

**HIV/AIDS in South African schools:  
Neuropsychological and psychoeducational implications**

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**Abstract**

In this article, we briefly describe the current epidemiology of HIV/AIDS among South African schoolchildren, as well as the neurocognitive, academic and psychosocial difficulties they experience. Cultural factors linked to HIV prevention and treatment are identified, and government and schools' response to HIV/AIDS is outlined. We then evaluate what has been done thus far to address these issues in the educational, healthcare, and government contexts. In conclusion, we point to recommendations for how school psychologists and other school-based professionals can work with affected children, families, communities, agencies and governments to effect change.

Keywords: intervention; neuropsychology; pediatric HIV/AIDS; South Africa

The increasing availability and access to pediatric antiretroviral therapy (ART) and the implementation of preventative mother-to child treatment (PMCT) programs has noticeably extended the life expectancy of children affected by HIV (Lowenthal, Bakeera-Kitaka, Marukutira, Chapman, Goldrath, & Ferrand, 2014). However, children with HIV continue to face considerable challenges. South African children affected by HIV/AIDS are among the poorest, most vulnerable and marginalized, and the combined effects of poverty and HIV-infection considerably exacerbate their disadvantage. High rates of parental HIV-infection place these children at significantly elevated risk of being orphaned, which together with neurocognitive impairment resulting from HIV-infection or prenatal HIV-exposure, create many obstacles to their ability to access appropriate support and interventions (Adnams, 2010). With an increasing number of affected children surviving to adolescence, the school functions as an important community that can offer educational, psychosocial and material support, particularly in terms of dealing with the neuropsychological effects of HIV/AIDS.

While there are several laudable government policies to assist affected schoolchildren, their implementation has been disappointingly sluggish. The aim of this article is to first review what is known regarding the prevalence of HIV/AIDS among South African schoolchildren, as well as the neurocognitive and related difficulties that they experience. As part of this review, we identify some of the socio-cultural factors that may be linked to HIV prevention and treatment. The second aim is to critically evaluate available government and school interventions that either directly or indirectly address the neuropsychological effects of HIV/AIDS in school children. Arising from these aims are a set of concrete recommendations focused on the role of school psychologists and school-based professionals for addressing the HIV-related challenges specific to the South African educational context.

### **Epidemiology of HIV and AIDS in South Africa**

Of the 5000 new, daily HIV infections that occur worldwide, the majority are in sub-Saharan Africa. Global epidemiological prevalence trends identify sub-Saharan and east Africa with the highest HIV estimations in the general population, and ascertain that there are 19.4 million people living with HIV in this sector (United Nations Programme on HIV/AIDS, UNAIDS, 2017). Given the various HIV epidemic typologies, South Africa is recognized as a generalized hyper-endemic epidemic country characterized by high prevalence in the adult population, with clusters of vulnerable groups exposed to high infection risk (Human Sciences Research Council - HSRC, 2018; Kharsany & Karim, 2016; Statistics South Africa, Stats SA, 2017). In 2016, new infections among South African children younger than 15 years were estimated at 12,000 (UNAIDS, 2017). While this accounts for a significant proportion of global new infections, comparisons with 2012 estimates reflect a decreasing trend in annual incidence rates among children and young adults regionally (HSRC, 2018; Zuma et al., 2016). In 2017, prevalence rates among young children between birth and 14 years was 2.7%, with a prevalence of 5.8% for females and 4.7% for males aged 15 to 19 years (HSRC, 2018).

South Africa has an expansive domestically funded HIV/AIDS treatment program that has improved over the past few decades with regard to availability and accessibility of pediatric ART (HSRC, 2018). Attenuation in new infection rates largely reflects the success of PMCT antiretroviral programs, with a significant number of HIV-infected pregnant women having access to ART (UNAIDS, 2017). While this is the current situation, access to ART in South Africa only began in 2004, a delay that contributed to the current high infection rate among adolescents (Zanoni, Archary, Buchan, Katz, & Haberer, 2016). There is consequently more extensive ART exposure among younger children than among adolescents

and young adults living with HIV, with exposure to ART in the youngest age group having increased exponentially over the last decade (UNAIDS, 2017; Zuma et al., 2016).

