

ORIGINAL ARTICLE

Caught in the Crossfire: The Effects of a Peer-based Intervention Program for Violently Injured Youth

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Purpose: To assess the effect of a hospital-based peer intervention program serving youth who have been hospitalized for violent injuries on participant involvement in the criminal justice system and violent reinjury and death after hospital discharge.

Methods: A total of 112 violently injured youth (ages 12–20 years; 80% male; predominantly African-American [60%] and Latino [26%]) hospitalized in Oakland, California participated in a retrospective case-control study. Clients were matched by age and injury severity. Treatment and control youth were followed for 6 months after their individual dates of injury. The outcome variables of rate of entry/reentry into the criminal justice system, rate of rehospitalization for violent injuries and rate of violence-related deaths were compared for treatment and control groups using an odds ratio analysis.

Results: Intervention youth were 70% less likely to be arrested for any offense (odds ratio [OR] = 0.257) and 60% less likely to have any criminal involvement (OR = 0.356) when compared with controls. No statistically significant differences were found for rates of reinjury or death.

Conclusion: A peer-based program that intervenes immediately after, or very soon after, youth are violently injured can directly reduce at-risk youth involvement in the criminal justice system. © *Society for Adolescent Medicine, 2004*

KEY WORDS:

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Violence continues to plague our society and is a serious public health problem that results in loss of life, injury, disability, suffering, and expenditure of billions of dollars in treatment of victims and incarceration of perpetrators each year [1–5]. Young people continue to be disproportionately represented as victims of violent injuries and deaths. In 2000, adolescents aged 15–19 years were more than twice as likely to be injured in violence-related incidents at a rate of 1397.31 per 100,000 compared with the overall U.S. population [6]. Homicide is the second leading cause of death for Americans aged 15 to 24 years [7]. In 1999, young people in this age category died as a result of homicide at a rate of 13.2 per 100,000, more than twice the rate for the general population [8]. Homicide is the leading cause of death for young African-American males aged 15–24 years, who are murdered at a rate of 85.1 per 100,000 [9]. This rate is eight times higher than the rate for young Caucasian males of the same age [10]. The homicide rate in Oakland, California, at 30 murders per 100,000 people, is the highest in the County of Alameda [11] and is more than five times the nation's average homicide rate [7]. Homicide is the leading cause of death for males aged 15–24 years in Oakland [11].

Being a victim of violence during adolescence increases the odds of being a perpetrator or victim of violence in adulthood [12]. Furthermore, a recent study suggests that criminal involvement places an

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individual at increased risk of subsequent homicide victimization [13,14]. A number of factors increase the risk of perpetration of violence during adolescence and young adulthood, including negative peer influences, family disruption, and social isolation [1,5,15,16].

Effective long-term violence prevention requires multidisciplinary approaches, involving families and communities, that address both the underlying roots of the problem and the day-to-day manifestations [17], and that treat individuals within a complex of an interconnected system [18]. However, specific violence prevention efforts can mitigate the effects of some risk factors, at least for the short term [19].

The present evaluation of the *Caught in the Crossfire* program was conducted from 1998 to 2001 to examine the effect of the program on three key outcomes: (a) rate of entry/reentry into the criminal justice system; (b) rate of rehospitalization for violent injuries; and (c) rate of violence-related deaths. These outcomes are directly related to the primary goals of the program: (a) prevent retaliatory violence; (b) reduce entry and reentry into the criminal justice system; (c) reduce the total number of youth injured and killed by interpersonal violence; (d) promote alternatives to violence for youth; and (e) provide positive peer role models. The results of this study may have significant implications for designing future interventions for youth injured by violence in urban areas.

Methods

Program Description

Caught in the Crossfire is a peer-based violence prevention intervention program serving youth who have been hospitalized in Oakland, California for violent injuries. Established in 1994, *Caught in the Crossfire* is predicated on the importance of intervening with violently injured youth "at the right time and with the right person" to maximally achieve the program's goals. The program employs and trains young adults who are from the same or similar communities as the youth which they serve and who have experienced violence in their own lives; some of these peer staff members have been formerly incarcerated or are disabled from a violent injury. These Crisis Intervention Specialists serve as positive peer role models and are particularly qualified to establish trusting mentoring relationships with "highest risk" and "hardest-to-reach" youth. Crisis Intervention Specialists meet with the youth and their family

and friends immediately after, or very soon after, the youth have been hospitalized for a violent injury (often for close to 2 hours), a pivotal period in the young person's life in which he or she may be most likely to make a lifestyle change.

