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AN OVERVIEW ON CLUB DRUGS

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Abstract: The chronological Concept of club drugs was first of all come in knowledge among public in the mid of 1980s from Britain and the United States. They are a pharmacologically heterogeneous group of the drug that tends to be ill-treated by teenagers and younger generations at bars, nightclub, concerts, rave parties and parties etc. Gama-hydroxy-butyrate (GHB), Ketamine, and Rohypnol (flunitrazepam) are the most popularly used club drugs in our society because they are perceived to enhance energy, stamina, friendliness and sexual provocation and enhance social familiarity and sensory inspiration. By keeping above points in mind in this present article the author has describes the various physical, chemical properties, toxicity, pharmacology, treatment and toxicological effects of above mentioned drugs.

Keywords: Club Drug, GHB, Ketamine, Rohypnol, Toxicological effects etc.

Introduction

The Historical Concept of club drugs was first of all come in knowledge among public in the mid of 1980s from Britain and the United States. Since then it is mounting over the world and covering the countries like Australia, India, Belgium, Egypt and Canada etc. **Club drugs** are a pharmacologically heterogeneous group of the drug that tends to be ill-treated by teenagers and younger generations at bars, nightclub, concerts, rave parties and parties etc. They enhance social familiarity and sensory inspiration. Club drugs such as Ecstasy, Gama-hydroxy-butyrate (GHB), Ketamine, and Rohypnol (flunitrazepam) have become popular now a day with participants in raves, because they are perceived to enhance energy, stamina, friendliness and sexual provocation[1].

Club Drugs at a Glance:

The brief description of some of the club drugs those are very common among teenagers and younger generations are as follows:

Ketamine

This drug is also known as **ketalar** and is a derivative of phencyclidine. It achieved popularity as an anesthetic and has been approved for uses of both human and animal in trauma and emergency surgery as well as veterinary medicine and can be taken through various routes i.e. A typical method uses a nasal inhaler, called a “bullet” or “bumper”; an inhalation is called a “bump”. Ketamine often is taken in “trail mixes” of methamphetamine, cocaine, sildenafil citrate (Viagra), or hero. the street names of this drug includes Special K, Vitamin K, K, keets, super acid, super K, cat valiums and jet etc[2].

GHB (Gamma-hydroxybutyrate):

This drug is also known as “**date rape drug**” and was first of all synthesized 1960 in France as an anesthetic but later achieved popularity as a recreational drug and a nutritional supplement publically and marketed as body builders. It is available as a clear liquid, white powder (dissolved in water), tablet, or capsule and can be made in private residences with ingredients and recipes obtained on the Internet. Overdose is common because the often unknown strength of the solution and the Toxicity of this drug increased if taken with alcohol or other CNS depressants. The

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Street names of this drug includes "G", "Liquid Ecstasy," "Scoop," "Easy Lay," "Georgia Home Boy," "Grievous Bodily Harm," "Liquid X," "Goop," "Gib," "Soap," and "Nitro" etc[3].

Rohypnol (flunitrazepam):

Rohypnol is a benzodiazepine manufactured by Roche Laboratories; it is available in more than 60 countries in Europe and Latin America for preoperative an aesthesia, sedation, and treatment of insomnia. This drug is also known by another name i.e. **'Date rape'** and use began gaining popularity in the United States in the early 1990s. The importation of this drug is banned in USA because of its disapproval of medical uses. It is available in odourless, colourless, and tasteless and commonly available in pill (few reports notified it as ground and snorted form) and taken orally. It is frequently combined with alcohol and other beverages and may be lethal when mixed with alcohol and/ or other CNS depressants. The Street names of this drug includes Roofies, Rophies, Roche, Forget-me Pill, Circles, Mexican Valium, Rib, Roach-2, Roopies, Rope, Ropies, Ruffies, and Roaches etc[4].

