Effects of a Brief Intervention for Reducing Violence and Alcohol Misuse Among Adolescents: A Randomized Trial

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Abstract

Context—The Emergency Department (ED) visit presents an opportunity to deliver brief interventions (BIs) to reduce violence and alcohol misuse among urban adolescents at risk for future injury.

Objectives—To determine the efficacy of BIs addressing violence and alcohol among adolescents presenting to an urban ED.

Design, Setting, and Participants—Patients (ages 14–18; 12 pm–11 pm; 7 days/week) at a Level 1 ED in Flint, MI, completed a computerized survey. Adolescents reporting past year alcohol use and aggression were enrolled in a randomized trial (SafERteens) which included: a computerized baseline assessment, randomization to a control group, or a 35-minute brief intervention delivered by a computer or therapist in the ED, and follow-up assessments at 3 and 6 months.

Intervention—Combining motivational interviewing with skills training, the BI for violence and alcohol included: review of goals, tailored feedback, decisional balance exercise, role plays, and referrals.

Main Outcome Measures—Self-report measures included peer aggression and violence, violence consequences, alcohol use, binge drinking, alcohol consequences.

Results—3338 adolescents were screened (n=446, 12% refused): 1452 (43.5%) male; 1866 (55.9%) African-American. Of those, 829 (24.8%) screened positive for both alcohol and

violence; 726 were randomized. As compared to the control, participants in the therapist intervention showed self-reported reductions in the occurrence of peer aggression (−34.3% therapist, −16.4% control; RR=0.74, CI=0.61–0.90), experience of peer violence (10.4% therapist, +4.7% control; RR=0.70, CI=0.52–0.95), and violence consequences (30.4% therapist, −13.0% control; RR=0.76, CI=0.64–0.90) at three months. At 6 months, participants in the therapist intervention showed self-reported reductions in peer aggression (−37.7% therapist, −28.4% control; RR=0.85, CI=0.68–1.06) and alcohol consequences (−32.2% therapist, −17.5% control; RR=0.56, CI=0.34–0.91) as compared to controls. At 6 months, participants in the computer intervention also showed self-reported reductions in alcohol consequences (−29.1% computer, −17.5% control; RR=0.62, CI=0.39–0.98).

Conclusions—Among adolescents identified in the ED with self-reported alcohol use and aggression, a brief intervention resulted in a decrease in the prevalence of self-reported aggression and alcohol consequences.

Trial Registration—ClinicalTrials.gov Identifier NCT00251212.

In the U.S. in 2006, there were 19,525,000 visits by patients ages 15–24.[1] The ED is an important contact point for medical care for adolescents, especially underinsured and uninsured patients.[2, 3] Prevention programs in the ED may reach adolescents who do not attend school regularly, or who lack a primary care physician, or who view themselves as too old to be seen by pediatricians and have not established adult medical care. Adolescents seeking care in the ED are an important population for injury prevention based on increased risk for problems related to alcohol and violence.[4, 5] Despite a recent increase in ED-based interventions for youth violence[6–9] or alcohol use,[10–13] few ED studies have examined brief interventions (BI)that address reductions in violence, or the combination of these co-occurring risk behaviors (e.g., violence and alcohol).[14] These approaches could have substantial public health impact, especially if designed to be easily incorporated into ED practice. Computerized brief interventions are mostly untested in the ED and offer a practical solution to barriers in this setting.

This manuscript examines 3 and 6 month outcomes from a randomized control trial (RCT) (SafERteens Study) of a therapist brief intervention (assisted by a computer) or a computer brief intervention as compared to a control condition among adolescents (ages 14–18) presenting to an urban ED who screened positive for violence and alcohol use. Hypotheses were that the therapist and computer interventions would be more effective than the control on reducing violence and alcohol misuse at 3 and 6 months.

METHODS

Study Setting—The SafERteens RCT took place at Hurley Medical Center in Flint, Michigan, a Level I Trauma Center. Study procedures were approved by the University of Michigan and HMC Institutional Review Boards (IRB), for Human Subjects; a NIH Certificate of Confidentiality was obtained.

Participants—ED patients (ages 14, 15, 16, 17, and 18) presenting for medical illness or injury were eligible for screening. Exclusions were: acute sexual assault or suicidal ideation, altered mental status precluding consent, or medically unstable (i.e., abnormal vital signs).

