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EXPERIENCES OF GAMMA HYDROXYBUTYRATE (GHB) INGESTION: A FOCUS GROUP STUDY

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Abstract

GHB (gamma hydroxybutyrate) is a significant new drug of abuse added to the United States Controlled Substance Act in 2000. The majority of the published literature on GHB consists of clinical case reports, mainly from emergency departments, and a collection of laboratory-based studies, focused mainly on anesthesia. While comments about the various experiences and behaviors of human users are often included in such studies or reports, these aspects of GHB are only just beginning to be systematically investigated or detailed. Reported here are data from a qualitative study using focus group methods on the consumption habits, experiences, and beliefs of GHB users. A total of 51 people, 30 men and 21 women, mean age of 31.1 ± 7.6 years (range 18 – 52 years), who report having used GHB for an average of 4.3 ± 2.5 years (range 1–11 years), were interviewed in 10 separate groups held in 2004. This paper discusses broadly the general experience of the GHB ‘high,’ major perceived benefits including sexual responses to the drug, perceived risks and dangers of ingestion, co-ingestion, and various contexts of use. The paper concludes with a discussion of the implications drawn from this information for clinicians treating patients who use GHB.

INTRODUCTION

Until recently, gamma hydroxybutyrate (GHB) and its chemical analogs, butanediol and gamma butyrolactone, were readily available and cheap to purchase through Internet sales and in nutrition stores. Labeled as dietary supplements, they claimed to enhance muscle growth, aid sleep, and improve sexual performance (Snead & Gibson 2005). GHB was FDA approved in 2002 as a therapeutic agent for cataplexy. The analogs are available for a range of legitimate commercial uses, for example, as industrial solvents, paint strippers, and flavoring agents. Throughout the last decade, however, various state and national drug monitoring systems, emergency departments, health care professionals, drug counseling services, and law enforcement agencies noticed a precipitate rise in patients presenting for medical care after overdose or chronic use of GHB (Compton et al. 2005; Snead & Gibson 2005; Zvosec & Smith 2005; Sporer et al. 2003; Dyer & Haller 2001; Miotto et al. 2001; Zvosec et al. 2001; Chin et al. 1998). Responding to escalating evidence of abuse, GHB was legislated a Schedule I controlled substance in 2000, leaving a provision for approved drug products in Schedule III.

GHB is a naturally occurring substance in the body. Physiologic activity at endogenous levels remains unclear and levels achieved with exogenous administration have activity at GHB and GABA-B receptors (Snead & Gibson 2005). Prominent effects seen after GHB ingestion begin with euphoria, sedation, memory loss, nausea, and vomiting, and escalate with dose to produce

agitation, myoclonus, bradycardia, respiratory depression, and coma. A number of deaths have been attributed to GHB ingestion or after co-ingestion of other illegal substances or alcohol (Dyer & Haller 2001; Zvosec et al. 2001), death occurring from accident, injury, and respiratory compromise. Peculiar to GHB is the time course: an extremely fast onset and short duration of effects. Medical response to overdose therefore focuses on short-term airway maintenance and support of respiration; rarely does intubation become necessary. GHB is rapidly metabolized and even profoundly comatose patients are responsive in 4–6 hours. The drug is eliminated below the limit of detection in blood or urine within 12 hours. This short detection period is troublesome in drug-facilitated assault (Snead & Gibson 2005; Smalley 2003) where GHB's unique effects are exploited for nefarious acts: these unique effects are disinhibition, anterograde amnesia, and fast onset of incapacitation. In contrast to acute overdose, prolonged administration allows central nervous system adaptation to sedative effects resulting in an abstinence syndrome upon discontinuation or rapid reduction in chronic dosing. The GHB abstinence syndrome presents with symptoms of stimulation: anxiety, insomnia, tremor, agitation, and hallucinations, and may progress to life-threatening delirium and seizures (Zvosec & Smith 2005; Dyer & Haller 2001). While some indications show that GHB use in the United States is dropping (Anderson et al. 2006), in other parts of the world, such as Australia, England, and Europe, the use of GHB, especially by youth, continues unabated or is even increasing (Duff 2006; Degenhardt, Darke & Dillon 2003; 2002; Winstock, Griffiths & Stewart 2001; Iten, et al. 2000; Weir 2000). Because consumption of GHB is often said to take place at dance-music clubs or "raves" which attract youth and young adults en masse (Fendrich, Wislar, Johnson & Hubbell 2003; Maxwell 2005; Gahlinger 2004; Winstock et al. 2001), and is noted as being in wide use at gay male 'circuit parties' (Palamar & Halkitis 2006; Camacho, Mathews & Dimsdale 2004; Mansergh et al. 2001; Mattison et al 2001), the National Institute of Drug Abuse has categorized GHB as a 'club drug.'

Until very recently, the majority of the published literature on GHB consisted of clinical case reports mainly from emergency departments, animal studies, and investigations from the 1960s into its potential for use as an anesthetic. Largely absent are pharmacokinetic studies of GHB, either alone or after co-ingestion with alcohol or other substances. The impact of GHB on basic cognitive and motor functions has also been poorly investigated to date. While comments about the various behaviors observed in human users of this drug are often included in case studies or reviews (Snead & Gibson 2005), this aspect of GHB use has only just begun to be systematically investigated or detailed. Especially absent in the literature are reports of user's motivations for use and their experiences with GHB. In response to these weaknesses, a series of connected investigations has been undertaken, comprising the Forge Study (J. E. Dyer, Principal Investigator), funded by the National Institute of Drug Abuse. In the Forge Study, GHB use has been investigated in connection with (a) trend and outcome analysis of hospital consultations to a state poison control system; (b) pharmacokinetics of both GHB and its precursor form, butanediol, alone or co-ingested with alcohol; (c) impact on cognitive, cardio-respiratory, and motor function, and (d) users' consumption habits, experiences and beliefs. This last set of investigations has used both a structured telephone survey and a series of focus groups to document GHB users' views and accounts of experience with this substance. The present report outlines the procedures and basic findings solely from the qualitative focus group component.

METHODS

Focus groups — a method of systematic qualitative research based on interview techniques — are especially useful when exploring new topics or developing a deeper understanding of the processes behind specific behaviors (Bloor et al. 2001; Morgan 1996; Stewart & Shamdasani 1990; Krueger 1988). A small number of subjects (usually <10) are selected for their particular knowledge or relevance to the phenomenon under consideration and then asked, in as

conversational and open-ended a fashion as possible, to describe their experiences, knowledge or views on the research topics. A main aim is to uncover the degree of consensus in the opinions and experiences of the subjects as well as the range of opinion. In this study, users of the illicit drug gammahydroxybutyrate comprised the population of relevance, and their beliefs, experiences and practices with respect to GHB were the primary topics of conversation in the focus groups.

