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Effect of electronic screening and brief intervention on hazardous or harmful drinking among adults in the hospital outpatient setting: a randomized, double-blind, controlled trial

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Abstract

Background: Most trials of electronic alcohol screening and brief intervention (e-SBI) have been conducted in young people. The aim of this study was to evaluate the effect of e-SBI in adults with hazardous or harmful drinking.

Methods: This individually randomized, parallel, two-group, double-blind controlled trial was conducted in the outpatient department of a large public hospital in Australia. Consenting adults who scored 5 to 9 on the AUDIT-C (837/3225; 26%) were randomized in a 1:1 ratio by computer to screening alone (442/837; 53%) or to 10 minutes of assessment and personalized feedback on their alcohol consumption (comparisons with medical guidelines and age and sex-specific norms), peak blood alcohol concentration, expenditure on alcohol, and risk of alcohol dependence (395/837; 47%). The two primary outcomes, assessed six months after randomization, were the number of standard drinks (10 grams ethanol) consumed by participants in the last 7 days and their AUDIT score.

Results: 693/837 (83%) and 635/837 (76%) participants were followed-up at 6 and 12 months, respectively. There was no statistically significant difference between the groups in the median number of standard drinks consumed in the last 7 days (intervention: 12; control: 10.5; rate ratio, 1.12 [95% confidence interval, 0.96 to 1.31]; P = .17) or in their median AUDIT score (intervention: 7; control: 7; mean difference, 0.28 [-0.42 to 0.98]; P = .44).

Conclusion: These results do not support the implementation of an e-SBI program comprising personalized feedback and normative feedback for adults with hazardous or harmful drinking in the hospital outpatient setting.

Trial Registration: Australian New Zealand Clinical Trials Registry ACTRN12612000905864. Registered 24 August 2012.

Keywords: hazardous drinking, harmful drinking, screening, brief intervention, electronic, adults, outpatients.

1. Introduction

Globally, over three million deaths per annum (one in 20) are caused by alcohol consumption (World Health Organization, 2014a). Alcohol screening and brief intervention (SBI), which is "a structured set of questions designed to identify individuals at risk for alcohol use problems, followed by a brief discussion between an individual and a service provider, with referral to specialized treatment as needed"(American Public Health Association and Education Development Center Inc, 2008), is estimated to reduce alcohol consumption by 20 grams per week (95% CI: -28 to -12) in non-dependent patients presenting for primary healthcare (Kaner et al., 2018). However, SBI is not well implemented despite being recommended by the World Health Organization (World Health Organization, 2014b), and national bodies such as the U.S. Preventive Services Task Force (Moyer, 2013), the National Institute of Clinical Excellence (National Institute for Health and Clinical Excellence (NICE), 2011) and the Royal Australian College of General Practitioners (Royal Australian College of General Practitioners, 2015). Research conducted in the USA, for example, found that only 4% of ambulatory care patients with past-month heavy episodic drinking (but not an alcohol disorder) reported being advised to decrease their alcohol consumption (Glass et al 2016). Similarly, Australian research has shown that General Practitioners provided counselling or advice in relation to alcohol at a rate of only 4 per 1000 encounters, even though one in four patients reported drinking at a level that increases their risk of harm from alcohol (hazardous drinking (World Health Organization, 1994)) or at a level that is already causing harm (harmful drinking (World Health Organization, 1994)) (Britt et al., 2013).

