

Psychological and psychiatric characterization of various groups of drugs users

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ABSTRACT



Aim. We aimed to assess the differences among various groups of drugs users, especially in the psychiatric and psychological domains. **Materials and Methods.** A retrospective study was carried out in collaboration with C.E.T.T.T `St. Stelian` Institute from Bucharest. There were analyzed the medical records of 604 hospitalized patients with heroin or polydrug addiction. **Results.** Significant differences in diagnosis at submission among groups were outlined (personality and behavior disorders, p-value = .04298, psychotic disorders, p-value = .004274, schizophrenia, p-value = .000141) as well as significant differences among psychiatric parameters: perception (legal highs, opiates), attention (cannabis), consciousness (legal highs), thinking (legal highs), and, instinctive life (legal highs). **Conclusions.** Personality and behavioral disorders have been particularly linked to opiate use, the psychotic disorder was related to cannabis and legal highs intake, while schizophrenia was related to legal highs intake.

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Introduction

It is well known that once the onset of abuse substances, some irreversible changes occur in one's personality and character. Due to the non-selective mechanism of action or poly-consumption, most of the substances of abuse lead to similar adverse effects, therefore the changes in one's psychological and psychiatric profile are similar.

However, given the fact that many of the changes induced by the drugs of abuse are irreversible, most of the consumers end up in the emergency room or detoxification centers with various, non-specific psychological and psychiatric symptoms, and at last, they end up in mental health facilities. Although each class of drugs has certain peculiarities when it comes to clinical symptoms, when it comes to defining the addict's profile from the psychiatric and psychological perspectives, it is rarely possible to conclude the type of drug that caused the illness.

Given the mechanisms of action of the various classes of substances of abuse [1], the specificity of the different types of consumption are described in Table 1.

It should be noted that, due to the action on multiple systems, the psychological and psychiatric profiles of patients consuming various substances of abuse are usually similar. To define some peculiarities of psychiatric profiles of different groups of patients addicted to various classes of substances of abuse, a retrospective study was conducted in collaboration with C.E.T.T.T (Toxic Addiction Assessment and Treatment Center for Young People) „St. Stelian” detox center from Bucharest.

Materials and Methods

The study group consisted of 604 drug users, patients who were voluntarily admitted to the detoxification center C.E.T.T.T. `St. Stelian` of Bucharest due to their addiction to different categories of drugs of abuse. Approved under approval no. 1 issued on 25-Jan-2021 by the Ethics Commission of the Center, the study includes medical data of the patients which were collected by accessing the center's archive.

Analyzing the medical records, the following details were taken into account: diagnosis at admission, primary

diagnosis at discharge, admission symptoms, as well as psychological and psychiatric examination.

The following indicators/ parameters were monitored: age, sex, history of use of certain substances, diagnosis of patients at admission, psychiatric and physical exam, as well as psychological examination.

Statistical analysis

The data that was collected by analyzing the center's archive for a period of 6 years (January 2015 - January 2021) was centralized in an EXCEL database and

processed using the appropriate statistical functions for each type of data collected. To assess the possible correlations between various parameters, Chi test was applied. The relationship between variables is described using Chi-square test of independence, expressed as X^2 (DF = degrees of freedom, N = sample size) = chi-square statistic value, $p = p$ -value. According to the requirements of the Chi-square test of independence, parameters that had less than 5 observations among the groups were excluded from the analysis. For those situations with only 2 degrees of freedom, the Yates correction was applied.

Table I. Correlation between mechanisms of action of the various classes of substances of abuse and psychiatric and psychological manifestations.