Flyers and a web site advertising all components of the Forge project were the main tools used to recruit participants. Though it was expected that most respondents would be from the city of San Francisco, outreach via flyers was carried out with the aim at generating a more geographically widespread sample incorporating those living within an approximate 60 mile radius of San Francisco. Before being referred to the focus group researchers, a brief telephone screening questionnaire was used to establish respondent eligibility for the study, i.e., that the person claimed to have personally used GHB at least once within the previous six months and could accurately describe the physical form of GHB. Approximately one-third of focus group participants noted that they either already had completed or intended to complete the structured telephone survey as well as participate in a focus group.

The focus groups aimed to recruit a total of 45 people with personal experience of the drug having consumed it at least once in the previous 12 months. Participants were to be adults, with a lower age limit set at 18 years. No upper age limit was set although it was expected that most subjects would be 30 or under, consistent with the literature on many other illicit drugs. Comments from health providers and others knowledgeable about this substance suggested that user experiences would vary by gender, sexual orientation, and whether or not a person was a novice or Light user. Hence, recruitment aimed at soliciting a total sample of at least one-third female respondents, at least one-third who were Light or novice users, and at least one-third who were Heavy or dependent users. Sexual orientation was not a formal recruitment criterion but was monitored with the intent to solicit at least one-third non-heterosexuals.

Prior to commencing subject recruitment, all its components of the Forge study received ethical approval from the institutional review board of the University of California, San Francisco as well as a Certificate of Confidentiality from the National Institutes of Health. Focus group participants provided signed consent and were given an honorarium to compensate for their travel costs, time and disruptions of routine.

All focus groups were audio-taped followed by verbatim transcription of all utterances. The same moderator (JCB) ran all the groups assisted by a co-facilitator who managed the audio-taping, took written notes, ensured completion of necessary paperwork and oversaw the provision of snacks. Transcripts were checked for accuracy and completeness by both the moderator and the co-facilitator, through comparison with the original audiotapes.

Conversation was guided by a primary set of open-ended questions posed in the same order to each group, with each question being followed-up as appropriate with probing questions eliciting further commentary and details. Discussion between the participants was encouraged so that diverse experiences and viewpoints would be revealed. Focal questions were chosen to elicit GHB users' experiences and insight into issues that are at present poorly documented or are difficult to handle in other formats (e.g., questionnaires). Efforts were made to ensure that each participant was able to recount fully his or her experience with GHB and to express the full range of their experiences rather than simply recalling their usual or desired experience. At the end of each session, participants were asked to answer two short questionnaires, one on socio-demographics and one on their GHB use practices (both surveys being derived from those used in the parent Forge study (Dyer, Anderson, Kim, Barker & Blanc 2007 - in press).

Altogether these questionnaires took a total of 10 minutes to complete, and were derived from and compatible with those used in the telephone survey component of the Forge study.

After a lead-off question about the street names these users give to GHB - a question designed to establish rapport and encourage conversation among participants - the primary questions focused on the following topics:

1. nature of the subjects' 'high.'
2. benefits believed to derive from use of GHB
3. perception or refutation of GHB as a dangerous or risky substance
4. reactions, complications or unintended effects of GHB
5. comparison of GHB to Ecstasy (methylenedimethylamphetamine or MDMA), alcohol, and other (illegal) substances
6. medical, social, economic, legal, or other problems GHB may have caused participants.

Participants were also asked to describe their first encounters with GHB and their use trajectory thereafter. Probing questions, derived from diverse hints in the extant literature, concentrated on understanding GHB's effect on driving, sexual desires and behaviors, possible role in date rape, mood swings, or violence.

RESULTS

Recruitment

Recruitment occurred through interested persons using information on flyers or the Forge website to contact the main Forge study telephone number. Researchers screened contacts for eligibility for inclusion in the study and referred eligible subjects to the focus group researchers. Eligible participants had to be English-speaking, at least 18 years of age, able to answer correctly questions about the physical appearance of GHB, and self-report having used the substance at least once. A small proportion (15%) of focus group participants was recruited via word-of-mouth referral by other focus group respondents or through personal contact with study staff.

A total of 82 eligible people expressed interest in attending a group. Overall, 60% of these people actually attended a focus group; 11 people (17% of the 62 scheduled) simply did not show up at their scheduled event. Only one person withdrew, not wanting to set a date to attend after expressing initial interest. Nineteen people (17 of whom were male) were simply unable to be contacted: nine because of no replies to telephone calls despite at least five attempts at various times of day or day of week, or unreturned responses to discreet messages; seven had provided the wrong contact information, moved out of state, or had a contact number disconnected. One person proved to be ineligible. Analyses of all potential subjects showed no systematic differences, by gender, referral source, or geographic location (judged by area code of contact telephone number), between those who did participate and those who were "no-shows," or those lost to further contact. .

Focus Groups

Between March and December 2004, 10 focus groups were held — six groups comprising only male participants, four comprising only females — with a total of 51 participants. Groups ranged in size from three to nine participants, with a median size of 4 to 5. All group meetings lasted between 1 hour 45 minutes and 2 hours, and took place in a private meeting room in a university building. The employment status of the respondents was reflected in the scheduling

of groups. All male participants attended groups beginning at 4pm on Wednesdays whereas all female participants said their job responsibilities precluded weekday attendance, hence, all female groups were held at 11am on Saturdays. Participants were recruited from geographically dispersed sites: two-thirds (67%) lived in San Francisco city, 18% came from Oakland and other immediate East Bay locations, and with the remaining 15% coming from other locations in the greater San Francisco Bay Area, including a few people from as far away as Sacramento.

The goals set for sample composition were generally well met. Of the total of 51 people, women comprised 40% (n=21), and 61% (n=31) of the total sample self-reported as heterosexual. Overall, one-third (36%) were Light users, having ingested GHB five or fewer times in their lifetime. One fourth (24%) said they had used the drug more than 50 times and were therefore classed in this study as Heavy users. Several Heavy users also described themselves as dependent or addicted to the substance.

Socio-Demographic Characteristics of Respondents

Socio-demographic characteristics of the total sample are presented in Table 1. Although diverse in some ways, participants collectively are best described as white, urban, and well-educated people, with stable employment and moderately high income. Participants were somewhat older than expected (on average, 31.1 years $\pm$ 7.6 years), and encompassed a broad age range (18 to 52 years). The majority (70%) of respondents was unmarried, though relatively few lived alone. Most (98%) were childless. Overall, three-fourths of the sample (74%) self-reported as being in excellent or very good health.

Analysis revealed only one significant difference among respondents with respect to any socio-demographic characteristic. While significantly more female (81%) than male (47%) respondents were working ($\chi^2=6.09$, $df=1$, $p<0.01$), overall there was no significant difference in annual income by gender. Nearly one-third (28%) of the total sample reported an annual income of over \$60,000. More than half the sample had completed college, with one-fifth (22%) having completed post-graduate or professional degrees. Most participants were engaged in managerial, scientific or technical occupations, one-fourth (24%) were artists or musicians or had other jobs in the entertainment industry.

