

A comparative study of the psychological problems of HIV-infected and HIV-uninfected children in a South African sample

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Abstract

According to research children living with HIV experience elevated levels of depression, anxiety, ADHD and disruptive behavioural disorders. Although South Africa's paediatric population that is infected with the human immunodeficiency virus (HIV) is the largest worldwide, little research has been conducted on their mental health challenges. However, attributing high levels of mental health problems solely to their HIV status can be problematic as there may be other contributory factors. This research explored the mental health problems of HIV-infected children and compared these to the mental health problems of their HIV-unaffected peers from similar backgrounds. Data was gathered from two samples of child and caregiver pairs. HIV-infected children (aged 6 to 12 years) and their caregivers/mothers (n=54) were recruited from the Kalafong paediatric clinic where they received medical treatment and routine ART. A comparison group of 113 HIV-uninfected children and their uninfected mothers were recruited from primary care clinics in the same community. Caregivers completed the Child Behaviour Checklist (CBCL) to assess children's mental health. Children completed the Self-Description Questionnaire (SDQ-I) and the Revised Children's Manifest Anxiety Scale (RCMAS). The scores of the psychometric sub-scales of the two groups were compared using parametric and non-parametric statistics. HIV-infected children experienced more somatic and affective problems, physiological anxiety, less ADHD and lower self-esteem than HIV-uninfected children in the comparison group, while controlling for age differences. The high levels of mental health problems of both groups of children may be attributed to similar difficult socio-economic circumstances. The fact that most infected children were not aware of their HIV-status could have influenced the results. Mental health services should not be limited to HIV-infected children but should form part of all health care services.

Keywords: Paediatric HIV, mental health problems, comparison group, CBCL, South Africa

Introduction

Despite the success of prevention of mother-to-child transmission, many children in South Africa still acquire HIV through vertical transmission (Feucht, Meyer, & Kruger, 2014; Feucht et al., 2016). This, together with enhanced antiretroviral treatment (ART) that prolongs life, has resulted in a large HIV-infected paediatric population (Massyn et al., 2013; UNAIDS, 2015). This poses a new challenge: the psychological complications of growing up with HIV (Morobadi & Webber, 2014).

Research findings on mental health of HIV-infected adults (Brandt, 2009; Breuer, Myer, Struthers, & Joska, 2011) cannot be extrapolated to apply to children (Rao et al., 2007), because of differences in children's cognitive and emotional abilities, familial and societal expectations. Furthermore, the effects of HIV on the central nervous system can be amplified as children's nervous systems are still developing (Lowenthal, Cruz, & Yin, 2010). Research has associated elevated levels of depression, anxiety, ADHD and behavioural disorders with paediatric HIV (Betancourt et al., 2011a; Earls, Raviola, & Carlson, 2008; Myer et al., 2008; Nozyce et al., 2006; Rao et al., 2007; Scharko, 2006). Although South Africa has the largest HIV-positive paediatric population worldwide (UNAIDS, 2015), surprisingly little research has been conducted on the mental health challenges of South African children living with HIV. Research on children's mental health can benefit the health care system to address children's mental health issues early to limit escalating problems, risk behaviour and ART-non-adherence (Amzel et al., 2013; Betancourt et al., 2011a; Biadgilign et al., 2009).

High levels of mental health problems among HIV-infected children cannot be attributed solely to their HIV-infection though, as there may be other contributing factors (Mellins et al., 2003; Tadesse et al., 2012). Research that compares the mental health outcomes of HIV-infected children with a similar comparison group of HIV-uninfected children would provide a more accurate representation of the mental health of HIV-infected children. In this regard,

Betancourt et al. (2011b) compared the prevalence of mental health problems among HIV-infected, HIV-affected¹ and HIV-unaffected² Rwandan children (10-17 years). They found that HIV-infected and -affected children showed higher levels of depression, anxiety and conduct problems compared to HIV-unaffected children, after controlling for contextual variables. Similarly, a study conducted in India indicated that 45% of HIV-positive children experienced mental health problems, compared to 35% of their HIV-negative siblings (affected) (Das, Maiti, & Sinha, 2016). In a South African study, Sipsma and colleagues (2013) found non-significant differences between HIV-affected and -unaffected children (6-10 years) except when the affected children's HIV-positive mothers became ill. These results underscore the complexities of studying mental health among children living with HIV and emphasise the need for comparison groups. The purpose of the present research was to explore whether HIV-infected children experienced increased levels of mental health problems and to compare these to their HIV-uninfected peers from a similar background.

