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GHB AND ITS PRECURSOR GBL:
AN EMERGING TREND CASE STUDY

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Key issues at a glance

Use of GHB, also commonly referred to as 'liquid ecstasy', surfaced on the recreational nightlife scene in some parts of Europe, the USA and Australia during the 1990s. It is usually consumed in recreational nightlife settings, where it is taken orally in liquid form for sought-after effects that are close to alcohol. More recently, there have been reports of direct consumption of the precursor chemical, gamma-butyrolactone (GBL) which is rapidly converted into GHB in the body.

Use of GHB/GBL is, generally, low in the EU but there is evidence of some sub-populations, settings and geographical areas where it is commonly used, such as in gay nightclubs. Among 15–16 year old school students lifetime prevalence is between 0.5 % and 1.4 % in 12 of the EU countries. Surveys conducted in dance music settings report higher prevalence estimates for ever in lifetime use of GHB that range from 3 % to 19 % but prevalence drops to less than 3 % in all estimates for last month use. Little is known about use of GHB in private settings for purposes of recreation, bodybuilding and self medication.

In March 2001, GHB (shown as gamma-hydroxybutyric acid) was added to Schedule IV of the 1971 UN Convention on Psychotropic Substances. Therefore, all EU Member States were bound to control it under their legislation addressing psychotropic substances. The new controls rapidly curtailed the previously open sale of GHB. They may also help to explain the emergent use of GBL, which does not fall under the controls of the international drug control convention.

GHB has a steep dose-response curve where even a small increase in dose can cause serious toxic effects, including impaired consciousness and coma. Combined use of alcohol or other psychoactive substances, both depressants and stimulants, may intensify the toxic effects of GHB. With the increased direct consumption of GHB's precursors, additional health challenges may arise.

Concerns are increasing about the use of GHB precursor chemicals, gamma-butyrolactone (GBL) and 1,4-butanediol (1,4-BD), that are rapidly converted to GHB when ingested. Furthermore, GHB can be easily manufactured from GBL and 1,4-BD, which are widely used in the chemical industry and commercially available. Some Member States (Italy, Latvia, Sweden) have chosen to control one or both precursors under drug control or equivalent legislation. The European Community and the Member States have taken additional voluntary measures to prevent their diversion.

The ease with which GBL can be acquired allows potentially much easier and cheaper access than that usually found in illicit drug markets in the EU. On the internet, prices of GBL vary between 9 cents and 2 euros for a 1-gram dose.

Accidental overdoses that occur in recreational nightlife settings account for a substantial proportion of the overall drug related emergencies that require emergency ambulance or hospital services in a number of European cities.

Media coverage of 'drink spiking' with GHB — particularly cases of 'drink spiking' to facilitate sexual assault (often referred to as 'date rape') — has brought GHB into the spotlight. However, forensic evidence points to the more common presence of alcohol in cases of reported sexual assault. Evidence for this type of crime is notoriously difficult to obtain and true incidence may be higher than identified due to non- or delayed reporting.

Responses to the use of GHB commonly target nightlife settings and usually consist of training club staff and disseminating information about the risks of using GHB. Such prevention often takes place in conjunction with other interventions related to 'club drugs' and use of alcohol and drug combinations. On the internet a wide range of information sources on GHB/GBL exist, generally targeting drug users, recreational drug users or users attending electronic dance music events.

Contents

Introduction

GHB is a compound which occurs naturally in the body, but is also a medicinal product and a recreational drug. Non-medical use of GHB is reported to have begun in the 1980s by body builders. Use of GHB surfaced on the recreational nightlife scene in some parts of Europe, USA and Australia during the 1990s, specifically in night clubs where many other drugs were being commonly used. Concerns quickly arose about the health risks associated with its use. In particular, anxieties arose about the potential for surreptitiously adding GHB to drinks (commonly referred to as 'drink spiking') to facilitate sexual assault.

At the EU level, GHB has been under surveillance since 2000, when the Horizontal working party on drugs of the European Council requested a risk assessment to be carried out on GHB under the terms of the 1997 Joint action on new synthetic drugs (EMCDDA, 2002). On the basis of the resulting risk assessment report, the Council requested the EMCDDA and Europol to 'actively' monitor GHB. In March 2001, GHB (shown as gamma-hydroxybutyric acid) was added to Schedule IV of the 1971 UN Convention on Psychotropic Substances. Therefore all EU Member States were bound to control it under their legislation addressing psychotropic substances.

