Effects of a Primary Care-Based Intervention on Violent Behavior and Injury in Children

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ABSTRACT. Objective. Although many major health care organizations have made recommendations regarding physicians’ roles in preventing youth violence, the efficacy of violence prevention strategies in primary care settings remains to be empirically tested.

Methods. We conducted a randomized, controlled trial to evaluate the effects of an office-based intervention on children’s violent behaviors and violence-related injuries. Children 7 to 15 years of age who presented at 8 pediatric practices and scored positive on a brief psychosocial screening test (n = 224) were randomly assigned to an intervention group (clinicians saw the screening test results during the visit and a telephone-based parenting education program was made available to clinicians as a referral resource for parents) or a control group (clinicians did not see the screening test results).

Results. Compared with control subjects, at 9 months after study enrollment, children in the intervention group exhibited decreases in aggressive behavior (adjusted mean difference: −1.71; 95% confidence interval [CI]: −2.89 to −0.53), delinquent behavior (adjusted mean difference: −0.71; 95% CI: −1.28 to −0.13), and attention problems (adjusted mean difference: −1.02; 95% CI, −1.77 to −0.26) on the Child Behavior Checklist. Children in the intervention group had lower rates of parent-reported bullying (adjusted odds ratio: 4.43; 95% CI: 1.87-10.52), physical fighting (adjusted odds ratio: 1.79; 95% CI: 1.11-2.87), and fight-related injuries requiring medical care (adjusted odds ratio: 4.70; 95% CI: 1.33-16.59) and of child-reported victimization by bullying (adjusted odds ratio: 3.23; 95% CI: 1.96-5.31).

Conclusions. A primary care-based intervention that includes psychosocial screening and the availability of a parenting education resource can decrease violent behavior and injury among youths.


ABBREVIATIONS. PSC, Pediatric Symptom Checklist; CBCL, Child Behavior Checklist; CI, confidence interval.

Violence is one of the leading causes of death among adolescents in the United States and around the world. In America, young people are disproportionately represented among both victims and perpetrators of violence. Homicide is the fifth leading cause of death for youths 10 to 14 years of age and the second leading cause of death for youths 15 to 19 years of age. In 2001, there were 2088 homicides among youths 10 to 19 years of age in this country. Nonfatal injuries resulting from violence are also a critical dimension of the public health problem. Nonfatal interpersonal violence often precedes fatal violence among youths and results in disabilities and high costs of medical care and rehabilitation. National estimates based on emergency department visits indicated that, in 2002, there were 438,391 assault-related nonfatal injuries among youths 10 to 19 years of age.

Risk factors associated with violent behavior and injuries among youths include exposure to violence as a witness or direct victim, childhood aggression and antisocial behavior, substance use, depressed mood, and hyperactivity. Protective factors include high academic achievement and parent-family connectedness. In addition to supportive parent-child relationships, positive and consistent discipline and parental monitoring and supervision are critical family-level protective factors in promoting resistance to involvement in violence among youths.

Recommendations defining the role of clinicians in youth violence prevention and management have been issued by a number of groups, including the American Medical Association, American Academy of Pediatrics, American Academy of Family Physicians, American College of Physicians, Society for Adolescent Medicine, and US Public Health Service. Recommendations include incorporating preventive education, risk screening, and linkages to necessary intervention and follow-up services into clinical practice. However, few residents and practicing physicians in pediatrics and family medicine routinely provide screening and anticipatory guidance for patients and parents regarding youth violence. Furthermore, the effectiveness of primary care-based youth violence prevention interventions is unknown.

The purpose of this study was to determine the effectiveness of a primary care-based intervention, directed at youths and their parents, in reducing violence involvement and violence-related injuries among the youths. We hypothesized that youths ex-
posed to a primary care-based intervention directed not only at reducing risk but also at promoting family-level protective factors would exhibit significant decreases in violence participation and fight-related injuries, compared with control subjects.

