

CHEMICAL SUBMISSION A GROWING PHENOMENON WITH FUTURE IMPLICATIONS**Luis Inglada Galiana^{*1}, Maria San Miguel, Daniel Garcia-Moreno² and Angel San Miguel³**¹Internal Medicine Service. Rio Hortega Valladolid University Hospital. Valladolid. Spain.²Health Center. Ribera Del Orbigio. Leon. Spain.³Department of Health Sciences International University of La Rioja (UNIR). Spain.***Corresponding Author: Luis Inglada Galiana**

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ABSTRACT

Chemical subjugation is a practice that consists of administering drugs to a person to carry out criminal acts such as harassment, theft, abuse and sexual assault or taking advantage of their voluntary consumption to carry out these acts. In addition to alcohol, other commonly used drugs are substances such as burundanga, ketamine, fentanyl, atropine, rohypol, GHB, etc. These substances are colorless, odorless, tasteless and can be easily diluted in any drink. Any of them, mixed with the drink, causes you to lose your will completely. The authorities point out that these are crimes facilitated by drugs in which the aggressor takes advantage of a woman with diminished will, in a state of semi-or unconsciousness and who also has amnesia that makes it difficult to tell the facts.

KEYWORDS: Chemical submission, burundanga, ketamine, fentanyl, GHB.**INTRODUCTION**

Chemical submission represents an alarming phenomenon characterized by the non-consensual use of drugs or chemical substances to incapacitate individuals, affecting their ability to resist aggression or remember events.

This term is commonly associated with crimes such as sexual assault or robbery, where perpetrators use these substances to subdue their victims.

The seriousness of chemical submission lies in its devastating impact: it not only violates people's autonomy and safety, but also poses serious challenges in terms of detection, legal prosecution and support for victims.

In figures 1, 2 and 3, chemical submission and its possible solution with drink protectors and the stop to chemical submission are shown graphically.

**Figure 1: Chemical submission.****Figure 2: Beverage protectors against chemical submission (cup covers).**



Figure 3: Stop chemical submission.

Evolution and Diversification of the Substances Used

Historically, chemical submission has been synonymous with drugs such as flunitrazepam (Rohypnol) and GHB (gamma-hydroxybutyric acid). However, the landscape has changed drastically in recent decades. With technological advances and the appearance of new synthetic drugs, the range of substances used has diversified. This includes everything from drugs prescribed for other purposes, to synthetic drugs created to evade current laws and controls.

Many of these new substances are difficult to detect with standard methods, increasing the complexity of chemical submission cases and presenting significant challenges for authorities and health professionals.

Need for a Deep and Updated Analysis

Given this changing scenario, it is imperative to carry out an exhaustive and updated analysis of the substances used in chemical submission. It is essential to understand not only their pharmacological and toxicological effects, but also how changes in laws, the availability of these substances, and social trends influence their use and abuse.

Additionally, research should focus on improving detection techniques and developing effective prevention strategies. Likewise, it is crucial to address the needs of victims, from medical and psychological treatment to legal and social support, ensuring a comprehensive and humanized response to this serious problem.

Objectives of the Study

This article aims to provide a detailed and up-to-date review of substances used in chemical submission, examining their properties, effects and the challenges associated with their detection and management.

Through a review of the scientific literature, analysis of cases and recent studies, we seek to offer a broad perspective that contributes to the understanding and effective response to this constantly evolving problem.

Substances Used in Chemical Submission

1. Depressants of the Central Nervous System

Central nervous system depressants slow brain function, resulting in sedation and muscle relaxation. Its use in chemical submission is alarmingly common due to its ability to incapacitate and disorient victims, often with little or no memory of the events (Table 1).

- **Benzodiazepines (for example, Rohypnol, Valium, Xanax):** These drugs are highly effective in inducing a state of relaxation and sedation. Rohypnol, known as the "rape drug," is notorious for its amnesiac effects and rapid elimination from the body, making it difficult to detect in toxicology tests.
- **GHB and Precursors (Gamma-Hydroxybutyrate):** GHB is a substance that can induce a state of unconsciousness and amnesia. Its use in chemical submission is particularly insidious due to its ability to dissolve quickly in liquids and its slightly saline taste, which can go unnoticed in beverages.

2. Stimulants

Although less common, stimulants are also used in chemical submission. They increase energy, attention and euphoria, but in high doses they can lead to a loss of control and disorientation.

