

ORIGINAL ARTICLE

A 9-month follow-up of a 3-month web-based alcohol treatment program using intensive asynchronous therapeutic support

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Abstract

Background: Web-based alcohol interventions have demonstrated efficacy in randomized controlled trials. However, most studies have involved self-help interventions without therapeutic support. **Objectives:** To examine the results of a 3-month web-based alcohol treatment program using intensive, asynchronous (non-simultaneous) therapeutic support (www.alcoholdebaas.nl) at 9-month follow-up assessment. **Methods:** This study reports the follow-up results of 144 problem drinking participants who received a web-based alcohol treatment program. We investigated whether the intervention effects at treatment completion (3 months) continued to exist at 6 and 9 months of follow-up. The primary outcome measure was weekly alcohol consumption. Repeated measures analysis with a mixed model approach was used to address loss to follow-up. **Results:** Weekly alcohol consumption significantly improved between baseline and 9 months ($F(1,74) = 85.6, p < 0.001$). Post-hoc tests revealed that the reduction occurred during the first 3 months (from 39.9–11.4 standard units a week). Although alcohol consumption had risen to 19.5 units per week at 9 months, it still decreased by more than 20 units compared to baseline drinking. Significant improvements with medium to large effect sizes were found on the secondary outcomes (depression, general health, and quality of life) at 9 months. **Conclusion:** The web-based alcohol treatment with intensive asynchronous therapeutic support has been shown to be effective in reducing alcohol consumption and improving health status at post treatment assessments. The present study showed that most of these improvements were sustained after 9 months. Despite the lack of a control group and the high dropout rate, our findings suggest that web-based treatment can achieve relevant health gains in the long term.

Keywords

Alcoholism, e-health, follow-up studies, web-based treatment

History

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Introduction

Problem drinking is a highly prevalent public health issue and is associated with serious health consequences, mortality, social problems, and reduced economic productivity (1,2), especially if left untreated. Despite the high prevalence rate, only 10–16% of people with problem drinking ever receive professional help (3–5), and many problem drinkers struggle 10 years or more before seeking help (6).

Web-based alcohol interventions have reached a new population of problem drinkers, especially groups that are underrepresented in regular face-to-face therapy, including women, higher educated people, and employed people (7,8).

Web-based alcohol interventions also demonstrated efficacy in randomized controlled trials (9–23). Most of these web-based alcohol interventions comprise self-help interventions without therapist involvement.

The subject of the present study was not a self-help intervention but a 3-month treatment program using intensive, asynchronous communication with a therapist. Asynchronous communication is characterized by messages between client and therapist that do not take place simultaneously. The intensive therapeutic support differentiates the present intervention from other web-based alcohol interventions, as the focus of the majority of web-based alcohol intervention studies is on brief, personalized feedback interventions (24). In our randomized controlled trial of this Dutch web-based treatment program (www.alcoholdebaas.nl), we compared differences between the experimental and control group at post treatment (approximately 3 months). The web-based

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treatment program showed that it was effective in reducing weekly alcohol consumption at post treatment with 28.8 units compared to 3.1 units in the control group. The intervention group also showed significant improvement on general health and depression symptoms (18).

Most of the brief web-based alcohol intervention studies have reported 3 months or less of follow-up results (9,10,12–15,17,18,20,21), and some have reported 6 months of results (11,16,19,22,23). Few studies have reported longer-term follow-up results; however, all have involved brief self-assessment or self-help alcohol interventions (25–29). Two single-group follow-up studies (without a control group) showed improvements between baseline and the 12-month follow-up. Hester et al. (26) found that a computer-based brief motivational intervention significantly reduced the quantity and frequency of drinking by 50% at the 12-month follow-up. Koski-Jannes et al. (27) found that a web-based self-assessment intervention led to significant reductions in drinking and its negative consequences from baseline to the 12-month follow-up. Three other studies compared 12-month results between an intervention and a control group. Two of these studies found no long-term differences between the groups, but the other study did. Wallace et al. (29) found that both versions of their computer-based intervention (flat text-based and enhanced interactive) showed comparable reductions in alcohol consumption and related harms at 12 months of follow-up. Cunningham et al. (25) found that the impact of the CheckYourDrinking screener on reducing alcohol consumption at 3 and 6 months of follow-up (a six- to seven-drink per week reduction), relative to problem-drinking controls, was no longer significant at the 12-month follow-up. Although they found no significant differences between the intervention and control condition at 12 months, the problem drinking intervention subgroup showed a significant reduction of 5.7 units (22.5–16.8, $p=0.001$) in typical weekly drinking from baseline to the 12-month follow-up (J.A. Cunningham, personal communication, 17 July, 2012). Riper and Kramer (28) found that the difference in number of participants drinking within the low-risk guideline limits between the web-based, self-help intervention “Drinking Less” and the control group was significant at the 6-month and (17.2% vs. 5.4%, $p<0.01$) and 12-month follow-up assessments (13.6% vs. 5.5%, $p<0.05$). In the intervention group, they found a reduction of 7.2 units per week from baseline to the 12-month follow-up (40.9–33.7, $p<0.001$; $d=0.28$).

