ÉTUDE ORIGINALE

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Clonazepam misuse does not impact upon penal issues

A comparative study in adult male Creole convicts on Reunion Island in 2011

Résumé

Le mésusage de clonazepam n'influence pas le passage à l'acte. Une étude comparative chez des détenus créoles à La Réunion en 2011
Contexte : cette étude transversale en milieu pénitentiaire examine le lien entre mésusage de clonazepam avant incarcération et conséquences pénales du passage à l'acte. **Méthodes :** les conséquences pénales ont été comparées entre des sujets condamnés consommateurs de clonazepam et des condamnés non consommateurs. Ensuite, elles ont été comparées, parmi les consommateurs, entre ceux qui ressentaient des effets paradoxaux (EP) du produit et ceux qui n'en ressentaient pas, puis entre ceux qui avaient consommé du clonazepam avant le passage à l'acte et ceux qui n'en avaient pas pris. Les prisonniers participants étaient des hommes français d'origine créole condamnés depuis le 1er janvier 2011 sur l'Île de la Réunion. **Résultats :** ni la sévérité de la peine reçue, ni le type de sentence ne différaient statistiquement entre les 35 consommateurs et les 29 non-consommateurs (p = 0,137 pour la durée d'incarcération, p = 0,087 pour l'obligation de soins), de même pour la récidive (p = 0,355). 69 % des consommateurs ressentaient des EP sous clonazepam et 97 % étaient dépendants du produit. La consommation au moment de l'acte n'était pas liée aux caractéristiques de celui-ci (p = 1,000 pour les antécédents d'incarcération, p = 0,879 pour la durée de la peine), de même que les EP (p = 0,387 pour les antécédents d'incarcération, p = 0,823 pour la durée de la peine). **Conclusion :** le mésusage de clonazepam n'influence pas le passage à l'acte.

Mots-clés

Abus de substance – Clonazepam – Effet paradoxal – Passage à l'acte – Prison.

Summary

Context: This cross sectional study assesses the impact of clonazepam misuse before imprisonment upon the legal issues of acting out in a population of convicts. **Methodology:** penal issues were compared between convicts clonazepam users and non-users before incarceration. Then they were compared among users between those who felt paradoxical effects (PE) and those who did not; and between those who used clonazepam before acting, and those who did not. Participants were recruited among French Creole inmates convicted since the 1st of January 2009 in detention center of le Ports' prison, Reunion Island. **Results:** 35 users and 29 non-users were interviewed between July and December 2011. Severity and type of sentences were not statistically different between users and non-users (p = 0.137 for length of prison sentence, p = 0.087 for obligation of care). Recidivism was also not significantly different between the two groups (p = 0.355). Users were 69% to feel PE when taking clonazepam, and 97% of them were dependent to clonazepam. Consumption before acting was not associated to any of penal behaviors characteristics (p = 1.000 for history of incarceration, p = 0.879 for length of sentence), as well as PE (p = 0.387 for history of incarceration, p = 0.823 for length of sentence). **Discussion:** clonazepam misuse before imprisonment does not influence penal behaviors characteristics.

Key words

Substance abuse – Clonazepam – Paradoxical effect – Acting out – Prison.

Clonazepam is a benzodiazepine drug having anxiolytic, anticonvulsant, muscle relaxant, and hypnotic properties. It has been marketed in France since 1973 and classified as a high potency benzodiazepine (1). Clonazepam is a second-line treatment of epilepsy and is also used for treatment of anxious diseases, especially panic disorder (2). It has been widely misused since flunitrazepam retract in 1997 (3, 4), in spite of several restrictions on its prescription and delivery since 2008 (5, 6). Misuse of benzodiazepines appears as a frequent problem in numerous countries, associated with dependence, overuse, and adverse reactions (7-10). Some of these reactions are called paradoxical effects (PE), because they are completely in opposition to usual effects of benzodiazepines (for example psychomotor agitation and aggressive behavior). Numerous PE have been described with benzodiazepines over years (11-14). According to previous publications there is not one unique PE but many different sensations of increased talkativeness, excitement and excessive movement, occurring with all benzodiazepines in less than 1% of patients under treatment (12, 15). Such PE can happen whatever it is the first intake or not (15).

