



Adolescent health brief

## Keeping Adolescent Orphans in School to Prevent Human Immunodeficiency Virus Infection: Evidence From a Randomized Controlled Trial in Kenya

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### A B S T R A C T

**Purpose:** We report the findings from a pilot study in western Kenya, using an experimental design to test whether comprehensive support used to keep adolescent orphans in school can reduce risk factors associated with infection with human immunodeficiency virus.

**Methods:** Adolescent orphans aged 12–14 years (N = 105) in Nyanza Province were randomized to condition, after stratifying by household, gender, and baseline survey report of sexual behavior. The intervention comprised school fees, uniforms, and a “community visitor” who monitored school attendance and helped to resolve problems that would lead to absence or dropout. Data were analyzed using generalized estimating equations over two time points, controlling for gender and age.

**Results:** Compared with the control group, intervention students were less likely to drop out of school, commence sexual intercourse, or report attitudes supporting early sex. School support also increased prosocial bonding and gender equity attitudes.

**Conclusions:** After 1 year of exposure to the intervention, we found evidence suggesting that comprehensive school support can prevent school dropout, delay sexual debut, and reduce risk factors associated with infection with human immunodeficiency virus. Further research, with much larger samples, is needed to better understand factors that mediate the association between educational support and delayed sexual debut, and how gender might moderate these relationships.

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Of the estimated 15 million children orphaned as a result of the human immunodeficiency virus (HIV) pandemic, about 11.6 million are living in sub-Saharan Africa [1]. Orphans are at increased risk of psychological distress, poverty, and school dropout [2]. Sexual behavior increases among school dropouts [3], leaving adolescent orphans particularly vulnerable to HIV infection. Structural interventions, such as enhanced access to continued schooling, offer the promise of more effective HIV prevention strategies for this vulnerable group [4].

Several recent experimental studies have demonstrated reductions in HIV risk by improving enrollment and attendance at school. In Kenya, an intervention wherein school uniforms were provided to the students decreased school dropout, marriage, and pregnancy compared with an intervention consisting of teachers who were trained in HIV education [5]. In Malawi, young women who received conditional cash transfers (for staying in school) and secondary school fees were more likely to remain in school and showed some reductions in sexual risk behavior [6]. A subsample of older girls (average age: 17 years) who had previously dropped out of school, were less likely to marry or become pregnant as compared with controls [6]. In Zimbabwe, comprehensive school support for rural adolescent orphan girls reduced school dropout by 78% and early marriage by 63% [7].

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This article reports early findings from an experimental pilot study testing the effect of providing comprehensive community-based school support on orphan adolescent sexual risk behaviors in Nyanza Province, Kenya. Nyanza Province has the highest HIV prevalence (15%) in Kenya; the Luo tribe, which dominates in Nyanza, has the highest HIV prevalence (22%) among all ethnicities [8]. On the basis of the Social Development Model [9], we hypothesized that intervention students would show greater attachment to school and prosocial adults and have higher educational aspirations, more positive future expectations, more protective attitudes about early sex, and less sexual activity. We also hypothesized that school support for both girls and boys would increase equitable gender attitudes, which have been found to be associated with HIV prevalence in sub-Saharan Africa [10].

**Methods**

The study sample included 105 Luo students aged 12–14 years, who had lost one or both parents through death by any cause in a rural location (East Kochieng) near the city of Kisumu. Local leaders identified 79 households with one or more eligible orphans. Parent or guardian consent and student assent were obtained, and all protocols were approved by the Pacific Institute for Research and Evaluation and the Moi University institutional review boards.

We used stratified random assignment to avoid relative deprivation and ensure that sexual experience and gender were equivalent by study condition at baseline. First, we assigned the same study condition to all eligible participants in the same household; we also assigned the same condition to participants in households in close proximity (as in polygamous households). Next, using baseline survey data, we stratified households according to the participant’s sexual debut and gender, and then generated random numbers for random assignment.