Method

Study design and subjects

A cross-sectional comparative study was done. Data was gathered from two samples of child-caregiver pairs: 54 HIV-infected children and their caregivers and a comparison group of 113 HIV-uninfected children and their caregivers. A caregiver refers to the primary caregiver of a child (mother or legal guardian). HIV-infected children were recruited from the paediatric outpatient clinic of Kalafong Hospital, a tertiary and academic hospital in Tshwane. It is a large clinic (more than 250 new HIV-infected children per year (Feucht et al., 2016)) where children receive medical treatment and routine ART. The clinic provides multi-disciplinary services to children from surrounding low socio-economic communities

¹ HIV-affected children are HIV-negative children who live with an HIV-positive caregiver or who lost a parent due to AIDS-related complications.

² HIV-unaffected children are HIV-negative children not exposed to HIV in their immediate family.

(Statistics South Africa, 2011) that cannot afford private health care or medical insurance (Harris et al., 2011). The following selection criteria were used:

- Children were between 6 and 12 years old.
- Children's *HIV-positive status* was documented in their medical files.
- Each child was accompanied by a caregiver.

The comparison group consisted of HIV-negative children recruited from primary health care clinics in the area surrounding Kalafong Hospital. The same criteria were used to recruit participants except that the *HIV-negative test results* of both the mother/caregiver and child were noted in their medical files (HIV testing is routinely done). Therefore, the children in the two samples were in the same age range and from the same geographic area and differed in terms of HIV-status. The same comparison group was used in the research of Sipsma et al. (2013).

The children and their caregivers were interviewed at the clinic they visited. The interviews were structured and conducted by trained research assistants from the same community, in the vernacular of the participants (Sepedi or Setwana). The data of the HIV-infected group was collected just after and within three months of those for the HIV-uninfected group.

Data collection instruments

The structured interviews with the caregivers consisted of questions on demographic details such as caregivers' age, educational and marital status, household composition, children's age, gender, grade in school, health status and status disclosure to the child. This was followed by the assessment of the children's mental health.

Child Behaviour Checklist (CBCL)

The children's emotional and behavioural problems were assessed using the parent-report version of the CBCL (Achenbach & Rescorla, 2001). Caregivers rated the typical behaviours of children during the preceding six months on a three-point Likert scale ranging from "absent" to "occurs often". The Diagnostic and statistical manual of mental disorders (DSM) orientated scales of the CBCL (6–18 years), which are consistent with DSM-IV diagnostic categories, were used (Achenbach & Dumenci, 2001). These include six subscales:

- Affective problems
- Anxiety problems
- Somatic problems
- ADHD
- Oppositional problems
- Conduct problems

The CBCL had been adapted for previous research involving the specific population. The items were reviewed by local community advisors for conceptual applicability and cultural relevance. Items were translated into four local languages, back-translated and piloted with 20 mothers (Eloff et al., 2014; Sipsma et al., 2013). Although the CBCL has been used in several South African studies (Boeving-Allen et al., 2014; Cluver, Gardner, & Operario, 2007; Eloff et al., 2014), it has not been standardised for South African samples. Norms provided by Achenbach, Dumenci, and Rescorla (2003) for the DSM-orientated subscales were thus used to categorise the behaviour of the children. The DSM-orientated scales have the following psychometric properties: internal consistency ranging from $\alpha=0.75$ to $\alpha=0.84$ (overall mean=0.80) and test-retest reliability (over a period of 8 to 16 days) ranging from $\alpha=0.78$ to $\alpha=0.88$ (overall mean=0.83) (Achenbach & Dumenci, 2001;

Achenbach & Rescorla, 2001; Achenbach et al., 2003). In this study the Cronbach alpha score for the total scale was 0.91 and scores for sub-scales were acceptable, except for the anxiety and somatic sub-scales (Table 3).

The children responded verbally to questions of two psychometric scales:

Revised Children's Manifest Anxiety Scale (RCMAS)

The RCMAS (Reynolds & Richmond, 1978) which consists of 37 self-report items, was used to assess anxiety among children. Children provided a yes or no response on items in the following subscales:

- Physiological anxiety
- Worry/Oversensitivity
- Social concerns/Concentration

The RCMAS shows satisfactory reliability of 0.82, with the respective subscales showing reliability coefficients ranging from 0.63-0.77 (Reynolds & Richmond, 1985). The nine-month test-retest reliability of the instrument is 0.68 and the internal consistency is acceptable (Reynolds & Paget, 1983). This study found high reliability of the scale as a whole ($\alpha=0.80$), but similar to findings of Boyes and Cluver (2013) the reliability of the subscales were low, ranging from 0.56 to 0.78 (Table 4).

Self-Description Questionnaire (SDQ-I)

The non-academic and general self-concept subscales of the SDQ-I (Marsh, 1988) for pre-adolescents were used to assess self-concept. The SDQ-I is a widely used and extensively researched self-concept assessment instrument (Butler & Gasson, 2005; Byrne, 1996; Rosen et al., 2010). Respondents indicated their agreement on a four-point scale ranging from "No never" to "Yes always". The subscales comprise:

- Physical ability
- Physical appearance
- Social ability
- Relationship with parents
- General self

The reliability scores of these scales were reported as between 0.81 and 0.92. The construct validity ranged from 0.80 to 0.92 for the subscales (Marsh, 1988). In the current study the Cronbach alpha for the total scale was 0.93, with subscales ranging from .69 to 0.78 (Table 5).

