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## SPECIAL ISSUE: THE ADOLESCENT BRAIN AND ALCOHOL

## Alcohol Screening and Brief Intervention for Adolescents: The How, What and Where of Reducing Alcohol Consumption and Related Harm Among Young People

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**Abstract — Aim:** The aim of the study was to explore the evidence base on alcohol screening and brief intervention for adolescents to determine age appropriate screening tools, effective brief interventions and appropriate locations to undertake these activities. **Methods:** A review of existing reviews (2003–2013) and a systematic review of recent research not included in earlier reviews. **Results:** The CRAFFT and AUDIT tools are recommended for identification of 'at risk' adolescents. Motivational interventions delivered over one or more sessions and based in health care or educational settings are effective at reducing levels of consumption and alcohol-related harm. **Conclusion:** Further research to develop age appropriate screening tools needs to be undertaken. Screening and brief intervention activity should be undertaken in settings where young people are likely to present; further assessment at such venues as paediatric emergency departments, sexual health clinics and youth offending teams should be evaluated. The use of electronic (web/smart-phone based) screening and intervention shows promise and should also be the focus of future research.

## INTRODUCTION

Alcohol is a major global threat to public health (Ofori-Adjei *et al.*, 2007). The World Health Organization (WHO) reports that alcohol consumption is related to 3.2% of mortality worldwide (Rehm *et al.*, 2003), while in Europe alcohol accounted for 6.5% of deaths and 11.6% of disability adjusted life years in 2004 (Rehm *et al.*, 2009). Although the main burden of chronic alcohol-related disease is in adults, its foundations often lie in adolescence (Bellis *et al.*, 2009). The latest ESPAD survey of alcohol use among 14–15-year olds in 36 European countries found that 87% reported lifetime alcohol use, with 57% consuming alcohol on one or more occasion in the previous month (Hibell *et al.*, 2011). ESPAD found considerable variation in the levels of youth alcohol consumption between countries, with adolescents in the UK and Nordic countries drinking three times more than in Southern and Eastern Europe. Rates of youth alcohol use are lower in the USA than in Europe, with 70% of 18-year olds reporting lifetime alcohol use, and 33% in the preceding month (Johnston *et al.*, 2011). While the proportion of young people in England aged 11–15 years who reported that they have drunk alcohol decreased from 62 to 45% between 1988 and 2011, the mean amount consumed approximately doubled (from 6.4 to 10.4 units of alcohol per week) between 1994 and 2011 (Fuller, 2012). In England there has been a rapid increase in regular alcohol consumption during school-aged years, with 1% of 11 years reporting weekly alcohol consumption compared with 28% of those aged 15 years of age (Fuller, 2012). Adolescents in the UK are now among the heaviest drinkers in Europe (Hibell *et al.*, 2009).

Alcohol consumption and related harm increase steeply from the ages of 12–20 years (NHS Information Centre, 2008). In early adolescence alcohol use and alcohol use disorders (AUDs—alcohol abuse/harmful alcohol use and alcohol dependence) are relatively uncommon. But, alcohol has a disproportionately adverse effect on younger adolescents, for example, possibly predisposing them to damage the developing brain (Zeigler *et al.*, 2005), to develop alcohol dependence

in later life (Dawson *et al.*, 2008; Hingson and Zha, 2009) and increasing risk of disability (Sidorchuk *et al.*, 2012). In middle adolescence (ages 15–17 years) binge drinking (single occasion consumption leading to intoxication) emerges. Binge drinking is associated with increased risk of unprotected/regretted sexual activity (Windle and Windle, 2004; Hibell *et al.*, 2009, 2011), criminal and disorderly behaviour (Department of Health, 2007; Hibell *et al.*, 2009), suicide and deliberate self-harm (McCloud *et al.*, 2004), injury (Hibell *et al.*, 2009), drink driving or allowing oneself to be carried by a drink driver (Bukstein and Kaminer, 1994), alcohol poisoning (Rehm *et al.*, 2003) and accidental death (Thunstrom, 1988).