There is evidence that electronic screening and brief intervention (e-SBI), which refers to the delivery of key elements of traditional SBI using computers, telephones, or mobile devices, is also effective (Dedert et al., 2015; Donoghue et al., 2014; Kaner et al., 2017; Tansil et al., 2016). The primary meta-analysis (41 trials; 19,241 participants) in the most recent of these reviews found participants who received an electronic intervention drank 23 g of alcohol per week (95% CI: 15 to

30g) less than participants who received no or minimal intervention (Kaner et al., 2017). However, when the primary meta-analysis was conducted separately in young people (27 trials; 13,477 participants < 29 years of age) and adults (14 trials; 5,764 participants aged > 18 years), the effect was smaller in young people (-13.4 g per week; 95% CI: -19 to -8g) than in adults (-56.1 grams per week; 95% CI: -82 to -30g) (Kaner et al., 2017). The substantial heterogeneity in both groups of trials, I^2 of 52% and 89% respectively, calls into question the methodological quality of the trials (Fletcher, 2007). Indeed, only one of the 14 trials in adults blinded the participants, and nine used advertisements (e.g., online newspapers (Brendryen et al., 2014) or Facebook (Brief et al., 2013)) to recruit people who presumably were concerned about their drinking. Accordingly, there is a need for high quality research evaluating the effect of e-SBI in adults.

The aim of this double-blind randomized trial was to evaluate the effect of e-SBI on hazardous or harmful drinking among adults. We recruited adults in the hospital outpatient setting because one in three people report hazardous or harmful drinking in this setting (Johnson et al., 2014), compared with one in four in primary healthcare (Britt et al., 2013) and one in five in the Australian general population (Australian Institute of Health and Welfare, 2008)). The intervention we evaluated was based on social norms theory, which posits correcting people's misperceptions about peers' behaviour influences their own behaviour (McAlaney et al., 2011). This approach seemed reasonable given it was almost identical to an intervention shown to reduce alcohol consumption in university students (Kypri et al., 2008; Kypri et al., 2004), and review level evidence showing older people also "adopt or share drinking habits of their partner, family members or peers" (Kelly et al., 2018).

2. Methods

2.1 Design

We conducted a single center, individually randomized, parallel, two-group, double-blind

controlled trial (Johnson, Kypri, Saunders, et al., 2013). Ethical approval was granted by the Hunter New England (12/05/16/4.04) and the University of Newcastle (H-2012-0272) Human Research Ethics Committees, and participants provided signed consent. We registered the trial with the Australian New Zealand Clinical Trials Register (12612000905864) before recruiting the first patient.

2.2 Setting

The trial was conducted in one wing of the outpatient department in a large public hospital in Newcastle, Australia, which provides services for 870,000 people in a region the size of England (NSW Health). The clinics operating were: cardio-thoracic surgery, colorectal surgery, general surgery, neurosurgery, ophthalmology, oral and maxillofacial surgery, orthopedics and rehabilitation, otolaryngology, pain management, pre-operative assessment, renal surgery and transplant, vascular disease prevention, vascular surgery, and urology.

2.3 Participants and procedure

We invited adults (18+ years) waiting for an appointment, between 28 August and 21 December 2012, who were able to read and respond to questions presented to them in English using an iPad, without assistance from anyone else, to participate. Those who consented were screened for hazardous or harmful drinking using an iPad while seated in the large central waiting area. We considered this approach necessary, despite concerns about privacy, because we had previously found that patients rushed through the online program when taken to another area to complete it, fearing they might miss their appointment (Johnson, Kypri, & Attia, 2013).

2.4 Screening

The screening component of the e-SBI program comprised five screens (pages) of questions. It took approximately 5 minutes to complete and was delivered via an iPad without human interaction, aside from technical support. Page 1 introduced the Hospital Outpatient Alcohol Project (HOAP) as a "survey of alcohol use among hospital outpatients … [that] will take approximately 5 to 15 minutes to complete and is confidential". Page 2 collected demographic data (gender, age, postcode [used to determine an Index of Relative Socio-economic Advantage and Disadvantage score], and their email address). Page 3 asked patients if they had consumed alcohol in the last 12 months (yes/no), and page 4 asked if they were currently receiving treatment for alcohol-related problems (yes/no). Those who responded "no" and "yes", respectively, were excluded at this point. Page 5 comprised only the brief, 3-item, Alcohol Use Disorders Identification Test – Consumption subscale (AUDIT-C) (Bradley et al., 2007) because answering questions on drinking in brief intervention trials may itself alter subsequent self-reported behavior (McCambridge and Kypri, 2011). Upon clicking the continue button on page 5, AUDIT-C scores were calculated (range 0-12 with higher scores reflecting heavier drinking). We excluded participants who scored <5 because Australian research has shown that 5 is the optimal cut-off for detecting hazardous drinking (sensitivity 91%; specificity 86%) (Vitesnikova et al., 2014). We also excluded participants who scored >9 because, at this level of drinking, most patients are likely to be alcohol dependent (Rubinsky et al., 2010) and probably require more than brief intervention (Saitz, 2010). We referred these patients for specialist care.