Although there have been important gains in addressing the HIV epidemic, vulnerable sectors of the population bear a disproportionate HIV burden. HIV infection trends reflect a gender-disparate profile, with higher prevalence and incidence, more age-disparate relationships, fewer sexual partners and earlier sexual debut among young women in comparison to their male peers (HSRC, 2018). These trends have remained stable over the past five years. Notably, since 2012, prevalence rates among 15 to 19-year-old males have increased together with increased incidence and less awareness of their HIV status when compared to female peers.

These epidemiological data point to a heterogeneous group of school children (aged between 6 and 18 years) affected by HIV/AIDS, with a range of different ages of initiation of ART, differing levels of advancement of the disease, and a range of neuropsychological difficulties ranging from mild to profound (Laughton, Cornell, Boivin, & Van Rie, 2013).

### **Existing Research on Neurocognitive Effects of HIV/AIDS on South African School-Age Children**

The successes in preventing and reducing the transmission of HIV bring their own challenges, which include the neurocognitive effects of perinatal exposure to HIV, as well as those associated with long-term ART usage for both vertically and horizontally transmitted HIV. Even when treated with highly active antiretroviral therapy (HAART), there is evidence that vertically transmitted HIV has a negative impact on ongoing development, with affected children showing evidence of neuropsychological difficulties varying from subtle to severe (Laughton et al., 2013). The population of school children affected by HIV/AIDS is very heterogeneous and includes those who commenced ART soon after HIV infection (and before

clinical diagnosis of neurodevelopmental delay), those who initiated ART after diagnosis with HIV encephalopathy (resulting in permanent neurocognitive deficits), others who were perinatally infected with HIV who have not yet reached the ART eligibility threshold, and those who are uninfected, but were perinatally exposed to HIV and received PMCT ART (Hazra, Siberry, & Mofenson, 2010; Laughton et al., 2013; Smith, Adnams, & Eley, 2008). This review focuses only on those studies that have examined the neurocognitive effects of HIV/AIDS on South African school children. The term “HIV-affected” is used throughout to refer to the different categories of children described above.

The actual rate of neurocognitive disability related to HIV/AIDS infection in South African schoolchildren is unknown, but is likely to be significant (Adnams, 2010). There is consensus that HIV-infection results in a depression of global intellectual ability, with ART playing an important role in reversing or reducing these effects (Laughton, Cornell, Grove, Kidd, Springer, Dobbels et al., 2012). Most studies of HIV-infected children and adolescents on ART used global measures of neurocognitive functioning, which may overlook subtle deficits in specific domains, such as psychomotor or executive functioning. A few studies that examined specific areas of neurocognition showed difficulties with complex reasoning, processing speed, visuospatial perception, and working memory (Cockcroft & Milligan, 2019; Laughton et al., 2013; Milligan & Cockcroft, 2017). These are all key cognitive abilities important for learning as well as for adaptive and social functioning (Cockcroft, 2015). These neurocognitive difficulties are accompanied by a high rate of psychiatric comorbidities, including Attention Deficit Hyperactivity Disorder and depression, in comparison to typically developing peers (Mofenson & Cotton, 2013).

The availability of PMCT ART means that the HIV-exposed, uninfected child population is likely to soon overtake the number of children born with HIV infection (Morden Technau, Giddy, Maxwell, Keiser, & Davies et al., 2016; Shapiro & Lockman

2010). The HIV-exposed, uninfected child is believed to have a unique neurocognitive profile due to exposure to the immunological side effects of HIV in utero (as a result of immune activation in the mother), as well as exposure to the prophylactic effects of ART. There has been limited research into the neurocognitive functioning of this population, but there are indications that, relative to unaffected peers, they show some neurocognitive effects, which include lowered verbal skills and poorer working memory (Cockcroft & Milligan, 2019; Laughton et al., 2013; Milligan & Cockcroft, 2017; Robertson, Holmes, Cotton, Dobbels, Little, Laughton, van der Kouwe, & Meintjes, 2018).

