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Recent Trends in the Use of "Club Drugs": An Australian Review

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The use of "club drugs" such as MDMA, ketamine, and GHB appears to have increased in Western countries over the last 20 years, and Australia is no exception to that trend. While levels of use appear to be relatively low in the general population, among users of these drugs a number of adverse health and psychological problems, including dependence, have been reported. MDMA or ecstasy is the third most commonly used illicit drug in Australia, and relatively more information is available on its use in Australia than of drugs such as GHB or ketamine. Although there are no population level data available, levels of ketamine use in the general population appear to be lower than those of MDMA. In addition, the harms reported by recreational users are not excessive and the mortality rate is low. At the individual level, many of those who experiment find the effects aversive and do not persist. The harms that require further investigation are the association between ketamine and unsafe sex and injecting behaviors, the neurotoxic effects, and use in situations where there is a heightened risk of accidental death when the user's cognition is grossly impaired. In contrast, while least is known of the epidemiology of GHB use, there is mounting evidence suggesting significant acute and long-term risks associated with the use of this drug. This suggests an urgent need for international research on the patterns of use, health, and psychosocial consequences of GHB use. In order to address public health issues associated with a range of club drug use, there is a need for research to identify the trends in population prevalence of these drugs. This could be most easily achieved by the inclusion of MDMA, ketamine, and GHB in household surveys that are currently collected routinely in a number of countries.

Keywords ecstasy; MDMA; ketamine; GHB; club drugs; epidemiology

Introduction

This paper aims to examine the epidemiology of the use of "club drugs," with a particular emphasis on research conducted among Australian users. The term club drug is a fairly amorphous term used to describe drugs historically taken in social or party situations, but increasingly used across a wide range of contexts by many different groups of users. We have focused here upon three particular drugs typically used in such situations: "ecstasy" (MDMA), ketamine, and GHB. These drugs were chosen as they have become the subject of increasing interest and sometimes concern among health, law enforcement, and researchers due to the apparent increase in their use and related harms.

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Table 1
Data on lifetime prevalence of "club drug" use

	Ecstasy		GHB		Ketamine	
	%	Age range	%	Age range	%	Age range
Australia[a]	6.1	14 + years	n/a		n/a	
	19.7	20–29 years				
Canada[b]	5.6	Grades 7–12	1	Grades 7–12	2.6	Grades 7–12
France[c]	0.9	15–64 years	n/a		n/a	
Ireland[d]	3.8	15–64 years	n/a		n/a	
	7.1	15–34 years				
Netherlands[e]	3.6	15–64 years	n/a		n/a	
New Zealand[f]	5.4	15–45 years	4.7	15–45 years	0.7	15–45 years
Spain[g]	4.2		n/a		n/a	
United Kingdom[h]	5.9	15–59 years	n/a		n/a	
United States[i]	15.1	18–25 years				
	3.3	12–17 years				
United States[j]	2.1	8th Grade	0.9	8th Grade	1.1	8th Grade
	3.0	10th Grade	1.4	10th Grade	1.9	10th Grade
	4.5	12th Grade	1.4	12th Grade	2.1	12th Grade

[a]National Drug Strategy Household Survey 2001 (Australian Institute of Health and Welfare, 2002).
[b]Drug Use Among Ontario Students 2003 (Centre for Addiction and Mental Health, 2003).
[c]EROPP 2002 (Beck, Iegleye, and Peretti-Watel, 2003).
[d]Drug use in Ireland and Northern Ireland: First results from the 2002/2003 drug prevalence survey (National Advisory Committee on Drugs and Drug and Alcohol Information and Research Unit, 2003).
[e]Licit and illicit drug use in the Netherlands 2001 (Abraham, Kaal, and Cohen, 2002).
[f]Drug use in New Zealand National Survey 2001 (Wilkins et al., 2002).
[g]Household Survey on Drugs 2001 (National Plan on Drugs, 2001).
[h]British Crime Survey 2001/2 (Aust, 2002).
[i]SAMSHA 2001 National Survey on Drug Use and Mental Health (Substance Abuse and Mental Health Services Administration, 2002).
[j]US Monitoring The Future survey 2003 (Johnston, O'Malley, and Bachman, 2003).

