



# Review: Web-based brief interventions for young adolescent alcohol and drug abusers - a systematic review

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## Abstract

**Background** Adolescents' use of alcohol, cannabis and other psychoactive substances has significantly increased in European countries. Parallel to this web-based screening and brief intervention have been disseminated. An important question is if it is based on evidence for effect? Therefore, the aim of this review is to evaluate the evidence for effect.

**Method** A systematic literature search was performed on randomised trials in the following databases: MEDLINE, the Cochrane Central Register of Controlled Trials (CENTRAL) and EMBASE – supplemented by hand search. The target group of young adolescents was defined as 16 to 18 years old.

**Results** Overall, 35 papers were identified as randomised trials on web-based screening and/or intervention concerning alcohol and drug among young people; however the only identifiable randomised trial to evaluate the young adolescents was a published protocol describing an ongoing study.

**Conclusion** Young adolescents might benefit from web-based screening and brief intervention on alcohol and drugs; however an effects remains to be established in high quality studies.

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## Introduction

Adolescents' use of alcohol, cigarettes, cannabis and other psychoactive substances has significantly increased in European countries since the 1990s (1). The use of alcohol, cannabis, or both, can have severe consequences for adolescents and young people in different domains, including health problems, intentional injuries, traffic violation, early sexual activity, sexual and/or physical abuse (2). Early onset of alcohol use is also a major risk factor for later alcohol dependence or alcohol use disorder (3-5). Similar to alcohol, cannabis consumption in adolescence can also affect the brain development and have long-lasting behavioural consequences that involve dependence. Other health issues are chronic bronchitis and related histopathological changes, impairments of attention and memory as well as dependence (6). Cannabis use is associated with later depression, increased likelihood for psychosis development and might lead to the use of more harmful drugs in vulnerable subjects (7;8). Finally, the combined use of psychoactive substances holds specific dangers, such as an increased severity of effects and heightened toxicity, depending on certain characteristics of the user

like existence of tolerance, the route of administration and the quantity and purity of drugs (1).

One especially well-established approach in the field of hazardous alcohol consumption are brief interventions. Internationally, there is a large body of research on brief intervention approaches in alcohol-abusing adults (9;10). While positive research results on brief interventions in heavy drinking adults are abundant, research focusing on brief interventions for adolescents with alcohol or other drug problems has been scarce. This is surprising given the fact that such studies have been called for since the mid nineties (11). But in the last few years, the body of evidence in this area has increased (12-14); although these findings are limited by small sample sizes.

Interestingly, the web-based models of brief intervention for young poly-drug users have been widely disseminated; especially targeting the young adolescents consuming alcohol and cannabis. The question that still remains is if these models are supported by evidence for the young adolescents between 16-18 years of age? The aim of this systematic review



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was therefore to assess the effect of web-based brief intervention for this group of drug and alcohol abusers in randomised designs.

### Method

#### Search methods

The literature search was performed in the following databases: MEDLINE, the Cochrane Central Register of Controlled Trials (CENTRAL) and EMBASE. The search strategy included adolescent\* OR young OR teenag\* OR child\* OR high school OR freshmen AND Alc\* OR Beer OR Wine OR Spir\* OR Liq\* OR Breezer\* OR ethanol OR Drug\* OR narco\* OR medic\* OR Cannabis Or Extacy OR amphetamin\* OR heroin\* OR morphin\* OR Opiat\* OR hallucinog\* OR Cocain\* OR Substance\*OR Abus\* OR misus\* OR depend\* OR addict\* OR intox\* OR ebbie\*AND Web\* OR online OR Computer-based OR inter-active AND Brief Intervention OR Motivational interview\* OR Stages of change OR Changing process AND Outcome\* OR Effect\* OR Follow-up OR Withdrawal OR Abstinence OR Reduct\*. The last updated search was performed 28 Nov 2013. No time or language restrictions were set.

Full paper articles, abstracts as well as study protocol were considered. Titles and abstracts were screened to exclude any clearly irrelevant papers as well as duplicate papers. All potentially relevant papers, abstracts and protocols were assessed in accordance with the inclusion and exclusion criteria. Also reference lists and related articles from the included papers were hand-search to identify other relevant studies.

