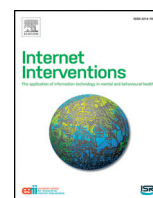


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Online alcohol interventions, sexual violence and intimate partner violence: A systematic review



Robert J. Tait*, Simon Lenton

National Drug Research Institute, Faculty of Health Sciences, Curtin University, Perth, WA 6008 Australia

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ABSTRACT

Background: Sexual and intimate partner violence (IPV) is a leading cause of disease burden, with alcohol use strongly related to these behaviors. Online interventions have been shown to be effective in reducing both alcohol use and some alcohol-related problems. These programs are widely available especially to university students, a particularly high-risk group for sexual or IPV.

Aim: We aimed to systematically review the evidence for the effectiveness of online alcohol interventions in reducing sexual violence or IPV.

Methods: We searched electronic databases (PsycInfo, Embase, Global Health, Medline, CINAHI, Pubmed, and ProQuest) and hand searched key reviews.

Results: From 569 titles, 23 were assessed in detail: five articles (four studies) fulfilled the inclusion criteria. All these studies were undertaken in the USA, with three recruiting college students ($n = 17,332$), and one using an emergency department ($n = 262$) sample of adolescents. We summarized the characteristics of the samples, the interventions and outcomes for alcohol use and sexual violence or IPV. Most interventions were unguided, with only one group receiving a guided intervention. Effect sizes, where they could be calculated, were small (Cohen's $d < 0.2$) or not significantly different to zero for alcohol, sexual violence or IPV outcomes.

Conclusions: Currently, there are insufficient data to evaluate the effectiveness of online alcohol interventions in reducing sexual or IPV. Given the prevalence of these behaviors and their association with alcohol use, this deficit requires urgent attention.

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* Corresponding author at: National Drug Research Institute, GPO Box U1987, Perth, WA 6845, Australia. Tel.: +61 8 9266 1610; fax: +61 8 9266 1611.
E-mail addresses: Robert.Tait@curtin.edu.au (R.J. Tait), S.Lenton@curtin.edu.au (S. Lenton).

1. Introduction

Violence against women is a global health problem and major human rights concern (World Health Organisation, 2013), with intimate partner violence (IPV)¹ and sexual violence being primary components (World Health Organisation, 2005). Definitions of IPV often include not only sexual violence, but also other physical violence and psychological abuse (Jewkes, 2002). In addition to immediate health problems and physical injuries, those who have been subjected to gender based violence are at greatly increased odds of mental health problems including depression, anxiety, post-traumatic stress disorder and substance use disorders, with impaired quality of life and increased levels of disability (Rees et al., 2011). An estimation of the global burden of disease associated with intimate partner violence is currently underway (World Health Organization, 2013), but in Victoria, Australia it was judged the single greatest cause of death, illness and disability in women aged 15–44 years (Victorian Mental Promotion Foundation, 2004). Although perpetrating IPV is common for both genders, assault resulting in injury and, in particular, serious injury is more often committed by men (Straus, 2004).

The nature of the relationship between alcohol consumption and sexual violence is complex and impacts on both perpetration and victimization (Testa and Livingston, 2009). In terms of vulnerability to victimization, heavy episodic drinking, defined as at least four drinks for women, greatly increases the likelihood of being the target of aggression (Wilsnack, 2012), but research suggests that moderate drinking does not increase the odds of experiencing aggression compared to not drinking (Parks et al., 2008). It has been noted that although alcohol use itself does not cause victimization, consumption tends to occur in public settings which leaves consumers more vulnerable to sexual violence (Testa and Livingston, 2009). Heavy episodic drinking by males (defined as at least five drinks) also increases the likelihood of perpetration (Fals-Stewart, 2003): increased levels of intoxication by either person are associated with more severe injuries to the victim (Testa et al., 2004) and with more severe violence occurring when the perpetrator is intoxicated (Testa et al., 2003).

In general, a higher level of education is a protective factor against experiencing sexual violence, although this may be confounded by other factors such as socioeconomic status (World Health Organisation, 2005). Nevertheless prevalence studies conducted in industrialized counties suggest that those undertaking tertiary education are a high-risk group. In the USA, about 5.2% of college women reported being raped in the previous year compared with less than 1% from an age-weighted, but not precisely comparable, national sample (Kilpatrick et al., 2007). Over 28% of college women report rape or sexual assault after the age of 14, with 20% of senior year women being raped or sexually assaulted during their time at college (Koss et al., 1987; Krebs et al., 2009). Similarly high levels of sexual violence are reported from the UK (National Union of Students, 2010). In many of these cases the perpetrators (National Union of Students, 2010) and the victim (Krebs et al., 2009) are under the influence of alcohol.