There are no known reported industrial uses of GHB and new controls rapidly curtailed the previously open sale of GHB. However, concerns are increasing about the direct consumption of GHB's precursor chemicals, gamma-butyrolactone (GBL) and 1,4-butanediol (1,4-BD). These are rapidly converted to GHB when ingested, yet are widely used in the chemical industry and are commercially available. Furthermore, GHB can be easily manufactured from GBL and 1,4-BD. In view of concerns about the diversion of GHB from the domestic distribution channel and illicit trade of GBL, some Member States — Italy, Latvia and Sweden — have chosen to control one or both precursors under drug control or equivalent legislation (EMCDDA, 2007b).

About the E-POD project

This paper is part of a series of EMCDDA E-POD case studies. Each E-POD case study provides practical knowledge to help to build a better European understanding of emerging drug trends, and to develop optimal responses to them.

GHB/GBL has been selected as the focus for this study based on the following criteria: there is a lack of routine data about prevalence of GHB use in the EU; there are potentially severe health risks associated with its consumption and there is a potential for its use to spread. In addition, there have been anecdotal reports about an increase in hospital emergency admissions related to the illicit use of a precursor chemical to GHB, GBL.

Main sources of information for the case study on GHB are:

- EMCDDA reporting form (Detecting, tracking and understanding emerging trends, between July 2005 and October 2005)
- Early Warning System reports
- National Reitox reports
- EMCDDA risk assessment report
- EMCDDA drug profiles
- ESPAD School Survey Project
- Scientific articles published in peer reviewed journals
- Published literature
- Forensic science bulletins
- Official governmental and international organisations documents
- Grey literature
- Newspaper and magazine media articles
- Internet websites and discussion groups
- Personal communication with key informants

Although GBL and 1,4-BD are not included in the Tables of the 1988 UN Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances, the European Community and the Member States have taken additional voluntary measures to prevent their diversion. These include guidance for operators to be vigilant when placing these substances onto the international market. Discussions about possible further controls of the two precursors are in progress in the UK.

Description

GHB is an abbreviation for both gamma-hydroxybutyric acid (protonated form) and gamma-hydroxybutyrate (deprotonated form of the carboxylic acid moiety). GHB was first synthesised in 1960 (Laborit, 1964), but was later discovered to be an endogenous compound present at very low levels in the body (Bessman and Fishbein, 1963). Importantly, GHB is also a product of post-mortem decomposition.

GHB can form salts (e.g. sodium and potassium salts), which are soluble in water and alcohol. It is colourless and easily mixes in aqueous solutions; however, a salty taste may be noticeable (Ward et al., 1998).

Medical use of GHB

Since the 1960s GHB has undergone various pre-clinical and clinical trials and has been evaluated for a range of potential therapeutic uses in obstetrics, anaesthesia, alcohol/opiate withdrawal and treatment of narcolepsy and cataplexy. Furthermore, some reports have suggested anti-depressant effects of GHB as well as sex enhancing effects in humans.

The international non-proprietary name of GHB is sodium oxybate. Pharmaceutically, it is presented as sodium gamma-hydroxybutyrate in liquid form. It was originally evaluated and is used as an anaesthetic, particularly in France and Germany as Gamma OH™ and Somsanit™, respectively. It has also been assessed in the treatment of narcolepsy and associated disorders such as cataplexy ([1]), in addition to its use as an aid to opiate and alcohol withdrawal as Alcover™ in Austria and Italy. In June 2005, the European Medicines Agency (EMEA) recommended granting a marketing authorisation for the medicinal product Xyrem®, where the active substance is sodium oxybate (500 mg/ml), to treat adults who have narcolepsy with cataplexy (EMEA, 2005). Consequently, in October 2005 the European Commission granted a marketing authorisation for Xyrem valid throughout the European Union. Xyrem can only be obtained with a special prescription; it is given at a dose of 4.5 to 9g per day in two equally divided doses (EMEA, 2005). GHB is not authorised for veterinary use.