Substance use disorder and especially benzodiazepine misuse appear to be frequent in detained population (16). Some authors find that influence of benzodiazepine intoxication could facilitate violent crimes among vulnerable males (with impulsive personality traits or looking for sensation of power and self esteem) particularly when associated to alcohol (17). There are many examples of penal cases involving these molecules (18-20). In the area of Reunion Island, clonazepam is known for increasing disinhibition and violent reactions among young users (21), but prevalence rates of clonazepam use still remain lower than in Metropolitan France (22). On Reunion Island, few illegal substances are available and psychotropic agents are the substances the most commonly misused (mainly by the way of falsified prescriptions). However the way clonazepam is used influences penal offences and has never been studied.

In this transversal study we approached a population of young French Creole convicts. We first compared penal issues of acting out between clonazepam users involved in an addiction care program for clonazepam use and non clonazepam users who had never participated in addiction care program for any other substance. Then we focused on the users' group, in order to determine whether paradoxical feeling under clonazepam or clonazepam use before acting could impact on offences and sentences characteristics.

Methods

This cross sectional study was carried out between July and December 2011 in the detention center of Le Port, Reunion Island, France, which contains adult male convicts only.

Participants

First we selected prisoners incarcerated between the 1st of January 2009 and 31th of August 2011 to control for memory confounds when reporting substance use. Clonazepam use has been defined by at least one misuse of clonazepam ("misuse" defined as use out of prescription or falsified prescription) in the 12 months before imprisonment. The medical penitentiary service of Le Port's prison created some parole-groups for addiction care in order to help offenders willing to understand and overcome their addictive disorders with alcohol, tobacco, cannabis, and psychotropic agents. Users were recruited among compliant inmates taking part in an addiction care group between the 1st of January 2010 and the 1st of December 2011 for problematic clonazepam use before incarceration.

Controls (i.e. non-users) were selected among prisoners who did not use clonazepam in the 12 months before imprisonment (possible use in past life). We did not include in non-users' group subjects eligible to addiction care groups for problematic use of another substance (psychotropic agent, alcohol or cannabis). We excluded from the study foreigners and non Creole French inmates (mainly from Metropolitan France and Mayotte), who may have known other substances out of the island. We excluded also mentally ill subjects, prisoners followed by a member of psychiatry penitentiary staff, and those who had ever beneficed of a therapeutic prescription of clonazepam in medical antecedents.

Interviews

During face-to-face interviews, data were collected with a questionnaire administered by a psychiatrist physician working in penitentiary medical service. In a preliminary stage of the study, the questionnaire has been tested for relevance by administering it to five non clonazepam users, recruited in addiction care groups. In view of experience with previous workers (23), prisoners were suspicious when asked about psychoactive drug use, so subjects were told that their participation was only by their own. All prisoners were assured that their answers will be anonymous

and that their declarations would be treated in the strictest confidence (i.e. for research only). The same physician not involved in clinical care of selected inmates and fluent in Creole and French interviewed all subjects. At the end of the formal interview, each subject was engaged in an informal discussion to counsel him on his health situation.

Data collection

The questionnaire was divided in three parts: socio-demographic data, drug use information (alcohol, cannabis, clonazepam and other psychotropic agents) and forensic history including cause of current incarceration as well as substance use before acting and related behavior. All the data collected referred to the 12 months prior to imprisonment. Alcohol use was considered as excessive if consumption was higher than either three glasses daily or at least weekly four glasses per occasion according World Health Organization recommendations (24). Declarations of clonazepam users concerning wanted drug effects and effective felt effects were noticed in Creole like expressed by detainees, then coded when possible following known properties of benzodiazepines (anxiolysis, sedation, drug high, euphoria, amnesia). Some other sensations were coded into study variables if frequently cited (drug high sensation, euphoria, relief, self assertion, loss of self control). The first word cited has been recorded as "main" wanted/felt sensation. The variable "paradoxical effect" consisted in main feeling of excitement or self-control loss when taking clonazepam.