Statistical analysis

Data was analysed using the IBM SPSS Statistics version 24 computer package. Differences in biographic data across groups were explored using Pearson's chi square test (for gender) and t-test for independent samples (for age). A comparison of CBCL DSM-orientated scores in terms of norms across groups was performed by means of Pearson's chi square test. Although the scales were not normally distributed the t-test for independent samples and the Mann-Whitney U test (non-parametric statistics) were used to compare the mental health scores of the two groups – the Mann-Whitney test was regarded as more accurate. The results of the parametric and non-parametric tests were more or less comparable which justified performing MANCOVAs with age as covariate.

Ethical procedures

The study was approved by the Ethics Committee of the Faculty of Humanities, University of Pretoria. Participation in the research was voluntarily. All caregivers gave informed consent and children gave verbal assent before interviews were conducted. No identifying data was included in the data base.

Results

Demographic data of the HIV-infected and -uninfected samples is given in Table 1. The two groups were similar in terms of gender composition ($\chi^2(1) = 1.311$; $p=0.252$), but on average the HIV-infected group were significantly older than the HIV-uninfected group ($t=-2.196$, $p<0.05$).

Table 1. Comparison of demographic information of HIV-infected and –uninfected children

	HIV-infected children (n = 54)	HIV-uninfected children (n = 113)
Male	25 (46.30%)	63 (55.75%)
Female	29 (53.70%)	50 (44.25%)
Mean age	8.26 years (SD 1.60)	7.75 years (SD 1.285)
Grade in school (mode)	Grade 2	Grade 2
Child knows HIV status	17.5%	
Child has suffered serious illness	63%	

The mental health problems of the children as reported by their caregivers, given in terms of the CBCL norms (Achenbach et al., 2003) are given in table 2. Of the HIV-infected children, 42.6% experienced somatic problems and 37.1% affective problems (borderline and clinical levels). They did not experience high levels of anxiety, ADHD and conduct problems. The HIV-uninfected children experienced high levels of conduct problems (32.7%). When the clinical and borderline levels were grouped together and compared between groups, the CBCL norms for affective problems and HIV groups were significantly associated ($\chi^2(1)=4.699$; $p=0.030$). More HIV-infected children fell in the clinical/borderline category than was expected under the independence model.

Table 2. HIV-infected and -uninfected children's CBCL DSM-orientated scores in terms of norms

Sub-scales		Clinical	Borderline	Normal	Total	χ^2
Affective problems	HIV-infected	13 (24.1%)	7 (13.0%)	34 (63.0%)	54	0.030
	HIV-uninfected	12 (10.6%)	12 (10.6%)	89 (78.8%)	113	
Anxiety problems	HIV-infected	0 (0%)	7 (13.5%)	45 (86.5%)	52	0.779
	HIV-uninfected	0 (0%)	12 (11.1%)	96 (88.9%)	108	
Somatic problems	HIV-infected	15 (27.8%)	8 (14.8%)	31 (57.4%)	54	0.140
	HIV-uninfected	15 (13.3%)	20 (17.7%)	78 (69.0%)	113	
Attention deficit/Hyperactivity (ADHD)	HIV-infected	2 (3.7%)	5 (9.3%)	47 (87.0%)	54	0.301
	HIV-uninfected	9 (8.0%)	10 (8.8%)	94 (83.2%)	113	
Oppositional defiant problems	HIV-infected	2 (3.7%)	0 (0.0%)	52 (96.3%)	54	0.065
	HIV-uninfected	8 (7.1%)	6 (5.3%)	99 (87.6%)	113	
Conduct problems	HIV-infected	6 (11.1%)	6 (11.1%)	42 (77.8%)	54	0.162
	HIV-uninfected	20 (17.7%)	17 (15.0%)	76 (67.3%)	113	

In comparison with HIV-uninfected children, HIV-infected children obtained statistically significant higher median raw scores on somatic problems, affective problems (nears significance) and lower scores on ADHD using the raw scores of children (Table 3). The t-tests for independent samples gave almost similar results.

HIV-infected children's median raw scores were significantly higher on physiological anxiety (somatic symptoms of anxiety) than uninfected children ($p < 0.05$), but these scores did not differ significantly on the total anxiety scale (Table 4). The t-test for independent samples showed similar differences.

The results of both parametric and non-parametric tests on the SDQ scores (see Table 5) indicated that HIV-infected children rated themselves significantly lower than did HIV-uninfected children, especially with regard to physical and social ability ($p < 0.05$).

