

Neurocognitive Outcomes among Perinatally-HIV Infected Young Adults

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INTRODUCTION

- Neurocognitive problems are barriers to perinatally HIV-infected (PHIV+) young adults (YA) achieving optimal health, behavioral and functional outcomes.
- Few studies have examined longitudinal outcomes of key domains of neurocognition (i.e., processing speed, working memory, and executive functions) among PHIV+ and perinatally HIV-exposed, uninfected (HEU) YA.
- We examined: 1) differences in Processing Speed, Working Memory, and Executive Functions between PHIV+ and HEU YA across three time points and by age, and 2) associations between viral load (VL) over time and neurocognitive outcomes among PHIV+ youth.

METHOD

- CASAH is an ongoing New York City-based, longitudinal cohort study of PHIV+ and PHEU youth recruited at ages 9-16 (2003-2008) and followed at 12-18 month intervals.
- YA Working Memory (WAIS Digit Span), Processing Speed (Trail Making Test, Part A [Trails A]), and Executive Functions (Trail Making Test, Part B [Trails B]) were assessed at follow-ups (FU) 5, 6 and 7, when participants were ≥18 years of age.
- Generalized estimating equations (GEE) were used to examine differences in neurocognitive test performance between groups across FU.
- We also conducted a longitudinal mixed effect model with a random intercept to examine if test performance changes over time (age) by HIV status, with performance from one additional FU (FU 4) when some participants were <18 years of age.

RESULTS

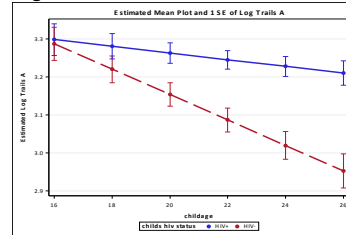
- Participants at FU5 were: 18-28 years old (mean=21.90; SD=2.68); 53% female; 56% African-American/Black; 40% Latino. Age ranges for FU6 were 19-28, and 20-29 for FU7.
- PHIV+ YA had significantly slower Processing Speed scores compared to the HEU YA at all FUs (Table 1.)

Table 1. Test Performance Across Follow-Ups

| | Digit Span (≤25 th %ile) | | Trails A (≥22.93 sec.) | | Trails B (≥48.97 sec.) | |
|-----------------|-------------------------------------|----------------|------------------------|----------------|------------------------|----------------|
| | HEU % (N) | PHIV+ % (N) | HEU % (N) | PHIV+ % (N) | HEU % (N) | PHIV+ % (N) |
| FU5 (N=249) | 47.2% (42) | 66.7% (92)** | 44.8% (39) | 65.4% (89)** | 66.7% (58) | 77.2% (105)** |
| FU6 (N=199) | 47.2% (34) | 64.5% (71)** | 40.0% (28) | 61.9% (65)** | 40.0% (28) | 37.1% (39) |
| FU7* (N=148) | 51.1% (23) | 60.8% (48) | 34.7% (17) | 55.6% (45)** | 51.0% (25) | 67.9% (55)** |

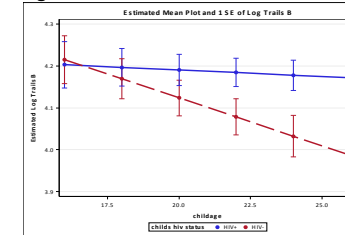
Note: *FU7 data collection ongoing, **p<.05, ***p<.01

Figure 1. Mixed Effect Model for Trails A



- Trails A: There was a significant interaction between age and HIV status ($F_{1,502}=8.61, p=.0035$). Among HEUs, each increasing year in age was associated with a 3.3% performance boost ($p<.0001$) in Trails A completion time. No change was observed in the PHIV+ group.
- Trails B: There was a trend-level significant interaction between child age and HIV status ($F_{1,499}=3.32, p=.069$) such that HEUs saw performance gains as they got older. No change was observed among the PHIV+ group.
- Digit Span: There is no significant interaction between child age and HIV status ($F_{1, 507} = 0.03, p=.86$), suggesting no difference in Digit Span change by HIV status.

Figure 2. Mixed Effect Model for Trails B



CONCLUSIONS

- PHIV+ YA performed worse than HEU YA at most follow-ups on tests of Working Memory, Processing Speed, and Executive Functions.
- When examined longitudinally, HEU performance on Trails A significantly increased as they got older, whereas PHIV+ performance remained flat. A similar trend relationship was found for performance on Trails B.
- PHIV+ YA may be at risk for worse neurocognitive outcomes as they grow older, which could interfere with achievement of important adult milestones and activities of daily living.
- While PHIV+ YA did not see test performance increases over time compared to HEUs, it is important to note that large proportions of HEU YA performed poorly on all tests (e.g., ~50% performed at least 1.5 standard deviations below the norm on Digit Span).
- Continued research is needed to understand neurocognitive outcomes among PHIV+ YA as they grow older and how neurocognitive impairments impact their health and behavioral outcomes.
- Research is also needed to understand how factors such as poverty, prenatal exposure, and educational opportunity can impact neurocognition in both groups.

ACKNOWLEDGMENTS

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