Most of the studies of neurocognition in HIV affected children are cross-sectional and focus on a broad age range (6-17 years), and so do not consider how the neurocognitive effects change with development. In addition, studies employ a wide range of different neurocognitive and developmental measures, many of which are not valid or appropriate for South Africa's culturally and linguistically diverse children (Laughton et al., 2013; Milligan & Cockcroft, 2017). These factors make it difficult to provide precise indications of the nature and extent of neurocognitive difficulties experienced by affected children. Coupled with these neurocognitive difficulties are a host of related psychosocial factors, such as chronic illness, poverty, death of parents, stigma, rejection by peers and others and cultural mores which influence HIV treatment and prevention (Mellins & Malee, 2013).

### **Cultural Factors that Influence HIV Prevention and Treatment**

Advances in educational initiatives, together with augmented access to primary health care and exponential increases in ART coverage, have yielded definite benefits in regard to HIV/AIDS-related outcomes for South African schoolchildren. The availability of ART, with its immediate effect on clinical symptoms, has changed the disease trajectory from that of an acute to a chronic illness, and decreased AIDS mortality rates among those who access

treatment in a timely manner. Although these gains have provided some countermeasure to the epidemic among children and adolescents, a confluence of ancillary factors continue to delay diagnosis, hinder access to prevention initiatives and treatment, and so adversely affect development (Pillay & Wassenaar, 2018; Sherr, Hensels, Tomlinson, Skeen, & Macedo, 2018). These factors are diverse and include severely constrained institutional health care capacity, socioeconomic determinants, community contexts, family structure, personal attitudes and cultural norms (Bhana et al., 2016; Pienaar, van Rooyen, & Walsh, 2017; Visser, 2017). Cultural norms influence a range of factors such as familial structure and availability of support, parental involvement in child rearing, sexual practices, and notions about sexual education for school children.

Children and adolescents are particularly vulnerable to the adverse impact of maternal and familial HIV (Lowenthal et al., 2014; Sharer, Cluver, Shields, & Ahearn, 2016). Loss of parents and caregivers, psychological trauma, parental illness and dysfunctional parent-child relationships are some of the ancillary challenges to a child's adaptive functioning brought about by these circumstances. In children, exposure to frequent and cumulative stressors is a key determinant of adverse long-term developmental outcomes. When combined with a low socioeconomic and hyper-endemic environment, children and adolescents with, and affected by, HIV/AIDS are more susceptible to adverse emotional, behavioral and neurocognitive outcomes (Boeving Allen et al., 2014; Kharsany & Karim, 2016; Skeen, Macedo, Tomlinson, Hensels, & Sherr, 2016; Stein et al., 2014). Developmentally, children and adolescents have to navigate social, emotional and personal vicissitudes whilst dealing with a chronic illness. Taking on the primary responsibility for disease management, coping with stigma and dealing with the conflict of peer disclosure are some of the diverse and complicated obstacles encountered by affected children and adolescents (Bhana et al., 2016; Murnane et al., 2017; Pienaar & Visser, 2012).

In addition to the issues discussed above, many children and adolescents with perinatal infection are unaware of their HIV status (Arrive, Dicko, Amghar, Aka, Dior, Bouah, et al., 2012). This places them at elevated risk for deferred diagnosis and treatment, and means that they carry a disparate disease burden when ultimately presenting at primary health care facilities. Parents/guardians in resource-limited environments face many structural and personal challenges that complicate disclosure of the child's HIV status to their child/ward. Reported prevalence of caregiver disclosure to children and adolescents ranges between 9% and 40% in South African studies (Madiba & Mokgatle, 2017, Murnane et al., 2017). Practical interventions are thus needed to support age-appropriate disclosures by parents/caregivers to affected children. A primary health care supportive team approach to gradual disclosure, together with the use of age- and culturally-appropriate tools, such as disclosure cartoon books, have been found to enhance disclosure motivation among parents/guardians (O'Malley et al., 2015).