In an effort to identify demographic characteristics that possibly contributed to mental health of children, several variables were explored. Only two variables, age and illness, were related to children's mental health scores and showed significant statistical differences. A MANCOVA with age as covariate (Table 6) indicated that younger children experienced

Table 3. Comparison of HIV-infected and uninfected children on CBCL sub-scales

	α	items		HIV+ (n=54)	HIV- (n=113)	t-value	p-value	Mann-Whitney test	p-value
Affective problems	.73	13	Mean (SD) Median	3.63 (3.53) 3.00	2.67 (3.28) 2.00	-1.721	0.087*	-1.745	0.081*
Anxiety problems	.48	6	Mean (SD) Median	2.13 (2.41) 1.5	2.42 (2.19) 2.00	0.764	0.446	1.181	0.238
Somatic problems	.57	7	Mean (SD) Median	3.02 (2.57) 3.00	2.01 (2.01) 2.00	-2.268	0.006**	-2.460	0.014**
ADHD	.74	7	Mean (SD) Median	3.35 (3.12) 2.00	4.57 (3.41) 4.00	2.213	0.028**	2.211	0.027**
Oppositional behaviour	.69	5	Mean (SD) Median	1.87 (1.96) 1.5	2.38 (2.63) 2.00	1.266	0.207	0.943	0.346
Conduct disorder	.86	17	Mean (SD) Median	3.22(3.73) 2.00	4.63 (6.00) 3.00	1.855	0.066*	0.735	0.462
CBCL total	.91	55	Mean (SD) Median	17.22 (12.99) 16.00	18.67 (15.18) 16.00	0.604	0.547	0.231	0.817

*p<0.1; **p<0.05

Table 4. Comparison of HIV-infected and -uninfected children's RCMAS sub-scales

	α	items		HIV-infected children (N = 31)	HIV-uninfected children (N = 109)	t-value	<i>p</i> -value	Mann- Whitney	<i>p</i> -value
Physiological anxiety	.63	10	Mean (SD)	3.58 (2.4)	2.54 (2.0)	-2.73	0.007*	-2.372	0.018**
			Median	3.00	2.00				
Social concerns/ Concentration	.56	7	Mean (SD)	1.94 (1.7)	1.70 (1.8)	-0.450	0.653	-0.667	0.505
			Median	1.00	1.00				
Worry/Oversensitivity	.78	11	Mean (SD)	4.39 (2.8)	4.03 (2.8)	-0.732	0.465	-0.779	0.436
			Median	5.00	4.00				
Total anxiety	.80	37	Mean (SD)	16.52 (5.8)	14.9 (5.87)	-1.665	0.098	-1.643	0.100
			Median	16.00	14.00				

Note ** $p < .05$

Table 5. Comparison of HIV-infected and -uninfected children's SDQ sub-scales

	α	items		HIV-positive children (N = 50)	HIV-negative children (N = 100)	<i>t-value</i>	<i>p-value</i>	Mann-Whitney U	<i>p-value*</i>
Physical ability	.73	5	Mean (SD)	20.58 (4.23)	22.83(3.28)	3.299	0.001**	4.083	<0.0001**
			Median	21.50	24.00				
Physical appearance	.78	5	Mean (SD)	23.10 (3.30)	23.35 (3.15)	0.451	0.653	0.481	0.630
			Median	24.00	24.00				
Social ability	.69	5	Mean (SD)	20.94 (4.32)	22.27 (3.67)	1.972	0.05*	2.225	0.026**
			Median	21.00	23.00				
Relationship with parents	.69	5	Mean (SD)	22.54 (3.49)	22.4 (3.43)	-0.234	0.815	-0.439	0.661
			Median	23.5	23.00				
General self-evaluation	.72	5	Mean (SD)	22.18 (3.67)	22.79 (3.25)	1.037	0.302	0.991	0.322
			Median	23.00	23.00				
Total score	.93	25	Mean (SD)	109.34 (16.89)	113.64 (15.19)	1.574	0.118	2.101	0.036**
			Median	112.5	115.5				

Note** $p < .05$

more mental health problems on the CBCL total score ($p<0.05$), ADHD ($p<0.01$) and oppositional behaviour ($p<0.05$). When controlling for age, differences in affective ($p<0.1$) and somatic problems ($p<0.01$) were still significant. No significant age differences were found for RCMAS and SDQ scores.

Table 6. MANCOVA: Comparison of HIV-infected and uninfected children on CBCL sub-scales with Age as covariate

	Model fit		HIV status		Age as covariate	
	F-value df 2;162	p-value	F-value df 1;162	p-value	F-value df 1;162	p-value
Affective problems	2.467	0.088*	3.754	0.054*	1.954	0.164
Anxiety problems	1.091	0.338	0.294	0.588	1.595	0.208
Somatic problems	3.814	0.024**	7.494	0.007***	0.010	0.920
ADHD	8.227	<0.001***	2.828	0.095*	11.311	0.001***
Oppositional behaviour	3.113	0.047**	0.811	0.369	4.588	0.034**
Conduct disorder	1.928	0.149	1.868	0.174	1.345	0.248
CBCL total	2.361	0.098*	0.062	0.803	4.350	0.039**

* $p<0.1$; ** $p<0.05$; *** $p<0.01$

HIV-infected children who had been seriously ill previously (tuberculosis, pneumonia and abdominal problems), experienced more somatic problems ($p<0.05$) compared to children who had not been seriously ill.

