

A forensic aspect on drug facilitated sexual assault

Abstract

Drug Facilitated Sexual Assaults (DFSA) is one of the complex and sensitive cases in a criminal investigation. Cases involving date rape drug has increased exponentially in recent years. Some common drugs used in date rapes cases are Gamma-hydroxybutyric acid (GHB), Benzodiazepines, Rohypnol, Ketamine (KET), etc. These drugs are either used alone or with combination to facilitate sexual assault/rape. Date rape drugs are generally added to eating or drinking items intending to take advantage of the situation. A date rape drug alters the consciousness, lowers self-control, makes the body physically weak, or inhibit the ability of a person to oppose sexual assault. This paper focuses on drugs used in a date rape scenario, its effect, collection, biological samples, and forensic analysis.

Keywords: sexual assault, rape drug, forensic analysis, toxicology, molestation

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Introduction

Drug-Facilitated Sexual Assaults (DFSA) have increased notably in the past few years. The victims of these sexual assaults (most common women) are often teen adolescents and young adults at nightclubs, social parties, rave clubs, and bars.¹ The term 'date rape' was first coined by Karen Barrett in September 1982 in an article called 'Date Rape: A Campus Epidemic?' in Ms. Magazine. Drug-facilitated sexual assault is defined as the voluntary or the involuntary ingestion of a drug by a victim that results in an act of sexual activity without consent.^{2,3} Drugging is the main purpose of a sexual offender. Perpetrator secretly adulterates the drink of the victim with a sedative drug and sexually assaults the victim who is under the influence of such substance.⁴ Date rape can be a distinct kind of DFSA where the victim is on a visit with the perpetrator. To facilitate sexual assault, drugs and alcohol are used often. Terms such as 'date rape drugs' have been used to describe drugs that can cause biological effects that facilitate sexual assault. Drinks with intoxicating or inhibition-reducing drugs added to drugs a potential victim have been called 'spiked drinks'.^{5,6} According to the Society of Forensic Toxicologists guides, the main drugs involved in DFSA are analgesics (fentanyl, codeine, tramadol); antidepressants (citalopram, fluoxetine, amitriptyline); antihistamines (diphenhydramine and hydroxyzine); some antipsychotics such as clozapine and barbiturates such as phenobarbital. However, the most common drugs are ethanol, benzodiazepines, gamma-hydroxybutyrate (GHB), Rohypnol, and Ketamine (KET).⁷ These drugs look like pills, liquid or powder have no colour, no smell, and no specific taste when added to food or drink causes weakness, loss of consciousness, loss of body control, emotion becomes unstable. Changes can be troublesome to detect if the drink is coloured. Date rape drug affects quickly health causes health problems like feel sleepy, confused, loss of consciousness, less able to defend against sexual assault.⁸ Sexual attack victims who think drugs were secretly given to them typically report remembering responses of drunkenness that do not correlate with the amounts of alcohol consumed, unexplained gaps in memory, adjusted levels of consciousness, and unexplainable flashes of physical trauma.⁹ It is still difficult to measure the actual number of sexual violence cases, as well as the type and prevalence of the drug used,

as there are several factors involved, such as the victim's hesitation in reporting abuse, whether due to embarrassment, lack of support, as well as discouragement, because the blame for the violence is usually attributed to the woman; the time elapsed between the fact and the complaint; the time taken to collect biological material for analysis; and the lack of adequate instrumentation for detection, since the most used drugs for this purpose, according to the literature, have a short half-life, is quickly metabolized and eliminated from the victim's body, without leaving a trace.¹⁰