All participating households received mosquito nets and blankets, as well as food supplements (maize, oil, sugar, water guard) every fortnight. Experimental (E) condition participants also received uniforms and school fees. A local adult female “community visitor” was assigned to approximately 10 E children, and was required to visit their households at least monthly and schools weekly to monitor their school attendance. If needed, the community visitor could use intervention funds to address problems resulting in absenteeism (e.g., sanitary napkins for girls during menses; clinic visit and medication for common problems, such as malaria or parasites). The budgeted cost of the school support intervention was approximately \$200/year/child; the budgeted cost of food supplements and other services provided to all participants was approximately \$100/year/child.

**Table 1**  
Baseline equivalence between experimental group and control group

Group	Experimental	Control	Total
	N = 53	N = 52	N = 105
	Mean (SD)/Number (%)	Mean (SD)/Number (%)	t/χ <sup>2</sup> (p value)
<b>Demographic variables</b>			
Age in 2008	12.94 (.16)	12.92 (.16)	-.09 (.93)
Grade	6.04 (.19)	5.73 (.20)	-1.12 (.27)
Gender (% female)	31 (58.5%)	31 (59.6%)	.01 (.91)
Orphan status			2.74 (.25)
Paternal	35 (66%)	26 (51%)	
Maternal	5 (9%)	9 (18%)	
Double orphan	13 (25%)	16 (31%)	
SES count index (α = .62, 13 items)	2.75 (.28)	3.31 (.23)	1.52 (.13)
School uniform	24 (46%)	31 (66%)	3.92 (.05)*
Absenteeism	1.92 (.16)	1.94 (.16)	.06 (.95)
<b>Perception of caring adults</b>			
Teachers care	4.00 (.19)	3.78 (.24)	-.73 (.45)
Adults in the family care	3.60 (.21)	3.81 (.20)	.71 (.48)
Adults in the community care	3.56 (.21)	3.46 (.21)	-.35 (.72)
Education aspiration (higher than secondary school vs. others)	44 (83%)	38 (73%)	2.50 (.29)
<b>Future expectations:</b>			
Graduate from secondary school	4.11 (.19)	4.06 (.20)	-.21 (.84)
Graduate from college/university	4.30 (.15)	4.12 (.18)	-.80 (.42)
Enough salary by age 30	3.45 (.22)	3.38 (.20)	-.23 (.82)
Live to age 35	3.83 (.19)	3.75 (.20)	-.29 (.77)
Gender equity index (α = .71)	11.3 (5.4)	12.2 (4.7%)	.92 (.36)
<b>Wife beating: it is acceptable for a husband to beat his wife: yes</b>			
If she neglects the children	31 (58.5%)	30 (57.7%)	.01 (.93)
If she argues with him	33 (62.3%)	30 (57.7%)	.23 (.63)
If she refuses sex with him	5 (9.4%)	6 (11.5%)	.30 (.59)
If she burns the food	9 (17.0%)	11 (21.2%)	.30 (.59)
For any reason	8 (15.1%)	5 (9.6%)	.73 (.39)
<b>Sexual attitudes</b>			
Disagree with early sex (α = .65)	3.79 (.12)	4.04 (.11)	1.56 (.12)
Believe in waiting until marriage before sex	1.89 (.18)	2.42 (.23)	1.85 (.07)**
Sexual debut (yes)	9 (17%)	9 (17%)	.0 (1.00)

\* p ≤ .05; \*\*p ≤ .10. SES = Socioeconomic status.

