A School Health Center Intervention for Abusive Adolescent Relationships: A Cluster RCT

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abstract

BACKGROUND AND OBJECTIVES: Few evidence-based interventions address adolescent relationship abuse in clinical settings. This cluster randomized controlled trial tested the effectiveness of a brief relationship abuse education and counseling intervention in school health centers (SHCs).

METHODS: In 2012–2013, 11 SHCs (10 clusters) were randomized to intervention (SHC providers received training to implement) or standard-of-care control condition. Among 1062 eligible students ages 14 to 19 years at 8 SHCs who continued participation after randomization, 1011 completed computer-assisted surveys before a clinic visit; 939 completed surveys 3 months later (93% retention).

RESULTS: Intervention versus control adjusted mean differences (95% confidence interval) on changes in primary outcomes were not statistically significant: recognition of abuse = 0.10 (−0.02 to 0.22); intentions to intervene = 0.03 (−0.09 to 0.15); and knowledge of resources = 0.18 (−0.06 to 0.42). Intervention participants had improved recognition of sexual coercion compared with controls (adjusted mean difference = 0.10 [0.01 to 0.18]). In exploratory analyses adjusting for intensity of intervention uptake, intervention effects were significant for increased knowledge of relationship abuse resources and self-efficacy to use harm reduction behaviors. Among participants reporting relationship abuse at baseline, intervention participants were less likely to report such abuse at follow-up (mean risk difference = −0.17 [−0.21 to −0.12]). Adolescents in intervention clinics who reported ever being in an unhealthy relationship were more likely to report disclosing this during the SHC visit (adjusted odds ratio = 2.77 [1.29 to 5.95]).

CONCLUSIONS: This is the first evidence of the potential benefit of a SHC intervention to address abusive relationships among adolescents.

WHAT'S KNOWN ON THIS SUBJECT: Adolescent relationship abuse (ARA) is prevalent in confidential clinic settings such as school health centers (SHCs) and is associated with poor health outcomes. No evidence-based interventions target reduction of ARA in the SHC setting.

WHAT THIS STUDY ADDS: This study provides the first evidence of the potential benefits of a brief provider-delivered universal education and counseling intervention in SHCs to address and prevent a major public health problem: ARA.

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Adolescent relationship abuse (ARA; physical, sexual, or psychological abuse in the context of a past or present romantic relationship) is associated with injuries, poor academic performance,[1] unintended pregnancy,[2,3] sexually transmitted infections,[4] depression,[5,6] suicidality,[5–7] and substance abuse.[3,5] ARA is not uncommon among adolescents seeking care in confidential settings such as family planning and school health centers (SHCs; comprehensive clinics located within high schools) with lifetime prevalence estimates ranging from 40% to 53%.[8–11] No evidence-based interventions target ARA in the SHC setting.

SHCs represent a unique setting for addressing ARA because of the prevalence of ARA, ease of access to clinical services,[12–14] emphasis on psychosocial assessments during visits, and potential to engage students through peer leaders.[15,16] With health reform legislation, SHCs are an authorized federal program essential for health services delivery for adolescents. SHCs offer the opportunity to reach adolescents experiencing ARA (targeted intervention), identify adolescents at risk for ARA (early intervention), and offer universal education about ARA (primary prevention).

Clinic-based ARA assessment can be a step toward helping youth to recognize abusive behaviors.[17,18] Discussion of ARA during a clinical encounter may enhance adolescents' ability to address such abuse. The School Health Center Healthy Adolescent Relationships Program (SHARP) is a provider-delivered intervention implemented within routine SHC visits. The intervention is universal, inclusive of all genders, sexual orientation, and clinic visit types, addressing a range of abusive behaviors, including cyber dating abuse (the use of social media to abuse a partner).[19,20] This study uses a cluster randomized controlled trial (RCT) design to evaluate the

effectiveness of this brief universal education and counseling intervention to improve adolescents' recognition of ARA, use of resources, and attitudes and behaviors to reduce ARA.

The study's 3 prespecified primary outcomes for the full sample focused on ARA knowledge and attitudes: (1) recognition of abusive behaviors, (2) intentions to intervene, and (3) knowledge of ARA resources. Self-efficacy to use harm reduction behaviors was a secondary outcome. For the subset of patients reporting recent ARA at baseline, additional outcomes were as follows: (1) disclosure of ARA during the clinic visit, (2) recent ARA at follow-up, and (3) use of harm reduction behaviors and use of ARA resources.

METHODS

Description of Intervention and Control Conditions

A team of practitioners, violence prevention advocates, and researchers developed the SHARP clinical guidelines,[21] training slides, and a palm-size brochure that discusses healthy relationships, how to help a friend, and ARA resources. Clinicians and staff at intervention SHCs received a 3-hour training on the SHARP intervention about ARA impact on health and how to introduce the brochure, conduct ARA assessment, and make a warm referral to a victim service advocate (connecting a patient to an advocate via telephone or in person). Provider discussion of healthy and unhealthy relationships is integrated into each clinical encounter with the provision of the palm-size brochure to every patient regardless of reason for visit. Even in the absence of disclosure, patients are encouraged to take extra brochures for friends. SHC providers reported the time required to review the brochure with a student was typically less than a minute but could lead to longer discussions when ARA was disclosed. In addition to the

provider-delivered intervention, each of the intervention SHCs involved their youth advisory boards to organize school-wide outreach events to provide ARA information and encourage students to come to the SHC.