Abuse substance	Mechanism of action	Psychiatric and psychological manifestations
Heroin and opiates [2-5]	Action on opioid receptors: Mu (μ_{1-3}), Kappa (κ_{1-2}), Delta (δ_{1-2})	Antisocial behavior; compulsive drug use - drug dependence; dysphoria (anti-reward effects); sedation; agitation, insomnia; decreased appetite; euphoria;
Legal highs (New Psychoactive Substances - NPS) [6-13, 14-17]	Synthetic cannabinoids: Action on CB ₁ and CB ₂ cannabinoid receptors	Agitation; irritability; confusion; slurred speech; hallucinations; delusions; aggression and violent behavior; delirium; paranoia; psychosis.
	Synthetic cathinone: Effects on the neurotransmitters: monoamine, dopamine, norepinephrine, and serotonin	Anxiety; agitation; panic; dysphoria; bizarre behavior; psychosis; hallucinations, delirium.
Alcohol [18-21]	Action on the gabaergic system (GABA), opioidergic and dopaminergic neurotransmitters, and 5-HT ₃ receptor	Sedation; disinhibition; relaxation; pleasure; satisfaction; compulsive drug use - drug dependence; euphoria; psychosis; mental and physical dependence; insomnia; agitation; hallucinations; visual illusions;
BZD [22-25]	Action on GABA-mediated inhibitory neurotransmission, sites 1 and 2	Lethargy; slurred speech; irritability; depression; decreased appetite.
Cannabis [7-9,26-29]	Action on the CB ₁ and CB ₂ cannabinoid receptors	Euphoria; disinhibition; impaired thinking and concentration; obsessions; delusions; hallucinations; delirium; panic; psychosis; disorganized thinking; psychotic symptoms; insomnia; disorientation; decreased appetite; sleep disorders.
Amphetamines [30-32]	Action on monoamines (MAO)	Altered consciousness; anxiety; psychosis; agitation; increased intellectual strength; emotional instability; personality changes; violent behavior; paranoid ideation.
Hallucinogenic drugs (LSD) [33,34]	Action on 5-HT _{1A} , 5-HT _{2A} , 5-HT _{2C} , dopamine D ₂ , and α_2 adrenergic receptors	Visual disturbances; synesthesia; psychotic states; flashbacks; depersonalization; disorders of perception of time and space; schizophrenia; suicidal tendencies; panic attacks.

Results

The study group consisted of 604 patients, who were examined both psychologically (183) and psychiatrically (421). The study group was composed of women and men, aged between 18-46 years and 18-51 years, respectively. The admission diagnosis of the patients was variable depending on the symptomatology, they presented with

several behavioral disorders caused by drug consumption, heroin addiction, cannabis addiction, major depressive episode, to restlessness and agitation, mixed personality disorder, and substance abuse, all of which were associated or not with social problems. A complex description of the group taking into account demographic aspects, psychological and psychiatric examinations, and diagnoses at admission is presented in Table 2.

Table 2. Characterization of the study group		
Parameter	Group characteristics	
Sex	87.25% male, 12.75% female	
Male/female ratio	6.84	
Abuse substance	Heroin/opiates 13.08%; Legal highs 27.81%; Cannabis 11.26%; multiple drugs 46.03%; other (alcohol, BZD, cocaine) 1.82%;	
Age (years) (mean ± SD)	Psychiatric examination	Psychological examination
	29.89 ± 6.65 male 29.89 ± 6.65 (range 18-51) female 29.82 ± 6.65 (range 19-39)	27.14 ± 5.77 male 27.14 ± 5.77 (range 18-46) female 27.08 ± 5.78 (range 18-34)
Psychological examination	Total examinations 183: Cannabis 26 (11.26%), Legal highs 54 (29.51%), Opiates 23 (12.57%), Multiple drugs 76 (41.53%), others (alcohol, BZD, cocaine) 2.19%. <i>Changes in*</i> : disease awareness 8.33%; attention 18.94%; perception 4.54%; memory 19.13%; thinking 10.04%; affectivity 14.39; activity 16.85%; personality 7.76%.	
Psychiatric examination	Total examinations 421: Cannabis 42 (9.98%), Legal highs 114 (27.08%), Opiates 56 (13.30%), Multiple drugs 202 (47.98%), other (alcohol, BZD, cocaine) 1.66%. <i>Changes in*</i> : perceptual function 10.34%; attention 19.74%; mnemonic function 13.28%; TSO and allo-psychic 0.53%; consciousness 2.00%; thinking 11.81%; affectivity 16.63%; instinctive life 7.52%; nictemeral rate 18.16%.	
Diagnosis at admission	<i>Personality and behavior disorder</i> : Cannabis 44.12%; Legal highs 47.02%; Opiates 63.29%; Multiple drugs 54.68%. <i>Moderate to major depressive episode</i> : Cannabis 22.06%; Legal highs 14.29%; Opiates 17.72%; Multiple drugs 20.86%. <i>Psychotic disorder</i> : Cannabis 35.29%; Legal highs 28.57%; Opiates 2.53%; Multiple drugs 18.71%. <i>Schizophrenia</i> : Cannabis 8.82%; Legal highs 13.69%; Opiates 2.53%; Multiple drugs 3.60%.	
*Comparison applied for substances (Cannabis, legal highs, opiates, and multiple drugs)		

Group characteristics

To outline the characteristics of the group, the following demographic aspects were taken into account: age at the time of admission, sex, and diagnosis at admission. Also, highlights on the patterns of use were outlined.

