Use and misuse of drugs and alcohol in adolescence

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Substance misuse is one of a group of linked behaviours that has recently become more common among young people in westernised societies.^{w1} This rise has paralleled increasing rates of anxiety and depressive symptoms and of deaths related to substance misuse.^{1w1-w3} Substance use disorders are potentially treatable and should be managed as chronic, relapsing diseases of complex origin.² This review examines the scale of these disorders among young people and how healthcare practitioners can intervene.

Method

We searched Medline, Google, and the websites of the UK National Treatment Agency, US National Institute on Drug Abuse, and European Monitoring Centre for Drugs and Drug Addiction for suitable evidence based material. We also consulted colleagues working with young people with substance misuse, as well as consulting young people themselves and their carers.

What constitutes substance misuse?

Substance misuse and dependence are a subset of "substance use," which includes phenomena such as experimentation and intermittent recreational use. "Substances" include alcohol as well as illicit or (if deliberately misused) prescribed drugs. See box 1 and 2 for definitions. (Substance misuse is also referred to as substance abuse—for example, by the *Diagnostic and Statistical Manual of Mental Disorders*.)

Is substance use increasing?

Drugs

Serial data from the European school survey project on alcohol and other drugs (n=103 000 in 2003) showed a broadly stable rate of 40% lifetime use of cannabis in 15 year olds in the United Kingdom up to 2003.⁴ A more recent English school survey of 8200 school-children aged 11-15 years showed an overall decline in

Box 1 Definitions of misuse and dependence*

Substance misuse

Substance misuse is a maladaptive pattern of use leading to clinically important impairment or distress, manifested by one or more of the following over 12 months:

- Failure to fulfil major obligations at work, school, or home
- Use of a substance in situations in which it is physically hazardous
- Persistent or recurrent use of the substance despite persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance
- Persistent or recurrent use despite legal problems related to use of the substance

Substance dependence

Substance dependence is broadly equivalent to addiction and generally suggests physiological changes related to chronic drug administration. Dependence is associated with three or more of the following over 12 months:

- Tolerance
- Withdrawal
- Taking larger amounts than intended
- Unsuccessful efforts to cut down
- Spending a great deal of time obtaining or using the substance
- Giving up important activities because of use
- Continued use despite physical or psychological problems likely to have been caused or exacerbated by the substance

*Based on the *Diagnostic and Statistical Manual of Mental Disorders*⁴⁴

TIPS FOR NON-SPECIALISTS

- A good history may constitute an effective brief intervention
- It may often uncover neglect or mistreatment, depression, or school failure
- Health practitioners should meet parents or carers when possible
- Meeting parents may amplify the effect of intervention
- Young people in difficulties should be referred to substance misuse or mental health services

Box 2 Evidence for a neurological explanation of dependence

- A series of imaging studies of adults dependent on cocaine have shown abnormal responses in the prefrontal cortex and basal ganglia, including the nucleus accumbens and related structures. The studies showed that the "high" experienced by the participants coincided with rapid saturation of dopamine transporters in the basal ganglia.^{3w5-w7}
- Increased extracellular dopamine in the basal ganglia also motivates (or in animal studies prompts) the "emission of behaviours" in the pursuit of anticipated rewards such as food.^{w8} Commonly misused substances seem to trigger this mechanism, which leads to the person seeking reward.
- As use progresses to dependence there is pressure to avoid uncomfortable withdrawals.^{w7} This system seems to be the physiological basis for dependence or addiction, a condition in which the person's life becomes organised not by what we regard as rational considerations but by the largely subcortical drive to obtain the substance.

drug use from 11% in 2005 to 9% in 2007⁵ but also showed that 4% of 11 year olds had used illicit drugs in the past month, compared with 0% in 1998, when comparable data were first obtained.

Some southern (Cyprus, Malta, Greece) and northern (Norway, Sweden) European countries report rates for adolescents of <10% lifetime use of any illicit drug.⁴ However, other regions with previously low rates such as eastern Europe have shown considerable catch-up in lifetime use. In the United States, daily use of cannabis by 15 year olds has dropped from 6% to 5% but remains well above the 2% of the early 1990s.^{w9}

Alcohol

According to survey data,⁴ regular drinking is common among UK and Irish adolescents and has increased among 15 and 16 year olds from 22% in 1995 to 27% in 2003. This rise results partly from an increase from 20% to 29% in binge drinking among young females and an increase in self reported consumption of "alcopops" (fizzy, flavoured alcoholic drinks) among 15-16 year old girls. Reported rates of drinking among 11-13 year old boys and 14 year old girls have trebled since 1990.⁵

What do we know about rates of misuse and dependence?

