# Important report on cerebral palsy in Bangladesh: but different findings compared with other countries need further exploration

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Data from a population-based study of cerebral palsy (CP) in Bangladesh[1] could help bridge the knowledge gap regarding developmental disabilities in low- and middle-income countries (LMICs). Prevalence data are particularly crucial for developing appropriate health, social, and education services, and the lack of rigorous population-based studies in LMICs has severely hampered both national and international programmes and likely contributed to widespread neglect of children with disabilities. Despite attempts to bridge this critical gap using sophisticated modelling as described in a recent Global Burden of Disease report regarding developmental disabilities, the 'true' global burden and worldwide distribution of children living with disabilities remain unknown due to poor primary data sources.[2]

It was therefore encouraging to read the population-based study by Khandaker et al.[1] The authors used a key informant methodology in a two-stage process in which community-based key informants identified children with suspected CP and referred them to local day camps. There, a team comprised of a paediatrician, a physiotherapist, and a counsellor examined the children to confirm the CP diagnosis and assess them for functional limitations and associated impairments. We recently performed a population-based study of CP in Uganda using a three-stage screening process.[3] As these are the first population-based studies of CP in LMICs using contemporary classification and assessment methods, it would be interesting to compare the results to identify commonalities that could be used to construct a global database and also explore differences to identify geographic variations and aid in developing customized preventions and interventions.

Both studies reported a higher prevalence of CP (3.4/1000 [Bangladesh] and 3.1/1000 [Uganda after triangulation]) relative to high-income countries (HICs) (2/1000). In the Ugandan study, the prevalence changed with age, declining from 4/1000 at 2 to 7 years of age to approximately 2/1000 at 8 to 17 years of age, driven by fewer older severely affected children in Gross Motor Function Classification System (GMFCS) levels IV to V. Variation with age was not observed in the Bangladesh cohort, which included children as young as 4.8 months, introducing uncertainty regarding the prevalence data, as it is difficult to diagnose CP at this young age. However, the high death rate (20/1000) during the 2-year study supported a similar age-associated trend in the Bangladesh cohort; most of the deceased children were stunted and were in GMFCS levels III to V. Collectively, these studies support earlier speculation that CP is more common in LMICs, thus constituting a significant global burden. Both studies also suggest that mortality is high among severely affected children.

The studies differed in terms of risk factors. Children born preterm (<37 gestational weeks) constituted 19% of the Bangladesh cohort, approximately half the reported percentage in HICs. This is in stark contrast to the Ugandan cohort, only 2% of which was born preterm. This discrepancy likely reflects the state of maternal and neonatal care, as very few infants born preterm survive in rural Uganda. Presumably, Bangladesh provides better services, enabling more children born preterm to survive. Another difference is the proportion of post-neonatal CP. Although the Bangladesh study reported 6% post-neonatal cases (like the 5% reported in HICs), the Ugandan study reported 25%. The probable cause for the high number of post-neonatal cases in Ugandan children was cerebral malaria, which is endemic in the region. In both countries, however, events that could harm the brain of term infants during the perinatal period were common.

The Bangladesh and the Ugandan cohorts differed considerably regarding disease severity, as classified by the GMFCS and Manual Ability Classification System. To illustrate these differences, we compiled a table with data from both cohorts and included distributions from several population-based cohorts in HICs (Table SI, online supporting information). The Ugandan cohort was divided into two age groups due to a dramatic decline in the percentage of severely affected children (GMFCS levels IV–V) at older ages. There were fewer mildly affected children in the Bangladesh cohort compared to both Ugandan cohorts. This could be due in part to differences in aetiology; for example, the post-neonatal patients in Uganda exhibited less impairment (GMFCS levels I–II, 75%). Another possibility could be differences in methodology that precluded identifying all mild cases in the Bangladesh study. The three-stage screening in Uganda was performed at a Health and Demographic Surveillance System facility where each child is registered during annual surveys. This means that every household was screened by well-trained field workers during the first stage. Notably, in the

 

Bangladesh study, key informants did not visit every child but instead used their knowledge, contacts, and community engagement to disseminate information and invite families with children suspected as having CP. In the key informant methodology study, key informants identified 6.2/1000 physically impaired children, whereas a simultaneous household survey identified 8/1000 children, suggesting that key informants missed 23% of physically impaired children.[4] Whether those missed children had mild or severe impairments was not reported. Notably, the proportion of milder cases was considerably higher in HICs (Table SI) than in Bangladesh, like the Ugandan cohort, supporting the hypothesis that milder cases were missed in Bangladesh.

The prevalence of associated impairments also differed between the two cohorts (Table SI). Seizures were less prevalent in the Bangladesh cohort than in either Ugandan age group, with similar differences in the prevalence of intellectual disabilities. Hearing and vision impairments were also less prevalent in the Bangladesh cohort. Considering the reported positive correlation between severe GMFCS classification and associated impairments in HICs,[5] the finding of fewer associated impairments in the Bangladesh cohort is contradictory, given that this cohort had proportionally more severely affected children. Equally puzzling is the observation that Bangladesh children exhibited fewer associated impairments than children in HICs. To better understand the relationship between geographic characteristics and CP, the reasons for these differences must be elucidated.

In conclusion, the Bangladesh population-based study of CP represents an important step toward obtaining useful information about the prevalence, functional limitations, associated impairments, and risk factors in LMICs. The study clearly shows that we cannot simply extrapolate data from HICs – or from one LMIC to another – but must also consider economic, cultural, and geographic differences. Comparisons with the Ugandan study also raise questions regarding how much of the observed differences are real or due to differences in screening and assessment methods.

## SUPPORTING INFORMATION

The following additional material may be found online:

**Table SI**: In order to compare the CP cohort from Bangladesh with cohorts from Uganda, Scandinavia, and Australia, we have compiled a supplementary table with information on functional limitations and associated impairments from several population-based sources.

## REFERENCES


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