A 2004 systematic review of sexual assault prevention programs found that although numerous interventions had been trialed, the evidence supporting the effectiveness of programs was weak, with a range of methodological problems identified. These included, small samples, low-risk samples, short-follow-up, inconsistent/peripheral outcome measures and little evaluation of the role of gender on the success of programs (Morrison et al., 2004). Finally, most studies did not use a randomized design. Common risk reduction strategies identified by the review included examination of rape myths, rape deterrence, awareness and self-defense. In addition, elements addressing gender-roles, sexuality and sexual assault education have all yielded positive

effects (Morrison et al., 2004; Vladutiu et al., 2011). However, most positive outcomes have been for measures of attitude or behavioral intentions, with few studies measuring behavioral change (Morrison et al., 2004; Vladutiu et al., 2011). For example, of 11 studies reporting on behavioral outcomes in terms of victimization, only one (9%) reported positive results with 45% reporting positive or mixed results. In contrast of 29 studies that measured knowledge or attitudes, seven (24%) reported positive outcomes and 100% positive or mixed outcomes (Morrison et al., 2004).

University/college students have been shown to drink more than their aged-matched non-student peers (Kypri et al., 2005). Online or computer delivered screening and brief intervention programs targeted at reducing problematic drinking and the associated alcohol-related problems are one means of potentially addressing these issues. These programs have been shown to be effective in general adult populations (Riper et al., 2011), in predominantly student samples (White et al., 2010) and among adolescents/young adults (Tait and Christensen, 2010). The effect size for these interventions is generally in the range $d = 0.2$ – 0.6 with variations attributed to different outcome measures, content, target group, intensity (dose) and venue (home/clinic) (Riper et al., 2011; White et al., 2010; Rooke et al., 2010). These interventions have been effective in improving outcomes relative to control groups for both direct measures (e.g. number of alcohol units consumed per week, blood alcohol concentration) and indirect measures (e.g. academic and social problems) of alcohol consumption (Tait and Christensen, 2010). However, this review combined data from studies that used no treatment controls and minimal treatment controls (e.g. printed leaflets): others have found a trend for larger effects from no treatment control studies than studies that employ a lower intensity intervention (Riper et al., 2014). Supported or guided interventions have been found to be more effective for mental health disorders than unguided programs, but to date, this is still open to question for substance use problems (Riper et al., 2014; Richards and Richardson, 2012).

While this literature supports the effectiveness of online or computer-based brief interventions in reducing alcohol consumption and related problems in general, evidence about the effectiveness of such interventions on violence in particular was the focus of the current systematic review. Thus, we wanted to determine the potential for online or computer-based brief interventions, either in the form of a typical alcohol focused brief intervention alone, or one that incorporates additional elements specifically relating to sexual violence, to reduce the prevalence of alcohol-related sexual violence or IPV. The primary objective of the review was therefore to identify all peer reviewed data on computer based or online interventions to reduce alcohol consumption that also reported outcomes for sexual assault or intimate partner violence. A secondary objective was to determine if any intervention had been assessed in relation to same sex perpetration or female on male IPV.

2. Method

2.1. Search strategy

The electronic databases Ovid (PsycInfo, Embase, Global Health, and Medline), CINAHL, Pubmed and ProQuest (Medicine and Health databases) were searched in August 2013 and updated in January 2015. The search strategy for sexual violence terms was developed from Morrison et al. (2004), and internet or computer related terms from Tait et al. (2013). In brief, the search strategy was (computer OR online OR CD-ROM) AND (alcohol OR alcohol intoxication OR alcohol abuse OR alcohol related problems) AND (rape OR sexual assault OR intimate partner violence OR date rape): Appendix A provides further details of the search terms. English and non-English publications were eligible for inclusion in the analysis. The search was not limited to randomized controlled trials given the potentially small number of studies on the topic.

¹ Non-standard abbreviation: IPV = intimate partner violence.

Searches were limited to peer-reviewed publications from June 2003 to January 2015, where databases had these options. This start date was chosen as the time since the major review by Morrison et al. (2004), to reflect current practices and to capture the expansion of on-line interventions. We chose to exclude the 'gray-literature' (e.g. reports outside the indexed, academic literature) due to time and funding constraints. Interventions had to include outcome measures of changes in alcohol use and outcomes relating to sexual assault (this excluded engaging in unsafe sex or sex that was later regretted but included 'being taken advantage of i.e. sexual events where there was no consent) or IPV. While the introduction focused on male perpetrators in heterosexual relationships, no eligibility restriction was placed on the systematic search. Thus, reports on same sex partner violence, or female-on-male IPV were eligible for inclusion, although no such papers were identified. To check the effectiveness of the search strategy, all the eligible alcohol interventions in three recent systematic reviews were inspected for measures reporting on sexual violence or IPV (Riper et al., 2011; White et al., 2010; Rooke et al., 2010). One new paper was found (Paschall et al., 2006): this did not mention sexual violence in the text, but the author provided a copy of the survey and it was eligible for inclusion. Furthermore, these three reviews only included one alcohol study pre-dating the 2003 cutoff date. Finally, the websites for major online alcohol interventions identified during the review (i.e. AlcoholEdu, CollegeAlc, e-Checkup to go) were searched for supporting studies that also reported the required outcomes.