**METHODS**

**Study Design**

We conducted a randomized, controlled trial to evaluate the primary care-based intervention. The study was conducted in 8 outpatient pediatric practices in the Minneapolis-St. Paul metropolitan area and included 36 primary care clinicians. The practices included 2 urban community clinics, 2 urban private practices, and 4 suburban private practices. Randomization occurred at the individual patient level. During defined data collection periods from June 2001 through November 2001, all consecutive English-speaking parents of children 7 to 15 years of age who were undergoing a medical visit were invited to complete the 17-item Pediatric Symptom Checklist (PSC-17) before their visit with the primary care clinician. The PSC-17 is a brief, validated, psychosocial screening instrument developed to facilitate recognition and referral of child psychosocial problems by primary care pediatricians. The checklist consists of subscales for internalizing, externalizing, and attentional symptoms. A positive screening score was defined as at least 1 positive subscale score or a positive total score (Table 1). Youths who scored positive on the screening test and had not yet seen the clinician by the time the screening test was scored were eligible to participate in the study with their parents or guardians. Eligible youth-parent pairs were randomly assigned, by research staff members in the clinic waiting room, to receive a primary care-based intervention to reduce violence participation or to be control subjects. For those in the control group, the primary care provider did not see the psychosocial screening test. Procedures and consent and assent forms were approved by the institutional review board of the University of Minnesota.

**Intervention**

The intervention focused on 2 strategies to reduce violence involvement among youths, ie, 1) to identify, prevent, and treat mental health problems among youths through psychosocial screening and appropriate mental health referral and follow-up monitoring; and 2) to promote healthy child-parent relationships through a telephone-based positive parenting program. For those in the intervention group, the patient’s scored PSC-17 was attached to the medical chart, so that the provider would see the psychosocial screening test during the visit. Clinicians were instructed to respond to the positive screening test results as they thought appropriate. In addition, a telephone-based parenting education program, Positive Parenting, was made available to clinicians as a referral resource for parents in the intervention group. Providers were asked to indicate on a form whether they made referrals to mental health services, Positive Parenting, or other resources and whether they recommended follow-up visits with themselves for each patient in the intervention group.

The parent training curriculum was adapted for telephone delivery from the Positive Parenting curriculum, a research-based, family-strengthening program developed by the University of Minnesota Extension Service, in cooperation with the University of Wisconsin Extension Service. The program emphasizes 3 core dimensions of authoritative parenting, namely, nurturance, discipline, and respect or granting of psychologic autonomy. Parents referred to Positive Parenting by their child’s provider were contacted by a parent educator via telephone, and a series of 15- to 30-minute weekly telephone sessions with the parent educator were scheduled at the parents’ convenience. Parents received 2 videotapes and a manual for the parenting course. Video segments included role-playing and a group of parents discussing the parenting topic. Sessions and curricular materials were organized around 13 lessons, ie, parenting tools, attention, respect, responsibility, monitoring, perception, development, communication, conflict, discipline, parenting styles, decision-making, and friendships/peer influence. From these lessons, parents were asked to choose the topics and number of sessions that they wanted. Three parent educators provided training; all had a parent education license.

**Outcome Measurements**

Control and intervention participants were contacted by trained interviewers, via telephone, for a baseline assessment immediately after the medical visit at which they were enrolled in the study and for a follow-up assessment 9 months later. Interviewers conducting follow-up assessments were blinded with respect to participant allocation and indicated on the questionnaire after each interview whether they became aware of the parent’s or child’s group assignment during the interview. Study allocation was ascertained by the interviewer in 7% of all follow-up interviews (23 of 324 interviews) conducted with youths and parents. Interviews were conducted with all parents and with youths ≥10 years of age at the time of study enrollment.

Parents were asked questions about their children’s behavior with the Child Behavior Checklist (CBCL). Questions about problem behaviors produced subscales including aggressive behavior, delinquent behavior, attention problems, and anxiety/depression. Youths completed the Achenbach Youth Self-Report, producing similar subscales.

Parents and youths independently completed questions measuring the frequency of bullying and being bullied during the past