Recreationally, GHB is usually obtained in the form of a liquid formulation. Rarely, it is also encountered as a powder, either loose or in capsules. Prior to sale or consumption the powder (usually GHB sodium salt) is typically mixed with water and the route of administration is usually oral. 1ml of such liquid usually contains approximately 1g GHB, although there may be variances in the GHB concentrations of such solutions.

GHB is a central nervous system (CNS) depressant but its specific action is not fully understood. However, it is believed that GHB binds to GABAB and GHB-specific receptors (Benavides et al., 1982 and Maitre et al., 1990) that lead to an increase in dopamine in the brain. There may also be an accompanied increase in the release of endogenous opioids, for example, dynorphin (Hechler et al., 1991).

At low doses, GHB effects are similar to those of alcohol. Sought after effects from ingestion of GHB are euphoria, relaxation, reduced inhibition and sedation depending on the dose taken. Non-medically, GHB is used for its relaxant and euphoric effects, to enhance bodybuilding, to induce sleep and as an alcohol/drug substitute (self-medicating insomnia, depression and alcohol

([1]) Narcolepsy is a sleep disorder that causes excessive daytime sleepiness; cataplexy is a symptom of narcolepsy involving sudden muscle weakness in response to an emotional reaction.

dependence) for sexual relaxation and disinhibition.

If pharmaceutical-grade GHB (i.e. >99 % purity) cannot be obtained, illicit GHB can be easily synthesized from a chemical precursor, gamma-butyrolactone (GBL) by changing the pH with addition of an alkali (e.g. sodium hydroxide). There are dangers associated with this, particularly as the reaction is exothermic ([2]) and GBL is flammable. Commercially and widely available as a solvent, GBL is also a metabolic precursor, which when ingested can be converted in the body to GHB. The other precursor, 1,4-BD, is also rapidly converted in the body to GHB. GBL and 1,4-BD produce effects that are identical to those of GHB (ACMD, 2002). It is important to note that in vivo 1,4-BD is converted into GHB by alcohol dehydrogenase (González and Nutt, 2005), therefore its metabolism may be affected by alcohol co-ingestion. Preparations of both precursors may be ingested by users, consequently information about GHB that is based on self-reports of users (in the absence of forensic or toxicological analysis) may relate to direct use of a precursor chemical (most likely GBL) rather than GHB.

Methods

Information about GHB that is based on self-reports of users (in the absence of forensic analysis) may relate to direct use of a precursor chemical (most likely GBL) rather than GHB.The relatively recent introduction of GHB/GBL into the illicit drug market means that information on its use is not within the routine reporting scope of many general population surveys. However, ESPAD and some other representative school student surveys that were developed during the 1990s include questions about the use of GHB/GBL. Prevalence estimates of GHB/GBL use reported in these surveys are very low and because they are usually based on a very small number of students they can only be indicative. In addition to school surveys, information about the prevalence and patterns of GHB/GBL use is derived from a range of non-probability surveys conducted in dance music settings and other surveys that target individuals with a prior interest in recreational drugs. These non-probability surveys (conducted in a limited number of countries) almost always show higher prevalence estimates of illegal drug use than those found in general population surveys. They cannot, therefore, be regarded as representative in any statistical sense, and drawing comparisons between different countries or over time based on these surveys must be done with caution.

Prevalence and use patterns

Most information about the prevalence of GHB use is derived from surveys which ask respondents about their drug use. Whilst respondents may report that they have used GHB, they may in fact have used one of its precursor chemicals. There have been reports of the precursor chemical (GBL) being sold as GHB which are based on chemical analyses of liquid drugs seized from individuals attending nightclub venues in London (Wood et al., 2007). Hence, when referring to prevalence and patterns of use, the term GHB/GBL may include known or unknown use of GBL or 1,4-BD, particularly in surveys conducted after GHB was placed under drug control and when it began to be substituted by GBL.

On the basis of the limited information available, use of GHB/GBL is, generally, low in the EU but there is evidence of some sub-populations, settings and geographical areas where it is commonly used, such as in gay nightclubs.

In 2003, national school survey data collected in 25 Member States plus Norway, Croatia and Turkey indicated that GHB/GBL has been tried by a very small proportion of 15-16 year olds

([2]) Exothermic reaction, i.e. which releases energy (heat).