2.5 Randomization, concealment and blinding

We allocated participants in a 1:1 ratio using simple randomization (no blocking or stratification), to either electronic screening alone (control) or to electronic screening, additional assessment and personalized feedback (intervention). We concealed treatment allocation using

computer-generated random assignment (SecureRandom.random_number method ("securerandom: Ruby Standard Library Documentation," 2015)) via the iPads, immediately following screening. We did not inform participants of the true nature of the study, having asked them to participate in a series of surveys on their alcohol use, without indicating they had been randomized in an intervention trial.

2.6 Intervention

The brief intervention component of the e-SBI program comprised additional assessment and personalized feedback. It took approximately 5-10 minutes to complete and was delivered via an iPad without human interaction, aside from technical support. The additional assessment comprised the rest of the AUDIT (Saunders et al., 1993), the 10-item Leeds Dependence Questionnaire (Raistrick et al., 1994), questions regarding the largest number of standard drinks consumed on a single occasion in the preceding four weeks, the duration of the drinking episode in hours, and their body weight (so we could estimate their peak blood alcohol concentration). The personalized feedback comprised: their AUDIT and LDQ scores with guidance on their meaning, an estimated blood alcohol concentration for the heaviest drinking episode with information on the their traffic crash relative risk, an estimate of their yearly expenditure on alcohol, and bar graphs comparing their typical episodic and weekly consumption with medical recommendations (National Health and Medical Research Council, 2009), and that of adults of the same age and gender (Australian Institute of Health and Welfare, 2008). Three additional pages offering information about alcohol, tips for reducing the risk of harm, and sources of support for drinking problems were provided. We sent a copy of the feedback to participants who had agreed to receive it. The program can be found at https://esbi.herokuapp.com/

As described elsewhere, the e-SBI program was pilot tested with hospital outpatients who reported hazardous or harmful drinking before it was used in this trial: at the time of the 6-month

follow-up, 65% of the participants reported that they "found the feedback on my drinking useful",

and 24% reported having "sought support to reduce my drinking as a consequence of receiving the

feedback" (Johnson, Kypri, & Attia, 2013).

2.7 Follow-up

We sent a letter advising participants they would receive a brief follow-up questionnaire in a few

days' time, and then six months (March to July 2013) and 12 months (September 2013 to January

2014) months after randomization. We enclosed a $20 supermarket voucher (which could not be

used to purchase alcohol) as a token of our appreciation. Participants who provided an email

address were sent a unique hyperlink to the brief web-based follow-up questionnaire, while those

who did not were sent a paper questionnaire. We sent up to three email/postal reminders and

followed-up non-responders by telephone.

2.8 Outcomes

We assessed alcohol consumption by asking participants to indicate for each of the preceding

seven days, how many standard drinks they had consumed (Rehm, 1998). The two primary

outcomes, assessed six months post randomization, were: (i) number of standard drinks consumed

in the past week, and (ii) AUDIT score (Saunders et al., 1993) with a 6-month reference period.

