

The analysis of admissions to the Emergency Department of the Psychiatric Hospital in Bielsko-Biała connected with psychotic disorders induced by psychoactive drug use

Analiza zgłoszeń do Izby Przyjęć Szpitala Psychiatrycznego w Bielsku-Białej związanych z zaburzeniami psychotycznymi wynikającymi z używania substancji psychoaktywnych

Department of Psychiatry and Psychotherapy, Medical University of Silesia in Katowice, Katowice, Poland

Correspondence: Magdalena Kaizer-Będkowska, Kaskadowa 29b, 43-300 Bielsko-Biała, Poland, tel.: +48 601 545 199, e-mail: magdalena.kaizer@gmail.com

Abstract

Background: The recreational use of psychoactive substances has become quite popular nowadays, yet there is a sufficient body of data about psychotic disorders associated with toxicity of these substances is still lacking. The purpose of this article is description of the psychotic disorders among individuals checking into the Admissions Department in one of the psychiatric hospitals in Bielsko-Biała during a period of seven years. **Material and methods:** A retrospective analysis of cases attended to by the Emergency Department of the Psychiatric Hospital, admitted to the Psychiatric Ward in Bielsko-Biała, and diagnosed with mental and behavioural disorders due to drug use and use of other psychoactive substances between January 2010 and December 2016. The exclusion criterion was prior or concurrent diagnosis of psychotic disorders secondary to a psychiatric condition. For the data analysis, descriptive statistics was used. For the statistical calculations, a freeware spreadsheet software was used. **Results:** During the period covered by the study there were 5,769 hospitalisations in total, out of which 156 were cases of psychotic disorders induced by the use of psychoactive substances. An average patient was a 26-year-old man, with lower education, unemployed, and single. Alcohol co-ingestion was reported in almost one-third of the cases. As regards the mental state, the most frequently reported symptoms were: delusions (63.5%), hallucinations (50%), suicidal thoughts (14.1%) and considerable psychomotor agitation (31.4%). In 60.2% of cases, aggressive behaviour was reported. **Conclusions:** Most hospitalisations were connected with symptoms such as delusions and hallucinations. The patients' aggressive behaviour posing danger to others was the major problem. The substance used by the patients often remained unidentified.

Keywords: novel psychoactive substances, designer drugs, psychotic disorders

Streszczenie

Wstęp: Choć używanie substancji psychoaktywnych jest w dzisiejszych czasach coraz bardziej popularne, wciąż nie ma zbyt wielu danych na temat zaburzeń psychotycznych związanych z toksycznością tych substancji. Celem niniejszego artykułu jest opis zaburzeń psychotycznych wśród pacjentów zgłaszających się na Izbę Przyjęć jednego ze szpitali psychiatrycznych w Bielsku-Białej w okresie siedmiu lat. **Materiał i metody:** Retrospektywna analiza przypadków osób, które w okresie od stycznia 2010 do grudnia 2016 roku zgłosiły się do Oddziału Ratunkowego i zostały przyjęte na Oddział Psychiatryczny w Bielsku-Białej z rozpoznaniem zaburzeń psychicznych i zaburzenia zachowania spowodowanych naprzemiennym przyjmowaniem środków psychoaktywnych. Kryterium wykluczającym było wcześniejsze lub jednoczesne rozpoznanie zaburzeń psychotycznych na podłożu choroby psychicznej. Do analizy danych użyto statystyki opisowej, do wykonywania obliczeń statystycznych – bezpłatnego oprogramowania arkusza kalkulacyjnego. **Wyniki:** W badanym okresie było 5769 hospitalizacji, przyczynę 156 stanowiły zaburzenia psychotyczne związane z przyjmowaniem substancji psychoaktywnych. Przeciętny pacjent był 26-letnim mężczyzną z wykształceniem niższym, bezrobotnym i samotnym. W prawie jednej trzeciej przypadków odnotowano dodatkowo nadużywanie alkoholu. W odniesieniu do stanu psychicznego najczęściej zgłaszanymi objawami były: urojenia (63,5%), omamy (50%), myśli samobójcze (14,1%), znaczne pobudzenie psychoruchowe (31,4%). W 60,2% przypadków odnotowano agresywne zachowania. **Wnioski:** Większość hospitalizacji wiązała się z takimi objawami, jak urojenia i halucynacje. Poważnym problemem było agresywne zachowanie pacjentów stanowiące zagrożenie dla innych. Stosowanej substancji często nie udało się zidentyfikować.

