



Original article

A Family Intervention to Reduce Sexual Risk Behavior, Substance Use, and Delinquency Among Newly Homeless Youth

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ABSTRACT

Purpose: We evaluate the efficacy of a short family intervention in reducing sexual risk behavior, drug use, and delinquent behaviors among homeless youth.

Methods: A randomized controlled trial of 151 families with a homeless adolescent aged 12 to 17 years. Between March 2006 and June 2009, adolescents were recruited from diverse sites in Southern California and were assessed at recruitment (baseline), and at 3, 6, and 12 months later. Families were randomly assigned to an intervention condition with five weekly home-based intervention sessions or a control condition (standard care). Main outcome measures reflect self-reported sexual risk behavior, substance use, and delinquent behaviors over the past 90 days.

Results: Sexual risk behavior (e.g., mean number of partners; $p < .001$), alcohol use ($p = .003$), hard drug use ($p < .001$), and delinquent behaviors ($p = .001$) decreased significantly more during 12 months in the intervention condition compared with the control condition. Marijuana use, however, significantly increased in the intervention condition compared with the control condition ($p < .001$).

Conclusions: An intervention to reengage families of homeless youth has significant benefits in reducing risk over 12 months.

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There are an estimated 1.6 million runaway and homeless youth in the United States each year [1]. Although recent reports indicate that the prevalence of HIV among the general population of young people in the United States is only .2% [2], the rate

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of infection among homeless youth far exceeds this number in urban centers, with estimates ranging from 2% to 11% [3,4]. Researchers have consistently shown that the longer the youth are away from home and living on the streets, the more heavily involved they become in risky behavior, especially HIV-related sexual and drug-taking risk behaviors [5–12]. Intervening when homeless youth first leave home may provide the best opportunity for reducing their risk behaviors.

Recent work has demonstrated that most runaways return home within 3 months of first becoming homeless [13]. Contact

with parents, especially mothers, increases the chances that newly homeless youth will return home and remain at home over time [14]. To date, however, the only effective HIV prevention programs for homeless youth have targeted individual youth in the context of street life [15]. Interventions involving the family that occur before the youth becomes chronically homeless may prove an efficacious alternative [16]. Behavioral family interventions can be effective in preventing negative developmental outcomes, such as delinquent behaviors, for children and adolescents [17]. Family interventions have been successfully used with other high-risk youth, including those who are suicidal [18], delinquent [19], or engaged in HIV-related risk behaviors such as substance abuse [17,20–23].

To address the need for family-based risk reduction and HIV prevention for homeless youth, we evaluated the efficacy of a brief family intervention in reducing risk-taking and delinquent behaviors among newly homeless youth in Southern California. We hypothesized that risk behaviors are prevalent among homeless youth, but that a family intervention would result in less risk-taking and fewer delinquent behaviors over time among those in the intervention compared with the control condition.

Methods

Study design and participants

A randomized controlled trial was conducted from March 2006 through June 2009. Newly homeless youth were recruited from community-based organizations (e.g., presentations at shelters or schools) and from direct recruitment (e.g., flyers, advertisements) in Los Angeles and San Bernardino Counties. Eligibility criteria included having been away from home for at least two nights in the past 6 months, not being away for more than 6 months, and having the potential to return home. Additional eligibility criteria included no current abuse or neglect, no active psychosis, or no current substance intoxication; these additional criteria could not be determined before obtaining informed consent and were screened for in the baseline assessment.

Flyers and recruitment scripts indicated eligibility criteria for the study. Adolescents expressed interest in the study by calling phone numbers provided on recruitment materials or by approaching recruiters. Attempts were then made to obtain written informed consent to participate from both the adolescent and the parent (parent refers to parent or guardian, including a birth, adoptive, step, or foster parent). In two-parent families, both parents could participate in the intervention sessions if the family wanted both parents to participate, but data were collected from only one parent that the family selected as the parent participant). The Institutional Review Board of the University of California, Los Angeles, approved the protocol for this study.

