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Designer drug poisonings as a growing clinical problem

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Abstract:

Introduction and purpose: Designer drugs also known as legal highs, research chemicals or herbal highs become more and more popular not only in Poland but also in other countries around the world. That might have many reasons but the most crucial is their easy availability and rather cheap price in comparison to other psychoactive substances.

Material and methods: We analyzed the data of patients hospitalized in years 2013-2018 in the Toxicology Department in Lublin and evaluated patients hospitalized due to psychoactive substance poisoningT40 according to ICD10). Moreover the review of available scientific articles was done.

Results: After analysis the data of patients hospitalized in years 2013-2018 we can observe increasing tendency of poisonings. The growing number of designer drug poisonings may be the result of many factors - the phenomenon of these substances is based not only on a wide range of products, but also on various advertising strategies and patterns of use.

Conclusions: There can occur big diagnostic difficulties due to unpredictability of the course of poisoning and unpredictability of composition. Therefore it is very important to react quickly and choose the right treatment. Many of these poisonings are really severe and often cause death. It is worth saying that side effects occur more often in combined preparations. It is also very important to educate young people and warn against using NPS, which are particularly dangerous and risky for human organism.

Key words: designerdrugs; toxicology; poisoning

Introduction:

The term New Psychoactive Substances (NPS) refers to "substances of abuse, in a pure form or in a preparation, which are not controlled by the 1961 Single Convention on Narcotic Drugs or the 1971 Convention" as defined by the United Nations Office of Drugs and Crime (NODC) [1]. Designer drugs also known as legal highs, research chemicals or herbal highs become more and more popular not only in Poland but also in other countries around the world. That might have many reasons but the most crucial is their easy availability and rather cheap price in comparison to other psychoactive substances. This led to the fact that much more young people in student age started to use drugs so new varieties and mixtures of designer drugs are constantly appearing on the black market. It means that the chemical composition of these substances is constantly evolving, which is a real challenge for doctors to treat such patients because of unpredictable effects, side effects and health complications.

Materials and Methods:

We analyzed the data of patients hospitalized in years 2013-2018 in the Toxicology Department in Lublin and evaluated patients hospitalized due to psychoactive substance poisoningT40 according to ICD10). Moreover the review of available scientific articles was done.

Results:

After analysis the data of patients hospitalized in years 2013-2018 we can observe increasing tendency of poisonings with highest number noted in 2018 – 282 patients. We also observe this tendency when analyzing data from registers kept since 2007. Since the start of the toxicology department in 2013, the trend has increased. Taking into consideration that in 2013 there were 137 patients admitted with drug poisoning we can easily say that over the past five years number of poisonings with designer drugs has almost doubled. In 2018 the majority of admitted patients were men (88%) with predominant number of people in student age (18-25 years old) – 41,2%. We also checked if there is any tendency for poisonings to occur more often on weekends and after analysis of the data we can say that drug poisoning on weekends accounts for 49,65% of all registered intoxications. It is often very difficult to identify the drug which was taken by patient and which caused poisoning. Frequently the patient's medical history and clinical symptoms decide about making a diagnosis.

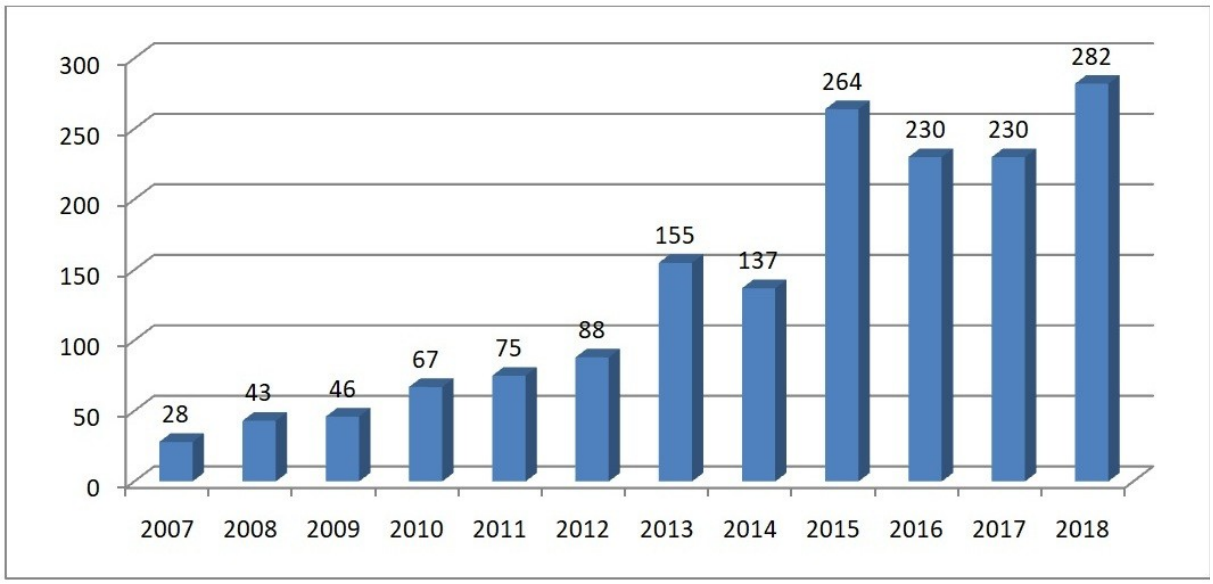

Fig. 1 Number of poisoning with designer drugs during past six years in Toxicology Department in Lublin.