The risk of bias was assessed and summarized using the criteria for parallel group designs from the Cochrane handbook (Higgins and Green, 2011). Criteria were assessed separately by the authors, with differences subsequently resolved by discussion. Study details were extracted into a form adapted from a prior systematic review of internet interventions (Tait et al., 2013). Where data were available, the effect size was determined with Comprehensive Meta-analysis software (Biostat, 2015). The preferred effect size measure was Cohen's d (post-test intervention mean – post-test control mean / pooled standard deviation). Where multiple outcomes were reported (e.g. frequency of alcohol use, frequency of binge drinking), the mean of their individual effects was calculated. One study reported incident rate ratios which are a direct measure of effect (Hoffmann et al., 2008).

2.2. Sample selection

The search strategy realized 569 papers with Fig. 1 showing the standard PRISMA flow chart (Moher et al., 2009). After the elimination of duplicate and non-peer reviewed publications, 386 items were eligible for further inspection. We eliminated 363 papers after inspection of their titles and abstracts – the first identified reason for exclusion is shown in Fig. 1. Twenty three papers were inspected in more detail. Of these 18 were eliminated as they did not include a measure of sexual violence or intimate partner violence – these papers typically only included items relating to engaging in unsafe sex due to alcohol use.

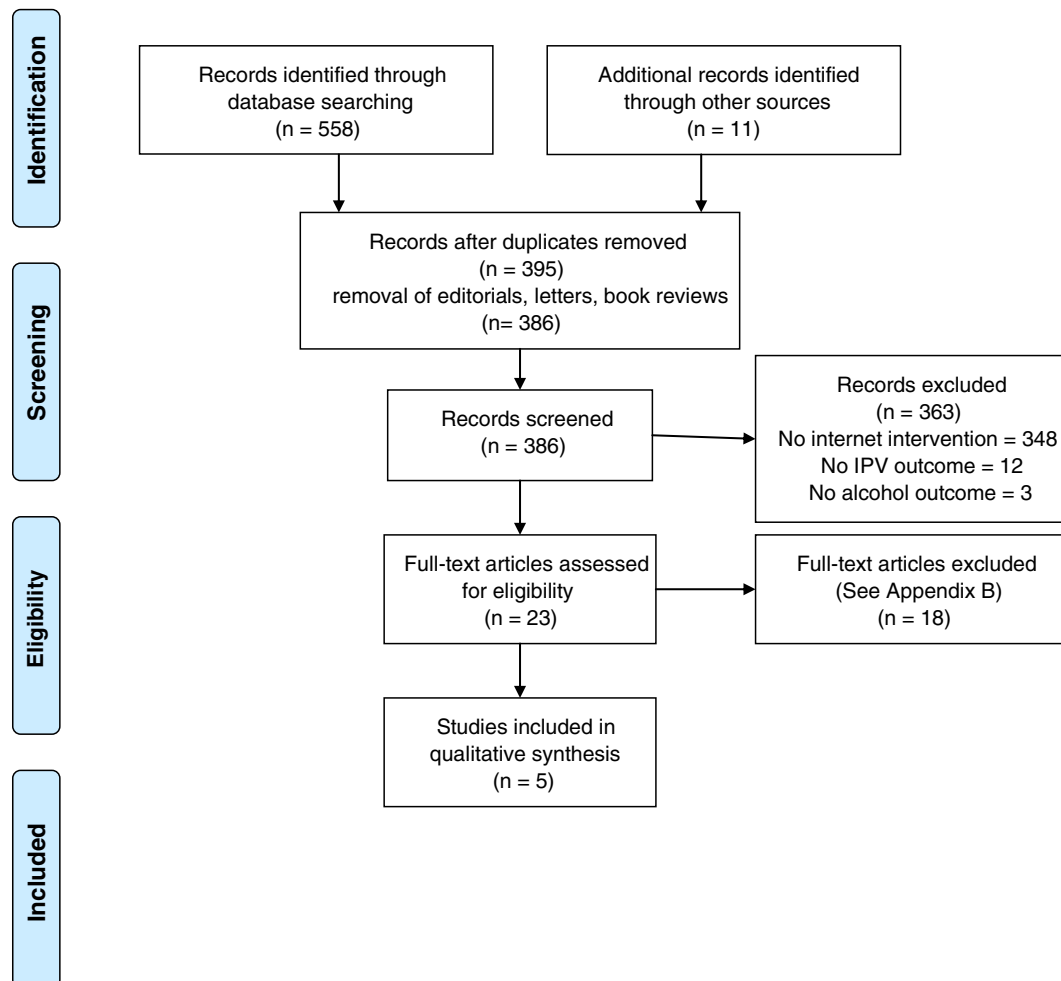


Fig. 1. PRISMA flow chart of study identification and extraction. Footnote: "Other sources" websites for major online alcohol interventions e.g. www.everfi.com/alcoholedu-for-college, www.echeckuptogo.com/ and three recent systematic reviews (Riper et al., 2011; White et al., 2010; Rooke et al., 2010).

Table 1
Characteristics of the eligible studies in the systematic review.

