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Physical Activity on Standing of Gross Motor Function Measure Score (GMFM- 88) In Spastic Cerebral Palsy Children – A Pilot Study

R.Shyam Sundar, M.Premkumar, R.Muthupandikumar, Mohammed Ameer Hussain

Abstract

Background: Cerebral Palsy (CP) is the most common cause of physical disability in childhood. 57% of CP children in Europe are bilateral spastic (BSCP). They perform on a severely reduced activity level and suffer from reduced mobility or immobility. Physical therapy (PT) plays a central role in managing the condition by focusing on function, movement, and optimal use of the child's potential. The GMFM-88 consists of 88 items in five dimensions: lying and rolling (GMFM-A); sitting (GMFM-B); crawling and kneeling (GMFM-C); standing (GMFM-D); and walking, running and jumping (GMFM-E). **Aims and Objectives of the study:** To Analyze and Understand the effect of Gross Motor Function on improving Physical Activity with Spastic Cerebral Palsy Children. **Data analysis and Results:** This study result shows that there is statistically significant improvement in the variables of Modified Gross Motor Function Measure (GMFM- 88) in Spastic Cerebral Palsy patients with p values $p < 0.05$. There was an improvement in a Spastic Cerebral Palsy patient with mean difference of 10.75. **Conclusion:** This study was concluded by the results of this study that there is statistically significant improvement of the Gross Motor Function (GMFM- 88) of standing in Spastic Cerebral Palsy Children after the intervention of Various Physical activity & Play therapy.

Keywords: Spastic Cerebral Palsy, Physical activity for Spastic Cerebral Palsy, Modified Gross Motor Function (GMFM- 88).

1. Introduction

Cerebral palsy (CP) describes a group of permanent disorders of the development of movement and posture, causing activity limitation, which is attributed to non-progressive disturbances that occurred in the developing fetal or infant brain. The motor disorders of CP are often accompanied by disturbances of sensation, perception, cognition, communication and behaviour, by epilepsy, and by secondary musculoskeletal problems.^{1,2} The GMFM-88 is a criterion- referenced instrument constructed to evaluate the development of motor skills in children with CP, designed and validated for these children by using principles of classical test theory. It is used widely as a clinical and research outcome measure and there is considerable evidence of its reliability, validity and responsiveness.¹

Immobilisation of the musculoskeletal system causes muscle mass loss which is followed by reduced bone mass^{3,4} which results in higher risk of low energy fractures⁵ and further immobilisation. Physical therapy (PT) plays a central role in managing the condition by focusing on function, movement, and optimal use of the child's potential. PT uses physical approaches to promote, maintain and restore physical, psychological and social well-being.² Numerous therapeutic interventions have been used to minimise the development of secondary problems (normalising tone, increasing active range of motion), to improve muscle strength and mobility, to obtain functional motor skills and to encourage functional independence at home, at school and in the community.

Children with CP have more sedentary time and participate less in habitual physical activities than their peers without disabilities, which implies risks for health outcomes, physical function and human metabolism.⁶ Additional to being and staying physically active,

replacing sedentary time with light physical activity might be a beneficial way to reach health benefits for children with CP, especially for those with severe motor impairments when physical activity with moderate to vigorous intensity often is a huge challenge.⁷

GMFM is composed of 88 test items and is categorized into 5 developmental dimensions by test position: Dimension A (lie/roll), Dimension B (sit), Dimension C (crawl/kneel), Dimension D (stand), and Dimension E (walk/run/jump). Each dimension can be used independently. A 5-year-old child with normal gross motor ability usually could accomplish all items⁸. The physical outcomes measure included Gross Motor Function Measure (GMFM) and muscle tone of hip adductor. The GMFM was developed for use with children with CP to evaluate the effect of treatment over time on gross motor function without regard to the quality of the performance⁹.

The aim of this study was to analyse and understand the effect of Gross Motor Function on improving physical activity with spastic cerebral palsy children. By obtain and understanding the result of the study it can be executed Gross Motor Function is useful for Spastic Cerebral Palsy Children to improve Physical Activity. By doing this study the significance and importance of physical activity on improving Gross Motor Function in Cerebral Palsy Children will be enclosed and ascertained.

2. Material and Methods

Study Design

Pilot Study.