Patients attending control SHCs received usual care (ie, standard social history assessments without specific prompts to assess for ARA). In the event of a disclosure, clinicians and staff followed clinic protocol, including referring to advocacy services. The control SHC youth advisory boards conducted other health- and wellness-related outreach events at their schools.

Sample and Setting

Eleven SHCs in Northern California already part of the California School-Based Health Alliance, in proximity to the California Adolescent Health Collaborative in Oakland, California, were recruited to participate in this study. Several of the SHC schools were participating in the federal Safe and Supportive Schools (S3) project, which involves school climate interventions to reduce bullying and violence, which was accounted for in the randomization via stratification. Two of the clinics shared providers, thus were treated as a single cluster. Cluster randomization was selected as the intervention was available to all patients served by a clinic. Ten clinic clusters were evenly randomized into intervention and control arms by using computer-generated randomization.[22] After randomization and before participant enrollment, 3 schools withdrew when new school administrators determined they did not want the SHC participating in research, leaving 8 SHCs (7 clusters: 4 intervention, 3 control) as the final sample.

This longitudinal study was conducted via baseline and follow-up survey 3 months post intervention. Participants were recruited from September to December 2012; all

follow-up surveys were completed by June 2013. All English- and Spanish-speaking patients ages 14 to 19 years seeking care for any reason in participating SHCs and who expected to be available for follow-up were eligible. Upon check-in for a clinic visit, patients were told about the study, and trained research staff at each SHC screened interested patients for eligibility. Eligible patients were escorted to a private area in clinic for consent and survey administration. The study received a waiver of parental permission.

Survey data were collected via computer with questions read through headphones (Audio Computer-Assisted Self-Interview software). Each participant received a $10 gift card upon baseline survey completion and $15 after follow-up. The survey was available in English or Spanish; all participants opted for English. All study procedures were approved by University of Pittsburgh and Public Health Institute's institutional review boards and reviewed by administrators at respective schools and SHCs. Data were protected with a National Institute of Justice Privacy Certificate.

Clinic staff from all 8 participating SHCs referred patients (n = 1062) to research staff: 1012 consented (95% participation), 1011 completed the baseline survey, and 939 completed the follow-up survey (93% retention; Fig 1). Baseline surveys occurred at the time of clinic visit (and during the fall, before implementation of student outreach activities). Follow-up surveys were conducted at the SHCs at a time convenient for participants; 4% of participants were unable to return to clinic because of moving and completed the survey via e-mail.

Measures

Single items assessed sex, race/ethnicity, grade level, and nativity. Each school's proportion of free lunch was used as proxy for socioeconomic status. SHCs' overall demographic characteristics were obtained from already available clinic data.

The recognition of ARA scale[23] assessed perceptions of abusiveness of relationship behaviors by using a 5-point Likert response from "not abusive" to "extremely abusive" (Cronbach's α = 0.85), modeled as a mean of responses to 10 items. An additional 8 behaviors specific to reproductive and sexual coercion were developed and piloted with the same Likert response as above to assess recognition of sexual coercion, modeled as a mean of 8 items (Cronbach's α = 0.86).

To assess intentions to intervene, participants were presented with abusive behaviors and asked how likely they would be to stop the behavior if they witnessed a peer doing this,[24,25] with 5 responses ranging from "very unlikely" to "very likely" (Cronbach's α = 0.89), modeled as a mean of 9 items.

Knowledge and recent use of ARA resources items measured whether the participant knew about ARA resources (ie, Teen Dating Abuse Helpline, SHC clinical/counseling staff, other hotlines) and whether they had used any of these in the past 3 months, each modeled as a summary score.

The SHARP intervention included discussion of harm reduction to reduce reproductive coercion risk for female participants. Self-efficacy to use harm reduction behaviors was measured with 4 harm reduction behaviors by using a 5-point Likert response from "strongly disagree" to "strongly agree" (Cronbach's α = 0.77). These items were asked of female participants only, and to reduce measurement effect, introduced only at follow-up.

General self-efficacy was measured at baseline by using an established scale, with responses ranging from "not true at all" to "exactly true," scored by using the item means[26] (Cronbach's α = 0.89).

Intimate relationships were defined as "someone you were going out with or hooking up with." Recent (past 3 months) physical and sexual violence were assessed by using 3 items modified from the Conflict Tactics Scales-2[27] and the Sexual Experiences Survey,[28] 1 for physical violence and 2 for sexual violence (with and without the use of force or threats). Any affirmative response was coded as recent physical or sexual violence (Cronbach's α = 0.49).

Recent cyber dating abuse was assessed by using 7 items modified from Ybarra et al[29] and Bennett.[30] Any positive responses were coded as recent cyber dating abuse (Cronbach's α = 0.72).

Recent ARA was a combined variable of any physical or sexual violence or cyber dating abuse in the past 3 months (Cronbach's α = 0.72).

The ARA disclosure outcome was assessed in an exit survey immediately after the SHC visit only in patients who answered affirmatively to a broader branching question "Have you ever experienced an unhealthy relationship or been hurt by a sexual partner?" resulting in a different sample than those who reported recent ARA in the baseline survey.