Study Protocol—Recruitment occurred from 12 pm–11 pm, seven days per week (9/06–9/09), excluding major holidays. Adolescent patients identified from electronic logs were approached by research assistants (RAs) in waiting rooms or treatment spaces. Following written consent (and assent and parent/guardian consent if < 18), participants self-administered a 15-minute computerized survey with audio, and received a $1.00 gift.

Study Eligibility—After completing the survey, participants reporting both past-year aggression (see Measures; peer, dating, weapon carriage/use) <u>and</u> alcohol consumption ("In the past 12 months, have you had a drink of beer, wine or liquor more than two to three times? Do not count just a sip or taste of someone else's drink.")[15] were eligible for the RCT. Note that participants reporting only one behavior (aggression or alcohol) were not eligible.

RCT Procedures—Following written consent (and assent and parent/guardian consent if < 18), for the RCT, participants self-administered a computerized baseline assessment ($20 remuneration). As required by the IRB, participants were told they would be randomly assigned to one of three groups: computer session, counselor session, or brochure. Participants were blind to condition assignment until after the baseline assessment. After the baseline, participants were randomized and received the therapist brief intervention, computer brief intervention, or control brochure during the ED visit. Randomization was stratified by sex (male/female) and age (14–15/16–18) assigned based on computer generated algorithm and using numbered sealed envelopes. Randomization occurred blocks of 21 (7 per group).

Follow up interviews—Participants self-administered computerized assessments 3 and 6 months after the ED visit at a convenient location (e.g., home, ED, restaurant); remuneration was $25 and $30 respectively. Follow-up staff were blind to baseline condition assignment.

Measures—Previously validated measures were used; piloting (n=23) was conducted to ensure youth could understand and self-administer the assessments and interventions.[16–18] The time frame for questions was the past year at screening/baseline and past 3 months at follow-ups.

<u>Demographics:</u> Questions included: age, gender, race, ethnicity, and receipt of public assistance.[15]

<u>Alcohol Use:</u> Frequency (how often), quantity (on a typical occasion), and binge drinking (5 or more) were assessed with the Alcohol Use Disorders Identification Test-Consumption (AUDIT-C).[19, 20] As recommended for adolescents,[21] binge drinking quantity was five drinks instead of six. Piloting revealed that question 1 response options were misunderstood by urban teens and were replaced with the response options for question 3. An *Alcohol Consumption* summary variable was computed ($\alpha = 0.81$); among adolescents, the cut-off is 3 for an alcohol use disorder.[21]

<u>Alcohol Consequences:</u> The 17-item substance abuse scale from the Problem Oriented Screening Instrument for Teenagers (POSIT)[22] measured alcohol consequences (e.g., missed school, trouble getting along with friends because of drinking). An *Alcohol Consequences* summary variable was created ($\alpha = 0.83$). Among adolescents, the cut-off is 2 for an alcohol use disorder.[23]

<u>Aggression:</u> Ten items [24, 25] assessed frequency of aggression toward peers and included moderate (e.g., pushed or shoved) and severe (e.g., hit or punched, used a knife/gun) ($\alpha = 0.86$) aggression. *Peer Aggression* was computed by summing the mid-point of the responses.[26] Knife/razor and gun carriage frequency was assessed using two items. Two items assessed frequency of moderate and severe dating aggression.[5, 27]

Experience of peer violence (being a victim of moderate or severe peer violence) was assessed by collapsing the moderate and severe CTS items into two questions. The score was computed by summing the mid-point of the items ($\alpha = 0.77$).

Violence Consequences: Using a 7-item scale developed for this study, participants identified consequences of fighting (i.e., trouble at school, hurt someone, constant desire to fight, family or friends suggested you stop, arguments with family or friends, trouble getting along with friends, can't control fighting). A *Violence Consequences* summary variable was created ($\alpha = 0.78$).

