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Gross Motor Development Trajectories in Children with Cerebral Palsy in a Village-Based Early Intervention Program in Rural South India

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Background: Cerebral palsy (CP) is the most commonly occurring childhood physical disability, with an overwhelming majority of its global burden in low-resource countries.¹ Motor outcomes of children with cerebral palsy in high resource countries have been well described based on their level of motor function on the Gross Motor Function Classification System (GMFCS). However, longitudinal studies of motor development in CP populations in low-resources countries are lacking and needed to address prognostication.

Objective: The objectives of this study were to: a) describe gross motor development trajectories for children with CP by GMFCS level in low-resource rural South India and b) to perform a comparative analysis with the motor growth curves for CP developed from the Ontario Motor Growth (OMG) Study.²

Design: A longitudinal cohort study

Participants: The cohort in this study represents a subset of children from a larger longitudinal study, the ASSA Mobile Village Based Rehabilitation-Early Intervention (mVBR-EI) Programme study. Recruitment took place between April 2017 and April 2019. The data set included 338 children, aged 1 year to 7 years at study onset, with a confirmed diagnosis of CP. Levels of severity according to the GMFCS were 9.4% Level I, 13.7% Level II, 22.3% Level III, 25.5% Level IV and 28.9% Level V. Children's ages at baseline according to GMFCS levels ($p < .001$) were: level I (mean age=5.6 years), level II (mean age=5.7 years), levels III and IV (mean age=5.1 years), and level V (mean age=4.6 years).

Setting: Children received either home-based or centre-based early intervention (EI) from a Village Based EI Program newly established by an Indian non-governmental organization in the District of Tirunelveli, in the state of Tamil Nadu in rural South India.

Methods: Over the course of the 2-year study, the participants were assessed every 6 months by trained physiotherapists using the Gross Motor Function Measure (GMFM-66). The severity of CP was classified at baseline by physiotherapists according to the 5-level Gross Motor Function Classification System (GMFCS). If children were classified close to age 2, the GMFCS level was

re-evaluated on next assessment. Data were analysed using nonlinear mixed effects modelling. For each of the five GMFCS levels, trajectories for gross motor development were created, as well as estimation of limits and rates of development, as was done for the OMG curves.

Results:Based on a total of 1157 GMFM assessments, an average of 3.6 observations per child, five distinct motor growth curves of predicted GMFM-66 were developed for ages 1 to 10 years. Differences were found in patterns of gross motor development by GMFCS level, and in the rates and limits in the rural South Indian cohort as compared to the Canadian cohort. Substantial within-stratum variation and interindividual variation in motor development within GMFCS levels were observed.

Conclusions:This study adds to the body of knowledge by describing gross motor trajectories for children with CP living in a rural low-resource setting. Other than the GMFCS level, there exists multifactorial contributors to the differences in patterns of motor development which demands to be explored.

References:

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