III. Demand Reduction

11. New Psychoactive Substances: Understanding the Health Risks and Clinical Impacts

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Introduction

Despite global efforts to combat drug abuse, the number of people suffering from addictions continues to rise. In 2021, over 296 million people worldwide consumed drugs, marking a 23% increase over the past decade. Concurrently, the number of individuals suffering from drug use disorders surged to 39.5 million, reflecting a 45% increase over the same period (UNODC 2023). These statistics highlight the persistent and growing challenge of drug abuse, necessitating ongoing and enhanced global intervention strategies.

A growing concern is the increasing number of individuals experiencing adverse effects from the risky use of psychoactive substances without developing physical dependence. This issue extends beyond addiction, as more people are facing significant health burdens related to drug use. For example, there has been a steady rise in the number of people infected with HIV, hepatitis C, and sexually transmitted infections due to drug use. These infections not only impact the health of individuals but also strain public health systems and resources.

In parallel, the modern world has witnessed a dramatic shift in the types of psychoactive substances available on illegal markets. New psychoactive substances (NPS) have emerged, posing significant challenges to public health and safety. These substances are often designed to mimic the effects of traditional drugs but can be more potent and unpredictable. The rapid introduction of new NPS variants complicates the ability of health professionals and law enforcement to manage and mitigate their impact effectively.

Research and systematic reviews indicate that the health risks posed by new psychoactive substances are comparable to, and sometimes exceed, those associated with traditional substances such as heroin, opium, cocaine, amphetamines, and cannabis (Chiappini et al. 2021; Rinaldi et al. 2020). NPS can lead to severe health issues, including acute toxicity, mental health

disorders, and long-term physiological damage. The constant variability of new formulas and their unpredictable combinations in illegal markets exacerbate these risks, leading to a persistent lack of the knowledge necessary for developing balanced harm reduction measures.

The challenges of NPS are multifaceted. First, their chemical compositions are continually changing to evade legal restrictions, making it difficult to monitor and regulate their use. Second, the lack of comprehensive data on their long-term effects complicates the creation of effective treatment and prevention strategies. Third, the accessibility and appeal of NPS, especially among young people and vulnerable populations, contribute to their widespread use and the associated health risks.

The purpose of this chapter is to review the symptoms associated with the use of new psychoactive substances. This information is crucial not only for medical professionals but also for addiction counsellors, social workers, and harm reduction specialists who work directly with individuals affected by NPS use. Understanding these symptoms can enhance the ability of these professionals to provide appropriate care and support.

For clarity and ease of use, symptoms will be presented according to the organ systems most often targeted by the toxic effects of NPS. This systematic approach allows for a comprehensive understanding of the various health impacts of NPS and facilitates targeted interventions. By categorising the symptoms, we aim to provide a clear and accessible reference for identifying and managing the adverse effects of NPS use.

Overall, this chapter seeks to contribute to the body of knowledge on NPS and support efforts to mitigate their harmful effects. Through increased awareness and understanding, we can better address the challenges posed by these substances and improve outcomes for those affected by their use.

The Effect of the Synthetic Cannabinoids on the Respiratory System

Synthetic cannabinoids (SCBs) can depress the respiratory centre even in the absence of pre-existing respiratory conditions. In a study by Manini et al. (2022), 29 out of 83 patients had experienced an SCB overdose, with acute respiratory failure occurring in 25% of these cases, compared to just 4% among those overdosing on other narcotic substances. Berkowitz and colleagues (2015) reported four cases of pneumonia leading to respiratory failure in individuals using SCBs.

Orsini and colleagues (2015) documented a case involving a young man who developed acute respiratory failure after consuming SCBs, necessitating artificial lung ventilation in the intensive care unit. The authors attributed the respiratory failure to acute heart failure.