Reported Habits of Use

Focus group participants reported their consumption habits and experience of GHB both verbally and in writing. Results from the written responses to the short questionnaire on drug use habits are provided in Table 2. For the purposes of this study, participants were classified, according to their lifetime experience with using GHB, in the following manner: a Light user self-reported using GHB a total of 1–5 times in their life; a Moderate user 6–50 times; and a Heavy user more than 50 times.

Only a handful of people in the study, those working in health care, had ever heard of the drug Xyrem® which metabolizes to GHB and has recently begun to be used in United States to treat narcolepsy. No one had ever received or attempted to procure a prescription for this substance from a physician.

Analysis revealed very few significant differences by gender or category of use in the extent or nature of experience with the drug. The legend to Table 2 details the two instances in which Light, Moderate, and Heavy consumers of GHB differed significantly in their responses to questions about the co-ingestion of GHB with others substances. Heavy users in these focus groups were more likely than either Moderate or Light users to mix GHB with Ecstasy (MDMA) or with crystal meth (methamphetamine).

Major Themes and Issues Discussed

Information and opinions arising during the focus group conversations are provided in this section. These mainly corroborate or expand the picture provided by the quantitative data in Table 2, and are generally consistent with many comments noted in other work on GHB. Several prominent and repeated themes throughout the group sessions are illustrated with typical quotations taken directly from transcripts.

Street Names for GHB—Although the published literature reports a large number of street names for GHB (Compton et al 2005; Snead & Gibson 2005; Maxwell 2005), very few of these names were used by participants. The most common names were simply “G” or GHB, with a few other appellations being widely recognized, such as “Gina,” “George,” “GBH,” or more rarely, “liquid ecstasy,” “Auntie G,” “Vitamin G” and “Georgia Homeboy.” GBH is an in-group joke, a purposeful play on words with users aware that this acronym stands for “Grievous Bodily Harm,” a serious assault charge in Britain, as well as the name of a leading British punk rock band (<http://www.njhindl1.demon.co.uk./gbh>, accessed 9/20/05).

Secrecy—All participants were aware of the illicit nature of this substance, and limited the knowledge of their use of GHB to a small, select group of close friends or partners, many of whom also used drugs. Very few family members were aware that participants used this substance although three females reported that their mothers knew. Most other participants, however, said they actively denied using drugs when parents or other family members asked.

Additionally, names such as “Gina” were intentionally used to obscure the meaning of a conversation when in the presence of people who did not know about their drug use. For example, if participants were on the telephone with their source or arranging to be at an event where drugs were going to be available for purchase or consumption, they would not refer to GHB directly, but would instead ask if “Gina” was going to be at the party.

Age at First Use—In contrast to many other substances (e.g., alcohol, nicotine, and other club drugs), average age at first use of GHB among these respondents was surprisingly high: 26.8 ± 7.2 years, with a range from 13–50 years. People reported having used GHB for a mean of 4.3 ± 2.5 years, with a range of 1–11 years. Relatively few people either knew about or used pre-cursor substances or analogs of GHB, and therefore most had not switched between products.

Costs—Most but not all respondents were aware that five years ago GHB was reclassified as a controlled substance and that there had been successful law enforcement efforts since that date to halt sales via the Internet. This has resulted in reduced availability of GHB and sharply increased cost. Compared to some other commonly used party drugs, such as Ecstasy, GHB is expensive.

In general, men displayed knowledge of the availability and cost of GHB and changes over time; said they had purchased it at some time; and had on some occasions kept a supply of it at their residence. Most women, however, indicated that they themselves had never bought the drug; were often unaware of its availability or cost; did not keep a supply, and tended to use GHB more intermittently, mainly at social gatherings when it was supplied by others.

Internet connections remain important to GHB users, not just because the availability of this substance through the web has started to increase again, but because it provides key access to sources of information about the drug, its effects, and dangers. One website in particular, Erowid, was singled out as a trusted and important source of reliable and authoritative knowledge and has been accessed by many Forge study participants. Many people reported

reading testimonials and seeking information on the web before ingesting GHB for the first time.

Three of the 30 male respondents and one of the 21 female participants knew how easy the substance was to make and could provide a recipe for doing so at home. Only one person — a self-identified GHB addict and drug dealer — claimed to have actually made GHB himself and to have sold it, while the others spoke of having friends who either made or sold the substance.

Timing and Location of Use—Consistent with the information imparted during discussion, in the questionnaire responses most (86%) participants reported taking GHB infrequently - less than one day a week; mainly in the evening on weekends; and at parties or social gatherings. A modest proportion (about one-third) said they take GHB when at or going to dance-music clubs or ‘raves,’ as they find it energizing and gives them stamina to dance all night. For several reasons, however, most participants said they did not use GHB at public events. These respondents preferred to consume GHB at private parties in residences, often during the ‘chill out’ period after dances. An emphatic reason for this preference, stated by several respondents, was the more assured presence of people whom respondents knew well and trusted to look after them if an adverse reaction occurred. Another reason related to the users’ accounts of decreased control of limbs or coordination of movements as well as feeling tired, lethargic, mellow and content as well as disinhibited. The third reason was an extension of this disinhibition: participants’ description of GHB as a powerful aphrodisiac inducing sexual activity, something they wished not to undertake in public locales.

Sexual Responses—The influence of GHB on sex was a popular theme throughout the focus group discussions. Both male and female participants recalled increased feelings, sometimes quite intense, connected to many aspects of sexuality, such as sexual desire, arousal, and activity. Reports of these effects did not differ by sexual orientation

G, for me, just like turns me into a perfect slut, I think, loving up the whole room.
Everybody is looking really good.

[Male, 42 years old, Heavy user]

G feels to me like it has the qualities of teaching you how to open up to people and have less inhibitions naturally and also sexually, you can open up, it’s to me the best. It is the most perfect drug for sexual interaction, the best sexual function, the best sexual function, the best.

[Female, 30 years old, Moderate user]

Whereas women commonly spoke of the sensual and emotional dimension induced by GHB, men tended to discuss GHB more in the terms of enhanced tactile sensations and intensity of sexual arousal. Some men wryly noted that while sexual desire was increased greatly, their ability to perform or successfully complete sexual acts was greatly diminished, a phenomenon some referred to as “having a whisky dick” as happens after consuming too much alcohol. Similarly, some women noted that while sex under the influence of GHB might have been great, they could not always remember precisely what occurred on those occasions and so chose to no longer engage in sex after ingesting the drug.

Both male and female participants commented that they knew GHB use was prevalent in the gay male community, but no one suggested that the experience of the high or the ways of using GHB was in any way connected with sexual orientation. Both the gay men and the bisexual females in the focus groups described experiences, beliefs, and practices around GHB that were indistinguishable from people who self-reported as heterosexual.