After both the adolescent and parent assented/consented, they completed baseline assessments. Eligible families were then randomly assigned to one of two treatment conditions, intervention or control. Families in the control condition received the "standard care" that they were receiving from the agencies that referred them. If they were not actively receiving any type of services, the families were given appropriate referrals based on their needs. Families in the intervention condition received the STRIVE (Support to Reunite, Involve and Value Each Other) intervention.

Separate teams were involved in the recruitment/assessment and intervention aspects of the study. After a family provided consent and both baseline assessments, the recruitment/assess-

ment team referred them to the intervention team, which then used a computerized coin toss to assign families to study condition and provided the intervention to families randomized to receive it. The recruitment/assessment team continued to follow all families through June 2009, blinded to study arm.

After outreach efforts, the team found 442 adolescents initially indicated interest in the study. Among these, 151 provided full consent from parent and child, completed both the parent and adolescent baseline assessments, and were randomized. Sixty-eight were assigned to receive the intervention and 83 were in the control condition. Parents included mothers/female guardians (76%), fathers/male guardians (10%), grandparents (6%), and other adults (7%).

Intervention methods

The STRIVE intervention consisted of five sessions administered to the youth and parent(s) together by a trained facilitator at a site selected by the family (usually their home, where youth could be found despite runaway episodes). Five sessions were determined as the minimum number of sessions required for behavioral change and the maximum number of sessions anticipated to be replicable [24,25]. The session content was based on cognitive-behavioral theories, designed to improve families' problem-solving and conflict resolution skills [17,26–28]. Because the intervention was specifically designed for newly homeless youth, running away from home was framed as an ineffective attempt to resolve family conflicts. The conceptual frame underlying the intervention highlights the importance of establishing a positive family climate, improving family functioning by routinely resolving conflicts in a mutually beneficial manner, learning how to recognize and effectively manage feelings, increasing positive affirmations, learning and practicing problem-solving skills, and providing role clarity [29–32]. Table 1 shows the sessions are based on a set of very highly interactive, semi-structured tasks involving repeated feedback and practice. New skills are learned based on the preceding sessions, and the skills learned in one session are constantly reinforced in the subsequent sessions. For example, nurturing a positive family climate is reinforced in all five sessions. The intervention includes the following tools: tokens to strengthen desired behaviors, a feeling thermometer to teach emotional regulation, a "think-feel-do" problem-solving model to operationalize and tackle problems, role playing for safely practicing new skills, and reframing to conceptualize problems and solutions in a non-blaming manner.

An intervention manual was created to ensure fidelity. Intervention sessions usually lasted between 1½ and 2 hours, and were conducted once weekly. All sessions were audio recorded, and 20% were monitored for quality assurance. A 13-item rating instrument was developed to assess fidelity to session content and goals; overall 98% of tasks were implemented with fidelity. Attendance was found to be high: 76% of families completed all five sessions, 6% attended three to four sessions, 16% attended one to two sessions, and only one family did not attend any session. In addition, satisfaction was assessed using the Working Alliance Inventory. The Working Alliance Inventory is a valid and reliable instrument, with scores ranging from 12 to 84 [33]. The median adolescent score was 78.0 ($SD = 12.5$, mean = 72.0), and the median parent was 81.0 ($SD = 10.0$, mean = 76.4), indicating that satisfaction was very high.

Table 1
Content of the STRIVE intervention sessions

Session	Description
1	Create a positive family atmosphere Establish facilitator's credibility Negotiation modeling Plan for and identify potential emergencies Connect feelings to behaviors
2	Identify outside social supports Identify and rank problem situations Relate feeling thermometer to each problem Assign priorities to each identified family problem Increase problem-solving abilities Select a relatively easy family problem and practice problem solving
3	Analyze a problem of moderate difficulty Uncover obstacles: rules, roles, assumptions, benefits of keeping the status quo Select a family problem of moderate difficulty and practice problem solving
4	Review HIV and street life educational materials Decide how to cope with the problem(s) Select a family problem of medium to high difficulty and problem-solve Learn how to negotiate solutions
5	Select the family problem of the highest difficulty (i.e., the one with the highest probability of being the main source of family conflict) and practice problem solving Evaluate solutions, and implement them through negotiation Review family's own strengths as problem solvers