1. *Indicator: age and sex*

Out of the total of 604 patients included in the study, there were 421 psychiatric examinations and 183 psychological examinations. The majority were men (527, which represents 87.25%) and a small part were women (77, representing 12.75%), the ratio of men/women being 6.84. Depending on the pattern of use, the distribution of patients by sex was also outlined (Figure 1).

The mean age of the patients included in the study is 29.89 ± 6.65 years (29.89 ± 6.65 years for men, and 29.82 ± 6.65 years for females) and ranged from 18 to 51 years for the group (18-51 years for men, and 19-39 years for females) on which psychiatric examination was analyzed. As for the group which was analyzed under psychological examination, the mean age is 27.14 ± 5.77 years, 27.14 ± 5.77 years (range 18-46) for men, and, 27.08 ± 5.78 (range 18-34) for females.

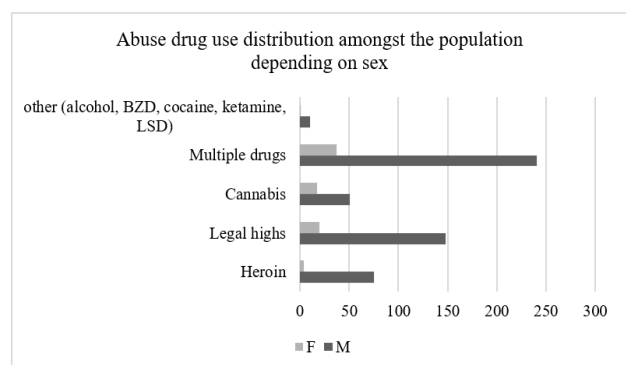


Figure 1. Abuse drug use distribution amongst the groups depending on sex

2. *Indicator: diagnosis at admission*

There were taken into account the following diagnoses at admission: personality and behavior disorder, moderate to major depressive episode, psychotic disorder, and schizophrenia (as presented in the Table 3). A Chi-square test of independence was performed to examine the relation between the substance of abuse (Cannabis, Legal highs, Opiates, Multiple drugs) and various diagnoses at submission. The results obtained for each type of examination (psychological or psychiatric) is described in Table 4.

Table 3. Distribution of different diagnoses at admission depending on the substance of abuse (psychological examination/psychiatric examination/total examinations)

	Personality and behavior disorder	Moderate to major depressive episode	Psychotic disorder	Schizophrenia
Cannabis	13/17/30	8/7/15	9/15/24	1/5/6
Legal highs	20/59/79	8/16/24	18/30/48	7/16/23
Opiates	12/38/50	7/7/14	1/1/2	0/2/2
Multiple drugs	31/121/152	22/36/58	17/35/52	4/6/10

Table 4. Chi-static test: diagnosis at admission depending on the substance of abuse

Parameter	X^2 (DF, N) = Chi-square statistic value, p-value count, (expected count), [contribution to chi-square]
Personality and behavior disorders	X^2 (3, 593) = 8.1516, p value = .04298 Cannabis 30 (35.66) [0.90]; Legal highs 79 (88.11) [0.94]; Opiates 50 (41.43) [1.77]; Multiple drugs 152 (145.80) [0.26].
Moderate to major depressive episode	X^2 (3, 593) = 4.1692, p value = .243761 Cannabis 15 (12.50) [0.50]; Legal highs 24 (30.88) [1.53]; Opiates 12 (14.52) [0.44]; Multiple drugs 58 (51.10) [0.93].
Psychotic disorder	X^2 (2, 514) = 10.9104, p value = .004274 Cannabis 24 (16.40) [3.52]; Legal highs 48 (40.53) [1.38]; Opiates 2 (NA); Multiple drugs 52 (67.07) [3.38];
Schizophrenia	X^2 (2, 484) = 17.7272, p value = .000141 Cannabis 6 (3.06) [2.82]; Legal highs 23 (13.54) [6.61]; Opiates 2 (NA); Multiple drugs 10 (22.40) [6.86];
The result is significant at values of p-value < .05	

3. Indicator: type of abuse substance

The study groups were characterized from the perspective of the incriminated drug and the results were outlined in Table 5.