A review of national guidelines on consumption to limit alcohol-related harms (Furtwaengler and de Visser, 2013) found a lack of consensus between countries. Several nations had no official guidance on levels of consumption; others had a wide variety of definitions of a 'standard drink' (ranging from 8 g ethanol to 14 g). Actual guidance provided ranged from 20 to 56 g/day for males and 10 to 42 g/day for females. There are no specific guidelines for alcohol consumption among young people. In 2009 the Chief Medical Officer (CMO) for England provided recommendations (Donaldson, 2009) on alcohol consumption for young people based on an evidence review (Newbury-Birch *et al.*, 2009). The CMO advises that children should abstain before age 15 years and also suggests 15 to 17-year olds should not consume alcohol, but if they do drink, it should be no more than 3–4 units (24–32 g) and 2–3 units (16–24 g) per week in males and females, respectively, on an occasional basis.

Over the past 15 years the WHO, the US Surgeon General, the American Medical Association, and the American Academy of Paediatrics have called for practitioners to carry out screening and brief interventions (SBI) for adolescent drinkers (Elster and Kuznets, 1994; Committee on Substance Abuse, 2001; World Health Organisation, 2006; NIAAA, 2007). The alcohol strategies in both England and Scotland identify adolescents as a key target group in which to reduce alcohol consumption and related harm (Department of Health,

2007; Scottish Government, 2013). However, while there has been an increase in SBI activity in relation to adults presenting to health care providers, adolescents remain a neglected group.

## BRIEF INTERVENTION FOR ADOLESCENTS

The term brief intervention (BI) encompasses a range of therapeutic processes from advice to extended counselling, and typically is delivered in short sessions on one or more occasions. A number of trials focusing upon young people (aged 12–21) have reported significant positive effects of BI on a range of alcohol consumption measures (Monti *et al.*, 1999, 2007; Bailey *et al.*, 2004; Schaus *et al.*, 2009; Bernstein *et al.*, 2010; Walton *et al.*, 2010). Walton *et al.* (2010) noted that BI reduced alcohol-related harms, and Bernstein *et al.* (2010) found significant reductions in alcohol consumption compared with ‘information only’ controls. Bailey *et al.* (2004) found that BI participants showed increased readiness to reduce alcohol consumption, an initial reduction in alcohol consumption, and an improvement in knowledge regarding alcohol and related problems compared with the control condition. Researchers from the USA have also reported reductions in blood alcohol concentration, number of drinks per week and risk-taking behaviour (Schaus *et al.*, 2009). Monti *et al.* (1999) concluded that BI subjects were less likely to drink and drive or experience alcohol-related injury than controls, although both treatment groups significantly reduced their alcohol consumption. A subsequent trial conducted by the same research group (Monti *et al.*, 2007) reported that alcohol consumption was also significantly decreased in both BI and control groups. Spirito *et al.* (2004) found a significant reduction in alcohol consumption at follow-up in both BI and control groups. However, adolescents who screened positive for alcohol problems at baseline reported more changes after BI than controls. Three trials reported null effects after BI (Maio *et al.*, 2005; Peterson *et al.*, 2006; D’Amico *et al.*, 2008). One trial that used an audio-taped programme with 12 to 17-year-old adolescents (Boekeloo *et al.*, 2004) reported an increase in alcohol use and binge drinking among BI subjects, although it should be noted that in this age group one would expect increase in uptake of drinking, so this does not necessarily represent an adverse effect, but rather potentially a lack of effect. There has been a lack of consensus regarding the most effective components of effective interventions. Therefore we conducted a brief review of reviews (and recent trials) to identify screening methods, types and settings for interventions applied to adolescent populations that are effective in reducing alcohol consumption and related harms.

## METHOD

We conducted a review of reviews based upon publications from 2003 to 2013. A search of electronic databases (PubMed, Web of Science) was undertaken using the terms <alcohol>, <intervention> and <adolescent>. Search terms were expanded to include variations on these themes, and review papers were identified and summarized (Carey *et al.*, 2007; Deas, 2008; Lemstra *et al.*, 2010; Wachtel and Staniford, 2010; Calabria *et al.*, 2011; Jackson *et al.*, 2011; Carney and

Myers, 2012; Haug *et al.*, 2012; Mitchell *et al.*, 2013; Yuma-Guerrero *et al.*, 2012; Champion *et al.*, 2013; Newton *et al.*, 2013; Pilowsky and Wu, 2013). We defined adolescent as aged 10–21 years. Any studies of alcohol screening and brief intervention for adolescents that were not included in any of the published systematic reviews were identified and included in this review (Bernstein *et al.*, 2010; Walton *et al.*, 2010; Segatto *et al.*, 2011; Gmel *et al.*, 2012; Winters *et al.*, 2012) (Table 1). Studies that focused upon primary prevention of alcohol use were excluded from this review.