- **Amphetamines and Methamphetamines:** These substances can increase alertness and energy, but can also cause intense confusion and erratic behavior at high doses, which can potentially be exploited by an attacker.
- **MDMA (Ecstasy):** Known to increase empathy, sociability and a sense of well-being, MDMA can make victims more trusting and less aware of their surroundings, making them more vulnerable to manipulation.

3. Hallucinogens

Hallucinogens alter perception, thinking and sensations. In the context of chemical submission, they can disorient and confuse victims, making them more susceptible to manipulation and control.

- **LSD (Lysergic Acid):** Although not commonly associated with chemical submission, LSD can cause intense sensory disturbances and significant disorientation, which can be exploited in certain contexts.
- **Ketamine:** Originally used as an anesthetic, ketamine can induce a dissociative state, with effects that include immobility and amnesia. Its potential to quickly incapacitate a person makes it a frequent choice for chemical submission.

This description offers us a deeper and more detailed look at the categories of substances used in chemical submission, highlighting not only their characteristics and effects, but also their potential for abuse and the implications for the health and safety of victims. Each category represents unique challenges in terms of detection and prevention, as well as treatment and support for victims.^[1-6]

Table 1: Summary of the main substances used in chemical submission.

Substance	Pharmacological Characteristics	Pharmacodynamics
GHB (Gamma-Hydroxybutyric Acid)	CNS depressant, fast acting, inducing sedation and amnesia.	It acts on GABA receptors, reducing neuronal activity.
Benzodiazepines	Sedatives, muscle relaxants, produce anterograde amnesia.	They enhance the action of the neurotransmitter GABA, causing sedative effects.
Ketamine	Dissociative anesthetic, produces sedation and amnesia, can cause immobilization.	It blocks NMDA receptors, producing anesthesia and dissociative effects.
Rohypnol (Funitrazepam)	Powerful hypnotic, induces deep sedation and anterograde amnesia, rapid effect.	It acts as an agonist at GABA receptors, similar to other benzodiazepines, but with greater potency.
MDMA (Ecstasy)	Stimulant and hallucinogenic, it increases empathy and sociability, but reduces inhibitions and risk awareness.	It works by increasing the release and decreasing the reuptake of serotonin, norepinephrine and dopamine.

Chronological Evolution of Substances in Chemical Submission

1970s and 1980s: Benzodiazepines and First Uses

During the 1970s and 1980s, benzodiazepines, such as Valium (Diazepam), emerged as the primary substances used in chemical submission cases. These drugs, commonly prescribed to treat anxiety and insomnia, were used for their ability to relax and disinhibit people, often resulting in anterograde amnesia.

Late 1980s and 1990s: Rise of Rohypnol and GHB

Towards the end of the 1980s and throughout the 1990s, Rohypnol (Funitrazepam), a more potent benzodiazepine, became notoriously known as the "rape drug." Its use in chemical submission was so prevalent that it led to legal reforms and changes in the drug's formulation to make its presence in beverages more detectable.

At the same time, GHB (Gamma-Hydroxybutyric Acid) gained popularity. Although initially used in club and party settings for its euphoric effects, its potential for abuse in chemical submission soon became apparent due to its ability to quickly incapacitate people.

2000s: Diversification and Emergence of New Synthetic Drugs

In the 2000s, a diversification in the substances used was observed. The emergence of synthetic drugs such as Ketamine, originally a veterinary anesthetic, began to gain notoriety. Ketamine produces deep sedation and a dissociative state, which made it attractive for use in chemical submissions.

MDMA (Ecstasy), although best known for its stimulant and empathogenic effects, has also been used in contexts of chemical submission. Its ability to lower inhibitions and increase trust in others can make people more vulnerable to manipulation.

XXI century. Ongoing Challenge of New Psychoactive Substances

In the last two decades, the challenge in chemical submission has been the rapid evolution and proliferation of new psychoactive substances (NPS). These substances, which are often designed to circumvent existing laws, vary in effects and potency, and represent an ongoing challenge to detection and prevention.

The ease of access through the Internet and dark markets has facilitated the availability of these new drugs, which requires constant surveillance and updating in detection methods and prevention strategies.

This timeline shows how the chemical submission landscape has evolved, highlighting the need to continually adapt to new substances and methods of abuse. Constant surveillance and investigation are essential to keep up with these changing trends and effectively protect potential victims.

Analysis of Recent Trends in Chemical Submission

1. Advances in the Synthesis of Substances

Technological advances in chemistry and pharmacology have facilitated the synthesis and modification of psychoactive substances. This has led to the emergence of new synthetic drugs, some of which are used in

chemical submission. These substances may be designed to evade legal controls and be more difficult to detect in standard toxicological tests.

