



Volume 1 Issue 1 January 2021 ISSN 0000-0000

Emerging Trends in

Drugs, Addictions, and Health

Editor-in-Chief: Ornella Corazza



INTERNATIONAL SOCIETY
FOR THE STUDY OF
EMERGING DRUGS

**X INTERNATIONAL CONFERENCE ON NOVEL PSYCHOACTIVE SUBSTANCES
ABU DHABI 6-8 NOVEMBER 2023**

SUBMITTED ABSTRACTS

(in alphabetical order)

GUEST EDITORS

Dr Valeria Catalani, University of Hertfordshire, United Kingdom

Dr Elisabeth Prevede, Sapienza University of Rome, Italy

Dr Attilio Negri, ASST Santi Paolo e Carlo Milan, Italy

NPS: Challenges and future outlooks – the analytical toxicologists' points of view

Abbate V., Vigar M., Watkins C., Clifford J., Jones M.*

**King's College London, UK - vincenzo.abbate@kcl.ac.uk*

In recent years, the global market for novel psychoactive substances (NPS) has continued to grow rapidly, presenting significant challenges for analytical toxicologists. Indeed, the constant emergence and the evolving nature of NPS requires their rapid detection and identification; studies on their pharmacokinetics; and ideally the prediction of future analogues to try and stay ahead of the competition with illicit NPS manufacturers. This presentation will provide an overview, from the analytical toxicologists' point of view, of the current challenges and future outlooks for detecting, identifying, and predicting NPS. It will explore both recent efforts in my group, and what we plan to do in the near future to tackle the emergence of NPS using multidisciplinary approaches. I will discuss the importance of both emerging analytical tools and techniques, including portable instruments, for the rapid and on-site detection and identification of NPS. Finally, I will briefly mention how computational methods could simplify substance identification and aid in predicting the emergence of NPS. It is hoped that some of the described approaches will have positive implications for public health and safety and will create opportunities to promote exchange between various stakeholders, including basic scientists/toxicologists, clinicians, and policy makers.

Challenges in New Psychoactive Substances and Traditional Drugs of Abuse Testing in Saudi Arabia

*Al Asmari A.**

**King Abdul-Aziz Hospital, KSA - ahmadalasmari@yahoo.com*

Globally, new psychoactive substances (NPS) continue to increase in incidence threatening life, and may lead to deaths in many circumstances. In contrast, in the scientific literature from the Middle East and North African (MENA) region, including Saudi Arabia, drug-related fatalities have rarely been reported. Little is known about drug-related deaths, although in the media tons of drugs have been seized annually. In addition, most studies in the MENA region are outdated. In other words, in MENA regions, even drug seized the custom department seems to be not matched with what is trending worldwide. The phenomenon of NPS is widely spread across the globe, but little is known in these regions. Confirmation of the identity of illicit and licit drugs in each matrix or as seized material are paramount task in forensic and clinical toxicology. Although many reviews have been published on the potential advantages of hyphenated techniques in toxicology, these devices required special setting may be not available in custom department or outside laboratories. Many portals small devices are not available for testing these seized materials on custom such as Raman spectroscopy. This presentation will address the use of many small devices that can be attached to GC-MS or LC-MS techniques. These techniques are rapid, accurate and efficient for primary identify both traditional and NPS in different sample types either biological or seized material. At first glance, identification of targeted analytes is not always problematic if standards are available, a suitable method of extraction is used and there is an adequate chromatographic separation. However, problems arise when trying to follow identification criteria using guidelines based on GC-MS analysis using new technologies. Challenging encountered with identification using portal, small and mobile techniques will be discussed. In fact, many identification parameters are presented which may give toxicologists added confidence in making decisions as to the presence of such drugs in seized and biological matrices. In this presentation, the role of forensic toxicology centre across Saudi Arabia in fighting against the emerging NPS and traditional drug of abuse will be discussed in parallel with introducing Saudi Arabia experience and solutions in combination of old and new identification techniques for such analysis.

The Picture of the New Psychoactive Substances-Problem in Saudi Arabia

*Aldlgan A.**

**Security Forces Hospital, Riyadh, KSA - aziz5aziz@hotmail.com*

Recently the use of new psychoactive substances (NPS) has increased at an unprecedented pace around the world. Despite many NPS becoming controlled under drug legislation, many of them remain legal in some countries around the world. In Saudi Arabia, NPS are controlled under the Saudi Food and Drug Authority that only cover a few early NPS. The picture of the NPS-problem in Saudi Arabia is vague due to insufficient prevalence data, particularly that using biological samples. Whilst there is evidence of increasing use of NPS throughout the world. Several studies indicate that NPS may cause serious toxicity and impairment to health, therefore it is important to understand the scale of use within society. Awareness among health organisations should be raised regarding these drugs and their risk to individuals, especially young people. With more research and better understanding of the problem and its extent, the response can be improved and be more effective.