## HOW TO IDENTIFY ADOLESCENTS WHO DRINK

Various alcohol screening methods have been developed in the USA but have not been evaluated in the UK. Pilowsky and Wu (2013) reviewed screening instruments used in primary care settings, concluding that the CRAFFT had the most consistent data to support its use for older adolescents (15–18 years) in this setting; however, research comparing brief screening methods with more in-depth measures (such as the Time Line Follow Back) was limited. An earlier systematic review of alcohol screening and brief interventions in young people across a wider range of settings for both adolescents (age 10–17 years) and adults (aged over 18 years), conducted for the English National Institute for Health and Clinical Excellence (NICE) (Jackson *et al.*, 2009), reviewed 51 studies of alcohol screening. Questionnaires were found to perform better than blood markers or breath alcohol concentration in all age groups. In adolescents, the AUDIT questionnaire (Saunders *et al.*, 1993) was found to have greater sensitivity and specificity than other questionnaires (including CAGE, TWEAK, CRAFFT, RAPS4-QF, FAST, RUFT-Cut and POSIT). AUDIT sensitivities for adolescents range from 54 to 87% and specificities from 65 to 97% (Clark and Moss, 2010): the majority of the findings were at the lower end of the range of sensitivity and specificity and are therefore suboptimal for effective screening. Electronic or computerized screening is becoming more widely used and has proved to be an effective and acceptable method of identifying ‘at risk’ adolescents (Pilowsky and Wu, 2013).

Several shortcomings of existing alcohol screening methods for adolescents have been identified (Clark and Moss, 2010). Existing approaches do not sufficiently take account of age and developmental stage of adolescents. Any alcohol consumption may be of concern in younger adolescents, whereas identification of AUDs is more relevant in the older adolescent.

## WHAT INTERVENTIONS ARE EFFECTIVE?

A number of reviews on effective interventions for adolescents identified as being in need of help or advice about their drinking have now been published; the most recent of these have focused upon the use of internet, computer and mobile phone technologies, collectively referred to as electronic brief interventions (e-BIs). These reviews present limited evidence that e-BI significantly reduces alcohol consumption compared with minimal or no intervention controls (Champion *et al.*, 2013; Mitchell *et al.*, 2013; Newton *et al.*, 2013). However some caution should be exercised when interpreting these

findings as an earlier meta-analysis by Carey *et al.* (2012) that compared e-BI with more traditional face-to-face (F2F) delivery of interventions concluded that F2F is superior (Carey *et al.*, 2012).

BIs based on one or two sessions of motivational interviewing (MI) that lasted between 20 and 45 min have been studied in an adolescent population (Monti *et al.*, 1999, 2007; Peterson *et al.*, 2006; D'Amico *et al.*, 2008; Schaus *et al.*, 2009). Delivery of these interventions was carried out by a range of trained professionals including physicians, nurse practitioners, psychologists, addiction clinicians and youth workers. One trial tested a more intensive programme of four MI sessions during a 1-month period (Bailey *et al.*, 2004). Two studies used information technology to deliver BI, one involving the use of an audio programme in primary care clinics (Boekeloo *et al.*, 2004) and the other an interactive computer programme in a minor injury unit (Maio *et al.*, 2005). The length of follow-up ranged from 2 to 12 months. Overall, the loss to final follow-up evaluations was low (0–20%), although D'Amico *et al.* (2008) reported that 34% of their study population were lost to follow-up. MI is more effective when delivered across a series of sessions, rather than as a one-off intervention; the 2012 review by Carney and Myers (2012) included nine studies of MI in adolescent populations, concluding that individual interventions across multiple sessions had the strongest effect.