<table>
<thead>
<tr>
<th>TABLE 1. PSC-17 Subscales and Scoring</th>
<th>Never (0)</th>
<th>Sometimes (1)</th>
<th>Often (2)</th>
<th>Positive Screen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internalizing problems</td>
<td></td>
<td></td>
<td></td>
<td>≥5</td>
</tr>
<tr>
<td>1. Feels sad, unhappy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Feels hopeless</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3. Is down on self</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>4. Worries a lot</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Seems to be having less fun</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attention problems</td>
<td></td>
<td></td>
<td></td>
<td>≥7</td>
</tr>
<tr>
<td>6. Fidgety, unable to sit still</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>7. Daydreams too much</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Distracted easily</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>9. Has trouble concentrating</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>10. Acts as if driven by a motor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Externalizing problems</td>
<td></td>
<td></td>
<td></td>
<td>≥7</td>
</tr>
<tr>
<td>11. Fights with other children</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12. Does not listen to rules</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>13. Does not understand other people’s feelings</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Teases others</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>15. Blames others for his/her troubles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Refuses to share</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>17. Takes things that do not belong to him/her</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Total of ≥15</td>
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</tbody>
</table>
school term among the youths. Parents reported how many times during the past year their child was "in a physical fight" and was "in a physical fight in which he or she was injured and had to be treated by a doctor or nurse." Youth also reported on physical fighting during the past year. Youth attitudes toward interpersonal peer violence, as well as knowledge and skill in resolving conflicts nonviolently, were evaluated with 14 items assessing the level of agreement with statements such as "If I walked away from a fight, I’d be a coward ("chicken")" and "I don’t need to fight because there are other ways to deal with being mad." Cronbach’s α, which is used to assess the internal consistency of multi-item scales, was .65 for this measure.

To assess positive parenting skills, items were taken from a parent self-check questionnaire. Questions comprising the positive parenting skills scale asked parents to assess their strengths and needs regarding 4 parenting practices, such as "calmly set limits with defiant and disrespectful behavior." For these items, parents responded with a number on a scale from 1 to 10, where 1 indicated "not at all; major change needed," 5 indicated "some changes needed," and 10 indicated "okay as is; area of strength." Cronbach’s α for this measure was .71. Youth were asked similar questions regarding parenting practices of the parent enrolled in the study with them. Parental monitoring was assessed with 4 items that were completed independently by parents and youths and were adapted from a parental monitoring scale. Cronbach’s α was .73 for the youth version and .72 for the parent version. Two questions that were completed independently by parents and youths assessed the use of corporal punishment, ie, "I use physical punishment as a way of disciplining my child" and "I spank my child when he or she is disobedient." Response options were "never," "sometimes," and "always." Youth also responded to 13 items assessing parent-family connectedness, including perceived closeness to and caring by mother and/or father and feeling loved and wanted by family members. Cronbach’s α for this scale was .85. Parental depression was assessed with a 3-item version of the Rand Corporation Screening Instrument for Depressive Disorders.

Statistical Analyses
Baseline comparability of the intervention and control groups was assessed with χ² tests for categorical variables and t tests for continuous variables. Intervention effects for continuous and dichotomous measures were tested with Proc Mixed and Proc Genmod, respectively. These generalized linear models procedures, based on generalized estimating equations, allowed us to control for clustering of participants according to pediatric practices. For each multivariate analysis, the posttest measure was the dependent variable, group assignment (intervention versus control) was the independent variable, and the baseline measure of the dependent variable, age, and gender were covariates. Each outcome measure was also tested for intervention-age and intervention-gender interactions. All analyses were conducted on an intention-to-treat basis, and all test of statistical significance were 2-tailed, with α = .05.

An anticipated sample size of 100 youth-parent pairs per group gave the study 80% power to detect an effect size of 0.40, with a 2-tailed test of statistical significance with α = .05 and a correlation of 0.50 between baseline and follow-up measures. Parent-reported measures were the primary outcomes of the study, potentially available for all eligible youth-parent pairs. Child-reported measures were secondary outcomes, available only for the subset of youths who were ≥10 years of age at the time of study participation.

RESULTS
Sample Characteristics
The study design and participation are presented in Fig 1. Overall, 22% of youths (455 of 2032 youths) scored positive on the psychosocial screening test. Of those with a positive score, 164 parent-youth pairs (36%) saw the clinician before they could be invited to participate in the study, 67 (15%) declined to participate, and 224 (49%) were enrolled in the study. Study participants were significantly less likely to live with their biological father (60% vs 72%, P = .011) and were more likely to receive welfare (13% vs 4%, P = .002) than were youths who were ineligible to be in the study because they had seen the clinician by the time their screening tests were scored. This finding likely reflects longer average waiting times in the waiting room before seeing the clinician in the urban clinics serving more low-income patients than in the suburban clinics. Eligible participants who declined to be in the study did not differ from study participants in key demographic variables, including age, gender, race/ethnicity, family structure, and receipt of welfare.