Author, year, country	Target group	% female	Delivery/ recruitment site	Conditions: T = treatment C = control	N per group T = treatment C = control	Dose/no. of sessions	Guided	Sexual violence measure	Alcohol measure	Time post-test in months	% followed-up
Bersamin et al. (2007), USA	1st year students (mean 18.06 SD 0.31 years)	52%	Online/university	T = College Alc C = TAU	T = 310 C = 312	3 h/not reported ^f	U	NARC 'taken advantage of'	Fq use, heavy use, fq getting drunk	3 months	T = 57% C = 62%
Paschall et al. (2006), USA	Teenagers (14–18 years)	65%	PC/hospital ED	T1 = SaFERteensT, T2 = SaFERteensC	T1 = 135 T2 = 131	30 min/1	G	CADRI 'moderate', 'severe'	AUDIT-C, heavy use	3, 6 & 12 months	T-BI = 76% C-BI = 86%
Paschall et al. (2011a,b), USA	1st year students (mean 18.7, SD 0.8 years)	55%	Online/university	C = TAU + leaflet T = AlcoholEdu	TAU = 131 T = 1298	2–3h/2	U	RAPI+ 'victimization'	Fq use, average, heavy, heavy fq	>30 days ~5 months	TAU = 86% T = 45% ^a C = 51% ^a
Wyatt et al. (2013), USA	1st year students (18–22 years)	~66%	Online/university	C = TAU T = AlcoholEdu	C = 1102 T = 14,310 ^a	Not reported/ not reported	U	'Taken advantage of'	Any use, heavy use	≥2 months	C = 51% ^b

AUDIT-C = Alcohol Use Disorders Identification Test — Consumption; CADRI = Conflict in Adolescent Dating Relationships; fq = frequency; G = guided intervention (e.g. some therapist involvement); NARC = negative alcohol related consequences; RAPI+ = Rutgers Alcohol Problem Index + additional alcohol problem items including 'taken advantage of sexually'; SaFERteensT = SaFERteens therapist delivered; SaFERteensC = SaFERteens Computer delivered; TAU = treatment as usual; U = Unguided intervention (no therapist involvement).

^a Mean response rate across 15 colleges: target 200 students/college.

^b Completion rate for AlcoholEdu 72% over six years, outcome survey results from approximately 10% of college population.

^c Number of sessions not reported but contained 5 units.

Two papers reported in-person rather than computerized intervention (Brahms et al., 2011; Stuart et al., 2013); one had no alcohol outcome measure (Salazar et al., 2014); two were purely descriptive (Hallett et al., 2012; Kiene et al., 2009) and one compared outcomes based on stage of change (Schrager et al., 2013) and did not allow comparison for different exposures to intervention (Appendix B). This left five eligible papers.

3. Results

3.1. Search outcomes

Table 1 contains summary details of the five eligible papers, although two papers report on the same study (Paschall et al., 2006; Bersamin et al., 2007). All the studies were based on tertiary student samples (n = 17,332) bar one that recruited adolescent participants in hospital emergency departments (Cunningham et al., 2012) (n = 262): the latter was also the only program to target intimate partner violence rather than sexual violence. This study included a third comparison group who received an intervention delivered by a therapist using the program on a laptop as an aid (n = 135). Three studies (four papers) used parallel group designs with either individual (Cunningham et al., 2012) or cluster randomization (Bersamin et al., 2007; Paschall et al., 2011a,b). The final study used an interrupted time series analysis of colleges that had implemented alcohol programs (Wyatt et al., 2013). The risk of bias assessment (Table 2) noted a low risk of bias on most criteria for the Cunningham et al. (2012) and Paschall et al. (2011a) studies, although in both cases, primary data were reported elsewhere. The main risk of biases associated with the Bersamin et al. (2007) and Paschall et al. (2006) study related to uneven attrition and non-blinding of participants.

3.1.1. Study characteristics — interventions

The “CollegeAlc” program uses theory and research based content, including personalized feedback and normative information. It also addresses key mediators such as behavioral intentions and alcohol expectations (Paschall et al., 2006; Bersamin et al., 2007). The “AlcoholEdu” program covers aspects of drinking norms, the effects of alcohol, laws and policies, goal setting, harm reduction and dealing with alcohol-related problems (Paschall et al., 2011a; Wyatt et al., 2013). The “SaFERteens” study used techniques adapted from motivational interviewing with a non-confrontational and non-judgmental stance, emphasizing choice and self-efficacy (Cunningham et al., 2013). All the interventions were of short-duration, ranging between 30 min and 3 h. To our knowledge, only the SaFERteens program contained components specifically targeting perpetration or victimization of IPV or sexual violence.

3.1.2. Study characteristics — measures

Sexual violence was assessed with the item “taken advantage of sexually” in four papers, but in all but the Wyatt et al. study, this was reported as part of a composite “negative consequences of alcohol use” score, without separating the sexual violence item (Paschall et al., 2006, 2011a; Bersamin et al., 2007; Wyatt et al., 2013). The later Paschall et al. (2011a) study combined “taken advantage of sexually” and “victim of a crime”: the earlier Paschall et al. (2006) and Bersamin et al. (2007) papers report a combined 27 item “negative consequences of alcohol use score”. IPV was assessed with items from the Conflict in Adolescent Dating Relationships Inventory (CADRI) (Wolfe et al., 2001). Moderate IPV was defined as “threw something that could hurt, twisted arm or hair, pushed, shoved, grabbed, or slapped” while severe IPV referenced “punched or hit with something that could hurt, choked, slammed against a wall, beat, burned or scalded on purpose, kicked, or used a knife or gun” (Walton et al., 2009, p. 77–8).