Table 5. Distribution of different drug users among study groups depending on the substance of abuse and the sex.

Substance of abuse	M (count, %)	F (count, %)	Total
Heroin/opiates	75 (92.41 %)	4 (5.06 %)	79 (13.08 %)
Legal highs	148 (88.10 %)	20 (11.90 %)	168 (27.81 %)
Cannabis	51 (75 %)	17 (25 %)	68 (11.26 %)
Multiple drugs	241 (86.69 %)	37 (13.31 %)	278 (46.03 %)
Other (alcohol, BZD, cocaine)	10 (90.91 %)	1 (9.09 %)	11 (1.82 %)
			604

In the case of polyconsumption, from the total of 241 patients who combined different categories of drugs, 210

(87.13%) have associated legal highs (190 men and 20 women). Most patients have mentioned, „Pur”, and „Magic White” as the most popular legal highs (known as New Psychoactive Substances).

4. Assessment of mental state

• Psychiatric examination

To evaluate the psychiatric parameters, 414 psychiatric examinations were analyzed for 4 groups of consumers: Cannabis, legal highs, opiate, and polyconsumption (multiple drugs). The other 7 examinations collected from other drug users (such as alcohol, cocaine, BZD) were not included in the analysis due to the very small frequency of observations among the group.

The following parameters were analyzed: perceptual function (hyperesthesia, hypoesthesia, anesthesia, paresthesia, cenesthopathy, illusions, hallucinations), attention (spontaneous, distribution-concentration, lability, fatigue), mnemonic function (fixation, evocation, hypermnesia, paramnesia), temporo-spatial orientation TSO (self and allopsychic), consciousness (degree of lucidity, changes in the structure of the field of consciousness), thinking (rhythm, organization, coherence, mental calculation, ideas, themes, delusional/depressive/obsessive prevalence), affectivity (mood, emotions,

feelings, intensity, lability, irascibility, anxiety, euphoria, depression, parathymia), instinctive life (sexual instinct, defense, food, maternal), nictemeral rhythm (waking period, sleep period, sleep mode, sleep mode awakening, depth, and duration of sleep, dreams, nightmares), and personality (deterioration, doubling, transformation).

A Chi-square test of independence was performed to determine the existence of a possible correlation that is statistically significant between the various changes in psychiatric parameters and the category of the substance of abuse (in this case Cannabis, legal highs, opiates, and multiple drugs) (Table 6).

Table 6. CHI test - psychiatric parameter in correlation to substance abuse (Cannabis, legal highs, opiates, multiple drugs).	
Parameter	X ² (DF, N) = Chi-square statistic value, p value count, (expected count), [contribution to chi-square]
Perceptual function	X² (3, 414) = 17.2647, p value = .000623 Cannabis 20 (17.86) [0.26]; legal highs 63 (48.46) [4.36]; multiple drugs 80 (85.87) [0.40]; opiates 13 (23.81) [4.91];
Attention	X² (3, 414) = 9.5446, p value = .022861 Cannabis 40 (34.09) [1.03]; legal highs 95 (92.52) [0.07]; multiple drugs 161 (163.94) [0.05]; opiates 40 (45.45) [0.65];
Mnemonic function	X ² (3, 414) = 3.3637, p value = .338878 Cannabis 20 (22.93) [0.37]; legal highs 69 (62.23) [0.74]; multiple drugs 110 (110.27) [0.00]; opiates 27 (30.57) [0.00];
Consciousness	X² (2, 358) = 7.1637, p value = .027824 Cannabis 5 (3.52) [0.62]; legal highs 15 (9.55) [3.11]; multiple drugs 10 (16.93) [2.83]; opiates 4 (NA);
Thinking	X² (3, 414) = 8.278, p value = .040602 Cannabis 24 (20.39) [0.64]; legal highs 63 (55.35) [1.06]; multiple drugs 95 (98.07) [0.10]; opiates 19 (27.19) [2.47];
Affectivity	X ² (3, 414) = 4.9036, p value = .178996 Cannabis 31 (28.71) [0.18]; legal highs 83 (77.93) [0.33]; multiple drugs 137 (138.08) [0.01]; opiates 32 (38.28) [1.03];
Instinctive life	X² (3, 414) = 8.9039, p value = .030596 Cannabis 13 (12.90) [0.00]; legal highs 41 (35.25) [0.94]; multiple drugs 66 (62.45) [0.20]; opiates 8 (17.31) [5.01];
Nictemeral rhythm	X ² (3, 414) = 0.5862, p value = .899577 Cannabis 27 (27.29) [0.00]; legal highs 76 (74.07) [0.05]; multiple drugs 128 (131.25) [0.08]; opiates 38 (36.39) [0.07];
The result is significant at values of p-value < .05	