The study was designed to provide 80% power to detect standardized effects of 0.3, conservatively assuming that outcome-specific variance inflation factors from the cluster RCT design could reduce the planned actual enrollment of 1200 students from 10 clinics into effective sample sizes as low as 378.[31,32]

Analysis

To account for the hierarchical arrangement of the data (up to 2 measurements per student nested within SHCs) and the cluster randomization, survey data analysis methods[33] and multilevel mixed-effects models[34] were employed for statistical inferences. Statistical
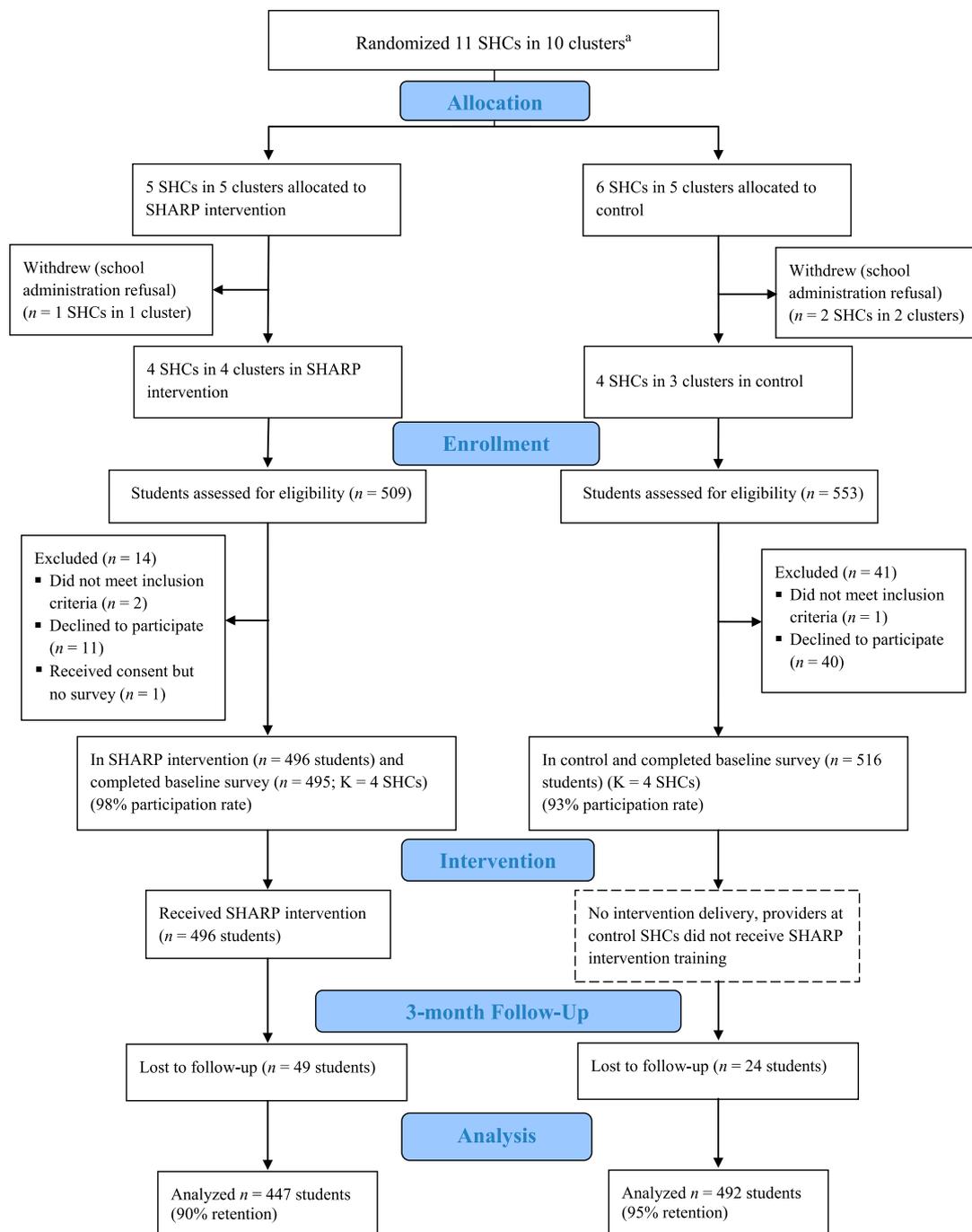
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FIGURE 1
Flow diagram. [a]Two SHCs (both non-S3 grantee schools) combined in 1 cluster because of shared health care providers.

analyses were conducted by using SAS version 9.3 (SAS Institute, Inc, Cary, NC).[35]

Except for the self-efficacy outcome, between-arm adjusted mean differences (AMDs) in over-time changes of continuous outcomes were used to estimate intervention effects (ie, the change in each outcome score attributed to the intervention). Race/ethnicity, sex, grade, US nativity, and school-level socioeconomic status and S3 program participation were included as covariates. All available data were used, with students analyzed according to SHC treatment assignment. Sample size varied slightly across outcomes based on small amounts of missing data (missingness across outcomes ranged from <1% to 4%). Because only a general self-efficacy score was assessed at baseline to reduce potential measurement effect related to querying about specific harm reduction behaviors, intervention effects on self-efficacy to use harm

reduction behaviors were assessed by estimating AMD by using a mixed-effects model that included the baseline general self-efficacy score as an additional covariate.

For victimization outcomes, multinomial logistic regression models for clustered data were used to estimate mean risk difference (MRD) in victimization at follow-up within subgroups (based on recent victimization status at baseline).[36] Only participants with baseline and follow-up data available for these outcomes were included (81% of the baseline sample); this approach was chosen to elucidate the pattern of abuse over time in each arm. For the ARA disclosure outcome, the clustered data multiple logistic regression model used a reduced set of covariates (S3 program participation, age and school-level socioeconomic status along with the binary intervention group indicator) because of small cell sizes.