Date rape drugs

Date rape drugs are the most common term used to define these drugs and they are becoming more common, since they are substances that, because their discrete organoleptic characteristics, can be easily placed in drinks or administered directly in the victim's mouth.¹¹ Drugs used for DFSA have several resulting properties: produce sedation, cause amnesia, are odourless and tasteless, diffuse immediately in alcoholic or other beverages, and are shortly absorbed after oral administration.¹² Drugs regularly named as date-rape drugs are GHB (gamma-hydroxybutyric acid) and benzodiazepines (such as flunitrazepam, also known as Rohypnol or "roofies"); Veterinarian anaesthesia like ketamine, however, an American 1997 research revealed that alcohol is still employed. Alcohol continues the chief commonly used rape drug because it's legal and easily obtainable. Several attackers use alcohol because their sufferers often voluntarily drink it, and can be boosted to drink amply to lose restraints or cognizance. Even if the victim agrees to sex, the act could also be considered rape in some jurisdictions if the victim's opinion was weakened or hindered by alcohol. Some assaulters have perpetrated "rapes of convenience" whereby they have assaulted a victim after he or she had become ignorant from drinking too much.^{13, 15} A drug that has been used in DFSA are Ethanol, Benzodiazepines (Alprazolam, Clonazepam, Chlordiazepoxide, Diazepam, Flunitrazepam, Flurazepam, Lorazepam, Triazolam), GHB, Ketamine, Scopolamine, Amphetamine (Methamphetamine MDMA), Barbiturates, Cocaine, Marijuana, Opiates, Muscle Relaxant (Carisoprodol, Cyclobenzaprine, meprobamate), Antihistamines (Diphenhydramine), and Chloral Hydrate.^{16,17}

Common date rape drugs

Benzodiazepines are mostly used in cases of date rape in combination with alcohol for a synergistic effect. Benzodiazepines are central nervous system depressants that cause disorientation, loss of awareness, dizziness, lack of coordination, mumbled speech, flabby muscle tone, nystagmus, and anterograde amnesia due to their influences on distinct neurotransmitter receptor sites for gamma-aminobutyric acid (GABA). Benzodiazepines are drugs needed to treat insomnia, panic attacks, anxiety, and other conditions. Some benzodiazepines won't to treat insomnia possess powerful sedative, motor impairment, and powerful amnesic qualities. Midazolam, temazepam (Restoril), and Flunitrazepam (Rohypnol) are the three benzodiazepines most usually used to aid date rape; all three are narcotic benzodiazepines.^{18,19} In its primary form, flunitrazepam is odorless, tasteless, colorless, and dissolves easily in fluids. The significant results of flunitrazepam include sedation, amnesia, disinhibition, and anxiolysis.^{20,21}

The origin of operation is approximately 20 minutes, with a top consequence at one to two hours and resolution by eight hours. In the connection of drug rape, flunitrazepam is usually crushed or dissolved but it can be smoked, snorted, or injected as well. Flunitrazepam can be identified in the urine for up to 72 hours after exposure.²² GHB can also be referred to as G soap, or liquid ecstasy. GHB is a salty powder that is quickly manufactured from its antecedent gamma-butyrolactone (GBL) and 1,4-butanediol (1,4-BD). GHB is also odorless and colorless but can have a slightly salty taste. It appears in liquid form. Effects occur within approximately 20 minutes and begin to dissipate after two to three hours.^{23,24} At low doses (0.5 to 1.5 g), the strengthening effect of the drug bosses: it has a socially potentiating effect, mildly euphoric, and anxiolytic, although, like alcohol, it can impair motor control. When taken in greater doses (up to 2.5 g), it starts at first, like alcohol, to a heightening of mood and drives, sometimes of sexual appetite. It is massively sleep causing. Excesses can cause unexpected, deep naps from which the affected person can barely be stimulated. GHB overdoses, i.e., doses that produce undesired, narcotized sleep, are relatively unproblematic, till the drugs have not been taken at the equivalent time.²⁵ Rohypnol comes in pill form but can be dissolved in liquid, such as an alcoholic drink.²⁶ K, special K, vitamin K, and super acid are other names of ketamine. In the 1960's Ketamine, obtained from phencyclidine, was used as an anesthetic.

Alongside having the desired effects of the drug, unfavorable effects such as raised heart rate, hypertension, periods of no breathing, confusion, anterograde amnesia, and delirium may exist. Ketamine can take many other forms as a colorless liquid, white powder (white crystals), pills, or capsules. Ketamine is scentless and flavorless, commonly supplemented to drinks without being revealed to produce amnesia. Due to such characteristics, it is sometimes given to sufferers, who don't doubt its appearance and are used in sexual assaults as DFSA drugs.^{23,27} Using alcohol as DFSA on a date means that a person encourages another person to drink more than they had intended. Like other drugs, alcohol possesses characteristics that are free from restraints and induce amnesia, central nervous depressant, impaired judgment, that empowers people to misremember their activities, or their outcomes, prior, throughout, and after coital activity.²⁸ Usually, it is also common to observe the rest of drugs like cocaine, ketamine, methamphetamine, GHB, benzodiazepines, or some volatile inhalants being blended with alcohol.²⁹