There have been several reviews of more intensive psychosocial interventions for adolescent AUDs (Williams and Chang, 2000; Deas and Thomas, 2001; Hser *et al.*, 2001; Perepletchikova *et al.*, 2008; Deas and Clark, 2009). Interventions have included behavioural and cognitive-behavioural therapies, motivational enhancement therapy (MET), contingency management and 12-step approaches (based on the principles of Alcoholics Anonymous). Family based interventions such as Multi Systemic Therapy and Multi Dimensional Family Therapy have been recommended by NICE for alcohol misusing adolescents with more complex needs (NICE, 2011); however, these are beyond the scope of this review. Interpretation of this literature is complicated because most studies examine comorbid drug and AUDs rather than AUD alone, and a wide age range from 12 to 18 years, and sometimes up to 25 years. Of these psychosocial approaches, MET shows promise as a treatment intervention for AUD in adolescents (Marlatt *et al.*, 1998; Kaminer and Burleson, 1999; Dennis *et al.*, 2004; McCambridge and Strang, 2004). MET has yet to be studied as a more intensive intervention in the context of a stepped care approach.

## WHERE IS THE BEST PLACE TO DELIVER THESE INTERVENTIONS?

A systematic review of brief alcohol interventions in young people attending health settings identified eight randomized controlled trials between 1999 and 2008 (Jackson *et al.*, 2009). Seven were based in the USA (Monti *et al.*, 1999; Boekeloo *et al.*, 2004; Spirito *et al.*, 2004; Maio *et al.*, 2005; Peterson *et al.*, 2006; D'Amico *et al.*, 2008), and one in Australia (Bailey *et al.*, 2004). Subsequently, a further trial based in a US student health centre was published in 2009 (Schaus *et al.*, 2009). Study population sizes range from 34 to 655, and ages ranged from 12 to 24 years. Three trials targeted socioeconomically disadvantaged groups where drug and alcohol misuse were more prevalent (Bailey *et al.*, 2004; Peterson *et al.*, 2006; D'Amico *et al.*, 2008). Four trials were based in ED in order to maximize the 'teachable moment' (Williams *et al.*, 2005) in which the connection between alcohol consumption and its adverse consequences can be more readily highlighted (Monti *et al.*, 1999, 2007; Spirito *et al.*, 2004; Maio *et al.*, 2005). Two studies recruited adolescents in a primary care setting during routine general check-ups (Boekeloo *et al.*, 2004; D'Amico *et al.*, 2008) and one in a university health centre (Schaus *et al.*, 2009). The remaining trials targeted homeless youth (Peterson *et al.*, 2006) and those attending a youth centre that delivered health services (Bailey *et al.*, 2004). An earlier review of BIs in health settings (Jackson *et al.*, 2009) was based on eight Randomised Controlled Trials (RCTs) (mostly MI focused) conducted between 1999 and 2008, of which five reported positive effects upon consumption and related harms.

Opportunistic alcohol screening and brief intervention in emergency departments (ED) have shown efficacy in adolescents (Monti *et al.*, 1999, 2007; Spirito *et al.*, 2004), with evidence of cost effectiveness in adults (Barrett *et al.*, 2006). One systematic review has explored BI delivered in ED settings (Yuma-Guerrero *et al.*, 2012). Of the seven RCTs identified, six of these employed a MI based intervention, and of these, half demonstrated significant reductions in alcohol consumption and consequences for the MI groups. Six of the seven studies reported positive treatment effects in all arms of the trials. To date no trials have been undertaken in paediatric ED settings; however, one programme of research is currently underway (SIPS Junior). The effectiveness of MI for this population had been previously reported by Wachtel and Staniford (2010) in a general review of effective interventions for adolescents (Wachtel and Staniford, 2010).

Table 1. Additional RCTs included in the review

| Study                          | Focus         | Population                  | Intervention                                       | Conclusion   |
|--------------------------------|---------------|-----------------------------|--|--|
| Gmel <i>et al.</i> (2012)      | Schools based | 5633 pupils<br>13–16 years  | MI based   | Intervention was ineffective   |
| Winters <i>et al.</i> (2012)   | Schools based | 315 pupils<br>12–18 years   | MI based   | Intervention groups had significant reduction in alcohol use                                       |
| Segatto <i>et al.</i> (2011)   | ED based      | 175 patients<br>16–25 years | MI based   | No significant differences in outcomes between groups. All groups reduced consumption              |
| Walton <i>et al.</i> (2010)    | ED based      | 726 patients<br>14–18 years | e-BI vs. therapist delivered<br>BI (both MI based) | Both active interventions reduced alcohol consequences   |
| Bernstein <i>et al.</i> (2010) | ED based      | 853 patients<br>14–21 years | MI based vs. information only                      | Significant increase in attempts to stop drinking in MI group. Consumption reduced in both groups. |