The aim of the present study was to examine the single-group 9-month follow-up results of the Dutch web-based alcohol treatment program using intensive asynchronous therapeutic support. As the control group received the intervention immediately after the experimental group completed treatment, it was not possible to compare follow-up data between the groups. We therefore merged the data from the experimental and control group. Only 9 months of follow-up data were available for both groups.

We hypothesized that the reduction in alcohol consumption and the improvement in health status would be sustained at 9 months of follow-up. To the best of our knowledge, no other study has conducted a long-term follow-up of this type of intensive asynchronous support web-based alcohol intervention.

Methods

Study design

This study reports the secondary analyses of our randomized controlled trial (RCT) conducted in 2008–2009. An open trial was conducted with 156 participants randomly assigned to the treatment group ($n=78$) or the waiting list control group ($n=78$). As the control group received the web-based treatment intervention immediately after the experimental group completed treatment, we merged the data of both RCT groups (experimental and control) to create one dataset for the present manuscript (Figure 1). Twelve participants in the control group did not start the treatment after the 3-month waiting period and never received the web-based intervention. We therefore merged the data from 144 participants who received the web-based intervention to investigate whether intervention effects at treatment completion (3 months, $n=65$) continued to exist at 6 ($n=61$) and 9 months ($n=58$). Details of the original study can be found in earlier publications of this trial (18,30,31).

Sample and recruitment

Recruitment occurred between 1 October and 31 December 2008 through media attention and an advertisement on a website. We recruited Dutch-speaking problem drinkers in the general population aged ≥ 18 years. Problem drinking was defined as currently drinking at least 15 units (10 grams of ethanol) per week in women and 22 units per week in men. We excluded participants who were treated for problem drinking in the preceding year and participants with psychiatric treatment in the past 6 months or those with a current, diagnosed psychiatric disorder. Participants received no incentives for their participation. They received the web-based intervention free of charge. Participants could remain relatively anonymous because there was no face-to-face contact, and only names, email addresses and phone numbers were required. The web-based treatment program therefore was a very accessible and attractive treatment service for people with alcohol problems. There were no obligations to complete the treatment program.