- Psychological examination

The second examination that was taken into account in the characterization of the study group consisted of the analysis of the examinations of 179 patients who underwent a complete psychological examination. The same as for psychiatric examination, the group of other drug users (alcohol, cocaine, BZD) totalizing 4 patients was excluded from the analysis. Almost similar to the psychiatric examination, the analyzed parameters were: disease awareness (present/absent), attention (concentrative hypoprosexia), perception (qualitative disorders of perception), memory (fixation and/or evocation hypomnesia), thinking (delusional ideas/suicide), affectivity (depressive mood), intellect (according to/non-compliance with education), activity (decreased useful performance), personality investigation (low tolerance for frustration). A chi-square test of independence was performed to determine the correlation

between the various changes in psychological parameters and the substance of abuse consumed (Table 7).

Group characteristics

Most of the included patients in the study were men, without notable differences between males and females regarding the mean age at admission. Same, from the point of view of the type of substance of abuse, almost similar trends in consumption were outlined for both men and women.

Diagnosis at admission

Regarding diagnosis at admission, according to the Chi-square test of independence, we conclude that personality and behavior disorders are related to opiates consumption while psychotic disorder is triggered especially by Cannabis intake. Although the multiple drugs users group appear to have a greater chi-static contribution than the rest of the groups, given the fact that 87.13% of the users use legal highs (New Psychoactive Substances) in

polyconsumption, it can be concluded that legal highs users are more likely to develop both schizophrenia and psychotic disorder than the other users' groups. As for the depressive episodes, these seem to be common for all categories of substances of abuse, the Chi-test showing up that there is no significant relationship among them.

Assessment of mental state

The examination of the mental state (ESM) consists of the formal evaluation of the thinking, of the disposition, aiming at the current behavior of the patient [35]. The main behavioral manifestations reported in the literature [2-34] caused by some categories of drugs are presented in Table 8.

Table 7. CHI test – psychological parameter in correlation to abuse substance (Cannabis, legal highs, opiates, multiple drugs)	
Parameter	X^2 (DF, N) = Chi-square statistic value, p-value count, (expected count), [contribution to chi-square]
Disease awareness: absent	X^2 (2, 155) = 1.9161, p value = .383633 Cannabis 9 (6.71) [0.78]; legal highs 11 (13.94) [0.62]; multiple drugs 20 (19.35) [0.02]; opiates 4 (NA)
Attention: Concentrated hypoprosexia	X^2 (3, 178) = 2.0656, p value = .558912 Cannabis 13 (14.53) [0.16]; legal highs 34 (30.17) [0.49]; multiple drugs 42 (42.46) [0.00]; opiates 11 (12.85) [0.27];
Perception: qualitative disorders	X^2 (1, 130) = 4.278, p value = .038609 - with Yates correction: X^2 (1, 130) = 3.3362, p .067771 Cannabis 3 (NA); legal highs 13 (8.72) [2.1]; multiple drugs 8 (12.28) [1.49]; opiates 0 (NA);
Memory: hypomnesia	X^2 (3, 179) = 0.8581, p value = .835532 Cannabis 15 (14.67) [0.01]; legal highs 33 (30.47) [0.21]; multiple drugs 41 (42.88) [0.08]; opiates 12 (12.98) [0.07];
Thinking: delusional ideation/suicide	X^2 (1, 130) = 14.8701, p value = .000115 correctio Yates: X^2 (1, 130) = 13.4625, p .000243 Cannabis 4 (NA); legal highs 29 (18.69) [5.68]; multiple drugs 16 (26.31) [4.04]; opiates 4 (NA);
Affectivity: depressive mood	X^2 (3, 179) = 1.7581, p value = .64086 Cannabis 14 (11.04) [0.79]; legal highs 21 (22.93) [0.16]; multiple drugs 31 (32.27) [0.05]; opiates 10 (9.77) [0.01];
Activity: diminished useful yield	X^2 (3, 179) = 2.7916, p value = .424884 Cannabis 13 (12.93) [0.00]; legal highs 30 (26.85) [0.37]; multiple drugs 38 (37.79) [0.00]; opiates 8 (11.44) [1.03];
Personality: low tolerance for frustration	X^2 (1, 130) = 1.5997, p value = .205946 - with Yates correction: X^2 (1, 130) = 1.1285, p .288099 Cannabis 3 (NA); legal highs 11 (14.12) [0.69]; multiple drugs 23 (19.88) [0.49]; opiates 4 (NA)
The result is significant at values of p-value < .05	

