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Longitudinal associations between HIV risk reduction and out-of-school time program participation

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Abstract

Purpose—The study aimed to determine the longitudinal associations between several variables assessing positive youth development and HIV risk reduction practices.

Methods—Participants were 329 youth enrolled in out-of-school time programs in New York City. Longitudinal data were collected in 3 waves during 2008 (baseline, 6 month follow-up and 12 month follow-up). Due to the nested nature of the data, multivariate analyses were performed using multilevel models.

Results—At baseline, HIV risk reduction was associated with female gender, greater individual-level program participation, and greater school connectedness. Over time, HIV risk reduction was associated with program-level participation: Individuals in groups with program-level participation scores 1 SD below the average showed significant declines in risk reduction practices over the 1-year study period compared to individuals in more participatory programs.

Conclusions—This study provides support for the out-of-school environment as an important context for sustaining HIV risk reduction and positive health promotion practices.

Keywords

Out-of-school time programs; Positive youth development; Participation; Sexual and reproductive health; Adolescent; HIV/AIDS risk reduction; Family connectedness; School connectedness; After-school programs

Introduction

Identifying effective approaches that promote adolescent sexual health is crucial to advancing national public health goals. For example, rates of sexual activity in the United States are similar to those in other developed countries, but STIs and HIV/AIDS are more prevalent among U.S. adolescents.¹ Further, individuals aged 13–29 are disproportionately

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represented in new HIV infections in the US,² and marginalized urban and minority adolescents may experience even higher levels of infection and related risk behaviors.^{2,3}

Despite increasing evidence for the importance of the ecological framework in understanding risk, most evidence-based adolescent sexual health promotion programs seek change primarily at the individual level, and do not directly address the complex set of developmentally significant contexts that make up young people's lives. In contrast, positive youth development (PYD) approaches focus on building adolescents' developmental assets,⁴ and many community-based agencies serving youth in out-of-school time (OST) programs seek to promote adolescent well-being by implementing PYD practices, including meaningful program participation and engagement.⁵ Because of the potential importance of OST programs in promoting healthy development, the present study assessed whether change in adolescent HIV risk reduction (HIV-RR) practices over a one-year period was influenced by OST program participation and social connectedness, as well as by OST program characteristics.

Methods

Data were collected through a community-based participatory research (CBPR) partnership involving a university and community-based organizations, as reported previously.⁶ Longitudinal data from 329 13–17 year old participants in 19 OST programs offered by 8 community-based agencies were collected in 3 waves beginning in early 2008, with follow-up 6- and 12-months after baseline. Retention was 91% across the 3 waves. At baseline, parents/guardians provided signed consent, and youth assent was also obtained. Cornell University's Institutional Review Board reviewed and approved study procedures.

Measures

Outcome variable—We derived our 10-item measure of HIV-RR from prior sexual risk scales⁷ and in consultation with our CBPR partnership. The scale includes items on risk and protective practices, as well as healthcare access.⁸ HIV-RR scale scores ranged from 0–5, with higher scores indicating lower risk (i.e., more risk reduction practices).

Covariates—Quality of OST participation was measured using the 20-item Tiffany-Eckenrode Program Participation Scale (TEPPS), which includes 4 subscales (Personal Development, Voice/Influence, Support/Safety, Civic Engagement).⁶ Responses were measured on a 5-point Likert-type scale and summed; higher scores indicate more highly engaged program participation (range, 40–99; α , baseline=0.87). Family (8 items) and school (6 items) connectedness were measured using scales developed for this study.⁸ Higher scores indicate higher levels of connectedness (range, family, 8–40; α , family, baseline=0.90; range, school, 1–30; α , school, baseline=0.71). To assess intensity and duration of program involvement, participants were asked how many hours per week they spent at the program and how long they had been involved in the program, respectively. Several program-level variables were also created from information collected during 62 interviews with staff and youth participants in the 8 partner organizations and by aggregating individual-level variables to create program-level averages (e.g., program-level TEPPS score).⁸

Analysis

Covariates that were related to HIV-RR at the $p < .20$ level were retained for inclusion in multivariate models. Because our data are nested (time [Level 1] within participants [Level 2] within programs [Level 3]), we used multilevel multivariate models.⁹ For the multivariate models, we determined the optimal structure by examining t-ratios for fixed effects, and χ^2

values for random effects. We also considered the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC), and ran nested log likelihood tests to compare model fit. Only the final model is presented here. All individual level variables were group-mean centered, and our aggregate program-level variables were grand-centered.