#### Inclusion/Exclusion

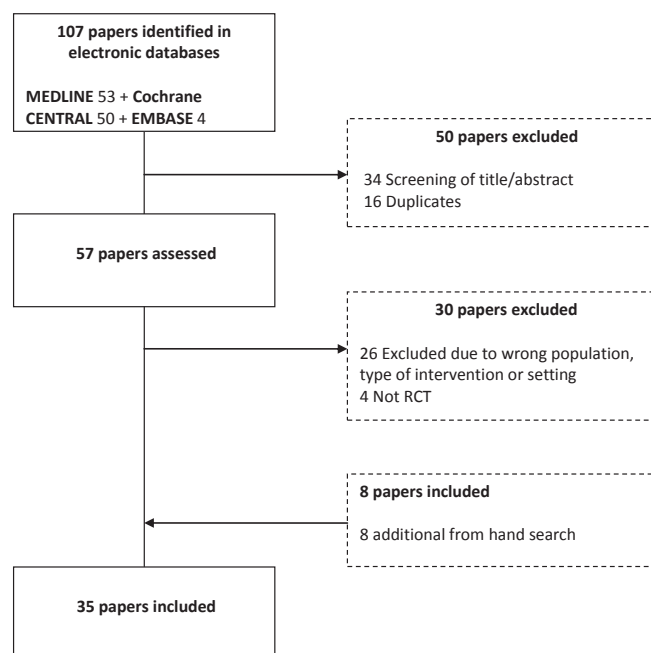
Only randomised clinical trials (RCTs) were included. The target group was the young adolescents aging 16-18 years. Studies including young or adolescent drug users/abusers and alcohol abusers were considered. Non-randomised trials, reviews and other types of secondary literature were excluded. Other exclusion criteria were wrong population (e.g. adults), type of intervention (e.g. smoking cessation) or setting (e.g. not web-based). Studies were included if they provided data on the population and age, description of the web-based alcohol and/or drug intervention and comparator(s) and adequately reported alcohol/drug outcomes at follow-up. Interventions of interest were web-based brief alcohol and/or drug interventions focusing on moderation or cessation of their problematic substance use. Comparators could be screening or assessment only or other types of interventions (e.g. leaflets, in-person brief interventions).

### Results

#### Search outcome

The database search resulted in 107 papers of which 16 were duplicates. Fifty papers were excluded after screening of titles and abstracts, while another 8 papers were included after hand search. A total of 57 full article papers were assessed according to the inclusion and exclusion criteria (see trial profile in figure 1). A total of 35 papers were included in the review (15-49).

Figure 1 Trial profile



#### Study characteristics

Characteristics of the 35 RCTs are presented in table 1 (Appendix). The majority of the studies originated from the United States (n=24). The remaining were from New Zealand (n=4), the Netherlands (n=3), Sweden (n=2), United Kingdom (n=1) or multiple countries (n=1). The trials were published from 2004 to 2013. The 35 studies had a total of 21,433 participants (ranging from 17 to 5,227). Most studies were conducted among college or university students. The age range was from 14 to 29 years, and only one paper (a protocol) matched our specific criteria regarding the target group at 16-18 years of age (15). Four study protocols were included; three concerning web-based alcohol interventions (24;45;46) and one poly-drug intervention programme (15). Among the 31 full papers articles, one trial focused on marijuana use exclusively (30) and the remaining were web-based brief alcohol interventions. The most common comparator was assessment/screening only. Follow-up was conducted after 4 weeks (n=16), 6 weeks (n=1), 2 months (n=4),



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3 months (n=10), 5 months (n=2), 6 months (n=11), 12 months (n=5), 18 months (n=1) and 24 months (n=1). In 23 trials the patients were compensated for participation in terms of money, vouchers, course credit or entry to a lottery.

### Alcohol and drug outcomes

Eight trials found no effect of the interventions on alcohol outcomes (16-19;33;34;44;47). The remaining trials found significant reductions in alcohol intake or alcohol-related consequences, but in some the effect was limited to specific subgroups (21;38;41) or secondary outcomes (39;40). Finally, the effect of web-based personalised feedback on marijuana use was only significant for the selected group having a family history of drug problems (30).

### Discussion

Evidence for the effect on alcohol and drug outcomes following brief interventions was mixed, and none of the included studies specifically assessed the effect among the 16-18 year olds, except for one ongoing trial targeting poly-drug use among teenagers (15). This project WISEteens ("Web-based Screening and Brief Intervention for Substance using Teens") aims at reducing these risks by creating and evaluating a web-based brief intervention (web-BI) that will motivate adolescents with risky consumption patterns to moderate or cease their problematic substance use, and to seek referral to treatment if necessary.