Few large scale studies directly examine this question. However, survey data suggest that 10% of UK 15-16 year olds reported "problems" linked with substance use.⁴ A diagnostic study of a representative sample of 3021 Munich adolescents and young adults found that 18% exhibited substance misuse or dependence.^{6w10} At age 18 years, 20% of a New Zealand birth cohort of 1265 children were misusing alcohol and 6% were dependent. The corresponding figures for cannabis were 12% and 5%.⁷

Two large US cross sectional population studies of young adults showed that rates of cannabis dependence increased between 1991 and 2001.^{w11} The authors attributed this rise to more potent varieties of cannabis; the rise also paralleled the increase in cannabis use during that decade.

Does substance misuse impair the developing brain?

Recent research supports the view that early adolescence is a potential "critical period" during which the long term direction of biopsychosocial development can be altered.⁸ Substance use in the early teenage years may prove to have serious long term consequences.

Two studies of representative samples of over 43 000 US adults found that those who reported their first alcoholic drink before age 14 or their first drug use before age 15 were three times more likely to develop alcohol or drug dependence than those whose first use of alcohol or drugs was at age 15 or older.^{9w12} Regular use of cannabis before age 15 seems to be linked with increased risk of subsequent psychosis.^{w13}

Two small neuroimaging studies found that young adults who had misused or been dependent on alcohol in adolescence had smaller prefrontal cortices and hippocampi than healthy controls.^{w14 10} However, it is unclear whether these findings reflect alcohol neurotoxicity or pre-existing developmental vulnerabilities, or both, but animal studies support alcohol neurotoxicity.

A small longitudinal study of 113 subjects tracked from infancy showed that frequent users of cannabis in late adolescence had a lower IQ than expected and poorer performance on memory tests than non-users or former users.¹¹ This effect on memory may be one factor in the poor educational outcomes linked with cannabis use.

How dangerous is substance misuse?

According to UK National Statistics data for 2005,^{w3} 8.5% of male and 8.2% of female deaths in the 15-19 year age group were due to misuse of substances;

Box 3 Confidentiality

"Adolescents are more likely to provide truthful information if they believe that their information, at least detailed information, will not be shared. Before the adolescent interview, the clinician should review exactly what information the clinician is obliged to share and with whom. . . Typically, a clinician should inform the adolescent that a threat of danger to self or others will force the clinician to inform a responsible adult, usually the parents. The clinician should . . . encourage and support the adolescent's revealing the extent of substance use and other problems to parents. In other cases, the clinician should discuss what information that the adolescent will allow the clinician to reveal such as a general recommendation for treatment or impressions rather than a detailed report of specific deviant and substance use behaviors."

Taken from Bukstein et al¹³

Box 4 CRAFT questionnaire—brief screening test for substance misuse in adolescents*¹⁴

C—Have you ever ridden in a Car driven by someone (including yourself) who was “high” or who had been using alcohol or drugs?

R—Do you ever use alcohol or drugs to Relax, feel better about yourself, or fit in?

A—Do you ever use alcohol or drugs while you are Alone?

F—Do you ever Forget things you did while using alcohol or drugs?

F—Do your family or Friends ever tell you that you should cut down on your drinking or drug use?

T—Have you been in Trouble while using drugs or alcohol?

*Answering “yes” to two or more questions suggests an important problem

in the male group this is similar to the proportion of deaths due to cancer (8.5%) and far ahead of deaths due to infection, for example. If deaths from self harm (often associated with substance misuse) are added, the proportions rise to 21% and 16.8% of all deaths among this age group. Deaths from accidental overdose tend to occur most often among young adults, leading to substantial “years of potential life lost.”^{w15} A longitudinal study of 9491 notified teenage opiate addicts indicated that their death rate was 12 times greater than the death rate in the general population of teenagers; the addicts’ deaths were mainly due to accidental poisoning.¹²

Management

The capacity for healthcare workers to intervene requires first a preparedness to accept substance misuse as “their business.”

