Screening and brief interventions for adolescent alcohol use disorders presenting through emergency departments: a research programme including two RCTs

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Scientific summary

SBIs for adolescent alcohol use disorders

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Scientific summary

Background

Alcohol consumption is a major public health concern. Although the main burden of chronic alcohol-related disease is in adults, its foundations often lie in adolescence. Alcohol consumption and related harm increase steeply from the age of 12 years, and although the proportion of young people in England aged between 11 and 15 years who reported that they had drunk alcohol had decreased in the last 30 years, the mean amount consumed by those who drank doubled. About 10% of 11- to 15-year-olds and 33% of 15- to 16-year-olds in England had reported alcohol intoxication in the past month.

Alcohol use and alcohol use disorders (AUDs) are relatively uncommon in early adolescence. Nevertheless, alcohol has a disproportionate effect on younger adolescents, for example by predisposing them to alcohol dependence in later life and damage to the developing brain. In middle adolescence (ages 15–17 years), binge drinking emerges. Although binge drinking does not necessarily meet the criteria for an AUD, it is associated with an increased risk of unprotected or regretted sexual activity, criminal and disorderly behaviour, suicidality and self-harm, injury, drink driving, alcohol poisoning and accidental death.

In 2009, the Chief Medical Officer for England provided recommendations on alcohol consumption in young people based on an evidence review (Donaldson L. *Guidance on the Consumption of Alcohol by Children and Young People.* London: Department of Health and Social Care; 2009). These recommendations stated that children should abstain from alcohol before the age of 15 years and that 15- to 17-year-olds should not drink, but, if they do drink, then they should consume no more than the recommended limits for adults (currently 14 units per week).

Alcohol screening and brief interventions in health settings

Opportunistic alcohol screening and brief interventions (SBIs) in emergency departments (EDs) capitalise on the 'teachable moment' when a connection can be made between alcohol consumption and ED attendance. SBIs in EDs have shown efficacy in adults and adolescents, and evidence of cost-effectiveness in adults. However, although there has been an increase in SBIs for adults, adolescents remain a comparatively neglected group.

Several alcohol screening methods have been developed in the USA but not evaluated in the UK. Questionnaires were found to perform better than blood markers or breath alcohol concentration in all age groups. However, most of these had low sensitivity and specificity and are therefore suboptimal for effective screening.

The validity of alcohol screening methods in younger adolescents is also unclear. Existing approaches do not sufficiently take account of the age and developmental stage of adolescents.

Moreover, a systematic review of brief alcohol interventions in young people attending health settings identified nine randomised controlled trials (RCTs) between 1999 and 2008. Eight were based in the USA and one was based in Australia. Six trials tested brief interventions based on one or two sessions of motivational interviewing (MI) that lasted between 20 and 45 minutes. One trial tested a more intensive programme of four MI sessions over 1 month. Two studies used information technology to deliver brief interventions, one using an audio programme in primary care and the other using an interactive computer program in a minor injury unit.

Five trials reported significant positive effects of brief interventions on a range of alcohol consumption measures, whereas three trials reported null effects after brief interventions. One trial reported an increase in alcohol use and binge drinking among brief intervention subjects, which is a possible adverse effect.

Therefore, there is a need to develop more effective alcohol screening tools and interventions for adolescents in the ED that are age appropriate and cover a wider range of alcohol consumption and alcohol-related problems than do existing methods. Although evidence suggests that brief interventions may be beneficial for adolescents, particularly in EDs, there is a clear need for a UK trial to examine this further.

This research programme was designed to address these key gaps in the evidence base for the most clinically effective and cost-effective SBIs for at-risk adolescent heavy drinkers, and prevent alcohol uptake or increased alcohol consumption in low-risk adolescents attending EDs.

Work package 1: prevalence study of alcohol consumption and alcohol use disorders in adolescents aged 10–17 years attending emergency departments

This work package investigated the prevalence of alcohol consumption in adolescents presenting to EDs and the association between that consumption, age at onset, and health and social behaviours. In addition, we assessed the diagnostic performance of brief screening tools.

Methods

We included 5376 consecutive attenders, aged 10–17 years, at 10 EDs. We collected information on alcohol use, alcohol-related health and social consequences, general health and social functioning, and quality of life.

Results

Nearly 40% of adolescents reported that their consumption of alcohol was more than a sip in their lifetime. First alcohol consumption before the age of 15 years was associated with tobacco use [odds ratio (OR) 2.8, 95% confidence interval (CI) 1.8 to 4.2; $p < 0.001$], lower quality of life (OR 1.5, 95% CI 0.5 to 2.6; $p = 0.003$) and diagnosis of AUD (OR 2.4, 95% CI 1.3 to 4.4; $p = 0.002$). It was also associated with impaired general social functioning [presence of conduct disorder (OR 4.5, 95% CI 1.8 to 11.4; $p < 0.001$) and hyperactivity (OR 2.6, 95% CI 1.4 to 4.8; $p < 0.001$)], alcohol-related health and social consequences [accidents (OR 1.8, 95% CI 1.0 to 3.2; $p = 0.046$), and problems with parents (OR 4.4, 95% CI 1.3 to 15.4; $p = 0.017$), school (OR 3.7, 95% CI 1.2 to 11.3; $p = 0.0117$) or police (OR 13.5, 95% CI 1.7 to 102.4; $p = 0.012$)].