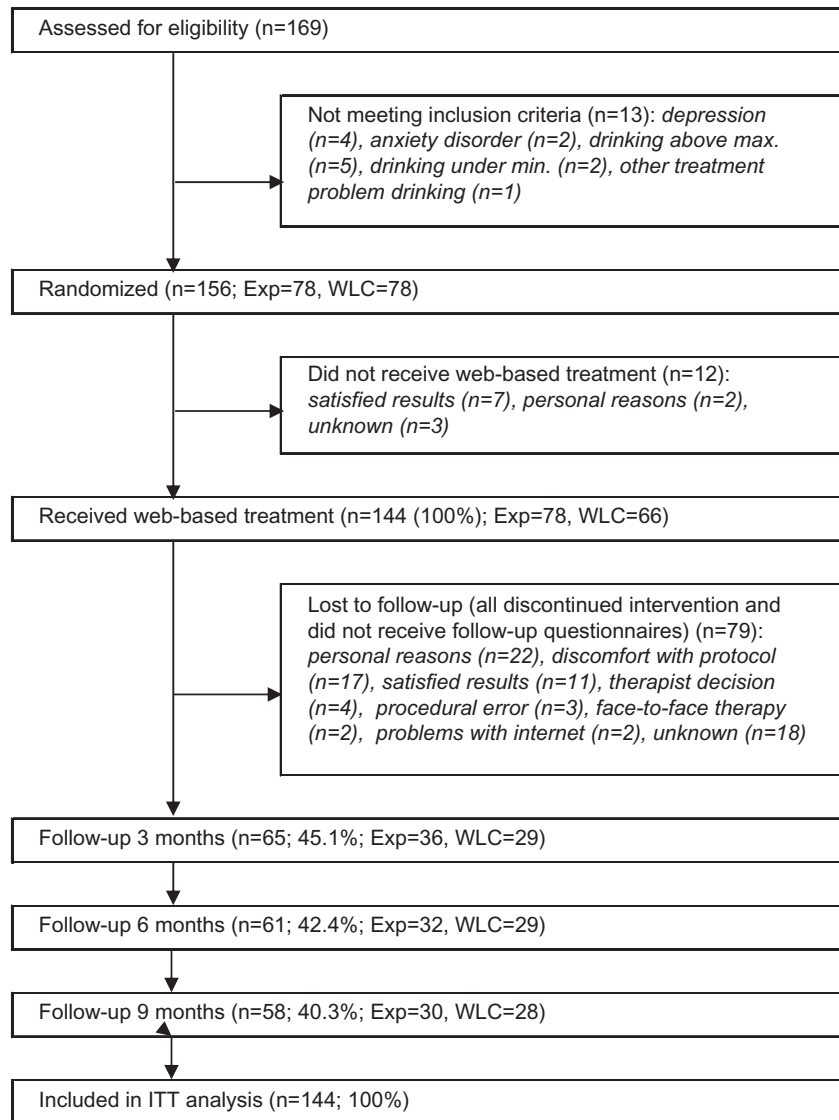
Ethics statement

The study protocol was approved by the independent medical ethics board METiGG (ref. no. NL20742.097.07) and registered at <http://www.controlled-trials.com> (ISRCTN39104853). All participants provided online informed consent.

Interventions

The web-based treatment program consisted of a structured two-part online treatment program in which the participant and the therapist communicated asynchronously via the Internet only (Figures 2 and 3). Participants accessed the web-based treatment program in their personal environment. Participant and therapist were in separate or remote locations, and the interaction occurred with a time delay between the responses. The method underlying the program was based on the principles of cognitive behavior therapy (32) and

Figure 1. CONSORT diagram: flow of participants through the study protocol.



motivational interviewing (33). Part 1 of the program focused on the analysis of the participants' drinking habits and consisted of four assignments: advantages and disadvantages, daily drinking diary, craving moments, and identifying risky drinking situations. Part 2 focused on behavioral change (harm reduction or abstinence) and included five assignments: drinking goal, (non) helpful thoughts, helpful behaviors, decision moment, and action plan. The treatment program used a linear model, in which participants could not move on to the next assignment until they completed the previous task, as the program is most effective with this specific ordering of treatment steps. The average duration of the total web-based treatment program was 3 months, with one or two therapist contacts per week and daily self-registration.

Outcome measures

Weekly alcohol consumption was assessed by a 7-day retrospective drinking diary, including a question about atypical drinking (34). Participants had to register their alcohol consumption in units (10 g of ethanol) per day. Type and severity of substance dependence was assessed by the

Substance Abuse Module of the Composite International Diagnostic Interview (CIDI-SAM) (35). Alcohol dependence was defined as scoring 3 or higher on the first 7 items on the CIDI-SAM. The 21-item Depression Anxiety Stress Scale (DASS-21) was used to measure the three related negative emotional states of depression, anxiety, and stress (36). The General Health Questionnaire (GHQ-28) and the Maudsley Addiction Profile, Health Symptom Scale (MAP-HSS) were used to assess health status (37,38). Quality of life was measured with the EuroQol Visual Analogue Scale (EQ VAS) (39).