The possibility of sexual risk-taking as a consequence of GHB ingestion was barely acknowledged. One gay male respondent very directly noted that he had decided to quit using GHB after the second time because when sober later he recalled that he had engaged in sex with a partner whom he had just met and without using a condom, practices he would not usually undertake and that he felt were very risky. Several women noted the possibility of heightened sexual risk-taking but only indirectly. Indirectly because they claimed, first, that they would not engage in activity outside their usual practices or fantasies, and, second, that GHB unleashed the restraints on their desires but did not change their fundamental behaviors.

Date Rape—There was a general recognition among both male and female participants of GHB's reputation as a date rape drug (see Smalley 2003). Indeed, the frequency with which some people, mainly but not exclusively women, said a street name for GHB was "roofie" or "the date rape drug" signals its wide recognition in this context. To some degree, then, GHB and the drug Rohypnol® (commonly called "roofie" and also recognized as a 'date rape drug') are fused in the minds of some GHB users.

Like on the date rape stuff, I just want to say, like there's certainly this...this one's been abused socially like that quite a bit and it's got a reputation.

[Male, 42 years old, Heavy user]

I used to go out with my girlfriends when I was single and maybe end up talking to a cute guy and their friends are going home, and ... [I'm] like, "Oh, I'll take a cab home and I'm not ready to go home yet." I just think, I could see it [date rape] happening.

[Female, 22 years old, Moderate user]

Men in the focus groups, however, tended to feel that the date rape reputation was more talked and worried about than actual. Men expressed doubts about how often a person could be counted on to pass out or not remember things that occur when under the influence of GHB. Conversely, women generally expressed great concern over the potential use of GHB in such situations. Cognizant of the vulnerability potentially induced by the dissociative and amnesiac states that often accompany GHB ingestion, several women recognized the possibility of having this undetectable colorless substance slipped into their drink and being taken advantage of while under its influence. Some women said that date rape or threats thereof had occurred to friends after they ingested GHB, but were somewhat uncertain of the extent to which the substance was a major factor in the situation.

Dosing—Almost all subjects (96%) consumed GHB in liquid form, one capful at a time, with the cap holding about 5ml (1 teaspoon) of fluid. One person reported snorting GHB and one injected it. The majority reported the main effects of the drug beginning within 30 minutes of ingestion and waning considerably, if not completely, by 4 hours after consumption. After four hours, euphoric and carefree feelings tended to be replaced by hunger and fatigue. Thus, a majority (60%) of subjects take GHB twice or more on any one occasion in order to produce or maintain a "high" that lasts eight hours or longer.

Experiences of the GHB "High"—Overall, the description of the experience of a GHB-induced 'high' was remarkably uniform, with only slight variations between male and female users, or between Light, Moderate, and Heavy users. Participants generally stressed the euphoric and relaxing nature of the high while also emphasizing the loss of inhibition and increased sexual response that GHB induced. Most respondents emphasized that they felt GHB enhanced their mood and sociability but left unimpaired and unchanged their decision-making and thinking abilities. Many noted they also felt silly or giggly as well as talkative during the first several hours after ingestion. While a few people described occasions on which they had experienced hallucinations, both visual and auditory, and involuntary limb movements, these

were not common aspects of the GHB ‘high,’ and tended to be experienced by Heavy users of the drug rather than Light or Moderate users. Some participants also discussed their experience as cognitively disorienting:

It’s very dissociative. You’re definitely not totally present in your body and I agree with that [previous comment noting this effect]. Just being able to talk to people. I felt...it’s funny, I felt pro-social but I also felt very introverted because I was having a hard time speaking. I was just kind of sitting there laughing now and then, and just kind of being comfortable being around people, but not really wanting to talk.

[Female, 27 years old, Moderate user]

I almost felt like disabled, like wanting to move, but my body wouldn’t move, like heavy-ish and lazy. Like I wanted to do something, but I just couldn’t get up.

[Male, 21 years old, Light user]

Emotionality—One of the most noticeable differences in the experience of the high by Light, Moderate, and Heavy GHB users revolved around expressions of emotion. Light and Moderate users tend to describe the influence of GHB on emotion and mood thus:

I’ve gotten very emotional on it. I get vulnerable, in a positive way emotional. But for me, emotional...like I have to cry when I’m emotional but it’s usually very open-hearted and just able to kind of...I’m finally able to kind of get out and share with people, which is really a great experience, I think. It’s allowed me to connect much more easily.

[Female, 27 years old, Moderate user]

A Heavy user, in contrast, recounted a quite different experience with GHB, one that teetered unstably between deep sadness and uncontrollable aggression. When recounting an episode in which he underwent a sudden mood swing triggered by being bumped slightly when entering a dance club, which led to his physically beating up one of his companions, he explained:

It [GHB] does make you emotional. If you’re by yourself and just sitting, you bawl your eyes out over nothing. And at times it makes you very aggressive. You just want to go and just like start some shit. If you take it everyday, trust me, you’ll experience those parts.

[Male, 37 years old, Heavy user]

Other male participants recognized the mood swing phenomenon, recounting instances when they saw similar rapid shifts in mood happen to other people. A few male respondents referred to the resulting aggression as “having G muscles.”

General Risks—Generally, participants were steadfast in their view that GHB was not a risky or dangerous drug.

It’s like any other drug, if you take the right dose, and you take a pure drug and you know what to expect and, you know, have the correct boundaries, socially, psychologically, then it’s not dangerous.

[Male, 34 years old, Moderate user]

Nonetheless, participants did acknowledge some risks and dangers in using GHB with specific reference to particular circumstances. For instance, they did recognize that it was easy to overdose and suffer adverse outcomes. Many expressed concern over the dose sensitivity of GHB:

With dosage, you're very scared. I'm like "don't go over the top of that cap" and "it can make the difference between life and death."

[Male, 30 years old, Moderate user]

Despite a very high degree of consensus and repeated, assertive verbal acknowledgments during the focus group conversations that it was very easy to overdose on GHB, few respondents checked the strength of the product they were ingesting or adjusted dosage. While a few people told us that with a new bottle or source of GHB they will ingest a smaller than usual amount and judge the strength by the time to produce effects and the nature of those, most people made no such comment. For those who did check in this fashion, they often redosed with the same or slightly reduced amount until the desired 'high' occurs if they experienced little effect within the first 30–60 minutes.

Many participants stressed the need to control risks by ensuring that GHB is taken in a context whereby each user is socialized into how properly to use the drug. Several people gave descriptions similar to the one quoted below, descriptions of what many considered the most appropriate scenario for introduction to GHB:

The first time I took it I was coached, told exactly what I was going [to experience] — I mean, the person that introduced me to it was very like, "okay, this is how you're going to feel, what to expect, don't do this, don't do this."