Secondary outcomes assessed six months post randomization were also related to alcohol

consumption in the past seven days: (i) frequency of drinking (range: 0-7 days); (ii) number of

standard drinks per typical drinking occasion; (iii) whether the participant exceeded guidelines for

acute risk (>40g ethanol at least once) (National Health and Medical Research Council, 2009); and

(iv) whether the participant exceeded guidelines for chronic risk (>140g ethanol over the 7-day

period) (National Health and Medical Research Council, 2009). Secondary outcomes assessed 12

months post-randomization were: (i) number of standard drinks consumed in the past week; (ii)

AUDIT score (Saunders et al., 1993) with a 6-month reference period; (iii) frequency of drinking;

(iv) number of standard drinks per typical drinking occasion; (v) whether the participant exceeded guidelines for acute risk (National Health and Medical Research Council, 2009); (vi) whether the participant exceeded guidelines for chronic risk (National Health and Medical Research Council, 2009); and (vii) their self-reported healthcare utilization in the past year, i.e., the number of: visits to a doctor, emergency department visits, inpatient admissions, and nights in hospital.

2.9 Sample size

We estimated the required sample size based on a pilot study conducted in the same setting in 2010 (Johnson, Kypri, & Attia, 2013). Assuming a 5% level of significance and 80% power, we required 578 participants (289 per group) at six months to detect a difference of 3.5 standard drinks (35g ethanol) per week (18% difference) between the groups (as found by Kypri et al (Kypri et al., 2008) and similar to the 38g ethanol reduction found in the meta-analysis by Kaner et al (Kaner et al., 2007)). We inflated this to 772 to allow for 25% attrition six months post randomization.

2.10 Statistical analysis

In STATA 13, we used negative binomial regression to analyze the number of standard drinks consumed, and liner regression to analyze AUDIT scores. We used logistic regression to analyze drinking frequency, entering each individual's data as the binomial outcome of the number of days the individual drank in the preceding week. We used negative binomial regression to analyze typical occasion quantity and healthcare utilization and logistic regression to analyze the proportions exceeding drinking guidelines. We adjusted for baseline AUDIT-C score in all models (Vickers and Altman, 2001), and analyzed participants in the group to which they were randomized (intention-to-treat). We conducted five pre-specified subgroup analyses to determine whether the intervention was effective: (i) in participants with AUDIT-C score of 5-7, because such drinking may be more responsive to e-SBI than heavier consumption; (ii) in participants who requested a

copy of their feedback, because they had the opportunity to review the information on more than one occasion; (iii) in 18-24 year-olds, because the intervention was based on an instrument shown to reduce alcohol consumption in university students (Kypri et al., 2009; Kypri et al., 2008; Kypri et al., 2004); (iv) by gender, because findings regarding the effect of e-SBI on alcohol consumption in men and women are mixed (Hansen et al., 2012; Riper et al., 2008); and (v) in participants scoring $\geq 51\%$ on the Index of Relative Socio-economic Advantage and Disadvantage (Australian Bureau of Statistics, 2013) because behavioral health promotion strategies appear to be more effective in more advantaged groups (Baum and Fisher, 2014). We did not fit models testing the difference in the treatment effect between subgroups using an interaction term because such comparisons would lack sufficient statistical power.

We conducted a sensitivity analysis to assess the impact of missing data under the assumption the data were not missing at random (NMAR). For a range of values (shift parameters) from 0 to 5 in increments of 0.5, we imputed 10 datasets to determine at which value the conclusion of the study would have been that participants in the intervention group did worse than participants in the control group. We imputed data for individuals in the control group assuming their missing outcome data were missing at random (MAR), conditional on their group allocation and their baseline AUDIT-C scores. For participants in the intervention group, we imputed data in a similar way, adding a random increase with a mean equal to the value of the shift parameter. This approach assumes that those in the intervention group who did not respond at follow-up had a higher average consumption than those who did respond, by the value of the shift parameter, on average.

3. Results

3.1 Screening and randomization

We illustrate the flow of participants through the trial in Figure 1. Of those invited to participate in screening, 2116/5732 (37%) refused, and 391/5732 (6.8%) were called for their appointment

before completing the screening questions. Of those who completed the screening questions, 837/3225 (26%) screened positive for hazardous or harmful drinking. Of these, 442 (53%) were allocated to the control group and 395 (47%) to the intervention, of whom 27 (6.8%) did not receive intervention because they were called for their appointment. The difference in the size of the groups is due to chance, in the absence of block randomization. We present summary statistics for the study groups in Table 1.