Respiratory failure can also result from pulmonary embolism. Yırgın et al. (2018) described a young patient who developed pulmonary embolism without any apparent cause other than a two-year history of SCB use, despite normal blood coagulation test results. Similarly, Raheemullah & Laurence (2016) reported a 32-year-old woman who visited the emergency room four times due to repeated episodes of embolism following SCB use. Notably, these episodes did not occur during periods of abstinence from SCBs.

The Neurological and Psychiatric Effects of SCBs

Long-term use of SCBs may be one of the causes of psychosis. In addition, the use of SCBs may be accompanied by mania with psychotic symptoms. Thus, Ustundag et al. (2015) described the case of a young man whose relatives noticed behavioural abnormalities. He talked to himself, could look at one point for a long time, spent a lot of money, suddenly became interested in religion, and barely slept. In addition, he called himself an angel, a demon, and a prophet. According to relatives, he had had no mental abnormalities before he began using illegal drugs, something he had been doing for three to four years. The appearance of behavioural abnormalities had started to be noticed in the last six months, when the young man had begun to use SCBs.

The use of SCBs can be accompanied by suicidal thoughts, as in the description of the case of a young man who was admitted to the emergency department with acute arousal, confusion, suicidal thoughts, and self-inflicted trauma due to using SCBs. The following day, all symptoms disappeared after receiving care (Thomas 2012).

SCBs affect speech and movement coordination. For example, the research of Yeakel & Logan (2013) discussed twelve cases of motor vehicle drivers who tested positive for SCBs. The authors described that the drivers' speech was slow and slurred, and their coordination was reduced. Musshoff et al. (2014) studied some cases of detention of drivers who used SCBs and noted an extremely high level of danger on the road because of

the drivers' impaired fine motor skills and inability to hold the steering wheel.

The main symptoms of using SCBs are changes in mood and behaviour. These include anxiety, hallucinations, arousal, and euphoria. Other symptoms include various types of cognitive impairment, such as decreased memory, concentration, and attention. Besli et al. (2015) noted in their study a decrease in academic performance and school attendance among adolescents admitted to the emergency department with acute intoxication due to SCB use.

The Effect of SCBs on the Digestive System

Cannabis has an antiemetic property. However, in 2004, the syndrome of 'cannabinoid hyperemesis' was described in scientific literature, which is characterised by abdominal pain, nausea, and vomiting against the background of chronic use of cannabinoids. Patients suffering from this syndrome may need to take a hot bath or shower. Patterson et al. (2010) described four cases of cannabinoid hyperemesis syndrome, indicating that the symptoms of damage to the digestive organs disappeared after stopping cannabis use.

Ukaigwe et al. (2014) described the case of a 38-year-old man who was admitted to the emergency department complaining of nausea and vomiting that had lasted for two weeks. It turned out that the patient had used cannabinoids and smoked SCBs the day before hospitalisation. In the past, the patient had noted similar symptoms that could last for two or three days but disappeared on their own without medical intervention. During the examination of this patient, there was soreness in the epigastric and umbilical regions. Interestingly, the pain stopped after taking a shower. The patient was diagnosed with cannabinoid hyperemesis syndrome. During hospitalisation, the patient did not use SCBs and did not complain about their digestive system.

The Effect of SCBs on the Circulatory System

Diseases of the circulatory system, especially among middle-aged people, are of concern to the medical community. When coronary heart disease is diagnosed among young people, anxiety also increases significantly. Ac-