Statistical analysis

The demographic and clinical variables were normally distributed (as assessed by the Kolmogorov-Smirnov test and visual inspection) and were analyzed with parametric statistical tests with a threshold of $p < 0.05$ (two-tailed). Continuous variables were compared between clonazepam users and non-users using t-tests while categorical variables were compared using χ^2 or Fischer tests. Among users' consumption characteristics and penal issues were compared between those who felt a paradoxical effect and those who did not; then between those who consumed clonazepam before acting and those who did not, using the same statistical tests. Data were analyzed by SPSS Version 17.0 software.

Results

Socio-demographic characteristics

A total of 64 male Creole adult detainees condemned to prison were included, within 35 male clonazepam users during the 12 months before entering prison and 29 control subjects. Participants were mostly living in South and West areas of the island, which are the most crowded zones of Reunion Island (table I). Clonazepam users were significantly younger ($p < 0.05$) than non-users, with an average of age at 25 years in the whole sample. All prisoners had a low level of education (secondary school level

Table I: Socio-demographic characteristics, substance use and penal issues, Le Port Detention Center, Reunion Island, 2011 (n = 64)

		Clonazepam users (n = 35)		Non users (n = 29)		Total (n = 64)		p
Socio-demographics	Age (years)	24	(7-41)	26	(8-45)	25	(12-38)	0.045
	Lives in the West and South	28	(80.0%)	18	(62.1%)	46	(71.9%)	0.112
	Illetteracy	9	(25.7%)	5	(17.2%)	14	(21.9%)	0.414
	Main income by acquisitive crimes	11	(34.3%)	5	(17.2%)	16	(25.0%)	0.192
	Single marital status	24	(57.1%)	18	(42.9%)	42	(65.6%)	0.586
Penal issues	Acquisitive crime	28	(80.0%)	20	(69.0%)	48	(75.0%)	0.310
	Violent offense	22	(62.9%)	13	(44.8%)	35	(54.7%)	0.149
	Penal aggravating circumstances	31	(88.6%)	24	(82.8%)	55	(85.9%)	0.720
	Antecedent of imprisonment	27	(77.1%)	23	(79.3%)	50	(78.1%)	0.835
	Current prison sentence (months) [a]	[a] 38	(0-168)	31	(0-113)	35	(0-114)	0.137
Substance use	Has ever taken clonazepam in past life	35	(100.0%)	21	(72.4%)	56	(87.5%)	0.001
	Alcohol use	12	(34.3%)	11	(37.9%)	23	(35.9%)	0.762
	Cannabis use	22	(62.9%)	19	(65.5%)	41	(64.1%)	0.825
	Trihexylphenidyle use	15	(42.9%)	3	(10.3%)	18	(28.1%)	0.004
	Believes that clonazepam could facilitate acting out [b]	25	(73.5%)	9	(69.2%)	34	(72.3%)	1.000

[a] 1missing data; [b] 1 missing data among users and 16 missing data among non users.

or vocational and special education). We reported 21.9% of illiterate people, not surprisingly on this island where illiteracy is quite frequent (among 20% of adults) (25). About 38% of prisoners mainly earned money from illegal activities such as received stolen, thefts or drug dealing (data not shown). More than half of the detainees were unmarried and 53% were living in familial house, such as most of young Creole people at Reunion Island.

Over 35% of the subjects included consumed usually alcohol and 64.1% of inmates used to smoke cannabis not surprisingly regarding prevalence of alcohol and cannabis consumption on the Island (table I). Most of non-users included (21/29) had ever tested clonazepam at least one time in their life, which shows that clonazepam is highly popular among young people. Clonazepam users were more likely than controls to misuse other drugs, especially trihexyphenidyle easily available (usually prescribed to treat adverse effects of neuroleptics) for 28.1% of inmates. Only three users and one control subject reported use of another drug (flunitrazepam, clorazepate, ecstasy, data not shown).