[Male, 30 years old, Moderate user]

Some disclosed that their circle of friends or drug-consuming communities take deliberate and certain measures to avoid risky or dangerous situations, as one woman explained:

Like if we are deciding to do G that night, we have a law in our, like, tribe. At a party we write down the dosage and time so if you do forget...and you'll forget... and then a half hour later you think you can take another cap and then that's too much.

[Female, 27 years old, Moderate user]

Co-ingestion—Not only did people not often check the strength, a large proportion (80%) reported having co-ingested GHB with another substance at least once, although some claimed to be unaware of this mixing until later, particularly if the other substance was alcohol. Other illicit substances most often deliberately co-ingested with GHB were amphetamines, Ecstasy and marijuana (see Table 2). Most people report mixing GHB with just one other substance although almost half the sample (46%) reported having mixed it, on at least one occasion, with two or more co-ingestants. The aim of mixing substances was to produce a high that was individually tailored to a person's preferred experiences and/or to minimize or offset unwanted side effects. For example, the stimulant crystal meth was frequently described as "counteracting" the depressant effects of GHB, and was sometimes administered to people who were "falling out" or "G-napping" (i.e., passing out completely, forgetting segments of time or activities, suddenly losing motor control and falling over or sitting down with a blank stare or facial expression, "acting spacey") (see also Kohrs, Mann & Greenberg 2004).

Rarely were any risks from mixing substances overtly or extensively discussed. These were metaphorically recognized, however, through the sardonic names given to some mixtures; for example, "EKG": a mixture of Ecstasy, Ketamine and GHB. Ketamine is widely known on the streets as "Special K" — yet another mocking pun, this time referring to a well-known brand of breakfast cereal.

GHB and Alcohol—Mixing GHB with other (predominantly illegal) substances appeared to be more deliberate acts than was the co-ingestion of GHB with alcohol – the one risky act

of co-ingestion that users openly and vociferously discussed. Most participants were adamant about not ever using GHB with alcohol. While some people mentioned unpleasant reactions to the mixture of GHB and alcohol, such as nausea and vomiting, others talked about potentially more serious consequences, such as coma or death. These possible outcomes are a widespread piece of street knowledge:

Everything I've ever read or heard about GHB and alcohol indicates that it is a recipe for going into a coma.

[Male, 34 years old, Moderate user]

If you drink [alcohol] with it, it's a whole other ballgame. If you drink a bunch of booze with it, even like a couple of beers, it's going to change the effects of it without that... And again, I'm sure it's hella fun, but you're going to get knocked out. I mean, at that level, you don't come down off of it, you pass out and wake up the next day.

[Male, 26 years old, Moderate user]

At the same time, several participants admitted that they or their friends and acquaintances have, nonetheless, mixed GHB with alcohol. These occasions tended to be when GHB was ingested for the first time outside the context of a specific group or site at which the drug is carefully introduced. Some recounted occasions when GHB was unwittingly ingested after having already consumed alcohol, often because they were provided fluids (e.g., orange juice or water) that unbeknownst to them had been spiked with GHB.

To the amazement, even consternation, of others in the group, one respondent reported deliberately and unconcernedly imbibing alcohol and GHB together on a regular basis. This respondent was far from being a typical GHB user, however, as she reported a history of having used practically every illegal substance as it became available or fashionable over the last three decades.

Although there was a strong discourse about the risks run by mixing GHB and alcohol, the villain in this pair was not claimed to be GHB but alcohol. In the rhetoric of many focus group respondents, alcohol was a much more dangerous drug than GHB. These people alleged that alcohol has far greater mortality and morbidity than GHB, in both short and long term. And also, that alcohol is much more addictive with considerably worse and more wide ranging physical and social effects. A couple of respondents even acerbically commented that, in stark contrast to the case with alcohol, no one had ever gone out and beaten up their wife or children because they were drunk on GHB, or had staggered around the streets incoherently yelling, cursing and raging at all who pass by.

Reactions—In general, participants did not always view reactions to or undesired effects of GHB as unpleasant or unexpected, even though many such experiences/sequelae are pointed to in the medical literature as evidence of overdose. Some people had a high tolerance for these side effects, seeing them as necessary adjuncts to achieving the desired effects, of any drug not just GHB. For instance, “falling out” or “G-napping” was accepted by many as part of the experience of using GHB. If dealt with appropriately, they were not matters of great concern. These adverse reactions were reported as usually waning completely by 4 hours post-ingestion.

For a few respondents, undesired reactions were sufficiently unpleasant and aversive enough to limit their consumption of GHB or to make them stop using it entirely. Four respondents commented they had stopped using GHB because they did not like the vomiting, the “weird sensations running up and down my arms,” and the episodes of memory loss the drug induced. Other respondents said they quit or cut-back their GHB use when other drugs became available

that better produced their sought-after effects, for example, preferring Ketamine or “shrooms” (mushrooms) to GHB because of their greater psychedelic propensities.

I used to think that it required immediate medical attention once they went into a coma when I first, that night that I first took it. Whereas now I ... it's been shown to me that as long as you just let them sleep and put them in a position so that they don't choke on their own spit ... or whatever, that they will wake up pretty much without incident.

[Male, 35 years old, Moderate user]

The appropriateness of responses to potentially dangerous reactions, like G-napping, depends very much on who one is. Users and medical professionals tend to have quite different responses to and evaluations of the appropriateness of, for example, giving crystal meth to a person beginning to succumb to the effects of too much GHB, or to the advice simply to let a person who is beyond a momentary “G nap” but actually comatose, to sleep it off.

Amnesia—Several participants discussed having episodes of anterograde loss of memory after ingesting GHB. Mild to moderate episodes were the most commonly articulated experiences during which people could still hear and see but were slow to comprehend or respond. Memory loss was sometimes of very short duration. A few participants, however, recounted similar yet more severe amnesic experiences.

I woke up a couple of times and said, “How did I get here? I don't remember what just happened” ... But I didn't ever ended up in a hospital.

[Male, 30 years old, Heavy user]

I took some GHB, I was high, I was really high and I went to this building [where the dance was that night ... while waiting to use the restroom] I was pacing back and forth. Well, at some point I hit the cement wall, opened my eyes. Hit the cement wall and opened my eyes. Hit the cement wall hard ... I'm like two miles down from where the actual building was. So while I was pacing, somehow I fell asleep and I walked and I do not remember how I walked out of that gate and I kept going straight until I hit this cement wall and opened my eyes.