Table-1: Shows Chemical and Pharmacological Profile of Club Drug

Characteristics	Ketamine	GHB	Rohypnol
Chemical Name	Ketamine Hydrochloride	GammaHydroxybutyrate	Flunitrazepam
Molecular Formula	$C_{13}H_{17}Cl_2NO$	$C_4H_8O_3$	$C_{16}H_{12}FN_3O_3$
Molecular Weight	274.185 g/mol	142.19 g/mol	313.3 g/mol
Duration of Action	<1hour	2-5 hours.	Up to 12 hours
Metabolism	Liver, primarily by CYP3A4	95%, mainly liver and also in blood	Hepatic
Onset of Action	VI & MI yb nim5 > < 30min by muscular	Within 5–15 min	20-30 minutes
Biological Half Life	4A3PYC yb yliramirp ,reviL	30-60 minutes	18–26 hours
Therapeutic use	Veterinary anaesthetic, also used as anaesthetic in India for humans	To treat cataplexy associated with narcolepsy	To treat insomnia.

Sources: Ref. No.2, 3 & 4

Table-2: Shows Toxicological Profile of Club Drug

Characteristics	Ketamine	GHB	Rohypnol
Manner of use	**Liquid:** injected added to items to be smoked. **Powder:** dissolved in drinks, smoked, snorted or dissolved and injected	**Liquid:** often mixed with alcohol effects amplified	**Tablet:** typically ingested. **Orally**: crushes and snorted.
Clinical effects	**Low dose:** relaxation (K-land) **Higher dose:** dream-like state, hallucinations, visual distortions, increased tone, purposeful movements amnesia, hallucinations, delirium	**10mg/kg:** euphoria amnesia, & hypotonia **20-30mg/kg:** somnolence **>50mg/kg:** unconsciousness & coma, anxiety reduction, ataxia, effects similar to alcohol.	**1 or 2 mg**: dose reduces anxiety, inhibition, & muscular tension **Higher-dose:** intergraded amnesia, lack of muscular control, and loss of consciousness.
Toxic effects	Increased heart rate, hypertension, cognitive psychomotor impairment, nausea, respiratory depression, immobility, anxiety, dissociation**,** flashbacks, delirium, amnesia, schizophrenic symptoms	Sleep induction, tremors, agitation, seizures, GI symptoms, CNS & respiratory depression, dizziness, confusion, hallucination	Decreased body temp. And blood pressure, sedation, cognitive and psychomotor impairment, visual disturbances, dizziness confusion, and urinary
Dependence liability	No dependence.	Can Produce Physical dependence	Can Produce Physical dependence.

Sources: Ref. No.2, 3 & 4

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Some Previous Studies on Club Drugs and their Findings:

'Raves' are parties with loud, electronic "techno-rock" music, laser light shows, and all-night dancing held in clandestine locations, including warehouses, nightclubs, and farm fields1. These first became popular in Great Britain in the late 1980s. The underground or non-commercial music featured at raves which is produced by computers and include little or no vocals is distinct from the music played at conventional nightclubs. Following bans in some countries the rave parties moved in to legitimate nightclubs. A raver is a person who has an exciting and uninhibited social life and regularly goes to raves[5].

Ketamine, gamma-hydroxybutyrate (GHB), methamphetamine, and d-lysergic acid diethylamide (LSD/acid) have been identified as "club drugs" because of their link to club culture among young adults. Yet little is known about users' demographic differences in the prevalence of club drugs. This study sought to provide a comprehensive profile of users' demographic differences in prevalence of club drug use and dependence. Analytical method using in this study was time-space sampling, a stratified sample of 400 18- to 29-year-old club-going young adults was recruited into the Club Drugs and Health Project and concluded that though participants reported using an array of club drugs, almost all participants (90.0%) were cocaine users. Although there were several sexual orientation and gender differences in recent drug exposure, patterns of use (measured in days) were fairly similar across gender, sexual orientation, and age. Finally, a majority of individuals (58.5%) met or exceeded criteria for club drug dependence, with most (61.7%) indicating cocaine was the one drug causing them significant problem[6].