Assessments

A highly trained assessment team diverse in ethnicity and gender conducted computerized interviews. Audio computer-assisted self-interviewing was used for sensitive measures. Youth in the study completed assessments at baseline, and at 3, 6, and 12 months after the baseline. All youth were paid for completing each assessment (e.g., \$30, \$35, and \$40). Of the 151 randomized adolescents, 77% (116) completed at least one follow-up, 71% (107) completed a 3-month, 58% (87) completed a 6-month, and 46% (69) completed a 12-month assessment. On average, the 3-month assessment occurred 16 days after the last intervention session; however, 21 cases had the 3-month assessment before the last intervention session.

Demographic data (age, gender, sexual orientation, race/ethnicity, and birthplace) as well as information about running away were collected at baseline. Lifetime history of sexual- and drug-related HIV risk behaviors was also assessed at baseline, as was history of delinquent behavior.

Measures of recent risky behavior were collected at each assessment. "Recent" behaviors were defined as in the past 3 months. Sex was defined as vaginal or anal intercourse, and measures of sexual behavior included the following: a dummy indicator for having sex, an indicator for having unprotected sex (without using a condom), number of sexual partners, and number of times one had sex. Measures of recent risky behavior also included substance use variables, again reflecting behavior in the 3 months before each assessment (indicators for using alcohol, marijuana, and hard drugs; number of times used alcohol, marijuana, and hard drugs).

Delinquent behaviors were measured by a count of conduct problems engaged in during the prior 3 months, from a list of 13 possible behaviors, identified in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) as being symptomatic of

conduct disorder [34]. The list of behaviors is provided in Table 2; examples include starting fights or destroying property. Runaway behavior was not included, as it was an inclusion criterion for the study.

Statistical methods

Baseline characteristics of participants assigned to the intervention were compared with those assigned to the control condition. Measures compared included demographics, runaway history, and baseline values of outcome measures. Those completing at least one follow-up assessment were compared with those lost to follow-up. For both sets of comparisons, *t* tests and χ^2 tests were performed for continuous and categorical measures, respectively.

Table 2
Observed characteristics of STRIVE participants at baseline, by intervention status^a

	Intervention (n = 68)	Control (n = 83)	Total (n = 151)
Age, mean (SD)	14.7 (1.3)	14.9 (1.5)	14.8 (1.4)
Gender, N (%)			
Male	15 (22.1)	36 (43.4)	51 (33.8)*
Female	53 (77.9)	47 (56.6)	100 (66.2)
Sexual orientation, N (%)			
Heterosexual	60 (88.2)	76 (91.6)	136 (90.1)
Bisexual, gay, lesbian	8 (11.8)	7 (8.4)	15 (9.9)
Race/ethnicity, N (%)			
Hispanic	42 (61.8)	51 (61.4)	93 (61.6)
White	8 (11.8)	9 (10.8)	17 (11.3)
African American	12 (17.6)	19 (22.9)	31 (20.5)
Other, mixed	6 (8.8)	4 (4.8)	10 (6.6)
Born in this country, N (%)	62 (91.2)	77 (92.8)	139 (92.1)
Longest time ever away, N (%)			
2 weeks or less	43 (64.2)	52 (62.7)	95 (63.3)
3 weeks to 1 month	17 (25.4)	18 (21.7)	35 (23.3)
2–6 months	7 (10.4)	13 (15.7)	20 (13.3)
Where currently living, N (%)			
Birth or adoptive family	53 (77.9)	55 (66.3)	108 (71.5)
Other family or friends	9 (13.2)	11 (13.3)	20 (13.2)
Shelter, group home, other	6 (8.8)	17 (20.5)	23 (15.2)
In the 3 months before baseline			
Had vaginal or anal sex, N (%)	26 (38.2)	33 (39.8)	59 (39.1)
Had unprotected sex (without a condom), N (%)	17 (25.0)	20 (24.1)	37 (24.5)
Number of times had sex, mean (SD)	4.1 (12.3)	3.0 (7.7)	3.5 (10.0)
Number of partners, mean (SD)	.8 (1.5)	.8 (1.4)	.8 (1.4)
Used alcohol, N (%)	29 (43.3)	39 (47.0)	68 (45.3)
Times used alcohol, mean (SD)	8.5 (25.9)	5.5 (11.9)	6.8 (19.4)
Used marijuana, N (%)	30 (44.1)	42 (50.6)	72 (47.7)
Times used marijuana, mean (SD)	9.9 (29.0)	11.6 (25.1)	10.9 (26.9)
Used hard drugs ^b N (%)	14 (20.9)	22 (26.5)	36 (24.0)
Times used hard drugs, mean (SD)	2.5 (9.4)	2.8 (6.6)	2.7 (7.9)
Number of delinquent behaviors ^c mean (SD)	2.4 (2.0)	2.8 (2.4)	2.6 (2.2)