We tested the screening properties of the questionnaire against the standard (Timeline Followback) criteria for at-risk drinking, heavy episodic alcohol consumption and the *International Classification of Diseases*, Tenth Edition (ICD-10), for hazardous alcohol use and dependence. We identified appropriate cut-off points for each instrument. An Alcohol Use Disorders Identification Test, Consumption (3 items) (AUDIT-C) score of ≥ 3 was the optimal cut-off point for at-risk drinking (sensitivity 0.89, 95% CI 0.89 to 0.91; specificity 0.97, 95% CI 0.96 to 0.97), monthly episodic alcohol use (sensitivity 0.76, 95% CI 0.73 to 0.80; specificity 0.98, 95% CI 0.97 to 0.98) and alcohol abuse (sensitivity 0.91, 95% CI 0.85 to 0.95; specificity 0.90, 95% CI 0.88 to 0.91). A score of 7 for the full Alcohol Use Disorders Identification Test was considered the optimal cut-off point for identifying alcohol dependence (sensitivity 0.96, 95% CI 0.89 to 0.99; specificity 0.90, 95% CI 0.88 to 0.91).

Conclusions

We found associations of alcohol consumption and earlier onset of drinking with poorer health and social functioning. EDs offer opportunities to identify at-risk alcohol use in adolescents. A simple, short, self-completed screening instrument, the AUDIT-C, is an effective tool for identifying adolescents who are at risk of alcohol-related problems, or engage in monthly heavy episodic alcohol use or in harmful alcohol use, according to the ICD-10 criteria. A score of 7 on the AUDIT-C is effective in identifying adolescents who are alcohol dependent.

Work package 2: exploratory modelling of the interventions

This work package developed age-appropriate alcohol interventions in collaboration with the target audience through a series of focus groups and evaluations.

Personalised feedback and brief advice

The personalised feedback and brief advice (PFBA) intervention is structured brief advice that takes approximately 5 minutes to deliver. It is based on an advice leaflet from Screening and Intervention to Promote Sensible drinking (SIPS), Brief Advice About Alcohol Risk, and was adapted for the target age group in this study. The advice covers recommended levels of alcohol consumption for young people; summarises the screening test results and their meaning; provides normative comparative information on prevalence rates of high- and low-risk drinking in young people; summarises the risks of drinking and highlights the benefits of stopping or reducing alcohol consumption; outlines strategies that the young person might employ to help stop or reduce alcohol consumption; and indicates where to obtain further help if they are unsuccessful or need more support.

Electronic brief intervention based on smartphone or web

The electronic brief intervention (eBI) smartphone intervention is an offline-capable mobile web application that works on a variety of platforms, but it was optimised for recent iPhone (Apple Inc., Cupertino, CA, USA) and Android (Google Inc., Mountain View, CA, USA) phones. It has been developed using the concept of gamification so that users can navigate, explore, learn facts and figures about alcohol, receive personalised feedback and set goals in an engaging format. The content adapts to provide the most pertinent information and advice for high- or low-risk drinkers. Game components of the web application supported high-risk drinkers to reduce or stop their alcohol consumption and low-risk users to maintain abstinence or low-risk drinking.

Work package 3: linked randomised controlled trials of face-to-face and electronic brief intervention methods to prevent alcohol-related harm in young people aged 14–17 years presenting to emergency departments

In work package 3, we conducted two linked RCTs to evaluate the clinical effectiveness and cost-effectiveness of PFBA and eBI (the two alcohol interventions described above), compared with screening alone, in 14- to 17-year-olds attending 10 EDs in England. One trial focused on at-risk adolescent drinkers (AUDIT-C score of ≥ 3) and the other focused on abstinent or low-risk drinkers (AUDIT-C score of < 3). Our primary (null) hypothesis was similar for both trials: PFBA and personalised feedback plus eBI are as effective as screening alone in reducing or preventing alcohol consumption, in standard UK units (1 unit = 8 g of ethanol), over the past 3 months, at 12 months after randomisation, as measured with the AUDIT-C. Our secondary (null) hypothesis for related health economics states that PFBA and eBI are as cost-effective as screening alone.

Methods

We undertook participant recruitment, baseline data collection, randomisation, intervention delivery and follow-up electronically via an ad hoc, secure computer tablet application developed as part of this programme. We recruited 1639 participants into the trials from 10 EDs: 756 high-risk drinkers and 883 low-risk drinkers or abstainers. Follow-up at 6 and 12 months was 82.9% and 73.0%, respectively.