3.2 Follow-up Assessment

We obtained 6-month follow-up data from 362/442 (82%) participants in the control group and 331/395 (84%) in the intervention group; and 12-month follow-up data from 335/442 (76%) participants in the control group and 300/395 (76%) in the intervention group. Participants unobserved at follow-up were younger (34 years versus 46 years; $p < 0.01$) and had higher mean AUDIT-C scores at baseline compared with those who were observed (6.9 versus 6.5; $p = 0.02$). In the control and intervention groups, the mean ages of those unobserved were 34.1 and 34.3 years, respectively ($p = .64$), and mean AUDIT-C scores were 6.6 and 7.1, respectively ($p = 0.04$).

3.3 Primary outcomes

We analyzed 692/837 participants' (83%) number of standard drinks consumed in the past week, and 687/837 participants' (82%) AUDIT scores. There was no statistically significant difference between the groups in the median number of standard drinks consumed at follow-up (intervention: 12; control: 10.5; rate ratio, 1.12 [95% confidence interval, 0.96 to 1.31]; P = .17) or in their median AUDIT score (intervention: 7; control: 7; mean difference, 0.28 [-0.42 to 0.98]; P = .44).

3.4 Secondary outcomes

We found no significant differences between the groups on any secondary outcome (Tables 2 and 3).

3.5 Subgroup analyses

We found no significant differences in the effects of intervention in any subgroup (Table 4).

3.6 Sensitivity analyses

Our sensitivity analysis of the two primary outcomes suggested there would have been a statistically significant difference between treatment groups, on the quantity of alcohol consumed, if individuals who received the intervention but who had missing data for this variable had consumed on average 4.5 drinks more that those who provided data. Similarly, there would have been a significant effect of intervention if individuals who received the intervention, but who had missing AUDIT data, scored on average 3.5 points higher than those who provided data.

4.0 Discussion

The electronic intervention we evaluated, which comprised additional assessment and personalized feedback, including normative feedback, did not reduce alcohol consumption in adults with hazardous or harmful drinking recruited in the hospital outpatient setting. This is in stark contrast to the results of a Cochrane review of 14 trials involving 5,764 adults which estimated that those randomized to an electronic intervention drank 56 g of alcohol per week (95% CI: 30 to 82g) less than those who received no or minimal interventions (Kaner et al., 2017).

The readability of the HOAP e-SBI program, as measured by the Flesch-Kincaid and SMOG formulas, was approximately 9 and 11.5 years, respectively, while the recommended level for health materials aimed at the general public is 8 years (SA Health, 2013). It is also possible that

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normative feedback is effective in young adults because they have a greater need for peer approval than older adults (Kuerbis et al., 2016). Inspection of the comments provided by respondents to our 6-month follow-up questionnaire suggests that many of the participants were comfortable with their drinking. Examples include: "I enjoy a drink, it does not affect my ability to live a normal life"; "I do not think I drink in excess. I seem to be in control at all times whilst I am having my drinks"; "I believe I personally have no problem with alcohol. I drink socially with my wife or at a function"; "For the past 10 years or so I have enjoyed a few drinks on 2 or 3 occasions a week, but have not been drunk (slurred speech, stumbling) at any time"; "My drinking is about the same as most of my friends (male). My friends and I enjoy our drinks and have not experienced any problems with our drinking in the past." This explanation is consistent with the findings of a secondary analysis of data from a randomized trial to reduce drinking in at-risk drinkers aged 55 years and older, which found that participants who did not respond to the intervention did not think their drinking was a problem (Borok et al., 2013). Indeed, a recent systematic review of studies testing the ability of constructs in the Theory of Planned Behaviour to predict alcohol consumption found that attitudes (an individual's positive or negative evaluation of performing the behaviour) were more strongly associated with intentions (which had the strongest relationship with behaviour) than subjective norms, i.e., an individual's perception of social approval or disapproval for performing the behaviour (Cooke et al., 2016).