Most studies of schools based interventions have focused upon primary prevention aimed at children prior to the onset of alcohol use, and are therefore beyond the scope of this review. Two published RCTs describe the effect of MI on children identified as current alcohol users; both report significant impact on alcohol use (Winters and Leitten, 2007; Winters *et al.*, 2012). Gmel *et al.* (2012) reported borderline significant effects for MI on reduced levels of consumption, concluding that the intervention was ineffective. These findings should be interpreted with caution, however, as a recent critical review (Pape, 2009) reminds us to question the reliability of published reports of effectiveness in this setting. Calabria *et al.* (2011) reviewed interventions delivered outside of educational settings but were unable to identify any one approach that demonstrated superior impact.

## DISCUSSION

With 12% of 11–15 year olds drinking weekly (Fuller, 2012) and at least in the UK a fall in the age of onset of many alcohol-related harms such as alcohol liver disease (NCEPOD, 2013) there is a need to develop public health measures to tackle adolescent drinking. Recent systematic reviews (NICE, 2007, 2010) have not identified validated screening instruments that could be easily introduced across settings to accurately detect alcohol misuse use in younger adolescents (10–14 years old), who are more vulnerable to alcohol-related harms. In the absence of sensitive instruments to detect alcohol misuse in this age group, there is a risk of defining alcohol misuse in young people through the incidence of gross intoxication or hospital admissions due to alcohol poisoning, which might miss a proportion who could potentially benefit from alcohol intervention.

Greater accuracy in determining the level of need for alcohol misuse in adolescence will support the broader implementation of public health measures at a national and local level, as well as identify those individuals who may benefit from specific interventions. Screening methods that are sensitive to the developmental stage of the adolescent should be tested to maximize opportunities for intervention. Alcohol screening has been mostly studied in older adolescents and young adults of college age (18–24 years). Therefore the validity of alcohol screening methods in younger adolescents is unclear. Questionnaires such as the AUDIT may be too lengthy (10 items) to incorporate into busy settings pointing to the need for briefer tools for use in routine clinical practice.

Increasing engagement in screening particularly with younger adolescents might result from using computer screening and interviewing adolescents confidentially, separately from parents (Ford *et al.*, 1997; Gregor *et al.*, 2003). Screening is perhaps the most important element of SBI—reactivity to assessment has an impact upon outcome and screening itself may be the briefest of BIs—and yet no single screening instrument has been identified that reliably determines a young person's risk status. It is likely that no single cut-off on any screening instrument will suit the broad age range encompassed by adolescence, and that lower thresholds for AUDs for younger age groups will be required. Research to develop to refine existing tools by establishing concordance with Time Line Follow Back data should be a priority.

Most of the published research on brief alcohol interventions for adolescents has been set in mainly acute medical and ED or educational settings. Other care interfaces (such as sexual health clinics, adolescent mental health services or Youth Offending Teams) should be considered as potential settings for both identification of AUDs and the delivery of BIs.

Based upon the reviews to date and the RCTs undertaken from 2010 onwards, MI/MET approaches appear to be associated with reductions in alcohol consumption and related harms, with health settings proving to be a promising location for such programmes. e-BIs (computer, web and phone based) offer both effective and cost effective delivery of interventions across settings that may prove to be more acceptable to the target population than more traditional (F2F) approaches, yet the most effective mechanism for e-BI is less apparent—the utilization of ‘smart-phone’ technology may add both function and credibility to interventions; however, their usefulness in this context remains untested, with several clinical trials currently underway.

This brief review of reviews and recent RCTs suggests that despite an increasing interest in applying screening and brief interventions to an adolescent population, there are no clear indications of which target population, setting, screening tool or intervention approach can be recommended. The relationship between age, alcohol consumption and harm is complex and further research is required in order to establish guidelines for consumption and thresholds of harm for different age groups.

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