Discussion

This research provides interesting results that differ in some respects from previous studies. The most prevalent mental health problems among HIV-infected children were

somatic and affective problems (among 42.6% and 37.1% children respectively), whereas previous research reported affective problems and anxiety as the most common mental health problems (Earls et al., 2008; Rao et al., 2007; Scharko, 2006). In this sample more children were identified with affective problems (37.1%) than the average prevalence of 25% identified in Scharko's (2006) review. Most studies involving HIV-infected children (Earls et al., 2008; Rao et al., 2007) do not corroborate the high prevalence of somatic problems found in this study. It should be noted that the CBCL, used to assess mental health, was culturally adapted for this population, but has not yet been standardised for African populations. The high rates of somatic problems and the near-absence of anxiety may be related to cultural factors. In many non-Western cultures, somatic symptoms tend to be manifestations of mood and anxiety disorders (Rohleder, 2012); therefore, the high prevalence of somatic problems may represent elevated affective and anxiety symptoms (as also reflected in the physiological anxiety subscale of the RCMAS). Children are also more inclined than adults to express anxiety and mood disorders in terms of somatic complaints (Sadock, Kaplan, & Sadock, 2007). The research results also indicate that HIV-infected children who had suffered serious illnesses previously showed elevated levels of somatic problems. These problems can thus be related to their own or their caregivers' perception of their health status. The high somatic and affective scores may illustrate the effects that serious illness and children's general physical health could have on their mental health, confirming the findings of previous research (Kohut et al., 2013). Contrary to findings in previous research (Benton & Ifeagwu, 2008; Earls et al., 2008; Nozyce et al., 2006; Rao et al., 2007; Scharko, 2006), anxiety, oppositional behaviour, conduct and ADHD problems were not rated high among HIV-infected children in this study.

Compared to HIV-uninfected children, HIV-infected children were found to have higher somatic and affective problems, physiological anxiety and lower levels of self-esteem. The

differences were mostly related to their physical or perceived physical condition which could be related to their HIV-symptoms (Phelps, Ferrer, Kim & Schwarzwald, 2010) or side-effects of ART (Roa et al., 2007). The uninfected group rated higher in terms of ADHD, which could be indicative of being more healthy and energetic or could be the result of the uninfected group being younger than the infected group.

In this context, HIV-infection may not be the major contributing factor to children's mental health problems. High levels of mental health problems of both groups may be attributed to growing up in similar difficult socio-economic circumstances. Poverty is associated with mental health problems in adults and children (Boeving-Allen et al., 2014; Reiss, 2013).

Another factor that may have contributed to the findings, is that only 17.5% of the HIV-infected sample was aware of their HIV-positive status. They may be aware of their physical condition and routine hospital visits, but may not understand why they have these experiences. Previous research shows that children's knowledge of their own HIV-status affected their mental health in a variety of ways (Brown et al., 2011; Wiener, Mellins, Marhefka, & Battles, 2007).

Furthermore, children in the comparison group may include children with other chronic illnesses, which could affect their risk for negative psychosocial outcomes (Kohut et al., 2013). They were HIV-uninfected, but may not be completely HIV-*unaffected*. Indirect effects of HIV may influence their mental health (Hosegood, 2009).

Limitations

The small sample of the HIV-infected children ($n = 54$) identified from one large clinic in a hospital setting, may have limited the generalisability of the results. The results may therefore, not apply to all HIV-infected South African children from different socio-economic

backgrounds. Unfortunately, levels of poverty were not assessed in this study and could not be adjusted for.

The comparison group were recruited from primary health care clinics to have a similar group of children that visited clinics but were HIV-uninfected. Their reasons for visiting the clinics were not established and could have a bearing on their mental health. In their study, Sipsma et al. (2013) who used the same comparison group, did not identify differences between HIV-affected and –unaffected children.

Although the assessment instruments were adapted for cultural appropriateness and translated into vernacular, they had been developed based on Western conceptualisations of mental health. Because of the lack of norms for South African children, United States norms were used to categorise CBCL scores according to DSM categories. As a result different cultural experiences and expressions might not have been accommodated. Nevertheless, previous researchers described the internal validity of these instruments as good (Boeving-Allen et al., 2014).

In this study the overall internal consistency of scales was high, except for the CBCL anxiety and somatic scales and the RCMAS physiological anxiety scale. Two of these scales showed most differences between the two groups. Caution is needed when drawing conclusions from these scales.