Posthoc Intervention Intensity-Adjusted Analyses

The SHARP intervention involved providers discussing healthy relationships with patients and providing a brochure about ARA. Exit surveys completed immediately after the visit (by 95% of participants) demonstrated that in the intervention clinics, 69% (range, 63%–79%) reported having a discussion with a provider about relationships and 55% (range, 38%–74%) reported receiving the brochure. In posthoc analyses, intervention participants were assigned a "score" for intervention intensity, with 0.5 assigned if the participant reported no discussion with provider and no receipt of brochure, 0.75 for either provider discussion or brochure, and 1.0 if the participant received both. Intensity-adjusted intervention effects were estimated by substituting the intervention intensity score in place of the binary intervention indicator used in primary analyses.

RESULTS

Demographic Characteristics and Attrition Analyses

Seventy-six percent of the entire sample was female (Table 1). Almost all participants identified as nonwhite (5% white), with no significant differences between intervention and control clinics by race/ethnicity. Schools varied in students eligible for free lunch (37%–79%). Compared with each SHC's demographics, participants were more likely to be female, in higher grades, and self-report as white, African-American, and multiracial/other.

Participants who did not complete the follow-up survey tended to be younger compared with those who completed (P = .09). Noncompleters were more likely to report recent ARA at baseline (63% vs 51%; P = .02). Attrition did not differ significantly

between intervention (10%) and control (5%; P = .12).

Differences in Outcomes of Interest at Baseline

Control participants had lower baseline scores on recognition of abusive behaviors and were more likely to report recent physical or sexual abuse at baseline (16% vs 10%, P = .01) compared with intervention participants. Both arms were similar at baseline on recognition of sexual coercion, and knowledge and use of ARA-related resources (Table 2).

Female participants were more likely to report any recent ARA victimization at baseline (48% vs 35%, $P < .01$), as well as recent cyber dating abuse (45% vs 31%, P = .01) and physical or sexual violence victimization (14% vs 10%, P = .07) than male participants.

TABLE 1 Sample Characteristics at Baseline

Characteristic	Total No. (%)	Intervention No. (%)	Control No. (%)
Sex			
Male	240 (23.7)	120 (24.2)	120 (23.3)
Female	771 (76.3)	375 (75.8)	396 (76.7)
χ^2 P[a]	—	—	.85
Grade			
9	175 (17.3)	96 (19.4)	79 (15.3)
10	229 (22.7)	124 (25.1)	105 (20.4)
11	266 (26.3)	135 (27.3)	131 (25.4)
12	326 (32.3)	133 (26.9)	193 (37.4)
Other	15 (1.5)	7 (1.4)	8 (1.6)
χ^2 P[a]	—	—	.46
Race			
Asian	156 (15.4)	71 (14.3)	85 (16.5)
African American	274 (27.1)	146 (29.5)	128 (24.8)
Hispanic or Latina/Latino	368 (36.4)	168 (33.9)	200 (38.8)
Native American or Pacific Islander	52 (5.1)	28 (5.7)	24 (4.7)
White	52 (5.1)	27 (5.5)	25 (4.8)
Multiracial/other	109 (10.8)	55 (11.1)	54 (10.5)
χ^2 P[a]	—	—	.67
Country of origin			
Born in the United States	869 (86.0)	415 (83.8)	454 (88.0)
Born outside the United States	142 (14.1)	80 (16.2)	62 (12.0)
χ^2 P[a]	—	—	.31
Recent ARA[b]	455 (45.2)	206 (41.9)	249 (48.4)
χ^2 P[a]	—	—	.13
Recent cyber dating abuse	417 (41.4)	189 (38.3)	228 (44.3)
χ^2 P[a]	—	—	.14
Recent physical or sexual abuse in relationship	130 (12.9)	50 (10.1)	80 (15.5)
χ^2 P[a]	—	—	.01

The sample included 1011 participants; 495 in the intervention arm and 516 in the control arm.
[a] Wald Log-Linear χ^2 test for clustered survey data.
[b] Any physical or sexual abuse or cyber dating abuse in the past 3 months in intimate relationships.

TABLE 2 Intervention Effects Among Entire Sample

Study Outcomes[a]	Baseline			Follow-up		Primary Analyses		Posthoc Analyses	
	Intervention, Mean (SD)	Control, Mean (SD)	P[b]	Intervention, Mean (SD)	Control, Mean (SD)	Adjusted Intervention Effect, AMD (95% CI)	P	Intensity Score Effect, AMD (95% CI)	P
Recognition of ARA	3.94 (0.63)	3.87 (0.69)	<.01	4.06 (0.62)	3.90 (0.73)	0.10 (−0.02 to 0.22)	.11	0.06 (−0.06 to 0.17)	.34
Recognition of sexual coercion	4.25 (0.69)	4.22 (0.71)	.57	4.38 (0.66)	4.24 (0.78)	0.10 (0.01 to 0.18)	.02	0.07 (−0.06 to 0.20)	.29
Intentions to intervene	4.03 (0.84)	4.09 (0.82)	.45	4.06 (0.79)	4.07 (0.81)	0.03 (−0.09 to 0.15)	.62	0.02 (−0.10 to 0.13)	.74
Knowledge of ARA resources	1.78 (0.89)	1.74 (0.90)	.82	2.22 (0.86)	2.00 (1.00)	0.18 (−0.06 to 0.42)	.14	0.25 (0.11 to 0.39)	<.01
Use of ARA resources	0.47 (0.57)	0.28 (0.53)	.09	0.57 (0.66)	0.31 (0.58)	0.07 (−0.06 to 0.21)	.30	0.13 (−0.003 to 0.26)	.06
Self-efficacy to use harm reduction behaviors[c,d]	—	—	NA	4.33 (0.64)	4.17 (0.69)	0.09 (−0.42 to 0.61)	.66	0.33 (0.06 to 0.60)	.02

At baseline, the sample included 495 participants in the intervention arm and 516 in the control arm. At follow-up, the sample included 446 participants in the intervention arm and 492 participants in the control arm. NA, not applicable; —, outcome was not measured at baseline.