Penal characteristics

Most of inmates were imprisoned in year 2010, control subjects being incarcerated earlier than users ($p < 0.05$, data not shown). For 75.0% of detainees, the cause of incarceration was a theft with or without violence (table I). We noticed 35 incarcerations for violent behavior, in which one homicide, two sexual offences, and six drug related crimes (three cases of drinking and driving and finally only three cases of illicit drug detention, among them two were cannabis). Clonazepam users were 73.5% to think that clonazepam consumption could facilitate acting out. Among non-users, 16 detainees did not answer to this question, and only nine detainees were thinking the same way (table I). Aggravating circumstances were found in 85.9% of users whatever they take clonazepam or not. In a same way, prison sentence was not heavier in users' group ($p = 0.137$), showing that consequences of penal acts were not more severe for users. 50 prisoners had at least one antecedent of imprisonment, as 52 inmates have been condemned for the same offence as current in the past (data not shown). Obligation of care (defined in article 132-45.3 of French penal code as obligation to submit to control measures, treatment and care after release) was not more often given to clonazepam users in our study ($p = 0.087$, data not shown). Only 48.6% of consumers in total had an obligation of care, which shows difficulties for justice to distinguish drug users needing care and specialized follow-up after legal punishment if there is no evidence for drug using during the trial.

Clonazepam use

In clonazepam users 42.9% were taking only clonazepam and about the same proportion took the drug in association with alcohol or cannabis. 48.0% of consumers admitted taking other legal or illegal substances if they could not find clonazepam (alcohol for 34.3%, cannabis for 62.9% and trihexyphenidyle for 48.6 % of them, data not shown). Asked prisoners were more likely to take clonazepam together with friends than alone (62.9%), and 45.7% of users preferred clonazepam as drinkable form than pills (table IIa). Most of 50.0% of detainees were using clonazepam once a week and more, and 35.3% several times a day (Table IIa). About 82.0% had ever wished to stop clonazepam utilization, for 26.5% of them to control their aggressive reactions under effect (table IIa). In spite of these findings more than half of included prisoners had never tried to stop (data not shown).

Included consumers were looking at first for anxiolysis and drug high sensation in respectively 37.1% and 34.3% of cases (data not shown). Nine detainees (25.7%) were looking mainly for self-assertion when using clonazepam. Regarding known properties of benzodiazepines, anxiolysis euphoria and drug high were the most frequently reported effects, explaining why clonazepam is appreciated by users (table IIb). But users were not always feeling the effects they had looked for (for example anxiolysis is wanted in 48.6% of cases but felt in only 22.9%, table IIb). Amazingly, numerous clonazepam users (68.6%) declared self-assertion feeling or self-control losing after taking clonazepam, which is one of the highest rates ever observed as paradoxical benzodiazepines adverse effects (15, 26, 27). Almost 74.0% of consumers were complaining about adverse effects, especially memory impairment. 30 of the 35 users (85.7%) were aware that long term use of clonazepam could impact their life: 48.6% were afraid of psychiatric consequences (fear of losing mind, becoming mentally ill or handicapped) and 22.9% were afraid of social consequences such as family or couple trouble, inability to keep a job and loneliness (table IIa).

The average amount of clonazepam taken by detainees was about 16 mg per intake (table IIa), with many differences between subjects. Such quantities are highly elevated regarding recommended doses (0.05 to 0.1 mg/kg/day in 2004 version of product notice of compliance). In spite of

Table IIa: Habits of clonazepam use, paradoxical effects and dependence (DSM-IV criteria), Le Port Detention Center, Reunion Island, 2011 (n = 35)

	n	%
Habits of consumation		
Prefers drinkable solution than pills	16	45.7%
Frequency of use [a]		
- < 1 intake/month	3	8.6%
- 1 intake/month – 1 intake/week	11	32.3%
- Several intakes /week	8	23.5%
- Daily use and more	12	35.3%
Average amounts consumed /intake (mg) [a]	16	(0-55)
Maximal amounts consumed /intake (mg) [a]	46	(0-388)
Effects of clonazepam		
Paradoxical effects	24	68.6%
- In wich self assertion	13	37.1%
- In wich loss of self control	5	14.3%
- In which excitement	20	57.1%
Adverse effects	26	74.3%
- Memory impairement	13	37.1%
- Anxiety rebound	6	17.1%
- Other effects	7	20.0%
Dependence to clonazepam (DSM-IV criteria)	33	97.0%
Tolerance [a]	34	100.0%
Withdrawal symptoms	6	17.6%
Difficulties controlling use (i.e. to refuse it when proposed)	6	17.6%
Negative consequences (reported by users)	30	85.7%
- In which social ones (familial or couple conflicts)	15	42.9%
- In which psychiatric ones (to become mentally ill or handicapped)	17	48.6%
- In which somatic ones (asthenia, anorexia, nausea, vertigo)	8	22.9%
Desire to cut down clonazepam us [a]	28	82.3%
- To avoid familial conflicts	4	11.8%
- To avoid imprisonment	8	23.5%
- To be able to control violent behavior	9	26.5%
- Because of adverse effects of benzodiazepines	6	17.6%

[a] 1 missing data.

