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Lower Working Memory and Processing Speed Scores Among Children and Youth With HIV Exposure Compared to Unexposed Children and Youth

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Background: Recent studies suggest that HIV exposure during pregnancy is associated with worse neurocognitive outcomes. Studies on cognitive outcomes among school aged children with HIV exposure and living without HIV (CHEU) in sub-Saharan Africa are limited and evidence for cognitive differences when compared to children unexposed to HIV (CHUU) is mixed.

Methods: In a cross-sectional study, we recruited Kenyan CHEU and CHUU aged 7 to 18 years. Using the NIH Toolbox African Languages cognitive battery, we assessed working memory, episodic memory, attention and inhibitory control, cognitive flexibility, and processing speed. Assessments were administered in either Kiswahili or Dholuo. We compared domain scores between groups and determined correlates of lower scores using linear regression, with models adjusted for age and socio-demographic factors that differed in the 2 groups.

Results: Overall, 219 and 209 CHEU and CHUU, respectively, were enrolled. The median age was 12 years (IQR: 9.1, 14.0) for CHEU and 12.8 (IQR: 9.2, 15.0) for CHUU. CHEU were more likely to be orphaned and vulnerable children (OVC) and to have mild food insecurity.

Compared to CHUU, CHEU had significantly lower scores in working memory (age adjusted coefficient 1.3, 95% CI 0.5, 2.1, $p = 0.001$), and processing speed (age adjusted coefficient 4.65, 95% CI 2.3, 7.0, $p < 0.001$). These differences

persisted in separate models adjusted for age and food security as well as age and OVC status.

There were no differences in the other domains (episodic memory, attention and inhibitory control, and cognitive flexibility).

Conclusion: These findings suggest that CHEU may experience deficits in working memory and processing speed. These differences persisted after adjustment for socio-demographic factors suggesting other factors, including biological factors, may play a role. Further work to determine the impact of these deficits on function and other potential cofactors is warranted.

