

Behavior and psychological functioning of young children of HIV-positive mothers in South Africa

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Adults with HIV are living longer due to earlier diagnosis and increased access to antiretroviral medications. Therefore, fewer young children are being orphaned and instead, are being cared for by parents who know they are HIV positive, although they may be asymptomatic. Presently, it is unclear whether the psychological functioning of these young children is likely to be affected or, alternatively, whether it is only when a mother is ill, that children suffer adverse effects. We, thus, aimed to compare the behavior and psychological functioning of young children (aged 6–10 years) of HIV-positive and HIV-negative mothers. We also aimed to examine the association between HIV status disclosure and child outcomes. This study uses cross-sectional data from the baseline assessment of a randomized controlled trial conducted in Tshwane, South Africa. Participants ($n = 509$) and their children were recruited from area health clinics. Among the 395 mothers with HIV, 42% reported symptoms of HIV disease. Multivariate linear regression models suggested that after adjusting for socio-demographic characteristics, children of HIV-positive mothers had significantly greater externalizing behaviors than children of HIV-negative mothers. Importantly, children whose mothers were symptomatic had greater internalizing and externalizing behaviors compared with children of HIV-negative mothers, but this was not true for children of asymptomatic mothers. Additionally, among children of HIV-positive mothers, those who had been told their mothers were sick compared with children who had been told nothing had less internalizing and externalizing behaviors and improved daily living skills. This study, therefore, provides evidence that maternal HIV disease can affect the behaviors of young children in South Africa but, importantly, only when the mothers are symptomatic from their disease. Furthermore, results suggest that disclosure of maternal illness but not HIV status was associated with improved behavior and psychological functioning among young children.

Keywords: maternal HIV; child behavior; psychological; disclosure; South Africa

Introduction

The psychological effects of parental HIV infection on children orphaned by the disease are well documented (Chi & Li, 2012). Now, however, the epidemic in sub-Saharan Africa is changing and with decreasing mortality rates (UNAIDS, 2012), fewer children are being orphaned. Additionally, greater efforts to promote HIV testing have resulted in individuals being diagnosed earlier in the course of their disease, and thus large numbers of children are being cared for by parents who are aware they are HIV positive, but are asymptomatic.

Although young children are not often told about their parents' HIV status (Nostlinger et al., 2006; Palin et al., 2009), it is commonly presumed that HIV can adversely impact children due to the effects of stigma and the psychological effects of the disease on

parents, even when they are healthy (Daniel, Apila, Bjargo, & Lie, 2007). Studies conducted in Europe and the USA have demonstrated adverse effects of parental HIV disease on young children (Esposito et al., 1999; Forehand et al., 2002; Pelton & Forehand, 2005), but it is not known to what extent these results might be reflected in an African context with a generalized epidemic. It is also unclear whether only children of mothers who are ill suffer adverse effects or whether children of asymptomatic mothers are also affected.

Thus, the aim of this study was to compare the behavior and psychological functioning of young children (aged 6–10 years) of HIV-positive and HIV-negative mothers in South Africa and determine whether maternal HIV status alone is associated with child outcomes or whether it is only when a parent is ill that children are affected.

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Methods

Subjects and study design

This study uses cross-sectional data from the baseline assessment of a randomized controlled trial designed to examine the efficacy of a support group intervention for HIV-positive mothers and their uninfected young children. The control group consisted of a smaller group of uninfected children and their HIV-negative mothers. Subjects were recruited in clinics in Tshwane, South Africa between November 2006 and May 2009. Eligibility criteria included being the primary caregiver of a child aged 6–10 years, having a documented HIV test, and speaking at least one of the four local languages. If there was more than one child in a family within the age range, the older child was selected. Families were ineligible if there was an HIV-infected child in the family or if there were other persons with serious illnesses living in the household. Table 1 shows the sample characteristics by maternal HIV status. The study protocol was approved by the institutional review boards of the University of Pretoria and Yale University.

Table 1. Maternal socio-demographic characteristics by HIV status.

	HIV + mothers (<i>N</i> = 395)	HIV– mothers (<i>N</i> = 114)	<i>p</i> - value ^a
Age (years)	33.1 ± 5.94	32.6 ± 5.49	0.431
Education ≥ 12 years	32.5%	40.4%	0.119
Employed	28.1%	42.1%	0.004
With partner	69.9%	93.9%	<0.001
Pregnant	12.7%	29.8%	<0.001
Socioeconomic index	3.6 ± 1.66	3.7 ± 1.67	0.613
Number living in the home	5.4 ± 2.89	4.9 ± 2.43	0.130
Child age (years)	8.1 ± 1.38	7.7 ± 1.29	0.006
Child gender: male	51.9%	55.3%	0.526
Time since first knowing HIV status		NA	NA
0–12 months	51.5%		
13–24 months	16.8%		
More than 24 months	31.7%		
Taking antiretroviral medication	45.1%	NA	NA
Maternal illness status		NA	NA
No or mild illness	58.0%		
Non-specific or severe illness	42.0%		

Note: ^a*p*-Values are derived from *t*-tests for continuous variables and chi-square tests for categorical variables to determine differences by HIV status.