Despite evidence that suggests an increase in the population level use of these drugs, research on the population prevalence of their use is limited, most probably because of the relative recency of their recreational use. Table 1 shows some of the available population level data on the prevalence of use of MDMA (ecstasy), GHB, and ketamine. With this limitation in mind we present a selected review of what is known about actions of these drugs, give a précis of some key Australian studies conducted with users of these drugs, and summarize existing data on the side effects of their use.

The drug most commonly associated with club drug use is "ecstasy" and this drug class has the most epidemiological data. Research is needed, however, to investigate the population prevalence of the use of drugs such as ketamine and GHB, which could easily be achieved through the inclusion of additional questions in household surveys, in addition to more in-depth studies.

The use of ecstasy appears to be increasing in many parts of the world. In Australia, general population surveys indicate an increase in those ever having tried ecstasy between the years 1998 and 2001: from 4.7% to 6.1% (Australian Institute of Health and Welfare,

2002). In recent years, there has been increasing interest in Australia in examining trends in the use and harms associated with ecstasy and related drugs (Breen, Topp, and Longo, 2002). There is a good history in Australia of an approach to drug policy that adopts supply reduction, demand reduction, *and* harm reduction initiatives. As a result of a focus upon evidence-based health, law enforcement, and drug policy in this country, Australia has developed detailed and sensitive early warning systems for detecting the emergence of trends in the use of ecstasy and related drugs, through the Party Drugs Initiative (PDI), which has been running in NSW since 2000 (White et al., 2003, 2004; Topp and Darke, 2001; Topp et al., 2002a) and in all Australian States since 2003 (Breen, Topp, and Longo, 2002; Breen et al., 2004).

The PDI is aimed at monitoring the price, purity, and availability of ecstasy and related drugs, as well as monitoring the patterns of use and harms related to these drugs. It involves the triangulation of three components: surveys of regular ecstasy users; interviews with key informants from health, law enforcement, and the nightclub industry; and the collection of existing indicator data on the availability, use, and related harms of ecstasy and related drugs. In 2003, over 800 regular ecstasy users were interviewed around the country, along with almost 200 key informants (Breen et al., 2004). In NSW, data from 2000 has indicated that use has increased over the period (White et al., 2004).

There have also been reports of an increase in the use and availability of other substances, such as ketamine and GHB (ABCI, 2000; McKetin et al., 2000). A 1997 survey of Australian ecstasy users found that 16% of the ecstasy-using sample reported ever having used ketamine, with only 3% reporting GHB use. In contrast, a study conducted in 2002 using a comparable sample reported 59% had used ketamine, with 35% of the respondents ever having tried GHB (White et al., 2003). These high rates were maintained in the 2003 study conducted by the same researchers (White et al., 2004). In 2003, PDI researchers documented the fact that the use of drugs such as GHB and ketamine was occurring in all states and territories around the country (Breen et al., 2004). Given these trends, the current review will briefly consider the evidence on the use and side effects of these drugs, as well as report the findings of previous studies of ecstasy, ketamine, and GHB users in Australia.

Ecstasy

Pharmacology

Ecstasy,[a] the street name for 3,4-methylenedioxymethamphetamine (MDMA), has gained popularity throughout the past two decades as a highly pleasurable drug often associated with the "dance" or "club" subcultures (Forsyth, Barnard, and McKeganey, 1997). MDMA has a high affinity for serotonin receptors and transport sites in the brain (Pierce and Peroutka, 1988). Serotonin-producing neurons in the brain regulate aggression, mood, sexual activity, sleep, and sensitivity to pain and also play a role in memory and temperature regulation (Gowing et al., 2002). While there are methodological problems with a number of the studies of MDMA neurotoxicity in humans, it is generally agreed that MDMA is a human neurotoxin, although the mechanism of action remains an active area of research (Sprague, Everman, and Nichols, 1998). The long-term functional consequences of ecstasy