cording to the medical literature data, cases or series of cases of circulatory system diseases at a young age after using the SCB K2 are described. Khan et al. (2018) presented a case of ischemic cardiomyopathy and ischemic stroke in a 25-year-old man after he had used the SCB K2. The patient had no obvious traditional risk factors for coronary heart disease. According to blood tests, there were no signs of dyslipidemia. An ischemic infarction of the left middle cerebral artery was diagnosed on a CT scan of the head. On echocardiography (ECHOCG), the contractile function of the heart is significantly reduced. Moreover, acute deep vein thrombosis in the left leg was diagnosed. McKeever et al. (2015) described the case of a 16-year-old man with a prolonged angina attack in the two hours after taking K2. There was a bronchial asthma and attention deficit disorder with hyperactivity in the anamnesis. Ibrahim et al. (2014) delineated the case of a 56-year-old man who lost consciousness after consuming the SCB K2. The anamnesis included coronary heart disease, post infarction cardiosclerosis, coronary artery bypass grafting, hypertension, and dyslipidemia. The patient underwent cardiopulmonary resuscitation. During diagnostic cardiac catheterisation, no acute vessel blockage was detected, and a defibrillator was implanted in the patient. Kourouni et al. (2020) studied 42 medical records of patients in the emergency department who misused SCBs (mostly K2). In terms of issues relating to the circulatory system, two patients (6%) underwent cardiac catheterisation due to an anginal attack. Two cases (6%) of acute coronary syndrome were diagnosed. One patient (3%) had a cardiac arrest. Bradycardia was observed in 16% of cases, while hypertensive crisis was seen in 6% of cases.

While taking SCBs, one of the most common clinical symptoms is high blood pressure and palpitations. Heath et al. (2012) described two cases of pronounced tachycardia among two people aged 15 and 17 after using K2. In one case, tachycardia was accompanied by hypertension. Abouchedid et al. (2016) described a clinical case of a young 19-year-old woman whose symptoms after using psychoactive substances, including SCBs, included visual hallucinations, seizures, tachycardia, and minor hypertension. Symptoms were relieved 13 hours after consumption. Lam et al. (2017) demonstrated a clinical case of a 24-year-old man who was taken to the emergency department with a short-term episode of tachycardia after using SCBs. In their work, Martínez et al. (2021) compared the dynamic of acute manifestations when consuming the SCBs JWH-122 and JWH-210 for four hours. The number of heartbeats and the level of systolic and diastolic blood pressure were calculated. When comparing the two substances, both systolic and

diastolic blood pressure and heart rate were significantly higher when taking JWH-122

Tait et al. (2016) studied approximately 4,000 clinical cases of adverse events involving SCBs, including 26 deaths. The main causes of death were also cardiovascular complications in the form of myocardial infarction, ischemic stroke, and embolism. The most frequent complaint in terms of the circulatory system was tachycardia. Kasper et al. (2019) described toxic complications in patients after using SCBs in 2015 in Mississippi with prevalent aggression, hypertension, and tachycardia. The average age was 31 years old, and 85% were male. As regards issues relating to the circulatory system, 42% had tachycardia and 30% had hypertension. Law et al. (2015) studied cases of referral at the US toxicology centres from January to May 2015. It was found that during this period, there were 3,572 patient referrals following SCB use, largely among men (80.7%). The average age was 26 years old. Tachycardia, as one of the main symptoms seen when treating patients, occurred in 1,035 cases (29%).

Monte et al. (2017) analysed a group of patients using SCBs who sought medical help for five years. After analysing the data, the researchers obtained the following results. Overall, 84% were men. The average age was 25. When it comes to the circulatory system, the main symptom in 12.5% of cases was tachycardia with a heart rate of more than 140 beats per minute, bradycardia with a heart rate of fewer than 50 beats per minute in 5.7%, and arterial hypotension in 4.2%. Cooper (2016) described the results obtained from patients who had been misusing SCBs for three and a half years in her research paper. In the work, the researchers drew attention to the frequency of use and the presence of side effects. The author concluded that even with a single use of SCBs, tachycardia was found in 6.5% of cases.

There are some works in the literature describing cases of the death of patients after SCB use. Shanks (2016) reported on the fatal outcome of a 41-year-old woman who used the SCB ADB-FUBINACA in his article. According to the autopsy results, the deceased had thrombosis of the left anterior descending coronary artery and pulmonary edema. McIlroy et al. (2016) wrote about a 39-year-old man with acute myocardial infarction, complicated by cardiac arrest after SCB use. Blood flow in the coronary artery was restored after stenting.