(somewhere between 0.5 % and 1.4 %) in 12 EU countries. These school surveys show that the students generally perceive GHB/GBL to be considerably less available than cannabis, despite current concerns about the ease of access to GHB/GBL. With regard to risk perceptions, the majority of students view the risks associated with trying GHB/GBL to be as low, or even lower, than the risks of trying cannabis in more than half the countries surveyed (Hibell et al., 2005).

Methods

During the early stages of an emerging drug trend, prevalence estimates are inevitably very low and confined to specific geographical areas and sub population groups. Data are limited and usually lack the methodological requirements needed for making robust comparisons over time. Therefore methods to assess developments in a new drug trend must invariably tap into a wide range of different sources rather than rely on the key indicators commonly used for assessing changes in the more common and well established drug trends.

Surveys conducted in dance music settings and other targeted surveys report prevalence estimates for ever in lifetime use of GHB/GBL that range from 3 % to 19 %. For example, a large UK Independent Drug Monitoring Unit (IDMU) survey, using anonymous questionnaires distributed at popular music festivals and similar outdoor events between 1999 and 2002, reported that approximately 3.4 % of over 8,000 respondents had ever used GHB/GBL (Atha and Davis, 2003). An Austrian study of 225 young people attending raves in Vienna in 2002 reported that 12.6 % had ever used GHB/GBL (EMCDDA Reitox Early Warning System Report). A survey of 408 pub-goers in Amsterdam conducted in 2005 reported lifetime prevalence of 10 %. However, evidence suggests a rather niche market for GHB/GBL where use is concentrated in very specific subpopulations. Among respondents sampled in 'gay' Amsterdam bars prevalence estimates for GHB/GBL use rose to 17.5 % and in the city's 'hip' bars 19 % compared to less than 5 % among respondents in the more mainstream or student pubs (Nabben, Benschop, Korf, 2006). A UK clubber's magazine survey, based on a self-selected sample of readers of Mixmag in 2004 represents a population that generally reports higher than average prevalence estimates for drug use, reported lifetime prevalence estimates of 18.1 % for use of GHB/GBL. Prevalence drops to less than 3 % in all estimates for last month use (Mitcheson, 2007: personal communication). A UK survey shows that the peak age for first trying GHB/GBL is in young adulthood and not in the teenage years which are associated with first trying cannabis and other drugs. This suggests that most GHB/GBL users will have tried many other drugs before experimenting with GHB/GBL (Atha and Davis, 2003). It should be noted that data sources located in recreational dance music settings will inevitably under-represent those who generally take GHB/GBL in more private settings for the purposes of relaxation and recreation or to self-medicate in relation to sleep, alcohol or other substance abuse problems.

Two European surveys provide a more profound understanding about the effects of GHB/GBL and about the users themselves and the context of their use. These surveys have been conducted among targeted population groups that use or have used GHB/GBL. The first was a Dutch survey conducted in 2001 among 72 GHB/GBL users ([3]). It reported that three quarters of the respondents had taken GHB/GBL at least once a month in the past year and half of these had taken it at least once a week. Most took GHB/GBL in combination with other substances (Korf et al., 2002). The second survey, conducted in the UK in 2006, was an internet survey of 189 GHB/GBL users ([4]). This survey reported that a third of the 189 users had taken GHB/GBL during the last month and two thirds reported mixing GHB/GBL with other drugs (Sumnall et al., 2007).

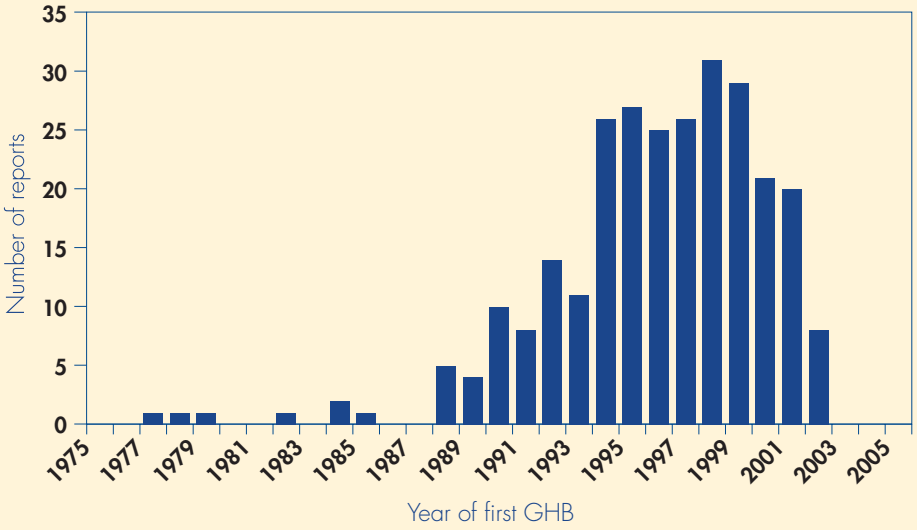
([3]) GHB users defined as having taken GHB 5 times or more in their lifetime and at least once in the past year.