Alcohol use was assessed on a range of dimensions including: frequency of use/any use (last 30 days) (Paschall et al., 2006, 2011b;

Table 2
Risk of bias according to Cochrane criteria for parallel group designs.

Author, year, citation	Selection bias	Performance bias	Attrition bias	Detection bias	Reporting bias
Bersamin et al. (2007), Paschall et al. (2006)	Unclear: "stratified randomization procedure" but method and concealment not specified.	No: participants not blinded.	No: Hispanic students under-represented in final sample. Blacks under-represented among completers in treatment group. Unclear whether attrition greater in treatment vs control groups.	Yes: standardized measures computer administered.	Yes: main focus on drinking status rather than study condition but no differences between treatment & control conditions per se.
Cunningham et al. (2013)	Yes: "randomized by computer generated program".	Yes: all participants received an enhancement or TAU. Investigators blinded to study condition.	No: data are sub-sets of original groups and attrition differs by group at 12 months (86%, 76%, 86%).	Yes: computerized assessments and "investigators were blinded".	Yes: (but primary outcomes reported elsewhere Cunningham et al., 2012).
Paschall et al. (2011a)	Unclear: stratified, clustered random design but method and concealment not specified.	Yes: participants unaware of allocation due to cluster design.	Yes: but low response rate to survey in target population rather than all exposed people.	Unclear: done by an independent survey company, who were provided with 200 'random' students. No details on this randomization.	Yes: (but primary data reported elsewhere, Paschall et al., 2011b).
Wyatt et al. (2013)	NA interrupted time series analysis, not a parallel group design.	-	-	-	-

Yes = low risk bias; unclear = insufficient information to determine risk of bias; no = high risk bias; TAU = treatment as usual.

Bersamin et al., 2007; Wyatt et al., 2013), heavy use (e.g. five or more drinks at a sitting) (Paschall et al., 2006, 2011b; Bersamin et al., 2007; Cunningham et al., 2012; Wyatt et al., 2013; Walton et al., 2010), days of use (last 30 days) (Paschall et al., 2011b), frequency of feeling drunk in the last 30 days (Paschall et al., 2006; Bersamin et al., 2007), frequency of heavy drinking (Paschall et al., 2011b), average drinks per drinking day (Paschall et al., 2011b), drank in the last week (Wyatt et al., 2013), underage drinking (last 30 days) (Wyatt et al., 2013) and alcohol related consequences (Cunningham et al., 2012; Paschall et al., 2011b; Walton et al., 2010). Alcohol use in the hospital intervention was assessed with scores on the 3-item version of the Alcohol Use Disorders Identification Test (AUDIT-C) (Bush et al., 1998) (past year) and with the outcomes reported in companion papers (Cunningham et al., 2012; Walton et al., 2010).

3.2. Effect sizes

With respect to sexual violence outcome measures the AlcoholEdu program by Paschall et al. reported short-term reductions (at 30–45 days) in alcohol-related victimization (rate ratio 0.38, 95% CI .36–.88) (Table 3), but between the Fall and following Spring semester (approximately six months), this effect disappeared (Paschall et al., 2011a). Wyatt et al. (2013) reported that there was no significant decline on the specific sexual violence item after the introduction of the AlcoholEdu program. The CollegeAlc program resulted in a non-significant decline on composite scores (Cohen's $d = 0.16$). However, a sub-analysis found significantly improved composite scores for those who were drinkers at baseline (Cohen's $d = 0.18$) whereas for non-drinkers at baseline, both the intervention and control groups had increased negative consequences at follow-up (Cohen's $d = 0.03$) (Bersamin et al., 2007). SafeRteens reported outcomes at 3, 6 and 12 months. At 12 months those who received a therapist guided intervention reported significantly less victimization ($p = .04$) compared with the control group: this was not replicated for the unguided intervention (Cunningham et al., 2012). However the effects were small for both the guided ($d = 0.15$) and unguided ($d = 0.11$) groups – both of these did not differ significantly from zero. Nevertheless, the authors did report significant benefits from the guided intervention at 3 months (Walton et al., 2010). A sub-analysis was conducted for those who reported IPV, rather than general victimization at baseline, and who thus received an additional intervention on this specific topic (Cunningham et al., 2013). This sub-analysis is not included in Table 3. For those receiving the unguided intervention there were significant declines in moderate IPV (e.g. slapped, shoved, grabbed) at three months (Cohen's $d = 0.12$) and six months (Cohen's $d = 0.18$) but not at 12 months (Cunningham et al., 2013). The guided intervention did not produce significant declines at any time point.