Socioeconomic and cultural factors that likely contribute to non-disclosure include inadequate primary health care regarding counselling and testing, HIV-related stigma, the age and gender of the child, the caregiver's pediatric HIV health literacy, geographical barriers and orphanhood (Kimani-Murage, Manderson, Norris, & Kahn, 2013; Thurman, Luckett, Taylor, & Carnay, 2016). Moreover, guardianship of orphaned children and adolescents is often within the purview of grandparents, who themselves may face challenges of poverty, aging and a high burden of intergenerational care. The dissonance between the importance attributed to HIV status disclosure and actual disclosure prevalence highlights the complexity of the issue (Madiba & Mokgatle, 2017). A community's stigmatizing attitudes and fear of self-discrimination are among the foremost motivations for non-disclosure and reluctance to access treatment (Bekker & Gray, 2017). The consequences of non-disclosure as children mature into adolescence include poor medication management and adherence, intermittent

follow-up visits to primary health care facilities and greater potential risk of HIV transmission through sexual behavior (Dube & Harms Smith, 2016; Lowenthal et al., 2014).

Early sexual debut, multiple sexual partners, intergenerational sex, transactional sex and low condom use have been identified as sexual behavioral risk indicators among South African adolescents (Kharsany & Karim, 2016). Subjective and personal norms, as well as interpersonal and contextual elements, facilitate the enactment of these risky behaviors. For example, among adolescent females, the socio-cognitive (self-efficacy, self-esteem) and socio-behavioral (intergeneration sex, early sexual debut) consequences of gender dynamics, the role of cultural patterns among females regarding health seeking behavior, and low socioeconomic status have all been identified as predictors of vulnerability to HIV infection. Culturally entrenched gender norms determine agency regarding the negotiation of safe sexual practices, and this is reflected in the consistent finding of lower condom use among young women compared to their male peers (De Wet, 2016; HSRC, 2018; Jukes, Simmons, & Bundy, 2008). Deliberations that are restricted to merely enhancing female agency in sexual relationships obfuscate the wider cultural roles that young males often adopt when engaging in such behavior. For example, although the HIV incidence rate among young women has declined over the past five years by an estimated 26%, the incidence rate among young males has increased by 11%, and sexual debut before the age of 15 continues to increase (HSRC, 2018).

The reluctance to engage in conversations about sexuality and sexual education is embedded in prescribed notions of conventional cultural sexual practices. Teachers face particular challenges when addressing sexual education in the curriculum and educating learners in a culturally diverse context (De Palma & Francis, 2014). Culture is often considered as an irrefutable and dominant discourse that is used to validate the lack of conversation on sexuality. In addition to difficulties in regard to communication between

learners and teachers, low levels of parent-adolescent communication on sexuality further diminish the social impact of interventions and optimum sexual health outcomes among adolescents (Bhana et al., 2016; Coetzee et al., 2014). Moreover, in a culturally diverse country with a political history of enforced inequality, distinct trends in parent-adolescent communication along ethnic divides frame the complex challenges for effective prevention and treatment of HIV/ AIDS.

HIV-related social stigma exerts a ubiquitous effect on prevention, status disclosure and non-adherence to treatment, and has concomitantly impacted on the broader political and socio-cultural responses to HIV/AIDS. Given the political history of oppression in South Africa, stigma is entwined in a multifarious system of knowledge and beliefs that attribute a particular negative valence to HIV/AIDS. These systems are embedded in social inequalities that reinforce marginalization, gender disparities, and social isolation among children and adolescents with HIV/AIDS. In this context, wider socio-cultural factors inform knowledge and beliefs about HIV/AIDS related stigma and discrimination (Madiba & Ngwenya, 2017).