Measures

Measures were reviewed by the research team for conceptual applicability and by local community advisors for cultural relevance. All instruments were translated into the four local languages, back-translated, and then piloted with 20 mothers.

Socio-demographic data included a “housing index” as a measure of socioeconomic status with scores ranging from 0 to 5, indicating amenities (e.g., electricity) present in the home. Measures of child behavior obtained by maternal report included the Vineland Adaptive Behavior Scales, which measured children’s adaptive functioning across three domains: communication ($\alpha = 0.73$), daily living skills ($\alpha = 0.68$), and socialization ($\alpha = 0.67$; Sparrow, Cicchetti, & Balla, 2005), and the Child Behavior Checklist (CBCL), which assessed children’s internalizing and externalizing behaviors ($\alpha = 0.85$ and $\alpha = 0.92$, respectively; Achenbach & Rescorla, 2001). Psychological measures were completed by the children themselves and included the Children’s Depression Index (CDI, $\alpha = 0.72$; Kovacs, 1992), the Revised-Children’s Manifest Anxiety Scale (RCMAS, $\alpha = 0.74$; Reynolds & Richmond, 1994), and the BarOn Emotional Quotient Inventory: Youth Version, which measures children’s emotional intelligence ($\alpha = 0.79$; BarOn & Parker, 2000).

HIV-positive mothers were considered symptomatic if, in the prior three months, they reported any nonspecific symptoms (unintentional weight loss > 5 kg or fatigue that interfered with daily activities for more than two weeks) or an HIV-related illness satisfying WHO clinical staging 3 or 4 (WHO, 2007). Subjects reporting milder symptoms were considered to be nonsymptomatic. Mothers were also asked about what their children had been told about their HIV status. Disclosure was categorized as “partial” when children had been told that something was wrong with the mother’s health, but there had been no mention of HIV/AIDS.

Statistical analysis

We first examined the unadjusted associations between HIV status and socio-demographic characteristics and children’s behavior and psychological functioning using independent sample *t*-tests and chi-square tests for continuous and categorical variables, respectively. Next, we constructed multivariate linear regression models to determine if HIV status was associated with child outcomes after adjusting for all socio-demographic characteristics. To investigate associations between child outcomes and maternal illness and disclosure status, subsequent regression models were constructed replacing HIV status with

corresponding dummy variables for maternal illness and disclosure status. We consider significant results to be those with p -values < 0.01 to adjust for multiple comparisons.

Results

Compared with HIV-negative mothers, significantly fewer HIV-positive mothers lived with a partner, were employed, and were pregnant at the time of the interview (Table 1). Additionally, the children of HIV-positive mothers were slightly older. In unadjusted analysis, children of HIV-positive mothers tended to have greater externalizing behaviors and higher emotional intelligence than children of HIV-negative mothers ($p < 0.05$; Table 2). After adjusting for socio-demographic characteristics, children of HIV-positive mothers had significantly greater externalizing behaviors ($p < 0.01$), but there was not a significant difference in emotional intelligence.

We repeated the analyses to determine whether differences in outcomes were related to whether or not the mother had been ill. After adjusting for socio-demographic characteristics, symptomatic maternal illness was significantly associated with greater internalizing and externalizing behaviors compared to mothers who were HIV negative ($p < 0.01$; Table 3), but there were no significant differences between children of nonsymptomatic mothers and children of HIV-negative mothers.

Among children of HIV-positive mothers, only 29 (7.4%) had been informed of their mothers' HIV status and 18 (4.6%) experienced partial disclosure. Slightly more children of the symptomatic mothers

had been told something about their mothers' condition (15.7%) than the children of nonsymptomatic mothers (9.2%), but there was little difference in disclosure about HIV status: 8.4% versus 6.6%, respectively. Children to whom there had been partial disclosure had significantly less internalizing and externalizing behaviors and had higher daily living skills compared with those who had been told nothing; there was no such association for those told about HIV (Table 4). In our post-hoc analysis, disease severity did not moderate the effect of disclosure on child outcomes ($p > 0.01$).

Discussion

The results of this study, conducted in an African population, illustrate that it is not the mother's HIV status, but whether or not she has been ill, that affects a young child's behavior, a finding similar to the results of studies conducted in the USA (Murphy & Marelich, 2008; Murphy, Marelich, & Hoffman, 2002). There were no differences, however, between the two groups on any of the child-completed psychological measures, which contrasts with results of similar studies conducted in the USA using the same measures (CDI and RCMAS). These instruments have not been validated in the South African context, and despite our best efforts at cultural adaptation, they may not have been robust enough to use with young children. There were also no differences in adaptive functioning scores between the children of HIV-positive and HIV-negative mothers. This might be expected, however, as the mothers had only known of their HIV status for an average of one year, thus much of the

Table 2. Comparison of child behavior and psychological functioning by maternal HIV status.