These drugs are popular because of their low cost and convenient distribution as small pills, powders, or liquids. Club drugs usually are taken orally and may be taken in combination with each other, with alcohol, or with other drugs. Club drugs often are adulterated or misrepresented. Any club drug overdose should therefore be suspected as polydrug use with the actual substance and dose unknown. Persons who have adverse reactions to these club drugs are likely to consult a family physician. Toxicological screening generally is not available for club drugs. The primary management is supportive care, with symptomatic control of excess central nervous system stimulation or depression. There are no specific antidotes except for flunitrazepam, a benzodiazepine that responds to flumazenil. Special care must be taken for immediate control of hyperthermia, hypertension, rhabdomyolysis, and serotonin syndrome. Severe drug reactions can occur even with a small dose and may require critical care. Club drug overdose usually resolves with full recovery within seven hours. Education of the patient and family is essential[5].

General pharmacology

The pharmacology of ketamine will be described in two parts. The first one is dealing with the effect of the substances on various neurotransmitter systems and mainly used as clinical and as a recreational agent. The second part is dealing with the effects on various organ systems and often wanted in clinical or veterinary practice or occurring during non-medical use and sometimes leading to adverse reactions.

Ketamine is a dissociative anaesthetic[7]. Originally, the dissociation component refers to a functional and electrophysiological dissociation of thalamo-neocortical and limbic systems[8, 9]. Later, the nature of the subanaesthetic ketamine experience has led to the use of the term 'dissociative' in a more psychological sense referring to a feeling of dissociation of the mind from the body [10, 11]. The commercially available ketamine is a racemic mixture of two enantiomers. The Senantiomer is shown to be the more potent one with an approximately 3-4 fold anaesthetic potency compared to R-ketamine.

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This correlates to the higher binding affinity for the PCPsite of the NMDA-receptor. The psychotomimetic properties of ketamine are mainly caused by the S-enantiomer, although sub anaesthetic doses of R-ketamine may induce a state of relaxation [12, 13].

Therapeutic and industrial use of ketamine

Ketamine hydrochloride is used as an analgesic and anaesthetic in human and veterinary medicine, where it has acquired a unique place. It is on the market in 70 out of the 74 countries that answered the questionnaire; in most countries as an anaestesic, in some countries also as a2n analgesic. A typical description of the indication reads: "Used for restraint or as the sole anaestheticagent in diagnostic or minor, brief surgical procedures that do not require skeletal muscle relaxation in humans.[14]"

Rohypnol (flunitrazepam) use began gaining popularity in the United States in the early 1990s. Important clinical applications are mainly brief procedures in paediatric and ambulatory anaesthesia, its use in the treatment of burning wound patients, obstetrics and for the induction and maintenance of anaesthesia in hypovolemic, pericardial tamponade, constrictive pericarditis, and cardiogenic shock patients. It is a benzodiazepine (chemically similar to sedative-hypnotic drugs such as Valium or Xanax), but it is not approved for medical use in this country, and its importation is banned [8, 9, 15].

The National Survey on Drug Use and Health9 and the Monitoring the Future Study10 both assessed the prevalence of club drug use among young people. Although neither of these national studies assessed a complete range of club drugs, these data indicated high rates of lifetime exposure to MDMA/ecstasy (12.4% to 14.9%), cocaine (12.6% to 14.3%), and LSD/acid (7.9% to 11.2%) among young adults. While these population estimates illustrated the dispersion of drug trends, they did not assess prevalence among target populations within club and youth cultures. A focus on these groups is vital given the link between club drugs and club culture, as well as the increasing trends of club drug use among young adults participating in club subcultures[16].