**Table 2**  
Effects of intervention over two time points

	Experimental group		Control group		Condition time* Parameter estimate (p value)
	Time 1 (n = 53)	Time 2 (n = 52)	Time 1 (n = 52)	Time 2 (n = 51)	
	Frequency (%) / Mean				
School dropout in 2009 <sup>a</sup>	NA	2 (3.77%)	NA	6 (11.54%)	AOR = 3.66 (CI = .7–19.9) (.05)*
Absenteeism	1.92	1.74	1.94	1.91	.41 (.26)
Perception of caring adults					
Teachers care	4.13	4.10	3.72	3.74	.20 (.42)
Adults in the family care	3.61	3.82	3.79	3.44	2.09 (.02)**
Adults in the community care	3.54	3.48	3.43	3.35	.08 (.47)
Education aspiration (higher than secondary school)	2.78	2.91	2.62	2.74	.39 (.35)
Future expectations					
Graduate from Secondary School	4.07	4.00	4.02	3.64	.51 (.31)
Graduate from college/university	4.29	4.29	4.10	3.72	.86 (.19)
Good salary by age 30	3.50	3.50	3.41	3.51	-.74 (.23)
Live to age 35	3.82	3.82	3.69	3.91	-.85 (.20)
Gender equity ( $\alpha = .71$ )	2.26	2.79	2.44	2.85	.69 (.24)
Wife beating: it is acceptable for a husband to beat his wife?					
If she neglects the children	31 (58.5%)	31 (59.6%)	30 (57.7%)	35 (68.6%)	-.95 (.17)
If she argues with him	33 (62.3%)	21 (40.4%)	30 (57.7%)	17 (33.3%)	.22 (.41)
If she refuses sex with him	5 (9.4%)	1 (1.9%)	6 (11.5%)	7 (13.7%)	-1.48 (.07)*
If she burns the food	9 (17.0%)	9 (17.3%)	11 (21.2%)	10 (19.6%)	.33 (.37)
For any reason	8 (15.1%)	3 (5.8%)	5 (9.6%)	6 (11.8%)	-1.51 (.07)*
Sex attitudes					
Disagree with early sex ( $\alpha = 65.$ )	3.81	4.29	4.05	3.77	4.16 (<.00)**
Believe in waiting until marriage before sex	1.89	1.96	2.43	2.13	1.24 (.11)
Virginity because of values	1.28	1.31	1.25	1.34	.71 (.20)
Virginity because of consequence	1.14	1.17	1.22	1.22	.07 (.40)
Sexual debut	9 (17.3%)	10 (19.2%)	9 (17.0%)	17 (33.3%)	-1.50 (.07)*

Models controlled for age and gender.

NA, not applicable; AOR = adjusted odds ratio; CI = confidence intervals.

One tailed test at \* $p \leq .10$ ; \*\* $p \leq .05$ .

<sup>a</sup> Logistic regression was conducted for school dropout.

We used factor analyses to create multi-item indices and conducted  $\chi^2$  and  $t$  tests to establish baseline group equivalence. For intervention effects, we tested differential change from baseline to follow-up between the E and control (C) groups using generalized estimating equations (SAS Proc GENMOD; SAS version 9.1, Cary, North Carolina, USA). The models assessed the main effects of condition and time and the condition by time interaction, controlling for age and gender. Because of the small sample size, we used a significance standard of  $p \leq .10$ .

## Results

Baseline survey data were essentially equivalent between the E and C groups, except for marginal differences for school uniforms and attitudes about waiting until marriage before sex (Table 1). Both of these were in the direction that would favor the C group.

At the 1-year follow-up, 98% of participants responded to the survey. Significant differences by condition over time were as follows: those in the C group were more likely than those in the E group to: (1) drop out of school (12% vs. 4%;  $p = .05$ ), (2) begin sexual intercourse (33% vs. 19%;  $p = .07$ ), and (3) report attitudes supporting early sex ( $p < .001$ ). Those in the E group were more likely than those in the C group to perceive that adults in the family liked or cared about them ( $p = .02$ ). Those in the E group were less likely to perceive that it is acceptable for a husband to beat his wife if she refuses sex ( $p = .07$ ) or for any reason ( $p =$

.07). All significant differences were in the hypothesized direction (Table 2).

## Discussion

After 1-year of exposure to the intervention, we found evidence that comprehensive school support can prevent school dropout, delay sexual debut, and reduce HIV risk factors. We also found evidence that school support increases prosocial bonding and gender equity attitudes. These effects are promising, particularly given the small size of the study, the young age of the adolescents, and the inclusion of both genders.

A major limitation of the study is the small sample size, making it infeasible to discern intervention interactions on the basis of gender or factors that mediate the relationship between school support and HIV risk behaviors. Moreover, the study can only be generalized to the orphan youth of the Luo tribe in rural western Kenya. However, this pilot study is the first known community-based structural intervention found to reduce HIV risk behaviors among adolescent orphan boys and girls in sub-Saharan Africa.

Our findings add to the mounting evidence that school support can help reduce HIV risk behaviors in high-prevalence, low-resource countries. Besides replication with a larger sample size, models for widespread diffusion of comprehensive school support, with safeguards to ensure that funding reaches and benefits orphan students, are also needed.

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