Caught in the Crossfire Crisis Intervention Specialists conduct initial visits at the hospital bedside whenever possible (for youth who are hospitalized for only a brief period of time these initial visits are conducted at the individual's home postdischarge) and provide ongoing intensive follow-up services to the youth and their family members, including home visits, referrals to community services, and assistance with job placement, court and probation hearings, school enrollment, and housing. Staff members work closely with the youth and their families for up to 1 year. Crisis Intervention Specialists receive training in counseling skills development, cultural competency, anger management, conflict resolution, effective communication, resource identification, sexual assault, and the theoretical frameworks of counseling, casework, community social work, and youth development. New staff members receive intensive training in these areas during their first month of employment and all staff participates in ongoing in-service training sessions.

Evaluation Design

This outcome evaluation of the *Caught in the Crossfire* program is a retrospective case-control study in which clients of an intervention were matched by age and by injury severity to equivalent youth who did not receive the intervention [20]. Owing to ethical reasons, the intervention was not withheld from any violently injured youth during the intervention period. Controls were overselected from violently injured youth in 1998 who had not received intervention services from the program and then carefully matched to members of the treatment group by age and injury severity to minimize selection bias.

The evaluation was designed with the intent of assessing the intervention's overall effects. Members of the treatment and control groups were followed for 6 months after their individual dates of injury. Probation, arrest, violent injury, and violent death data for both groups were collected, analyzed, and compared.

This study was reviewed and approved by the Alameda County Medical Center Committee for the Protection of Human Subjects.

Study Sample

Using a case-control study design, youth hospitalized for violent injuries at Alameda County Medical Center/Highland General Hospital in Oakland, California were selected to participate in the study. Youth in both the treatment and control groups had an average hospital stay of 3.39 days and an average injury severity score of 7.94 out of a 1–36 (minimum to maximum) point scale. All incoming clients were selected to be part of the treatment group. Initially, controls were selected randomly and 69 controls were matched to 69 treatment cases by age and injury severity. However, 23 treatment group youth were eliminated from the evaluation, given that they did not meet inclusion criteria for the study, and three youth declined to participate in the intervention. A final total of 112 youth participated in the study. The sample is comprised of 69 controls (61.6%) and 43 treated cases (38.4%).

Caught in the Crossfire staff approached 69 youth ages 12 through 20 years hospitalized for a violent injury (i.e., "trauma admits") between January 1999 and May 2000 for participation in the intervention program. Of these youth, more than 95% agreed to participate in the program. To ensure that each participant met the inclusion criteria, data for 10 participants were excluded from the final database, as they were "trauma consults" and not "trauma admits." Furthermore, in order for clients to be eligible for inclusion in the study, they were required to successfully complete the *Caught in the Crossfire* program. Successful completion of the program was defined as a minimum of three contacts with a Crisis Intervention Specialist within 6 months of injury, at least one of these being an in-person contact (on average, members of the treatment group had 5.14 in-person contacts and 11.23 telephone contacts with a Crisis Intervention Specialist during the 6-month period). Out of 56 youth, eight participants were excluded based on this criterion. Thus, 86% of eligible clients who joined *Caught in the Crossfire* successfully completed the program. In addition, data for five youth were excluded owing to significant missing data, resulting in a net total of 43 eligible treatment cases. Among the treatment group, 72% ($n = 31$) were referred to *Caught in the Crossfire* while in the hospital, and 28% ($n = 12$) were referred to the *Caught in the Crossfire* program after being discharged.

Control group participants were selected randomly from youth ages 12 through 20 years who were hospitalized for a violent injury and survived

the previous year (January 1998 through December 1998). These youth did not receive services from *Caught in the Crossfire* and were carefully matched by age and injury severity to members of the treatment group. A 17-month recruitment period for members of the treatment group was necessary to achieve a large enough sample size ($n > 40$) to conduct statistical analyses.