Collection of forensic evidence

Law enforcement agencies should confine mind the signs of a drug-facilitated statutory offense so that they'll properly document and collect physical evidence and facilitate the victim to make a call if a "full drug screen" is extremely important. this is often notably essential in cases wherever controlled substance, Flunitrazepam, general anesthetics, and different "date rape drugs" could be sneakily given to the victim.³⁰ Within the primary discussion of the claimed sufferer, an ensuant examination by a health-care expert and methodical assortment of biological specimens are vital steps in the initial part of a DFSA investigation. Whereas the alleged victim's care is of prime importance; the focus needs to even get on the protective proof of the crime. Evidence of lawful offense (anal and vaginal swabs for spermatozoa and supreme deoxyribonucleic acid testing, description, and photos of intumescency, proof of various injury) should be fastidiously gathered and documented by the skilled one. It is vital that the health-care skilled person has the correct bombastic coaching and is adequate to collect proof that will be used in criminal proceedings. Specimens need to be properly tagged with the date and time of assortment and also the collector's initials. Collected specimens need to be instantly sealed and hold on firmly. Zoological specimens need to be held at 2-8 °C to help stop degradation. Specimens need to be brought cold to the laboratory as soon as possible; in any occasion, minimizing the time they're intact at temperatures above 25°C.³¹

Biological samples

The toxicological analysis for the determination of those drugs is often wiped out by several biological matrices, like urine, plasma, blood, oral fluid, and hair. Generally, in forensic toxicological analysis, blood is taken into account as the gold standard sample for monitoring drug use. However, it allows the detection of medicine and/or their metabolites for less than 24 to 48 hours after the utilization, and therefore the sample collection outside the hospital environment is difficult to perform.³² Serum specimens are also significant, especially when the claimed crime has befallen within 24 hours of accumulation. The blood should be secured during a vessel with preservatives, sort of a grey-top tube carrying salt and potassium oxalate, and be deposited during a refrigerated condition. It's recommended that drugs identified in urine specimens be specifically targeted for in blood drug screens. A blood concentration of a drug, beside pharmacokinetic data, may help in corroborating denying a victim's story of events.³³

Urine is the most valuable specimen within the extent of date drug examinations. Because drugs and metabolites are centered within the urine, they favor being more quickly detectable during this specimen. Urine specimens should be solicited up to 96 hours after drug exposure. If likely, 100 mL of urine should be obtained to form specific that plenty of the specimen is out there for the laboratory to perform a delicate, precise analysis while also maintaining an appropriate part for retesting. Urine samples should be collected up to 96 hours after drug exposure.^{33,34} In cases recently arriving of the alleged assault or if chronic exposure to a drug must be assessed, head hair should be obtained a minimum of 4 weeks after the alleged assault. A minimum of two hair samples should be cut as on the brink of the scalp as possible. Many inherent knock-out drugs can later be distinguished in hair samples which were only consumed once. The clothes of the complainant or vomit from the scene of the alleged attack could even be a useful specimen. If a drug isn't fully incorporated before vomiting occurs, the drug could even be discovered at comparatively

great amounts during a vomit spot. If collected, vomit or a vomit stain should be deposited preferably iced.^{31,35} Sweat specimens are also used as proof in DFSA cases. Sweat Patch could be placed on a victim during rape examination and removed 3 to 7 days later. Any drug Excreted in sweat absorbed onto patch. Patch is extracted and analyzed for the targeted sample.³⁶ The increasing availability of new evidence kits, which include stuff for taking early urine specimens and a mouth

rinse or swab, may improve the initial collection of evidence. Other vital specimens for criminological examination may include feminine hygiene commodities, clothes, and chewing gums. Care should also be provided to attending forensic medicinal testing to obtain DNA and other evidence and reviewing the different potential types of assault (e.g., penile insertion of the vagina, mouth, or anus; penetration with an object; or sexual touching).^{37–39}