[a] Intervention effects are adjusted for baseline grade, sex, race/ethnicity, nativity, school-level socioeconomic status (% free lunch), and S3 grant status. Unless otherwise specified, mixed-effects regression models were used to estimate intervention effects as adjusted mean between-arm differences in baseline-adjusted changes, specifying units of analysis as nested within patients nested within clinics (the units of randomization).

[b] Regression models for clustered survey data (via SAS PROC SURVEYREG) were used to compare arms on baseline outcomes, specifying clinics as clusters.

[c] Only assessed in female patients.

[d] Intervention effects were assessed by estimating AMDs by using a mixed-effects model that included the baseline general self-efficacy score as an additional covariate.

Overall Intervention Effects

No differences between intervention and control emerged in intentions to intervene, knowledge of and recent use of ARA-related resources, or self-efficacy to use harm reduction strategies (Table 2). Compared with controls, at follow-up, intervention participants demonstrated greater increases in recognition of sexual coercion (AMD = 0.10 [95% confidence interval (CI): 0.01 to 0.18]).

Intervention Effects by Baseline ARA

Among those reporting recent ARA at baseline, intervention participants demonstrated an increase in recognition of ARA (AMD = 0.14 [0.01 to 0.27]) and knowledge of ARA resources (AMD = 0.26 [0.09 to 0.43]) compared with controls (Table 3). Analyses of intervention effects by sex revealed no significant differences. Among those reporting any lifetime experience of an unhealthy relationship or being hurt by a sexual partner, 36% of intervention versus 22% of control patients reported disclosing to the provider (adjusted odds ratio [AOR] = 2.77 [1.29 to 5.95]).

Fewer intervention participants experiencing ARA at baseline reported ARA at follow-up compared with controls (65% vs 80%; MRD = −0.17 [−0.21 to −0.12]), including cyber dating abuse (62% vs 76%; MRD = −0.15 [−0.22 to −0.09]) and physical or sexual abuse (16% vs 24%, MRD = −0.07 [−0.12 to −0.01]; Table 4). Among participants not experiencing ARA at baseline, the intervention was associated with less likelihood of recent physical or sexual abuse at follow-up (7.3% vs 7.4%; MRD = −0.02 [−0.04 to −0.001]).

Posthoc Intervention Intensity-Adjusted Analyses

Intensity-adjusted intervention effects were associated with increased knowledge (AMD = 0.25 [0.11 to 0.39]) of ARA resources and increased self-efficacy to use harm reduction strategies (AMD = 0.33 [0.06 to 0.60]) among intervention participants compared with controls (Table 2). For ARA disclosure during the clinic visit, the intervention-intensity adjusted odds ratio for the intervention was 9.30 (2.44 to 35.51; results not shown).

DISCUSSION

Findings suggest the potential utility of a brief SHC provider-delivered intervention, which discusses healthy relationships, integrating education, and connection to resources as part of routine care. Changes in prespecified outcomes of ARA knowledge and attitudes for the entire sample were not significant. Exposure to the SHARP intervention was associated with improvements in recognition of sexual coercion, and among youth recently experiencing ARA, improvements in recognition of ARA and knowledge of ARA resources. Disclosure to SHC providers about unhealthy relationships was greater among participants in the intervention clinics. Although the intervention did not have significant effects on use of harm reduction strategies, relative reductions in overall ARA, as well as cyber dating abuse and physical/sexual violence victimization are promising.

The SHCs in this study serve mostly female patients, who reported greater ARA victimization than their male counterparts, consistent with studies that include sexual violence victimization in the measurement of ARA.[37–39] Intervention effects by sex did not differ significantly. Continued attention to similarities and differences in ARA experiences by sex is needed to enhance ARA prevention.

Brief interventions such as SHARP embedded in clinical settings are a promising strategy for prevention and intervention, yet uptake by providers remains an anticipated challenge. Even with focused provider training, only two-thirds of patients in intervention sites reported having a conversation with a provider about relationships and

TABLE 3 Intervention Effects Among Participants Experiencing Recent ARA at Baseline

Study Outcomes[a]	Baseline			Follow-up		Primary Analyses		Posthoc Analyses	
	Intervention, Mean (SD)	Control, Mean (SD)	P[b]	Intervention, Mean (SD)	Control, Mean (SD)	Adjusted Intervention Effect, AMD (95% CI)	P	Intensity Score Effect, AMD (95% CI)	P
Recognition of ARA	3.91 (0.61)	3.90 (0.61)	.84	4.04 (0.59)	3.89 (0.66)	0.14 (0.01 to 0.27)	.04	0.13 (0.01 to 0.26)	.04
Recognition of sexual coercion	4.27 (0.64)	4.27 (0.64)	>.99	4.38 (0.73)	4.25 (0.73)	0.12 (−0.01 to 0.25)	.07	0.09 (−0.09 to 0.26)	.34
Intentions to intervene	3.99 (0.83)	4.10 (0.80)	.36	4.06 (0.75)	4.10 (0.81)	0.06 (−0.09 to 0.21)	.41	0.05 (−0.13 to 0.22)	.61
Knowledge of ARA resources	1.83 (0.92)	1.76 (0.88)	.70	2.30 (0.81)	1.96 (0.97)	0.26 (0.09 to 0.43)	<.01	0.33 (0.13 to 0.53)	<.01
Use of ARA resources	0.59 (0.59)	0.36 (0.60)	.08	0.69 (0.70)	0.36 (0.59)	0.10 (−0.04 to 0.24)	.16	0.14 (−0.02 to 0.30)	.09
Self-efficacy to use harm reduction behaviors[c,d]	—	—	NA	4.35 (0.63)	4.16 (0.73)	0.15 (−0.46 to 0.75)	.56	0.32 (−0.07 to 0.70)	.11
	Intervention, Mean (SD)	Control, Mean (SD)	P[b]	Intervention, Mean (SD)	Control, Mean (SD)	Adjusted Intervention Effect, AOR (95% CI)	P	Intensity Score Effect, AOR (95% CI)	P
Use of any harm reduction behaviors[c,e]	—	—	NA	110 (63.6)	145 (62.2)	1.00 (0.54 to 1.85)	>.99	1.19 (0.60 to 2.35)	.62