CollegeAlc produced a non-significant mean effect across three alcohol frequency measures (alcohol use, five or more drinks and getting drunk over the last 30 days, Cohen's $d = 0.16$) (Paschall et al., 2006) (Table 4). In the SafeRteens study, neither the guided nor the unguided interventions groups had significantly improved outcomes compared with controls (Cunningham et al., 2012; Walton et al., 2010). The effect sizes for both the guided ($d = -0.08$ i.e. inferior outcomes to controls) and unguided ($d = 0.07$) interventions were non-significant. The initial effect of AlcoholEdu was significant on frequency of alcohol use and 'binge' drinking (mean $d = 0.08$) but no significant outcomes were reported at the next (approximately six months) follow-up (Paschall et al., 2011b). However, the impact of AlcoholEdu has been also assessed with an interrupted time series analysis which suggests that successive waves of implementation with new college entrants have resulted in improvements on these alcohol measures (Wyatt et al., 2013).

Table 3
Baseline and follow-up measures of sexual violence/interpersonal violence (IPV) with effect sizes.

Intervention Author, year, citation, program name	Intervention		Control		Effect size (post test intervention v control)	p value	95% CI
	Baseline mean (SD) or %	Follow-up mean (SD) or %	Baseline mean (SD) or %	Follow-up mean (SD) or %			
Bersamin et al. (2007) & Paschall et al. (2006), CollegeAlc	6.6 (14.3)	6.0 (20.3)	5.8 (11.2)	9.1 (18.8)	1 month $d = 0.16$	0.132	-0.05, 0.36
Cunningham et al. (2012), unguided, SafERteens	43.5	26.1	42.3	30.0	12 months $d = 0.11$ (overall $d = 0.17$)	0.391	-0.14, 0.35
Cunningham et al. (2012), guided, SafERteens	47.6	24.9	42.3	30.0	12 months $d = 0.15$ (overall $d = 0.12$)	0.154	(-0.06, 0.40)
Paschall et al. (2011a), AlcoholEdu	4.2%		3.7%		>30 days IRR = 0.38	0.240	-0.10, 0.39
Wyatt et al. (2013), AlcoholEdu	NR				NR	0.295	(-0.11, 0.35)

NR = not reported.

Overall = combined effect at 3, 6 and 12 months.

4. Discussion

Over the last decade computerized and online brief interventions to reduce alcohol consumption and associated problems have been widely evaluated, especially in tertiary student populations (Riper et al., 2011; White et al., 2010; Rooke et al., 2010). However, this review found that to date, there have been few assessments of their impact on sexual violence or intimate partner violence victimization, and that few of the interventions had substantial components addressing this important issue. These omissions are more surprising in view of the prevalence of sexual violence and IPV suffered by tertiary students and the association between alcohol use, especially heavy episodic consumption, and sexual violence. This systematic review only identified four studies (five peer-reviewed articles) that measured the impact of online alcohol-related interventions on sexual violence or intimate partner violence victimization and even in these papers the interventions did not appear to incorporate substantial components specifically targeting victimization. The SafERteens intervention was the only study to address 'peer violence', where there was a non-significant decline in the perpetration of 'dating aggression', with further data not reported (Cunningham et al., 2013).

The Morrison et al. review made only sparse comment in relation to alcohol or other drug use, for example in promoting the development of coping strategies other than substance use (Morrison et al., 2004). A "meta-review" that focused on sexual assault interventions delivered in colleges in the USA found eight reviews covering 102 papers (Vladutiu et al., 2011). Most of the recommendations summarized by the review focused on the format, content, audience and facilitators of sexual assault prevention programs. Nevertheless, there was a recommendation that programs be combined with alcohol or other drug prevention programs. However, others have noted that currently there are few connections between violence prevention programs and other preventive interventions, including alcohol and other drug programs (Banyard, 2014).

Reviews of online alcohol interventions typically estimate their effects to be in the range of $d = 0.2$ – 0.6 in reducing problematic alcohol consumption (Riper et al., 2011; White et al., 2010; Rooke et al., 2010). However, where effect sizes were reported or it was possible to calculate them for the current studies, these were less than $d = 0.2$ or not significantly different from zero. Sample size estimation for post-test between group comparisons would recommend just under 400 people per group where expected effects are small (e.g. $d = 0.2$) (Cohen, 1992). Therefore, the non-significant findings could be due to 'underpowered' studies or interventions that were not effective. However, there was some evidence of short-term effects that were not maintained over time for both alcohol outcomes (e.g. AlcoholEdu Paschall et al., 2011b) and victimization measures (e.g. SafERteens Walton et al., 2010).

One further potential explanation is that most of the studies were preventive interventions, so the inclusion of abstainers and low consumers could create a floor effect for the interventions. This was in particular noted for a CollegeAlc study where a small increase in alcohol related consequences was found for people who were non-drinkers at baseline (Bersamin et al., 2007). If people were abstainers at baseline, by definition, they could not have alcohol related problems, so at follow-up it would not be possible for them to have "improved" outcomes. However, Hustad et al. (2010) report substantial changes ($d = 0.56$ – 0.75) associated with AlcoholEdu compared to assessment only controls in a similar tertiary sample. Nevertheless, the small changes found in alcohol consumption suggest that it is unsurprising that little change was found for measures of sexual violence or IPV.