Raves attract adolescents and young adults to large and often remote settings, such as bars, open fields or warehouses, where supervision is absent or minimal. Ethnographic data from the commission on alcohol and drug abuse indicate that individuals attending raves range in age from 13 through 40 years. Alcohol consumption is not popular at raves, although it usually is available, and consumption ranges from minimal to heavy, however, club drug are popular at raves and are readily available. Drug use ranges from none or experimental to heavy. Given the age of this population the isolation of raves, and their activities, it is likely that a person from this group will be admitted to the operating room in an emergency situation. Motor vehicle crashes are the leading cause of morbidity and mortality in the 15- to 21 year old age group. Approximately 38% of all traffic fatalities in 1999 involved a substance- impaired driver or no motorist. These facts call attention to the need for anesthetists to be cognizant of club drug, their effects, and their potential interactions with aesthetic drugs. This article is an extensive literature review of common club drugs, physiological actions, and when data were available, aesthetic consideration. In this review the term 'club drugs' will be used in reference to Ecstasy, GHB, ketamine, and Rohypnol to avoid further confusion. These drugs are being used in an expanding variety of venues by groups who differ in terms of age, gender, sexual orientation, and race/ethnicity. Each of these drugs has very different pharmacologic properties, physiological and psychological effects, and potential consequences[1, 5].

GHB was first synthesized in France in 1960 as an aesthetic but later achieved popularity as a recreational drug and a nutritional supplement marketed to bodybuilders56. Non-prescription sales in the

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United States were banned in 1990 because of adverse effects, including uncontrolled movements and depression of the respiratory and CNS57. It is now a Schedule I drug in the U.S. and Schedule IV of the 1971 UN Convention. In 2002, sodium oxalate, a formulation of GHB, was approved for the treatment of narcolepsy and classified as schedule III16. Illegal GHB and its precursors, GBL (gamma butyrolactone) and 1, 4-BD (1,4-butanediol), can be obtained over the Internet and sometimes are marketed as solvents such as ink jet printer fluid or as GHB alternatives in health food stores, gyms, raves, and nightclubs. Chemistry kits, reagents, and recipes are available on the web to convert the precursors into GHB[1].

General Treatment for Club Drugs

Because club drugs are illicitly obtained and often are adulterated or substituted, they must be considered as unknown substances. In the ever-changing world of illegal drug distribution, Internet Web sites can be helpful in identifying the rapidly changing appearances of these substances. The immediate concern with the use of club drugs is cardio respiratory maintenance. Users often present with multiple drug ingestions, which may include stimulant and depressant drugs (e.g., MDMA combined with GHB or alcohol). When the predominant symptoms are controlled, the symptoms of a second under lying drug may surface. Most hallucinogens are CNS stimulants; in overdose, patients may exhibit hyperthermia, hypertension, tachycardia, anxiety, and agitation. The risk of escape or self-injury also should be considered. No standard treatment regimen has been identified for club drug overdose. Basic management should include cardiac monitoring, pulse oximetry, urinalysis, and performance of a comprehensive chemistry panel to check for electrolyte imbalance, renal toxicity, and possible underlying disorders [17, 18].

Precautions should be taken to prevent seizures. Gastrointestinal decontamination with activated charcoal and a cathartic may be useful in acute exposures if the drug was taken orally within the previous 60 minutes. Otherwise, unless a massive dose was taken, inducing emesis is seldom effective and may increase psychologic distress. Hypertension and tachycardia generally will resolve with the management of anxiety or agitation. Severe hypertension can be treated with labetalol (Normodyne), phentolamine (Regitine), nitroprusside (Nipride), or similar agents. For agitation, benzodiazepines such as diazepam, lorazepam (Ativan), or midazolam (Versed) may be used.