While conducting a literature search, we came across interesting cases of individuals suffering from non-ischemic cardiomyopathy who also had clinical symptoms of heart failure after SCB use. Mohammed (2019) described the case of a 15-year-old patient with a prolonged angina attack,

accompanied by an episode of loss of consciousness and various hallucinations. These complaints appeared after SCB intake. Takotsubo stress cardiomyopathy was diagnosed. Al Fawaz et al. (2019) described another case of heart failure. Following the use of the SCB UR-144, a 19-year-old woman was admitted to the emergency department with an epilepsy attack. After four days of hospitalisation, the phenomenon of heart failure with reduced myocardial contractility occurred.

The literature provides insights into the clinical manifestations of the circulatory system during periods of intoxication. However, the cardiac implications during the withdrawal phase remain underexplored. Nacca et al. (2013) documented two clinical cases of withdrawal syndrome following the prolonged use of SCBs, where anxiety and tachycardia emerged as the primary symptoms post-cessation. This highlights a significant gap in the current understanding of cardiovascular responses associated with SCB withdrawal, underscoring the need for further research in this area.

The Effect of Synthetic Cathinones on Kidney and Liver Function

Sutamtewagul et al. (2014) described a case of kidney damage after the consumption of synthetic cathinones (SCs). A 37-year-old man was admitted to the emergency centre with jerking movements throughout his body. Three days before his hospitalisation, he had used SCs. At the time of examination in the hospital, high blood pressure, rapid breathing, palpitations, and excessive sweating were diagnosed. Based on laboratory blood tests, renal insufficiency was also diagnosed. Acute renal failure is usually a complication of rhabdomyolysis in patients using SCs. Rhabdomyolysis is a syndrome characterised by the destruction of muscle tissue cells. Many authors describe rhabdomyolysis in cases of SC use. In the research by O'Connor et al. (2015), the 102 patients with sympathomimetic toxicity and detection of a stimulant agent in urine were aged 14 to 65, of which 74% were male. Rhabdomyolysis was diagnosed in 42% of cases. The authors concluded that SCs were associated with a high risk of rhabdomyolysis.

In addition to rhabdomyolysis with renal insufficiency, during the period of acute SC intoxication, patients may experience liver failure with elevated liver enzymes. Borek & Holstege (2012) described the case of a 25-year-old man who was admitted to hospital after SC use, with arousal and a body temperature increase. The patient had rhabdomyolysis with acute renal and hepatic insufficiency. The patient was in hospital for a long time and

was discharged after therapy with a significant improvement in his general condition.

The Effect of Synthetic Cathinones on the Circulatory System

In a literature review, it was identified that the primary cardiac manifestations during the acute phase of intoxication, associated with the use of SCs and SCBs, are tachycardia and arterial hypertension. Franzén et al. (2018) cited the results of the STRIDA project in their work. Over two years, information was collected on 43 patients who used alpha-Pyrrolidinobutiophenone (α-PBP). Tachycardia, one of the primary clinical symptoms of acute intoxication, occurred in 54% of cases, while arterial hypertension was observed in 37% of cases. In the same STRIDA project, Beck et al. (2016) examined 42 patients with the drug α-pyrrolidinovalerophenone (α-PVP) confirmed in their blood during a four-year period. In 33% of cases, α-PVP was the only narcotic substance in the blood. Opioids, benzodiazepines, and ethanol were found in the blood in 67% of cases. Tachycardia (80%) and hypertension (33%) were also the main symptoms. Forrester (2012) described in his work the clinical symptoms of 362 patients who sought medical help because of SC use. Tachycardia was found in 45.9% of cases, hypertension in 21%.