([4]) GHB users defined as having taken GHB at least once in their lifetime. The majority of internet respondents (129) resided in the UK.

Trends

There are a small number of surveys that shed light on the diffusion of GHB/GBL use and its emergence as a new drug trend. A UK clubbing magazine survey which was conducted annually between 1999 and 2003 reported that ever in lifetime use of GHB/GBL increased over this 5-year period (Mitcheson, 2007: personal communication). Similarly, the Independent Drug Monitoring Unit (IDMU) survey, which has been conducting large scale surveys of drug use in the UK since 1997, reported a small but steady year on year rise in prevalence of GHB/GBL use up to 2000 and then a falling trend. However, it should be noted that these surveys cannot be regarded as representative in any statistical sense. Respondents are often self-nominated and comparability between samples and over time is usually poor. So any conclusions about trends must be drawn with caution. However findings from the IDMU survey (Figure 1) illustrate that the trend in GHB/GBL use is a relatively new phenomenon in the UK. In a sample of 172 GHB/GBL users, only a few individuals reported, retrospectively, that they had first used GHB/GBL prior to 1994 and even fewer prior to 1990 (Atha and Davis, 2003).

Figure 1: Year of first GHB use in the UK IDMU survey (Atha and Davis, 2003)

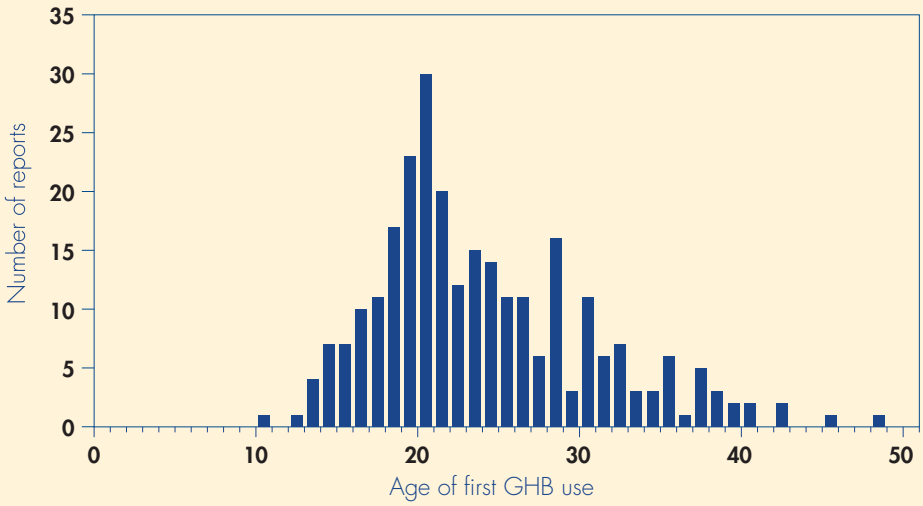


Source: Atha, M. and Davis, S. (2003), 'Gamma hydroxybutyrate usage, effects and UK prices', results from 1999—2002 IDMU surveys.

Notes: The peak in reported year of first use is consistent with the relatively recent arrival of GHB. Few individuals had used the drug prior to 1994 and very few prior to 1990. Note that there is a falling trend since 2000.

The IDMU survey also reported a relatively widespread of initiation ages for use of GHB/GBL (Figure 2). This shows that a number of people in their thirties and forties are trying it for the first time, which is also consistent with the relatively recent arrival of the substance onto the market (Atha and Davis, 2003).