Also, since most of the studies were conducted among older college or university students, generalisation of the effect to adolescents is not straightforward. The major methodological problem in all the web-based studies was that the alcohol and drug outcomes were self-reported without further validation. This may have damaged the validity of the results, especially since underreporting of alcohol and drug use is common in general, and increasing with higher consumption (50). Thus, the underreporting may not influence the intervention and control groups similarly. Validation may be improved by attendance or follow-up visits that allow for the use of biochemical validation, the risk of course being a lower follow-up rate due to extra time spent and unwillingness to for example provide blood or urine tests.

The effectiveness of internet-based psychotherapeutic interventions in general was most recently examined in a meta-analysis by Barak and colleagues (51). The authors included 92 studies involving 9,764 clients treated for a variety of problems, and reported an overall medium effect size. For substance use problems, literature

on web-based interventions is only just evolving. Copeland & Martin found signs of effectiveness of web-based interventions in this specific area (52). In a more recent investigation, only one of 10 studies matched inclusion criteria and could not prove efficacy, although the authors found that web-based interventions were generally well received (53). In contrast to this, another review that included 17 studies focused on internet- and computer-based interventions for college drinking, found promising results for web-based approaches to substance consumption reduction (54).

Computer-based intervention seems attractive for young people, because screening and brief intervention in health care are often limited by constrained resources. A qualitative study identified several barriers that complicate screening for young people's problematic substance use in primary care: insufficient time, lack of training in how to manage a positive screen, insufficient time to manage a positive result during the visit, lack of treatment resources and tenacious parents who would not leave the room for a confidential discussion (55). Adolescents report concerns regarding confidentiality, lack of information about services, unsuitable appointments and opening times, unfriendly environment and staff, difficult access due to geographical barriers, language barriers and difficulties to obtain parental consent (56). In a European study, factors were identified that lowered adolescents' access to primary care: older age (than aged 8-11), lower level of parental education, and lower socioeconomic status (57). Due to these barriers to health care for adolescents or vulnerable subgroups of adolescents, alternative and low-threshold ways of delivering screening and brief intervention could be attractive. However, this review has shown that evidence has to be established on the effect for young adolescents with alcohol and drug abuse through high quality studies with sufficient validation of the outcomes.

In conclusion, young adolescents might benefit from internet-based screening and brief intervention on alcohol and drugs; however, randomised trials have not yet been performed for this important group.

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### Contributions details

HT and HS designed the study, HT and BP performed the research, collected and analyzed data, HT and BP wrote the paper, and HT, HS and BP edited the paper.

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# The deadline for submitting nomination to the HPH Awards has been postponed to February 16<sup>th</sup>, 2014

As decided by the HPH General Assembly and HPH Governance Board, the HPH awards will again be handed out at this year’s HPH Conference. The purpose of the HPH awards is to promote HPH visibility, recognize extraordinary fulfilment of WHO standards, recognize extraordinary fulfilment of strategic goals and improve the number of published scientific articles.

The HPH awards are given in three categories:



### International HPH Award - Outstanding Fulfilment of WHO HPH Standards

(NB: Only Hospital/HS members eligible for nomination in this category)



### International HPH Award - Outstanding Fulfilment of HPH Strategy

(NB: Only Nat/Reg HPH Networks eligible for nomination in this category)



### International HPH Award - Outstanding Scientific Publication

(NB: Only an author/group of authors eligible for nomination in this category)

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### Last year’s winners were:

#### Outstanding Fulfilment of WHO HPH Standards:

Changua Christian Hospital

#### Outstanding Fulfilment of HPH Strategy:

Taiwan HPH Network

#### Outstanding Scientific Publication:

“The Influence of Antonovsky’s sense of coherence on admission and psychosocial functioning” by Walter Grassmann, Hartmut Berger & Oliver Christ



Last year’s winners in Gothenburg, Sweden.