The sample of participants experiencing recent ARA at baseline included 206 intervention and 249 control participants at baseline and 178 intervention and 234 control participants at follow-up. NA, not applicable; —, outcome was not measured at baseline.

[a] Intervention effects are adjusted for baseline grade, sex, race/ethnicity, nativity, school-level socioeconomic status (% free lunch), and S3 grant status. Unless otherwise specified, mixed-effects regression models were used to estimate intervention effects as adjusted mean between-arm differences in baseline-adjusted changes, specifying units of analysis as nested within patients nested within clinics.

[b] Regression models for clustered survey data (via SAS PROC SURVEYREG) were used to compare arms on baseline outcomes, specifying clinics as clusters.

[c] Only assessed in female patients.

[d] Intervention effects assessed by estimating AMDs using a mixed-effects model that included the baseline general self-efficacy score as an additional covariate.

[e] Intervention effect estimated as adjusted odds ratio by using a mixed-effects model that adjusted for baseline age, socioeconomic status (% free lunch), and S3 grant status.

even fewer reported receiving the brochure. Posthoc (as-treated) analyses suggest that intervention receipt was associated with increases in knowledge and use of ARA resources, self-efficacy to use harm reduction strategies, and disclosures about unhealthy relationships to SHC staff. Given multiple pressures on providers and time limitations, scaling up provider-based interventions such as SHARP will require attention to system-level changes.[40] Practice-based supports such as electronic health record prompts and involvement of nonclinical staff may facilitate intervention implementation. Additionally, testing the effectiveness of text messaging, computerized interventions, and related strategies is needed to enhance clinic-based assessment and counseling for ARA.

The SHARP intervention also introduced strategies youth could use to help a friend in an unhealthy relationship. Each of the intervention sites had student leaders presenting

TABLE 4 Adjusted Intervention Effects on Recent Abuse Victimization Among Those Who Had and Had Not Experienced Victimization at Baseline

Abused at baseline	Baseline[a]		Follow-up		Primary Analyses		Posthoc Analyses	
	Intervention (n = 172), No. (%)	Control (n = 225), No. (%)	Intervention (n = 172), No. (%)	Control (n = 225), No. (%)	Adjusted Intervention Effect, MRD (95% CI)	P	Intensity Score Adjusted, MRD (95% CI)	P
ARA[b]	172 (100)	225 (100)	111 (64.5)	179 (79.6)	−0.17 (−0.21 to −0.12)	<.0001	−0.21 (−0.27 to −0.16)	<.0001
Cyber dating abuse	156 (90.7)	207 (92.0)	106 (61.6)	171 (76.3)	−0.15 (−0.22 to −0.09)	<.0001	−0.19 (−0.27 to −0.11)	<.0001
Physical or sexual abuse	41 (23.8)	70 (31.1)	27 (15.7)	53 (23.6)	−0.07 (−0.12 to −0.01)	.02	−0.12 (−0.19 to −0.04)	<.01
Not abused at baseline	Intervention (n = 205), No. (%)	Control (n = 217), No. (%)	Intervention (n = 205), No. (%)	Control (n = 217), No. (%)	Adjusted Intervention Effect, MRD (95% CI)	P	Intensity Score Adjusted, MRD (95% CI)	P
ARA[b]	0 (0)	0 (0)	80 (39.0)	83 (38.3)	0.01 (−0.06 to 0.08)	.73	0.03 (−0.05 to 0.10)	.50
Cyber dating abuse	0 (0)	0 (0)	72 (35.1)	81 (37.3)	−0.03 (−0.08 to 0.02)	.30	−0.02 (−0.09 to 0.04)	.43
Physical or sexual abuse	0 (0)	0 (0)	15 (7.3)	16 (7.4)	−0.02 (−0.04 to −0.001)	.04	−0.02 (−0.04 to −0.002)	.03

[a] MRD intervention effects were estimated by using multinomial logistic regression models adjusted for baseline grade, race/ethnicity, nativity, school-level socioeconomic status (% free lunch), sex, and S3 grant status.

[b] Any physical or sexual abuse or cyber dating abuse in the past 3 months in intimate relationships.

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information during lunches and assemblies to encourage students to come to the SHC to learn about ARA. Although youth did report increases in knowledge and use of resources in the intervention arm, no changes in intentions to intervene were observed. Given the effectiveness of bystander approaches in preventing interpersonal violence,[41] further studies are needed to identify how to encourage positive helping behaviors among high school students.

Findings should be interpreted in light of several limitations. As a cluster RCT with a small number of clusters, the study may have been underpowered to assess outcomes. Interval to follow-up was short, precluding examining longer-term clinical outcomes.