[Male, 37 years old, Heavy user]

Loss of Motor Skills—Loss of control — usually a partial loss not complete — of gross motor skills was frequently cited as a reason why many respondents did not like to use GHB while out, especially when out at dance clubs. People spoke of this as feeling “weak” or “fatigued,” or wanting to sit down or lie down, to not move around. Some Heavy users of GHB also spoke of occasionally experiencing their limbs jerking or making similar involuntary movements. Although a modest proportion of people (about one-fourth) felt GHB energized them and so liked to use it while dancing, a much greater proportion of respondents said feelings of invigoration tended to come about the next day. Rather than feeling hung-over the next morning, GHB left them feeling normal and refreshed, energetic. Hangovers, which they associated with consumption of drugs such as alcohol or Ecstasy, were described as comprising nausea, dehydration, depressed mood, withdrawal from social interaction, and fatigue/lassitude.

I think people think of it [using GHB], at least I know I sort of look at it on the same level as having a drink. Often times it affects me for a shorter period of time and I don't have any hangover the next day, it doesn't make me feel crappy... get great sleep.

[Female, 20 years old, Moderate user]

When you take a proper dose of G you get a better feeling than if you were to get drunk [on alcohol] anyway. If you get drunk you have a lack of judgment, a hangover the next day. It's to me like having a few drinks and getting drunk is more disassociative than taking G because, like ... your judgment is more impaired and all that stuff to do the next morning, feeling like crap. I'm sure, granted, you can take too high a dosage of G or something and maybe go the same way, but taking just enough you'd probably get the same euphoria as drinking. Your judgment isn't as impaired and you're not typically falling over things.

[Male, 32 years old, Moderate User]

One specific circumstance where there was clear acknowledgement of danger from GHB was driving. Specifically, the decrease in motor skill and increase in amnesia or loss of consciousness induced by GHB was considered stressful, unsafe and a major impediment to functioning. While the majority of focus group participants expressed amazement and disbelief that anyone would even consider driving while under the influence of GHB, a few people said they had done so, an action that in hindsight horrified them. These people vividly recounted instances of driving under the influence of GHB, instances that eventually convinced them not to get behind the wheel after ingesting this drug.

It's not cool actually. Your eyes get shaky and for me it was hard to judge speeds and distances very well. I mean, I could obviously, if I got close enough, but I was doing a lot of going real fast and slowing down. It's nerve racking. I never went on the freeway. I can't imagine trying to go on like some crazy freeway like that. It would be insane.

[Male, 26 years old, Moderate user]

It was like suspended animation. I was barely conscious. I was able to just drive, not drive well, not stay between the lines. It was horrible and I mean like actually I crashed, you know I crashed into a concrete barrier doing 100 miles an hour and came out with two bruises [shakes head in wonder]. I mean, I barely had control. Went over 150 miles [in distance] each time without remembering it. I ended up in another state [Nevada] at one time and I was, like, I didn't even know where I was.

[Female, 32 years old, Heavy user]

Effects of Long-term Use—Inquiry into possible long-term effects of GHB ingestion revealed that this is not a topic widely discussed within this particular drug-consuming community. A common opinion vigorously expressed by most Light and some Moderate users was that GHB is not an addictive substance, that a user cannot become dependent. A few Moderate users, however, noted that they had noticed that their use had increased over time from occasional to more frequent, and thus were beginning to reconsider whether dependence was possible.

A handful of respondents (6%) reported using GHB daily. All of these Heavy users acknowledged the potential of becoming addicted to GHB, but only a two admitted to actually being dependent. At the time of the focus groups, two people, one man and one woman, were undergoing drug rehabilitation in a supervised therapeutic community setting for addiction, one for addiction to GHB, the other for dependence on several other drugs. A third man was receiving intense individual psychological counseling for his dependence on GHB, a dependence that he acknowledged was beginning to destroy his relationship with his long-time girlfriend.

One respondent told his story of falling into addiction. He began using GHB to deal with anxiety regarding his work in middle-level management, and suddenly stopped taking GHB about 18

months later after seeking emergency medical care for florid visual and auditory hallucinations and agitation:

I was told initially that it was not physically addictive. And for the first six months it wasn't, because I would come home from work and I would relax and have a dose and it was great. The honeymoon period, they call it. And then it started where I would wake up in the morning and it would be nice to have one before I got to work. And then it became this 24/7 nightmare that people talk about, and then I tried to stop and the agitation was so bad that I couldn't, I could not stop and I knew I needed to go to like an urgent care facility or something... It's a powerful substance. At first you think you're in control of it and, it's almost overnight, it switches on you and then it's controlling you.

[Male, 30 years old, Heavy user]

DISCUSSION

This qualitative study examining users' experiences of GHB ingestion and their beliefs about its benefits and dangers provides valuable insights for clinicians, counselors, and policy analysts. While the ability to generalize results from this focus group study is somewhat limited because of the relatively small size of the convenience sample and its specific geographic location, results are nevertheless important. Findings are highly consistent with notes and comments in the laboratory-based or clinical research literature in terms of effects and reactions experienced, whether desired or undesired (Maxwell 2005; Snead & Gibson 2005; Gahlinger 2004; Miotto et al. 2001; Chin et al. 1998). Findings are also consistent with and expand in very important ways the sparse existing literature reporting users' experiences in widely separate regions of the world, whether those studies be of mostly intermittent users of the drug (Duff 2006; Palamar & Halkitis 2006; Degenhardt, Darke & Dillon 2002, 2003) or of dependent or heavy use consumers (Zvosec & Smith 2005).

These findings enhance the literature by expanding knowledge about the use of this drug by the major type of GHB consumer — the non-dependent, occasional or recreational user. This is important, too, because it goes beyond the youth-student or club/dance-music scene, revealing GHB use among individuals who, for the most part, have otherwise unremarkable, stable, mainstream, middle-class urban lives; people who are well-educated, financially secure and fully employed. Hence, results from this study speak to a widespread, consistent pattern of responses to and evaluations of gammahydroxybutyrate (GHB) and its place in the repertoire of illegal substances available on the street and consumed on a regular basis.

Ingestion of GHB is acknowledged to be an illegal activity and so awareness of a person's habit in this regard is kept secret from family, co-workers, and even friends unless they are known to be past or current participants in a drug-using community. The street names for GHB, especially but not exclusively 'Gina,' are used as codes to maintain secrecy during public conversations with dealers or friends.

Demographic characteristics of respondents had little impact on responses. Focus group respondents turned out to be older than expected — on average, in their early 30's — some 5 to 10 years older than those generally present at raves or dance-music clubs where use of many kinds of illegal substances is common. As the experiences, reactions, and evaluations of these GHB users do not appear to be very different when compared with the available literature which has generally investigated younger subjects, it would appear that age is not a major factor in its consumption. Despite a few faint assertions to the contrary by a few (mainly the gay) male respondents in the focus groups, there also appears to be few if any differences by gender in willingness to try or use GHB regularly, or in the experiences of or evaluation of its effects.