Baseline and postintervention telephone interviews were completed by 95 parents (85%) in the intervention group and 97 parents (87%) in the control group. Among the youths, baseline and postintervention telephone interviews were completed by 65 of the 79 youths (82%) in the intervention group who were ≥10 years of age and 66 of the 77 youths (86%) in the control group who were ≥10 years of age at the time of study enrollment. Intervention and control participants were comparable in age (mean ± SD: 11.2 ± 2.3 years vs 10.9 ± 2.3 years, P = .43), gender (44.6% vs 40.0% girls, P = .53), race/ethnicity (78.3% vs 78.9% white, P = .92), family structure (64.1% vs 60.0% living with both biological parents, P = .57), and receipt of welfare (12.1% vs 12.6%, P = .91).

Exposure to Intervention Components
For all intervention participants, the clinician saw the psychosocial screening test results during the visit. Clinicians indicated that they referred 30 of the 112 youths (27%) in the intervention group to mental health services and scheduled follow-up visits for 38 of the youths (34%). Referral to mental health services was significantly more likely for youths with a positive versus a negative score on the internalizing subscale (38% vs 15%, P < .05) and for youths with a positive versus a negative PSC-17 total score (40% vs 18%, P < .05). Recommendation of a clinician follow-up visit was more likely for youths with a positive versus a negative score on the attention subscale (50% vs 26%, P < .05).

Clinicians referred 78 of the 122 parents (70%) in the intervention group of the study to Positive Parenting. Of the referred parents, 6 (8%) declined participation at the clinician visit and the remaining 72 (92%) received an introductory call from a parent educator. Overall, 60 of the 78 parents (77%) referred for the parenting education program received a manual and videotapes for the program by mail, 52 (67%) completed an initial assessment telephone session, and 41 (53%) completed at least 1 educational telephone session. These 41 participants completed a mean of 6.7 telephone sessions (SD: 3.9), with a range of 1 to 15.

Effects of the Intervention on Mental Health Service Use and Parenting Practices
At baseline, 24.7% of parents in the intervention group and 23.9% of parents in the control group reported that their child was currently receiving
mental health treatment \((P = .89)\). During the 9-month follow-up period, there were no statistically significant differences between youths in the intervention and control groups with respect to parent-reported primary care clinic visits (mean ± SD: 2.9 ± 4.2 visits vs 4.1 ± 7.3 visits, \(P = .16\)), mental health treatment (36.8% vs 41.2%, \(P = .53\)), or medication use for a mental health problem (26.3% vs 32.0%, \(P = .39\)). There was no difference in the percentages of intervention and control parents who reported that the clinician recommended any referral for their child at the visit in which they were enrolled in the study (15.8% vs 16.5%, \(P = .89\)). However, intervention parents reported that 80.0% of these referrals were to mental health professionals, whereas control parents reported that 37.5% of the referrals were to mental health professionals \((P = .01)\). Of parents who reported a mental health referral for their child at the visit in which they were enrolled in the study, 66.7% of intervention parents and 33.3% of control parents reported that their child saw the professional to whom they were referred at least once during the study period \((P = .18)\).

In baseline assessments, the intervention and control groups did not show significant differences in parental characteristics (Table 2). In follow-up assessments, there were no significant intervention effects on parents’ reports of their positive parenting skills or parental monitoring. Parents in the intervention group reported significant decreases in the use of corporal punishment, compared with control subjects. The intervention also significantly decreased reported parental depression on a 3-item screening test. Differences in child-reported parenting practices and parent-family connectedness between the intervention and control groups in follow-up assessments were not statistically significant.