Differences in demographics across clinics at baseline, while adjusted for in analyses, may reflect other unmeasured clinic differences left unaccounted. Sites were not well balanced at baseline, with a higher prevalence of ARA in control sites. Intervention implementation varied across sites, and the degree to which participants were exposed to any of the school-wide outreach events is not known. Findings from 8 SHCs in 1 region also cannot be generalized to all US high schools. A larger cluster RCT with a greater number of clusters, more geographically diverse clinics, and longer-term follow-up with assessment of health outcomes is needed.

These limitations notwithstanding, this trial provides the first evidence of the potential benefits of a brief universal education and counseling intervention in SHCs to address and prevent a major public health problem: ARA.

REFERENCES

1. Foshee VA, Reyes HL, Gottfredson NC, Chang LY, Ennett ST. A longitudinal examination of psychological, behavioral, academic, and relationship consequences of dating abuse victimization among a primarily rural sample of adolescents. *J Adolesc Health*. 2013;53(6):723–729

2. Miller E, Decker MR, McCauley HL, et al. Pregnancy coercion, intimate partner violence and unintended pregnancy. *Contraception*. 2010;81(4):316–322

3. Silverman JG, Raj A, Mucci LA, Hathaway JE. Dating violence against adolescent girls and associated substance use, unhealthy weight control, sexual risk behavior, pregnancy, and suicidality. *JAMA*. 2001;286(5):572–579

4. Decker MR, Silverman JG, Raj A. Dating violence and sexually transmitted disease/HIV testing and diagnosis among adolescent females. *Pediatrics*. 2005; 116(2). Available at: www.pediatrics.org/cgi/content/full/116/2/e272

5. Exner-Cortens D, Eckenrode J, Rothman E. Longitudinal associations between teen dating violence victimization and adverse health outcomes. *Pediatrics*. 2013;131(1):71–78

6. Ackard DM, Eisenberg ME, Neumark-Sztainer D. Long-term impact of adolescent dating violence on the behavioral and psychological health of male and female youth. *J Pediatr*. 2007; 151(5):476–481

7. Chiodo D, Crooks CV, Wolfe DA, McIsaac C, Hughes R, Jaffe PG. Longitudinal prediction and concurrent functioning of adolescent girls demonstrating various profiles of dating violence and victimization. *Prev Sci*. 2012;13(4):350–359

8. Miller E, Decker MR, Raj A, Reed E, Marable D, Silverman JG. Intimate partner violence and health care-seeking patterns among female users of urban adolescent clinics. *Matern Child Health J*. 2010;14(6):910–917

9. Rickert VI, Wiemann CM, Harrykissoon SD, Berenson AB, Kolb E. The relationship among demographics, reproductive characteristics, and intimate partner violence. *Am J Obstet Gynecol*. 2002; 187(4):1002–1007

10. Zeitler MS, Paine AD, Breitbart V, et al. Attitudes about intimate partner violence screening among an ethnically diverse sample of young women. *J Adolesc Health*. 2006;39(1):119.e1–119.e8

11. Keeling J, Birch L. The prevalence rates of domestic abuse in women attending a family planning clinic. *J Fam Plann Reprod Health Care*. 2004;30(2):113–114

12. Britto MT, Klostermann BK, Bonny AE, Altum SA, Hornung RW. Impact of a school-based intervention on access to healthcare for underserved youth. *J Adolesc Health*. 2001;29(2):116–124

13. Juszczak L, Melinkovich P, Kaplan D. Use of health and mental health services by adolescents across multiple delivery sites. *J Adolesc Health*. 2003;32(suppl 6): 108–118

14. Gibson EJ, Santelli JS, Minguez M, Lord A, Schuyler AC. Measuring school health center impact on access to and quality of primary care. *J Adolesc Health*. 2013; 53(6):699–705

15. Clayton S, Chin T, Blackburn S, Echeverria C. Different setting, different care: integrating prevention and clinical care in school-based health centers. *Am J Public Health*. 2010;100(9):1592–1596

16. Soleimanpour S, Geierstanger SP, Kaller S, McCarter V, Brindis CD. The role of school health centers in health care access and client outcomes. *Am J Public Health*. 2010;100(9):1597–1603

17. Bair-Merritt MH, Lewis-O'Connor A, Goel S, et al. Primary care-based interventions for intimate partner violence: a systematic review. *Am J Prev Med*. 2014;46(2):188–194

18. Nelson HD, Bougatsos C, Blazina I. Screening women for intimate partner violence: a systematic review to update the U.S. Preventive Services Task Force recommendation. *Ann Intern Med*. 2012; 156(11):796–808, W-279, W-280, W-281, W-282

19. Dick RN, McCauley HL, Jones KA, et al. Cyber dating abuse among teens using school-based health centers [published online ahead of print November 17, 2014]. *Pediatrics*. doi: 10.1542/peds.2014-0537

20. Zweig JM, Dank M, Yahner J, Lachman P. The rate of cyber dating abuse among teens and how it relates to other forms of teen dating violence. *J Youth Adolesc*. 2013;42(7):1063–1077

21. Miller E, Levenson R. Hanging Out or Hooking Up: Clinical Guidelines on Responding to Adolescent Relationship Abuse—An Integrated Approach to Prevention and Intervention. 2012; Development of these clinical guidelines funded by the Department of Justice Office of Juvenile Justice and Delinquency Prevention, the Administration of Children and Families, and the Office on Women's Health. Available at: www.futureswithoutviolence. org/userfiles/file/HealthCare/Hanging-Out-or-Hooking-Up_Low_Res_Cropped_FINAL.pdf. Accessed December 13, 2012