Visit type: Current ED visit reason (i.e., chief complaint) was abstracted from the medical chart, medical illness (e.g., abdominal pain, asthma), or injury (ICD–9–intentional (E950–E969) or unintentional (E800–E869, E880–E929). Chart reviews were audited regularly to maintain reliability using established criteria.[28]

SafERteens Brief Interventions: Participants received their assigned condition prior to ED discharge in treatment spaces; interventions could be stopped and re-stared as needed to avoid interference with medical care. Research staff ensured that sessions were completed privately. Participants in all groups received a brochure with community resources. The SafERteens brief interventions were based on principles of motivational interviewing,[29, 30] but also involved normative resetting and alcohol refusal and conflict resolution skills practice (see below and[31]). The therapist and computer interventions were designed to have similar sections, but with different modes of presentation. They were developed to be culturally relevant for urban youth, who at this study site were ~ 50% African-American. The sections included: goals, personalized feedback for alcohol, violence, and weapon carriage, decisional balance exercise for the potential benefit of staying away from drinking and fighting, five tailored role-plays (e.g., anger management, conflict resolution, alcohol refusals, not drinking and driving, etc.), and referral. Although both interventions reviewed these content areas in a way that was consistent with tenets of motivational interviewing (i.e., non-judgmental), the mode of delivery resulted in important differences. For example, it was not possible for the computer to provide complex interpersonal responses that a skilled therapist could deliver.

The therapist intervention was also facilitated by a tablet laptop computer which displayed tailored feedback for participants, and screens to prompt content for the therapists. Research social workers were initially trained on motivational interviewing techniques and the specific SafERteens intervention. Based on harm reduction principles, which are well suited for adolescents,[32, 33] motivational interviewing emphasizes developing a discrepancy between current behavior and future goals, increasing problem recognition, motivation, and self-efficacy. To ensure fidelity, sessions were audio taped and 20% were coded based for adherence and competence; therapists received individual and group supervision and periodic re-trainings to throughout the study.

The computer intervention developed for this study was a stand-alone interactive animated program,[31] with touch screens and audio via headphones to ensure privacy. The buddy guided participants through the intervention components via audio feedback for the choices made focusing on tipping the decisional balance away from risk behaviors. The entire computer program was an interaction, not passively viewed. For example, during the role-play scenarios, participants had to *interact* with peers and make behavioral choices about drinking and fighting.

Data analysis

Data were analyzed using SAS Version 9 (SAS Institute, Inc., Cary, NC). Descriptive statistics were computed for the total sample and by assigned condition. Because of baseline differences by condition in rates of participant school drop-out, this variable was initially included in analyses to control for group differences. Models are presented without this covariate, however, because it was unrelated to outcomes when it was included in initial analyses. For descriptive purposes, rates of occurrence of risk behaviors are presented as percents along with percent change at 3 and 6 months. At baseline, a single imputation procedure was used to complete missing alcohol misuse scores for 5 participants. Statistical significance was set at p<.05, 1-tailed, and expressed as a 95% confidence interval.

Data were analyzed using generalized estimating equations (GEE), due to the correlated structure of data from repeated measures at baseline, 3, and 6 month follow-up.[34] GEE analyses allows for observed variable distributions (e.g., binary/logit, continuous/negative binomial). An *intent to treat* approach was used in which all randomized participants (n=726) were included because GEE analyses include all cases, even drop-outs, by using available pairs to estimate working correlation parameters for the entire sample. The study was powered to detect differences between intervention groups and the control, not between treatment conditions (e.g., therapist brief intervention and computer brief intervention); thus, analyses compared each intervention condition separately to the control condition. Based on 15% reduction in occurrence of a risk behavior and p<.05, n=107 per group is needed for power = 0.8.; thus, the analyses were adequately powered.

Because the intervention focused on decreasing the occurrence as well as the frequency of the risk behaviors, GEE analyses were conducted examining group differences over time in the occurrence (binary variables) and frequency (continuous variables) of primary outcomes(i.e., peer aggression, violence consequences, alcohol misuse (AUDIT-C score), binge drinking, and alcohol consequences] and secondary outcomes (i.e., experience of peer violence). GEE analyses produces a model group by time interaction effect, as well as specific group by time interaction effects for the therapist and computer conditions as compared to the control. For conservative purposes, only models with significant overall group by time interaction effects were examined further to determine intervention effectiveness (i.e., therapist group by time interaction, computer group by time interaction). A significant therapist group by time interaction effect indicates that the intervention condition significantly differs from the control in a specific outcome; thus, this analysis approach considers baseline values and the relative change over time in outcomes based on group assignment. Regarding effect sizes, for outcomes using binary variables percent change was computed. For continuous variables, Cohen's effect sizes[35] were calculated which indicate the strength of the relationship between the intervention and the observed outcome and allows for comparisons across studies; the prevention literature suggests that effect sizes =0.10 are clinically meaningful.[36]