^a For characteristics expressed as means, *t* tests were performed; for characteristics expressed as percents, χ^2 tests were performed.

^b Hard drugs defined as cocaine; crack; amphetamines; ice/smoked speed; heroin, nonprescription methadone; other opiates, narcotics, or painkillers; barbiturates; tranquilizers; inhalants; party drugs; or other drugs.

^c Of 13 possible: bullied/threatened, started a fight, used a weapon, physically been cruel, tortured/hurt an animal, stole face-to-face, forced sex, set a fire, destroyed property, broke into a building, lied to obtain something, stole from someone not present, skipped class.

* *p* < .01.

The impact of the STRIVE intervention on adolescents' risk-taking and delinquent behaviors was evaluated by intent-to-treat random-intercept regression models. Outcome variables were the measures of recent risky behavior and delinquent behaviors. In these models, a random intercept was included for each youth, to account for repeated measures taken from the same individual. Model predictors include the intercept, gender, a time measure for each assessment, an intervention status indicator, and an interaction between time and intervention status. The interaction term captures the impact of the intervention over time (i.e., the relative change across assessments for those in the intervention condition as compared with control condition). To test for nonlinear time trends in the outcome measures, we re-estimated the models with the addition of squared terms for the time variables. If the squared terms were found to be significant, they were retained in the model; if nonsignificant, the more parsimonious model was used. We present results from significance tests of the time-intervention interaction terms, as well as observed and model-fitted mean values at each time point for youth in both arms of the study.

Results

Baseline

Characteristics of randomized participants ($N = 151$) are shown in Table 2, overall and by intervention status. Adolescents were found to be similar on all baseline characteristics except gender; the intervention condition had significantly more females (78%) compared with the control condition (57%; $p = .006$). Thus, gender was controlled for in all analyses of the intervention effect. The average age of youth enrolled in the study was 15 years (range, 12–17), and 90% were heterosexual. Almost all were born (92%) in the United States. Youth were predominantly Hispanic (62%) and African American (21%), with fewer whites (11%) and other race/ethnicities (7%). Few had ever run away for more than a month (13% away for 2–6 months), and the majority (63%) had never been away for more than 2 weeks. More than 70% were back with their families by the time the baseline assessment was administered.

Effects of the intervention

For these analyses, we examined baseline and follow-up assessments administered at 3, 6, and 12 months after the baseline. Baseline characteristics of those who did and did not complete any follow-ups were compared; no statistically significant differences were found.