Assessing the problem

Assessment searches not only for the time line, dose, type, frequency, and context of substance use, but also for predisposing, maintaining, and protective influences. In straightforward cases, this may be achievable in one interview. Ideally, the history should also enable identification of problems such as school failure, neglect, or physical or sexual abuse. Taking a careful history and explaining confidentiality (box 3) may help to establish good rapport. Consider supplementing a history with screening questionnaires (box 4) and a physical examination looking for signs of physical or sexual abuse, neglect, poor growth, pregnancy, self

harm, injury, injection, and infection; also consider toxicology tests (box 5).¹³

Does watchful waiting have a role?

A large prospective study found that rates of substance dependence levelled off at age 18 years, with about 10% of illicit drug users being dependent.⁷ Similar trends have been shown in relation to alcohol.^{w16} Decreasing 12 month prevalence rates for misuse and dependence in one follow-up study suggested a significant rate of spontaneous recovery.^{w10} After assessment, a clinician might conclude that risk is not high and that a role for watchful waiting exists.

What active interventions can healthcare staff use?*Brief intervention*

In a recent randomised controlled trial a brief motivational intervention (box 6) almost halved the frequency of alcohol bingeing at 12 months’ follow-up among 13-17 year olds who reported excessive drinking on presentation to an emergency department compared with those who were assessed and given literature.¹⁶ There is recent evidence from an observational trial and a randomised controlled trial that a brief motivational interview versus information alone can substantially reduce the levels of both binge drinking and use of cocaine and ecstasy (3,4 methylenedioxy-methamphetamine) among regular teenage users at one year follow-up.^{w17 w18} However, reductions of substance use observed in control groups suggest that assessment and information alone may have prompted change.^{w17} The following strategies may exert useful effects: a sympathetically conducted history of substance use; thoughtful, knowledgeable interpretation of the findings; and avoidance of lecturing or arguing.

What to advise parents?

A large European survey of 15 year olds found that a confiding parent-child relationship is linked with markedly lower rates of substance use.¹⁷ International survey findings from a range of countries⁴ found that parental knowledge of their child’s whereabouts was a protective influence against substance use, although greater parental monitoring is likely to be a proxy for a

Box 5 Toxicology testing

“Toxicological tests of bodily fluids, usually urine but also blood, and hair samples to detect the presence of specific substances should be part of the formal evaluation and the ongoing assessment of substance use. The optimal use of urine screening requires proper collection techniques including [where possible] visualization of obtaining the sample [to ensure it is genuine], evaluation of positive results, and a specific plan of action should the specimen be positive for the presence of substance(s) . . . Because of the limited time that a drug will remain in the urine and possible adulteration, a negative result of urine testing does not [rule out drug use].”

Taken from Bukstein et al¹³

QUESTIONS FOR FUTURE RESEARCH

- What is the effect of brief interventions by health staff among younger adolescents?
- Do medications that work in adult alcohol dependence also work in young people?
- What is the potential for interventions in primary care?
- What is the effect of complex psychosocial interventions for those with multiple problems?
- What is the optimum intensity and length of interventions?

Box 6 Motivational interviewing (FRAMES)

Feedback—Give structured and personalised feedback on risk and harm

Responsibility—Emphasise the patient's personal responsibility for change

Advice—Give clear advice to the patient to change his or her drinking habits

Menu—Offer a menu of strategies for making a change in behaviour

Empathic—Deliver these strategies in an empathic and non-judgmental way

Self efficacy—Aim to increase the patients' confidence to change behaviour (self efficacy)¹⁵

confiding relationship in which the young person informs the parent of their whereabouts. A recent Finnish twin study found that the quality of the parent-adolescent relationship seems to moderate the effects of genetics on smoking tendency.^{w19} Whatever other predisposing factors may exist, a strong parent-child relationship could be a powerful barrier to substance misuse.

A nested observation of the intervention limb of a randomised controlled trial examining the effects of multidimensional family therapy for cannabis dependence showed that a good "therapeutic alliance" with the parents as well as with the young person was the best predictor of a good outcome.^{w20}

Often troublesome young people do not receive a generous response from education services or the police. Health professionals can support parents to be tenacious in obtaining a more supportive deal from education and other services.