Umebachi et al. (2016) studied eight cases of patients who went to the emergency department from March 2012 to November 2014. It was confirmed that all of them had the SC α-PVP in their blood. The time between use and admission to the emergency department averaged eight and a half hours, and the dosage ranged from 1.0 to 52.5 ng/ml. The main symptoms were fever (in three out of eight cases), tachycardia (in five out of eight cases), hypertension (in three out of eight cases), and impaired blood clotting (in four out of eight cases). There were no deaths. Also, Sivagnanam et al. (2013) described a clinical case of a 27-year-old man who was taken to the emergency department. The patient sought help after intravenous administration and inhalation of mephedrone. The patient had tachycardia and slight hypotension upon admission. Systolic blood pressure began to decrease to 60 mmHg two days after hospitalisation. There was no data for coronary artery disease during cardiac catheterisation. The patient's condition improved and he was discharged for outpatient treatment with a recommendation to stop using narcotic drugs.

Many sources are devoted to the presentation of deaths among SC consumers. Kesha et al. (2013) described a fatal incident that happened to a man who called an ambulance after drinking 'bath salts'. He developed a life-threatening rhythm disorder and hyperthermia, and then the patient sadly died. Methylenedioxypyrovalerone (MDPV) was detected in his blood at a concentration of 1.0 mg/l. Murray et al. (2012) described a fatal clinical case in a 40-year-old man who, after consuming MDPV 'bath salts', developed aggressive, inappropriate behaviour. During an objective examination at the prehospital stage, tachycardia and a slight shortness of breath were noted. In hospital, the patient developed bradycardia followed by cardiac arrest. Resuscitation measures were carried out and were successful after 30 minutes. Acute renal failure, rhabdomyolysis, and anaemia developed, and the patient fell into a coma. 42 hours after the treatment, clinical death was pronounced. Wyman et al. (2013) described the fatal case of a 39-year-old man who used MDPV. Death occurred because of toxic exposure to SCs, complicated by cardiac arrhythmia. Carbone et al. (2013) characterised a case of sudden cardiac death in a 19-year-old young man against the background of the use of the synthetic cathinone methylone (3,4-methylenedioxy-N-methylcathinone methylone). Loi et al. (2015) analysed 30 deaths among adolescents aged 16 to 24 after using mephedrone, which occurred in the UK from 2009 to 2013. 73% were male, and in 87% of cases, mephedrone was used in combination with other substances. The authors concluded that the use of mephedrone with other substances might have been the cause of these deaths.

In their work, Kudo et al. (2015) described a fatal case of a 30-year-old woman. The autopsy showed congestion and swelling in the lungs. Death occurred because of poisoning by three types of SC, diphenidine, benzothiazepines, and alcohol. Majchrzak et al. (2018) described the case of the death of a 29-year-old woman who suffered from alcoholism, who was repeatedly treated and whose suicide attempts had been previously noted. The woman came home intoxicated and consumed two teaspoons of powder of unknown origin. After a while, she fell unconscious. Resuscitation measures were not effective, and death occurred. The autopsy revealed swelling of the brain and lungs. The synthetic cathinone α-propylaminopentiophenone was found in the blood. Zaami et al. (2018) analysed 20 fatal SC-related cases. All cases were accompanied by hyperthermia, hypertension, and cardiac arrest. Thirakul et al. (2017) described a fatal case that happened to an absolutely healthy 29-year-old young man after consuming N-Ethylpentylone. Cardiac arrest was diagnosed, and cardiac

activity was restored after resuscitation. Tachycardia, shortness of breath, and hypotension were observed in the emergency department. As a result of the progression of renal failure and the profound dysfunction of other organs, death occurred 72 hours after hospitalisation.

Many authors conclude in their works that the combined use of several types of SCs and SCBs increases the likelihood of cardiotoxic lesion developing. Ezaki et al. (2016) studied the results of forensic autopsies in Tokyo from 2011 to 2015. Among all the conclusions studied, acute intoxication and myocardial ischemia were the main causes of death among people who combined SCBs and SCs. Fujita et al. (2015) analysed six patients with acute SCB and SC intoxication. They concluded that the simultaneous use of two psychoactive substances increased the likelihood of heart failure and death.

