



## Fine and Gross Motor Skills of Preschool Children with Cerebral Palsy Attending Special School at Vellore

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### ABSTRACT

**Introduction:** Cerebral palsy is a permanent movement disorder and globally 17 million are with cerebral palsy. There are many therapies available to improve the motor activities of children with cerebral palsy. Having knowledge on the skill levels of children with cerebral palsy would help in helping them further. **Objectives:** The objectives were to assess the levels of fine and gross motor skills of preschool children with cerebral palsy and find correlation and association between motor skills of children with selected demographic variables. **Materials and Methods:** Descriptive research design was used. Fifty cerebral palsy children were selected by purposive sampling technique. Observation technique was used to assess the motor skills. **Results:** The results showed that there was significant association between gross and fine motor skills and selected demographic variables. There was significant positive correlation found between the motor skills and demographic variables. **Conclusion:** The study concluded that the continuous monitoring of gross and fine motor skills is essential for nurses, parents/caregivers in assisting the children with cerebral palsy.

### KEYWORDS

Cerebral palsy, preschool children, gross motor skills, fine motor skills, nurses, parents, caregivers

### INTRODUCTION:

Cerebral palsy is defined as a group of permanent disorders of the development of movement and posture, causing activity limitations that are attributed to non-progressive disturbances that occurred in the developing fetal or infant brain."(Marilyn H.Hockenberry, 2013) Approximately 40% of cerebral palsy children were born preterm. Around 17 million people have cerebral palsy globally. On an average 1,200-1,500 preschool children are diagnosed with cerebral palsy. India has 51 schools for accommodating children with cerebral palsy.(BishwaBandhan Foundation, 2015).Cerebral palsy may interfere with developing brain and as a result damage occurs). This may take place either during pregnancy or delivery or during the first month of life and less commonly in early childhood. About 2% of cases are believed to be due Inherited genetic causes.(Besani Thomas, 2012).Mostly children are not diagnosed only at the age of 2 or 3years. Approximately 8,000 infants and 1,500 preschool-aged children are diagnosed with cerebral palsy each year. According to the March of Dimes, two to three children out of 1,000 children have cerebral palsy(Cerebral palsy statistics,2015). United States studies have showed the rates as low as 2.3 per 1,000 children to as high as 3.6 per 1,000 children.(SerayNuralSigan et al, 2013).

Cerebral palsy affects body movement, muscle control, muscle coordination, muscle tone, reflex, posture and balance. It can also impact fine motor skills, gross motor skills and oral motor functioning. All primary care providers will care for children with cerebral palsy. Their main interventions include diagnosis, planning for intervention, treatment and follow-up. They help in optimizing health and well-being for children with cerebral palsy and their families and entails family-centered care provided in medical home.(American Academy of Pediatrics,2011).A parent is likely to notice when a child doesn't roll over when he or she should, or when an infant is not enjoying a first step. When this occurs, it could mean the child is slow to develop, or it could be a sign of developmental delay. Developmental delay is an indicator that a child may have Cerebral Palsy. In the event a child has developmental delays, a number of interventions will help a young person develop their skill set, and their confidence, into adulthood.

Children with cerebral palsy reach 90% of their gross motor potential by the age of five or earlier for those more severely affected. (National Institute of Neurological disorders and stroke,2016).Primary care workers help in optimizing health and well-being for children with cerebral palsy and their families and entails family-centered care provided in medical home.(American Academy of Pediatrics,2011). A study regarding the relationship between communication skills and gross motor function in preschool children with cerebral palsy found that poorer communication was strongly associated with gross motor and full term birth. This study reinforces the need for early monitoring of communication development for all children with Cerebral palsy(Andrea Coleman,2012).Another study was on fine motor skills and executive function to contribute to kindergarten achievement. Children with higher levels of fine motor skills, predicted to have higher achievement at kindergarten entry. (Laura L.Brock, 2012).

### METHODOLOGY:

This study is aimed to assess the fine and gross motor skills of cerebral palsy children and to associate and correlate the gross motor skills with selected demographic variables. Descriptive research design adapted to conduct the study. Fifty preschool children with cerebral palsy aging between 3 to 6 years, attending special school at Worth Trust were chosen using purposive sampling technique served the sample of the study.

This study was conducted in Worth Trust, Vellore. Worth trust located in Katpadi area provides training to children with hearing and speech impairment. Rehabilitation centre and day care school functions for children with cerebral palsy and attends the age of 1-18 years. Each day nearly 10-15 children undergo physiotherapy. Various hospitals refer children to "Worth Trust" for physiotherapy. The trust train and appoint adolescents with cerebral palsy to teach the children with cerebral palsy. Modified Madras Developmental Programming System Behavioural profile was used. The instrument included: Section A included demographic variables consisting of age, sex, informant, type of residence, birth order, family history of cerebral palsy and regular analysis on motor skills. Section B consisted questions on gross motor skills, Section C consisted questions on fine motor skills. The scores were categorized

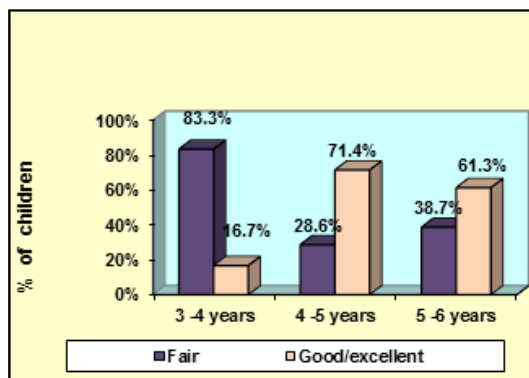
based on the following criteria: Upto 50% score-fair motor development, 51-75% score-good motor development and 76% and above score-excellent motor development.