Women were just as eager as men to try and continue using the substance, and experienced similar effects and reactions. A minor gender difference appeared to be that far fewer women than men had ever made, sold, or purchased the drug themselves. Though homosexual male respondents in the focus groups reported widespread use of GHB at ‘circuit parties’ or similar gay male events, largely due to its aphrodisiac qualities (see also Palamar & Halkitis 2006; Mansergh et al 2001; Mattison et al. 2001; McDowell 2000), the outcomes in terms of the experience of the ‘high’, risk evaluations, and likes or dislikes of the drug did not vary by sexual orientation.

The impact of GHB on several aspects of sexuality – in the form of increased desire and arousal, diminution of inhibitions, greater willingness to engage in sexual activity, and enhanced feelings of psychological and social connection – was widely recognized and, for the most part, a highly valued aspect of GHB ingestion. In contrast, the potential of this to lead to unsafe sexual practices was not widely discussed or recognized. Moreover, the danger of date rape resulting from the combination of increased sexual awareness and decrease of inhibition along with amnesia and partial loss of motor control was acknowledged (see also Smalley 2003). For men, this reputation tended to be dismissed as more urban legend than real possibility, or fact; for women, this reputation was felt to be more likely and real although hidden or silenced for the usual reasons that women under-report rape, such as being labeled “promiscuous” or as having “asked for it.”

It is interesting to note, however, that many focus group participants framed their perceptions of GHB’s risks and dangers, or lack thereof, within a temporal dimension. Specifically, the immediate risks of using GHB with alcohol (e.g., going into a deep coma) outweighed long-term risks, for example, of engaging in sexually-risky practices while under the influence of GHB with possible contraction of sexually-transmitted diseases. Another example concerns driving after ingesting GHB (Barker & Karsoho 2007 – in press)

Respondents recognized a high possibility of overdose due to the narrow therapeutic range and steep dose-response-curve of GHB (see also Palamar & Halkitis 2006; White et al . 2006). Most interesting in this regard is the deliberate socialization to the drug that seems to occur. Socialization consisted of careful explanation to novice users by more experienced users of how and when to use GHB, what its effects are, and what substances to avoid mixing it with. Monitoring activities also occurred among some groups of friends; for example, at some private parties, present company would designate an individual to stay sober and keep track of others’ ingestion of GHB and other drugs, and its impact, to ensure that overdose did not happen and or adverse effects were noticed and handled promptly. While most (62%) said they did something to check the strength of the GHB they were consuming in order to limit the potential dangers, a sizeable minority of respondents took no such action. More than one-third of respondents (38%) said they did not check the strength before using GHB by, for example, reducing the initial dose size in order to gauge their response.

Adverse reactions, such as episodes of vomiting, amnesia, loss of motor control or “G napping,” were not categorized by focus group participants as evidence of overdose. Rather, they are seen as common and for the most part tolerable side effects of the drug. For some people, however, these were sufficiently unwanted to curtail or stop their use of this substance. For other people, such reactions were just the price to be paid for experiencing the desired pleasurable states of euphoria, sociability, mellowness, and increased sexual desire and sensitivity to sound and touch.

With rare exceptions, GHB fatalities occur in the pre-hospital setting for reasons such as aspiration, positional asphyxia and traumatic accident or injury secondary to abrupt loss of consciousness. Over the past decade, however, during which time GHB has come to be a widely

available and consumed drug, users appear to have developed and disseminated a set of procedures aimed at prevention and non-professional management of overdose. An effective street knowledge has developed and been widely disseminated among users about not consuming GHB with alcohol, a combination known to have a high potential for inducing coma or death (Thai, Dyer, Benowitz & Haller, 2006; Thai, Dyer, Jacob & Haller 2007). Efficacy cannot be so confidently ascribed to users' strategies for dealing with other signs of serious adverse reaction or overdose, such as coma or "G naps" that extend over more than a few minutes or that result from co-ingestion of GHB and other substances. Rather than seeking professional medical help, it is apparently becoming a more common response among users to put a person in the "rescue position" to minimize potential for asphyxiation and allow him or her to sleep it off. Another apparently less frequently employed response is to give the person a stimulant such as crystal meth to counteract the depressant effects of GHB.

Consumer-produced management strategies such as these might work for some minor instances of overdose. The rescue position (laying on left-side, head-down position) will indeed reduce the likelihood of pulmonary aspiration of gastric contents. But only 20% of cases in a GHB-related fatality series had actually aspirated whereas pulmonary edema was present in 80% of cases (Dyer & Haller 2001), a major danger that emergency departments not only recognize swiftly but are better equipped to treat effectively. Some GHB-associated deaths would be preventable with continued rapid access to appropriate medical care.

Of concern to clinicians, too, is the great willingness respondents showed to consume carefully tailored drug cocktails to induce a very specific kind of 'high.'

Don't drink alcohol because it's dangerous. Always, alcohol and GHB is just a bad mixture. GHB and crystal meth, they go kind of smooth together. So speed and GHB just went hand to hand. It was great. Speed is a stimulant, GHB is a stimulant [sic]. Together, man, it makes a nice combo. It's like taking Ecstasy and GHB makes you not feel good. Special K and GHB is dangerous, I would say. Two downers together is just not a good mixture. So, like an upper and GHB. That was a good mixture, make you feel great.

[Male, 37 years old, Heavy User]

Heavy users experiencing reduced effects from GHB alone sometimes sought to boost the impact through use of mixes in an effort to recreate their original 'high.' The common habit of mixing GHB with one or two other substances simultaneously is a part of this process, the most frequent combinations being GHB and Ecstasy or GHB and crystal meth (see also Sporer et al. 2003; Chin et al. 1998). This practice also makes the presenting signs and symptoms of overdose different from those of GHB alone. Hence, detection or suspicion of the presence of GHB will possibly be muted to clinical personnel dealing with cases presenting to emergency departments. This might partially account for the diminishing presence of GHB in emergency department data or Poison Control call records in the past few years, although this decreased presence far more likely reflects a widespread general decrease in use of GHB, especially since the recent onset of concerted federal law enforcement activities (Anderson et al. 2006).

The information collected from these focus groups has important implications for clinicians treating GHB users. Overall, to date clinical understanding of GHB is derived from experience with those users who have, for whatever reason, sought medical treatment or been hospitalized on an emergency basis (Kim, Dyer, Anderson, Barker & Blanc 2007 – in press). Yet these patients only comprise one (probably small) portion of a much larger GHB-using population. As such, clinicians' knowledge of GHB is generally limited to that gained when treating what is clinically understood to be an overdose or adverse reaction. These responses do not exemplify the wide range of experiences of GHB. Therefore, clinical practice can benefit greatly from insights into the experience of GHB ingestion provided by users themselves.