In conclusion, the use of SCBs and SCs presents significant health risks, particularly affecting the respiratory, neurological, psychiatric, and circulatory systems. The clinical manifestations during the acute phase of intoxication, such as tachycardia and arterial hypertension, highlight the severe and potentially life-threatening impacts of these substances. The variability in chemical compositions of NPS, coupled with the rapid emergence of new variants, poses challenges for health professionals in managing and mitigating their effects. The documented cases of respiratory failure, psychosis, cardiovascular complications, and fatalities underscore the urgent need for enhanced awareness, comprehensive data collection, and targeted intervention strategies. Through continued research and education, healthcare providers can better understand the complex health risks associated with NPS and improve outcomes for those affected by their use.

Clinical Symptoms of New Psychoactive Substances in Children

Children and adolescents are particularly vulnerable to the adverse effects of NPS. The clinical symptoms in this population can differ from adults due to physiological and developmental differences. Common symptoms of NPS intoxication in children include severe agitation, hallucinations, and aggressive behaviour. Cardiovascular effects such as tachycardia and hypertension are also prevalent. Additionally, gastrointestinal symptoms like nausea and vomiting are frequently observed. The impact on mental health is significant, with many cases reporting acute psychosis, anxiety, and depression. Understanding these symptoms is crucial for early identi-

fication and effective treatment, thereby minimising the long-term health consequences for young individuals exposed to NPS.

Below, we present an analysis of the literature data describing disorders and symptoms that occur with NPS intoxication among minors. Unfortunately, current publications are limited to descriptions of a series of clinical cases or individual reports of poisoning with various synthetic drugs. Among the cases of exposure of minors to NPS, it is worth distinguishing between two groups: children and adolescents. Children typically consume NPS accidentally, often when parents or adults fail to restrict access to these substances. In such cases, the poisoning develops rapidly and requires urgent resuscitation measures, as it is accompanied by the impairment of vital bodily functions (Ruiz-Maldonado et al. 2021). The second largest group of poisonings registered by emergency departments pertains to adolescents. During adolescence, the use of NPS occurs deliberately, with the intention of seeking pleasure or for recreational purposes. However, an analysis of the publications reveals that adolescents do not always understand that they are consuming a specific narcotic substance and do not fully realise the extent of its destructive effects. Meanwhile, specialists in paediatrics and toxicology emphasise the significant health risks, which are exacerbated by the use of synthetic drugs with enhanced toxic potential. According to Anderson et al. (2019), teens who used synthetic cannabinoids had a higher likelihood of experiencing seizures and coma compared to those who used cannabis. Among 75 adolescents aged 10 to 19 using synthetic cannabinoids, 67% had neuropsychiatric disorders (Gilley et al. 2021).

Using the American Association of Poison Control Center's database, the effects of synthetic cathinone on children under the age of 20 were studied. The results showed that 5.5% of synthetic cathinone ingestion was complicated by seizures. Among these cases, 50.7% of individuals had a single seizure, 39.7% had multiple seizures, and 9.6% had status epilepticus. One 17-year-old adolescent experienced hallucinations and myoclonic jerks after using a synthetic cannabinoid. An ECG showed sinus tachycardia. Another 17-year-old adolescent developed anxiety, hyperreflexia, and tachycardia after smoking 'Spice' (Tekulve 2014). A 16-year-old adolescent who had been chronically using synthetic cannabinoids for three years suffered a perforated duodenal ulcer (Buyukbese 2016). A case of diffuse alveolar haemorrhage and respiratory failure was reported in an 18-year-old adolescent following an overdose of butyrfentanyl (Cole et al. 2015).