RESULTS

Flow Chart

Among 4296 potentially eligible patients presenting during recruitment, 88.1% (n=3784) were approached (see Figure 1 for details). For screening, no race differences were observed in refusals; males were more likely to refuse than females (n=224, 13.0%; n=222, 10.7% respectively; $X^2(1)=4.72$, p<0.05). For baseline, African-Americans were less likely to refuse than *Other* races (n=41, 9.2%; n=60, 15.8%, $X^2(1)=8.4$, p<.01); males were more likely to refuse than females (n=56, 15.1%;n=45, 9.9%, respectively; $X^2(1)=5.1$, p<.05). The follow-up rate exceeded 85%.

Sample Description

Table 1 characterizes of the sample by assigned condition. Participants assigned to the computer intervention were more likely to have dropped out of school as compared to the therapist intervention or control. No other significant differences were observed between groups.

Occurrence of Violence/Alcohol Use (Binary)

GEE models were computed for occurrence of violence (severe peer aggression, any experience of peer violence, any violence consequences) and alcohol (alcohol misuse   3, any binge drinking, alcohol consequences   2) at 3 and 6 months (see Table 2 for descriptive data and Tables 3 and 4 for GEE results). Participants in the therapist intervention were less likely to report any severe peer aggression at 3 months (model group by time interaction $X^2(2)=11.79$, p=0.0027) and 6 months (model group by time interaction $X^2(2)=3.02$, p=0.2208), experience of peer violence at 3 months (model group by time interaction $X^2(2)=6.96$, p=0.0308), and violence consequences at 3 months (model group by time interaction $X^2(2)=14.50$, p=0.0007) than controls. Models were not significant for alcohol misuse or binge drinking at 3 and 6 months or for alcohol consequences at 3 months. At 6 months, the alcohol consequences model was significant (model group by time interaction $X^2(2)=5.55$, p=0.0624); participants in the therapist and computer conditions were less likely to report consequences than controls.

Frequency of Violence/Alcohol Use (Continuous)

GEE models were computed for frequency of violence (peer aggression, experience of peer violence, violence consequences) and alcohol (alcohol misuse, binge drinking, alcohol consequences) at 3 months and 6 months (data not presented). The models were not significant for the frequency of peer aggression or experience of peer violence at 3 and 6 months or for the frequency of violence consequences at 6 months. The model for the number of violence consequence at 3 months was significant (model group by time interaction $X^2(2)=8.56$, p=0.0138). Participants in the therapist intervention decreased the number of violence consequences compared to controls at 3 months (therapist group by time interaction, p=0.0051; effect size 0.27; odds ratio = 0.77; confidence interval 0.65–0.93). None of the models were significant for the alcohol frequency variables.

COMMENT

Although replication is required, data presented provides novel findings demonstrating that a brief intervention for violence and alcohol among adolescents presenting to an urban ED shows promise, reducing peer violence and alcohol consequences over a 6 month period. Given that a leading cause of mortality and morbidity in this age group is violence, the reduction in the occurrence of *severe* violence following a single session brief intervention is clinically meaningful. Specifically, only 8 at-risk adolescents (with past year alcohol use and aggression) would need to receive the therapist intervention in order to prevent severe peer aggression in one adolescent. In addition, participants in the therapist intervention reported a reduction in the occurrence of experience of peer violence and frequency of violence consequences at 3 months. Clinically, a trained ED based therapist would need to deliver this 30 minute intervention to 10 at-risk adolescents to prevent one adolescent from being victimized by a peer. In a similar manner, the number of adolescents needed to treat with the therapist intervention is 6 in order to reduce violence consequences in one adolescent.