Results

The mean (SD) HIV-RR score was 3.80 (0.97) at Wave 1, 3.60 (0.91) at Wave 2 and 3.69 (0.89) at Wave 3. HIV-RR scores differed significantly across waves ($F[2, 926]=3.67, p=.026$), but in post-hoc comparisons, this difference was only significant for Wave 1 vs. Wave 2. Using model fit approaches as described above, we found that the optimal model included randomly varying intercept and time slopes at Level 2, and a randomly varying intercept at Level 3. In the best fit Level 2 model, higher HIV-RR scores at baseline were associated with higher individual TEPPS scores, greater school connectedness and female gender (Table 1); this model explained 23.0% of the variance in baseline person-level HIV-RR scores, and 1.4% of the variance in person-level change in HIV-RR. In the optimal Level 3 model, aggregate program-level participation score accounted for 54.4% of the variance in baseline program-level HIV-RR scores (Table 1). In addition, we also found a significant cross-level interaction between time and program-level participation. This interaction indicated that participants in programs with lower levels (-1 SD) of program-level participation reported greater declines in risk reduction practices than participants attending programs with higher levels ($+1$ SD) of participation ($b=-0.32, p=.005$; Figure 1).

Discussion

Findings from this observational study indicate that it is important to consider both the setting and individual levels when seeking to promote HIV-RR among adolescents. At the individual level, higher levels of program participation and school connectedness were associated with more risk reduction practices. In addition, our findings suggest that interventions that improve youth experiences of participation even moderately, as reflected in program-level TEPPS scores, may help sustain adolescent risk reduction practices over time. The potential importance of OST programs in addressing adolescent sexual health and risk reduction supports the findings of Gavin et al¹⁰, whose systematic review found that PYD programs can contribute to sustained improvements in adolescent sexual and reproductive health.

Several limitations of this study should be noted. First, this was an observational study, with no intervention component. Youth in the sample were involved in a variety of OST programs that implemented different strategies to ensure meaningful participation for varying durations. Second, we included a limited number of programs ($n=19$), and non-linear change over time could not be explored with only 3 waves of data. We are currently planning a followup study evaluating a setting-level HIV-RR intervention involving more programs and additional follow-up observations.

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participants, as well as the NYS Department of Health AIDS Institute Adolescent HIV Prevention Services Unit, the NYC Department of Youth and Community Development, and the Bronfenbrenner Center for Translational Research.

Abbreviations

PYD	Positive youth development
HIV-RR	HIV risk reduction
OST	Out-of-school time
CBPR	Community-based participatory research
TEPPS	Tiffany-Eckenrode program participation scale
CI	Confidence interval

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Implications and Contribution

Evidence-based adolescent HIV risk reduction and sexual health promotion programs seek change primarily at the individual level rather than intervening in the complex relationships, contexts and organizations that shape young people's lives. However, more participatory settings may sustain youths' HIV risk reduction over time, suggesting the need for setting-level interventions.

Figure 1.

Change in individual-level HIV risk reduction (HIV-RR) scores over time, by amount of program-level participation, as indicated by program-level TEPPS scores. Higher scores on the HIV-RR scale indicate more risk reduction practices. Simple slopes for average program-level participation ($Z=2.27$, $p=.02$) and -1 SD program-level participation ($Z=3.02$, $p=.003$) are both significant, but the simple slope for $+1$ SD program-level participation is not significant ($Z=0.29$, $p=.77$).

Table 1

Associations between HIV risk reduction and individual- and program-level predictors

Fixed Effect	Estimate (95% CI)
Intercept	3.71 (3.55, 3.87) ***
Program participation (TEPPS)	0.02 (0.01, 0.03) ***
School connectedness	0.03 (0.01, 0.05) **
Gender (female)	0.46 (0.24, 0.68) ***
+1 SD TEPPS (program level)	0.33 (−0.02, 0.68)
−1 SD TEPPS (program level)	−0.12 (−0.55, 0.31)
Wave	−0.04 (−0.12, 0.04)
Wave*TEPPS	−0.005 (−0.01, 0.0009)
Wave*School connectedness	−0.007 (−0.02, 0.007)
Wave*Gender	−0.04 (−0.18, 0.10)
Wave*+1 SD TEPPS (program level)	−0.007 (−0.16, 0.15)
Wave*−1 SD TEPPS (program level)	−0.32 (−0.54, −0.10) **

Random effect variance: Level 1=0.49; Level 2-Intercept=0.30; Level 2-Wave=0.05; Level 3-Intercept=0.03. All individual-level variables were group-mean centered. Model was estimated under restricted maximum likelihood. Number of level 1 units=925; Number of level 2 units=327; Number of level 3 units=19.

**
 $p < .01$;

 $p < .001$