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Neurodevelopmental intervention in early-treated HIV-infected children

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ABSTRACT

It has been estimated that more than 200 million children under the age of five years in low- and middle-income countries are at risk of not reaching their developmental potential, with the largest at-risk population residing in sub-Saharan Africa. A multitude of biopsychosocial risks have been implicated in poor short- and long-term developmental outcomes, most notably: poverty, stunting and infection with the Human Immunodeficiency Virus (HIV).

Infection of an infant with HIV can result in significant neurological damage. The use of paediatric antiretroviral therapy (ART) has reduced the frequency of HIV-related adverse neurological and neurodevelopmental sequelae. However, children living with HIV infection and those uninfected but exposed to HIV, face cumulative hurdles as in Africa HIV is often accompanied with economic and social disparity.

Evidence has demonstrated the importance of the early childhood period for the acquisition of cognitive, motor, language, perceptual, socio-emotional and self-regulation abilities which are foundational for future academic and economic competencies as well as human capital achievements over the life course. The proven benefits of early stimulatory interventions on developmental outcomes resulted in the inclusion of access to quality early childhood development programmes as a Sustainable Development Goal in an attempt to promote the development of underprivileged children.

As part of this study a scoping review investigating interventions which have been used to mitigate or prevent neurodevelopmental delays in children exposed to or infected with HIV, was conducted. The existing evidence mapped out by the review revealed a wide variation in the type, duration and intensity of interventions. Of the ten studies included in the review only one investigated an

intervention which focused specifically on stimulating child development in young children infected with HIV through a home-based stimulation programme.

This study was designed as a non-randomised controlled intervention study aimed to describe neurodevelopment at 12 months of age in three distinct groups, namely: an observational, an intervention and a control group, using a multi-dimensional diagnostic test – the Bayley Scales of Infant and Toddler Development III-edition (BSID-III), in an urban centre in Johannesburg, South Africa. The observational and intervention group (IG) consisted of children with perinatally acquired HIV infection who started ART within the first month of life, in addition children in the IG participated in a year-long developmental stimulation programme; HIV-exposed uninfected children made up the control group. Children in the observational group (OG) who were older than one year at the time of study start were assessed when 24 or 36 months old.

Compared with the test reference mean, the 12 month BSID-III assessment scores of children in all three groups were encouraging. Children with perinatal HIV infection in the IG displayed a trend towards higher BSID-III mean composite scores in the cognitive, language and motor sub-scales, compared with OG children: 105 (SD 128) vs. 103 (SD 9), p=0.5252; 105.2 (SD 11.1) vs. 100 (17), p=0.1904; 99.5 (SD 9.24) vs. 99 (SD 11), p=0.8705, respectively. BSID-III scores were lower in children assessed at 24 and 36 months of age.

Despite early diagnosis and treatment, children infected with HIV are still at risk of poor developmental outcomes – secondary to both HIV infection and underlying social determinants of health. Strengthening health services to ensure mothers and children receive a comprehensive package including an early stimulation programme will help children infected with HIV to achieve their developmental potential.