In general, guided interventions outperform unguided interventions (Andersson and Titov, 2014). Typical benefits include; the ability of the therapist to make a 'diagnosis' and ensure that the intervention is appropriate; enhanced tailoring of the intervention; increased support which reduces dropout; improved adherence and the ability of a

Table 4
Baseline and follow-up measures of alcohol use with effect sizes.

Intervention		Control			p value	95% CI
Author, year, citation, program name	Alcohol measure	Baseline mean (SD) or %	Follow-up mean (SD) or %	Follow-up mean (SD) or %		
Bersamin et al. (2007), Paschall et al. (2006), CollegeAlc	Fq	1.59 (0.98)	1.64 (0.82)	1.70 (1.09)	0.120	-0.04, 0.37
	Heavy	1.34 (0.88)	1.43 (0.87)	1.41 (0.98)		
Cunningham et al. (2012) (unguided), SaFERteens	Fq drunk	1.31 (0.72)	1.35 (0.64)	1.38 (0.82)	0.600 0.672	-0.18, 0.31 (-0.19, 0.30)
	AUDIT ≥ 3	45.6%	28.9%	47.7%		
	Binge	48.5%	30.3%	54.0%		
	Consequences	43.0%	19.9%	43.4%		
Cunningham et al. (2012) (guided), SaFERteens	AUDIT ≥ 3	50.0%	37.3%	47.7%	0.515 0.781	-0.32, 0.16 (-0.27, 0.21)
	Binge	52.8%	38.7%	54.0%		
	Consequences	48.0%	20.6%	43.4%		
Paschall et al. (2011a), AlcoholEdu	Fq	4.0 (5.2)	3.1 (NR) ^c	3.6 (4.9)	0.040	0.004, 0.16
	Fq heavy	1.3 (2.2)	1.0 (NR) ^c	1.2 (2.1)		
Wyatt et al. (2013), AlcoholEdu	Any	~80%	~60%	NR	NR	NR
	Heavy	~60%	~60%	NR		

Overall = combined effect size of the 3 measures at 3, 6 and 12 months.

^a Mean of 3 alcohol measure (fq use, fq of 5+ drinks, fq getting drunk).

^b Mean of 3 alcohol measures (binge drinking, AUDIT-C, alcohol consequences).

^c Estimated from graph.

therapist to link users with other services (Andersson and Titov, 2014). The SaFERteens intervention was the only one to include a therapist guided intervention. While the generalized estimating equation models used by the study were able to detect a significant decline in victimization at 3 and 12 months (Cunningham et al., 2012; Walton et al., 2010) the estimated effect sizes both at 12 months and overall were small and the confidence intervals included zero. The effects of the unguided intervention were not significant at any time although the effects were of a similar magnitude to the guided intervention. In contrast, a sub-analysis for those who had been victims of IPV, showed improvements from the unguided but not the guided intervention (Cunningham et al., 2013). This anomalous finding could be a result of sample bias – with the sub-group no longer being a random sample. There may also be elements in the additional intervention delivered to this group that were more effective when delivered without human interaction. It is plausible that the adolescents were more embarrassed discussing victimization by a partner than by another person. Among the putative advantages of internet interventions are their privacy and reduced level of stigmatization (Riper and Tait, 2012), so in this instance, the unguided approach could have advantages over the guided method.

4.1. Limitations

Clearly, the main limitation for this review is the dearth of studies on the topic, indicating the formative stage of this field. While systematic data searches were conducted, there is the possibility that relevant trials were missed. The systematic search only covered the period following a major review conducted up to 2003 (Morrison et al., 2004) with the potential that earlier studies were missed even though we also cross-checked recent systematic reviews of online alcohol interventions for earlier articles. Further, many studies report composite negative consequences of alcohol use scores which could include relevant items but which may not have been identified by the search strategy. The 'gray literature' related to the topic was not explored: again this could reveal further research. Two mechanisms for alcohol to impact on sexual violence or intimate partner violence have been identified – a reduction in alcohol use by either the perpetrator or the victim may account for any change (Testa and Livingston, 2009; Abbey, 2011). This issue was not addressed in any of the studies. Finally, an overall effect size was not estimated due to the limited number of trials, their diverse populations, interventions and measures (Deeks et al., 2008).

4.2. Further research implications

Considering the nascent stage of the field, it is worth considering limitations to inform its development. The accuracy of data collected via online tools is open to doubt with few options for validating responses relating to substance use (e.g. blood or other samples Brown et al., 2012) or examining the extent to which personal information is disclosed. However, comparison with data collected via telephone interviews reveals similar patterns of disclosure of substance use and negative consequences (Hines et al., 2010; Parks et al., 2006) although others have reported differences between online and in-person data concerning the perpetration of violence, with greater reporting online (Cornelius et al., 2011). These differences were attributed to participants initially misunderstanding the instructions or a mistake in endorsing the item or subsequently re-conceptualizing the event as non-violent (Cornelius et al., 2011). With respect to measures of alcohol use, some of the commonly used measures, such as the Alcohol Use Disorders Identification Test and 'Timeline Followback method' have already been validated for online data collection (Thomas and McCambridge, 2008; Pedersen et al., 2012).