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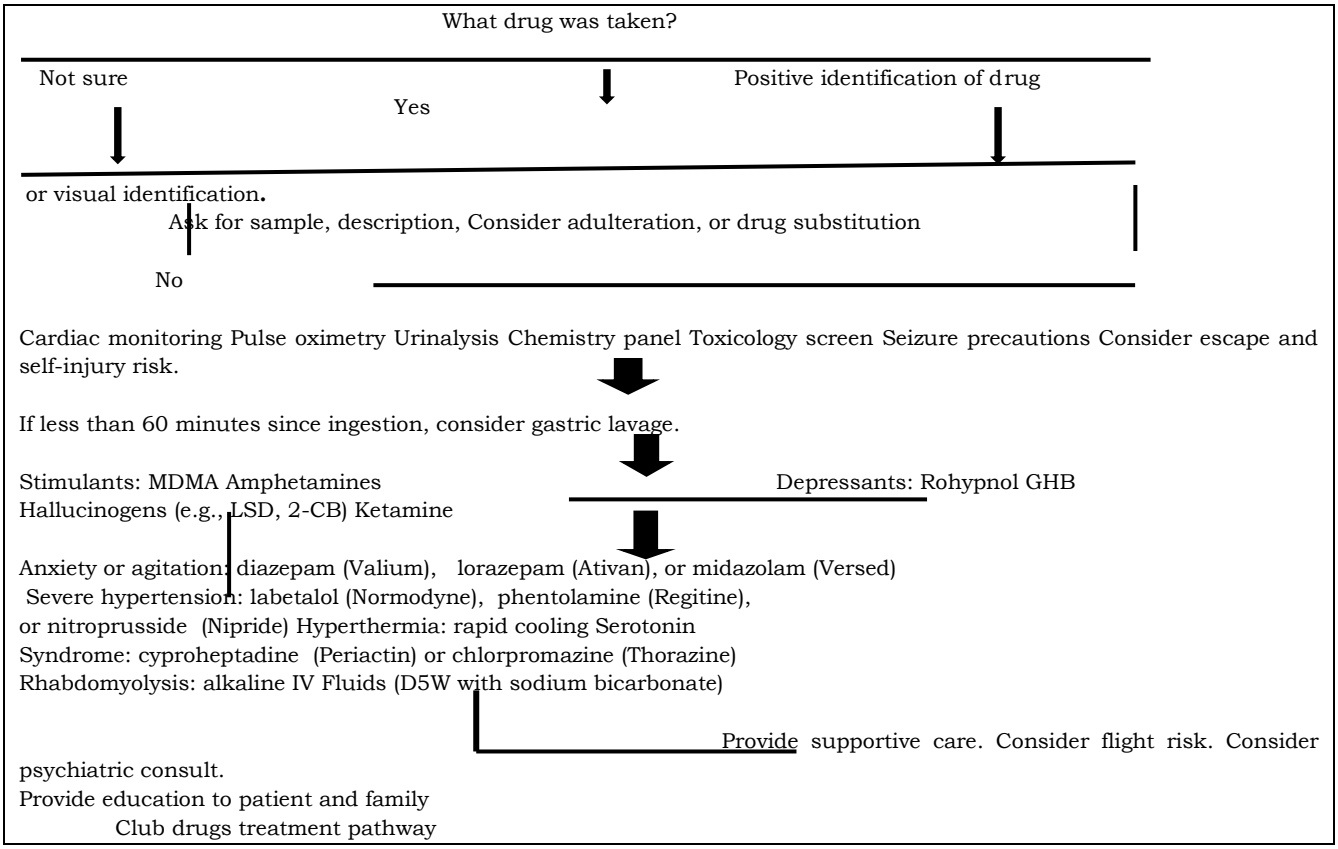
Club Drug Treatment Pathway

Figure-1: *Showing Algorithm for the management and treatment of ingestion of a "club drug. (MDMA=3, 4-methylenedioxymethamphetamine; LSD=lysergic acid diethylamide; 2-CB = 4-bromo-2, 5-dimethoxyamphetamine; GHB = gamma hydroxy butyrate; IV = intravenous)*



Sources: *http://www.clubdrugs.org*[17] *and http://www.drugabuse.com*[18]

Hyperthermia should be treated immediately with tepid water bathing and fanning. One study reported that a single tablet of MDMA resulted in fatal hyperthermia. The use of dantrolene (Dantrium) is questionable and no longer should recommend. Alkalinization of the urine, which usually is recommended for rhabdomyolysis, be used cautiously because it reduces the renal clearance of amphetamine. The serotonin antagonists' chlorpromazine (Thorazine) and cyproheptadine (Periactin) appear to be effective in mild to moderate cases of serotonin syndrome. There are no specific antidotes for ingestion of club drugs, except for Rohypnol, which has the antidote flumazenil. With supportive care, patients usually will recover completely within seven hours. Rohypnol and its active metabolite 7-aminoflunitrazepam may be detected by gas chromatography/mass spectrometry testing up to 72 hours after ingestion. For assistance with assay in cases of suspected rape, contact Roche Laboratories (800-608-6540) for a free screening for Rohypnol. Tests for ingestion of ketamine are seldom available, but ketamine may be suspected if a toxicological test is positive for PCP[16].