The main limitation of our study, which is typical of the existing literature, was the self-report of co-primary outcomes. Although blood markers (for example, gamma-glutamyltransferase level) may seem preferable for assessing outcomes, they have low sensitivity to hazardous drinking, and self-report has generally been found to be reliable (Kypri et al., 2015), particularly via computers (Bonevski et al., 2010; Miller et al., 2002). Strengths of the study include allocation concealment from research staff, blinding of participants to the study design (they were not informed it was a

trial, as ethically approved, until after the 12-month follow-up [46]), and a satisfactory rate of follow-up for primary outcomes.

In conclusion, the results of this scientifically rigorous randomized trial do not support the implementation of an e-SBI program comprising additional assessment and personalized feedback, including normative feedback, for adults with hazardous or harmful drinking in the hospital outpatient setting. However, given the many barriers to in-person SBI (Derges et al., 2017; Johnson et al., 2011), our success screening and intervening with a large number of outpatients without disrupting service delivery, and the general lack of evidence regarding the 'active ingredients' in brief intervention (Garnett et al., 2018; Gaume et al., 2014), further research testing the efficacy of e-SBI programs relying on other psychological mechanisms, specifically attitudes, may be warranted.

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Figure 1
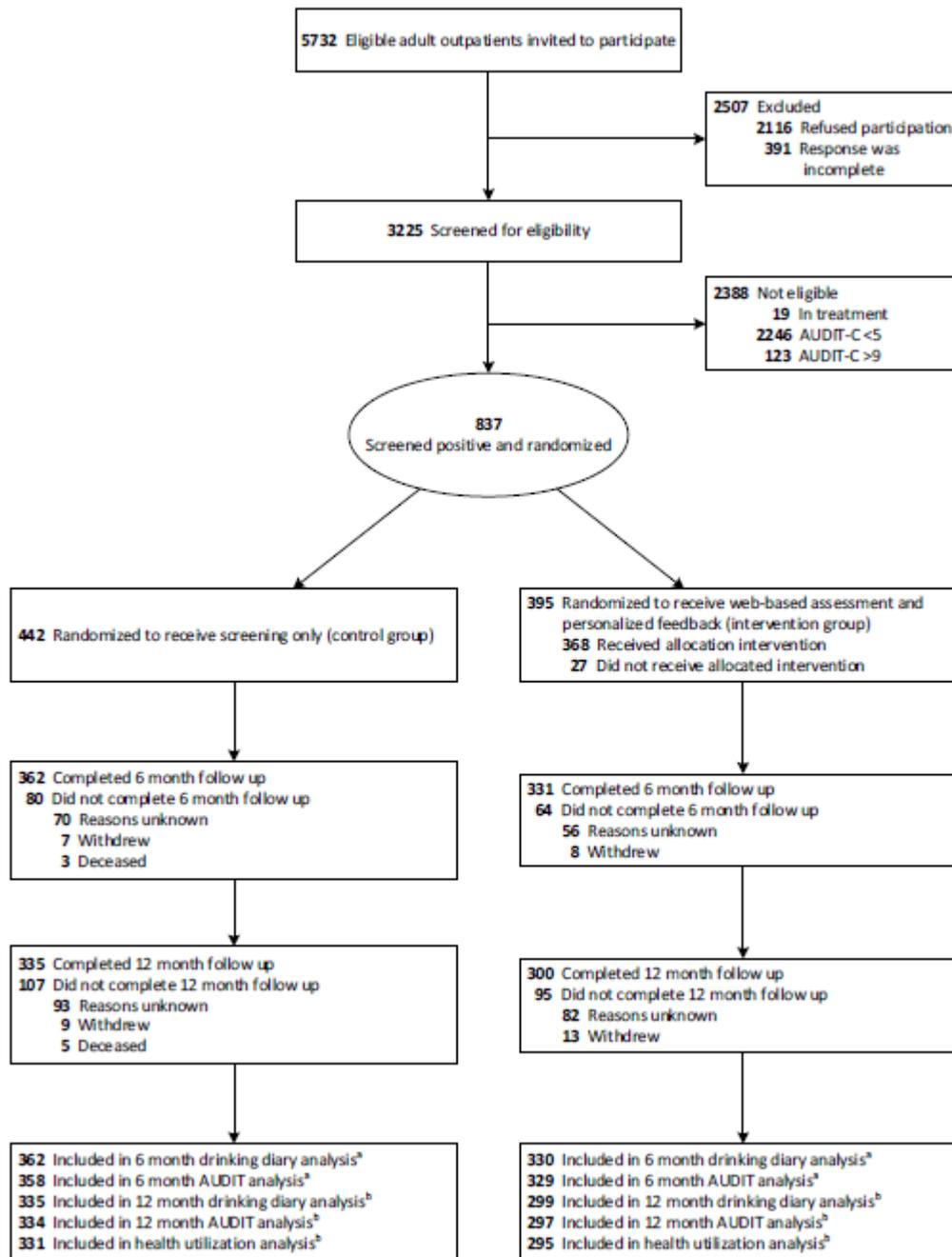
Table 1. Characteristics of Trial Participants at Baseline