**Effects of the Intervention on Behavior Problems and Violence**

Behavioral problems noted on the CBCL are presented in Table 3, and other violence-related measures are presented in Table 4. In baseline assessments, the intervention and control groups were comparable with respect to all measures. In follow-up assessments, youths in the intervention group exhibited significant decreases in aggressive behavior, delinquent behavior, and attention problems on the CBCL, compared with control subjects. Differences in anxiety/depression were not statistically significant but favored the intervention group. The intervention also significantly reduced parent-reported bullying, fighting, and fight-related injuries requiring medical care among youths in the intervention group. Similarly, youth reports of being the victim of bullying were much lower in follow-up
TABLE 2.  Parental Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Follow-Up</th>
<th>Adjusted Difference (95% CI)*</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intervention</td>
<td>Control</td>
<td>Intervention</td>
<td>Control</td>
</tr>
<tr>
<td>Positive parenting skills, 1–10 scale</td>
<td>7.50 (1.40)</td>
<td>7.45 (1.51)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parental monitoring, 1–3 scale</td>
<td>2.81 (0.30)</td>
<td>2.83 (0.27)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of corporal punishment, 1–3 scale</td>
<td>1.26 (0.45)</td>
<td>1.31 (0.45)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parental depression, no. (%)</td>
<td>36 (40.0)</td>
<td>43 (45.3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Data are presented as mean (SD) unless otherwise stated.
* Differences between intervention and control groups at follow-up assessments, adjusted for baseline score, age, and gender, except for parental depression, which is reported as an odds ratio adjusted for baseline parental depression, age, and gender.
† Youths ≥10 years of age at the time of study enrollment.

TABLE 3.  Children’s Behavioral and Emotional Problems

<table>
<thead>
<tr>
<th></th>
<th>Baseline, Mean (SD)</th>
<th>Follow-Up, Mean (SD)</th>
<th>Adjusted Difference (95% CI)*</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intervention</td>
<td>Control</td>
<td>Intervention</td>
<td>Control</td>
</tr>
<tr>
<td>Positive parenting skills, 1–10 scale</td>
<td>13.92 (7.65)</td>
<td>14.40 (7.35)</td>
<td>12.02 (6.35)</td>
<td>14.30 (6.64)</td>
</tr>
<tr>
<td>Parental monitoring, 0–26 scale</td>
<td>3.65 (3.58)</td>
<td>3.29 (2.50)</td>
<td>2.98 (2.87)</td>
<td>3.48 (3.01)</td>
</tr>
<tr>
<td>Attention problems, 0–22 scale</td>
<td>7.45 (4.21)</td>
<td>8.15 (4.38)</td>
<td>6.09 (3.89)</td>
<td>7.61 (4.12)</td>
</tr>
<tr>
<td>Anxiety/depression, 0–28 scale</td>
<td>9.15 (5.50)</td>
<td>9.58 (5.07)</td>
<td>8.05 (5.04)</td>
<td>9.09 (4.96)</td>
</tr>
<tr>
<td>Aggressive behavior, 0–40 scale</td>
<td>11.11 (5.78)</td>
<td>10.91 (5.45)</td>
<td>10.64 (5.55)</td>
<td>10.85 (6.31)</td>
</tr>
<tr>
<td>Delinquent behavior, 0–26 scale</td>
<td>3.73 (2.52)</td>
<td>3.55 (2.42)</td>
<td>3.26 (2.43)</td>
<td>3.40 (2.80)</td>
</tr>
<tr>
<td>Attention problems, 0–22 scale</td>
<td>7.41 (3.35)</td>
<td>7.05 (3.49)</td>
<td>6.83 (2.93)</td>
<td>6.89 (3.37)</td>
</tr>
<tr>
<td>Anxiety/depression, 0–28 scale</td>
<td>9.97 (5.63)</td>
<td>9.23 (5.52)</td>
<td>8.38 (4.86)</td>
<td>8.17 (4.67)</td>
</tr>
</tbody>
</table>

* Differences between intervention and control groups at follow-up assessments, adjusted for baseline score, age, and gender.
† Parent reports on problem scales of the CBCL.
‡ Child report on problem scales of the Youth Self-Report, from youths ≥10 years of age at the time of study enrollment.