As noted earlier, it is important for alcohol interventions to identify if reductions in IPV or sexual assault arise out of changes in either perpetrator or victim behavior. Also in relation to alcohol interventions, it has been observed that there is a wide diversity of alcohol consumption

measures, not all of which may have implications for sexual violence. In particular heavy episodic drinking appears to be of importance in both perpetration and victimization (Testa et al., 2004; Foran and O'Leary, 2008). Therefore, these measures should be included and clearly defined in any intervention studies where sexual violence/intimate partner violence is included as an outcome.

In the general IPV literature, the number of studies of male alcohol use and aggression outweigh studies of female use and aggression by nearly six to one (Foran and O'Leary, 2008). None of the included studies provided an analysis of victimization versus perpetration by gender. Further, no information was provided on same sex versus opposite sex relationships. With respect to same sex relationships, the association between alcohol and violence has been documented (Kelly et al., 2011; Klostermann et al., 2011) and treatment for alcohol disorders is associated with improved relationship scores and with preliminary evidence of reduced violence (Klostermann et al., 2011; Fals-Stewart et al., 2009). Given the additional barriers to treatment encountered by minority groups, including sexual minorities (Klostermann et al., 2011), we speculate that online interventions may be a means of providing services to these groups.

While this review focused on the use of online approaches with direct impacts on sexual violence or IPV, this medium can also be used to improve outcomes for those who have been subjected to violence. Notable examples of this is the use of continuing medical education programs to improve treatment services for this group (Short et al., 2006), and online interventions for depression, anxiety and post-traumatic stress disorder for potential comorbidities in this population (Amstadter et al., 2009). There is also the potential for other 'non-treatment' approaches to confer benefits. For example, initial findings have shown reduced level of symptomology at 6 and 12 months for users of internet support groups for those with depression (Griffiths et al., 2012). However, we are unaware of any evaluation of this approach for survivors of IPV or sexual violence.

In developing online alcohol screening and brief intervention programs, there already existed considerable evidence for the effectiveness of this approach using face-to-face interventions (Moyer et al., 2002). In contrast, the Morrison review of sexual assault prevention interventions identified many promising strategies and programs but found that rigorous evaluations were scant (Morrison et al., 2004). This conclusion was reiterated by the World Health Organization in 2010 (World Health Organization, 2010). Thus, presently it is difficult to recommend a specific program to serve as a model to adapt for online delivery. Nevertheless, one of the strategies identified by the WHO was the reduction in the availability and harmful use of alcohol (World Health Organization, 2010). Given that alcohol screening and brief intervention programs are recommended for people with lower levels of 'problematic drinking' (e.g. before the development of clinical dependence), this suggests that online interventions could play a valuable role in reducing both victimization and perpetration.

4.3. Conclusions

Although brief online interventions for alcohol use have become well-established, particularly in tertiary student settings, little assessment has been conducted of their use in reducing sexual violence or IPV either in this population or more broadly. Furthermore, most brief alcohol interventions do not appear to specifically address the issue of sexual violence or intimate partner violence. This is the case despite the high prevalence of sexual violence, particularly among female university/college students, even though most of the research in this field is based on college or university samples. Ideological impediments to acknowledging alcohol as a risk factor in sexual violence or IPV have been identified (Foran and O'Leary, 2008). These stem from a reluctance to diminish the responsibility of the perpetrator: this reluctance is likely to be exacerbated in the case of interventions targeting heavy episodic drinking by potential victims (Testa and Livingston, 2009; Foran and

O'Leary, 2008). Nevertheless the prevalence of sexual violence and IPV makes the evaluation of the effectiveness of alcohol interventions in diminishing sexual violence a research priority.

4.4. Recommendations

Online interventions have the potential to reach many people who would like to but who are currently unable or unwilling to access conventional treatment. In-person screening and brief intervention programs are often implemented opportunistically, in non-treatment seeking groups (Moyer et al., 2002): an approach that online interventions are ideally placed to emulate. However, caution should be exercised in generalizing findings from tertiary students to either the general population or specific minority groups. Where the use of online alcohol interventions is widespread, such as in USA colleges, leaders and health professionals at tertiary institutions should instigate pragmatic data collection of their impacts on measures of IPV or sexual violence. Currently, there is not enough known about these critically important outcomes. Development and evaluation of specific sexual violence or IPV prevention modules in brief online and computer-based alcohol interventions should be considered as a means of increasing the effect size associated with these interventions. However, this may require the separate development of online behavior change programs targeting perpetrators, victims and as recently evaluated, 'bystanders' (Salazar et al., 2014).

Declaration of competing interests

The authors have no conflicting interests to declare with respect to this paper.

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Appendix A. Supplementary data

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