

Occasional and Continuous Ketamine Users: Consumption Rules and Harm Reduction Strategies

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SUMMARY

Objectives: To describe the phenomenology of ketamine use; to identify feared/unwanted consequences due to the use of ketamine; to identify any common ketamine consumption rules.

Methods: A semi-structured questionnaire was administered to a sample of 48 (31.3% female) substance users living in Italy with recent use of ketamine (last 12 months) and who have never referred to an Addiction Service.

Results: From the results aspects emerge related to particular strategies implemented by interviewees to reduce the impact of ketamine consumption on their health, in everyday life and within social relationships: 1) ketamine consumption and purchase were primarily based on friendship networks and trusted relationships; 2) techniques of camouflage were adopted to keep the consumer status secret; 3) artisan controls to verify the quality of the substances were common; 4) general consumption rules were implemented to avoid unwanted consequences due to the use of ketamine.

Conclusions: The control of ketamine consumption is a complex practice that includes various aspects related not only to the knowledge of the substance, to the dosing-related harm reduction strategies, to the consumption setting, and to the consumer's psycho-physical state, but also to the choice of people to buy from and consume with.

Keywords: *substance use; ketamine; consumption rules; harm reduction strategies.*

INTRODUCTION

Ketamine was developed in the 1960s and introduced into medical use as a new dissociative anesthetic, and today it remains an alternative choice in pediatric and veterinary medicine [1]. As an anesthetic agent, ketamine can produce both anesthetic and analgesic effects, and has a relatively stable cardiovascular profile [2]. The drug does not depress respiration or the cardiovascular system, it can be used without electricity, oxygen, ventilators, and all the support systems required for other anesthetics. In high-income countries, ketamine is increasingly used to treat depression and chronic pain [3].

Recreational use of ketamine was first documented in the United States in the 1970s, and then it spread internationally in association with the rave dance sub-

culture of the 1980/90s. More recently, it has become part of the current post-rave clubbing and youth dance culture as a mainstream club drug [4], and its use is significantly higher in those frequenting the night-time economy (e.g. discotheques, nightclubs, dance/music events) and is commonly part of poly-substance use [5].

Ketamine is primarily obtained in a powder form and administered by sniffing or inhaling. Other forms of ingestion include intramuscular injection, or occasionally intravenous injection, and oral intake in tablet form [6]. Illicit manufacturing, trafficking, and use of ketamine appears to have started on a large scale in several Asian nations because of its relatively low price compared to other psychotomimetic drugs, and it has subsequently spread to other regions [7, 8].

Psychologically, the acute use of ketamine causes

hallucination, symptoms of psychosis, delusion, agitation, confusion, and memory impairment. In addition, many side effects, such as nausea and vomiting, and bizarre dreams, have been reported. These side effects have been documented in a dose-dependent fashion and some of them persisted for several days after administration. Following heavy ketamine use, abusers have experienced a near death feeling, known as a “K hole” [9].

Users are aware of the potency of the drug, but do not pay attention to long-term negative effects [10]. Regular ketamine use is associated with vague abdominal pains of unknown etiology, colloquially termed ‘K Cramps’, and there is evidence of gastro-intestinal toxicity and urological disorders, particularly hemorrhagic cystitis [11]. Furthermore, long-term recreational use can be associated with the development of dependence and tolerance [12].

Ketamine is generally the last substance a user experiments with in their lifetime, and its effects are perceived differently depending on the dosage, the route of administration, whether intake occurs alone or in a group, and whether it takes place after having eaten or not [13]. The principal physical dangers of most cases of non-medical use are believed to arise mainly from an interaction between the user and the setting of use, as ketamine can leave the user in a confused state (i.e., burns, falls, drowning, traffic accidents, and sexual assault) [14].

The effects that limit the clinical use of ketamine make the drug appealing to recreational drug users [15]. From a user’s point of view, the best effects of ketamine consumption seem to be altered senses, an out of body experience, escaping reality, feelings of well-being, and creativity [14]. Unappealing effects are memory loss and decreased sociability [4].

While ketamine is generally associated with the dance and rave scene, the main settings of use are at home or at a friend’s house. When taken in club settings, ketamine is often part of a poly-drug repertoire. When used in private settings, it is often taken alone to explore its hallucinogenic effects [10].