The CBCL is a parent-report measure. Mellins et al. (2006) and Rao et al. (2007) warned of a tendency among parents to over-report affective and anxiety symptoms in children. As a counteractive measure the RCMAS was administered alongside the CBCL to corroborate the results of caregivers' reports.

Conclusion

This research contributes to a gap in the South African literature on the mental health of children living with HIV. It confirms international research that many HIV-infected children experience clinical levels of affective and somatic problems, but do not find high levels of behavioural problems. The somatic problems are more prominent in this research which may reflect cultural differences. The comparison between HIV-infected and uninfected children (6-12 years) has not been researched in this context before. The finding that HIV-infected children experience more somatic and affective problems, while uninfected children experience more behavioural problems (such as ADHD), may indicate that elevated levels of mental health problems cannot be attributed solely to HIV-infection. The finding that younger children demonstrate more behavioural problems, make a case that mental health services should be available to young children and their caregivers. It can benefit the health system to address mental health problems of children early to avoid additional problems with ART adherence and risk behaviour (Amzel et al., 2013; Betancourt et al., 2011a; Biadgilign et al., 2009). Mental health care should not be limited to HIV-infected children, but should form part of all health care services because all the children in this study experienced high levels of mental health problems.

References

- Achenbach, T. M., & Dumenci, L. (2001). Advances in empirically based assessment: revised cross-informant syndromes and new DSM-oriented scales for the CBCL, YSR, and TRF: Comment on Lengua, Sadowksi, Friedrich, and Fischer (2001). *Journal of Consulting and Clinical Psychology, 69*(4), 699-702.
<http://dx.doi.org/10.1037/0022-006X.69.4.699>
- Achenbach, T. M., Dumenci, L., & Rescorla, L. A. (2003). DSM-oriented and empirically based approaches to constructing scales from the same item pools. *Journal of Clinical Child and Adolescent Psychology, 32*, 328–340.
http://dx.doi.org/10.1207/S15374424JCCP3203_02

- Achenbach, T. M., & Rescorla, L. A. (2001). *Manual for the ASEBA School-Age Forms & Profiles*. Burlington, VT: ASEBA
- Amzel, A., Toska, E., Lovich, R., Widyono, M., Patel, T., Foti, C., ... Altschuler, J. (2013). Promoting a combination approach to paediatric HIV psychosocial support. *AIDS*, 27(Suppl. 2), 147–157.
- Benton, T. D. & Ifeagwu, J.A. (2008). HIV in adolescents: What we know and what we need to know. *Current Psychiatry Reports*, 10 (2), 109-115. <http://doi.org/10.1007/s11920-008-0020-7>.
- Betancourt, T. S., Meyers-Ohki, S., Stulac, S. N., Elizabeth Barrera, A., Mushashi, C., & Beardslee, W. R. (2011a). Nothing can defeat combined hands: Protective processes and resilience in Rwandan children and families affected by HIV/AIDS. *Social Science and Medicine*, 73(5), 693–701. <http://doi.org/10.1016/j.socscimed.2011.06.053>
- Betancourt, T. S., Rubin-Smith, J., Beardslee, W. R., Stulac, S. N., Fayida, I., & Safren, S. A. (2011b). Understanding locally, culturally, and contextually relevant mental health problems among Rwandan children and adolescents affected by HIV/AIDS. *AIDS Care*, 23(4), 401–412. doi:10.1080/09540121.2010.516333.
- Biadgilign, S., Deribew, A., Amberbir, A., & Deribe, K. (2009). Barriers and facilitators to antiretroviral medication adherence among HIV-infected paediatric patients in Ethiopia: A qualitative study. *SAHARA-J: Journal of Social Aspects of HIV/AIDS*, 6(4). <http://dx.doi.org/10.1080/17290376.2009.9724943>.
- Boeving-Allen, A. B., Finestone, M., Eloff, I., Sipsma, H., Makin, J., Triplett, K., ... Forsyth, B. W. C. (2014). The role of parenting in affecting the behavior and adaptive functioning of young children of HIV-infected mothers in South Africa. *AIDS and Behavior*, 18(3), 605–616. doi.org/10.1007/s10461-013-0544-7
- Boyes, M.E. & Cluver, L.D. (2013). Performance of the Revised Children’s Manifest Anxiety Scale in a sample of children and adolescents from poor urban communities in Cape Town. *European Journal of Psychological Assessment*, 29, 113-120. doi.org/10.1027/1015-5759/a000134

