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Computer-facilitated Screening and Brief Advice to Reduce adolescents' Heavy Episodic Drinking: A Study in Two Countries

John R Knight Jr, MD^{1,2,3,4}, Kateryna Kuzubova, PhD⁵, Ladislav Csemy, PhD^{6,7}, Lon Sherritt, MPH^{1,2,4}, Sarah Copelas, BA⁸, and Sion Kim Harris, PhD^{1,2,3,4}

¹Department of Pediatrics, Harvard Medical School, Boston, MA

²Division of Developmental Medicine, Boston Children's Hospital, Boston, MA

³Division of Adolescent/Young Adult Medicine, Boston Children's Hospital, Boston, MA

⁴The Center for Adolescent Substance Abuse Research (CeASAR), Boston Children's Hospital, Boston, MA (Coordinating Site)

⁵Department of Counseling and School Psychology, University of Massachusetts, Boston, MA

⁶Centre for Evaluation, Prevention and Research of Substance Abuse, Prague, Czech Republic

⁷Prague Psychiatric Centre, Prague, Czech Republic

⁸University of New England College of Osteopathic Medicine, Biddeford, ME

Abstract

Purpose—A Computer-facilitated Screening and clinician Brief Advice (cSBA) intervention was previously shown to reduce drinking among US adolescents, but not among Czech youth. The purpose of this study was to assess cSBA effect on heavy episodic drinking (HED).

Address correspondence to: John R Knight, MD, Boston Children's Hospital, 300 Longwood Avenue, Boston, MA 02115, Tel: 617-355-5433, Fax: 617-730-0049, john.knight@childrens.harvard.edu, Internet: <http://www.ceasar.org>.

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Contributors

Drs. Harris and Knight had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

Study conception/design: Harris (Study Co-PI), Csemy (CZR PI), Sherritt (Study Data Manager), Knight (Study PI)

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Methods—12- to 18-yr-olds at nine U.S.A. (N=2096) and 10 Czech (N=589) offices completed measurements only during an 18-month Treatment As Usual (TAU) phase. We then initiated the cSBA protocol for all participants and recruited the 18-month cSBA phase. GEE logistic regression compared past-90-day HED for cSBA vs. TAU at 3- and 12-months, controlling for baseline HED and other covariates.

Results—Baseline past-90-day HED rates were 11% for U.S.A. and 28% for Czech youth. At 3-months, among Czech baseline non-HED, the adjusted Relative Risk Ratio (aRRR) for cSBA vs. TAU was 0.52 (95% CI 0.29,0.92). The effect dissipated by 12-months.

Conclusions—cSBA shows promise for short-term prevention of adolescent HED.

Keywords

adolescents; heavy episodic drinking; technology-assisted prevention

Introduction

Heavy episodic drinking (HED) in adolescence is associated with a range of health risks in the U.S.A. and Europe (1, 2). This makes settings where adolescents receive routine healthcare promising venues for screening and early intervention. We previously reported that a computer-facilitated screening and brief advice (cSBA) system for primary care resulted in >40% reduction in past-3-months drinking among USA adolescents, but had no significant effect in the Czech Republic (CZR) where underage drinking is more acculturated (3). The purpose of this study was to assess the effects of the cSBA system on HED in both countries.

Methods

We used a quasi-experimental, before/after comparative effectiveness trial design at nine primary care offices in New England, USA and 10 pediatrician-generalist offices in Prague, CZR. Detailed methods have been published elsewhere (3). Participants were patients presenting for routine care, aged 12–18 years for the USA and 13, 15-, and 17-yrs for CZR. An initial 18-month Treatment-as-Usual (TAU) phase with measurements only was followed by a 1-hour provider training session and an 18-month intervention phase during which the cSBA system was implemented at all sites. Before the medical visit, cSBA participants self-completed a computerized CRAFFT screen (4), received immediate personalized feedback, and viewed 10-pages of scientific information and true life vignettes illustrating the health effects of substance use. Their providers received a report with the screening results and a list of “talking points” designed to prompt 2- to 3-minutes of counseling. The study protocol was approved by the institutional review boards of Boston Children’s Hospital and other New England sites, and by the Charles University Second Faculty of Medicine Ethics Committee (Prague, CZR).