Discussion

Researchers have identified increases in club drug use and linked use specifically to young adults and club culture. Yet much of our knowledge about trends in club drug use has been limited to convenience-based samples (limiting generalizability) or national surveys (which are often devoid of the cultural

characteristics inherent to club drug use). Although increasing attention has been given to club drug use among gays, lesbians, and bisexuals in and of themselves, little research has been done that systematically assesses to develop culturally specific health education and prevention initiatives that are capable of tapping into different facets of club cultures (be it gender, sexual orientation, or age). Finally, a majority of those participants having met or exceeded CIDI club drug dependence criteria indicated that cocaine was the one drug causing them the most problems. These data suggest not only that cocaine is the drug of choice among club drug users, but it is also the single club drug causing the most significant problems in the lives of club drug-using young adults. Furthermore, frequency of recent cocaine use, and developing problems as a result of cocaine use, occurred independent of age, gender, and sexual orientation. Due to this unique association between cocaine use and cocaine dependence, these data not only highlight the need for targeted health education and prevention programs, but also indicate a need for treatment[19, 20].

Conclusion

Club drugs are a menace to the society. Their use, other than for strictly medical or approved research purposes, should be prohibited through legislation and awareness generation. Even though the "club drug" phenomenon was identified early, scientific information about these drugs, their identification, and short- and long-term effects are still evolving [21, 22].

The lack of research-based information on the adverse effects of these drugs has led to the emergence of a range of websites that may or may not provide accurate information. India has a huge teenage population which is being targeted by foreign drug peddlers to flourish their business. Club drugs continue to be modified and evolve, making them very difficult to monitor. It is useful to know what drugs are being used in the community. Information can be gleaned from teens themselves at both routine and emergency visits, from local substance abuse programmes, and from the police. Only collective effort can stop this menace from engulfing the society. Seven drugs commonly used in the rave culture have been reviewed. The clinically significant physiologic effects on the neurological, cardiovascular, hepatic, renal, and respiratory systems of these illicit drugs are summarized in the table. Anesthesia providers must be aware of the population at risk for abusing the drugs, the common drugs of abuse, and the possible effects of these drugs on the effects of commonly administered anesthetic agents.[23, 24]

Ketamine is an arylcycloalkylamine structurally related to cyclidines, like eticyclidine, phencyclidine, rolicyclidine and tenocyclidine. Ketamine can produce a state of dependence as shown in various animal models. This is supported by some human data as reported by the WHO. Although one should keep in mind that monitoring of adverse effects in patients is quite different from monitoring effects in recreational users. Due to its pharmacological affects it produces a depression of the central nervous system, resulting in hallucinations, disturbances in thinking and perception and also in motor function. There is evidence that ketamine is abused, but looking at the figures one can hardly consider this to constitute a public health and social problem. Especially when comparing ketamine to the other cyclidines. The substance is difficult to synthesize, so illegal production is unlikely. Preparations are mainly used in hospitals and veterinary clinics, so it is not expected that diversion will take place on a large scale[25, 26].