- Brandt, R. (2009). The mental health of people living with HIV/AIDS in Africa: A systematic review. *African Journal of AIDS Research*, 8(2), 123–133.
doi.org/10.2989/AJAR.2009.8.2.1.853
- Breuer, E., Myer, L., Struthers, H., & Joska, J. A. (2011). HIV/AIDS and mental health research in sub-Saharan Africa: A systematic review. *African Journal of AIDS Research*, 10(2), 101–122. <http://doi.org/10.2989/16085906.2011.593373>
- Butler, R. J., & Gasson, S. L. (2005). Self esteem/self concept scales for children and adolescents: A review. *Child and Adolescent Mental Health*, 10(4), 190–201.
<http://doi.org/10.1111/j.1475-3588.2005.00368.x>
- Brown, B.J., Oladokun, R. E., Osinusi, K., Ochigbo, S., Adewole, I.F. & Kanki, P. (2011). Disclosure of HIV status to infected children in a Nigerian HIV Care Programme. *AIDS Care*, 23(9), 1053-1058. <http://dx.doi.org/10.1080/09540121.2011.554523>
- Byrne, B. M. (1996). Academic self-concept: Its structure, measurement, and relation to academic achievement. In B. A. Bracken (Ed.), *Handbook of self-concept* (pp. 287–316). New York, NJ: Wiley.
- Cluver, L., Gardner, F., & Operario, D. (2007). Psychological distress amongst AIDS-orphaned children in urban South Africa. *Journal of Child Psychology and Psychiatry*, 48(8), 755–763. <http://doi.org/10.1111/j.1469-7610.2007.01757.x>
- Das, P. K., Maiti, S., & Sinha, N. K. (2016). Abundance of psychiatric morbidity in perinatally HIV infected children and adolescents with comparison to their HIV negative sibling. *Neurology, Psychiatry and Brain Research*, 22(3–4), 167–172.
<https://doi.org/10.1016/j.npbr.2016.05.001>
- Earls, F., Raviola, G. J., & Carlson, M. (2008). Promoting child and adolescent mental health in the context of the HIV/AIDS pandemic with a focus on sub-Saharan Africa. *Journal of Child Psychology and Psychiatry, and Allied Disciplines*, 49(3), 295–312.
<http://doi.org/10.1111/j.1469-7610.2007.01864.x>
- Eloff, I., Finestone, M., Makin, J. D., Boeving-Allen, A., Visser, M., Ebersöhn, L., ... & Forsyth, B. W. (2014). A randomized clinical trial of an intervention to promote resilience in young children of HIV-positive mothers in South Africa. *AIDS*, 28(Suppl. 3), 347-357. <http://doi.org/10.1097/QAD.000000000000033>

- Feucht, U. D., Meyer, A., & Kruger, M. (2014). Missing HIV prevention opportunities in South African children – A 7 year review. *BMC Public Health*, 14, 1265.
<http://doi.org/10.1186/1471-2458-14-1265>
- Feucht, U. D., Meyer, A., Thomas, W. N., Forsyth, B. W. C., & Kruger, M. (2016). Early diagnosis is critical to ensure good outcomes in HIV-infected children: Outlining barriers to care. *AIDS Care*, 28(1), 32–42.
<http://doi.org/10.1080/09540121.2015.106674>
- Harris, B., Goudge, J., Ataguba, J. E., McIntyre, D., Nxumalo, N., Jikwana, S., & Chersich, M. (2011). Inequities in access to health care in South Africa. *Journal of Public Health Policy*, 32(Suppl 1), S102–S123. <https://doi.org/10.1057/jphp.2011.35>
- Hosegood, V. (2009). The demographic impact of HIV and AIDS across the family and household life-cycle: implications for efforts to strengthen families in sub-Saharan Africa. *AIDS Care*, 21(S1), 13-21. DOI: 10.1080/09540120902923063
- Kohut, S. A., Williams, T., Jayanthikumar, J., Landolt-Marticorena, C., Lefebvre, A., Silverman, E., & Levy, D. (2013). Depressive symptoms are prevalent in childhood-onset systemic lupus erythematosus. *Lupus*, 22(7), 712–720.
<http://doi.org/10.1177/0961203313488840>
- Lowenthal, E., Cruz, N., & Yin, D. (2010). Neurologic and psychiatric manifestations of pediatric HIV infection. In Baylor College of Medicine International Pediatric AIDS Initiative (Eds.), *HIV curriculum for the health professional*. (4th ed., pp. 194-205). Retrieved from www.bipai.org/HIV-curriculum.
- Marsh, H. W. (1988). *The Self-Description Questionnaire I: SDQ Manual and Research*. San Antonio, TX: The Psychologist Corporation.
- Massyn, N., Day, C., Dombo, M., Barron, P., English, R., & Padarath, A. (2013). District health barometer 2012/13. Retrieved from <http://www.hst.org.za/publications/district-health-barometer-20121>
- Mellins, C. A., Brackis-Cott, E., Dolezal, C., Abrams, E. (2006). Psychiatric disorders in youth with perinatally acquired Human Immunodeficiency Virus Infection. *Pediatric Infectious Disease Journal*, 25(5), 432-437. doi: 10.1097/01.inf.0000217372.10385.2a