As reported above, in the literature there are many studies that describe the experience with ketamine, targeted in particular on the effects considered positive and on the consumers’ health consequences. Contrary to studies targeted on other substances [16-24], from which specific precautions emerge in order to control consumption, reduce negative effects, avoid stigma, and keep the consumer’s identity separate from that of the drug addict, there is little research on the practices implemented by ketamine consumers to avoid negative problems, or on the rules adopted for safe consumption.

For Moore and Measham [25], the control strategies implemented by ketamine users (dose, context of consumption, management of K hole) serve both to maximize the pleasure and to minimize the harm. In this case, the notion of pleasure is structured around preferences for more or less intense and more or less sociable states of intoxication, which ketamine users

attempt to control through drug dose and consumption context.

The most frequent strategies of harm reduction implemented by ketamine users were related to dose and consumption frequency, particularly spacing out sessions, spacing out doses within a session, and limiting the amount and not going over it [26].

This study, which addresses a theoretical sample of substance users living in Italy with recent use of ketamine (last 12 months) and who have never referred to an Addiction Service (AS), has the main aims: 1) to describe differences between occasional and continuous users; 2) to identify any common ketamine consumption rules (practices set out by communities of people who use ketamine) or harm reduction strategies.

MATERIALS AND METHODS

The participants had used ketamine over the last 12 months and had never been referred to AS for substance use problems or had never sought help from AS themselves. As regards the users’ selection process, the interviewers resorted to their own personal networks (e.g. friends of friends, acquaintances, work colleagues) and contacts suggested by the interviewees themselves (snowball sampling) or by ‘word of mouth’. These interviewees took part on a voluntary basis and were not paid, consent was collected in oral form. Everyone was explained the aims and goals of the study and anonymity was guaranteed along with the possibility to be excluded in the case of second thoughts.

A semi-structured questionnaire was specifically created for the study, partly modifying a tool used in previous works [24]. Twenty subjects were successively interviewed by two different interviewers, and the Kappa test was used to verify their understanding of the questions and the congruency of the responses [27].

The questionnaire collected socio-demographic data (gender, age, birthplace, living situation, educational background, and employment status), information regarding monthly income, relationship with illegal substances and alcohol, integrated with information regarding drug dealing, and risk behaviours.

Regarding alcohol, we collected data related to number of episodes of alcoholic alteration in the last year. The consumption of at least 6 units of alcohol on any occasion in the previous 30 days was defined as binge-drinking [28; 29].

For each illegal substance used we collected data regarding number of consumption days per month, average quantity per episode, average cost per gram/dose. Using these variables, the monthly expenditure for illegal substances was estimated.

Regarding ketamine, we collected further information regarding quality checks, secrecy (i.e. keeping consumption hidden from family, friends, work colleagues; using a code to communicate in regard to the substances), most feared/unwanted

consequences of ketamine's use and most common protective behaviours.

In relation to the frequency of ketamine use in the last year, two typologies of consumers have been distinguished: occasional (1/3 episodes of ketamine consumption per month) and continuous > 3 episodes of ketamine consumption per month). The differences between the two groups, as compared with the continuous and categoric variables, were analyzed with Student's t-test and the chi-square test, respectively. The data analyses were performed using the statistical software program STATA 15.0.

In keeping with Italian privacy regulations, the study design was approved by the local research

ethics committee (Cod. CE: 19035).

RESULTS

In the period from October to December 2019, 48 subjects, 31% females, 4% non-natives, mean age 23.6 years, were interviewed. The average monthly income was 746€. All of them had a stable home, and most had a medium-high level of education, studied and worked, although there were a considerable number of subjects who neither studied nor worked. During the past year, 85% had engaged in risky behaviours, but none had exchanged syringes (Table 1).

Table 1. General characteristics of the study patients

	Total (48)		Occasional* (22)		Continuous** (26)		P
	N	%	N	%	N	%	
Females	15	31.3	7	31.8	8	30.8	0.938
Not natives	2	4.2	1	4.5	1	3.8	0.904
Secondary school exam certificate	39	81.3	18	81.8	21	80.8	0.980
Living with his family	19	39.6	6	27.3	13	50.0	0.226
18/24 years	30	62.5	13	59.1	17	65.4	0.654
25/34 years	18	37.5	9	40.9	9	34.6	
Studies	18	37.5	8	36.4	6	23.0	0.624
Works	21	43.5	11	50.0	10	38.5	
Neither studies nor works	9	18.8	3	13.6	10	38.5	
Net monthly income <1000 Euro	35	72.9	16	72.7	19	73.1	0.993
Dangerous driving	21	43.8	9	40.9	12	46.2	0.715
Unprotected sex	35	72.9	15	68.2	20	76.9	0.497
Drug dealing	32	66.7	14	63.6	18	69.2	0.682

*1/3 episodes per month ** >3 episodes per month

In total, 22 subjects declared they had from 1 to 3 episodes of ketamine consumption per month in the last year (occasional) and 26 at least one episode per week (continuous).