[a]The term "ecstasy" originally referred to the compound 3,4-methylenedioxyamphetamine (MDMA). In reality, drugs sold and consumed as "ecstasy" could contain any combination of a number of substances that may or may not be related to MDMA. For the purposes of the current paper, the term "ecstasy" is used on the understanding that drugs consumed as such may not be MDMA or even one of its analogues.

use on human memory and cognition, however, remain to be determined by large-scale epidemiological studies.

Trends in Use

Increasing use among adolescents and young adults, as well as reports of potential neurotoxicity, have prompted a number of studies of ecstasy users throughout the world. To varying degrees, studies in Australia (Solowij, Hall, and Lee, 1992; Topp et al., 1999), the United Kingdom (Parrott et al., 2001; Winstock, Griffiths, and Stewart, 2001), Germany (von Sydow et al., 2002), Italy (Parrott et al., 2001), Spain (Bobes et al., 2002), the United States (Strote, Lee, and Wechsler, 2002; Klitzman et al., 2002; Mansergh et al., 2001), and Canada (Gross et al., 2002) have focused on patterns of use and harms among users recruited through purposive sampling. Purposive sampling involves recruiting participants from locations where ecstasy use is likely to occur; or from sources where a large number of ecstasy users are likely to be drawn (Kerlinger, 1986). Thus, participants for ecstasy studies have been recruited via rave parties (Gross et al., 2002); from sources such as street press and advertising targeted towards those attending dance parties, night clubs, and raves (Winstock, Griffiths, and Stewart, 2001; Topp et al., 1999); and from specific populations such as men who have sex with men (Klitzman et al., 2002; Mansergh et al., 2001).

Findings from these studies have suggested that ecstasy users are often middle class; white, slightly more likely to be male; and to be well educated and/or studying (Boys et al., 1999; Topp et al., 1999; Williamson et al., 1997; Hammersley et al., 1999). Prior research has found that ecstasy users take one to two ecstasy tablets on a typical use occasion (Solowij, Hall, and Lee, 1992; Topp et al., 1999), with use often occurring several times per month (Williamson et al., 1997; Solowij, Hall, and Lee, 1992; Topp et al., 1999).

Although these studies provide useful and necessary insights into patterns of use and harms associated with ecstasy use, the extent to which such samples are representative of ecstasy users in general is not clear. As a result of the "hidden" nature of illicit drug users (Griffiths et al., 1993), obtaining results that can be generalized to the entire population of users requires the recruitment of representative samples from the general population; such an exercise is typically beyond many research studies of illicit drug users. Recently, however, Topp and colleagues found that the characteristics and drug use patterns of ecstasy users recruited through purposive sampling were similar to those recruited in a general population household survey (Topp, Barker, and Degenhardt, 2004).

In a recent study examining the prevalence and correlates of ecstasy use in Australia using data from a national household survey, Degenhardt and colleagues found that ecstasy has become one of the most widely used illicit drugs in the Australian population, with a prevalence of recent use similar to amphetamines (Degenhardt, Barker, and Topp, 2004). Its use was particularly prevalent among young adults, with one in 10 of those aged 20–29 years, and one in 20 of those aged 14–19 years reporting use of ecstasy within the preceding 12 months. Users aged 20–29 years were more likely to be male, single, students, live in share households or households with parents and children than their counterparts. The finding of no significant differences between recent ecstasy users and others on completion of a post-secondary qualification or income level supports the notion that ecstasy is *not* linked with a certain social class or group.

The strongest correlates for ecstasy use in Australian young adults appears to be the use of other drugs, particularly amphetamines, cocaine, LSD, and cannabis (Degenhardt, Barker, and Topp, 2004; Strote, Lee, and Wechsler, 2002; Topp et al., 1999), and highlights the fact that ecstasy users can rarely be considered users of this drug only. The finding that

significant proportions of ecstasy users were likely to report binge alcohol use (more than 20 standard drinks in a single day) is consistent with evidence suggesting that ecstasy users may have a higher risk of other drug use problems, including alcohol use disorders (Lieb et al., 2002; Strote, Lee, and Wechsler, 2002).

