Factors Associated with the Academic Achievement of Perinatally HIV-Infected Elementary and Middle School Children

Walter L. Ellis, Ph.D.
Associate Professor of Social Work
Livingstone College

ABSTRACT: It is well documented that perinatally HIV-infected children experience difficulty in learning as well as behavioral and social problems in the school setting. While the research is mixed on the effect of the HIV virus on behavioral and social problems, it is much clearer on the effect of this virus on learning. This exploratory study identifies HIV-related medical, academically-based, behavioral, and affective/social factors associated with the academic achievement of nine primarily African-American perinatally HIV-infected elementary and middle school children in a rural county in North Carolina. Bivariate analysis found affective/social (peer pressure), behavioral (disruptive behavior), and academically-based (low grades and poor study habits) factors to be associated with the academic achievement of these children — failure to pass End-of-Grade Tests in both Reading and Mathematics. Low grades were more strongly associated with this failure. HIV-related medical factors (T4 cell count and viral load) were not associated with low grades, whereas academically-based (poor study habits), behavioral (disruptive behavior), and affective/social (peer pressure) factors were associated with them. It was concluded in this exploratory study, therefore, that rather than school professionals addressing strictly the HIV virus with pharmacological drugs as a means to improve low education performance, it would be more effective to devise an education-based behavioral modification plan to change the dynamics of perinatally HIV-infected children's peer group toward them.

Introduction

In 2001, about 8,900 pediatric AIDS cases had been reported in the United States (2001). Pediatric cases represent about 1.2% of the total number of AIDS cases as of this date. While the exact number of children infected with the HIV virus is not known, Stein (2001) reported that it is estimated that for each pediatric AIDS case reported, there are three to four other HIV-infected children living in the United States. In North Carolina, the number of HIV disease reports for school-aged children increased from 37 in 2001 to 59 in 2002, representing an increase from 5% to 7% of all reported cases of HIV in the state (North Carolina Department of Health and Human Services, Division of Public Health, 2003).

The HIV statistics in North Carolina show that children are increasingly becoming infected with the HIV virus. The implication of this trend for school professionals is that because of significant medical advances, including the drugs AZT, 3TC, DDI, and antiretroviral treatments, pediatric AIDS children are able to remain symptom-free and function at more developmental levels for longer periods of time (Palella, et al, 1998; Parker, 2000; Zuger, 2000). School professionals, therefore, must recognize this increased quality of life and offer perinatally HIV-infected children an opportunity to attend education programs that are appropriate for their age and developmental level (Task Force on Pediatrics AIDS, 1991). The purpose of this exploratory study is to identify HIV-related medical (T4 cell count and viral load), academically-based (lack of interest in school, poor study habits, and poor grades), behavioral (disruptive behavior), and affective/social (low self esteem and peer group pressure) factors associated with the academic achievement of

perinatally HIV-infected elementary and middle school children residing in a rural county in North Carolina. The identification of factors that may be associated with the academic achievement of these children could be beneficial to school professionals in devising an education plan that would help these perinatally HIV-infected children succeed in school.

HIV Challenges in the School Setting

The effect of the HIV virus on the brain and nervous system presents a special challenge for children in the school setting (Armstrong, Seidel, & Swales, 1993; Task Force on Pediatric AIDS, 1991). In particular, neuropsychological deficits may occur at unpredictable intervals in perinatally HIV-infected children which can create a number of social and behavioral problems in these children as they enter the preschool and school-age years. In contrast to these earlier studies, Mellins, Smith, O'Driscoll, Magler, Brouwers, Chase, Blasini, Hittleman, Llorente, and Matzen (2003) reported that, although a high prevalence of social and behavioral problems exist in perinatally HIV-infected children, HIV is not the underlying cause. Mellins et al. (2003) suggested that other biological and environmental factors are likely to be contributors toward poor social and behavioral outcomes in these children.