Data Collection and Analysis

All client information was kept strictly confidential and analysis was conducted on aggregated data. Baseline data, including demographics, injury characteristics, and medical information, were collected from local hospital trauma centers' medical records. Median household income information was obtained for all study participants using 1990 census postal code data. Youth provided postal code information at the time of hospital admission. Death, probation, and arrest data were provided by records from the Alameda County Coroner's Office, the County Probation Department, and the Oakland Police Department, respectively. Quality and accuracy of the collected data was assured by reconfirming deaths with the coroner's office, rechecking hospital or other records for questionable data (e.g. high injury severity scores), completing missing information whenever possible through case notes or other sources, and finally, excluding all cases that had significant missing information. The age of the youth was calculated based on age at time of hospital admission. All data analysis was double-checked by an epidemiologist at the Alameda County Public Health Department.

Software Package for Statistical Significance (SPSS) version 10.0 (Chicago, IL: SPSS Inc., 1998.) was used for statistical analysis. Simple frequencies of events in the treatment and control groups were first calculated. Independent sample Student's *t*-test or Analyses of Variance (ANOVA) was performed to determine whether the difference in various demographic, social, injury characteristics was significant between the two groups. Mantel-Haenszel Common Odds ratios were calculated, which estimate the relative risk for members of the treatment group compared with members of the control group for being arrested during the intervention period, as well as for other outcomes [21]. The 95% confidence limits around the odds ratios, based on a procedure developed by Cornfield and later modified by Gart [22], were calculated to estimate the precision of the relative risk estimates. Owing to the relatively small

sample size, particularly among the treatment group ($n = 43$), specific stratified analysis could not be conducted and in some categories multivariate analyses that would take into account two or more variables were not always feasible.

Results

Youth Characteristics

No significant difference in racial/ethnic or age composition exists between treatment and control groups: predominantly African-American (60.0%), followed by Latinos (25.9%), a few Asian/Pacific Islanders (8.0%) and the rest of "Other" race/ethnicity (6.1%). The average age of participants at the time of admission to the hospital was 18.3 years, with a range of 12 to 20 years. In both groups, the majority (61.6%) of participants were age 18 years or above and most were male (80%).

Youth in the treatment and control groups have similar socioeconomic backgrounds. Most were residents of Oakland. No statistically significant differences in median household income were found between control and treatment groups (approximately \$27,000).

The evaluators examined histories of arrest for general and violence-related offenses before the evaluation period and found no significant difference in prior arrests among the treatment versus control groups. In fact, members of the treatment group displayed slightly higher rates of prior arrests than members of the control group (53.5% vs. 52.2%) and more members of the treatment group compared with controls were arrested for a violence-related offense before the evaluation period (35% vs. 26%).

Of the treatment group, 67.4% of the members were victims of firearm violence and one youth suffered from an accidental self-inflicted shooting. Controls were one-third less likely to be victims of firearm violence, with only 47.8% being treated for a gunshot wound. Only 15.2% of youth in both groups were involved in a "brawl." Stabbing was the mechanism of injury for more controls (21.7%) than for members of the treatment group (9.3%). Use of blunt instrument was also much more common among controls (11.6%) than among members of the treatment group (2.3%).

Reduction in Rate of Entry and Reentry Into the Criminal Justice System

One of the outcomes measured in this study was whether being treated by *Caught in the Crossfire*

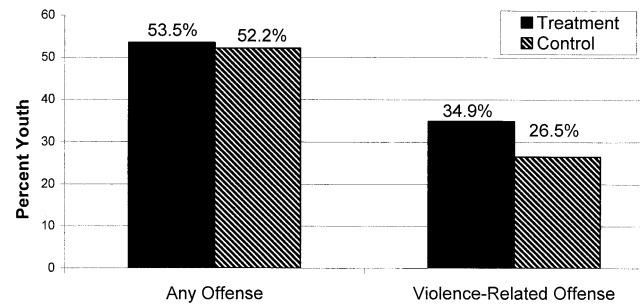


Figure 1. Arrest rates prior to 6-month postinjury evaluation period. Odds ratios = 1.054; 95% CI = 0.492, 2.261. p value is insignificant.

resulted in reduction of youth (re-) entering the criminal justice system as measured by arrest rates. Intervention results were significant for this outcome. The intervention program demonstrated a protective effect for members of the treatment group. Youth who participated in *Caught in the Crossfire* were 70% less likely (OR = 0.257; 95% CI = 0.054, 1.223) to be arrested for any offense 6 months postinjury when compared with youth in the control group. Almost 12% of the total 112 youth were arrested during this evaluation period, of which 87% were members of the control group (Figures 1 and 2).