Table IIb: Reported effects regarding known properties of benzodiazepines, Le Port Detention Center, Reunion Island, 2011 (n = 35)

Known properties of benzodiazepines	Desired effects		Felt effects	
Sedation	55	14.3%	6	17.1%
Anxiolysis /relief	17	48.6%	8	22.9%
Euphoria	11	31.4%	9	25.7%
Drug high	16	45.7%	9	25.7%
Amnesia	11	31.4%	6	17.1%

these amounts, withdrawal symptoms were rare (only 6/35 cases). About 50.0% of users were taking more than 9 mg per intake, and the same proportion declared to have taken at least one time more than 50 mg per shot. Maximal amounts used were found between 5 and 196 mg/intake, representing about four bottles of drinkable clonazepam.

Withdrawal symptoms concerned five detainees using clonazepam more than once a week (and one using clonazepam less than once a week, data not shown) and six detainees reported anxiety rebound (i.e. transient period of anxiety and insomnia) following brutal cessation of intake (table IIa).

All clonazepam users were considered as being tolerant to clonazepam (higher amounts than usually prescribed ones), and six had difficulties to control their use. 82.0% of users had desired to cut down (table IIa). Among the

4 DSM-IV criteria of dependence to clonazepam assessed in our study, seven detainees had one positive criterion, 19 had two positive ones, four had three positive criteria and three had four positive criteria (data not shown). So dependence to clonazepam concerned 97.0% of users.

Consumption before acting and penal issues

11 users did not use clonazepam before acting, but 24 did. Detainees under effect before acting were characterized by a usual intake of alcohol in absence of clonazepam ($p < 0.01$, data not shown) and in association to clonazepam ($p < 0.05$). They had a preference for drinkable form of clonazepam ($p < 0.05$), probably because drinkable form has a sweet taste and is easy to dilute in alcohol (table III). Moreover in this group 82.6% of detainees were thinking that acting out was largely increased by clonazepam taking.

All consumers who reported withdrawal symptoms were using clonazepam before acting (data not shown). Attempts to taper clonazepam use were found only among before acting users (average of 0.58 attempts, $p = 0.065$, data not shown) probably because they seemed to be aware of penal consequences of their use (according to non-structured part of interviews).

Interestingly wanted and felt effects were comparable in users who had taken clonazepam before acting. Those who had taken clonazepam before acting were not more violent ($p = 0.708$). In the same way, penal history was not associated to use before acting (table III).

Paradoxical reactions and penal issues

Paradoxical reactions were found among 24 detainees. Detainees feeling a paradoxical effect (PE) were not more likely to use it without association to any other drug or alcohol (table III). But they were more likely to take other psychotropic drugs (especially trihexyphenidyle) when they could not have access to clonazepam (we found 17 men using psychotropic drugs in absence of clonazepam,

Table III: Substance use and penal issues regarding clonazepam use before acting and feeling of paradoxical effects, Le Port Detention Center, Reunion Island, 2011 (n = 35)