While the research is mixed on the effect of the HIV virus on perinatally HIV-infected children's social and behavioral problems, it is much clearer on the effect of this virus on these children's learning ability. The Task Force on Pediatric AIDS (1991) reported that children with symptomatic HIV infection may develop severe developmental disabilities, including intellectual impairment. In fact, HIV-infected children with neurological impairment have been found to have more severe intellectual impairments than do neurologically normal children with HIV (Levenson, et al,1992). The mode of transmission of the HIV virus has also been found to have an effect on the intellectual ability of perinatally HIV-infected children. Maternally-infected children with HIV have higher IQs than children infected with HIV through transfusion and sexual abuse (Frank, Foley, & Kuchuk, 1997). Similarly, Tardieu, Mayaux, Seibel, Brentano, Straub, Teglas, and Blanche (1995) concluded in their study that perinatally HIV-infected children have better cognitive abilities and school achievement than was initially thought.

In addition to struggling with their HIV virus, children in this exploratory study are confronted with additional stress in the school setting; for example, meeting accountability standards in school by passing their End-of-Grade Tests in both Reading and Mathematics (North Carolina State Board of Education, Department of Public Instruction, 2000). The failure to pass these tests can result in children being required to attend a remediation summer program. If the remediation summer program is unsuccessful, these children may be required to receive additional remediation in the failed subject matter the following academic school year. In some cases, children's failure to pass their End-of-Grade Tests in Reading and Mathematics may prevent them from being promoted to the next grade level.

Methods

Data Collection

In the Spring of 2001, I recruited a HIV/AIDS-Service Coordinator, providing support services to HIV/AIDS-infected mothers as well as their perinatally HIV-infected children in an agency in a rural county in North Carolina, to administer a self-administered HIV/AIDS survey to these mothers determining the extent to which: 1) they felt that their children were exhibiting academically-based (truancy, no interest in school, poor study habits, and

low grades), behavioral (disruptive behavior), and affective/social (peer pressure and low self esteem) problems in the school setting, and 2) their children were successfully passing their End-of-Grades Tests in both Reading and Mathematics. Mothers were informed that continuation of their HIV/AIDS-related support services in this rural agency was not contingent on their participation in this exploratory study, participation was strictly voluntary. Mothers were instructed to provide information only on their first perinatally HIV-infected child who was living in their home at the time of the survey. This restriction allowed mothers to focus specifically on this one child.

Data Analysis

Data in this exploratory study were analyzed using descriptive statistics as well as cross tabulations and t-tests in SPSS (Norusis, 2000). Missing data were excluded from the analysis. The cut off point for statistical significance was set at .05.

Findings

Description of Perinatally HIV-Infected Children

A total of nine predominantly African-American (60%) HIV/AIDS-infected mother-child dyads participated in this exploratory study. The perinatally HIV-infected children were nine years of age, on average, and at the time of the survey the progression of the virus was still at the HIV stage. The children's T4 cell count and viral load were 630 and 1714, on average, respectively. The T4 cell count is a measure of the ability of the body's immune system to fight off diseases. The Center for Disease Control specifies that a T4 cell count below 200 is indicative of AIDS. The viral load is an indication of how much of the HIV virus is in the body; the higher the viral load the more of the virus that is in the body. The goal of treating perinatally HIV-infected children is to maintain a very high T4 cell count and very low to no detectable viral load in these children.

Mothers reported that an overwhelming majority (78%) of their perinatally HIV-infected children exhibited academically-based, behavioral, and affective/social problems in the school setting (Table 1, page 54). The most frequently cited problems were affective/social (low self esteem, 89%; peer pressure, 78%), and behavioral (disruptive behavior, 78%). Academically-based problems were less frequently cited, although the percentages were relatively high (low grades, 56%; poor study habits, 56%; lack of interest in school, 44%; truancy, 44%).

As reported in Table 2 on page 54, mothers reported that over half of their perinatally HIV-infected children failed to achieve proficiency levels in both Reading (56%) and Mathematics (56%). The failure rate of the End-of-Grade Tests in these subject matters is well above the rate for all children residing in this rural county in North Carolina. In this rural county, in 2001, the failure rate was 26% in Reading and only 8% in Mathematics (NCDPI Division of Accountability Services/Testing Section, 2001).

Bivariate Analysis

HIV/AIDS-infected mothers' reports of their perinatally HIV-infected children passing their End-of-Grade Tests in both Reading and Mathematics are shown in Table 3 on page 55. Academically-based (poor study habits and low grades), behavioral (disruptive behavior), and affective/social (peer pressure) factors were found to be associated with perinatally HIV-infected children's academic achievement, failure to successfully pass their End-of-Grade Tests in Reading and Mathematics. Of these academically-based, behavioral,

and affective/social factors, the academically-based factor, low grades, was found to have the strongest association ($p = .003$) with these perinatally HIV-infected children failing both of their End-of-Grades Tests.