Participants in both groups received online self-report questionnaires at baseline and 3-, 6- and 9-month follow-up points. Because the web-based treatment program used a linear model with technically integrated assessment points, it was not possible to send the questionnaires to non-responders. We therefore did not obtain data from non-completers.

Statistical analysis

PASW Statistics 19 (SPSS Inc., IL, USA) was used to perform an intention-to-treat analysis using univariate

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Figure 2. Homepage of the web-based alcohol treatment (English version: www.lookatyourdrinking.com).

Welkom Maaïke donderdag 29 januari 2015 11:56 Sluiten

_test_maaïke Samenvatting intake Zorgplan Client Details Dossier actief Dossier sluiten

Clientenoverzicht Nieuw bericht

Dossiers (1)

Alcoholschrift
laatste registratiedatum: 21-01-2015

Intake - ROM

- ✓ Voordelen, nadelen
- ✓ Alcoholschrift bijhouden
- ✓ Situaties analyseren
- ✓ Meten en weten
- ✓ Doel stellen
- ✓ Gewoontes doorbreken
- ✓ Anders denken
- ✓ Anders doen
- ✓ Beslissingen
- ✓ Actieplan

Postvak IN (0) Verzonden (0) Concepten (19) Prullenbak (0)

Onderwerp	Datum
RE: Beslissingen	10-04-2014 11:39
RE: Anders doen	09-04-2014 15:37
RE: Stof tot nadenken: contact met je kinderen en partner	09-04-2014 15:36
RE: Anders denken: deel 1	07-04-2014 16:55

Details Beantwoorden Printen Sluiten

Beste Maaïke ,

Mijn complimenten voor je vorderingen! Ik zie dat je een heel stuk geminderd bent en dat het je al vaak lukt om helemaal niet te drinken. Ook op dagen dat je wel zin in drinken hebt en je je emotioneel en down voelt. Dat vind ik erg knap. Je vraagt je af of deze gevoelens bij het veranderproces horen. Dat zou heel goed kunnen. Veranderen is moeilijk in het begin en gaat gepaard met gemengde gevoelens. Naarmate je langer bezig bent en het je steeds vaker lukt om niet te drinken, zul je merken dat het aemakkelijker wordt en je

Figure 3. Example of a personal record (test participant).

repeated measures analysis according to the mixed model approach to determine improvement between baseline and post treatment time points. This approach was used to address loss to follow-up, as it does include participants with missing data in the analysis. Outcomes were measured at 4 points in time (baseline and 3, 6 and 9 months). Post-hoc tests were conducted using Sidak corrections to correct for multiple comparisons. For all outcomes, Cohen's *d* effect sizes were calculated to analyze the strength of the observed effects (40).

Results

Participants

Of the 144 participants, 58% were female, 58% received a bachelor's or master's degree, and 81% were employed (Table 1). Ages ranged from 22–66, with an average of 45.8 years. A total of 120 participants reported dependence (83%) according to the CIDI-SAM. The majority ($n = 122$, 85%) had never received professional help for their drinking problem. The mean weekly alcohol consumption was 39.9 standard units per week: 49.8 in men and 32.6 in women.

We compared the main baseline characteristics (gender, age, alcohol consumption, and the total scores on the DASS, MAP-HSS, GHQ and EQ-VAS) of the entire group ($n = 144$) to that of the completers ($n = 58$). Results of one-sample *t*-tests and a binominal test for gender showed that there were no significant differences between the groups (data not shown).

Outcome measures

Table 2 presents the means and standard deviations of the outcome measures. A repeated measures analysis showed that weekly alcohol consumption significantly improved from baseline to the 9-month follow-up ($F(3,74) = 85.6$, $p < 0.001$) with a large effect size of $d = 0.91$. Post-hoc tests revealed that the substantial reduction in drinking (28.5 units) occurred during the first 3 months; weekly alcohol consumption significantly decreased from 39.9 standard units per week at

Table 1. Baseline characteristics ($N = 144$).