	Intervention (n=395)	Control (n=442)
Number of men (%)	298 (75%)	329 (74%)
Mean (SD) age, years	44.0 (17.4)	44.2 (18.4)
Median (minimum, maximum) Index of Relative Socio-economic Advantage and Disadvantage	51 (1, 80)	51 (1, 80)
Median (minimum, maximum) Alcohol Use Disorders Identification Test Consumption (AUDIT-C) score	7 (5, 9)	6 (5, 9)

Table 2. Effect of e-SBI on Primary and Secondary Outcomes Assessed Six Months after Randomization

Outcomes	Median (minimum, maximum) or Number (%)		Statistic	Effect estimate	p- value
	Control group (n=362)	Intervention group (n=331)		Intervention vs. Control[a] (95% CI)	
Primary outcomes:					
Volume consumed (No. of drinks per week)	10.5 (0.0, 60.0)	12.0 (0.0, 93.0)	Rate ratio	1.12 (0.96 to 1.31)	0.17
AUDIT score	7 (0, 31)	7 (0, 37)	Mean difference	0.28 (-0.42 to 0.98)	0.44
Secondary outcomes:					
Number of drinking days in the past week	3 (0, 7)	3 (0, 7)	Odds ratio	1.05 (0.86 to 1.29)	0.61
Number of standard drinks on a typical drinking day	3.5 (0.8, 54.0)	3.8 (1.0, 16.0)	Rate ratio	1.04 (0.87 to 1.25)	0.66
Exceeded recommended upper limit for risk of acute harm in past week	163 (45)	166 (50)	Odds ratio	1.20 (0.86 to 1.66)	0.28
Exceeded recommended upper limit for risk of chronic harm in past week	123 (34)	126 (38)	Odds ratio	1.19 (0.85 to 1.67)	0.30

[a]Adjusted for AUDIT-C score at baseline

Table 3. Effect of e-SBI on Secondary Outcomes Assessed 12 Months after Randomization