Side Effects

Ecstasy use can bring about a range of negative physical side effects while under the influence of the drug and during the comedown period, such as irritability, fatigue, nausea, loss of appetite, weight loss, tachycardia, tremors, tics, tightening of jaw muscles, and jaw-clenching (Topp et al., 2002b; Darke et al., 2000; Parrott et al., 2002). MDMA has also been associated with severe, symptomatic hyponatremia, to which young women appear to be particularly susceptible (Budisavljevic et al., 2003).

Administering ecstasy intravenously is an issue of concern, due to the high risk of blood-borne virus infection. In Australia, users are likely to have injected ecstasy if they do not identify with the dance scene or have had a longer history of ecstasy use, and have injected other drugs (Topp et al., 1997).

Ecstasy has been documented to profoundly increase the sensuality of sexual experiences in both men and women (Buffum and Moser, 1986), despite inhibiting sexual performance by decreasing the ability to reach orgasm or to maintain an erection (Zemishlany, Aizenberg, and Weizman, 2001).

The morbidity and mortality associated with MDMA use is widely reported in the popular media. The use of MDMA, however, has been involved in 27 deaths in the U.S. and more than 50 in Europe, usually related to severe dehydration, strokes, hyperthermia, and hyponatraemia (Koesters, Rogers, and Rajasingham, 2002).

Negative side effects can also be brought about by chemical adulterants, such as dextromethorphan, which has been commonly found in ecstasy tablets, particularly in the U.S. (Sherlock et al., 1999). Another adulterant that has been found in ecstasy tablets is paramethoxyamphetamine (PMA). PMA ingestion, either alone or mixed with MDMA, has resulted in at least six deaths within Australia (White, Bochner, and Irvine, 1997). It is likely that the purity of "ecstasy" tablets may vary widely—the actual MDMA content in tablets may vary widely, as can the sorts of drugs contained within them (Breen et al., 2004).

Ketamine

Pharmacology

Ketamine hydrochloride is marketed as a short-acting, general anaesthetic for human and veterinary use (Parke-Davis, 1999–2000). Reports have indicated that ketamine is being used in social rather than medical and scientific settings in many parts of the world (Curran and Morgan, 2000; Weiner et al., 2000; New York State Office of Alcoholism and Substance Abuse Service, 1997; White and Ryan, 1996; Skovmand, 1996; Brown, 1995; Dotson, Ackerman, and West, 1995). There are very few formal studies, however, of nonmedical ketamine use.

Trends in Use

Jansen reported that ketamine was being used illicitly as early as 1967–68, with the drug being distributed by those who made it under names such as 'rockmesc' (Jansen, 2000). Both

popular and research accounts indicate that the recreational use of ketamine has widened in the context of nightclubs, dance parties, and 'raves' (Curran and Monaghan, 2001; Crysell, 1998; Kent, 1996). Over the past decade there have been a growing number of reports on the nonmedical, unauthorized use of ketamine in the United Kingdom (Dalgarno and Shewan, 1996), Sweden (Skovmand, 1996), Australia (White and Ryan, 1996), and the U.S. (Tori, 1996; Drug Enforcement Agency, 1997).

The information available in the peer-reviewed literature is currently limited as little research has been carried out into patterns of nonmedical ketamine. Nonmedical, unauthorized experimentation with ketamine was first reported in Australia in 1980 (Ahmed and Petchovsky, 1980). The authors believed that use of the drug was largely confined to medical circles. Since that time, anecdotal evidence indicates that the nature of users has become much more varied. Ketamine has not previously been identified in the Australian National Drug Household Survey, which examines prevalence of drug use; the 2004 survey assessed ketamine use in the Australian population for the first time. In 1994, ketamine was listed in the Australian Illicit Drug Report for the first time, with jurisdictions being urged to keep the matter under review during 1995 (Australian Bureau of Criminal Intelligence, 1995).