After an approval from college research-committee, permission obtained from "Worth Trust" for conducting the study. The parents of the samples were informed about the need for the study. Informed consent obtained from the parents by assuring confidentiality. The data related to demographic variables was collected by the interview technique. The mother added additional information related to the questions asked. Children were assessed using modified Madras developmental programming system behavioral profile. Gross motor skills questionnaire included sitting, standing, crawling, running, climbing and riding bicycle/tricycle and fine motor skill questionnaire included holding objects, building tower, assembling beads, using pencil, coloring and tearing paper etc. Around 30-45 minutes spent on each child to assess the fine and gross motor skills using observation technique.

## Results & Discussion

Majority of the children (62%) belong to the age group of 5-6 years and majority of them do not have family history of cerebral palsy. All the fifty participants attend the special school as day scholars. Among gross motor skill development, lying in prone position, holding head for 5 minutes(92%) and running showed high score(88%). Observation on fine motor skill development yielded high score for holding one object in one hand (94%) and low score for carrying tumbler full of water without smashing, spilling and breaking (6%).

**Figure 1** Association between age and motor skills



**Figure 2** Correlation between fine and gross motor skills



**Table 1:** Generalization Of Motor Skill Development n=50

	Max score	Mean score	Mean score with 95% Confidence interval	Mean score % with 95% Confidence interval
Gross motor	20	10.6	10.60(9.15 – 12.05)	53.0%(45.7% – 60.3%)
Fine motor	20	9.44	9.44(7.99 – 10.89)	47.2%(39.9% – 54.5%)

The study showed association between fine and gross motor skills with selected demographic variables. Through assessment it was found that there was a statistically significant association found between age,(Fig 1)continuous treatment, regular analysis of motor skills with fine and gross motor skills.Fig 2 Correlation between motor skills was assessed using KarlPearson correlation co-efficient. It

showed that there is significant, substantial, positive correlation between gross motor skill score and fine motor skill score(Fig 1). The r value is considered to be less than or equal to p value( $r=0.73$  and  $p<0.001$ ,  $r_{sp}$ ). Table 1The mean score of gross motor development with 95% confidence interval is 10.60 and percentage is 53.0%. The mean score of fine motor skill development with 95% confidence interval is 9.44 and percentage is 47.2%. Mette C Tollanes(2014)stated that people born into families in which someone already has cerebral palsy are at elevated risk, depending on their degree of relatedness. The present study also shows that 30%of the participants family history of cerebral palsy.There was a statistically significant association found between age, continuous treatment and regular analysis of motor skills with selected demographic variables and it was supported by the study on quality of life in mothers of children with cerebral palsy conducted by HalimYilmaz (2013). The findings revealed that there is no significant correlation present except with selected variables. According to Pfeiferet al (2009) There were no significant differences between gender and age groups ( $p=0.887$ ) or between gender and motor type ( $p=0.731$ ).The present study too did not show any association between gender and age groups ( $p=>0.020$  but there was association found between age and gross motor skill levels. ( $p=0.731$ )

## CONCLUSION:

These results can help the professionals and health workers to gain deeper understanding of the assessment of motor skills of cerebral palsy children and mothers to find the meaning of assessment and improvement levels of their children. This study had helped the researchers to get the hands on experience through observation and assessment. This would help to teach the parents or care takers. Nurses are the capable change agents to create awareness and make parents/caretakers to understand the methods of assessing the fine and gross motor skills. This can be achieved by teaching the mothers how to do the assessment on the children while the trainer performs the assessment. The nurses can do regular analysis regarding children's motor skills of cerebral palsy children of all age groups. The study findings should be incorporated in nursing education to equip the students.

## Limitations of the study

The sample of the study was only fifty pre-schoolers with cerebral palsy from a single special school. Apart, other challenges of the study were busy schedule of the parents/caretakers and keen observation required when children perform the activities.

## Conflict of interest

The authors declare that the present study does not have any conflict of interest and the study was not funded by any agency.

## References:

- Andrea Coleman (2012). Relationship between communication skills and gross motor function in preschool children with cerebral palsy.,Australasian Academy of Cerebral Palsy and Developmental Medicine.
- Bersani I. Thomas(2012). The journal of maternal and fetal medicine. 1(12), 6
- Cerebral palsy data and statistics(2015). The journal of pediatrics(reviewed may,2016)
- Gregory, S. Liptak (2011). American academy of pediatrics.5(128), 547.
- HalimYilmaz(2013). Quality of Life in mothers of children with cerebral palsy. ISRN.
- Laura L. Brock (2012). Fine motor skills and executive function to contribute to kindergarten achievement, PMC journal, 83(4)
- Marilyn.H.Hockenberry(2013), Textbook of pediatric nursing,18<sup>th</sup>edition,Elsevier publications bishwabandhan foundation (2015). The cerebral palsy Indian statistics,Kolkata.
- Mette C Tollanes.(2014) department of global public health and primary care, BMJ
- Pfeifer, Luzialara, Silva, Daniela Baleroni Rodrigues, Funayama, Carolina Araújo Rodrigues, & Santos, JairLicio. (2009). Classification of cerebral palsy: association between gender, age, motor type, topography and Gross Motor Function. *Arquivos de Neuro-Psiquiatria*, 67(4), 1057-1061. <https://dx.doi.org/10.1590/S0004-282X2009000600018>
- Seray Nural Sigan et al.,(2013). Department of pediatric neurology: Istanbul university