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Table 1

RESPONDENT DEMOGRAPHICS (N=51)

Gender:	
Female	40% (n=21)
Male	60% (n=30)
Age:	
Mean = 31.1 years, sd = 7.6, range =18–52 years	
Ethnicity:	
White	80%
Hispanic	4%
Asian	4%
Black	4%
Other	8% (e.g., mixed race)
Education:	
Less than completed college	47%
College graduate (BA level)	31%
Post-Graduate/Professional	22%
Income: (2004 \$US)	
<20,000	22%
20–40,000	20%
40–60,000	28%
60–80,000	12%
80–120,000	6%
>120,000	10%
Don't Know	2%
Employment	
Working full-time	62%
Unemployed	20%
Student	14%
Other	4%
Type of Occupation	
Business/professional/managerial	20%
Science, health care	23%
Technical	10%
Artist/musician	22%
Clerk, sales, construction	25%
Marital Status	
Married/partnered	30%
Single	70%
Number People Living in Home (range 1–5)	
1	30%
2	38%
3+	32%
Self-Reported Sexual Orientation	
Heterosexual	61%
Bisexual	18%
Gay (male)	18%
Other	4%
Health Insurance	
Covered	66%
Not insured	34%
Self-rated Health Status	
Excellent	41%
Very good	33%
Good	18%
Fair	6%
Poor	2%

* Significantly more females (81%) than males (47%) were working full-time ($\chi^2=6.09$, $df=1$, $p<0.01$)

Table 2

GHB USE CHARACTERISTICS (N=51)

Category of Use & Number of Times Used in Lifetime Type		Times Used in Lifetime		
Light User:	36%	1–5	1–2 3–5	16% 20%
Moderate User:	41%	6–50	6–20 20–50	33% 8%
Heavy User	24%	50+	50+	24%
Duration of Use of GHB				
Mean = 4.3years, sd = 2.5, range 1–11 years				
Age at First Use of GHB:				
Mean = 26.8 years, sd = 7.2, range = 13 – 50 years				
Analog/Precursors Use:				
Uses GHB only or primarily		65%		
GBL primarily		8%		
Other (any other related substance)		24%		
Don't know exact type used		2%		
Ever Switch Between GHB Products:				
No		69%		
Yes		25%		
Don't know		6%		
Check Strength Before Use				
Yes		62%		
No		38%		
Number Times Ingest per Use Occasion				
Once		41%		
Twice		29%		
More		29%		
Form of GHB Ingested				
Undiluted liquid		49%		
Diluted liquid		43%		
Powder		6%		
Other		2%		
How Usually Measure Dose				
Teaspoon		15%		
Capful		66%		
Other		19%		
How Usually Consume Dose				
Sip		52%		
Swig		30%		
Mouthful		13%		
Other		4% (n = 2; 1 snorts, 1 shoots)		
Number of Times GHB Typically Used per Week				
< 1		88%		
1–2		4%		
3–6		4%		
7		6%		
Number of Days GHB Typically Used per Month				
<4		88%		
5–10		2%		
11–20		4%		
Every day		6%		
Typical Time of Day for GHB Use				
Morn/Afternoon		2%		
Evening/Night		73%		
Day and Night		8%		
No particular time		18%		
Typical Days on which GHB is Used				
Mon-Fri		2%		
Fri-Sat		53%		
Sun		2%		
No Particular Day		35%		
Other		8%		
Total Number of Other Substances Ever Mixed With GHB* (range 0 – 14)				
0		22%		
1		18%		
2		14%		
3		12%		
4		14%		
5		12%		
5+		8%		
Ever Taken GHB and Alcohol Together				

Category of Use & Number of Times Used in Lifetime Type		Times Used in Lifetime
Yes		43%
No		57%
Major Substances Used As Co-Ingestant * (n=40)		
Amphetamine**		45%
Ecstasy***		44%
Marijuana		43%
Alcohol		35%
Cocaine, Crack		33%
Typical Duration of Effects of GHB		
< 2 hours		33%
2–4 hours		59%
4 –6 hours		6%
> 6 hours		2%
Effects Ever Experienced After GHB Ingestion		
	Within 1 to 4 hours of ingestion	Between 4 and 24 hours after ingestion
Loss of inhibitions	100%	59%
Relaxation	100%	35%
Silliness/giggly	98%	58%
Happiness/Euphoria	98%	62%
Increased sexuality	97%	67%
Heightened tactile sense	97%	56%
Fatigue	90%	74%
Increased sensitivity to sound	95%	37%
Talkativeness	94%	59%
Involuntary muscle jerking	54%	34%
Loss of memory/amnesia	52%	26%
Sight hallucinations	51%	27%
Sound hallucinations	50%	25%
Total Number of Adverse Reactions Ever Experienced After GHB Ingestion		
0		30%
1		24%
2		22%
3		10%
4		4%
5		6%
6		2%
7		4%
Types of Major Reaction		
Confusion		45%
Passing out or coma		41%
Memory Loss		29%
Sleeplessness or Insomnia		22%
Tremors, shakes, or seizures		18%
Extreme anxiety or panic		14%
Accident/Injury		10%
Vomiting		2%
Total Number of Symptoms Ever Experienced After Cutting Back GHB Use		
0		67%
1		10%
2		4%
3		6%
4		8%
5		4%
6		2%
Symptoms Experienced After Cutting Back on GHB Use		
Very slowed down or can't sit still		22%
Feeling tired/exhausted		20%
Sleeping more than usual		16%
Trouble sleeping		14%
Greater hunger than usual		14%
Bad dreams		10%
Other		4%
Number of Sources Used to Acquire GHB		
1		31%
2		33%
3		20%
4		6%
5		10%
Type of Source Used to Acquire GHB		
Girlfriend, boyfriend, date		49%
Friends, classmates, co-workers		45%
One night stand, casual partner		20%
Stranger		18%

Category of Use & Number of Times Used in Lifetime Type	Times Used in Lifetime
Internet	14%
Family Member	12%
Dealer	6%
Other (eg, gym worker)	6%
Bartender, club worker, bouncer	4%

* Total number of substances ever mixed with GHB at least once, over the user's lifetime, not necessarily substances used simultaneously. Presented here as a percent of the 40 subjects who reported ever co-ingesting GHB and any another substance. The majority of respondents who reported co-ingesting alcohol and GHB did not do so knowingly, but deduced this afterwards, either because of the reactions they had at the time or because someone else told them that had happened.

** Compared to Moderate Users (43%) and Light Users (17%), significantly more Heavy Users (67%) had ever consumed a mix of GHB and amphetamine (i.e., Crystal Meth, methamphetamine, Speed, or Ice) Mantel-Haenszel $\chi^2 = 7.59$, $df=1$, $p<0.006$

*** Compared to Moderate Users (42%) and Light Users (22%), significantly more Heavy Users (58%) had ever consumed a mix of GHB and Ecstasy (X, XCT, E, MDMA) Mantel-Haenszel $\chi^2 = 3.92$, $df=1$, $p<0.04$