As in other countries, most recreational use of ketamine in Australia appears to be linked with the nightclub/dance party scene, although it is likely that use in medical and paramedical groups continues. Although the drug is usually snorted, very few ketamine users snort the drug in lines, instead they use "bumps." These have been defined as "small snorts usually measured by a tiny spoon provided with the container in which it is purchased" (Topp et al., 1998). In an Australian study, ketamine appeared to be added to an already extensive drug use repertoire of a well-educated and informed sample (Dillon, Copeland, and Jansen, 2003).

Side Effects

The use of ketamine has been linked with a range of unpleasant mental effects including anxiety, panic attacks, flashbacks, post-traumatic stress disorder, persistent perceptual changes, mania, depression, suicide, insomnia, nightmares, night terrors, an unpleasant feeling of being unreal or that the world is unreal, paranoid delusions, persistent hallucinations, automatic behavior, fragmentation of the personality, and aggression (Jansen, 2000). A study of Australian ketamine users found that they reported regularly experiencing effects such as an inability to speak, blurred vision, lack of coordination, and increased body temperature, which resulted in some either reducing their dose or stopping use altogether (Dillon, Copeland, and Jansen, 2003).

There are very few deaths by "pure" ketamine overdose recorded (i.e., not also involving another drug). Of 87 ketamine-linked deaths in New York City, none was purely due to the use of ketamine (Gill and Stajic, 2000). Parke-Davis has reported that there are cases of accidental injections with 10 times the amount required for surgery, with no obvious, lasting effects (Parke-Davis, 1999–2000). The principal physical dangers of most nonmedical use are currently believed to arise mainly from the setting, or an interaction between the user and the setting of use (Jansen, 1993), as ketamine can leave the user in a confused state. This can, for example, result in burns, falls (sometimes fatal), drowning, death by hypothermia from lying outside in winter, traffic accidents, and becoming a crime victim (e.g., "sedate rape").

There is a substantial amount of popular literature describing ketamine as having a marked potential for giving rise to nonphysical dependence (Turner, 1994; Sputz, 1989; Lilly, 1978), and case studies in the medical literature are accumulating (Moore and

Bostwick, 1999; Hurt and Ritchie, 1994; Soyka, Krupinski, and Volki, 1993; Jansen, 1990; Kamaya and Krishna, 1987; Ahmed and Petchovsky, 1980). There is evidence from animal studies to support the view that ketamine can give rise to a dependence syndrome without physical withdrawal phenomena (Beardsley and Balster, 1987). This resembles cocaine dependence without the "crash" after use. In addition to dependence, users have also reported problems with relationships, employment, finances, education and involvement in crime associated with their use of ketamine (Dillon, Copeland, and Jansen, 2003).

GHB

Pharmacology

Gamma-hydroxybutyrate (GHB) or sodium oxybate is also known as GBH, "grievous-bodily harm," "fantasy," "cherry meth," "Georgia Home Boy," "liquid ecstasy," "soap," "scoop," "Liquid X," or "Liquid E." The drug can come as either a crystal powder or, more usually as a clear, bitter or salty tasting liquid, usually sold in vials. It is also a neurochemical compound that occurs naturally in all cells of the human body.

Trends in Use

During the 1980s, GHB was widely available in the U.S., particularly in health food shops, where it was used by bodybuilders for weight control (Michael and Hall, 1994); it has also been sold in sex shops as an aphrodisiac. The marketing claimed that GHB promoted weight loss and muscular development. Galloway et al. (1997) suggested that this claim stems from the fact that GHB acutely facilitates slow-wave sleep, during which growth hormone release takes place. In recent years it has gained popularity among "party drug" users, possibly due to its euphoric and aphrodisiac effects (Australian Bureau of Criminal Intelligence, 2000).