Table 8. Behavioral effects depending on the drug of abuse	
Abuse substance	Behavioral effects
Heroin, methadone	Euphoria, drowsiness, loss of appetite, decreased sexual appetite, decreased activity, personality changes
Amphetamines and other sympathomimetics (including cocaine), amphetamine-like substances (khat, methcathinone), designer amphetamines (MDMA (ecstasy))	Euphoria, agitation, hyperactivity, aggression, irritability, paranoid tendencies, decreased libido to impotence, visual and tactile hallucinations
PCP (phencyclidine) and ketamine	Hallucinations, paranoid ideas, lability, schizophrenia
Benzodiazepine CNS depressants	Aggression with violent behavior, confusion, inattention, drowsiness, convulsions
Alcohol	Euphoria, drowsiness, confusion, motor incoordination
Cannabis	Euphoria or dysphoria, anxiety, inappropriate laughter, panic symptoms, psychosis, depression, apathy

Discussion

Psychiatric examination

The relationship between variables proved to be significant for the following parameters: perceptual function, attention, consciousness, thinking, and instinctive life. It turns out that legal highs and opiate consumer groups are more likely to experience perceptual changes such as hallucinations and paresthesia than other consumer groups. The group of Cannabis users is significantly more likely to suffer from attention deficit disorder, legal highs users have a greater impact on disease awareness, and opiate users are more likely to experience changes in thinking and instinct conservation [1,3,36].

Changes in **perception** are hallucinations, illusions, and perceptual distortions. Hallucinations can occur in any sensory way, having no diagnostic significance (except for taste/olfactory hallucinations and hallucinations that could indicate an organic pathology in the brain). The occurrence of these is not caused by external stimuli but they are generated inside the CNS (central nervous system). Illusions are the second category of perceptual changes. These, unlike hallucinations, are triggered by an external stimulus that is analyzed and misinterpreted [8,37-40]. According to the X² quantum effects test X² (3, 414) = 17.2647, p = .000623, the groups of opiates and legal highs users are more likely to develop perceptual changes, mostly hallucinations than the other groups.

In terms of changes in **attention** (orientation and concentration of mental activity in a certain direction) during the psychiatric examination, significant differences were obtained between consumer groups, X² (3, 414) = 9.5446, p-value = .022861. Manifested by the difficulty in directing, concentrating, and mobilizing attention, global hypoprosexia appears more significant among Cannabis users. During the psychiatric examination, the global hypoprosexia leads to the patient's distractibility, which entails the need for the evaluator to repeat the questions [41].

The **mnemonic function** was evaluated in terms of decreased, either concerning immediate memory or short-term memory (recent) [42-44]. There were no significant differences between the analyzed groups in changing this parameter, X² (3, 414) = 3.3637, p-value = .338878.

Consciousness refers to the patient's degree of lucidity. Its modification consists of the misinterpretation of the data from the environment. This can have repercussions on attention span, temporal and spatial orientation, and can generally affect vision [45-47]. Between the groups of consumers analyzed, a statistical difference was obtained, X² (2, 358) = 7.1637, p-value = .027824, the polyconsumption contributing the majority to the "blurring" of the field of consciousness. Legal high users seem to be more likely to develop changes in consciousness than Cannabis, multiple drugs users, or opiates [48-52].