Study Setting

Sri Venkateswara Brain and Spin Rehabilitation Centre, Batlagundu, Dindigul District, Tamilnadu.

Study Duration

12 Months

Study Sampling

Convenient Sampling.

Study Population

In and Around Madurai and Dindigul District.

Study Sample:

15 Patients.

Criteria of Selection

Inclusion Criteria

Children with Spastic Cerebral Palsy.

Sex: Both.

Age Group: 3-10 years.

Exclusion Criteria

Non-Co-operative Patients.

Patients with Severe Cardio Vascular Problems.

Other Neuro muscular disordered children.

Psychiatric Conditions.

Musculoskeletal Problems.

Variables

Modified Gross Motor Function Measure (GMFM -88).

Interventions

Various Physical Activity and Play Therapy with swiss ball and in exercise mats were given to the spastic cerebral palsy children.

Materials and Tools

Pen

Paper

Swiss ball

Procedure

15 Patients fulfilled the criteria of selection were selected and recruited for this study through convenient sampling. Their informed consent was taken and their demographic data including vitals were collected and documented. Pre intervention variables of Modified GMFM - 88 were measured and documented. Intervention of Physical Activity and Play Therapy for 1 hour per session per day, 5 sessions per week for 10 weeks to the patients of spastic CP children. Post intervention variables of Modified GMFM-88 measurement were collected, and documented. Suitable statistical method for data analysis were selected and applied. Data analysis was done by spss 16.0 software version for windows.

3. Data Analysis and Results

Shapiro Wilk test was used for checking normality distribution of data and student t test was used for analysis between variables. This study result shows that there was statistically significant improvement in the variables of Modified Gross Motor Function Measure (GMFM- 88) in Spastic Cerebral Palsy patients with p values $p < 0.05$. There is an improvement in a Spastic Cerebral Palsy patient with mean difference of 10.75. Thus, null hypothesis has been rejected and alternate hypothesis has been accepted for this study.

Table 1: Pre and Post Test Values of Mean, SD, t value, and p value of Modified GMFM- 88 (Source: Author).

No of Subjects	Intervention	Mean ± SD	T value	P value
15	Pre	9.75 ± 8.75	-7.34	.000164
	Post	20.5 ± 17		



Fig. 1: Physical Activity on Swiss ball (Source: Author)



Fig. 2: Physical Activity on Pegboard (Source: Author)

4. Discussion

This study results shows that the Gross Motor Skills (GMFM- 88) on standing (Class 52-64 = 39 Points) given to the Spastic Cerebral Palsy Children. Because of Gross Motor Skills (GMFM- 88) are the abilities required in order to control the large muscles of the body for walking, running, sitting, crawling and other activities with swiss ball and in exercise mats.

This study result strengthened the concept of Getz et al., (2007) stated that, the present study found significant effects following a 6-week aquatic intervention on the gross motor function of children with CP. Significant improvement in water skills was also observed. The intervention period was too short for sustainable improvement in dry-land motor skills after intervention (follow-up), but there was enough time to achieve sustainable improvements in aquatic skills. Future studies with a larger sample size and longer and more intensive interventions are needed. Aquatic activities not only have a therapeutic effect on children with CP (decreasing muscle tonus, increasing motor function, increasing walking efficiency, functional abilities, but they also have a psychosocial effect (increasing quality of life, life habits, socialization. So, in future studies researchers should use adequate questionnaires, tests or interviews for analysing these types effects.¹⁰

Salavati. M., et al. (2015) stated that, the adapted version of the GMFM-88 is a useful and reliable instrument for paediatric physical therapists who work with children with both CP and CVI. Considering the fact that visual perception contributes to the performance of motor functioning, it is important to use the version of GMFM-

88-CVI for children who have CVI, so that their motor functioning can be measured.¹¹

This study results shows that the effect of the physical activity improves the Gross Motor Function (GMFM- 88) of standing in Spastic Cerebral Palsy Children. This study can be further explored to do in large number of subjects and experimental study design to extract better statistically significant results.

5. Conclusion

This Study was concluded by the results of this study that there is statistically significant improvement of the Gross Motor Function (GMFM- 88) of standing in Spastic Cerebral Palsy Children after the intervention of Various Physical activity & Play therapy.

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