References

1. *Kaustav Chakraborty, Rajarshi Neogi & Debasish Basu; Club drugs: review of the 'rave' with a note of concern for the Indian scenario; Received February , 2010;Indian J Med Res 133, June 2011, pp 594-604.*

Paper ID: UGC 48846-835

2. *https://en.wikipedia.org/wiki/Ketamine, accessed on dated 3rd, June,2017*
3. *https://en.wikipedia.org/wiki/Gamma-Hydroxybutyric_acid, accessed on dated 3rd, June,2017*
4. *https://en.wikipedia.org/wiki/Flunitrazepam, accessed on dated 3rd, June,2017*
5. *Paul M. Gahliinger, M.D., PH.D., M.P.HClub Drugs: MDMA, Gamma-Hydroxybutyrate (GHB), Rohypnol, and Ketamine;-American Family Physician;Volume 69, Number 11 / June 1, 2004.*
6. *Mary Klein , RN, BSN; Frances Kromer, CRNA ,ND,MSN; Rave drugs ;consideration AANA journal course/feb2014/vol.72/no.1;page no. 61-67.*
7. *Domino EF, Chodoff P, Corssen G. Pharmacological effects of CI-581, a new dissociative anaesthetic, in man. ClinPharmacolTher 1966; 6:279-291*
8. *Reich DL, Silvay G. Ketamine: an update on the first twenty-five years of clinical experience. Can J Anaesth 1989; 36:186-97.*
9. *Haas DA, Harper DG. Ketamine: a review of its pharmacologic properties and use in ambulatory anesthesia. AnesthProg 1992; 39:61-8.*
10. *Jansen K. (2000a). Anaesthetic apocalypse. Ketamine part 1: hits and myths. Druglink 2000 (jan/feb):7-11.*
11. *Jansen K. (2000b). Anaesthetic apocalypse. Ketamine part 2: addictive psychedelic. Druglink 2000 (march/april):18-21.*
12. *Vollenweider FX, Vontobel P, Oye I, Hell D, Leenders KL. Effects of (S)-ketamine on striatal dopamine: a [11C]raclopride PET study of a model psychosis in humans. J Psychiatr Res 2000;34:35-43.*
13. *Engelhardt W. Recovery and psychomimetic reactions following S-(+)-ketamine. Anaesthesist 1997;46(Suppl 1):S38-42.*
14. *Kipke MD, Weiss G, Ramirez M, Dorey F, Ritt-Olson A, Iverson E, et al. Club drug use in Los Angeles among young men who have sex with men. Subst Use Misuse 2007;42:1723-43*
15. *Bergman SA. Ketamine: review of its pharmacology and its use in paediatric anaesthesia. Anesth Prog 1999; 46:1020.*
16. *Jeffrey T. Parsons, PhD,[a,b,c] Christian Grov, PhD, MPH,[a,d] and Brian C. Kelly, PhD[a,e]: "Club Drug Use and Dependence Among Young Adults Recruited Through Time-Space Sampling" Public Health Rep. 2009 Mar-Apr; 124(2): 246–254*
17. *http://www.clubdrugs.org , accessed on dated 13th, June,2017*
18. *http://www.drugabuse.com, accessed on dated 13th, June,2017*
19. *Budavari S, O'Neil MJ, Smith A, Heckelman PE (Eds.). The Merck index. An encyclopedia of chemicals, drugs and biologicals. 11th Edition. Merck & Co. Inc.: Rahway, New Yersey, USA, 1989.*
20. *Rome ES, It's a ravenew world: Rave culture and illicit drug use in the young. Cleve Clin J Med 2001; 68 : 541-50.*
21. *Weir E. Raves: a review of the culture, the drugs and the 2. Prevention of harm. CMAJ 2000; 162 : 1843-8*
22. *New Scientist 1995; 1999 : 51-2.Singh AN, Catalan J. Rave drug(ecstasy)and selective*
23. *Singh AN, Catalan J. Rave drug serotonin reuptake inhibitor anti-depressants. Indian J Psychiatry 2000; 42 : 195-7*
24. *RothenBerg, S., Schottenfeld, S., Meyer, R.E. and Krauss, K. (1977). Performance differences between addicts and non-addicts. Psychopharmacology. 52, 299-306.*
25. *Williams, H., Taylor, R. and Roberts, M. (1998). Gamma-hydroxy-butyrate (GHB): a new drug of misuse. Ir Med J. 91:2 56-7*
26. *Smith KM, Larive LL, Romanelli F. Club Drugs: Methylenedioxymethamphetamine, flunitrazepam, ketamine 2002; 59 (11); 1067-1076.*