In Australia, reports of recreational GHB have arisen in drug monitoring systems in New South Wales and South Australia, which noted the increased reporting of the use of GHB among regular ecstasy users sampled each year (White et al., 2003, 2004). Reports of GHB use and poisonings have also been documented in the U.S. (United States Department of Health and Human Services, 1997; Australian Bureau of Criminal Intelligence, 2000; Whitten, 2001), the United Kingdom (Thomas, Bonner, and Gascoigne, 1997), Canada (Weir, 2000), and Spain (Miro et al., 2002).

Increasing restrictions on the use of GHB in many countries (e.g., Nicholson and Balster, 2001) around the world has reduced the licit supply of GHB. In recent years, the ability of recreational users to obtain GHB over the Internet has also been quite markedly restricted. As a likely consequence of these restrictions, there have been increasing reports of the use of 1,4-butanediol (1,4-B) or gamma-butyrolactone (GBL) (Ingels et al., 2000). These are similar chemicals to GHB that also occur naturally in the body (Nicholson and Balster, 2001), which are metabolized into GHB in the body. They may be used as substitutes for GHB, but are known to be pharmacologically different. The effects of doses of GBL may also be greater than equivalent doses of GHB, which could lead to problems with dose titration (Nicholson and Balster, 2001).

There has been very little research conducted with recreational GHB users, so while there are clinical studies of the effects of GHB use, less is known about the patterns of use and harms associated with GHB use in recreational settings. In recreational settings, the additional factors of illicit GHB manufacture (and therefore inconsistent potency), variable individual response to GHB, environmental conditions, and polydrug use may increase risks

of GHB use, as is the case for all illicit drugs. Given that dose can be an important factor in increasing the effects of GHB, however, it may be that this issue is particularly crucial for recreational (illicit) GHB use (Nicholson and Balster, 2001).

In an Australian study, 76 recreational GHB users appeared to be a well-functioning and educated group who had only recent involvement with GHB use (Degenhardt, Darke, and Dillon, 2002). The short use careers of this sample of GHB users was consistent with evidence from countries such as the U.S. and the U.K. that the use of GHB for recreational purposes is a relatively recent phenomenon (Nicholson and Balster, 2001). The GHB users in this study had had extensive experience with a range of other drugs, and particularly, extensive recent use (use in the past 6 months) of a wide range of amphetamine substances and other drugs typically used by "club drug" users (Topp et al., 1999). The typical context of GHB use was with a wide range of other drugs—only 5% reported that they typically used GHB alone. In the U.S. sample the patterns of use were much heavier: almost half reported that they used GHB on 2 or more days *per week* (Miotto et al., 2001). In that study, they were most likely to use it two or more times on a use occasion, and take one to three capfuls.

Side Effects

Much of the research on GHB overdose has come in the form of case reports of poisoning, overdose, or death. Many of these have been discussions of a small number of cases where persons were suspected of having experienced an overdose of GHB (Ingels et al., 2000; Muller, 2003; Sanguineti, Angelo, and Frank, 1997; Karch, Stephens, and Nazareno, 2001; Li, Stokes, and Woeckener, 1998; Galloway et al., 1997); in one case, there was documentation of a "mass" GHB intoxication where 31 participants from a Californian rave party on New Year's Eve 1996 were hospitalized (Eckstein et al., 1999). There is good evidence to suggest that the number of GHB overdoses has increased in a number of countries in recent years (U.S. Drug Enforcement Agency, 2001; Whitten, 2001; Ferrara, Tedeschi, and Frison, 1995; Miro et al., 2002).

There has been little research conducted on the risk of overdosing on GHB among recreational users. In the Australian study mentioned previously, half (53%) of the sample of GHB users had overdosed at some time (overdosing was defined as losing consciousness and being unable to be woken) (Degenhardt, Darke, and Dillon, 2003). Of those who had used GHB more than 15 times, 75% had overdosed at least once. A third (33%) of those who had overdosed had done so more than three times; one person had reportedly overdosed 100 times. Two thirds (63%) had seen another person overdose after using GHB (Degenhardt, Darke, and Dillon, 2003).