- Mellins, C. A., Smith, R., O'Driscoll, P., Magder, L. S., Brouwers, P., Chase, C., ... Matzen, E. (2003). High rates of behavioral problems in perinatally HIV-infected children are not linked to HIV disease. *Pediatrics*, *111*(2), 384–393.
<http://doi.org/10.1542/peds.111.2.384>
- Morobadi, M.D., & Webber, L.M. (2014). Growing up with HIV in Southern Africa. *HIV Infected Children and Adolescents*, *1*(1), 1–6.
<http://doi.org/10.15406/jhvrv.2014.01.00005>
- Myer, L., Smit, J., Roux, L. L., Parker, S., Stein, D. J., & Seedat, S. (2008). Common mental disorders among HIV-infected individuals in South Africa: prevalence, predictors, and validation of brief psychiatric rating scales. *AIDS Patient Care and STDs*, *22*(2), 147–58. <http://doi.org/10.1089/apc.2007.0102>
- Nozyce, M. L., Lee, S. S., Wiznia, A., Nachman, S., Mofenson, L. M., Smith, M. E., ... Pelton, S. (2006). A behavioral and cognitive profile of clinically stable HIV-infected children. *Pediatrics*, *117*(3), 763–70. <http://doi.org/10.1542/peds.2005-0451>
- Phelps, R., Ferrer, K., Kim, J., & Schwarzwald, H. (2010). Diagnosis and staging. In Baylor College of Medicine International Pediatric AIDS Initiative (Eds.), *HIV curriculum for the health professional*. (4th ed., pp. 14-44). Retrieved from www.bipai.org/HIV-curriculum.
- Rao, R., Sagar, R., Kabra, S. K., & Lodha, R. (2007). Psychiatric morbidity in HIV-infected children. *AIDS Care*, *19*(6), 828–833. doi:10.1080/09540120601133659
- Reiss, F. (2013). Socioeconomic inequalities and mental health problems in children and adolescents: A systematic review. *Social Science & Medicine*, *90*, 24–31.
<http://doi.org/10.1016/j.socscimed.2013.04.026>
- Reynolds, C.R., & Paget, K.D. (1983). National normative and reliability data for the Revised Children's Manifest Anxiety Scale. *School Psychology Review*, *12*, 324-336.
- Reynolds, C.R., & Richmond, B.O. (1978). What I think and feel: A revised measure of children's manifest anxiety. *Journal of Abnormal Child Psychology*, *6*(2), 271–280.
<http://doi.org/10.1007/BF00919131>
- Reynolds, C.R., & Richmond, B.O. (1985). *Revised children's manifest anxiety scale*. Los Angeles: Western Psychological Services.

- Rohleder, P. (2012). *Critical issues in clinical and health psychology*. London, England: Sage Publishing.
- Rosen, J., Glennie, E., Dalton, B., Lennon, J., & Bozick, R. (2010). *Non-cognitive skills in the classroom: New perspectives on educational research*. Research Triangle Park, NC: RTI Press. Retrieved from <http://www.rti.org/pubs/bk-0004-1009-rosen.pdf>
- Sadock, B. J., Kaplan, H. I., & Sadock, V. A. (2007). *Synopsis of psychiatry (10th ed.)*. New York, NJ: Lippincott Williams & Wilkins.
- Scharko, A. M. (2006). DSM psychiatric disorders in the context of paediatric HIV and AIDS. *AIDS Care*, 18(5), 441–445. doi:10.1080/09540120500213487
- Sipsma, H., Eloff, I., Makin, J., Finestone, M., Ebersohn, L., Visser, M. J., ... Forsyth, B. (2013). Behavior and psychological functioning of young children of HIV-positive mothers in South Africa. *AIDS Care*, 25(6), 721–5. <http://doi.org/10.1080/09540121.2013.779627>
- Statistics South Africa (2011) Statistics by place: City of Tshwane. Retrieved from http://www.statssa.gov.za/?page_id=4286&id=11387
- Tadesse, A. W., Berhane Tsehay, Y., Girma Belaineh, B., & Alemu, Y. B. (2012). Behavioral and emotional problems among children aged 6-14 years on highly active antiretroviral therapy in Addis Ababa: A cross-sectional study. *AIDS Care*, 24(11), 1359–67. <http://doi.org/10.1080/09540121.2011.650677>
- UNAIDS (2015). *Country factsheets: South Arica HIV and AIDS Estimates*. Retrieved from <http://aidsinfo.unaids.org/#quicklinks-details>
- Wiener, L., Mellins, C. A., Marhefka, S., & Battles, H. B. (2007). Disclosure of an HIV Diagnosis to Children: History, Current Research, and Future Directions. *Journal of Developmental & Behavioral Pediatrics*, 28(2), 155–166. <http://doi.org/10.1097/01.DBP.0000267570.87564.cd>