Alcohol use was assessed at baseline and at 3- and 12-months follow-ups using a past-90-day Timeline Follow-Back (TLFB) calendar interview(5). The current analysis examined the number of past-90-days of HED, using the age and gender-specific definitions recommended by the U.S. National Institute on Alcohol Abuse and Alcoholism for children and

adolescents (i.e., for girls, 3 drinks for 9–17 yr-olds and 4 for 18 and older; for boys, 3 drinks for 9–13 yr-olds, 4 for 14–15, and 5 for 16) (6).

HED frequency data were highly skewed, so we dichotomized the outcome variable into past-90-days HED/no HED. We used logistic regression modeling with generalized estimating equations to compute adjusted relative risk ratios (aRRR) for cSBA compared to TAU at each of the two follow-ups, adjusting for the multi-site sampling design and baseline past-90-days HED status, as well as any demographic, peer/family substance use, and visit/provider variables on which the study groups differed at baseline. We stratified results by country and frequency of HED at baseline (none, any, 1–2 days, 3 days).

Results

The U.S.A. sample (N=2106/2435 eligible [86.5%]) had a mean age of 15.8+/-2.0 years, 58.2% were girls and 64.6% were white non-Hispanic. The CZR sample (N=589/589 eligible [100%]) mean age was 15.0 +/- 1.6 years, 47.2% girls and 100% white. Follow-up rates out to 12 months were >70% in the U.S.A. and >80% in the CZR.

Compared to USA youth, CZR youth had over twice the baseline rate of past-90-days HED (28.1% vs. 11.0%, aRRR 2.67; [95% CI 2.19, 3.25]). The HED baseline rates for cSBA and TAU were equivalent for the CZR sample but significantly higher for TAU in the USA. We controlled for this difference in all subsequent analyses (Table 1).

At 3-months, the USA sample showed an apparent cSBA effect size greater than 30% for cSBA vs. TAU, but this was not statistically significant. By contrast, the smaller CZR sample showed a greater than 40% effect, which was significant ($p<.05$). Stratified analyses suggest that cSBA had its optimal effect on those reporting no or low frequency HED at baseline. It had no apparent effect on those reporting 3 or more days of HED during the past-90-days.

Discussion

This study provides preliminary evidence supporting the use of cSBA to reduce the short-term risk of HED among CZR youth, for whom alcohol use is more socially normative. However, responders seemed to be those with either no or low-frequency HED at baseline, suggesting that cSBA is best suited for those who have not established lengthy histories of HED. We were surprised to note a sizeable drop of approximately 50% in HED for the TAU group. This could have been a result of assessment reactivity(7) or a Hawthorne effect of being observed. While cSBA did not have a significant effect among the U.S.A. sample, the apparent effect size of .32 warrants further investigation. The low frequency of HED in the U.S.A. sample may have reduced power. Future studies should employ larger samples and develop and test strategies aimed at bolstering the effect over time.

The study also showed that HED rates in the CZR, where the legal drinking age is 18 and underage drinking is largely tolerated, are double the New England sample, disproving the notion that European youth drink more responsibly than their American counterparts.

Our study had potential limitations. We used a quasi-experimental, non-randomized design. The U.S.A. TAU and cSBA groups were not equivalent at baseline. In fact, the difference at baseline was greater than at 3-months, so even the apparent effect size should be viewed cautiously. However, we did control for baseline data in all of our regression analyses. Our study relied on self-report, which may be prone to recall error and social desirability bias. However, questionnaires were completed on a computer in a private space, and prior studies have shown that computerized self-administered questionnaires are associated with higher adolescent disclosure of sensitive behaviors (8).

