Gross Motor Function in Preschool Children with Cerebral Palsy: Comparison between a High- and Low-Resource Country. Is a GMFCS Level III a III?

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**Background:** The motor outcomes of children with cerebral palsy (CP) in high-resource countries have been well described based on their level of gross motor function (Gross Motor Function Classification System, GMFCS). Motor outcomes are impacted by a wide array of factors including intrinsic child characteristics, family dynamics and functioning; and availability, access and options for interventions (Bartlett 2000). Despite these many influences, gross motor functional development in western children with CP has been shown to follow predictable patterns (along motor curves) based on the child’s overall motor severity (Rosenbaum 2002). Less is known about the role of these environmental factors on motor outcomes in low-resource settings; where children may be in settings of poverty, with less family knowledge and resources to support their child’s development, cultural differences in parent-child interaction style, and lower and delayed access to health services (Bartlett 2000, Piper 1990).

**Aim:** To compare the gross motor function (GMFM-66) in preschool age children in high- and low-resource countries (Australia and Bangladesh) with CP according to GMFCS.

**METHODS**

**Study Design:** Comparison of two cross-sectional studies

**Participants:** Children with Cerebral Palsy aged 30-48 months (corrected age); diagnosis and motor type confirmed by an Australian Paediatrician for both samples

**Recruitment: Australia**

Population-based sample: recruited through state-wide surveillance (Queensland and Victoria), tertiary and community centre referrals.

**Measures: Classified by 2 Australian physiotherapists**

**Motor ability:** Gross Motor Function Measure (GMFM-66). Converted to age- and GMFCS-normed percentile scores. GMFM-88 domain scores.

**Motor function:** Gross Motor Function Classification System (GMFCS).

**Motor type and distribution:** unilateral spasticity, bilateral spasticity, dyskinesia, hypotonia/ataxia.

**Sample characteristics:** n=237 (mean age= 33 months, 150 males (63%), GMFCS I= 48%, II=11%, III=15%, IV=13%, V=13%). Unilateral spasticity=32%, bilateral spasticity=55%, dyskinesia=5%, hypotonia/ataxia=10%.

**Results:**

- **Australia:** Mean GMFM-66=50.5 (SD=15.5)
- **Bangladesh:** Mean GMFM-66=38.4 (SD=15.7)

Children’s scores in Bangladesh remained significantly lower when converted to percentiles and compared accounting for GMFCS, motor type and age (11 percentile units, p=0.025). The differences were significantly lower for children classified GMFCS level III (26.9 percentile units lower, p=0.005) and GMFCS IV-V (14.2 percentile units lower, p=0.024). GMFCS I and II were not significantly different.

The Australian sample was reflective of the normative data from the original Ontario Motor study.

**LIMITATIONS**

- The sample in Bangladesh were clinic attendees, whereas in Australia was representative of a population-based sample.
- Data from Bangladesh was collected as part of a 12 month follow-up study. As such sample size was limited to n=41. GMFCS levels were combined in analysis to account for small sub-groups

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**CONCLUSIONS**

Children from Bangladesh have lower gross motor capacity compared to Australian children of equivalent age and motor performance. Further studies are required to establish possible differences in motor growth curves in populations of children with CP in low-resource settings. While GMFCS is helpful in optimizing service delivery and prioritizing appropriate early interventions for children with CP in these settings, motor performance varies.

**References**