This study focused on at-risk youth seeking general ED care for a single session intervention delivered completely during the teachable moment of the acute care visit. Prior hospital and ED interventions for youth violence have focused on patients with intentional injury and

have typically used multi-session case management or mentoring approaches.[6, 9, 37] Additional studies with larger samples of adolescents who are seeking care following an intentional injury (i.e., assault, gun-shot) are needed to determine the effectiveness of this intervention among youth with more severe violence profiles. Few ED studies have examined alcohol brief interventions among adolescents. Adolescents in the therapist intervention and the computer intervention were less likely to report alcohol related consequences (e.g., missed school, trouble with friends) than the control condition over the 6 month follow-up. Clinically, to prevent alcohol consequences in one adolescent, 17 adolescents would need to receive the therapist intervention; alternatively, 13 adolescents would need to receive the computer intervention to prevent alcohol consequences in one adolescent. These mixed findings for reductions in alcohol consequences but not consumption is consistent with prior adolescent studies of a therapist brief intervention[6] and computer brief intervention[38] in the ED.[11]

Data from this study did not support the effectiveness of the stand alone computerized intervention for reducing violence. It is important to recognize however, that the computer played a role in the therapist condition. As recently recommended,[26] assessments were computerized and the adolescent and therapist reviewed tailored feedback presented on the computer. The computer screens standardized the delivery of the intervention by the therapist; such approaches are appealing as a mechanism to prompt content for busy ED staff.

Limitations

A limitation of this study is that it is not possible for participants to be blinded to intervention condition given current IRB requirements. This concern is somewhat mitigated by blinding of follow-up staff to intervention condition assignment as well as by the self-administered nature of assessments. Findings may not generalize to patient groups not included in this single site study, such as adolescents presenting during overnight shifts, with acute suicidal ideation/attempt, or sexual assault. Although the sample reflected the ED study site composition, replication with other sites and samples (e.g., Hispanics) are needed. The self-report data is a potential limitation; however, recent reviews support the reliability and validity of self-report of risk behaviors when privacy/confidentiality is assured and when using self-administered computerized assessments.[39] Although the follow-up rates exceeded 85% and analyses included all participants regardless of drop-out, attrition is a limitation of this study. Findings are limited by the six-month follow-up. Future studies are needed that examine long-term follow-up, moderators of outcome such as age, and the temporal relationship between acute alcohol consumption and violence using calendar-based assessments.[40]

Conclusions

Although replication is required, findings support the efficacy of a therapist brief intervention (with computerized feedback and structure) in decreasing the occurrence of adolescent peer violence and alcohol consequences in the 6 months following an ED visit. In addition, both the therapist and the computer brief intervention was effective at reducing of alcohol consequences over 6 months. Computerized approaches could assist in translating research findings into routine clinical practice by standardizing intervention delivery, and have widely applicability across other content areas and settings.

Acknowledgments

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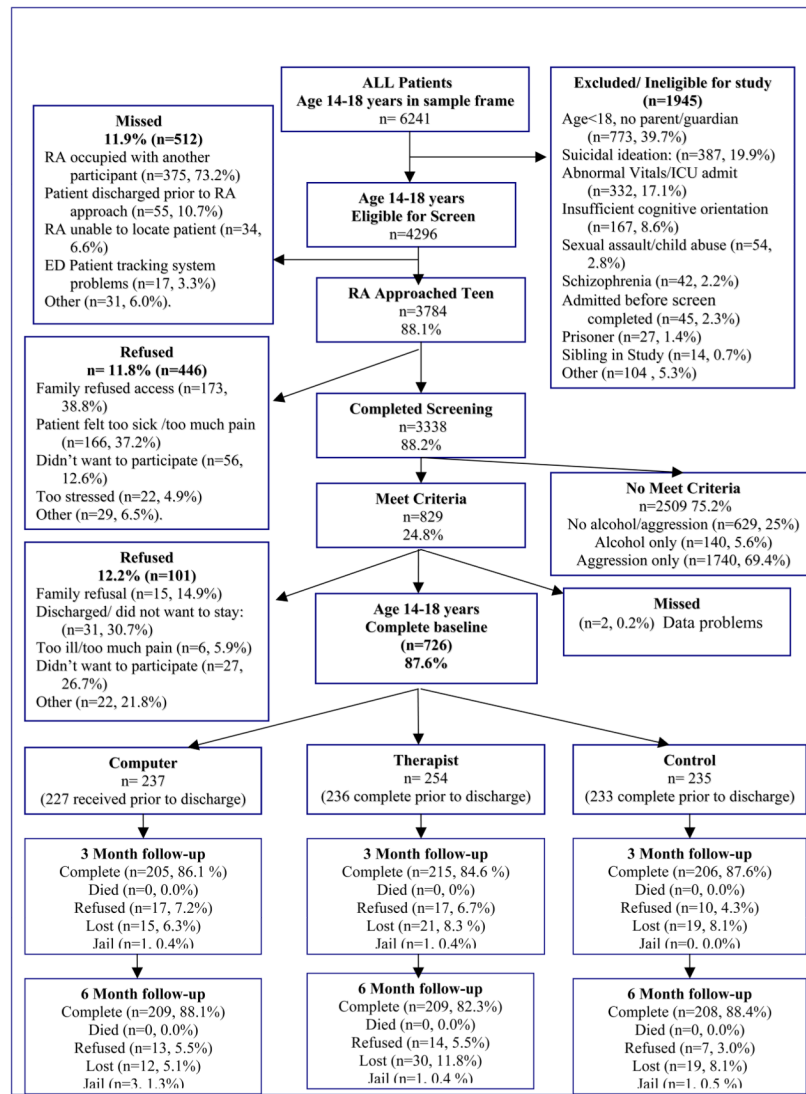
Figure 1.
SafERteens Flowchart (September 2006 to September 2009).