It must be noted that some of these Australian users did not see overdose as a negative thing, with many reporting that they had obtained information on this via the Internet and that they felt GHB overdose was not in itself a dangerous thing (Degenhardt, Darke, and Dillon, 2003). These risk perceptions need to be considered in any intervention aimed at minimizing the harms associated with GHB, with efforts aimed at educating users of the risks that may occur after becoming unconscious (e.g., falls, injuries, and the risk of choking, particularly if vomiting also occurs).

It has been argued that one of the most dangerous aspects of recreational GHB use are the difficulties in determining the strength and therefore the "safe" dose of GHB (Chin, Kreutzer, and Dyer, 1992; Galloway et al., 1997). It may be that this plays a part in the occurrence of GHB-related overdose. This possibility is consistent with the findings of the Australian study suggesting that GHB use itself was the only distinguishing risk factor for overdose (Degenhardt, Darke, and Dillon, 2003).

There is some evidence that tolerance to and physical dependence upon GHB may develop, as suggested by a withdrawal syndrome that may include insomnia, muscular cramping, tremor, and anxiety (Galloway et al., 1997). There have been published case reports of GHB dependence among chronic heavy users (McDaniel and Miotto, 2001; Craig et al., 2000; Galloway et al., 1997; Friedman, Westlake, and Furman, 1996). These have typically followed sustained periods of heavy, regular use of GHB.

In the study by Degenhardt and colleagues, approximately 4% of participants were classified as dependent upon GHB (Degenhardt, Darke, and Dillon, 2002): while this prevalence estimate is low, it does indicate that dependence upon GHB appears to occur among recreational users. This prevalence rate could also increase over time, given that GHB has only relatively recently been used recreationally in Australia. In support of this, the American study of GHB users, which comprised a more long-term and heavier using sample, found that 21% of the sample reported having felt as though they were "dependent" upon GHB at some time (Miotto et al., 2001).

There have also been a number of reports of withdrawal from GHB and GBL following a period of heavy and regular use (Schneir, Ly, and Clark, 2001; Catalano et al., 2001; McDaniel and Miotto, 2001; Dyer, Roth, and Hyme, 2001; Bowles, Sommi, and Amiri, 2001). The symptoms reported during withdrawal included insomnia, irritability, paranoia, auditory and visual hallucinations, mild tachycardia, hypertension, nausea, and vomiting. Withdrawal symptoms typically began within hours of cessation of use, and severe symptoms proceeded if there was no immediate admission for medical detoxification.

Discussion

The use of ecstasy and related drugs such as ketamine and GHB appears to have increased in Western countries over the last 20 years, and Australia is no exception to that trend. For the past 5 years, relatively good monitoring has occurred with sentinel groups of regular ecstasy users in Australia, with the result that rich data are available on sentinel groups of party drug users. However, there is at present a lack of data on population level use of newer drugs such as GHB and ketamine. While levels of use appear to be relatively low in the general population, among users of these drugs a number of adverse health and psychological problems, including dependence, have been reported.

MDMA or ecstasy is the much more widely used of the three, with greater information on patterns of use in the general population to complement targeted studies among user groups. Levels of ketamine use in the general population appear to be much lower than those of MDMA. At the individual level, many of those who experiment find the effects aversive and do not persist. The harms that require further investigation are the association between ketamine and unsafe sex and injecting behaviors, the neurotoxic effects, and use in situations where there is a heightened risk of accidental death when the user's cognition is grossly impaired.

In contrast, while least is known of the epidemiology of GHB use, the majority of data arises from health services data sets with users reporting significant morbidity associated with use. In 2004, data from an Australian household survey has included for the first time data on GHB and ketamine use in the general population, which will enable a better understanding of the epidemiology of use of these drugs.