We expected the newly homeless youth to be more engaged in risk behaviors than youth in general. Table 3 shows the frequencies of substance use and sexual risk behaviors among a nationally representative sample of high school students [35], compared with baseline estimates from the STRIVE study. Alcohol and inhalant use among STRIVE participants was comparable with national norms (72% vs. 73%, 11% vs. 12%, respectively; NS). Use of other substances (marijuana: 59% vs. 37%; cocaine: 17% vs. 6%; methamphetamines: 13% vs. 4%) was substantially greater among those in the STRIVE study ($p < .05$). STRIVE youth were not significantly more likely to have had sex (53% vs. 46%; NS) but were less likely to have used a condom if they did (45% vs. 61%; $p < .05$). Estimated use of alcohol or drugs before sex was lower

Table 3

Comparisons of STRIVE participants with a nationally representative sample of 9th–12th graders (Youth Risk Behavior Survey [YRBS], 2009)^a

	YRBS	STRIVE
Sample size	16,410	151
Used alcohol, lifetime ^b	72.5 (70.6–74.3)	72.2 (68.4–79.2)
Used marijuana, lifetime	36.8 (34.8–38.8)	58.9 (51.1–66.8)
Used cocaine, lifetime	6.4 (5.7–7.1)	17.2 (11.2–23.2)
Used methamphetamines, lifetime	4.1 (3.6–4.6)	12.6 (7.3–17.9)
Used inhalants, lifetime	11.7 (10.6–12.8)	11.3 (6.2–16.3)
Had sex, lifetime	46.0 (42.9–49.2)	53.3 (45.4–61.3)
If had sex, used a condom during last sexual intercourse	61.1 (59.0–63.1)	45.3 (34.8–55.9)
If had sex, used alcohol or drugs before last sexual intercourse	21.6 (20.0–23.3)	14.0 (6.6–21.3)

STRIVE = Support to Reunite, Involve and Value Each Other.

^a Source: CDC National Center for Chronic Disease Prevention and Health Promotion, Healthy Youth, YRBS National Trends in Risk Behaviors (<http://www.cdc.gov/HealthyYouth/YRBS/trends.htm>).

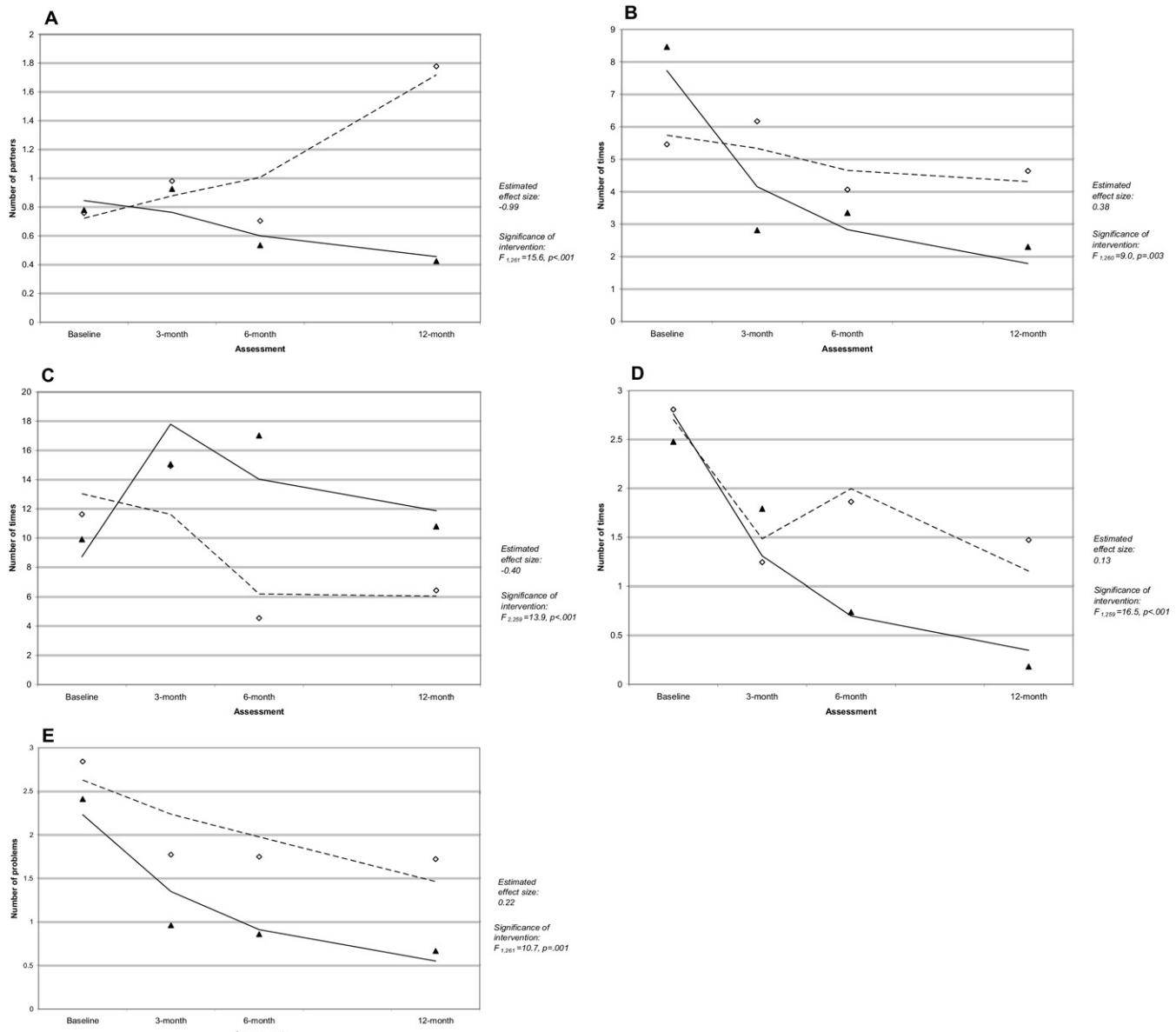
^b Percent (95% confidence interval).