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Appendix: **Table 1** (1 of 3) Characteristics of 35 web-based alcohol and/or drug interventions in RCT designs

Study	Population age (mean / range)	Web-based Intervention	Comparator(s)	F-U rates (months)	Compensation	Alcohol/Drug Outcomes (significant results)
1) Arnaud et al. 2012 PROTOCOL (4 EU countries)	800 adolescents, 16-18 y	Motivational Alcohol and Drug Feedback	Assessment only	3 m	Lottery to win IT equipment	Plan to compare frequency and quantity, consumption per occasion
2) Barnett et al. 2007 (USA)	225 college students, 18.8 y	Alcohol 101 session	Brief Intervention	3 m: 95% 12 m: 95%	Max \$95	No effect on alcohol problems
3) Bendtsen et al. 2012 (Sweden)	5,227 university freshmen, unknown age	Routine practice assessment	Assessment only Feedback only	2 m: 45%	Lottery to win cinema tickets	No differences between the groups on alcohol parameters
4) Bersamin et al. 2007 (USA)	622 college freshmen, 18 y (18-20)	College Alc	Assessment only	3 m: 59%	Max \$100	Reduction in heavy drinking, drunkenness and alcohol-related consequences
5) Bewick et al. 2008 (UK)	506 university students, 21.29 y	Feedback on alcohol	Assessment only	3 m: 63%	Printer credit values (max. £225)	No effect on units of alcohol/week or for CAGE scores
6) Butler & Correia 2009 (USA)	84 college students, approx 20 y	Single session alcohol intervention	Face-to-face intervention Assessment only	1 m: 100%	Credit + raffle for a \$50 prize	No differences in recidivism between groups
7) Carey et al. 2009 (USA)	198 college students, 19.2 y	Alcohol 101 plus	Brief intervention	1 m: 96% 6 m: 72% 12 m: 70%	Monetary compensation	The intervention reduced quantity and frequency
8) Croom et al. 2009 (USA)	3,216 college students, 17-19 y	AlcoholEdu course	Knowledge test Postcourse survey	1 m: 56%	Lottery to win tickets	Alcohol-related harm was not lower in the intervention group, except for playing drinking games
9) Doumas & Hannah 2008 (USA)	124 from a workplace, 18-24 y	Check Your Drinking	Assessment only	1 m: 63%	Movie tickets or monetary compensation	Lower levels of drinking in the intervention group
10) Doumas et al. 2009 (USA)	135 college students, 19 y (18-24)	Normative feedback on drinking	None	1 m: 88%	None stated	Lower weekly drinking quantity, peak intake, and intoxication in the intervention group
11) Elgán et al. 2012 PROTOCOL (Sweden)	183 adolescents, 15-19 y	web-ICAIP	Access to support groups (TAU)	2 m: - 6 m: -	None stated	Plan to compare frequency and quantity
12) Hendershot et al. 2010 (USA)	200 college students, 20.2 y	Genetic alcohol feedback	Attention-control feedback	1 m: 90%	None stated	Significant reductions in drinking frequency and quantity
13) Kypri et al. 2004 (New Zealand)	167 university students, 17-26 y	Normative feedback on alcohol	Leaflet only	6 w: 80% 6 m: 70%	Lunch voucher (NZ \$4.95)	The intervention reduced hazardous drinking
14) Kypri et al. 2008 (New Zealand)	576 university students, 17-29 y	Personalised alcohol feedback	Leaflet only	6 m: 84% 12 m: 82%	Lunch voucher (NZ \$4.95)	The intervention reduced hazardous drinking, and the effect lasted 12 months
15) Kypri et al. 2009 (New Zealand)	2,435 undergraduates, 17-24 y	Motivational alcohol feedback	Screening only	1 m: 78% 6 m: 65%	Chance to win gift vouchers (NZ \$40)	Screening and intervention reduced drinking in undergraduates
16) Kypri et al. 2013 (New Zealand)	17 university students, 17-24 y	Personalised feedback	Screening only	5 m: 79%	Chance to win a NZ \$500 prize	Web-based screening and brief intervention reduced hazardous and harmful drinking
17) Lee et al. 2010 (USA)	341 college students, 17-19 y	Personalised feedback on marijuana use	Assessment only	3 m: 95% 6 m: 94%	Max \$105	Intervention effected only those with a family history of drug problems



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Appendix: **Table 1** (2 of 3) Characteristics of 35 web-based alcohol and/or drug interventions in RCT designs