Discussion:

Until recently, legal highs were a group of legal, but camouflaged, drugs that escaped legal regulations - they were not banned by the law on counteracting drug addiction or allowed on the basis of separate provisions (like other drugs, e.g. alcohol or tobacco products). One of the first popular ingredients in legal highs were piperazine derivatives [benzyl piperazine (BZP); TFMPP, mCPP, DBZP] and cannabinoid receptor agonists. After their delegalization - the era of cathinone compounds and their derivatives came as well as new cannabinoid receptor agonists. [2]

Currently, Nafyron and its derivatives are recognized as second generation legal highs. The synthesis of new compounds is mainly dictated by the expectations of recipients, so afterburner manufacturers are constantly looking for compounds with properties most desired by users. [3]

The growing number of designer drug poisonings may be the result of many factors - the phenomenon of these substances is based not only on a wide range of products, but also on various advertising strategies and patterns of use. Designer drugs come in various forms: e.g. as tablets or pills (46.6%), dried plants mixed with plant extracts or synthetic chemical compounds for smoking (so-called Spice) (29.7%), raw plant material or plant extracts (18.1%), in powdered (3.7%), liquid (1.2%) and marginally as aerosols or chewing gums.[2]

Research results of the Main Sanitary Inspectorate Supervision – Department on replacement measures indicate that psychoactive substances contained in "new drugs" most often belong to the following chemical groups: synthetic cathinones, synthetic cannabinoids, synthetic opioids, benzodiazepines. Synthetic cathinones are psychostimulants similar to cocaine or amphetamine, which can cause cardiovascular disorders as well as visual and auditory hallucinations.[4] Synthetic cannabinoids imitate the effects of marijuana or hashish and can cause acute psychotic symptoms and permanent changes in the central nervous system. Synthetic opioids are psychodepressants stronger than heroin, their use causes a slow heart rate (bradycardia), impaired consciousness and breathing, and finally inhibition (paralysis) of the respiratory center and death. Whereas benzodiazepines are a group of organic chemicals that have a sedative, anxiolytic, hypnotic or anticonvulsant effect.

In the first quarter of 2018. 900 intoxications were reported and throughout 2018. 4,257 poisoning with "new drugs" and 65 deaths. However, in the first quarter of 2019. a total of 589 poisonings and 6 deaths were recorded. According to the presented data, it appears that in the first three months of 2019. there was a noticeable downward trend in poisoning with "new drugs" compared to the first quarter of 2018. [5]

The analysis of the research shows that in 2018 - 132 psychoactive substances were detected, of which 10 the most common were chemical substances shown in the table below.

Synthetic cannabinoids	Synthetic cathinones
N-[[1-[(4-fluorophenyl)methyl]-1H-indazol-3-yl]carbonyl]-L-valine, methyl ester (FUB-AMB)	1-(4-chlorophenyl)-2-(ethylamino)propan-1-one (4- CEC)
methyl-[2-(1-(5-fluoropentyl)-1H-indazole-3-carboxamido)-3,3-dimethylbutanoate] (5F-ADB)	2-(ethylamino)-1-phenylhexan-1-one (HEX-EN)
	1-(2H-1,3-benzodioxol-5-yl)-2-(ethylamino)pentan-1-one (N-ethylopentylone)
	1-phenyl-2-(propylamino)-1-pentanone (N-propylopentedrone)
	1-(4-chlorophenyl)-2-(methylamino)propan-1-one (4-CMC)
	4-methyl-1-phenyl-2-(pyrrolidin-1-yl)pentan-1-one, monohydrochloride (α-PHiP)
	1-(4-chlorophenyl)-2-(1-pyrrolidinyl)-1-pentanone, monohydrochloride (4-Cl-α-PVP)
	2-(ethylamino)-1-phenyl-pentan-1-one (NEP)

Table 1. Ten most often occurring psychoactive substances among new drugs in 2018.

Conclusions:

We can observe growing clinical problem with increasing frequency of use designer drugs because of the easy access to psychoactive substances. There can occur big diagnostic difficulties due to unpredictability of the course of poisoning and unpredictability of composition. Therefore it is very important to react quickly and choose the right treatment. Many of these poisonings are really severe and often cause death. It is worth saying that side effects occur more often in combined preparations. It is also very important to educate young people and warn against using NPS, which are particularly dangerous and risky for human organism.

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