This study shows that the cSBA system holds promise as way to prevent onset of HED in a high-risk Czech population. Future studies should test ways to bolster the intervention's effect over time and explore other outcomes and covariates.

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Implications and Contributions

Computer-facilitated alcohol screening and brief advice in primary care is a promising way to reduce the short-term risk of heavy episodic drinking, even in a country like the Czech Republic where youth drinking is strongly acculturated.

Table 1

Comparison of TAU and cSBA group rates of any past-90-day heavy episodic drinking at baseline, 3- and 12-month follow-ups.

New England, USA					Prague, CZR			
N	TAU n (%)	cSBA n (%)	aRRR ^{a,b} (95%CI)	N	TAU n (%)	cSBA n (%)	aRRR ^{a,b} (95%CI)	
Baseline	2096	145 (13.6)	86 (8.4)	0.64 [*] (0.45–0.89)	588	88 (29.7)	77 (26.4)	0.84 (0.59–1.19)
<hr/>								
3 Months Follow-up	1516	96 (12.7)	63 (8.3)	0.68 [†] (0.45–1.03)	516	88 (35.9)	72 (26.6)	0.57 [*] (0.39–0.84)
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Baseline past-90-days HED days								
None ^c	1369	40 (6.0)	34 (4.8)	0.72 (0.42–1.23)	371	30 (17.2)	21 (10.7)	0.52 [*] (0.29–0.92)
Any ^c	147	56 (62.2)	29 (50.9)	0.78 [†] (0.56–1.10)	145	58 (81.7)	51 (68.9)	0.87 (0.72–1.04)
1–2 days ^d	86	27 (54.0)	12 (33.3)	0.59 [†] (0.33–1.04)	78	30 (76.9)	22 (56.4)	0.74 [†] (0.52–1.04)
3 days ^d	61	29 (72.5)	17 (81.0)	1.10 (0.83–1.46)	67	28 (87.5)	29 (82.9)	0.97 (0.81–1.18)
<hr/>								
12 Months Follow-up	1545	102 (13.2)	98 (12.7)	1.09 (0.77–1.56)	532	115 (43.)	109 (41.0)	0.92 (0.71–1.19)
<hr/>								
Baseline past-90-days HED days								
None ^c	1396	52 (7.6)	61 (8.5)	1.06 (0.70–1.62)	389	47 (24.6)	53 (26.8)	1.01 (0.69–1.48)
Any ^c	149	50 (54.9)	37 (63.8)	1.12 (0.85–1.48)	143	68 (90.7)	56 (82.4)	0.93 (0.84–1.04)
1–2 days ^d	83	24 (52.2)	22 (59.5)	1.10 (0.73–1.65)	76	35 (87.5)	26 (72.2)	0.85 [†] (0.68–1.06)
3 days ^d	66	26 (57.8)	15 (71.4)	1.21 (0.84–1.75)	67	33 (94.3)	30 (93.8)	1.00 (0.91–1.11)

[†] p<0.10;

^{*} p<0.05

Abbreviations: HED: Heavy Episodic Drinking defined for boys as 3 drinks on a drinking day for ages 12–13, 4 drinks for ages 14–15, and 5 drinks for ages 16; for girls, 3 drinks for ages 12–17, and 4 for ages 18; TAU: Treatment As Usual; cSBA: computerized Screening and Brief Advice; aRRR: adjusted Relative Risk Ratios.

^aNew England logistic models adjusted for the multi-site sampling design, any baseline past-90-day heavy episodic drinking (HED), age, gender, race, parent education level, type of visit (well visit or other), perceived parent, sibling, and peer substance use, and connectedness to provider. Prague models adjusted for the multi-site sampling design, baseline past-90-day HED days, age, and gender.

^b Adjusted relative risk ratios with TAU as the reference group.

^c“None” models analyzed only participants reporting no past-90-day HED at baseline, while “Any” models included only those reporting any past-90-day HED at baseline.

^dNew England models: Because of small cell sizes in these stratified models, non-significant predictor variables were dropped, leaving only age, sex, and parent substance use in the models.