among the STRIVE participants (14% vs. 22%), but the difference was not significant.

Intent-to-treat analyses were conducted to estimate the impact of the STRIVE intervention on risk behaviors in the 3 months before each assessment. With regard to sexual risk-taking, a significant effect was found for number of partners. No significant intervention effect was found for whether the adolescent had been sexually active, whether the adolescent had unprotected sex, or for the number of times the adolescent had sex. With regard to substance use, a significant effect was found for number of times alcohol, marijuana, and hard drugs were used. No significant intervention effect was found for whether the adolescent used these substances. A significant difference was found between intervention and control participants in number of delinquent behaviors. Observed and model-fitted means for measures in which there was a significant intervention effect are shown in Figure 1.

Figure 1A shows that at baseline, the average number of sexual partners was less than one among both intervention and control participants, including zero values for the 47% of participants who had not yet had sexual intercourse. During a time of life when many American adolescents are initiating sexual activity [36], the mean number of recent partners estimated by our model for the intervention group dropped from .84 at baseline to .46 at 12 months. Among control participants, it increased from .72 to 1.72 over the same period, resulting in a highly significant intervention effect ($p < .001$). These results imply that relatively few youth in the intervention arm initiated sexual activity, and those with one or more partners at baseline reduced that number over time.

Youth in both the intervention and control conditions reduced alcohol use during the study period, as shown in Figure 1B. Intervention participants reduced alcohol use significantly more than controls (from an estimated mean of 7.7 times in 3 months to 1.8 times), as compared with controls (decreased from 5.7 to 4.3 times; $p = .003$). As seen in Figure 1C, marijuana use showed the opposite effect, with intervention participants increasing use over the period (from 9 to 12 times in a 3-month period), whereas control participants decreasing use (from 13 to 6 times; $p < .001$). Estimates of the amount of hard drug use, as shown in Figure 1D, indicate drops among youth in both arms of the study, with those in the intervention experiencing greater decreases in



* Effect sizes are calculated from model estimated (ME) values as:

($(ME_{control, 12-month} - ME_{control, baseline}) - (ME_{intervention, 12-month} - ME_{intervention, baseline})$) / standard deviation for the baseline value in the control condition.