Substance use - Over the last year, all the interviewees had used several drugs, mostly cocaine (94%), MDMA (88%), cannabis (85%), benzodiazepines (75%), speed (75%), LSD (56%), opium (35%), heroin (25%), and hallucinogenic mushrooms (13%). Only one

subject injected (heroin).

We observed a more intense pattern of use among the continuous group, evidenced by the higher weekly use of at least two substances other than cannabis. In addition, the continuous group were distinguished by the higher consumption of cocaine, speed, and MDMA, and the occasional group by the higher consumption of hallucinogenic mushrooms (Table 2).

Table 2. Patterns of substance use

Ketamine in the last year	Total (48)	Occasional* (22)	Continuous** (26)	P
Mean age at first use	18.67	19.18	18.23	0.276
Duration of consumption in years	4.96	4.90	5.0	0.932
Average episodes per month	6.4	2.0	10.2	<0.0001
Average Dose gram	0.42	0.34	0.48	0.0993
Average cost per gram (Euro)	42	46	38	0.1481
% Use exclusively at weekends	43.8	63.6	26.9	0.011
Other substances in the last year				
Mean age at first use	13.79	14.14	13.50	0.203
Duration of consumption in years	9.85	10.0	9.73	0.831
% Use exclusively at weekends	12.5	13.6	11.5	0.827
% Cannabis >=4 episodes per week	60.4	59.1	61.5	0.573
% At least 2 substances other than cannabis >=1 consumption episode per week	37.5	18.2	53.9	0.011
% Cocaine >=1 episodes per week	54.2	31.8	73.1	0.004
% Speed >=1 episode per week	37.5	22.7	50.0	0.052
% Opium >=1 episode per week	14.6	9.1	19.2	0.321
% Heroin >=1 episode per week	4.2	4.6	3.9	0.904
% MDMA >=1 episode per week	22.9	9.1	34.6	0.036
% LSD >=1 episode per month	31.3	36.4	26.9	0.482
% Hallucinogenic mushrooms >=1 episode per month	6.3	13.6	-	0.052
Alcohol in the past year				
% >=3 episodes of alcoholic alteration per week	21.7	28.6	16.0	0.303
% Binge drinking during last 30 days	75.0	81.8	69.2	0.316

*1/3 episodes per month ** >3 episodes per month

Regarding alcohol use, all the interviewees reported having been drunk at least once over the past year (22% at least 3 episodes per week) and 75% were identified as 'positive' for binge-drinking over the last month. Alcohol intoxication was more elevated among occasional.

Patterns of ketamine use – The mean age of the first ketamine use was around 18-19 years and lasted for 5 years. On average, there were 6.4 episodes of consumption per month, the average dose was 0.42 g, the average cost per gram was 42€, and the average monthly expenditure per capita was estimated at 150€, higher for the continuous group (continuous 256€, occasional 28€, P=0.0004). Forty-four percent of consumers used ketamine exclusively at weekends, particularly in the occasional group (Table 2). All participants reported inhaling ketamine in a powdered form as the main route of ingestion, and two reported

the occasional smoking of the drug.

Concerning quality checks, the majority trusted their dealers (total 33%; occasional 41%, continuous 27%) or used onsite drug safety testing services at party events or at concerts (19%), but we observed a high percentage of people who used sensory controls, particularly using their eyesight (total 31%; occasional 27%, continuous 35%) and their sense of smell (19%).

Regarding secrecy, the majority of occasional tried to keep their substance use hidden, especially from their family (total 69%; occasional 64%, continuous 73%), from their colleagues (Total 50%; occasional 55%, continuous 46%), and from their friends (Total 31%; occasional 46%, continuous 19% P 0.05); just under half paid particular attention to their contacts and resorted to a private code to communicate (total 46%; occasional 50%, continuous 42%).