Study	Population age (mean / range)	Web-based Intervention	Comparator(s)	F-U rates (months)	Compensation	Alcohol/Drug Outcomes (significant results)
18) Lewis and Neighbors 2007 (USA)	316 freshmen university students, 18,53 y	Normative alc. feedback (gender specific or neutral)	Assessment only	1 m: 89% 5 m: 85%	Max \$150	Results showed efficacy of the computer delivered intervention
19) Lewis et al. 2007 (USA)	85 university students, 20.1 y	Freshmen-specific personalised feedback	Assessment only	3 m: 94% 5 m: 85%	None stated	Reduced perceptions of typical freshmen drinking behaviour and personal drinking behaviour
20) Maio et al. 2005 (USA)	329 injury patients, 14-18 y	Program on alcohol misuse	Assessment only	3 m: 91% 12 m: 86%	Max \$50	No effect on alcohol misuse
21) Moore et al. 2005 (USA)	116 college students, 18-25 y	Binge drinking prevention	Postal leaflet only	1 m: 81/68 %	Course credit + max \$10	No differences on outcome measures
22) Murphy et al. 2010 (USA)	74 from student health centre, 21.2 y + 133 freshmen, 18,3 y	BASICS BASICS + Check Up to Go	Alcohol 101 Plus Assessment only	1 m: 97/91/89 84/93%	Max \$25	Effect on typical weekly and heavy drinking compared to assessment only
23) Neighbors et al. 2004 (USA)	252 university students, 18.5 y	Normative feedback on drinking norms	Assessment only	3 m: 79% 6 m: 82%	Course credit + max \$40	Effect on changing perceived norms and alcohol consumption
24) Neighbors et al. 2006 (USA)	214 university students, 19.7 y	Normative feedback	Assessment only	2 m: 86%	None stated	Effect on drinks per week
25) Neighbors et al. 2009 (USA)	295 college students, 21 y	Personalised feedback before 21st birthday	Assessment only	1 m: 96%	None stated	Drinking intentions moderated the effect; effective in those intending drinking to intoxication
26) Neighbors et al. 2010 (USA)	818 freshmen students, 18.7 y	Gender-specific versus gender-nonspecific normative feedback	Attention control only	6 m: 92% 12 m: 87% 18 m: 84% 24 m: 81%	Max \$135	Modest effects on weekly drinking and alcohol-related problems but not on heavy episodic drinking
27) Neighbors et al. 2012 (USA)	599 college students, 21 y	BASICS interventions (web/friend/in-person)	Attention control only	1 m: 91%	Max \$80	Web-based interventions varied by drinking outcome and whether a friend was included
28) Palfai et al. 2011 (USA)	119 university students, 18.6 y	Alcohol feedback + Motivational assessment	Alcohol feedback Motivational assessment Screening only	1 m: Unknown	None stated	Lower alcohol use and heavy drinking episodes for those with most alc consequences
29) Paschall et al. 2011 (USA)	200 first year students > 18 y	College Alc	Assessment	1 m: 56/63 %	\$10	A beneficial short-term effect on hazardous drinking behaviour
30) Saitz et al. 2007 (USA)	408 college students, > 18 y	Individualised minimal brief intervention	Extensive individual brief intervention	1 m: 75%	\$50 gift certificate	Unhealthy alcohol use decreased after brief intervention
31) Spijkerman et al. 2010 (Netherlands)	575 adolescents, 15-20 y	Brief intervention + normative feedback	Brief intervention Assessment only	1 m: 56% 3 m: 48%	None stated	No effect was found for alcohol use or moderate drinking
32) Voogt et al. 2011 PROTOCOL (Netherlands)	908 college students, 18-24 y	What Do You Drink (WDYD) brief intervention	Assessment only	1 m: - 6 m: -	None stated	Plan to compare weekly consumption, binge drinking



## Research and Best Practice

Appendix: **Table 1** (3 of 3) Characteristics of 35 web-based alcohol and/or drug interventions in RCT designs

Study	Population age (mean / range)	Web-based Intervention	Comparator(s)	F-U rates (months)	Compensation	Alcohol/Drug Outcomes (significant results)
33) Voogt et al. 2012 PROTOCOL (Netherlands)	750 low-educated adolescents, 15-20 y	What Do You Drink (WDYD) brief intervention	Assessment only	1 m: 6 m:	None stated	Plan to compare weekly consumption, binge drinking
34) Walters et al. 2009 (USA)	279 university students, 19,8 y	Personalised feedback	Motivational interview +/- feedback Assessment only	3 m: 90% 6 m: 86%	Course credit	Personalised feedback did not reduce drinking outcomes
35) Weitzel et al. 2007 (USA)	40 college students, 19.2 y	Daily messaging on alcohol-related consequences	No messaging	2 w: 100%	None stated	A small but positive effect on alcohol-related attitudes and behaviours