- **New Psychoactive Substances (NPS):** The proliferation of NPS, also known as "designer drugs", represents a significant challenge. These substances can have similar effects to traditional drugs, but with different chemical structures, which makes their regulation and detection difficult.
- **Use of Prescription Drugs:** There has been an increase in the misuse of prescription drugs such as sedatives or hypnotics in chemical submission. These medications are often perceived as safer or legitimate, despite their potential disabling effects.

2. Influence of Digital Media and Social Networks

Drug information and misinformation spread rapidly through the Internet and social media. This has changed the way people obtain information about substances, as well as their availability.

- **Online Commerce and Dark Markets:** The sale of illegal substances through online platforms and dark markets has increased their accessibility. Transactions are carried out anonymously, which represents a challenge for authorities.
- **Influence of Social Networks:** Social networks can influence perceptions and behaviors related to drug use. The glorification or trivialization of certain substances in these media can increase their use in contexts of chemical submission.

3. Changes in Social Dynamics and Consumption Patterns

Changes in social norms and drug use patterns also influence chemical submission tendencies.

- **Change in Usage Scenarios:** While chemical submission was once primarily associated with bars and clubs, it is now seen in a variety of contexts, including private encounters and online dating.
- **Diversification of Victims:** Victims of chemical submission are no longer limited to a specific demographic. There has been an increase in the diversity of victims, suggesting an expansion in the methods and motives behind these acts.

Methodologies for Detection of Substances in Chemical Submission

1. Conventional Analytical Techniques

Conventional analytical techniques remain essential in the detection of substances used in chemical submission. These methods are based on the chemical identification and quantification of substances in biological samples.

- **Gas Chromatography (GC):** Used to separate and analyze volatile compounds. It is effective in detecting substances such as solvents and some synthetic drugs.
- **High Performance Liquid Chromatography (HPLC):** Suitable for analyzing a broader range of substances, including water-soluble drugs and large biomolecules.

- **Mass Spectrometry (MS):** It is often combined with GC or HPLC to provide accurate identification of substances through their mass profiles.

2. Advances in Detection Methods

With the emergence of new psychoactive substances, more advanced methods have been developed to improve detection and overcome the challenges presented by the rapid metabolization and low concentration of these drugs in the body.

- **Tandem Mass Spectrometry Techniques (MS/MS):** They allow greater sensitivity and specificity, essential to identify substances present in low concentrations.
- **Detection of Metabolites:** Since many substances are rapidly metabolized in the body, the identification of specific metabolites may be more effective in confirming exposure to a certain drug.
- **Immunoassay Tests:** These are used for rapid, on-the-spot detection, although they may be less specific and susceptible to false positives or negatives.

3. Future Challenges

The detection of substances in chemical submission faces several challenges, including the rapid metabolization of drugs, the variety of substances and their mixtures, and the need for rapid and accurate detection methods.

- **Development of Rapid Detection Kits:** Research focuses on developing test kits that can be used on-site, such as in bars or healthcare facilities, for rapid and effective detection.
- **Improvements in Sensitivity and Specificity:** Continuing to improve the sensitivity and specificity of detection methods is crucial, especially with the emergence of new synthetic substances.
- **Data Integration and Artificial Intelligence:** The integration of large databases and the use of artificial intelligence can facilitate the identification of patterns and the rapid detection of new emerging substances in the field.

1. Diversity and Evolution of Substances Used

We have identified a wide range of substances used in chemical submission, including central nervous system depressants, stimulants, and hallucinogens. The constant evolution of these substances, particularly with the emergence of synthetic drugs and the misuse of prescription medications, presents significant challenges to both their detection and legal regulation.

2. Impact of Technological Advances and Social Changes

Technological advances in drug synthesis and ease of access through digital means have changed the landscape of chemical submission. Furthermore, changes in consumption patterns and social dynamics have led to a diversification in the contexts and victims of these acts.

3. Challenges in Detection and Need for Improved Methods

Despite advances in analytical techniques, the detection of substances used in chemical submission remains complex, due to the rapid metabolism of these drugs and the appearance of new substances. There is a critical need to develop faster, more sensitive and specific detection methods, as well as to improve approaches for the identification of emerging substances.