Table 1

Baseline Background, Violence, and Substance use Characteristics.

Characteristics	CBI N=237 (%)	TBI N=254 (%)	Control N=235 (%)	Total N=726 (%)
Demographics				
Male	100 (42.2)	114 (44.9)	102 (43.4)	316 (43.5)
African-American	129 (54.4)	145 (57.1)	132 (56.2)	406 (55.9)
Caucasian	96 (40.4)	96 (37.8)	92 (39.2)	284 (39.1)
Other race	12 (5.1)	13 (5.1)	11 (4.7)	36 (5.0)
Hispanic ethnicity	15 (6.3)	17 (6.7)	15 (6.4)	47 (6.5)
Mean Age (SD)	16.7 (1.4)	16.8 (1.3)	16.8 (1.3)	16.8 (1.3)
Family receipt of public assistance (yes)	140 (59.1)	149 (58.7)	128 (54.5)	417 (57.4)
Failing grades (some D's & F's)[a]	83 (40.9)	104 (44.3)	101 (47.0)	288 (44.1)
Dropped out of school [*]	34 (14.4)	19 (7.5)	20 (8.5)	73 (10.1)
Live with parent	192 (81.0)	205 (80.7)	184 (78.3)	581 (80.0)
Gang involvement	18 (2.5%)	21 (2.9)	14 (1.9)	53 (7.3)
ED-Related				
Chief Complaint injury	59 (24.9)	68 (26.9)	67 (28.6)	194 (26.8)
Chief Complaint intentional injury	12 (5.1)	25 (9.9)	17 (7.3)	54 (7.5)
Discharged from ED on day of recruitment	217 (91.6)	238 (93.7)	220 (93.6)	675 (93.0)
Past year Substance Use				
Binge Drinking (5 or more drinks)	115 (48.5)	134 (52.8)	127 (54.0)	376 (51.8)
Alcohol Misuse: AUDIT-C	108 (45.6)	127 (50.0)	112 (47.7)	347 (47.8)
Alcohol Consequences	102 (43.0)	122 (48.0)	102 (43.4)	326 (44.9)
Marijuana Use	151 (63.7)	166 (65.4)	159 (67.7)	476 (65.6)
Past year Violence				
Peer Aggression (Severe)	179 (75.5)	210 (82.7)	183 (77.9)	572 (78.8)
Experience of peer violence	103 (43.5)	121 (47.6)	99 (42.1)	323 (44.5)
Violence Consequences	183 (77.2)	213 (83.9)	195 (98.3)	591 (81.4)

Note: n=726.

[a] among those in school n=653 (89.9%).

[*] p<0.05

Table 2

Self-report of alcohol and violence over time.