Table 1. HIV/AIDS-Infected Mothers' Reports of their Perinatally HIV-Infected Children's Problems in the School Setting

Affective/Social	
Low Self Esteem	
No	1 (10%)
Yes	8 (89%)
Peer Pressure	
No	2 (22%)
Yes	7 (78%)
Behavioral	
Disruptive Behavior	
No	2 (22%)
Yes	7 (78%)
Academically-Based	
Low Grades	
No	4 (44%)
Yes	5 (56%)
Poor Study Habits	
No	4 (44%)
Yes	5 (56%)
Lack of Interest in School	
No	5 (56%)
Yes	4 (44%)
Truancy	
No	5 (56%)
Yes	4 (44%)

Table 2. HIV/AIDS-Infected Mothers' Reports of their Perinatally HIV-Infected Children Passing their End-of-Grade Tests in both Reading and Mathematics

End-of-Grade Reading	
Pass	4 (44%)
Fail	5 (56%)
End-of-Grade Mathematics	
Pass	4 (44%)
Fail	5 (56%)

Table 3. The Relationship between HIV-Related Medical, Academically-Based, Behavioral, and Affective/Social Factors and Perinatally HIV-Infected Children's Academic Achievement

	End-of-Grade Test Reading		End-of-Grade Test Mathematics	
	Pass	Fail	Pass	Fail
HIV-Related Medical				
Children's Viral Load	12.50	3418.00	12.50	3418.00
Children's T4 Cell Count	651.25	613.20	651.25	613.20
Academically-Based				
Truancy				
No	3 (75%)	2 (40%)	3 (75%)	2 (40%)
Yes	1 (25%)	3 (60%)	1 (25%)	3 (60%)
Lack of Interest in School				
No	3 (75%)	2 (40%)	3 (75%)	2 (40%)
Yes	1 (25%)	3 (60%)	1 (25%)	3 (60%)
Poor Study Habits				
No	3 (75%)	1 (20%)	3 (75%)	1 (20%)
Yes	1 (25%)	4 (80%)	1 (25%)	4 (80%)
		$X^2 = 2.72, p = .04$		
Low Grades				
No	4 (100%)	0 (0%)	4 (100%)	0 (0%)
Yes	0 (0%)	5 (100%)	0 (0%)	5 (100%)
		$X^2 = 9.00, p = .003$		
Behavioral				
Disruptive Behavior				
No	2 (50%)	0 (0%)	2 (50%)	0 (0%)
Yes	2 (50%)	5 (100%)	2 (50%)	5 (100%)
		$X^2 = 3.21, p = .03$		
Affective/Social				
Low Self Esteem				
No	0 (0%)	1 (20%)	0 (0%)	1 (20%)
Yes	4 (100%)	4 (80%)	4 (100%)	4 (80%)
Peer Pressure				
No	0 (0%)	2 (50%)	0 (0%)	2 (50%)
Yes	5 (100%)	2 (50%)	5 (100%)	2 (50%)
		$X^2 = 2.72, p = .04$		

Discussion, Conclusion, and Implications for School Professional

This exploratory study identified HIV-related medical, academically-based, behavioral, and affective/social factors that were associated with Perinatally HIV-infected elementary and middle school children's academic achievement as measured by their success with their End-of-Grade Tests in both Reading and Mathematics. While academically-based (poor study habits and low grades), behavioral (disruptive behavior), and affective/social (peer pressure) factors were found to be associated with these perinatally HIV-infected children's academic achievement, the failure of these children to successfully pass their End-of-Grade Tests in both Reading and Mathematics, were found to be more strongly associated with low grades. HIV-related medical factors were not associated with these children making low grades, whereas academically-based (poor study habits), behavioral (disruptive behavior), and affective/social (peer pressure) factors were found to be associated with them (data not reported). It is concluded in this exploratory study, therefore, that rather than school professionals addressing strictly the HIV virus with pharmacological drugs as a means to improve low education performance, it would be more effective to devise an education behavioral modification plan to change the dynamics of periniatally HIV-infected children's peer group towards them.