With wider availability of ART, HIV education initiatives, and greater visibility of people living with HIV, there is reportedly a general downward trend in HIV-related stigma (Stangl, Lloyd, Brady, Holland, & Baral, 2013). Results from a South African community-based survey showed a decline in perceived personal stigma over a 12-year period, with relatively stable but high levels of perceived community stigma. However, moral judgement (a component of HIV-related stigma) increased significantly over this timespan (Visser, 2018). High levels of perceived community stigma underlie much of the reluctance toward accessing HIV testing facilities and subsequent awareness of HIV status. The complexity regarding disclosure and community stigma is evident when responses regarding perceptions about non-family and family members living with HIV and AIDS are compared. Over a five-year span, more respondents held affirming perceptions toward non-family members with

HIV/AIDS, while simultaneously most respondents considered non-disclosure of a family member's HIV status as the preferred choice (HSRC, 2018). AIDS education also exerts an impact, since school-aged learners with higher knowledge levels about HIV/AIDS were more positively inclined toward peers and teachers with HIV/AIDS. Despite this, the majority of learners felt that individuals should not reveal their HIV status, nor were they inclined to reveal their own HIV status (Dzhugudzha, Mokgatle, & Madiba, 2015; Madiba & Mokgatle, 2015).

The prevention and treatment strategies implemented in response to the HIV/AIDS epidemic in South Africa have informed a distinctive HIV trajectory among children and youth. Declining mother-to-child transmission and wider availability of pediatric ART suggests that we can anticipate attenuated rates of HIV infection among infants commensurate with an increasing number of children who were perinatally exposed HIV maturing into adolescence (Lowenthal et al., 2014).

### **Schools' Response to HIV/AIDS Within the Context of Local Government, Educational Laws, and Healthcare services and Delivery**

South African school enrollment levels are reportedly among the highest on the continent (Grant & Hallman, 2008). Therefore, improved utilization of the school environment is an essential part of addressing the complex socio-cultural, economic and political determinants that inform HIV/AIDS prevention and treatment strategies. Educational initiatives have been implemented in South African schools to address the multifaceted behavioral drivers underlying risky behavior. Structural and content level modifications, such as curriculum changes and information and awareness campaigns underscore these intervention strategies. Whilst the success of these initiatives are reflected in the opinions of learners who identify schools as an important source of information about HIV/AIDS,

misconceptions regarding prevention and treatment are still common (Dzhugudzha et al., 2015; Madiba & Mokgatle, 2015). Far less has been done to address the neuropsychological effects of HIV/AIDS in school age children.

With regard to neuropsychological wellbeing, South African children affected by HIV/AIDS are covered by the White Paper 6 (Special Needs Education: Building an Inclusive Education and Training System (WP6; Department of Education and Training, 2001), which acknowledges that these children have special educational needs. Specific reference is made to the HIV/AIDS pandemic and the need to identify the incidence and impact of the disease on school enrolment and drop-out rates. The White Paper also acknowledges the combined role that poverty may play in negatively impacting these children's educational opportunities. In particular, the Ministry of Education is tasked with the roles of developing appropriate and timely intervention programs for affected children, establishing a system to identify orphans, coordinating support and care programs, putting in place referral procedures for educators, and developing teaching guidelines on how to support affected children. The intention of the White Paper legislation is to improve these children's access to specialized educational facilities, preferably in an integrated and inclusive educational setting. According to White Paper 6, the few existing specialized schools would be qualitatively improved and converted to resource centers which would be integrated into district-based support teams that provide professional support to surrounding schools.