	Baseline n (%) [n=726]	3 Month n (%) [n=626]	6 Month n (%) [n=626]	% Change Baseline - 3 month	% Change Baseline - 6 month
VIOLENCE					
Any Severe Peer Aggression					
Therapist	210 (82.7)	104 (48.4)	94 (45.0)	−34.3	−37.7
Computer	179 (75.5)	111 (54.2)	103 (49.3)	−21.3	−26.2
Control	183 (77.9)	126 (61.5)	103 (49.4)	−16.4	−28.4
Any Experience of peer violence					
Therapist	121 (47.6)	80 (37.2)	73 (34.9)	−10.4	−12.7
Computer	103 (43.5)	84 (41.0)	52 (24.9)	−2.5	−18.6
Control	99 (42.1)	96 (46.8)	73 (35.1)	+4.7	−7.1
Any Violence Consequences					
Therapist	213 (83.9)	80 (53.5)	116 (55.5)	−30.4	−28.9
Computer	183 (77.2)	84 (61.5)	104 (49.8)	−15.7	−27.4
Control	195 (83.0)	96 (70.0)	122 (58.7)	−13.0	−24.3
ALCOHOL					
Alcohol Misuse: AUDIT-C 3					
Therapist	127 (50.0)	74 (34.4)	69 (33.1)	−15.6	−16.9
Computer	108 (45.6)	67 (32.7)	67 (33.0)	−12.9	−12.6
Control	112 (47.7)	38 (38.1)	73 (35.1)	−9.6	−12.6
Any Binge Drinking					
Therapist	134 (52.8)	74 (34.4)	68 (32.5)	−18.4	−20.3
Computer	115 (48.5)	59 (28.8)	69 (33.0)	−19.7	−15.5
Control	127 (54.0)	71 (34.6)	71 (34.1)	−19.4	−19.9
Alcohol Consequences 2					
Therapist	122 (48.0)	46 (21.4)	40 (15.8)	−26.6	−32.2
Computer	102 (43.0)	43 (21.0)	33 (13.9)	−22.0	−29.1
Control	102 (43.4)	53 (25.9)	51 (21.7)	−17.5	−17.7

Table 3

GEE analyses examining occurrence of violence and alcohol risk variables baseline to 3 months based on intervention groups.

	Estimate	Standard Error	P value	Relative Risk	95% CI	
VIOLENCE						
Any Severe Peer Aggression[a]						
Time	−0.24	0.07	0.0003	0.79	0.69	0.90
Computer Group	−0.03	0.05	0.5469	0.97	0.88	1.07
Therapist Group	0.06	0.05	0.1843	1.06	0.97	1.16
Computer Group by Time	−0.10	0.10	0.3304	0.91	0.75	1.10
Therapist Group by Time	−0.30	0.10	0.0028	0.74	0.61	0.90
Any Experience of peer violence[b]						
Time	0.11	0.11	0.3214	1.11	0.90	1.37
Computer Group	0.03	0.11	0.7700	1.03	0.84	1.27
Therapist Group	0.12	0.10	0.2230	1.13	0.93	1.38
Computer Group by Time	−0.16	0.15	0.2868	0.85	0.63	1.15
Therapist Group by Time	−0.35	0.15	0.0215	0.70	0.52	0.95
Any Violence Consequences[c]						
Time	−0.17	0.05	0.0015	0.84	0.76	0.94
Computer Group	−0.07	0.05	0.1178	0.93	0.85	1.02
Therapist Group	0.01	0.04	0.7940	1.01	0.93	1.09
Computer Group by Time	−0.05	0.09	0.5227	0.95	0.80	1.12
Therapist Group by Time	−0.28	0.09	0.0018	0.76	0.64	0.90
ALCOHOL						
Alcohol Misuse: AUDIT-C 3[d]						
Time	−0.23	0.11	0.0450	0.80	0.64	0.99
Computer Group	−0.04	0.10	0.6491	0.96	0.79	1.16
Therapist Group	0.05	0.09	0.6054	1.05	0.87	1.26
Computer Group by Time	−0.11	0.17	0.5196	0.90	0.65	1.24
Therapist Group by Time	−0.15	0.16	0.3525	0.86	0.63	1.18
Any Binge Drinking[e]						
Time	−0.44	0.11	<.0001	0.64	0.51	0.80

	Estimate	Standard Error	P value	Relative Risk	95% CI	
Computer Group	−0.11	0.09	0.2312	0.90	0.75	1.07
Therapist Group	−0.02	0.08	0.7756	0.98	0.83	1.15
Computer Group by Time	−0.08	0.17	0.6515	0.93	0.66	1.30
Therapist Group by Time	0.02	0.16	0.9105	1.02	0.75	1.39
Alcohol Consequences 2[f]						
Time	−0.52	0.14	0.0002	0.60	0.45	0.78
Computer Group	−0.01	0.11	0.9360	0.99	0.81	1.22
Therapist Group	0.10	0.10	0.3064	1.11	0.91	1.34
Computer Group by Time	−0.20	0.21	0.3361	0.82	0.54	1.23
Therapist Group by Time	−0.29	0.20	0.1507	0.75	0.50	1.11

Note: n=726. CI= Confidence Interval.