22. Stata Statistical Software: Release 12 [computer program]. College Station, TX: StataCorp LP; 2011

23. Rothman E, Decker M, Silverman JG. Evaluation of a teen dating violence social marketing campaign: Lessons learned when the null hypothesis was accepted. *New Dir Eval*. 2006;110:33–44

24. Miller E, Tancredi DJ, McCauley HL, et al. "Coaching boys into men": a cluster-randomized controlled trial of a dating violence prevention program. *J Adolesc Health*. 2012;51(5):431–438

25. McCauley HL, Tancredi DJ, Silverman JG, et al. Gender-equitable attitudes, bystander behavior, and recent abuse perpetration against heterosexual dating partners of male high school athletes. *Am J Public Health*. 2013;103(10):1882–1887

26. Schwarzer R, Jerusalem M. Generalized Self-Efficacy scale. In J. Weinman, S. Wright, & M. Johnston, Measures in health psychology: A user's portfolio. Causal and control beliefs. Windsor, United Kingdom: NFER-NELSON; 1995: 35–37

27. Straus MA, Hamby SL, Boney-McCoy S, Sugarman DB. The Revised Conflict Tactics Scale: development and preliminary psychometric data. *J Fam Issues*. 1996;171(3):283–316

28. Koss MP, Gidycz CA. Sexual experiences survey: reliability and validity. *J Consult Clin Psychol*. 1985;53(3):422–423

29. Ybarra ML, Espelage DL, Mitchell KJ. The co-occurrence of Internet harassment and unwanted sexual solicitation victimization and perpetration: associations with psychosocial indicators. *J Adolesc Health*. 2007;41(6 suppl 1):S31–S41

30. Bennett DC, Guran EL, Ramos MC, Margolin G. College students' electronic victimization in friendships and dating relationships: anticipated distress and associations with risky behaviors. *Violence Vict*. 2011;26(4):410–429

31. Hsieh FY, Lavori PW, Cohen HJ, Feussner JR. An overview of variance inflation factors for sample-size calculation. *Eval Health Prof*. 2003;26(3):239–257

32. Murray DM, Varnell SP, Blitstein JL. Design and analysis of group-randomized trials: a review of recent methodological developments. *Am J Public Health*. 2004;94(3):423–432

33. LaVange LM, Koch GG, Schwartz TA. Applying sample survey methods to clinical trials data. *Stat Med*. 2001; 20(17–18):2609–2623

34. Murray DM. Statistical models appropriate for designs often used in group-randomized trials. *Stat Med*. 2001; 20(9–10):1373–1385

MILLER et al

35. SAS version 9.3 [computer program]. SAS System for Windows. Cary, NC: SAS Institute, Inc; 2002–2010

36. Spiegelman D, Hertzmark E. Easy SAS calculations for risk or prevalence ratios and differences. *Am J Epidemiol.* 2005; 162(3):199–200

37. Hamby S, Finkelhor D, Turner H. Teen Dating Violence: Co-Occurrence With Other Victimizations in the National Survey of Children's Exposure to Violence (NatSCEV). *Psychology of Violence.* 2012; 2(2):111–124

38. Mulford C, Giordano PC. *Teen Dating Violence: A Closer Look at Adolescent Romantic Relationships.* Washington, DC: NIJ Journal; 2008:261

39. Wolitzky-Taylor KB, Ruggiero KJ, Danielson CK, et al. Prevalence and correlates of dating violence in a national sample of adolescents. *J Am Acad Child Adolesc Psychiatry.* 2008;47(7):755–762

40. Decker MR, Frattaroli S, McCaw B, et al. Transforming the healthcare response to intimate partner violence and taking best practices to scale. *J Womens Health (Larchmt).* 2012;21(12): 1222–1229

41. Banyard VL, Plante EG, Moynihan MM. Bystander education: Bringing a broader community perspective to sexual violence prevention. *J Community Psychol.* 2004;32(1):61–79

ENGAGEMENT RINGS: *A long, long time ago (although not in a galaxy far away) I proposed to my girlfriend, now my wife. We had not shopped for engagement rings, but I had a pretty good idea what she might like – a ring with a small sapphire flanked by two smaller diamonds. What was a distinctly unusual engagement ring in the early 1980s has become much more common.*

As reported by CNN Money (Luxury: November 6, 2014), white diamond solitaire engagement rings are not as popular as they once were. More couples desire non-traditional rings with a colored center stone. Sapphires have become increasingly popular as have rubies and emeralds, while others prefer colored diamonds. The demand for non-traditional rings has, perhaps surprisingly, been fueled by older rather than younger women. Preference for non-traditional engagement rings can be due to a variety of factors. Older women may have a better understanding of who they are and what they want, and do not want to be seen as the same as their girlfriends. Famous women, emulated by women around the world, may opt for sapphire engagement rings just as the much admired future Queen of England has done. Non-traditional rings without an elevated diamond, and having a lower profile, fit better with an active life style. Some are reluctant to buy diamonds that could have come from conflict zones. Of course, it also helps that a sapphire ring costs about half that of a comparable diamond ring.

Still, the single diamond solitaire has not gone out of favor and remains a popular choice. The diamond is durable and more resistant to a lifetime of wear and tear. Furthermore, while some mounts and colors may go out of style, the single diamond is unlikely to ever be entirely out of style. As for my wife's ring, the band itself has had to be refurbished a few times but I am happy to report that she still wears it, and that she reports that the style still suits her well.

Noted by WVR, MD

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