In devising this education behavioral modification plan, while necessary, education alone is not sufficient to motivate people to act in a healthful way (Basch, 1989). One strategy for school professionals, therefore, would be to recruit a school psychologist or social worker to come to the school and present a psychological simulation to educate the peer group of the perinatally HIV-infected children (assuming that these children are willing to disclose the names in their peer group) as to the effects of their behavior in the school setting, being careful not to single out the perinatally HIV-infected children. The simulation may focus on a role play highlighting what it feels like to be marginalized or ostracized by one's peers. The problem in rural communities for perinatally HIV-infected children is that oftentimes disclosure of HIV by the infected person is not necessary because everybody knows about everybody else's "business". It's difficult for a feared virus like HIV to be kept a secret in rural communities, the word gets out somehow. While perinatally HIV-infected children may seek acceptance from their peer group, because of the fallacies and misinformation about the HIV virus it may be difficult to obtain this approval.

The goal of the psychological simulation is to change the behavior of the peer group and perinatally HIV-infected children so that these children now feel that they belong to the peer group. This acceptance into the peer group may heighten perinatally HIV-infected children's self esteem which in turn may raise the education performance of these children. By raising the education performance, it is plausible that perinatally HIV-infected children will be less disruptive in the school setting.

Elementary and middle-school aged children have so little knowledge of HIV that it would be critical to supplement this psychological simulation with a HIV/AIDS education program. Armistead, Summers, Forehand, Morse, and Clark (1999) examined the extent to which 231 elementary and middle school children were knowledgeable about HIV. These researchers found children infected with HIV and non-infected children to not differ on their level of understanding HIV/AIDS; however, Armistead et al. (1999) reported that both groups had little or no understanding of HIV/AIDS. In fact, the majority of 6 (85%) and 7 (95%) year olds who had infected and non-infected mothers, respectively, had no understanding of HIV, meaning that they either did not know what HIV was or had never heard of it. Similarly, a high number (48%) of a sample of 152 high school students did not know that AIDS is caused by a different organism than those that are the cause of other

sexually transmitted diseases (Walker, 1992).

In light of this void of knowledge about HIV/AIDS among school-aged children, it would be prudent for school professionals, after the psychological simulation to recruit a health educator, to educate the perinatally HIV-infected children and their peer group regarding all childhood diseases, including HIV/AIDS. At a minimum the Health Educator should explain to the group what the HIV virus and AIDS disease are and the different modes of transmission of HIV. By addressing these HIV/AIDS issues a lot of misunderstandings about the HIV virus and AIDS disease will be eliminated.

The goal of the health education program is to inform perinatally HIV-infected children and their peer group about children and disease so that HIV/AIDS will be viewed as any other chronic disease or sickness, such as asthma, Rheumatic fever, measles, chicken pox, and mumps. As a result of such an outlook on disease, the relationship between perinatally HIV-infected children and their peer group would be changed because the peer group versus the boy/girl with HIV/AIDS mentality would be changed.

Perinatally HIV-infected children are now living long enough to enter the school system (Parker, 2000). It would be wise, therefore, that school professionals at all grade levels and administrative ranks within the school system educate themselves about HIV/AIDS so that they can be comfortable with this disease. Dawson, Chunis, Smith, and Carboni (2001) studied AIDS-related knowledge and attitudes of 141 high school teachers and found that teachers of allied health possessed a fairly good understanding of HIV/AIDS, while teachers in other disciplines had less knowledge. For example, these researchers found 40% of the special education teachers to believe that HIV antibodies could be detected in the bloodstream immediately after infection, and 30% of humanities teachers believed the HIV virus could live several days outside the body. Dawson et al. (2001) noted that while health teachers are the ones most likely to be responsible for HIV/AIDS education, students may seek a trusted teacher in another discipline for advice as well. This suggests the need for teacher training in HIV/AIDS for both preservice and inservice educators.