	<i>n</i>	%
Female	83	57.6
Higher education ^a	84	58.3
Employed	117	81.3
DSM-IV ^b diagnoses		
Alcohol dependence	120	83.3
Alcohol abuse	14	9.7
No dependence or abuse	10	6.9
Prior alcohol treatment	22	15.3
Prior treatment mental health problems	72	50.0
Problem drinking ^c	144	100
Mean		SD
Age	45.8	9.7
Weekly alcohol consumption		
Males	49.8	26.9
Females	32.6	14.6

^aBachelor's or master's degree;

^bDiagnostic and Statistical Manual of Mental Disorders, 4th revision;

^cDrinking >21 (male) or >14 (female) units mean per week.

Table 2. Treatment outcomes for alcohol consumption and health status ($N = 144$)^a.

	Baseline ($n = 144$, 100%)		FU 3 months ($n = 65$, 45.1%)		FU 6 months ($n = 61$, 42.4%)		FU 9 months ($n = 58$, 40.3%)		Overall effect	
	M (SD)		M (SD)	<i>p</i>	M (SD)	<i>p</i>	M (SD)	<i>p</i>	<i>F</i>	<i>p</i>
Weekly alcohol consumption	39.9 (22.4)		11.4 (9.9)	<0.001	15.1 (12.3)	<0.001	19.5 (18.7)	<0.001	85.6	<0.001
DASS-21 ^c	27.0 (19.7)		13.8 (10.6)	<0.001	14.2 (14.5)	<0.001	13.6 (12.6)	<0.001	23.2	<0.001
GHQ-28 total score ^d	52.6 (11.9)		41.2 (7.2)	<0.001	43.0 (10.1)	<0.001	43.5 (10.4)	<0.001	36.4	<0.001
MAP-HSS total score ^e	19.8 (6.2)		16.1 (5.3)	<0.001	15.9 (4.8)	<0.001	16.1 (5.2)	<0.001	18.9	<0.001
EQ VAS ^f	67.5 (14.8)		75.5 (12.4)	<0.001	75.4 (11.3)	<0.001	74.6 (13.8)	<0.001	12.2	<0.001

FU, follow-up; M, Mean; SD, standard deviation; MD, Mean difference from baseline; ^aTreatment outcomes were measured with SPSS repeated measures analysis, mixed model approach. ^bEffect sizes were measured with Cohen's *d* using Mean difference at FU 9 months and baseline SD. ^c21-item Depression Anxiety Stress Scale. Possible scores range from 0–126 (total score). ^dGeneral Health Questionnaire. Possible scores range from 28–112. ^eMaudsley Addiction Profile – Health Symptom Scale. Possible scores range from 0–40. ^fEuroQoL Visual Analogue Scale. Possible scores range from 0–100.

baseline to 11.4 units per week at post treatment (3 months). Drinking increased significantly by 3.7 units between 3 and 6 months, from 11.4 units per week at the 3-month follow-up to 15.1 units at the 6-month follow-up. There was no significant change between 6 and 9 months. Although the weekly alcohol consumption had risen to 19.5 units per week after 9 months, it still decreased by more than 20 units compared to baseline drinking levels.

We also found significant improvements between baseline and the 9-month follow-up on the secondary outcome measures. The depression, anxiety and stress scores significantly improved from 27.0 at baseline to 13.8 at post treatment and 13.6 at the 9-month follow-up ($F(3,78) = 23.2, p < 0.001$). The initial decrease in depressive, anxiety and stress complaints was maintained 9 months later. The baseline score of 52.6 on general health complaints (GHQ-28) decreased to 11.4 at post treatment and decreased to 9.1 at the 9-month follow-up ($F(3,71) = 36.4, p < 0.001$). Complaints, such as fatigue, headache, and sleeping problems, decreased during treatment and beyond. These findings were consistent with the health status results (MAP-HSS); the baseline score of 19.8 decreased to 3.7 at post treatment and 3.8 at 9 months ($F(3,68) = 18.9, p < 0.001$). Participants showed significantly less health complaints including lack of appetite, trembling, and stuffiness at post treatment and follow-up. Quality of life increased from 67.4 at baseline to 75.5 at post treatment and remained at 74.6 at the 9-month follow-up ($F(3,69) = 12.2, p < 0.001$). Participants were able to maintain the improvement in quality of life 9 months later. The effect sizes of the secondary outcomes were medium to large ($d = 0.49$ to $d = 0.76$).