Currently, school psychologists are assigned to area teams, where they work collaboratively with other professionals to provide support to schools. In addition to a desperate shortage of such professionals, there are several systemic challenges, such as a serious lack of state income and a small number of professional training institutions, which prevent the optimal usage of skilled professionals in the educational system (Moolla & Lazarus, 2014). In addition, it is not clear how school children needing additional specialized

support will be identified, assessed and incorporated into either ordinary or special needs schools in an ethical manner that ensures confidentiality, given the stigma associated with HIV infection. Unfortunately, little concrete action appears to have occurred to implement the recommendations of the White Paper 6 since its introduction in 2001. In 2015, the Department of Basic Education's Report (DBE, 2015) on the implementation of Education White Paper 6 demonstrated that, in spite of small progress in certain areas, overall education for children with barriers to learning has not improved.

Other legislation, namely the Integrated School Health policy (2012), addresses the physical and mental health needs of school children, including those affected by HIV/AIDS. This policy expands school health services to include age appropriate health education, health screening and testing, the identification and support of children with chronic health conditions such as HIV/AIDS, the provision of psychosocial and mental health assessments, some on-site health services (such as hearing and vision screening), follow-ups and referrals, as well as preventive interventions, which include an emphasis on abstinence and delayed sexual debut. This policy offers promise by addressing many of the key social determinants of health. However, there is no available data on the actual implementation and effectiveness of this policy, and the provision of sexual and reproductive preventive services at school is still under contestation (Shung-King, 2013).

Sexual and HIV/AIDS education in secondary schools has been the subject of debate and discussion for some time in South Africa. The debates have mainly centered around three key issues, namely when to introduce it, what content is appropriate and who is qualified to provide such teaching. Comprehensive Sexuality Education (CSE) and the provision of Sexual and Reproductive Health (SRH) services are some of the key offerings in the Department of Basic Education's policy, which are globally recognized as important strategies to prevent new HIV infection amongst youth. Locally, there is evidence that in-

school interventions for adolescent girls that focused on broader sexual reproductive health and HIV-related knowledge are more effective than specific interventions that concentrated on abstinence (Dellar, Dlamini, & Karim, 2015; Thayer, 2012). However, CSE and SRH services have not been widely rolled out in South African schools.

The dangers of not implementing these government policies in schools, together with parent and community resistance in providing sexual and reproductive health services in schools, means that onward transmission in school children who are HIV positive is a grave concern. Currently, the focus has been on the provision of services (at least in principle) school-aged children living with HIV. However, it is evident from our review that both children living with HIV and those who were HIV-exposed but uninfected are likely to be in need of neuropsychological, academic and psychosocial support. In better serviced areas, children living with HIV may be followed up by specialized ART clinics which offer them support and access to social and allied therapeutic services, while children who were HIV-exposed, but uninfected seldom receive any of these auxiliary services resulting in their needs going largely unmet (Kerr, Puthanakit, Vibol, Aурpibul, Vonthanak, Kosalaraksa et al., 2014).

**Call to Action: How School Psychologists can Work with Families, Agencies, Schools, and the Community to Effect Change and Improve Advocacy for Children**

In developing countries, the social and economic impact of HIV/AIDS on school children tends to overshadow concerns about the neuropsychological impact of the disease. When basic needs are not met, it becomes difficult for schools to focus on addressing the less immediate or apparent neuropsychological difficulties (Foster & Williamson, 2000). Further, the neuropsychological effects of HIV/AIDS are closely wound into the socioeconomic factors that contribute to HIV infection. In addition, low prioritization and commitment

throughout government means that the government policies directly or indirectly targeted at school going children affected by HIV/AIDS have largely not been implemented. Where available, services tend to be concentrated in major cities, with limited access in rural areas. A small number of specialized education schools provide for children with severe neurocognitive difficulties (not exclusively related to HIV-infection or exposure), and they are egregiously oversubscribed. Educational policies for these children have largely not been implemented. Those with mild intellectual disability are supposed to have their learning needs addressed within a mainstream, inclusive approach, but this also appears not to be implemented effectively (Adnams, 2010). Children most affected remain those who are black, poor or working class and/or who reside in rural areas. For these children, high rates of parental HIV/AIDS infection have a deleterious effect on their school attendance. Education is typically disrupted when parents fall ill, with female children in poor and rural households the most affected (Foster & Williamson, 2000). The confluence of psychosocial factors, together with the child's own HIV status, further enhances vulnerability to overall educational risk, which includes poor school performance and attendance, delayed cognitive development and below age-appropriate grade placement (Sherr et al., 2018).

