



## Caregivers' depressive symptoms and parent-report of child executive function among young children in Uganda



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### ABSTRACT

Maternal mental health (particularly depression) may influence how child behavior report. Few research has focused on sub-Saharan countries where pediatric HIV concentrates and impacts child neuropsychological development and caregiver mental health. We investigated the associations between caregivers' depressive symptoms and neuropsychological outcomes in HIV-infected ( $n = 118$ ) and HIV-exposed ( $n = 164$ ) Ugandan children aged 2–5 years. We compared performance-based tests of development (Mullen Scales of Early Learning, Color Object Association Test), to a caregiver report of executive function (Behavior Rating Inventory of Executive Function, BRIEF). Caregivers were assessed with Hopkins Symptom Checklist-25 depression subscale. The associations between all BRIEF indices and caregiver's depression symptoms were differential according to child's HIV status. Caregivers with greater depressive symptoms reported their HIV-infected children as having more behavioral problems related to executive functioning. The assessment of behavior of HIV-infected children should incorporate a variety of sources of information and screening of caregiver mental health.

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### 1. Introduction

Increased access to antiretroviral treatment (ART) for children in low-income countries has significantly impacted the prognosis for HIV-infected children with the result that more children with HIV/AIDS survive to adolescence and adulthood (Anonymous, 2013). This improvement in therapeutic outcomes has changed the needs of the pediatric HIV/AIDS population with an emphasis on their quality of life, day-to-day functioning, and transition to adulthood.

As a result of the generalized HIV-epidemic in Uganda, approximately 190,000 children aged 0–14 are living with HIV (UN Joint Programme on HIV/AIDS (UNAIDS), 2012). HIV-infected children in low-income countries are now able to survive longer but are often exposed to multiple developmental risk factors including poverty, malnutrition, disease, poor home environment, and diminished care by HIV-infected caregivers that adversely affect their ability to reach their developmental potential

(Grantham-McGregor et al., 2007). Consequently, neuropsychological development is rapidly becoming an important component of pediatric HIV care and research. Cognitive and behavioral development in HIV-infected children is emphasized because early childhood is frequently identified as a point of entry on a pathway of increasing risk for later cognitive difficulties (Lughton, Cornell, Boivin & Van Rie, 2013).

Multiple neuropsychological and behavioral tests are available and have been successfully used to screen or assess cognitive development in children in low-income settings, including sub-Saharan Africa (Boivin et al., 2013) and Asia (Black et al., 2007). In these assessments, caregivers remain essential informants of child health outcomes. Parental observations of behaviors are particularly important for young children who do not possess the linguistic, motor, or sustained attention skills commonly involved in performance-based measures. However, parental mental health may influence how they report information about their children, particularly maternal depression. Maternal depression has received considerable attention for its association with child behavioral and emotional outcomes, with substantial evidence documenting a significant risk to children for internalizing and externalizing problems and general psychopathology (Goodman et al., 2011). Maternal mental health also affects optimal child development; depression symptoms in the mother can place the child at risk for cognitive deficits and

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developmental delays (Black et al., 2007). However, how maternal depression affects mothers' report on the health and well-being of their children has been explored to a lesser extent. Several studies suggest that mothers with depressive symptoms more frequently report behavioral and cognitive problems among their children than non-depressed mothers. Based on parental reports, maternal depression predicted more severe symptom reports among depressed youngsters (Kiss et al., 2007), higher rates of symptoms of depression/anxiety and aggression (Langrock, Compas, Keller, Merchant & Copeland, 2002), and more externalizing psychopathology (Maoz et al., 2014) in children and adolescents.

Ritchers and Pellegrini (1989) proposed the depression-distortion hypothesis as explanatory mechanism for the association of caregiver depression and child behavior and cognitive problems. In this view, the dysphoric emotions associated with depression are hypothesized to activate a negative perceptual bias in the caregiver's ratings of child behaviors that leads to over-reporting of child adjustment difficulties. Prior reports from mostly Europe and the US support the view that depressed mothers may exaggerate behavior and function problems in their children (Hennigan, O'Keefe, Noether, Rinehart & Russell, 2006; Ritchers, 1992). Mixed results have also been reported, including a review which found no significant influence of parental depression on child's report of psychopathology (Ritchers, 1992), while other studies have suggested that depressed parents can be better raters of their children's psychopathology than healthy parents (Tarullo, Richardson, Radke-Yarrow & Martinez, 1995). This evidence renders caregivers as necessary but potentially fallible informants of their child's behavior and cognitive development.