| Outcomes | Median (minimum, maximum) or Number (%) | | Effect estimate | | |
	Control (reference) group (n=335)	Intervention group (n=300)	Statistic	Between group differences[a] (95% CI)	p- value
Alcohol Consumption:					
Volume consumed (No. of drinks per week)	11.0 (0, 84)	12.0 (0, 84)	Rate ratio	0.98 (0.83 to 1.16)	0.82
AUDIT score	7 (0, 30)	7 (0, 36)	Mean difference	0.17 (-0.52 to 0.86)	0.63
Number of drinking days in the past week	3 (0, 7)	3 (0, 7)	Odds ratio	0.86 (0.70 to 1.07)	0.18
Number of standard drinks on a typical day	3.5 (0.8, 20)	3.8 (1, 24)	Rate ratio	1.00 (0.83 to 1.21)	0.99
Exceeded recommended upper limit for risk of acute harm in past week	177 (53)	163 (54)	Odds ratio	0.96 (0.69 to 1.35)	0.83
Exceeded recommended upper limit for risk of chronic harm in past week	132 (39)	130 (43)	Odds ratio	1.15 (0.82 to 1.60)	0.43
Healthcare utilization in past year:					
Number of visits to a doctor	2 (0, 56)	2 (0, 26)	Rate ratio	0.89 (0.74 to 1.07)	0.23
Number of visits to an emergency department	0 (0, 13)	0 (0, 4)	Rate ratio	0.70 (0.49 to 1.01)	0.05
Number of overnight says in hospital	0 (0, 13)	0 (0, 3)	Rate ratio	0.80 (0.54 to 1.18)	0.27
Number of nights in hospital	0 (0, 35)	0 (0, 180)	Rate ratio	1.51 (0.71 to 3.18)	0.28

[a]Adjusted for AUDIT-C score at baseline

Table 4. Effect of e-SBI on the Two Primary Outcomes within Subgroups

| Outcomes | Median (minimum, maximum) or Number (%) | | Statistic | Effect estimate | p value |
	Control group	Intervention group		Intervention vs. Control[a] (95% CI)	
AUDIT-C score < 8 (n=511):					
Volume consumed (No. of drinks per week)	9.00 (0.0, 60.0)	10.0 (0.0, 73.5)	Rate ratio	1.12 (0.93 to 1.34)	0.23
AUDIT score	6 (0, 25)	6 (0, 37)	Mean difference	-0.03 (-0.81 to 0.75)	0.94
Requested a copy of their personalized feedback[b] (n=149):					
Volume consumed (No. of drinks per week)	10.5 (0.0, 60.0)	11.0 (0.0, 63.0)	Rate ratio	1.02 (0.84 to 1.25)	0.83
AUDIT score	7 (0, 31)	7 (1, 26)	Mean difference	-0.13 (-1.00 to 0.75)	0.77
Aged 18 to 24 years (n=111):					
Volume consumed (No. of drinks per week)	8.0 (0.0, 54.0)	4.8 (0.0, 57.0)	Rate ratio	0.81 (0.54 to 1.21)	0.30
AUDIT score	9 (2, 23)	9 (0, 25)	Mean difference	-0.20 (-2.08 to 1.68)	0.83
Men (n=517):					
Volume consumed (No. of drinks per week)	12.0 (0.0, 59.0)	13.0 (0.0, 93.0)	Rate ratio	1.12 (0.93 to 1.34)	0.23
AUDIT score	7 (0, 25)	8 (0, 27)	Mean difference	0.55 (-0.20 to 1.30)	0.15
Women (n=176):					
Volume consumed (No. of drinks per week)	10.0 (0.0, 60.0)	8.5 (0.0, 73.5)	Rate ratio	1.13 (0.82 to 1.54)	0.46
AUDIT score	6 (0, 31)	6 (0, 37)	Mean difference	-0.53 (-2.22 to 1.17)	0.54
Score ≥ 51% on the Index of Relative Socio-Economic Advantage and Disadvantage (n=330):					
Volume consumed (No. of drinks per week)	10.0 (0.0, 60.0)	12.0 (0.0, 69.0)	Rate ratio	1.12 (0.90 to 1.41)	0.32

AUDIT score	7 (0, 31)	7 (0, 25)	Mean difference	0.24 (-0.77 to 1.24)	0.65

[a]Adjusted for AUDIT-C score at baseline

[b] Intervention group restricted to those who requested a copy of their electronic personalized feedback