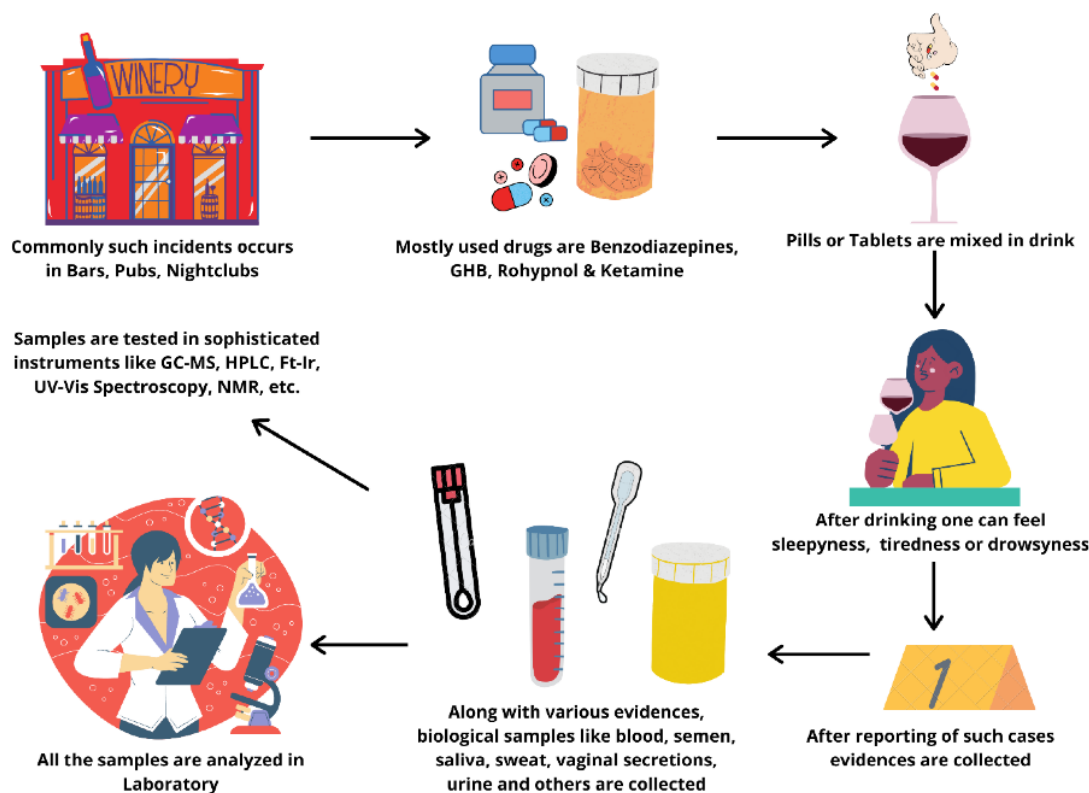


Figure 1 Date Rape Drug Process and its Analysis.

Analysis of date rape drug

In any case of presumed DFSA, it is very vital to test for the drugs judiciously. Most clinic laboratories do not test samples in a medico-legal way. Several queries need to be considered about DFSA cases. First, there requires to be a shielded chain of custody records for all samples that are to be examined. In a position where the chain of custody for the sample is broken, the results are strange to stand up to scrutiny in a court of law. Second, the time within which the samples are taken from the testified victim is important. Specimens require to be practiced in as timely a manner as possible while the drugs correlated are still identifiable. This is especially relevant to drugs like ethanol and GHB, which clear swiftly from the body.⁴⁰ The detection of rape drugs is complex because these active ingredients are potent, and, therefore, administered in small doses, and that they also are easy to be eliminated by the body, which ends up in low concentrations in biological fluids. Since the victims usually take an extended time to form the complaint, when it occurs, the drugs would have already been eliminated from the blood and urine, which are the most analyzed matrices.⁴¹ In situations recently detailing the alleged attack or if chronic exposure to a GHB features a short half-

life. It's detectable within the victim's blood and urine for about 6 hours after ingestion.⁴² Therefore, if the forensic examiner concludes that a victim's history is unusual of GHB facilitated sexual abuse, a blood and urine specimen should be collected as soon as achievable. A delay in specimen collection can profoundly impact the prosecutorial and toxicological outcome of the investigation.⁴³ positive results of a biopsy are getting to be obtained beyond 24 hours which test results are getting to be positive beyond 4 to 6 hours with substances like γ -hydroxybutyrate (GHB) and flunitrazepam. Urine could also be a far better specimen than blood for the detection of metabolites of most of the varied drugs used to facilitate sexual assault. With the utilization of current technology, substances like flunitrazepam (Rohypnol) are rarely detected beyond 24 hours after ingestion, and GHB is simply detectable within the urine for 6 to 12 hours after ingestion, resulting in many false-negative results.^{44,45} The unique characteristics of GHB make it especially challenging to the investigator of an alleged GHB DFSA. GHB has a very short half-life. Evidence of GHB should be preserved as early as possible because it is possible to detect GHB in the victim's blood and urine within 6 hours of intake.⁴⁶ For the analysis of important drugs and their metabolites (cocaine, LSD, ketamine, benzodiazepines, strychnine) in blood samples, GC and HPLC