Studies of the association between report of behavioral problems in children and maternal depression have predominantly been conducted in high-income settings with non-HIV affected populations (Goodman et al., 2011; Hennigan et al., 2006; Kiss et al., 2007; Maoz et al., 2014). Cultural practices on child upbringing can influence the expected behavior of the child (Yang, Kuo, Wang & Yang, 2014) and this could influence how parents perceive and rate their children's cognitive abilities. Additionally, behavioral problems can be modified cross-culturally by quality of developmental milieu and caregiving practices (Boivin & Giordani, 2009). Particularly in Uganda, there is a lack of studies focusing on the shift in child behavior perception if the caregiver is experiencing depressive symptomatology. Understanding this association in families affected by HIV is particularly important given the impact of HIV illness on child neuropsychological development (Le Doare, Band & Newell, 2012), higher rates of depression among adults living with HIV (Ciesla & Roberts, 2001), and negative attribution biases that may be more pronounced when reinforced by poor child health due to HIV illness. Thus, we hypothesize that the impact of parental depression on report of child cognitive and behavioral problems may be more pronounced for families with a child who is living with HIV. With 91% of the estimated 3.4 million HIV-infected children living in sub-Saharan Africa (UN Joint Programme on HIV/AIDS (UNAIDS), 2012), it is especially important to assess the relationship between parental mental health and report of child behavior in this setting.

In this study, we examined the associations between caregivers' depressive symptoms and neuropsychological outcomes in young HIV-infected and HIV-exposed Ugandan children by comparing performance-based tests, in which the children were directly observed by trained assessors, to a caregiver report measure of behavior. The research questions addressed in the present study are as follows: (1) Is there an association between a caregiver's depression and ratings of her child's behavioral problems? (2) If this association is present, does its strength differ according to child's HIV status (infected versus exposed)? Because family environment has been shown to have an effect on child behavioral problems (Riley et al., 2009) and development (Black et al., 2007), we included the Caldwell Home Observation for Measurement of the Environment scale for infants and toddlers

(IT-HOME) (Caldwell & Bradley, 2001) to assess the extent and nature of interactions that occur within caregiver-child dyads. We incorporated the IT-HOME assessment in a final research question. (3) Does home environment modify the association between caregiver depression and their child's ratings? We hypothesized that in the context of HIV disease, caregivers with depressive symptoms would more frequently report behavior problems in their children compared to ratings from children of non-depressed caregivers and that quality of home environment could act as moderator in this relationship.

## 2. Methods

### 2.1. Sample

This is a secondary analysis of baseline data collected from all caregiver-child dyads enrolled between March 2012 and April 2014 in a randomized controlled trial (RCT) of Mediation Intervention for Sensitizing Caregivers (MISC), in Tororo, Uganda. MISC is a 1-year training program that provides caregivers with strategies for enhancing the physical and neuropsychological development of their children through day-to-day interactions at home (Klein, 1996; Klein & Rye, 2004). The trial is designed to evaluate the impact of the MISC intervention on improving child neurodevelopment and caregiver well-being. The MISC RCT included caregivers with an HIV-infected child ( $n = 118$ ) or with an HIV-exposed child ( $n = 164$ ), who though uninfected, was born to an HIV-positive mother. Eligibility criteria included that a caregiver was female, aged 18 or older, and be willing and able to participate in a year of MISC training. Thus, women were excluded if they had a severe mental illness or disability that would prevent engagement in training. Caregiver was not defined as the biological mother of the child but rather as the adult predominantly taking care of the child. The child had to be between the ages of 2–5 years without having experienced a prior illness or injury that could have caused a central nervous system insult (including a serious birth complication or an episode of severe malnutrition, cerebral malaria, bacterial meningitis or encephalitis).

### 2.2. Measures

#### 2.2.1. Child neuropsychological outcomes

Performance-based measures of child neurodevelopment are those in which there is a direct observation of the child performing a specific task. In these tests, motor, language, and visual reception skills are frequently evaluated by a trained assessor using a standardized battery of tests that can include the use of props and toys. Subjective assessments of neurodevelopment, on the contrary, rely on the report of what primary caregivers, parents, or teachers observe in a child. In general, the items from a questionnaire relating to the child's behavior are read out loud to the informant, who evaluates the extent to which those behaviors describe the child.

Two performance-based tests of child cognitive development were used in this study. The Mullen Scales of Early Learning (MSEL) is a comprehensive test consisting of 124 items measuring specific developmental domains of gross motor, fine motor, visual reception, receptive language, and expressive language. Four scales (visual reception, fine motor, receptive language, and expressive language) are combined to yield the Early Learning Composite score (MELC). The MELC serves as a general measure of fluid intelligence thought to underlie cognitive ability in general (Mullen, 1995). Age-norm scores ( $T$ -scores) were obtained from normative tables in the MSEL administration manual. The MSEL has previously been adapted for use with young children in rural Uganda and has proven to be a sensitive and useful measure in this population (Busman, Page, Oka, Giordani & Boivin, 2013). Cronbach's alpha for the MSEL was 0.84.

Children were also assessed with the Color-Object Association Test (COAT), a performance-based test that uses the placement of small

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