TABLE 4.  Children’s Bullying Behaviors, Fighting, and Injury

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Follow-Up</th>
<th>Adjusted Odds Ratio (95% CI)*</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intervention</td>
<td>Control</td>
<td>Intervention</td>
<td>Control</td>
</tr>
<tr>
<td>Bullying</td>
<td>21 (22.6)</td>
<td>17 (17.5)</td>
<td>10 (10.5)</td>
<td>22 (22.7)</td>
</tr>
<tr>
<td>Being bullied</td>
<td>31 (33.3)</td>
<td>43 (44.3)</td>
<td>22 (23.2)</td>
<td>32 (33.0)</td>
</tr>
<tr>
<td>Bullying/being bullied</td>
<td>14 (15.1)</td>
<td>14 (14.4)</td>
<td>6 (6.3)</td>
<td>14 (14.4)</td>
</tr>
<tr>
<td>Physical fighting</td>
<td>44 (47.3)</td>
<td>51 (52.6)</td>
<td>30 (31.6)</td>
<td>43 (44.3)</td>
</tr>
<tr>
<td>Fight-related injury</td>
<td>7 (7.4)</td>
<td>6 (6.2)</td>
<td>1 (1.1)</td>
<td>7 (7.2)</td>
</tr>
<tr>
<td>Bullying</td>
<td>3 (4.8)</td>
<td>8 (12.1)</td>
<td>9 (13.8)</td>
<td>10 (15.2)</td>
</tr>
<tr>
<td>Being bullied</td>
<td>23 (36.5)</td>
<td>24 (36.4)</td>
<td>14 (21.5)</td>
<td>28 (42.4)</td>
</tr>
<tr>
<td>Bullying/being bullied</td>
<td>2 (3.2)</td>
<td>4 (6.1)</td>
<td>3 (4.6)</td>
<td>7 (10.6)</td>
</tr>
<tr>
<td>Physical fighting</td>
<td>32 (50.0)</td>
<td>38 (57.6)</td>
<td>22 (33.9)</td>
<td>28 (42.4)</td>
</tr>
<tr>
<td>Attitude toward violence, mean (SD) on 0–14 scale</td>
<td>11.59 (1.96)</td>
<td>11.32 (2.35)</td>
<td>11.64 (2.35)</td>
<td>10.94 (2.77)</td>
</tr>
</tbody>
</table>

Data are presented as number (percent) reporting each behavior unless otherwise stated.
* Odds ratio adjusted for baseline value, age, and gender, except for fight-related injury, for which gender was excluded from the model.
Because there were no fight-related injuries among girls at follow-up assessments, the model would not converge when gender was included. In addition, attitude toward violence is reported as an adjusted difference, which is the difference between intervention and control groups at follow-up assessments adjusted for baseline score, age, and gender.
† Youths ≥10 years of age at the time of study enrollment.

assessments among intervention children, compared with control subjects. There were no significant differences in other child-reported measures of violent behaviors. Although the differences were not statistically significant, youths in the control group had a more violent attitude orientation and less knowledge and skill in nonviolent conflict resolution than did youths in the intervention group in follow-up assessments.

The results did not change when family structure and welfare status were added as additional covariates in the analysis for any of the behavioral or...
violence-related outcomes. There were no significant intervention-age interactions for any of these outcomes, and the only significant intervention-gender interaction was for aggressive behavior. Separate analyses of intervention effects on aggressive behavior for boys and girls showed that the intervention had a significant effect on parent-reported aggressive behavior for boys (adjusted difference: $-2.75; 95\%$ confidence interval [CI]: $-4.29$ to $-1.21; P < .001$) but not for girls (adjusted difference: $-0.23; 95\%$ CI: $-2.08$ to $1.62; P = .80$).

**DISCUSSION**

To our knowledge, this is the first randomized, controlled evaluation of a primary care-based intervention designed to reduce youth involvement in violent behavior and fight-related injury. We found that the intervention significantly decreased aggressive and delinquent behavior, bullying, physical fighting, and fight-related injuries for which medical care was sought among the youths. In addition, the intervention significantly reduced the use of corporal punishment by parents and parental depression.

Use of the PSC-17 to screen for psychosocial problems at acute-care or well-care visits in this office-based intervention resulted in identification and intervention for a high-risk group of youths. At baseline, one-half of the youths in this study had been in a physical fight in the past year and $44\%$ were involved in moderate or frequent bullying (as a bully, a target of bullying, or both). These behaviors are markers for more serious violent behaviors.\(^3,28\)

In addition, we found that the subscale scores on the PSC-17 seemed to play a role in clinician decision-making regarding referral and follow-up monitoring of patients. This conclusion is based on the finding that clinicians were more likely to report making referrals or scheduling follow-up visits for patients with a positive versus a negative score on specific subscales of the screening test. Therefore, a screening tool such as the PSC-17 can be useful in guiding clinicians in their assessment and treatment of patients. Clinicians infrequently use standardized tools to assess child psychosocial problems.\(^29\) Epidemiologic research has documented the under-recognition of mental health problems, and resulting unmet needs, of children in primary care.\(^30\) Approximately $1$ of $5$ children attending pediatric practices has significant mental health problems. It is estimated that $60\%$ of those children do not receive the services they need.\(^31\)