Results

The mean age of participants was 16.1 [standard deviation (SD) 0.9] years in the high-risk study and 15.2 (SD 1.0) years in the low-risk study. There was a similar proportion of male and female participants, with 50.7% female overall. Primary analysis employed an intention-to-treat approach, in which participants were allocated as members of their allocated group irrespective of the treatment received. Analysis of the primary outcome, namely average weekly alcohol consumption in standard UK units (1 unit = 8 g of ethanol) at month 12, was conducted using analysis of covariance, adjusting for baseline values, age and gender. There were no significant differences between the three groups in either trial: in the high-risk trial, the mean difference compared with control was 0.57 (95% CI –0.36 to 1.70) for PFBA and 0.19 (95% CI –0.71 to 1.30) for eBI; in the low risk trial, the mean difference compared with control was 0.03 (95% CI –0.07 to 0.13) for PFBA and 0.01 (95% CI –0.10 to 0.11) for eBI. No significant interactions were observed between baseline alcohol consumption and allocated intervention. Alcohol consumption at 12 months was predicted at baseline by higher alcohol consumption, younger age at first drink, older age, being female, greater positive alcohol expectancy and greater alcohol-related problems. Health economic analysis supported the null hypothesis that neither PFBA nor eBI is more cost-effective than screening alone in both trials.

Conclusions

Findings from this research indicate that both face-to-face and electronic interventions were neither more effective nor more cost-effective than screening alone in reducing or preventing alcohol consumption in 14- to 17-year-olds attending EDs.

Qualitative study

Once follow-up was completed for all trials, we interviewed a sample of participating adolescents to explore their understanding of the study, as well as their views about the information and advice they received.

Methods

We interviewed 27 adolescents aged 14–17 years. Audio-recorded interviews were transcribed verbatim and thematically analysed, guided by four ethical principles (autonomy, beneficence, non-maleficence and justice).

Results

Participants were broadly positive about their experience of being approached and involved in the research process, and the emergency care context was felt to be acceptable. Participants reported a 'need to know' about risks from alcohol consumption, as this behaviour was seen to be common among young people. However, the presence of a primary caregiver during screening procedures could influence a young person's disclosure about alcohol use. The majority of participants demonstrated a high degree of moral agency, that is, an awareness and capacity to be responsible for actions related to their own health and well-being, and this extended to providing consent, on their own behalf, to participate in the relevant clinical trial.

Conclusions

There is limited evidence regarding effective behaviour change interventions for young people attending health services owing to concerns about involving vulnerable adolescents in research. However, even relatively young adolescents reported the capacity to provide informed consent and showed a clear interest in research that was relevant to them and had potential to benefit young people like them.

Discussion

The results of both the low- and the high-risk trials showed that we were able to recruit a sufficient number of participants to each trial to meet our target. We were also able to exceed the minimum follow-up targets in both trials. However, in both trials no significant differences in outcome were found between groups on either primary or secondary outcome measures. This supported the null hypothesis that PFBA and eBI are no more effective in preventing or reducing alcohol consumption in either low- or high-risk drinkers than screening alone.

In both trials, we found that engagement with the eBI was low among participants randomised to eBI. Only one-third of participants engaged with the eBI platform after leaving the ED. This may have limited the impact of the eBI compared with the control intervention. However, as these were pragmatic trials, this is likely to be the level of engagement expected in the typical patient recruited from an ED.

Low application program (app) usage or engagement is a common issue. The vast majority of apps, and other online interventions, are not used 1 month after they are downloaded. We also know that patients are less likely to engage in extended interventions when the onus to engage is on them.

A large proportion of the literature based on eBI has focused on the provision of websites, as opposed to smartphone apps. Arguably, the most important problem with developing an effective eBI app is engaging participants enough for them to find it useful.

Further research should explore strategies to improve engagement with the intervention.

Patient and public involvement

We worked closely with the British Youth Council and the Family and Parenting Institute, which facilitated focus group workshops in London and Newcastle. About 150 members of our target age group contributed to both methodology and materials. This activity changed our screening and intervention, notably the use of tablet computers for consent and data collection, and the design of specific materials, notably our PFBA brief advice leaflet and SIPS City app (version 2.1, King's College London, London, UK). We now maintain a database of young people interested in taking this work forward, whom we intend to engage in disseminating study findings.

Overall conclusions

This research programme was designed to address key gaps in the evidence base for the most clinically effective and cost-effective SBIs for adolescents attending EDs. The research has advanced our understanding of the nature and prevalence of AUDs in adolescents, and provided a firm foundation for future research to improve care for this population. We established the prevalence of AUDs and consequences of drinking in young people attending EDs using validated research tools. We developed age-appropriate and acceptable interventions for this population, in partnerships with national and local organisations, and tested them in two linked randomised trials.

Trial registration

This trial is registered as ISRCTN45300218.

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