The use of new psychoactive substances can be fatal for adolescents. In one case, a 17-year-old adolescent 'began gasping for breath and collapsed'

in the morning, and death was later confirmed. The individual's blood contained 5F-PB-22 at a concentration of 1.1 ng/mL and ethanol at 0.033 g/dL. In another case, an 18-year-old young man was found dead at a party with a blood concentration of 5F-PB-22 at 1.5 ng/mL (Mohr 2016). Reports of an increased risk of psychosis among adolescents using NPS are causing significant concern. This can lead to suicidal attempts, which in turn increases the mortality rate (Morini 2017).

In the context of Central Asia, the situation regarding the use of NPS by minors is complicated by the limited research into this issue and the low awareness among parents and specialists about how to provide assistance to children who have experience of using NPS. Minors who use synthetic drugs may have sharp mood swings and be emotionally unstable. Sluggishness, lethargy, and immobility can be replaced by aggressiveness, irritability, and hostility. The school performance of such children decreases, and their memory deteriorates. They lose their former interest in hobbies, become immersed in themselves, and narrow their circle of communication. There is a noticeable change in their daily rhythms: during the day, the teenager sleeps, but at night they're awake. The child may spend an unreasonable amount of money, constantly looking for and borrowing money. Yellow and brown stains may appear on their clothes, and they may be in possession of suspicious things such as powders, capsules, pills, syringes, needles, gauze and cotton swabs, rubber tourniquets, and small bills rolled up in tubes or torn in half. All of the above may be symptoms of NPS abuse by children and adolescents (Alymkulova 2019).

For medics and paediatricians, it's crucial to be vigilant about the diverse and often severe symptoms of NPS intoxication in children and adolescents, which can range from severe agitation and hallucinations to cardiovascular issues like tachycardia and hypertension and gastrointestinal problems such as nausea and vomiting. Given the significant mental health impacts, including acute psychosis, anxiety, and depression, a comprehensive diagnostic approach is essential. This includes a thorough clinical assessment, a detailed patient history, and the use of appropriate diagnostic tests to identify NPS use and its effects. Early identification and prompt intervention can significantly mitigate the long-term health consequences for young individuals exposed to these substances. Continuous education and training on the latest trends and symptoms associated with NPS use are critical for maintaining an effective clinical response.

Consclusion

This comprehensive review of the health risks and clinical impacts of NPS underscores the significant and multifaceted challenges these substances present to public health. The findings highlight that both synthetic cannabinoids and synthetic cathinones pose severe risks to multiple organ systems, including the respiratory, neurological, psychiatric, circulatory, and gastrointestinal systems. The rapid and unpredictable nature of NPS variants exacerbates these risks, making it difficult for healthcare providers and law enforcement to effectively monitor, regulate, and treat the adverse effects associated with their use.

Particularly alarming are the documented cases of acute respiratory failure, psychosis, cardiovascular complications, and fatalities resulting from the use of NPS. These cases emphasise the urgent need for enhanced awareness, comprehensive data collection, and targeted intervention strategies to mitigate the harmful effects of these substances. The significant health burden imposed by NPS is not limited to those with physical dependence but extends to a broader population experiencing severe health consequences from their risky use.

The impact on children and adolescents is particularly concerning. This vulnerable population exhibits a range of severe symptoms, including severe agitation, hallucinations, aggressive behaviour, cardiovascular issues like tachycardia and hypertension, and gastrointestinal problems. The mental health impacts, such as acute psychosis, anxiety, and depression, are also profound, necessitating a vigilant and comprehensive diagnostic approach from paediatricians and toxicologists.

Addressing the challenges posed by NPS requires a multifaceted approach, including continuous research, education, and the development of effective harm reduction measures. Healthcare providers must stay informed about the latest trends and symptoms associated with NPS use to provide timely and appropriate care. By enhancing our understanding and response to the health risks posed by NPS, we can improve outcomes for those affected and contribute to the overall effort to combat the growing challenge of drug abuse globally.

Through increased awareness and strategic interventions, we can better protect public health and support individuals and communities affected by the use of new psychoactive substances.

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