methods are used.⁴⁷ The use of GCMS and liquid chromatography, are both described to analyze GHB in biological matrices.⁴⁸ In urine samples, there's the likelihood of detecting KET and/or its metabolites for 72 hours, which can vary consistent with individual characteristics of the victims, administration routes, and doses. After about 2 hours of the crime, KET's biotransformation products can now be identified in urine by immunoassays.⁴⁹ The study indicates that ELISA screening followed by GC/MS analysis seems to be an efficient strategy of the screening-confirmation test in high-volume testing situations to research KET. For the determination of KET and its metabolites in blood or hair, liquid chromatography coupled to mass spectrometry is usually used.^{50,51} The highly specific and confirmatory techniques like IR, GC-MS, and NMR are often used for forensic rape drug analysis. Rapid advances are occurring within the area of mass spectrometric interfaces, like electrospray, which greatly increases the applicability of Liquid Chromatography-Mass Spectrometry (LC-MS) for routine forensic drug analysis.^{52,53} Scientists are developing a low price, ready to use, and completely reliable test kit for the discovery of the broadly used date rape drugs. It will be comprised of a sensor. The sensor including a tiny quantity of solvent is exposed to a drink. If present, its biochemical response with the solvent will affect a difference in the visual clarity of the solvent. A visual signal is estimated earlier and later the increase of the drink and the ubiquity of very small dosages is quickly recognized.^{54–56}

Discussion

Perpetrator intentionally uses date rape drugs alone or in combination with alcohol or others to make it easier to facilitate sexual assault. Date rape drugs are easily available in the market, on the internet, rave parties, dance clubs, from illegal traders, and even from medical stores under name of sleep drugs or anesthetics drugs. Victims may display symptoms like drowsiness, physical impairment, confusion, sedation, etc. which can lead to delayed reporting. Most of the time date rape cases are not reported on time due to numerous reasons like a victim being not able to recall what was happened, fear of humiliation, peer pressure, defamation, and social taboo. Investigators face challenges while analyzing the evidence collected due to delayed reporting, as most of the drugs are having short half-life, are easily metabolized, and can be eliminated from the victim's body. Evidence collected from biological or other samples should be properly collected, preserved, transported to the laboratory with maintaining proper chain of custody. Law enforcement agencies, forensic laboratories have adequate instrument facilities to analyze the trace amount of date rape drugs from the collected sample. In recent years, many advanced techniques have been used to analyze the trace evidence in date rape crimes and help lead the investigation in the forward direction with expertise.

Conclusion

The use of date rape drugs is common in every urban locality. It is the need of an hour to aware and educates masses about the date rape drug usage in an increasing fashion. It is not only limited up to bars or clubs but is nowadays used in major events also. Individuals, especially females should take extra precautions while encountering such situations. Acceptance of drink from unknown persons, blindly believing strangers or having granted for or blaze attitude can land the careless ones into unexpected situations. Not everyone you believe will be good, this has to be kept in mind while going out for a picnic or at a park or night outs. If any individual thinks they have drunk too much or are feeling unusual then should get help from trusted ones or should call family or relatives. As these drugs are tasteless and

odorless, it will be a preventive measure to look for your friends and your friends to look for you. If someone feels they have been drugged and assaulted then should look out for torn clothes, or unusual stains. One must also check for bruises, cut marks, scratch marks, bleedings, etc. It is most often seen that victims do not report the case in crucial early times. When understood that any of the assault has been executed should be reported immediately. Also, when the case is reported the First Responding Officer (FRO) or Investigating Officer (IO) should search and collect evidence as soon as possible. Date rape cases are much sensitive than other cases and are needed to handle with due care and cautions.

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Conflicts of interest

The authors do not show any conflicts of interest.

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