

Poster presentation

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Neuropsychological benefits of computerized cognitive rehabilitation training in Ugandan children surviving cerebral malaria and children with HIV

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Background

The present study seeks to establish the feasibility of a computerized cognitive rehabilitation training (CCRT) program called Captain's Log, in order to improve attention and memory in Ugandan school children surviving cerebral malaria or with HIV. We also seek to establish the feasibility of a computerized neuropsychological assessment (CogState) to document CCRT neuropsychological benefit.

Methods

Sixty-five children (40 boys, 25 girls) surviving CM about 3 years earlier now 6 to 16 yrs of age ($M = 9.9$, $SD = 2.5$) were randomly assigned to CCRT intervention or to a non-intervention control group. CM CCRT consisted of 8 weeks of twice weekly Captain's Log training (<http://www.braintrain.com>) at Mulago Hospital, Uganda's national referral hospital. 60 children (24 boys, 36 girls) 6 to 16 years of age with HIV ($M = 9.8$, $SD = 2.8$) were randomly to CCRT treatment or a non-treatment control group. A third of these children were on ARV treatment. HIV CCRT consisted of 5 weeks of twice weekly Captain's Log training at the offices of Child Health Advocacy Inter-

national (CAI) in Kayunga town, a rural area 80 km east of Kampala. CAI provides home-based health care for these children (<http://www.childadvocacyinternational.co.uk/projects/uganda.htm>). CogState neuropsychological assessment (<http://www.cogstate.com>), a computerized 22 min neuropsychological screening test, was given before the start of training and again at the completion of training. CogState has few practice effects. Achenbach Child Behavior Checklist (CBCL) (<http://www.aseba.org/index.html>) was read to the principal caregiver to assess psychiatric symptoms for each study child. The CBCL was translated and back-translated into Luganda.

Results

a) In both the CM and HIV studies, the CCRT and Control groups had similar age, demographic, and neuropsychological scores before training. b) The children with CM in the CCRT intervention group had significantly greater improvement than the controls for CogState assessments on the Groton Maze Chase Task ($P = 0.001$) and Groton Maze Learning Task correct moves per second ($P = .001$). c) The CM CCRT group had greater improvements on

CBCL Internalizing Symptoms (Depression, Anxiety, Somatic Complaints) ($P = .027$). d) Consistent with the CM groups, the children with HIV in the CCRT intervention group also had significantly greater improvement than the controls on the Groton Maze Chase Task ($P = 0.034$) and Groton Maze Learning Task correct moves per second ($P = .013$). e) The HIV CCRT group did not show significant improvements compared to the controls on CBCL Internalizing or Externalizing symptoms. Only the CBCL post-test was administered.

Conclusion

We have established the feasibility of computer-based training and assessment programs in Ugandan children at risk from CNS infection. Subsequent clinical studies should evaluate CCRT along with internet-based games for learning, and internet games designed only for entertainment. This would help us better understand the key computer program ingredients for neuropsychological and psychosocial benefit.

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