There are a number of ways in which school psychologists and associated professionals can work with parents, schools, the community, agencies and government to effect change. The urgent implementation of the various government legislation aimed to assist children living with HIV is an obvious first step. Beyond that, the effective implementation of compulsory community service across all health and education professionals could assist in providing qualified personnel to under-resourced schools, and assist with policy implementation and provision of effective interventions. At the moment, only clinical psychologists and certain health professionals are required to undertake community service. Extending this to teachers as well as educational, counseling, and

research psychologists may go some way towards addressing the human resource challenges in schools and in implementing the requisite legislation. These professionals could assist in providing community, parental and educator support to encourage age appropriate disclosures to children about their HIV status, together with testing, counseling, treatment and identification of school children in need of specialized educational assistance. In environments where financial and community resources are limited, involving adolescents themselves in peer-focused sexual health education, and integrating these interventions within the school system with the engagement of school psychologists, can potentially be an effective strategy to address socio-ecological determinants of risky sexual behavior and HIV-related stigma (Harrison, Newell, Imrie, & Hoddinott, 2010).

Across the board implementation of the Integrated School Health policy is urgently required and should include neurodevelopmental screening as a routine part of healthcare, together with referral to appropriate health services. These multidisciplinary support services could include treatment adherence monitoring, reproductive health counseling, mental health assessments and counseling, as well as vocational planning and counseling (Laughton et al., 2013). Effective implementation of this policy would assist with the prevention and management of onward HIV transmissions in the school-going population.

Another recommendation is the implementation of cognitive rehabilitation and intervention programs to address the neuropsychological deficits resulting from perinatal HIV infection. While such programs have been fairly extensively researched, few intervention studies with school children affected by HIV have been undertaken. One intervention that offers promise is computerized cognitive training. Preliminary results from a study with South African children and adolescents living with HIV showed that a working memory training program resulted in positive benefits in terms of verbal working memory and fluid reasoning, which were sustained over a six-month period. The program used in this study is

suitable for younger children as well, and could be enhanced if coupled with caregiver training on practical strategies to enrich the neurocognitive development of young children (Boivin & Giordani, 2013; Fraser, 2018).

Training in psychological resilience may also have positive effects on academic, psychosocial and neuropsychological functioning school children affected by HIV. Some local approaches to fostering resilience include using bibliotherapy, or the therapeutic use of carefully chosen stories to support children as they adjust to risks that threaten their optimal development. Bibliotherapy does not require implementation by mental health professionals and has been successfully used by teachers, caregivers, and even children. There is some evidence that the use of carefully selected African folktales can increase the resilience of primary school children affected by HIV by providing role models and appropriate ways of responding in adverse situations, as well as alternative problem-solving techniques (Theron, Cockcroft, & Wood, 2017).

### **Conclusion**

Although biomedical responses to the HIV/AIDS epidemic have improved substantially over the last decade in South Africa, much more is needed in terms of a continuum of care initiatives for young children and adolescents maturing into adulthood. The current failure in policy implementation leaves children and youth affected by HIV/AIDS highly vulnerable. The high prevalence of HIV infection in South Africa necessitates ongoing educational support, HIV testing and counseling at the school level, and life skills training and support as well as adequate and accessible healthcare. School psychologists have an integral role in this process, specifically with regard to assessing, educating and intervening on issues of HIV/AIDS-related neurocognitive, psychosocial and quality of life outcomes.

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