[a] Model group by time interaction $X^2(2)$=11.79, p=0.0027

[b] Model group by time interaction $X^2(2)$=6.96, p=0.0308

[c] Model group by time interaction $X^2(2)$=14.50, p=0.0007

[d] Model group by time interaction $X^2(2)$=1.30, p=0.5222

[e] Model group by time interaction $X^2(2)$=0.61, p=0.7359

[f] Model group by time interaction $X^2(2)$=2.66, p=0.2641

Table 4

GEE analyses examining occurrence of violence and alcohol risk variables baseline to 6 months based on intervention groups.

	Estimate	Standard Error	P Value	Relative Risk	95% CI	
VIOLENCE						
Any Severe Peer Aggression						
Time	−0.44	0.08	<0.0001	0.64	0.55	0.75
Computer Group	−0.03	0.05	0.5469	0.97	0.88	1.07
Therapist Group	0.06	0.05	0.1843	1.06	0.97	1.16
Computer Group by Time	0.01	0.11	0.9582	1.01	0.81	1.25
Therapist Group by Time	−0.17	0.11	0.1412	0.85	0.68	1.06
Any Experience of peer violence						
Time	−0.16	0.12	0.1774	0.85	0.67	1.08
Computer Group	0.03	0.11	0.7700	1.03	0.84	1.27
Therapist Group	0.12	0.10	0.2230	1.13	0.93	1.38
Computer Group by Time	−0.43	0.19	0.0214	0.65	0.45	0.94
Therapist Group by Time	−0.15	0.17	0.3661	0.86	0.62	1.19
Any Violence Consequences						
Time	−0.34	0.07	<.0001	0.71	0.62	0.81
Computer Group	−0.07	0.05	0.1178	0.93	0.85	1.02
Therapist Group	0.01	0.04	0.7940	1.01	0.93	1.09
Computer Group by Time	−0.11	0.10	0.3059	0.90	0.74	1.10
Therapist Group by Time	−0.08	0.09	0.4205	0.93	0.77	1.12
ALCOHOL						
Alcohol Misuse: AUDIT-C 3						
Time	−0.30	0.12	0.0102	0.74	0.59	0.93
Computer Group	−0.04	0.10	0.6491	0.96	0.79	1.16
Therapist Group	0.05	0.09	0.6054	1.05	0.87	1.26
Computer Group by Time	−0.08	0.17	0.6501	0.93	0.66	1.30
Therapist Group by Time	−0.12	0.17	0.4702	0.89	0.64	1.23
Any Binge Drinking						
Time	−0.47	0.11	<0.0001	0.63	0.50	0.78
Computer Group	−0.11	0.09	0.2312	0.90	0.75	1.07

	Estimate	Standard Error	P Value	Relative Risk	95% CI	
Therapist Group	−0.02	0.08	0.7756	0.98	0.83	1.15
Computer Group by Time	0.06	0.17	0.7269	1.06	0.76	1.47
Therapist Group by Time	−0.02	0.16	0.9032	0.98	0.71	1.35
Alcohol Consequences 2						
Time	−0.71	0.15	<0.0001	0.49	0.37	0.65
Computer Group	−0.01	0.11	0.9360	0.99	0.81	1.22
Therapist Group	0.10	0.10	0.3064	1.11	0.91	1.34
Computer Group by Time	−0.48	0.23	0.0414	0.62	0.39	0.98
Therapist Group by Time	−0.43	0.22	0.0492	0.65	0.43	1.00

Note: n=726. CI= Confidence Interval.

[a] Model group by time interaction $X^2(2)$=3.02, p=0.2208

[b] Model group by time interaction $X^2(2)$=5.47, p=0.0648

[c] Model group by time interaction $X^2(2)$=1.19, p=0.5520

[d] Model group by time interaction $X^2(2)$=0.54, p=0.7652

[e] Model group by time interaction $X^2(2)$=0.23, p=0.8911

[f] Model group by time interaction $X^2(2)$=5.55, p=0.0624