Pre-service and in-service HIV/AIDS training for school professionals could be valuable because not only do many of the HIV/AIDS-infected school-age children lack an understanding of the HIV/AIDS disease, but many of their mothers also lack this knowledge (Armistead et al., 1999). Armistead et al. (1999) found 63% of the eight and nine year olds of HIV-infected and non-infected children to have mothers who had no understanding of the HIV/AIDS disease. With school professionals being educated about the HIV/AIDS disease, they would be able to assist and/or answer questions that these mothers may have concerning this disease. These mothers, then, would be able to help their HIV-infected children deal with issues about the disease at home as well as in the school setting. This kind of involvement of mothers with perinatally HIV-infected children could also help boost the self esteem of these children. At the same time that perinatally HIV-infected children would have more positive feelings about themselves, school professionals would be better able to remediate the educational problems that these children are experiencing. In keeping with the Bush Administration's campaign of "Leave no Child Behind", it takes school professionals as well as parents who are well informed about the HIV virus and AIDS disease to successfully promote perinatally HIV-infected children through an ever-improving school environment

References

Armistead, L., Summers, P., Forehand, R., Morse, P., Morse, E., & Clark, L. (1999).

Understanding of HIV/AIDS among children of HIV-infected mothers: Implications for prevention, disclosure, and bereavement. *Children's Health Care, 28,* 277-295.

Basch, C. (1989). Preventing AIDS through education: Concepts, strategies, and research priorities. *Journal of School Health, 59,* 296-300.

Daniel, F., Seidel., J., & Swales, T. (1993). Pediatric HIV infection: A neuropsychological and educational challenge. *Journal of Learning Disabilities, 36,* 92-103.

Dawson, L., Chunis, M., Smith, D., & Carboni, A. (2001). The role of academic discipline and gender in high school teachers' AIDS-related knowledge and attitudes. *Journal of School Health, 71,* 3-8.

Frank, E., Doley, G., & Kuchuck, A. (1997). Cognitive functioning in school-age children with human immunodeficiency virus. *Perceptual and Motor Skills, 85,* 267-272.

Gross, E., & Larkin, M. (1996). The child with HIV in day care and school. *Nursing Clinics of North America, 31,* 231-241.

Levenson, L., Mellins, C., Zawadzki, R., Kairam, R., & Stein, Z. (1992). Cognitive assessment of human immunodeficiency virus-exposed children. *American Journal of Diseases of Children, 146,* 1479-1484.

Mellins, C., Smith, R., O'Driscoll, P., Magder, L., & Brouwers, P., Chase, C., Blasini, H., Hittleman, J., Llorente, A., & Matzen, E. (2003). High rates of behavioral problems in perinatally HIV-infected children are not linked to HIV disease. *Pediatrics, 111,* 384-393.

NCDPI Division of Accountability Services/Testing Section. (2001). *End-of-grade tests of reading and mathematics.* Raleigh, NC: State of North Carolina.

North Carolina Department of Health and Human Services, Division of Public Health. (2003). *Epidemiologic profile for 2004 HIV/STD prevention and care planning.* Raleigh, NC: State of North Carolina.

North Carolina State Board of Education, Department of Public Instruction. (2002). *End-of-grade/end-of-course testing in North Carolina.* Raleigh, NC: State of North Carolina.

Norusis, M. (1990). *SPSS advanced statistics.* Chicago, Ill: SPSS.

Palella, F., Delaney, K., Moorman, A., Loveless, M., Fuhrer, J., Sattem, G., Aschman, D., & Holmberg, S. (1998). Declining morbidity and mortality among patients with advanced human immunodeficiency virus infection. *The New England Journal of Medicine, 338,* 853-860.

Parker, T. (2000). Perinatal HIV: Children with HIV grow up. *Focus: A guide to AIDS. Research and Counseling, 15,* 1-4.

Stein, G. (2001. *AIDS update: 2001.* Upper Saddle River, NJ: Prentice Hall.

Tardieu, M., Mayaux, M., Seibel, N., Brentano, I., Straub, E., Teglas, J., & Blanche, S. (1995). Cognitive assessment of school-age children infected with maternally transmitted human immunodeficiency virus type 1. *The Journal of Pediatrics, 126,* 375-379.

Task Force on Pediatric AIDS. (1991). Education of children with human immunodeficiency virus infection. *Pediatrics, 88,* 645-648.

Walker, S. (1992). Teenagers' knowledge of the acquired immunodeficiency syndrome and associated risk behaviors. *Journal of Pediatric Nursing, 7,* 246-246-250.

Zuger, A. (2000). Voices from the clinic: AIDS then and now. *Health Affairs, 19,* 191-197.