Słowa kluczowe: nowe substancje psychoaktywne, dopalacze, zaburzenia psychotyczne

INTRODUCTION

Using psychoactive substances has become very common today. It is estimated that one fourth of the European Union population has had contact with narcotics or designer drugs. The most commonly used substances in Europe include cannabinoids, cocaine, 3,4-methylenedioxymethamphetamine (MDMA) and amphetamine (Liakoni et al., 2017). Additionally, new psychoactive substances are appearing on the market, known as “NPS” (novel psychoactive substances). In the United Nations Office on Drugs and Crime report, NPS is defined as “substances of abuse, either in a pure form or a preparation, that are not controlled by the 1961 Single Convention on Narcotic Drugs or the 1971 Convention on Psychotropic Substances, but which may pose a public health threat” (UNODC, 2013). Part of the problem with NPS is their variety, ease of synthesis, low cost, being undetectable by standard toxicology screens and resourceful marketing (Khaled et al., 2016). Recently, those drugs have emerged in addition to the “classic” drugs of abuse (Stanley et al., 2016). European Monitoring Center for Drugs and Drug Addiction is currently monitoring about 560 substances out of which about 100 were identified in 2015 alone (Tracy et al., 2017). The most common types are: synthetic cannabinoids, synthetic cathinones, phenethylamines, piperazines, tryptamines, benzodiazepines and opioids. Synthetic cannabinoids are the largest, most diversified and fastest-developing group of NPS. A substance commonly used in Poland is MAB-CHMINACA (also referred to as ADB-CHMINACA), a potent agonist of the cannabinoid CB₁ receptor, with users reporting euphoria, relaxation, improved mood, increased motivation and creativity (Adamowicz and Gieroń, 2016). In Europe, this group of NPS is known as “Spice” or “K2.” The reports on the synthetic cannabinoid toxicity cite seizures, refractory supraventricular tachycardia, acidosis, hypertension, agitation, paranoia and delusions. Those substances significantly affect the system of neurotransmitters, and are often a hundred times stronger than endogenous ligands. For example, synthetic cannabinoids have stronger affinity to the cannabinoid receptors CB₁ and CB₂ than delta-9-tetrahydrocannabinol (Huestis and Tyndale, 2017). Synthetic cathinones (the so-called “bath salts”) are chemically related to methamphetamine (“crystal meth”) and 3,4-methylenedioxymethamphetamine (ecstasy). These substances are potent inhibitors of the serotonin reuptake transporter as well as reuptake transporters for dopamine and norepinephrine, some are also receptor 5-HT_{2A} agonists. On the market, substances such as mephedrone, methylone, ethylone, naphyrone (cocaine-MDMA-like type), cathinone, flephedrone and methcathinone (methamphetamine-like type) and pyrovalerone are available. Users of these substances report euphoria, increased drive, lightening of mood, clear thinking. The adverse effects of synthetic cathinones are cardiovascular, neurological and psychiatric. The main ones are