More sustained intervention by healthcare practitioners

Research is limited on the role of healthcare providers in managing adolescent substance misuse. However, it is possible to extrapolate a general approach from relevant if tangential research. For example, a US randomised controlled trial of several interventions for young cannabis misusers reported significant reductions in use after each of these interventions. The authors concluded that the effect was the result of components that were shared between interventions.¹⁸ Interventional studies of adolescent depression and adult alcohol dependence evaluated the effects of seeing a healthcare practitioner as part of a placebo limb compared with specialist psychotherapy for a limited number of meetings over some months. Sympathetic, informed, supportive counselling from a health practitioner approached or equalled the effectiveness of cognitive behavioural therapy for adolescent depression¹⁹ and for adult alcoholism.^{w21}

A randomised controlled trial of 90 women with personality disorder (many of the young people receiving help from substance misuse services may be

developing serious personality dysfunction) showed that receiving weekly supervised support over a year led to improvement across a range of measures including self harm, depression, anxiety, and anger.^{w22} The authors commented that the continuity of care or "relationship focus" buffered the extremes of instability.

Without always consciously doing so, healthcare staff can exert substantial psychological "healing" and stabilisation, which are potentially valuable to troubled young people. The communication skills components of training could potentiate this capacity, particularly with regard to young people. Also, services working with young people need to offer continuity of care as a core feature.

An adolescent oriented service

A randomised controlled trial of 183 substance dependent adolescents showed that compared with clinic based appointments, a form of sustained flexible community outreach was linked with reduced substance use.²⁰ Services for adolescents could include flexible arrangements to meet, home visits, meetings in cafes, text messages, telephone calls to remind young people of appointments, and help with transport (which is crucial if some adolescents are to be engaged). This effort is required because, among those most vulnerable, lack of

ADDITIONAL EDUCATIONAL RESOURCES**For health professionals**

- National Treatment Agency (www.nta.nhs.uk)—A special health authority set up to ensure that better and fairer treatment is available for drug misuse
- National Institute on Drug Abuse (www.nida.nih.gov/)—Aims to ensure the rapid and effective dissemination and use of research results to improve prevention, treatment, and policy on drug misuse and addiction
- European School Survey on Alcohol and other Drugs (www.espad.org/)—For European data on substance misuse
- Monitoring the Future (<http://monitoringthefuture.org/>)—A more elaborate US counterpart to the European School Survey website
- United Nations Office on Drugs and Crime (www.unodc.org/)—This agency is responsible for combating drugs globally

For parents or patients

- Frank (www.talktofrank.com/)—A UK government sponsored website
- Erowid (www.erowid.org/)—A website with pieces sometimes written by people who have used drugs
- Tackling Drugs, Changing Lives (<http://drugs.homeoffice.gov.uk/dat/directory/>)—UK directory of local services

SUMMARY POINTS

Substance misuse or dependence is a form of chronic, relapsing, debilitating illness

International survey findings from a range of countries found that parental knowledge of their child's whereabouts protected against substance use, though this may be the result of a confiding parent-child relationship

Without always consciously doing so, healthcare staff can exert substantial psychological "healing" and stabilisation, which can be valuable to troubled young people

Healthcare organisations should actively engage young people through alliances with youth services, outreach, and continuity of care

external routine and structure (no school, work, family, organised interests), the effects of substances, mental disorder, and perhaps learning disability may be associated with markedly poor self motivation and organisation.^{21 22w23}

Using a range of community systems

Successful intervention often requires channelling a young person away from drug using peers and lifestyle. To achieve this goal, it is often necessary to tackle obstacles such as homelessness, educational exclusion, absence of a carer, continuing mistreatment, or risk of incarceration, all of which require solutions brokered with local services.

A further key strategy is to use other networks that are designed to take the longer term strain. The components of these networks differ across jurisdictions and with age but are likely to include elements from education, social work, criminal justice, non-governmental agencies, health, and mental health. Such a multifaceted system is difficult to test in a conventional trial, but packaged multidimensional or multisystem interventions have shown sustained positive effects.^{23 24}

Adjunctive interventions

Contingency management, pharmacotherapy, and motivational enhancement have been studied in healthcare settings. Voucher rewards for "clean" urine specimens and clinical attendance have been shown to be of benefit in managing addicted adults.¹⁵ However, contingency management is expensive, and its effectiveness with younger users has not yet been adequately studied. Combining broader psychosocial and pharmacological interventions to treat adolescent addicts, as has been shown to be effective among adult alcoholics,^{w21} has not yet been studied, but this might change with more medical interest in the field.

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