Thinking can be impaired in the sense of slowing down, ideas are disorganized and ideas of delirium and grandeur predominate (the patient is perceived as superior). Patients feel that they are being followed (the idea of pursuit and persecution) [53-55]. Following the significance test for quantum effects, there are significant differences between consumer groups, X² (3, 414) = 8.278, p-value = .040602, with opiate users being more prone to such manifestations than legal highs, Cannabis users, or multiple drugs users.

In terms of **affectivity**, rapid and unpredictable mood swings (between euphoric and depressive states, anxiety or irritability) were noted [56]. There are no statistically significant differences between consumer groups, X² (3, 414) = 4.9036, p-value = .178996.

Possible changes in the **instinctive life** were analyzed and it was found that lack of appetite predominates and rarely there was a decrease in sexual appetite [57,58]. With a dominant contribution to chi-square value and a significant chi-square test X² (3, 414) = 8.9039, p-value = .030596, opiate use predisposes consumers to decrease instincts.

Nictemeral rhythm disorders include a series of hypnotic changes such as insomnia (total or partial), insomnia manifested by fragmented sleep, or restless sleep with nightmares [59]. As a result, daytime sleepiness can occur, leading to a reversal of sleep-wake rhythm. From this point of view, the significance test for quantum effects does not show any significant differences between consumer groups as the p-value in this case is >.05 (X² (3, 414) = 0.5862, p-value = .899577).

Following the analysis of psychiatric examinations, it was concluded that at the time of examination most patients were temporally-spatially oriented (with some situations of temporal disorientation), consciousness was either altered or absent or with delusional content. The thinking appears disorganized, with a mostly slow pace, the predominant delusional ideas, of grandeur but also of pursuit and persecution. From an emotional point of view, there is lability, depression, irritability, anxiety, dysphoria, feelings of worthlessness, and inner tension. Also, drugs users manifest a decrease in instincts, in this case, a decrease in food appetite, insomnia, and the personality is changed in the context of the disease [60-62].

Psychological examinations

The relationship between the variables proved to be significant for the "thinking" parameter. It turns out that the legal highs consumer group is more likely to exhibit changes in thinking such as delusional ideation or suicide than other consumer groups [63,64]. According to the data collected, we can outline a general clinical picture for drug users: most patients have difficulty concentrating, in some cases eye contact is difficult to establish, hypomnesia of both fixation and evocation, their thinking and activity are

directed to addiction problems and drug procurement, highlighting their mental lability [65-67].

Conclusions

Following this study, there were outlined some correlations between different categories of substances of abuse and psychological and psychiatric parameters. Also, the study outlines the main disorders that may appear after legal highs intakes, such as psychotic disorder and schizophrenia. These highlights can serve as support for future research in the field. More research is needed in the field to determine whether these changes in one's personality are irreversible or reversible (the patients regaining their healthy mental state when they stop using legal highs).

Given the fact that a comparison between patients' mental health before and after abuse substances consumption is not possible, the importance of this retrospective study is significant as a prospective study with healthy patients intended to use these types of drugs would not be ethical. The study gives new perspectives on outlining the correlation of variable parameters (psychiatric, and psychological) with the possible chemical structures of the incriminated drugs detected by high-performance analysis methods in future research studies.

Limitations

Analyzing the data that was collected, a few limitations can be highlighted. First of all, the groups are unequal, most of them being opiate addicts. Secondly, psychiatric and psychological parameters were compared with the normal reference values in the healthy individual, as the mental health state of the included patients was not available before admission to the center. Finally, the data collected are not correlated with the chemical structures of the incriminated drugs of abuse, as the study is retrospective, and the information collected is based on the patient's confessions.

Highlights

- ✓ A wide range of symptoms appears after substances of abuse intake because most drugs cause non-specific symptoms, especially in the psychiatric and psychological sphere.
- ✓ Most the substances of abuse determine multiple changes in the consumers' personalities.
- ✓ The collaboration between pharmacists, chemists, and psychologists is essential in assessing a possible correlation between the changes in one's personality and the specific chemical structures of different drugs.

Conflict of interest disclosure

There are no known conflicts of interest in the publication of this article. The manuscript was read and approved by all authors.

Compliance with ethical standards

Any aspect of the work covered in this manuscript has been conducted with the ethical approval of all relevant bodies and that such approvals are acknowledged within the manuscript.

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