4. Importance of a Multidisciplinary Approach

This analysis underscores the importance of a multidisciplinary approach in the response to chemical submission, involving not only advances in toxicology and forensic medicine, but also in public policy, education, and victim support. Collaboration between different sectors is crucial to develop effective prevention, detection and treatment strategies.

5. Implications for Public Health and Safety

Chemical subjugation not only represents a challenge to the individual health of victims, but is also a significant public health and safety issue. The implications go beyond toxicology and medicine, affecting society in general, which is why coordinated and effective responses are required at the local, national and international levels.^[7-12]

Table 2: Summary of Chemical Submission Psychological and Emotional Impacts

Between them we have

- **Trauma and Post-Traumatic Stress:** Victims of chemical submission often experience symptoms of trauma and post-traumatic stress disorder (PTSD). This may include nightmares, flashbacks, avoidance of reminders of the event, and constant hyper-vigilance.
- **Trust and Relationship Issues:** The traumatic nature of chemical submission can lead to difficulties in interpersonal relationships. Victims may develop distrust of others, which affects their personal and social relationships.
- **Issues of Autonomy and Control:** The experience of losing control over your body and mind can have long-term effects on the perception of your own autonomy and ability to control aspects of your life.

APPROACHES IN TREATMENT

They are related to

- **Cognitive-Behavioral Therapy (CBT):** Used to treat PTSD and other effects of trauma. CBT helps victims understand and change the patterns of thinking and behavior that result from trauma.
- **Exposure Therapy:** It can be effective in treating PTSD symptoms. It involves gradually exposing the person to trauma-related memories and emotions in a safe, controlled environment.
- **Psychosocial Support and Support Groups:** Provide a supportive environment where victims can share their experiences and coping strategies.

Support groups can be particularly helpful in reducing feelings of isolation.

PREVENTION AND EDUCATION

Among them are

- **Chemical Submission Awareness:** Public education about the risks and warning signs of chemical submission, as well as strategies to protect yourself.
- **Training of Health Professionals:** Train doctors, nurses and other health professionals to recognize the signs of chemical submission and provide appropriate care and referrals.
- **Collaboration with Authorities and Organizations:** Work together with legal authorities and victim support organizations to create a comprehensive approach that encompasses both treatment and prevention.

MEDICAL AND TOXICOLOGICAL EXAMINATION

Consisting of

- **Clinical Evaluation of Victims:** Perform a complete and detailed physical examination of victims to identify signs of chemical submission, such as the presence of unknown substances in the body or injuries related to a possible assault.
- **Sample Collection and Analysis:** Take biological samples (blood, urine, hair) for toxicological tests. These samples can provide critical evidence of the presence of drugs or chemicals used to incapacitate the victim.
- **Interpretation of Toxicological Results:** Analyze and interpret the results of toxicological tests to determine what substances were used, in what quantity and how they may have affected the victim.

COLLABORATION IN LEGAL INVESTIGATIONS

These consist of

- **Advice to Judicial Authorities:** Provide expert evidence in legal cases related to chemical submission, explaining the medical and toxicological findings and their relevance in the context of the case.
- **Preparation of Forensic Reports:** Write detailed reports that can be used in legal processes, ensuring that the information is clear, accurate and based on solid scientific evidence.
- **Testimony in judicial proceedings:** Act as an expert witness in trials, explaining forensic findings to judges and juries, and answering questions from defense attorneys and prosecutors.

INVESTIGATION AND DEVELOPMENT

- **Research in Forensic Toxicology:** Participate in research to improve the detection and analysis techniques of substances used in chemical submission.
- **Medical-Legal Protocols:** Collaborate in the creation and updating of protocols for the evaluation

and management of chemical submission cases, ensuring that practices are current and effective.

- **Education and Training:** Provide training to other healthcare professionals and law enforcement on how to recognize and handle cases of chemical subjugation.

From a medical examiner's perspective, the approach is comprehensive, combining medical and toxicological skills with a deep understanding of the legal aspects involved in chemical submission cases. This approach is not only vital to providing justice to victims, but also to improving practices and protocols in responding to these incidents.^[13-15]

RECOMMENDATIONS FOR FUTURE RESEARCH IN CHEMICAL SUBMISSION

1. Advances in Detection Techniques

- **Development of Rapid and Portable Detection Methods:** Investigate the development of rapid and accessible test kits that can be used in places such as bars or in emergency healthcare contexts.
- **Improvement in Sensitivity and Specificity:** Work on improving the sensitivity and specificity of toxicological tests, especially for rapidly metabolizing substances and new synthetic drugs.