Discussion

The web-based alcohol treatment with intensive asynchronous therapeutic support has already been shown to be effective in reducing alcohol consumption and improving mental and physical health status at post treatment (18). The present study showed that the following improvements were sustained at the 9-month follow-up: the decline in depressive, anxiety and stress symptoms, as well as health-related complaints, and the improvements in quality of life. We only found a small but significant increase in alcohol consumption of 3.7 units per week between 3 and 6 months. However, the decrease in alcohol consumption, by more than 20 units per week from baseline to follow-up, is still substantial, and this halving is considered a clinically meaningful reduction (41). Our findings showed that web-based alcohol treatment with intensive asynchronous therapeutic support is an appropriate form of treatment that can achieve relevant health gains in the long term.

The alcohol consumption decrease of 20 units a week at 9 months is consistent with the 12-month results in the study by Hester et al. (26) (a 50% reduction in quantity and frequency of drinking). Our reduction is quite large compared to the reductions of 5.7 and 7.2 units per week at 12 months of follow-up in other studies (25,28). This difference might be explained by the follow-up period of 9 months instead of 12 and by the intensity of our web-based intervention. More active therapeutic involvement leads to larger effect sizes in

web-based treatment (42). This reasoning may not apply to the findings by Hester et al., as they found a similar decrease in alcohol consumption with a less intensive program.

Limitations and strengths

The substantial amount of participants lost to follow-up is the main limitation of our study. As a consequence of the embedded questionnaires, we were not able to contact dropouts through the web-based system used in this study. Participants who had not completed one questionnaire could no longer receive the following follow-up measures, which caused the dropouts at six and nine months to not be random. It was not possible to send the questionnaires to study dropouts in any other way because of limited resources. At that time, we thought the embedded questionnaires were useful so that therapists would not forget to send the questionnaires on time. We would have made different decisions in hindsight. We realize that we had a very high dropout rate, and this factor is a serious weakness of our study. We tried to overcome this limitation by using a mixed model approach, in which all participants were included in the analyses regardless of missing data. We additionally found that there were no significant differences between the follow-up group ($n = 58$) and the entire group ($n = 144$) at baseline; therefore, the follow-up group at least seems to be representative of the entire group at baseline.

Another main limitation is the lack of a control group. We therefore cannot be sure that the observed improvements at 9 months were caused by the web-based treatment program. Regression to the mean could explain some of the observed reduction in weekly alcohol consumption, because study participants could have reduced their weekly alcohol consumption because of chance fluctuation. This effect could have occurred due to the participants' knowledge that they were participating in a study and being monitored or other events in their lives causing them to change even without exposure to any intervention (43). Therefore, another randomized controlled trial with a long-term follow-up control group would increase our certainty about causal connections. Preferably, a design with a minimal intervention control group should be chosen so that both groups can be compared in the long term without withholding treatment from problem drinking control group participants.

A strength of our study is the recruitment of problem drinking participants in the general population, so that our sample is representative of participants in the open-access version of the web-based intervention (31).

Conclusion

This study showed that a web-based alcohol intervention with intensive asynchronous support can reduce alcohol consumption and improve health status at 9 months of follow-up. The study therefore confirmed the sustained impact of this type of web-based intervention. This finding suggests that web-based alcohol interventions with intensive asynchronous support can be a useful tool in reducing problem drinking. It is important to consider that asynchronous support requires additional resources beyond other, less intensive, web-based

interventions such as brief interventions or self-help support groups. Professional therapists are needed to communicate with the participants, and they need to be available at least twice a week to maintain treatment. This type of treatment also demands higher requirements from technology and security because personal information is sent between the client and therapist. This factor increases costs, but despite the higher costs, we think that the use of web-based alcohol interventions with intensive asynchronous support is legitimate as it successfully attracts new groups of problem drinkers, contributes to expanding treatment resources, and improves accessibility to interventions for problem drinkers (8). It would therefore be interesting to assess the cost effectiveness of this type of intervention in future research.

Currently, few clients receive web-based mental health treatments. Therefore, the challenge is to further integrate web-based treatment interventions with traditional mental health care services.

Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this paper.

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