	Clonazepam use before acting (n = 24)	No clonazepam use before acting (n = 11)	Total (n = 35)	p	Paradoxical effects (n = 24)	No paradoxical effects (n = 11)	Total (n = 35)	p
Clonazepam use								
- Favorite galenic form (/both):				0.020				0.579
. Drinkable solution	5 (20.8%)	0 (0.0%)	5 (14.3%)		10 (41.7%)	6 (54.5%)	16 (45.7%)	
. Pills	13 (54.2%)	3 (27.3%)	16 (45.7%)		3 (12.5%)	2 (18.2%)	5 (14.3%)	
- Frequency of consummation ≥1 intake /week (/< 1 intake/week)	[a] 15 (65.2%)	5 (45.5%)	20 (58.8%)	0.458	[a] 15 (65.2%)	5 (45.5%)	20 (58.8%)	0.458
- Was under effect of other substance(s) associated to clonazepam during current offense:								
. In which alcohol	12 (50.0%)	1 (9.1%)	13 (37.1%)	0.027	9 (37.5%)	4 (36.4%)	13 (37.1%)	1.000
. In which trihexyphenidyle	3 (12.5%)	2 (18.2%)	5 (14.3%)	0.640	4 (16.7%)	1 (9.1%)	5 (14.3%)	1.000
. In which cannabis	6 (25.0%)	1 (9.1%)	7 (20.0%)	0.392	6 (25.0%)	1 (9.1%)	7 (20.0%)	0.392
- Thinks that clonazepam could facilitate acting out	[a] 19 (82.6%)	6 (54.5%)	25 (73.5%)	0.111	[a] 17 (73.9%)	8 (72.7%)	25 (73.5%)	1.000
- Main expected effect of self assertion	9 (37.5%)	2 (18.2%)	11 (31.4%)	0.435	10 (41.7%)	1 (9.1%)	11 (31.4%)	0.114
- Main felt effect as paradoxical	16 (66.7%)	8 (72.7%)	24 (68.6%)	1.000				
- Adverse effects	19 (79.2%)	7 (63.6%)	26 (74.3%)	0.416	17 (70.8%)	9 (81.8%)	26 (74.3%)	0.685
- Dependence	6 (25.0%)	0 (0.0%)	6 (17.1%)	0.146	6 (25.0%)	2 (18.2%)	8 (22.9%)	1.000
- Average amounts used (mg)	[a] 16 (0-60)	16 (0-100)	16 (0-55)	0.957	15 (0-63)	[a] 16 (0-94)	16 (0-55)	0.903
Penal issues								
- Violent offenses	16 (66.7%)	6 (54.5%)	22 (62.9%)	0.708	15 (62.5%)	7 (63.6%)	22 (62.9%)	1.000
- Penal aggravating circumstances	20 (83.3%)	11 (100.0%)	31 (88.6%)	0.285	22 (91.7%)	9 (81.8%)	31 (88.6%)	0.575
- Antecedent of imprisonment	18 (75.0%)	9 (81.8%)	27 (77.1%)	1.000	17 (70.8%)	10 (90.9%)	27 (77.1%)	0.387
- Current prison sentence (months)	38 (0-186)	39 (0-310)	38 (0-168)	0.879	37 (0-190)	39 (0-297)	38 (0-168)	0.823

[a] 1 missing data.

among them 14 feeling PE, p = 0.088). Consumers feeling PE did not take more elevated amounts than others users (in average 16 mg p = 0.903) (table III). Interestingly, detainees feeling PE were looking for drug high ($p < 0.05$) rather than relief (p = 0.053) and anxiolysis (p = 0.053) (data not shown). Due probably to a lack of power, looking for self-assertion was also not significant (p = 0.114). Similarly feeling PE was associated to less sedative effect ($p < 0.01$) and less relief sensation ($p < 0.01$) (data not shown). Detainees feeling PE were significantly more often afraid of psychiatric consequences of clonazepam in long term use ($p < 0.05$), but they did not declare to have tried to taper it more often (p = 1.000). Actually the fact to feel PE was neither associated to any of penal behaviors characteristics nor to type of legal sentence (table III).

Discussion

To our knowledge, this is the first study to assess the existence of an association between recreational use of clonazepam and penal issues among French Creole convicts. The prevalence of detainees having tested clonazepam at least once in whole life is surprisingly high regarding other studies in convicts' populations (16, 28-30).

According to O'Brien, benzodiazepines are usually a secondary drug of abuse (31) but on Reunion Island a weak number of drugs is available and the use of clonazepam is often exclusive. In our study, clonazepam use was associated neither with recidivism (higher number of incarcerations), nor with severity of sentences, denying public image of clonazepam as "drug of acting out".