2. Detailed Epidemiological Studies

- **Investigation of Risk Factors and Victim Profiles:** Conduct epidemiological studies that explore in depth the demographic and social risk factors, as well as the profiles of victims of chemical submission.
- **Analysis of Geographic and Temporal Trends:** Examine how incidences of chemical submission vary geographically and temporally, identifying possible patterns or correlations.

3. Long-Term Health and Psychological Impacts

- **Longitudinal Studies on Psychological Effects:** Investigate the long-term psychological and emotional effects on victims of chemical submission, including the development of disorders such as PTSD.
- **Physical Health Consequence Analysis:** Examine the possible long-term repercussions on the physical health of victims, especially in cases of repeated exposure or combination of substances.

4. Prevention and Education

- **Evaluation of Current Prevention Strategies:** Investigate the effectiveness of current prevention strategies and develop innovative approaches based on recent evidence.
- **Awareness and Education Programs:** Study the effectiveness of different education and awareness programs for various demographic groups and contexts.

5. Public Policies and Legal Response

- **Analysis of Legislation and Legal Responses:** Evaluate the effectiveness of current legislation and legal responses to chemical submission, proposing improvements based on recent findings.
- **Development of Multidisciplinary Response Protocols:** Investigate how multidisciplinary approaches, involving physicians, psychologists, law enforcement, and social workers, can improve the response to these incidents.

6. New Substances and Emerging Trends

- **Surveillance of New Psychoactive Substances:** Maintain active surveillance of new psychoactive substances that emerge on the market and their potential use in chemical submission.
- **Study of Emerging Trends in Drug Use:** Investigate how emerging trends in drug use can influence patterns of chemical submission.

STRATEGY FOR MANAGEMENT OF CHEMICAL SUBMISSION CASES

1. Immediate Evaluation and Medical Assistance

- **Ensure the Safety and Comfort of the Victim:** The first thing is to make sure that the person is in a safe place and feels comfortable. If she is in a public place, move her to a quiet and safe area.
- **Rapid Medical Evaluation:** Perform an initial medical evaluation to determine if the person needs urgent medical attention. This includes checking your level of consciousness, vital signs, and any visible symptoms of poisoning or injury.

2. Transfer to a Medical Center

- **Hospital Care:** If chemical submission is suspected, it is vital to transfer the person to a hospital or health center as soon as possible for a more complete examination and the administration of any necessary treatment.
- **Evidence Preservation:** Advise the victim to avoid bathing, showering, changing clothes, or eating and drinking, if possible, to preserve evidence.

3. Collection of Samples and Toxicological Tests

- **Biological Sample Collection:** In the hospital, blood, urine and, if relevant, hair samples should be taken for toxicological analysis.
- **Documentation of Clinical Findings:** Record any clinical findings during the medical examination, including physical injuries, mental status, and any statements made by the victim about the incident.

4. Psychological and Emotional Support

- **Immediate Psychological Assistance:** Providing emotional and psychological support to the victim is essential. This may include the presence of a counselor or psychologist at the hospital.
- **Referrals for Long-Term Support:** Offer information about available resources and support,

including support groups and psychological therapy.

5. Legal Considerations and communication to the Authorities

- **Inform Law Enforcement:** In many cases, it is important to inform the police, especially if there are signs of a crime.
- **Legal Advice:** Consider providing or recommending legal advice to the victim, especially in cases where there are clear legal implications.

6. Follow-up and Continuing Care

- **Medical Follow-up:** Schedule follow-up appointments to monitor any late effects of the substances and address physical or mental health issues that may arise.
- **Ongoing Support:** Maintain an open line of communication with the victim to offer continued support or additional referrals as needed.¹⁶⁻²¹

CONCLUSIONS

Chemical submission uses the addition of substance or substances to a drink to make someone change their behavior and potentially make them vulnerable.

You can add it to any drink and includes: 1. Adding alcohol to a soft drink. 2. Add additional amounts of alcohol to another alcoholic beverage. 3. Or add illegal or prescription drugs to any drink.

If drugs have been added to the drink, it is unlikely to look, smell or taste different, so people often don't report incidents because they are embarrassed and believe they have no evidence and don't remember the details.

These recent trends in chemical addiction indicate a changing landscape in chemical addiction, influenced by technological innovation, social changes, and evolving consumption patterns.

Understanding these trends is crucial to develop effective prevention, detection and treatment strategies, as well as to formulate appropriate public policies that address this growing and complex problem.

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