[†] Significance testing is for the difference in slopes between the intervention and control conditions (time by treatment interaction). Analyses were conducted using SAS 9.1 software. Continuous measures were modeled with the PROC MIXED procedure. Dichotomous and Poisson-distributed count measures were modeled with the PROC GLIMMIX procedure. No significant intervention effect was found for whether the adolescent had been sexually active, had unprotected sex, number of times had sex, whether used alcohol or marijuana, whether used hard drugs.

Figure 1. Estimated regression lines and observed values for outcome measures: Adolescents in the intervention condition (solid lines, black triangles) and control condition (broken lines, white diamonds). (A) Number of partners. (B) Times had alcohol. (C) Times used marijuana. (D) Times used hard drugs. (E) Number of delinquent behaviors[†].

use (going from 2.8 to .3 times recently), as compared with those in the controls (drop from 2.7 to 1.2; $p < .001$).

Delinquent behaviors (Figure 1E) also declined more in the intervention condition (2.2–.6) compared with the decreases among controls (2.6–1.5; $p = .001$).

Discussion

Although other interventions have worked effectively with individual homeless youth to reduce risk-taking behaviors in

the context of street life [15], a family-based program can also result in significant reductions in risky behavior. Antecedent problems of family conflict that lead to runaway incidents [1,37] were the focus of the STRIVE intervention. We aimed to re-engage youth with their families. The intervention reduced the number of sex partners, and youth use of hard drugs and alcohol—activities associated with increased risk of HIV infection. Nevertheless, youth in the intervention condition increased their marijuana use relative to those in the control condition, perhaps substituting marijuana for alcohol or other

hard drugs. The intervention also reduced delinquent behaviors. Increasingly, family interventions are being suggested to address at-risk behaviors among youth [17,20,25,27,38]. Moreover, the STRIVE intervention comprises only five sessions, which is shorter than most family interventions [18,19,21,22,39]. These findings suggest that STRIVE is an efficacious intervention that should be replicated with homeless youth in other urban settings and rural settings, and disseminated in the service sector to determine its effectiveness as a family intervention for homeless youth.

The primary challenge and limitation of this study was the difficulty in recruiting “whole” families to the intervention. Only 33% (151/442) of the families were successfully randomized because of the “research” mission of the project. The consenting and randomization process was complex, challenging, and time-consuming. We had to obtain assent/consent from the youth, consent from the parent, conduct baseline assessments with both the youth and the parent before the completion of the recruitment process, and then randomization could occur. Youth were approached first and some did not want to be reunited with their families, so we could not approach their parents who might have been more willing to take part in the study. Our assessment team was flexible in scheduling with families to streamline the consenting and randomization process (e.g., interviewers available to conduct baseline of youth and parent individually at the same time), but having to go through consenting and a baseline assessment, usually two home visits, was difficult for some families to integrate into their busy lives at the onset of the study before they were fully engaged in the study. A limitation that resulted from the challenge in recruiting families was that some of the participants had their first follow-up assessment before the last intervention session occurred. Another limitation is that protections for the ethical conduct of research prevented us from collecting any data from families that did not fully complete the recruitment process; as a result, we cannot compare families from whom consent was not obtained. Although randomization eliminates many biases, we cannot evaluate selection effects for both less dysfunctional and conflicted, or more dysfunctional and conflicted families. Finally, as the data are self-reported, there may be a tendency for participants in the intervention condition to underreport their risky behaviors. We acknowledge that this is a limitation but the use of audio computer-assisted self-interviewing does lessen some of this underreporting in studies of risky behaviors that rely on self-report data [40].

These challenges and limitations suggest an important avenue for future research in risk prevention with newly homeless and runaway youth. Innovative approaches for engaging parents of high-risk youth need to be developed. It was relatively easy to find youth interested in participating in the study, but much more difficult to enroll their parents, many of whom were extremely frustrated with their children. Recruitment strategies are needed that directly target parents, normalize potential sources of parent/adolescent conflict (e.g., adolescents' need for autonomy), and do not blame parents or adolescents for family conflict. This study highlights the importance of focusing public health efforts on identifying youth when they are newly homeless and targeting their families to stop the evolution of riskier behavior patterns.

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