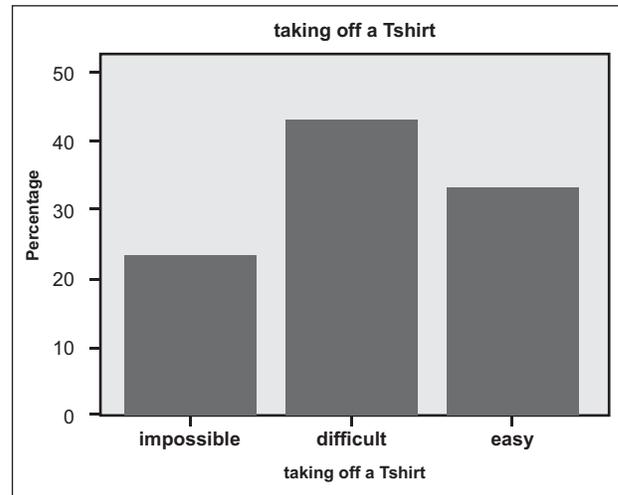
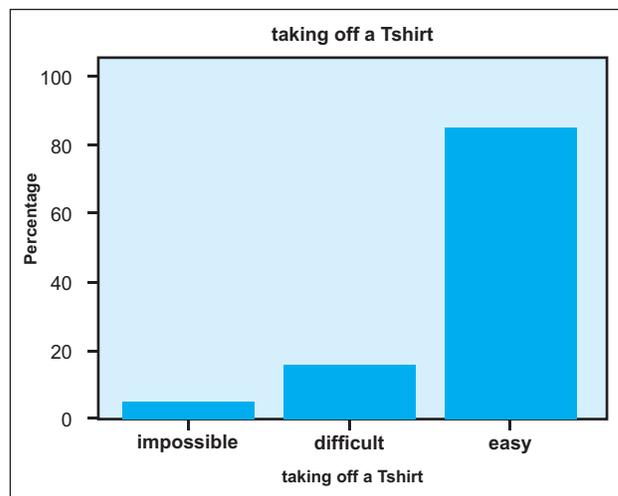


Chart 2: percentage of taking off a t-shirt after intervention



16.7%, n=5 patients were able to squeeze toothpaste onto a toothbrush easily before treatment but after treatment 56.7%, n=17 children found it easy to perform this task.

Table 2: Frequency of unscrewing a bottle cap

	Before		After	
	Frequency	Percent	Frequency	Percent
Impossible	11	36.7	2	6.7
Difficult	17	56.7	12	40.0
Easy	2	6.7	16	53.3
Total	30	100.0	30	100.0

Table 3: Frequency of zipping up trousers

	Before		After	
	Frequency	Percent	Frequency	Percent
Impossible	11	36.7		
Difficult	16	53.3	22	73.3
Easy	3	10.0	8	26.7
Total	30	100.0	30	100.0

Chart 3: percentage of filling a glass with water before intervention

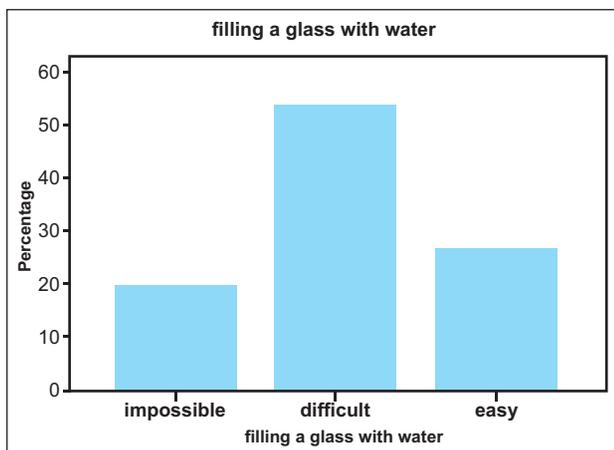
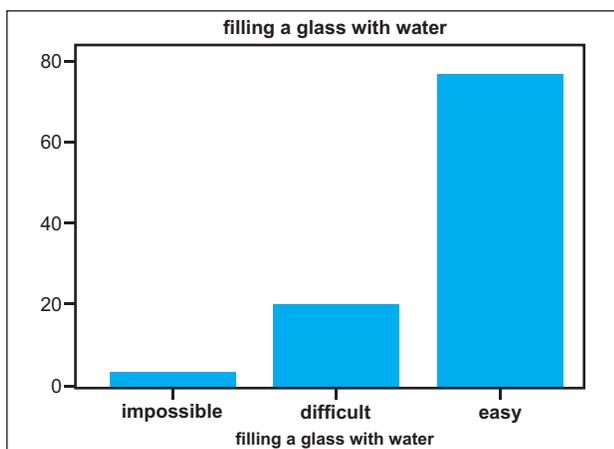


Chart 4: percentage of filling a glass with water after intervention



The HABIT intervention was effective in improving the manual ability of spastic cerebral palsy children (P-VALUE <0.05).