Figure 2: Age of first GHB/GBL use in the UK IDMU survey (Atha and Davis, 2003)



Source: Atha, M. and Davis, S. (2003), 'Gamma hydroxy butyrate usage, effects and UK prices', results from 1999-2002 IDMU surveys.

Notes: GHB is not normally a drug used by naïve drug users. Most users will have tried many other drugs before experimenting with GHB. The peak ages of initiation are in young adulthood.

The annual Amsterdam drug monitoring system ([5]) reported a modest upward trend in the use of GHB/GBL around 2000 but by 2002 the spread seemed to have halted. However the 2005 report notes that use of GHB/GBL may be relatively high among some small and specific sub-populations (Nabben, Benschop, Korf, 2006). In Germany, the Federal Office of Criminal Investigation (BKA) reported some diffusion in the consumption of GHB/GBL during this period but no prevalence data was provided (EWS report Germany, 2003).

The number of individuals who made contacts with drug help lines with questions or seeking help about GHB/GBL (by telephone, e-mail and internet chat rooms) have been reported to have increased in 6 countries in recent years, however this may simply reflect increased concern generated by media attention rather than concrete increases in prevalence (European Foundation of Drugs Helplines, 2004–2006).

Context of use

Most individuals who use GHB/GBL are likely to have tried other drugs before experimenting with GHB/GBL. This, together with the relatively delayed age at which individuals first use GHB/GBL, suggests that it is not a substance commonly used by naïve drug users (Sumnall et al., 2007; Atha and Davis, 2003; Wood et al., 2007). Furthermore, the two main surveys conducted among users show that GHB/GBL is commonly used in combination with other substances, particularly cannabis, alcohol and ecstasy (Sumnall et al., 2007; Korf et al., 2002). However it should be noted that anecdotal information from London suggests that recently some individuals in club settings are using GHB/GBL alone. Such single substance use may be a result of information campaigns conducted in

([5]) Antenna Amsterdam is a multi-method monitoring system aiming to identify and interpret new trends and developments in legal and illicit drugs use and gambling among young people in Amsterdam, and to update and improve drug prevention.

the area about the risks of combining GHB/GBL with alcohol and other drugs. However, it may also reflect informal controls exerted by individuals in mainstream society who wish to avoid the debilitating hangover effects associated with drug and alcohol combinations that affect daily functioning.

Evidence suggests that GHB/GBL is probably used in private settings as often, or more often, as in public nightlife settings. The UK survey of GHB/GBL users reported that GHB/GBL — unlike ecstasy and other stimulant drugs — is used in private home settings more than in nightlife settings (67 % and 26 % respectively) (Sumnall et al., 2007), while the Dutch survey reported equal numbers in each setting. In the Dutch survey GHB/GBL consumption in private homes was usually in the context of a social event or in the presence of friends or acquaintances (Korf et al., 2002). It has been noted that individuals who commonly took GHB/GBL in club settings were more likely to report problems associated with use than those who usually consumed it at home (Sumnall et al., 2007). The rapid and often unpredictable sedative effects of GHB/GBL pose a greater health risk in a crowded nightclub than they might in the relative security and comfort of a private home. Despite security searches to limit drug use in nightlife venues there are reports that in London GHB/GBL is regularly smuggled into clubs mixed with water in miniature plastic bottles, condoms and balloons (Druglink January/February 2007).

The reported lack of hangover, or other sub-acute, effects may contribute to the relatively high proportion of users (one third) in the Dutch study who had driven a car after taking GHB/GBL and others had been passengers in cars driven by someone who had taken it (Korf et al., 2002).

While GHB/GBL appears to be holding, or gaining, ground in some specific populations and geographical locations, the more mainstream Independent Monitoring Unit (IDMU) UK survey, reported that respondents gave GHB/GBL an average positive rating of only 2.11 on a scale of 0 to 10, which is much lower than the rating given to other drugs. Furthermore, the overall rating in 2002 was significantly lower than in previous years. In both the UK and the Netherlands the sound of critical voices in some nightlife circles has been heard regarding the incidence of vomiting and sudden collapses, which reflect negatively on a club. Researchers there have suggested that negative reports and the decline in positive rating may also reflect growing publicity about the use of GHB/GBL for the purpose of sexual assault (Atha and Davis, 2003; Korf et al., 2002).