The odds of having any criminal outcome were also significantly reduced for members of the treatment group, even after controlling for the severity of the injury (Table 1). The evaluation examined the likelihood that study participants were placed on formal or informal probation, violated probation, and/or were arrested during the evaluation period. This also increased the numbers in the outcome variable, enhancing the power of the study and providing a more reliable estimate of the outcome in relationship to the risk factors.

Of the 112 total youth, 13.4% had at least one criminal outcome during the intervention period; 80% of these youth were members of the control

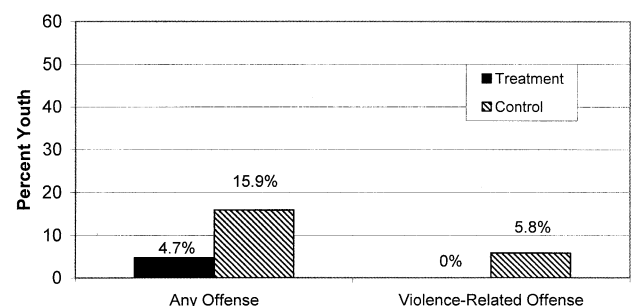


Figure 2. Arrest rates during 6-month postinjury evaluation period. Odds ratios = 0.257; 95% CI = 0.54, 1.223. $p = 0.06$.

Table 1. Outcomes of Treatment by *Caught in the Crossfire* vs. Control Group During the Evaluation Period^a

	All n = 112	Treatment Group n = 43	Control Group n = 69	Odds Ratio (95% CI) ^b
Arrested during evaluation period (%)	11.6	4.7	15.9	0.257 (.054–1.223)
violence-related (%)	3.6	0	5.8	
At least one criminal outcome ^d (%)	13.4	7.0	17.4	0.356 (.094–1.345)
Placed on in/formal probation (%)	6.3	4.7	7.2	0.624 (.116–3.371)
Violated probation (%)	2.7	4.7	1.4	^c
violence-related offense (%)	0	0	0	^c
Hospitalized for violence-related injury (%)	1.8	2.3	1.5	^c
Died as a result of violence-related injury (%)	0	0	0	^c

^a Evaluation period = 6 months following date of injury.

^b Odds Ratio (OR) is based on the Mantel-Haenszel test; it is a (estimate) ratio of the odds of having an adverse outcome if a youth is treated by *Caught in the Crossfire* compared to the odds of having an adverse outcome if not treated by *Caught in the Crossfire*. OR <1 means that treatment is protective.

^c Unreliable Odds ratio, numbers in cells less than 5.

^d Arrested, violated probation, or placed on in/formal probation during the evaluation period.

group. The controls had a 60% greater rate of a criminal outcome than members of the treatment group (OR = 0.356; 95% CI = -0.094, 1.345), not controlling for severity of injury. The difference between the two groups was significant in having at least one criminal outcome. Controlling for the severity of injury, the odds of having a criminal outcome during the 6-month evaluation period remained greatly reduced for members of the treatment group compared with the controls. The reduced odds of having a criminal outcome during the evaluation period were particularly significant among the less severely injured cases. Among the less severely injured youth (n = 69), the control group participants are 72% (OR = 0.287; 95% CI = 0.034, 2.432) more likely to have a criminal outcome compared with members of the treatment group. Among the more severely injured cases (n = 40), controls are 36% (OR = 0.636; 95% CI = 0.080, 5.050) more likely to have a criminal outcome compared with members of the treatment group (Figure 3).

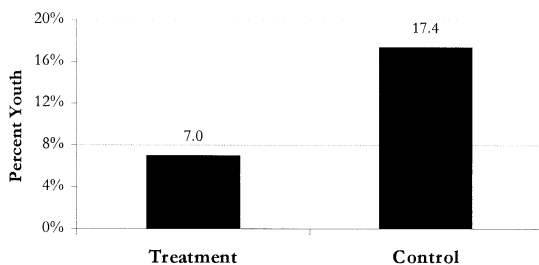


Figure 3. Percentage of treatment vs. control group involved with the criminal justice system* during the 6-month postinjury evaluation period. Odds ratio = 0.356; 95% CI = 0.094, 1.345 p value = 0.096.
*Arrest, violation of probation, or placement on probation.