Unwanted consequences of ketamine use - Another interesting aspect is the fear of having problems related

to ketamine use. From the interviews, many feared damages were identified as a consequence of the use of ketamine, the most common concerning the justice sphere (69% problems with the law, 50% being unable to hide the effects, 35% being caught in possession of the substance), the health sphere (29% road accidents, 27% long-term physical complications, 25% memory disorders, 23% loss of consumption control), and the condition that being a drug consumer will be made public (21% labelling/stigma). Other fears worth highlighting include the fear of psychic problems (19% hallucinations, 13% depression), psychiatric problems (19%), relational problems (17% loss of important relationships, 15% isolation from others), and complications related to the economic sphere (15% overspending, 10% being ripped off, 8% going into debt). It is worth noting that only one interviewee out of twelve feared developing any form of ketamine addiction. Statistically significant differences were not

observed between the two typologies being studied, but we highlight that occasional pay more attention not being ripped off (occasional 18%, continuous 4%), and continuous are most scared of being unable to hide the effects (occasional 41%, continuous 58%), and have reported a higher percentage of memory disorders (occasional 14%, continuous 35%), loss of consumption control (occasional 18%, continuous 27%), hallucinations (occasional 9%, continuous 27%), isolation from others (occasional 9%, continuous 19%), overspending (occasional 9%, continuous 19%), going into debt (occasional 5%, continuous 12%).

Consumption rules – As for protective behaviours individually adopted, we identified fourteen general ketamine consumption rules of thumb shared by all interviewees (regarding where, when, with whom and what doing before consuming; behaviours to avoid, and warnings) (Table 3).

Table 3. Consumption rules

		Total (48)	Occasional* (22)	Continuous** (26)	P
Where	Consuming only during social and recreational activities	50.0	63.6	38.5	0.082
	Consuming only in safe and comfortable setting	27.1	31.8	23.1	0.497
When	Consuming only in positive emotional states	25.0	27.3	23.1	0.738
	Not consuming before activities requiring physical/mental engagement	70.8	68.2	73.1	0.710
With whom	Consuming in company	64.6	72.7	57.7	0.278
	Not consuming with strangers	31.3	31.8	30.8	0.938
	Do not consume with people who are not regular users	27.1	22.7	30.8	0.532
What doing before	Doing sensorial tests before consuming	56.3	45.5	65.4	0.165
	Observing the effects on others before consuming	41.7	54.5	30.8	0.096
	Pre-set budget for purchases	37.5	45.5	30.8	0.295
Behaviours to avoid	Avoiding specific methods of consumption	72.9	72.7	73.1	0.978
	Avoiding the exchange of drug-taking implements	29.2	27.3	30.8	0.791
Warnings	Limiting the quantity taken	43.8	50.0	38.5	0.422
	To take specific precautions to avoid physical harm	37.5	45.5	30.8	0.295

* 1/3 episodes per month ** >3 episodes per month

In order to spare harmful side effects, most ketamine users consumed only in company, used sensory testing to check ketamine before consuming it, avoided specific methods of consumption (e.g. injecting), and did not consume ketamine before activities requiring physical or mental engagement. A percentage ranging from 40% to 50% used ketamine only during social and recreational activities, limiting the quantity and observing the effects on other ketamine users before consuming it. One subject in three took specific precautions to avoid physical harm, pre-set a budget for ketamine purchase, and did not consume it with strangers. One in four avoided the exchange of ketamine-taking implements, consumed only with regular ketamine users, consumed only when in a positive emotional state, and only in safe and comfortable settings.

Moreover, it should be highlighted that 23% of our sample avoided ketamine consumption in public spaces (occasional 36.4%, continuous 12.0%, $P=0.041$), 13% used ketamine only with experienced users, and 8% did not use different substances in the same period.

Despite statistically significant differences were not observed, more attention was observed among continuous doing sensorial tests before consuming and not to consume with not regular users. On the contrary, occasional pay more attention consuming in company, only during social activities and in safe and comfortable settings, to observe the effects on other before consuming ketamine and to pre-set a budget for ketamine purchase, to limit the quantity taken and to take precautions to avoid physical harms.

DISCUSSION

This study is based on a sample of ketamine consumers who had never been referred to AS for substance use problems: young people, working or attending university, with medium-low income, from a stable home and with a medium-high standard of education. They were well integrated into friendship networks and regularly carried out social and recreational activities, although there was a high propensity for risky behaviours (particularly unsafe sex), and illegal activities (particularly drug dealing).