RÉSUMÉ

l'utilisation des "club drugs" comme MDMA, le ketamine et le GHB semble avoir augmenté dans les pays occidentaux au cours des 20 dernières années, et l'Australie n'est aucune

exception à cette tendance. Tandis que les niveaux de l'utilisation semblent être relativement bas dans la population générale, parmi des utilisateurs de ces drogues un certain nombre de santé défavorable et des problèmes psychologiques, y compris la dépendance, ont été rapportés. MDMA ou ecstasy est la troisieme drogue illicite le plus généralement utilisée en Australie, et relativement plus d'information est disponible sur son utilisation que des outres drogues telles que GHB ou ketamine. Bien qu'il n'y ait aucune donnée de niveau de population disponible, les niveaux de l'utilisation de ketamine dans la population générale semblent être inférieurs à ceux de MDMA. En outre, dommages rapporté par les utilisateurs récréationnels ne sont pas excessifs et le taux de mortalité est bas. Au niveau individuel, beaucoup de ceux qui expérimentent trouvaille les effets opposés et ne persistent pas avec cet usage. Les dommages qui exigent davantage de recherche sont l'association entre le ketamine et le sexe non protégé et des comportements d'injection, les effets neurotoxic, et utilisation dans les situations où il y a un risque intensifié de la mort accidentelle quand la connaissance d'usagers est excessivement altérée. En revanche, alors que mineur est connu de l'épidémiologie de l'utilisation de GHB, il y a une accroît l'évidence qui suggère qu'il y ait des risques aigus et à long terme significatifs liés à l'utilisation de cette drogue. Ceci suggère un besoin pressant de recherche internationale sur les modèles de l'utilisation, de la santé et des conséquences psychosociales de l'utilisation de GHB. Afin d'aborder des questions de santé publique s'est associé à une gamme de l'utilisation des "club drugs" il y a un besoin de recherche d'identifier les tendances dans la prédominance de population de ces drogues. Ceci pourrait le plus facilement être réalisé par l'inclusion de MDMA, de ketamine et de GHB dans les enquêtes de ménage qui sont actuellement rassemblées par habitude en un certain nombre de pays.

RESUMEN

Durante los últimos 20 años, el uso de "club drugs" (por ejemplo MDMA, ketamine y GHB) parecen haber aumentado en los países occidentales, Australia no es ninguna excepción a esa tendencia. Mientras que los niveles de uso aparecen ser relativamente bajos en la población en general, entre los usuarios de estas drogas, un número de problemas de salud y de problemas psicológicos, incluyendo dependencia, se han divulgado. MDMA o Ecstasy es la tercera droga ilícita más comúnmente usada en Australia. En Australia hay relativamente más información disponible en el uso de Écstacy que de las otras drogas tales como GHB o ketamine. Aunque no hay datos disponibles del nivel de usuarios, los niveles del uso del ketamine en la población general aparecen ser más bajos que los de MDMA, además el daño divulgado por los usuarios de estas drogas no es tan excesivo y el numero de mortalidad es bajo. A escala individual, muchos de los que experimentan efectos adversarios no persisten con el use de las drogas. Los daños que requieren investigación adicional es la asociación entre: ketamine y la practica de sexo sin profilácticos (condones), los comportamientos al inyectar, los efectos neurotoxicos y el uso en situaciones donde hay un gran riesgo de muerte accidental cuando la cognición de los usuarios se deteriora enormemente. En contraste, mientras menos se sabe de la epidemiología del uso de GHB, hay una creciente evidencia que sugiere un significante riesgo agudo a largo plazo asociados con el uso de esta droga. Esto sugiere una urgente necesidad de estudio a escala internacional en los métodos de uso, salud y psico-sociales consecuencias del uso de GHB. Para tratar problemas de salud pública asociados con el uso de "club drugs" hay una necesidad de investigar tendencias en la prevalecencias de estas drogas. Esto se podría alcanzar lo más fácilmente posible por la inclusión de MDMA, del ketamine y de GHB en las encuestas que se recogen rutinariamente en un número de países.

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