Results were not significant for violence-related arrest rates or probation rates. Whereas none of the youth treated by the *Caught in the Crossfire* program were arrested for a violence-related offense during the 6-month postinjury evaluation period, only 5.8% of the controls were arrested for a violence-related offense. Furthermore, although youth treated by *Caught in the Crossfire* were 35% less likely than controls to be placed on probation during the evaluation period, the difference in this reduction rate between the two groups was not significant.

Rate of Youth Rehospitalization or Death Owing to Interpersonal Violence

A very small proportion (1.8%) of the youth were re-hospitalized for a violent injury during the evaluation period. A total of two youths (one in the treatment group and one in the control group) were rehospitalized owing to another injury. The difference in rehospitalization of the two groups was insignificant. In addition, no youth died as a result of violence-related injury in either group.

Discussion

This study demonstrates that treatment by the *Caught in the Crossfire* program of youth hospitalized for a violent injury was associated with the reduced likelihood of involvement in the criminal justice system (arrest, probation, probation violation) during a 6-month postinjury period. Results for criminal outcomes were statistically significant. For youth who participated in the intervention program, there

was a 70% reduction in arrests for any offense compared with the control group during a 6-month postinjury period. Moreover, youth who successfully completed the *Caught in the Crossfire* program were 60% less likely to have any involvement in the criminal justice system compared with youth who did not participate in the program.

These results are similar to those achieved by the "best" juvenile offender intervention programs reviewed by Lipsey and Wilson [23]. Of the 200 violence intervention program studies reviewed, programs falling into the "most effective" category reduced criminal recidivism by 40% among juvenile offenders and "average" programs reduced it by 12%. Programs that contained social skills training and family components (*Caught in the Crossfire* falls into this program category) were deemed most successful, whereas punitive programs such as boot camps demonstrated little or no effect.

Limitations

Despite these positive results, the current evaluation design was limited by several factors. The strategies used by the program are primarily intended for at-risk youth who are involved in violence either as victims or perpetrators, not youth in general. Additionally, although evaluators controlled for hospital injury severity scores during matching, mechanism of injury was not controlled for in this study. Furthermore, the evaluators measured the overall effects of the program (i.e., criminal involvement, reinjury, and death), not intermediate outcomes or the effects of specific interventions (e.g., school reenrollment, job procurement). This may have prevented a complete analysis of important risk or protective factors, as well as accurately using these factors as possible success outcomes of the program participation.

Data were collected on study participants for a 6-month postinjury period. Thus, long-term effects of the program could not be measured within this study. The effects of the program on violent reinjuries and deaths may be demonstrated during a longer follow-up period. A review of the literature reveals that reinjury (i.e., trauma recidivism) may occur more than 6 months after the initial injury [24–27].

Results may also have been confounded by some historical effects. Owing to ethical concerns, the evaluators did not randomly assign violently injured youth to control and treatment groups. To compare youth that participated in the violence prevention program to those that did not receive any interven-

tion, evaluators compared the outcomes of two groups from slightly different time periods (1998 for controls and 1999 and 2000 for treatment). Secular trends in local politics, economics, or major social events may have affected the outcomes measured. For this reason, the evaluation team collected local community data comparing the different time periods and found few significant changes. The only potentially significant difference identified was the change in leadership at the Oakland Police Department 6 months into the treatment period and after the conclusion of the control period. However, data obtained from the Research and Planning Division of the Oakland Police Department demonstrate that this change had minimal effect on general or juvenile arrest rates. In fact, the number of total arrests (12,576) and juvenile arrests (1959) during the treatment period exceeded both total arrests (11,835) and juvenile arrests (1751) during the control period.

Conclusions

This evaluation demonstrates that hospital-based peer intervention programs that employ members of the community and intervene immediately or soon after the injury has occurred can directly reduce criminal activity among youth most at risk for violence. These findings are significant in light of recent research, which indicates that criminal involvement places an individual at increased risk for subsequent violent victimization [13,14]. The creation of a hospital-based peer intervention program provides the possibility of reaching those youth most at risk for future violence during the pivotal postinjury period [28]. Additional research is warranted to determine the sustainability of these findings as well as potential long-term effects on violent reinjury and death.

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