We distinguished two profiles of users: 1) those who had taken clonazepam before acting, often in association with alcohol; 2) those who felt PE, looking for self-assertion, disinhibition and drug high, more likely to take exclusively clonazepam. We can wonder if detainees belonging to the first profile take clonazepam associated to alcohol in order to act out without any inhibition or if alcohol increases accidentally effects of clonazepam. Effect of clonazepam is indeed known to be empowered by alcohol or other pills (trihexyphenidyle), especially when its use is associated to violent behavior (15, 32-34). Penal issues usually distinguish between self-induced and unforeseen intoxication, and take into account common knowledge of unpredictable acts. The fact to be "under effect" is not proven in all trials, now justice may consider it in several cases. (35). The second profile does probably correspond to antisocial subjects looking for PE and using clonazepam among others in a recreative way or to feel self-confident. We can be surprised by the number of PE observed after taking clonazepam, as it has been shown that such reactions are usually rare and depend on several factors including personality, external circumstances, and pharmacological properties of molecule used (36-39). These findings confirm other studies showing that an increase of aggressiveness occurs more often than a decrease after taking benzodiazepines (40). High prevalence rates of PE among detainees can also be explained by predisposed personality profiles in this population with low pulsion drives, antecedents of violent offences, personality disorders and looking for disinhibition (37). By the way, such aggressive reactions may be due to group interaction when taking clonazepam (11). Now it is well known in clinical trials that effects of a substance can appear even if no substance is given (41), because subjects are persuaded to have taken a drug (placebo effect). This could explain why so many detainees declared to feel PE even if it is a rare effect of clonazepam. Finally none of these profiles was related to penal issues, which seems to be in contradiction with detainees' beliefs about clonazepam: it is neither PE which drives you in prison, nor the fact to consume clonazepam just before acting.

Substance use disorders are often associated with poor conditions and with low education level and low incomes, corresponding to our results (42-46). Benzodiazepines users are more likely to take or to have tested other psychotropic drugs, as found in other studies (47). In 2009, Bulten and al. described 30% of detainees with drug dependence and 28% with alcohol dependence. In this study like in ours, crimes against property were the most common reason for incarceration (37%), followed by violent crimes (23%) (48). Substance use disorders are known to be often associated to criminal convictions (49) and antisocial personality (50). For Fountoulakis, violence is mainly related to antisocial personality; especially when a substance use disorder is also present (51). This could explain why we did not find any difference between users and non-users concerning acting and legal issues. Despite of these results numerous inmates were thinking that clonazepam facilitated their acting, but they were all pursuing their consumption, even if they were aware of negative consequences.

In the benzodiazepines group, a high potency and a short half-life are the characteristics of the benzodiazepine which is the most at risk to be abused: clonazepam has different profile with a half-life of 19-60 h (33, 52). Thus, it is very surprising that clonazepam was the only

benzodiazepine to be known and used by prisoners, as it is acknowledged that other benzodiazepines are easily available for misuse.

The present study has several limitations. First, we possibly under diagnosed drug use in prison populations (23, 53) because drug abusers' self-reports vary as a function of different cognitive, motivational and social factors. We probably include in users' group subjects more aware of their problematic use of clonazepam. On the contrary the control group was composed only of inmates without substance abuse or denying it. Second, our study is suffering of a certain lack of power due to an insufficient number of detainees in each group. Moreover, we did not assess all DSM-IV criteria for the diagnosis of "dependence" to clonazepam. We had no information about neglecting social or professional activities and about time spent to obtaining, using or recovering from clonazepam use. Nevertheless quasi all detainees could complete enough DSM-IV criteria for the diagnosis of dependence, which seems very high according to epidemiologic data about whole population. However withdrawal syndrome was surprisingly rare among Creole detainees, regarding elevated doses consumed (54).

Finally, according to popular belief, clonazepam is the drug of aggressiveness. Even if this belief is broadly widespread by media, we could not conclude formerly in this study for the link between penal facts reported by users and clonazepam use. PE still remain unknown by physicians and users: prescription of benzodiazepines should be discussed in the light of these PE, with clear information given to the patient, on adverse effects and risks (42). As far as we know substance misuse does appear as a marker of social vulnerability in prison, and specific programs have to be developed to address specific needs of individuals suffering from substance use disorders (43, 55). Better treatment and rehabilitation are needed both inside prison and following release, especially to avoid recidivism (56). ■

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