	HIV + mothers (M ± SD)	HIV–mothers (M ± SD)	Unadjusted p -value ^a	Adjusted parameter estimate (standard error) ^b
Mother-completed instruments				
Adaptive functioning (Vineland)				
Communication	95.3 ± 19.46	94.7 ± 19.05	0.747	−0.27 (2.154)
Daily living skills	94.5 ± 18.71	92.6 ± 15.56	0.270	0.95 (2.036)
Socialization	109.7 ± 17.63	109.6 ± 17.36	0.987	0.19 (2.043)
Child behavior (CBCL)				
Internalizing behavior	11.8 ± 8.75	10.8 ± 7.75	0.238	1.16 (1.201)
Externalizing behavior	13.7 ± 11.65	11.2 ± 10.96	0.042	3.17 (1.302)*
Child-completed instruments ^c				
Depression (CDI)	7.3 ± 4.57	7.7 ± 4.78	0.415	0.04 (0.582)
Anxiety (RCMAS)	9.0 ± 5.40	9.4 ± 5.07	0.529	0.06 (0.650)
Emotional intelligence (BarOn)	74.0 ± 9.99	71.2 ± 9.71	0.017	1.06 (1.157)

Notes: ^a p -Values are derived from t -tests for continuous variables and chi-square tests for categorical variables to determine differences by HIV status.

^bEstimates derived from multivariate linear regression models adjusted for socio-demographic characteristics.

^cAdministered only to children aged 7–10 years ($N = 379$).

* $p < 0.01$.

Table 3. Multivariate linear regression models examining the association between child outcomes and maternal illness severity, adjusted for socio-demographic characteristics.

	HIV –	Nonsymptomatic	Symptomatic
	Parameter estimate (standard error)		
Mother-completed instruments			
Adaptive functioning (Vineland)			
Communication	REF	0.63 (2.279)	–1.78 (2.491)
Daily living skills	REF	1.20 (2.156)	0.53 (2.354)
Socialization	REF	0.87 (2.161)	–0.95 (2.356)
Child behavior (CBCL)			
Internalizing behavior	REF	–0.41 (1.254)	3.78 (1.371)*
Externalizing behavior	REF	1.52 (1.360)	5.95 (1.487)*
Child-completed instruments			
Depression (CDI)	REF	–0.23 (0.629)	0.44 (0.687)
Anxiety (RCMAS)	REF	0.23 (0.705)	–0.199 (0.763)
Emotional intelligence (BarOn)	REF	0.61 (1.251)	1.72 (1.356)

Notes: REF, Reference.

* $p < 0.01$.

children's development occurred prior to the HIV diagnosis.

Although the majority of children in this study had not been told anything about their mothers' HIV status, the small number of children who were told something was wrong but without mention of HIV had significantly better behavior and adaptive functioning. When disclosure included mention of HIV status, there were no significant differences from those who had not been told anything. These results may be seen as supporting the WHO guidelines on HIV disclosure, which recommend an incremental approach depending on a child's cognitive skills and emotional maturity (WHO, 2011). It is possible, however, that those mothers who were able to disclose their health condition were those experiencing better quality relationships with their children, thus explaining the more favorable outcomes (Hough, Brumitt, Templin, Saltz, & Mood, 2003; Nostlinger et al., 2006).

Implications

These findings suggest that early antiretroviral treatment for HIV-infected women before they become ill might not only benefit women but also could avoid

Table 4. Multivariate linear regression models examining the association between type of disclosure and child behavior and psychological functioning.

	Parameter estimate (standard error)		
	No disclosure	Partial disclosure	Full disclosure
Mother-completed instruments			
Adaptive functioning (Vineland)			
Communication	REF	8.77 (4.652)	2.77 (3.806)
Daily living skills	REF	13.75 (4.547)*	4.21 (3.616)
Socialization	REF	–1.61 (4.371)	2.48 (3.479)
Child behavior (CBCL)			
Internalizing behavior	REF	–8.01 (2.577)*	1.70 (2.070)
Externalizing behavior	REF	–8.73 (2.759)*	2.52 (2.216)
Child-completed instruments			
Depression (CDI)	REF	1.40 (1.333)	1.95 (1.254)
Anxiety (RCMAS)	REF	–0.53 (2.652)	–3.12 (2.577)
Emotional intelligence (BarOn)	REF	0.65 (1.512)	0.97 (1.426)

Notes: Models constructed among children whose mothers are HIV positive and are adjusted for socio-demographic characteristics and whether or not the mother had been symptomatic.

* $p < 0.01$. REF, Reference.

adverse effects of maternal illness on child behavior. Avoiding these adverse effects could have a significant impact on the well-being of large numbers of children in countries with high-prevalence, generalized HIV epidemics. The results also suggest that disclosure of maternal illness and not HIV diagnosis may be associated with better child behavior and psychological functioning among young children. Such discussions with children allow for the issue to be addressed at the appropriate developmental level while potentially avoiding the ill effects of maintaining secrets. Further research is necessary to help parents optimize this process of disclosure to provide the greatest benefit to children.

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