tachycardia, arterial hypertension, hallucinations and agitation. Intoxication can manifest with delirium or the serotonin syndrome with aggression, psychotic manifestations, fever and arterial hypertension (Hohmann et al., 2014). Phenethylamines like MDAI (methylenedioxy-2-aminoindane) are selective serotonin releasers, and are said to be “entactogens” or “empathogens” producing social cohesion and empathy among users. The neurotoxicity of MDAI is close to MDMA, and the drug is marketed as a substitute for MDMA and cathinone methylone. A well-known substance in this group is also “Ivory Wave,” which contains desoxypradrol. It can cause a highly agitated state with hallucinations, paranoia and classical amphetamine-like overdose symptoms (Gibbons, 2012). Piperazines like *N*-benzylpiperazine (BZP) known also as the “party pill” and trifluoromethylphenylpiperazine (TFMPP) are known to be central nervous system stimulants with effects similar to amphetamine. They trigger the release of dopamine and norepinephrine whilst inhibiting the uptake of dopamine, norepinephrine and serotonin (Smith et al., 2015). BZP and TFMPP have been studied in controlled trials. The manifestation of intoxication are typical for stimulants. The study of the effects of combined BZP, TFMPP and alcohol consumption was terminated because of the adverse effects – arterial hypertension, tachycardia, agitation, anxiety, hallucinations, vomiting, insomnia and migraine (Hohmann et al., 2014). Tryptamines are classified into two groups: one derived from tryptamine, and second structurally related to semi-synthetic lysergic acid diethylamide (LSD). DMT (*N,N*-dimethyltryptamine), 5-MeO-DMT, psilocybin, psilocin and bufotenin psychoactive effects are due to their agonism at 5-HT_{1A}, 5-HT_{2A} and 5-HT_{2C} receptors. The main clinical effects of tryptamine derivatives are visual hallucinations, alternations in sensory perception, distortion of body image, depersonalisation, mood lability, relaxation and anxiety. Adverse effects include agitation, tachyarrhythmias, hyperpyrexia, serotonergic neurotoxicity and death (Schifano et al., 2016). NPS benzodiazepines have similar clinical effects to established compounds, such as diazepam, with sedative, anxiolytic, hypnotic and anticonvulsant properties. Their long-term use is associated with a risk of addiction and impaired cognition, physiological and mental health sequelae consistent with traditional benzodiazepines. Opioid NPS specific subjective effects are too little known to differentiate them from the established recreational opioids. Self-experimentation reports suggest that some have a longer duration of action (Tracy et al., 2017). For a more comprehensive discussion of the subject, see Kaizer-Będkowska and Kucia (2017). Using the classic drugs linked to the sympathomimetic system such as amphetamine, methamphetamine or cocaine can trigger acute psychotic disorders. According to the DSM-V diagnostic criteria, in order to make a diagnosis of a substance-induced psychotic disorder (SIPD), symptoms such as delusions and/or hallucinations must emerge during or shortly after using a given drug; the

substance involved can potentially trigger the symptoms the patients present with; the symptoms cannot be better explained by a mental disorder not induced by a substance/drug; the symptoms do not occur only during the course of delirium, and they cause considerable clinical distress or impairment in social life, job-related activities or other important functional contexts (Zhornitsky et al., 2015). While the population risk of psychosis is estimated at 0.5%, the prevalence of drug-induced psychosis among users is estimated at 8–46% for amphetamine, and 7–86% for cocaine. In recent years, it has been observed that the risk of psychotic disorders is higher for cannabinol preparations. Most drug-induced psychotic disorders subside after several days, but it is estimated that 8–27% last longer than a month (Vallersnes et al., 2016). The issue of short-term and long-term psychopathological symptoms in NPS users is not widely covered in the medical literature, but there are more and more reports suggesting an increased risk of psychotic disorders among NPS users. Those symptoms include hallucinations, delusions, altered perception of time/space/self, anxiety, psychomotor agitation and sleep disorders (Valeriani et al., 2015).

The purpose of this article is the description of psychotic disorders in individuals checking in the Admissions Department in one of the psychiatric hospitals in Bielsko-Biała over a seven-year period. The following data were collected: demographic data, clinical symptoms, test results and treatment information.

MATERIAL AND METHODS

The study involved a retrospective analysis of the medical histories of patients who checked in the Emergency Department of the Psychiatric Hospital, and were admitted to the Psychiatric Ward in Bielsko-Biała for observation and treatment. The participants were all patients hospitalised between January 1, 2010 and December 31, 2016 who were diagnosed with “mental and behavioural disorders due to multiple drug use and use of other psychoactive substances: psychotic disorder” (ICD code F19.5). The study included patients who declared using psychoactive substances, and there was evidence from witnesses confirming the patient’s use of such substances, or a physician’s diagnosis based on the symptoms and additional tests (if ordered). The exclusion criterion was a prior or concurrent diagnosis of psychotic disorders secondary to a psychiatric condition (e.g. delusional disorder, schizophrenia-like disorders, or bipolar disorder). Demographic data (age, sex, place of residence, marital status, employment), data regarding the hospitalisation, including its duration, reasons for checking in the Emergency Department, mental state on admission, psychoactive substances used as declared by the patients or witnesses, and results of urine drug screens, as well as the administered treatment were analysed. Continuous data (mood, psychotic symptoms, demographic data, etc.) were analysed using descriptive statistics.