Untreated emotional and behavioral problems contribute to poor overall functioning, school failure, substance use, violence, and suicide among adolescents and adults.\(^32-34\) Guidelines for the assessment and treatment of children and adolescents with depressive, attention, and conduct disorders have been published,\(^35-37\) and the effectiveness of some treatments has been documented.\(^38-41\)

Family-level interventions have repeatedly shown efficacy in reducing violent and delinquent behavior among youths and are among the most promising interventions known to date.\(^42,43\) Effective family-level interventions include parent training, home visiting, and family therapy. Although each approach works, parent training is often the most cost-effective family-level intervention. The present intervention used the telephone to deliver the parenting education resource. Telephone-based parent training may reduce barriers to participation in parent training, such as difficulty getting time off work, lack of transportation, and difficulty finding or affording child care.\(^44\) Telephone-based counseling programs for behavior changes in multiple areas, including weight management, smoking cessation, and stress management, have been offered by a large health maintenance organization and have been found to be convenient and easily accessible for patients and to allow long-term follow-up monitoring.\(^45\) Telephone counseling services for smoking cessation have proliferated in the United States and many other countries in recent years, supported by strong evidence that such counseling is effective and has the potential to reach large numbers of smokers.\(^46,47\)

Although parenting interventions are among the most effective strategies known for preventing youth violence, parenting programs have not been widely implemented. Challenges include locating resources to start a program and replicating a program implemented in another community. Telephone-based delivery of the parenting program has the potential to overcome dissemination challenges by permitting access to parents throughout a state or region and beyond. Implementation of the program in the setting of a health maintenance organization could offer a source of funding and support.

This study has a number of limitations. The intervention included complementary strategies of identifying, preventing, and treating mental health problems among youths and promoting healthy child-parent relationships. All participants in the intervention group received the intervention, ie, a medical visit with a clinician who 1) saw a parent-completed, positive, psychosocial screening test for the child and 2) had a telephone-based, parenting education program available to him or her as a referral resource for the parent. However, exposure of intervention participants to potential elements of the intervention varied widely, contingent on assessment and treatment by the clinician and on patient and parent factors. This study design did not permit us to disaggregate intervention components to determine which were most effective. Measures of intervention effectiveness were based on parent and child reports. These results are constructed from the frames of reference of the parent and child, ie, perceived reality rather than objective reality is being reflected in the reporting of behavior. To minimize socially desirable responses, follow-up assessments were conducted by a different interviewer than the interviewer who conducted the baseline interviews. We used previously validated measures of violence-related outcomes, such as the CBCL.\(^21\) Although reported outcomes may be subject to bias and thus not as reliable as directly observed outcomes, many studies have found that self-reported behavioral changes are correlated with objective measures.\(^48\) In addition, studies have shown adequate correlation
between the results of parent reports of child behavior and independent observations.49,50 Finally, the study was conducted in a single geographic area and may not be generalizable to other parts of the country.

Most children with psychosocial problems are treated in general medical settings, rather than mental health settings, and most psychotropic drug prescriptions for children and adolescents are prescribed by primary care physicians.31,51 Despite the key role of primary care clinicians in identifying and treating mental health disorders among children and adolescents, research on primary care-based mental health services for children and adolescents is underdeveloped.52 Studies in adult primary care settings have demonstrated promising educational and organizational interventions with strong potential to improve the management of depression in primary care settings. Effective strategies include components of collaborative care, such as nurse care management, consultations of primary care providers with mental health specialists that do not involve face-to-face contact with patients, and follow-up monitoring of patients that includes telephone medication counseling by practice nurses.53 Future research should assess the effectiveness of these strategies in primary medical care settings for children. In addition, parenting education may be a critical component of addressing the mental health of children and adolescents. This study indicates that psychosocial screening and the availability of a telephone-based, parenting education referral resource may represent a promising, primary care-based approach to help prevent violent behavior and injury among children and adolescents.

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