Table 4: Wilcoxon Signed Ranks Test - Ranks

ABILHAND -kids QUESTIONNAIRE:		N	Mean Rank	Sum of Ranks
Post-Intervention Score- ABILHAND kids	Negative ranks	2 ^a	1.50	3.00
QUESTIONNAIRE: Pre-Intervention Score	Positive Ranks	26 ^b	15.50	403.00
	Ties	2 ^c	-	-

- a. ABILHAND-kids QUESTIONNAIRE: Post-Intervention Score < ABILHAND-kids QUESTIONNAIRE: Pre-Intervention Score.
- b. ABILHAND-kids QUESTIONNAIRE: Post-Intervention Score > ABILHAND-kids QUESTIONNAIRE: Pre-Intervention Score.
- c. ABILHAND-kids QUESTIONNAIRE: Post-Intervention Score = ABILHAND-kids QUESTIONNAIRE: Pre-Intervention Score.

Table 5: Wilcoxon Signed Ranks Test – Test statistics

	ABILHAND-kids QUESTIONNAIRE: Post-Intervention Score - ABILHAND-kids QUESTIONNAIRE: Pre-Intervention Score
Z	-4.562 ^a
Asymp. Sig. (2-tailed)	.000

- a. Based on negative ranks

DISCUSSION

The purpose of this study was to determine the effect of Hand Arm Bimanual Intensive Therapy in children with spastic Cerebral Palsy. Nava et al studied the effectiveness of modified CIMT and bimanual techniques in children with hemiplegic CP. The authors concluded that both these techniques could lead to advancement in bimanual coordination and functional tasks.¹¹ Our outcomes also correlate with other literatures emphasizing on intensive training. Though the intervention implemented in my study focuses on the bimanual practice which leads to the improvement in bimanual hand function and activities.

Bleyenheuft Y and Gordon AM suggested that HABIT-ILE required synchronized control and

harmonization of both upper and lower extremity motions.¹² The intention of this study was to develop a technique which incorporates intensive practice with child cooperation.¹³ The technique of HABIL is introduced to overcome CIMT limitations, as it has been proved that children with CP have more impaired bimanual coordination than unimanual impairments.

The prominent features of HABIL are based on training of functional tasks and performing goal-oriented activities.¹⁴ These foundations of HABIL addressed the limitations of activities of daily living which are the most striking characteristics of cerebral palsy according to its revised definition.¹⁵ Accordingly, current study also highlights the specific improvement in manual ability domain of cerebral palsy child by the application of Hand Arm Bimanual Intensive Therapy. Functionally HABIL proved to be a model intensive bimanual technique for children as explained in my study.

According to a recent study done on 20 children in whom effectiveness of bimanual technique was assessed, it was proposed that Habit can lead to improvement in bimanual function. The type of cerebral palsy children included in the study was hemiplegic.¹⁶ But in contrast, this study evaluated the effectiveness of HABIL in children with unilateral and bilateral spastic cerebral palsy and it has been concluded that performing bimanual activities even in spastic type leads to significant improvement.

One of the major limitations of the study was the small sample size, so it is recommended that study should be conducted on large sample. The appropriate level of impairment and side of lesion should be thoroughly identified.

CONCLUSION AND RECOMMENDATIONS

Hand Arm Bimanual Intensive Therapy was effective in improving bimanual coordination and manual ability of upper extremity in the selected group of spastic cerebral palsy children. The technique proved to be effective in improving function involving both hands. It is recommended that the effectiveness of HABIL should be evaluated in less common forms of CP for example ataxic and athetoid type of cerebral palsy.

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Author's contribution:

Iqra Khan; data collection, data analysis, manuscript writing, manuscript review
Samreen Sadiq; data collection, data analysis, manuscript writing, manuscript review