Year	Number of cases
2010	2
2011	3
2012	8
2013	7
2014	51
2015	66
2016	19

Tab. 1. Number of cases of psychotic disorders induced by psychoactive substance use by year

For the statistical calculations, a freeware spreadsheet software was used. A consent of the bioethical commission was not required for writing this article.

RESULTS

During the study, there were 5,769 hospitalisations in total, out of which 156 were cases of psychotic disorders induced by psychoactive substance use. The distribution of hospitalisations is presented in Tab. 1. Among the hospitalised patients, there were 120 men (76.9%) and 36 women (23.1%). Average age for women and men was 24 and 27 years, respectively, with the youngest patient being 18 years old and the oldest 43 years old. One hundred and nine patients declared they lived in towns and cities (69.87%). Diversity in terms of educational background of the patients was also noticeable and its distribution is presented in Tab. 2. When analysing the demographic data, the patients’ marital status was also considered. One hundred and seventeen patients were single (unmarried or having a live-in partner) (75%), 14 were married (8.97%), and 5 were divorced (3.21%). As for employment of the patients, 95 were unemployed (60.90%), 26 were employed (16.67%), 4 received a disability allowance (2.56%). In 31 cases, the employment status was not provided in the medical history.

Tab. 3 shows data concerning the reason for admission. For 44 patients it was the first hospitalisation (28.2%), for 58 patients it was a subsequent hospitalisation (37.18%), for the remaining 34.62% of patients no information was made available in this respect in the medical documentation. Average hospitalisation time was 9 days. The shortest hospitalisation was 1 day, the longest was 58 days.

Education	Number of cases (%); N = 156
Primary	42 (26.92%)
Lower-secondary	11 (7.05%)
Vocational	37 (23.72%)
Secondary	27 (17.3%)
University	3 (1.92%)
No data available	36 (23.08%)

Tab. 2. Demographic characteristics of patients with psychotic disorders induced by psychoactive substance use by education

	Number of cases (%) (N = 156)
Referral to Hospital/Emergency Department of the Psychiatric Hospital	
Emergency Medical Services	92 (58.97%)
Other hospital (Emergency Department/Admissions Department)	24 (15.38%)
Mental Health Outpatient Clinic	6 (3.85%)
Police	7 (4.49%)
Centre for Preventing Alcohol Problems/Sobering Centre	6 (3.85%)
No referral	21 (13.46%)
Police presence at admission	
Yes	91 (58.33%)
No	65 (41.67%)
Admission without consent under section 23 of the Act on Mental Health Protection	39 (25%)

Tab. 3. Circumstances of checking in and admission into the Emergency Department for patients with psychotic disorders induced by psychoactive substance use

On admission, the patients were often unable to provide information on what type of psychoactive substance they took, citing, for example, “some tablet” or “some powder.” Only a small group of patients could clearly state whether they took amphetamine, cannabinoids or designer drugs (most often “crystal meth,” that is a derivative of methamphetamine). Most of the patients denied taking any psychoactive substances and data on this matter were obtained by the admitting physician from the interview (family, friends, police, emergency medical staff, prior medical history). Screening tests for the presence of narcotics in the urine were administered to 94 patients, 58 of which were positive (61.7%). The results were presented in Tab. 4. Fifty patients (32.05%) apart from using psychoactive substances also abused alcohol, 3 patients abused tranquilizers (1.92%). As regards the mental state, in 21 cases (13.46%) altered perception of orientation was observed, mainly the perception of time/space/self. During the study, on admission the contact with the patient was described as difficult in 35 cases (22.43%), in 10 cases as chaotic 10 (6.41%), in 22 cases as illogical (14.1%), and there was one case of no verbal contact (0.64%). Additionally, 5 patients exhibited a distorted thought process (3.21%), in 3 patients it was racing (1.92%),