GHB and 'drink spiking'[6]

Media coverage of 'drink spiking' with GHB, particularly cases of 'drink spiking' to facilitate sexual assault ([7]), has brought GHB into the spotlight. However, forensic evidence points to the more common presence of alcohol in cases of reported sexual assault. Evidence for this type of crime is notoriously difficult to obtain and true incidence may be higher than identified due to non-, or delayed, reporting. In cases of drink 'spiking' that are not reported immediately, the narrow time window allowed for detecting GHB/GBL in body fluids limits the possibility of establishing evidence. A number of forensic studies have been conducted in France and the UK since 2000 to investigate cases of sexual assault which were allegedly facilitated by covert administration of a drug. However, these have failed to find strong evidence of GHB/GBL use for this purpose. These studies have revealed that high concentrations of alcohol use and also prescription benzodiazepine drugs are much more commonly associated with cases of alleged sexual assault than GHB (EMCDDA, 2008; Scott-Ham and Burton, 2005; Puri, 2007; Hurley et al., 2006; Hughes et al., 2007).

([6]) Covertly adding a drug to a drink usually to incapacitate a potential victim or for entertainment

([7]) Often reported in the media as 'date rape'

Market and availability

User terms

The most commonly used abbreviation for the substance are 'GHB' or 'G', but GHB is also widely referred to as 'liquid X', 'liquid E', 'liquid ecstasy'. The inclusion of references to ecstasy portrays GHB as having disinhibiting and social effects on a par with MDMA, despite the fact that the two drugs are chemically very different.

Other market user terms refer to other effects of GHB. The term 'growth hormone booster' relates to its growth hormone promoting effects, 'woman Viagra' to its libido-enhancing effects. Its relaxing properties are expressed through 'natural sleep 500', 'organic quaalude' or 'oxy sleep'. With reference to its use in the context of drug facilitated sexual assault it is commonly referred to as 'grievous bodily harm', 'k.o-Tropfen' (knock out drops) or 'easy lay', 'drogues du viol' (French for 'date rape drug'). Other terms for GHB include 'biberones' (Spanish for 'baby´s bottle'), 'oro bebible' (Spanish for 'drinkable gold') ([8]), 'fantasy', 'cherry meth', 'scoop', 'Georgia home boy'. The terms 'soap' and 'salty water' are probably a reference to the reportedly salty taste of GHB.

Since the sale of GHB was controlled under drug laws in all Member States, information suggests that there has been an increase in use of the precursor chemical GBL. User market terms for gamma-butyrolactone (GBL) include: 'GBL', 'paint stripper', 'serenity 2', 'gamma G', 'blue nitro', 'revivarant', 'renewtrient', 'revitalize plus' or 'weight belt cleaner'. 'Paint stripper' is a reference to the use of GBL as a solvent found in industrial cleaners and superglue removers.

Internet information and sales

The internet is an increasingly important platform for users, retailers and lobby groups, as well as drug demand reduction organisations and professionals, to exercise influence and disseminate information. The amount of information on GHB/GBL published on the internet is relatively small compared to information on other illegal drugs. For example in a UK drugs forum, the proportion of posted messages in a sub-forum on 'GHB' constitutes approximately 3 % of the total posted messages compared to the sub forum on cannabis, opium/opiates and cocaine/crack which account for more than 50 % ([9]). Despite the relatively low number of messages posted on 'GHB', analysis of the type of information exchanged via forums and retailer sites provides important insight into patterns of use and acquisition opportunities.

In order to obtain a snapshot of the type of information available on GHB/GBL — including the number and type of retailers selling GHB/GBL — direct observation of users postings in forums or chat-room settings — a systematic search via the search engine GoogleTM (http://www.google.com) using advanced search strategies was conducted in February 2007. The search used key words in Dutch, English, French, German, Hungarian, Polish and Spanish. Key words were selected to identify the sale of GHB/GBL, information sites, as well as forums where discussions and information exchange take place. Out of all the hits that were listed, the first 100 for each key word were analysed.

([8]) http://www.fad.es/Sustancias?id_nodo=65&tipo=0&accion=1&sustancia=13 (accessed October 2007)

([9]) http://www.drugs-forum.co.uk/forum/index.php, accessed May 2007