These were poly-drug users, with an average of eight different substances used in their lifetime, high alcohol abuse, and heavy use of cocaine, MDMA, cannabis, benzodiazepines, and amphetamines. Half used ketamine exclusively on the weekend, and only a minority declared they feared developing ketamine addiction.

Unlike other studies, in which ketamine is one of the last substances used, in our study it should be noted that in 10% of cases ketamine is one of the first 3 substances ever used, and in 42% of cases it is among the top 5 substances.

While most of the interviewees feared having

problems related to ketamine use, mostly regarding the justice sphere, long-term physical or psychic complications, and stigma, only a minority reported specific disorders, particularly memory disorders and paranoia.

From the results, other aspects emerge related to particular strategies implemented by interviewees to reduce the impact of ketamine consumption on their health, in everyday life and within social relationships: 1) ketamine consumption and purchase were primarily based on friendship networks and trusted relationships; 2) techniques of camouflage were adopted to keep the consumer status secret; 3) artisan controls to verify the quality of the substances were common; 4) general consumption rules were implemented to avoid unwanted consequences due to the use of ketamine.

As regards ketamine purchase, transactions based on trust, with well-known people, preferably at the seller's home prevailed. Even for consumption, subjects preferred to be at home or in fun contexts, and trusted relationships with friends and well-known people prevailed. In fact, the most appropriate consumption settings were recreational contexts and own home, while the least suitable were work and family.

While ketamine seems to be becoming a mainstream drug of common use among young people frequenting the amusement contexts, its consumption remains associated with a strong fear of being publicly discredited or labelled. Indeed, although purchase and consumption are based on trust, most consumers tried to keep ketamine use secret and adopted coded messages to communicate. The secret was kept not only from family and colleagues, but from friends too. From the interviews it emerged that most of the enrolled subjects feared problems with the law, being unable to hide the ketamine effects, being caught in possession of ketamine, and that the condition of being a ketamine consumer would be made public.

Regarding checking of the drug, while most interviewees trusted their dealers, and only a minority used onsite drug safety testing services at party events or at concerts, unsophisticated drug-checking practices based on habit and tradition have been observed, such as the use of touch and smell, and the preventive observation of what happens to others.

Most of the respondents examined the quality of ketamine by testing it and using their senses. For the checks, some referred to previous experiences, while others trusted the seller, who was considered to be more experienced. In fact, both for consumption and quality assessment, learning derived from trial and error, from suggestions by more experienced consumers, and by observing others. The different purchasing practices evoked an intimate and sensual relationship with ketamine, which had to be observed, touched, smelled and weighed, within a relationship with the seller that presupposed confidence and complicity.

Regarding consumption rules, previous studies have reported that ketamine users try to control dose, consumption frequency, and context of use to maximize

the pleasure and to minimize the harm [25]. Dosing-related harm reduction strategies are common among cocaine [17, 19], heroin [20], and ecstasy users [30], and this practice appears to be associated with less drug-related harm in a study conducted among poly-substance users [31].

In our study, we identified many general ketamine consumption rules of thumb shared by all interviewees, mostly related to harm reduction practices and oriented to control the quantity of ketamine taken (preset a budget, to limit the quantity), to take specific precautions to limit physical harms (i.e., drinking water), and to avoid particular methods of consumption (not injecting) and the exchange of drug-taking implements. Moreover, we observed behaviours related to the “set” (consuming only in positive emotional states and not before activities requiring physical/mental engagement) and to the setting (consuming only during social and recreational activities, in safe and comfortable setting). In all cases, it was important to carefully select people with whom to consume (only with regular ketamine users) or not to consume (never with strangers or non-regular users) ketamine.

Finally, from our study it emerged that ketamine use is particularly associated with the fun-time world and that the differences resulting from the greater or lesser use of ketamine had levelled over time. Indeed, looking at the two typologies related to ketamine use frequency, we did not observe any difference related to general characteristics, alcohol misuse, main motives for ketamine consumption, and ketamine consumption rules. On the contrary, subjects with a higher frequency of ketamine consumption showed a more intense pattern of use of any illegal drug, particularly cocaine, speed, and MDMA, and experienced a higher prevalence of problems related to ketamine consumption. On the other hand, occasional consumers used ketamine mainly on weekends and were more concerned about secrecy, avoiding ketamine consumption in public spaces.

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I confirm that neither the manuscript nor any parts of its content are currently under consideration or published in another journal.

CONFLICT OF INTEREST

Raimondo Maria Pavarin declare that he has no conflicts of interest.

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