Substance	Number of cases (%) (n = 94 administered test)
Amphetamine	4 (4.26%)
Opioids	1 (1.06%)
MDMA/ecstasy	1 (1.06%)
Tetrahydrocannabinols	30 (31.91%)
Presence of several substances	22 (23.4%)
Negative test	36 (38.3%)

Tab. 4. Results of urine drug tests for presence of narcotics in patients with psychotic disorders induced by psychoactive substance use

and in 2 patients it was not specified (1.28%). Other noted symptoms related to the patients’ behaviour were anxiety and agitation (52 patients; 33.33%), loquacity (34; 21.79%), disassociation (30; 19.23%), and silliness (7; 4.49%), another 5 patients were described as behaving oddly (3.21%). Four patients (2.56%) were excessively weepy, 1 patient reported derealisation (1.28%). Mood disturbances were observed in most patients. In 32 cases mood was described as dysphoric (20.51%), in 23 cases as lowered (14.75%), in 7 next cases as intensified (4.49%), in 12 cases as labile (7.69%), in 9 cases as irritable (5.75%), in another 9 cases as indifferent (5.77%), in 2 cases as euphoric (1.28%) and in 1 case as normal (0.65%). In 61 cases there was no data available (39.1%). As regards affect, 15 patients were described as irritable (9.62%), 9 patients as ill-adjusted (5.75%), 7 patients as pale (4.49%), 3 patients as lively (1.92%). In terms of psychomotor drive, it was elevated in 24 cases (15.38%), slowed in 13 cases (8.33%), freezing in 1 case (1.28%). Forty-nine patients exhibited considerable psychomotor agitation (31.41%).

The most frequently described mental disturbances were delusions in 99 cases (63.46%) and hallucinations in 78 cases (50%). Twenty-two patients reported suicidal thoughts (14.1%), by 6 (3.85%) self-mutilation was reported. Ninety-four patients presented with aggressive behaviour (60.25%) due to which in 62 cases (39.74%) the use of physical coercion (immobilisation) was necessary.

When it comes to treatment, in 129 cases anxiolytics (mainly benzodiazepines) were administered, 107 patients were given antipsychotics. Twenty patients required mood stabilisers, and in the case of 3 patients antidepressants were included in the treatment. In 53 cases, treatment ended with discharge against medical advice (AMA), before the completion of therapy.

DISCUSSION

This paper describes hospitalisations in the General Ward at the Psychiatric hospital in Bielsko-Biala connected with psychoactive substance use. Within the 7-year timeframe of the study, patients with psychotic disorders induced by psychoactive substance use made up 2.7% of all hospitalisations. An average patient was a 26-year-old man, with lower education, unemployed, and single. It is worth noting that in one third of cases psychoactive substance use was linked to alcohol abuse, in 3 cases to sedative drug abuse. Tests for the presence of narcotics were administered in about two thirds of the patients, of which over a half were positive. The most frequently identified substances were tetrahydrocannabinols and amphetamine. In many cases, the patients denied taking any psychoactive substances. Almost one fourth of the tests were positive for more than one substance. It must be noted that most novel psychoactive substances are not discovered in standard urine drug tests. The best method to identify those substances would be testing blood or urine samples using liquid chromatography–mass

spectrometry, but such a technique is applied only in specialised laboratories and seldom used for detecting acute intoxication (Liechti, 2015). Compared to a similar study conducted in the emergency department at the University Hospital of Basel in Switzerland between 2013 and 2014 in a group of 216 patients, where a typical patient was also a young man abusing alcohol, in over half of the cases, apart from the substance use, the identified substances are discernibly different. In that study the most frequently used substances were cocaine (33%), cannabis (37%), ecstasy (13%) or opioids (15%). Clinical symptoms other than cardiovascular, neurological and miscellaneous were anxiety (27%), psychosis (5%), hallucinations (4%), agitation or aggression (22%) and panic attack (6%) (Liakoni et al., 2015). Another study reports a long-term follow-up assessment of 48 patients diagnosed with concomitant drug abuse at the time of the first hospitalisation for a psychotic decompensation. In that study, 89.6% subjects were male, with the average patient being 26.94 years old. The average duration of hospitalisation was 12 days. In 56.4% cases, more than one drug was abused, and the most common substance of abuse was cannabis (85.4%) and cocaine (37.5%) (Mauri et al., 2017). A systematic review published in 2017 covered 20 studies that investigated the effects and toxicities associated with NPS. The studies were from 10 countries, and their duration ranged between a few hours to a few years. Forty-three NPS derivatives were reported in the studies. The classes of NPS accounted for in the studies were cathinones, kratom, opioids, ketamines, phenethylamines, piperidine, salvia, synthetic cannabinoids and tryptamines. These substances were used as cognitive enhancers, empathogenic or euphoric agents, hallucinogens and/or stimulants. Most of the NPS were used in conjunction with alcohol or classical drugs. Psychotic adverse drug reactions included agitation, anxiety, confusion, depression, irritability, paranoia, psychosis, psychotic breakdown, self-harming and suicidal thoughts (Assi et al., 2017). In our study, the patients were usually referred to the Emergency Department by emergency medical services (EMS). A major problem faced by their staff was the aggressive behaviour of the patients, mainly due to psychotic disturbances. In almost two thirds of the cases where EMS staff provided medical assistance, the involvement of the police was necessary, also in the transport of aggressive patients to the hospital. Over one third of the patients had to be forcibly immobilised due to their aggressive behaviour. Because of such behaviour and the presence of a psychotic disorder, 25% of the patients were admitted to hospital under section 23 of the Polish Act on Mental Health Protection (Act, 1994).

Another issue is the pharmacotherapy of such patients. There are no clearly defined procedures for treating psychotic disorders due to psychoactive substance intoxication, mainly because the substance used by the patients is unidentified. Symptomatic treatment is most often applied. If the sympathomimetic system is overstimulated, in the

case of agitation or convulsions, benzodiazepines are administered, while aggressive behaviour or psychotic symptoms might require therapy with antipsychotics (Zawilska, 2015). In the present study, in accordance with the recommendations mentioned above, due to the common occurrence of anxiety and aggression, in most of the cases (almost 83%) tranquilizers were used, most often benzodiazepines. In almost two thirds of the cases, short-term treatment with antipsychotics was also included. It needs to be mentioned that long-term administration of antipsychotics can upregulate D₂ receptors, producing receptor supersensitivity manifested by behavioural supersensitivity to dopamine stimulation and movement disorders and supersensitivity psychosis (Chouinard et al., 2017). The symptoms subsided usually after several hours or days. In a few cases, only observation with diuresis forced with water and electrolyte supplementation was used. In those cases, positive symptoms and aggression subsided in a short time, probably once the substance used had worn off.

Out of the discussed positive symptoms, most patients exhibited delusions and hallucinations. It is difficult to unequivocally ascertain how they originated. They are probably connected with the changing effect (depending on the substance used) on the serotonergic, noradrenergic and dopaminergic systems. It is worth noting that in over half of the screening tests, cannabinoids were detected. There are reports suggesting there is a link between the use of cannabinoids and an earlier onset of schizophrenia (Large et al., 2011).

SUMMARY

The present, 7-year retrospective study conducted in the Psychiatric Hospital in Bielsko-Biała has shown that most hospitalisations were connected with symptoms such as delusions and hallucinations. The patients' aggressive behaviour posing danger to others was the major problem. The substance used by the patients was often unidentified, which can be a major problem due to the possible side effects and in respect of adequate treatment. The most common presentation due to acute recreational drug toxicity was associated with designer drugs such as "crystal meth" and drug tests most often detected THC. It was not possible to correlate the exact symptoms associated with specific NPS, mostly because there are no fast screening-test available. These results are consistent with the current limited data available from other parts of Poland, thus potentially indicating national trends. Further multicentre studies are necessary to analyse the reported cases, and on the basis of these develop procedures, treatment guidelines and methods of reducing substance-induced psychoses.

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

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