Pharmacovigilance for Psychiatric Pharmacotherapy

*Al Essa R.K.S.**

**Drug Inspection Administration, Drug and Food Control MOH, Kuwait - reem@al-essa.com*

Introduction: Patients have become a priority for the health system. Several studies showed that health systems meant to improve people's health is an important source of disease. Psychiatric disorders are often managed with pharmacotherapy, and because of their chronic and relapsing nature, most practice guidelines recommend medications to be continued for several months or years. Misuse and abuse of novel psychoactive substances (NPS) has always been a public health and law enforcement challenge. Therefore, such substances always place patients/users at risk of experiencing a variety of adverse drug reactions (ADRs). Some ADRs are life-threatening while others are disabling and can seriously affect the patient's quality of life. Method: A systematic exploratory review of the literature is performed using articles from PubMed, Scopus, Google scholar, Academia, and Research Gate, to critically appraise and the importance of pharmacovigilance for psychiatric pharmacotherapy. Results: the systematic exploratory review show that pharmacovigilance is not only a "specialist" activity; it is the responsibility of all those involved in the care of patients with medications, including doctors, nurses, pharmacists, and paramedical staff. Conclusion: this study determines the significance of pharmacovigilance and risk management plans in monitoring the safety of psychotic drugs and managing the risks of antipsychotic related ADRs. Furthermore, it provides a useful ground for the physicians, nurses, and pharmacists to acquaint themselves with concepts and methods of Pharmacovigilance in the psychiatric field.

A comparative study of Office-based injectable buprenorphine in opioid-dependence

*Alhawi R.M.M.**

**Erada Center for treatment and rehab, Dubai, UAE - r.alhawi@erada.ae*

Background: opioid use disorder is a global epidemic and has recently become one of the most prevalent addictions in the United Arab Emirates (UAE). Opioids have long-lasting harmful effects on human health as well as affect the quality of life in terms of psycho and social aspects. The high mortality in opioid dependence remains a significant problem. To date, the recovery rate for patients who suffer from Opioid Use Disorder OUD doesn't exceed 22% globally by receiving effective treatments available. This study aims to determine if injectable buprenorphine reduction of opioids, increases recovery rates, and improves the quality of life in opioid dependence by comparing the efficacy of buvidal treatment vs psychosocial treatment after opioid intoxication one-month period. Methods: This is a longitudinal comparative study following 42 male inpatients and outpatients aged between 18-65 years under the care of Erada center for treatment and rehab – Dubai, who were admitted for detoxification and rehabilitation, between April 2020 to December 2021, and divided into two groups: 21 male patients who are receiving Buvidal Prolonged-Release Solution for Injection and completed at least 12 weeks of weekly Buvidal injection in a group; and Another group of 21 male patients who received psychosocial treatment for 12 weeks. Data collection from a medical record system, Urine Drug Test, Quantitative Data, Assessments as well as Semi-structured interviews, and a Generic quality of life questionnaire (QoL-5) were used to assess the quality of life domains. Results: Buvidal Prolonged-Release Solution for Injection formations is a promising therapeutic option in OUD; it was found to play the most significant role in reducing opioid consumption and improving the recovery rate, it encourages users to engage more in the psychosocial treatment process and positively impacts their lives. Conclusions: This study definitively showed that Buvidal increased recovery rates among users of opioid substances and reduced opioid consumption as well as improved the quality of life among patients with Opioid Use Disorder. These studies provided evidence of therapeutic benefits in the field of opioid use disorder. Further studies are needed to establish and develop preventive and treatment measures.

Psychosocial Rehabilitation Programs from Emirati Culture perspective at Erada Center

*Aljasmí A.**

**Erada Center for Treatment and Rehab, UAE - a.aljasmí@erada.ae*

All substance use patients on addiction treatment centers deserve to be treated to the highest professional and ethical standards by appropriately qualified, experienced healthcare professionals. Indeed, both the patients' micro and macro systems involve stakeholders' influences to informally or explicitly on their treatment. In addition, the UAE Federal Law No.8 of 2016 has a dramatic shift towards treatment where offenders will no longer have a court case if they voluntarily present themselves to the Addiction Treatment Unit seeking treatment. In addition to the Law No. 5 of 2015 of establishment of Erada Center in Dubai aims to treat the disease of substance use disorders and alcohol addiction, which result in negative psychological, economic, social and physical impacts. This presentation will give an overview about Erada Center Treatment Programs and how the cultural aspects was taken into consideration during the implementation process. The treatment programs are driven from trained clinicians through individual and group counselling include a variety of treatments used to treat behavioural health problems such as Matrix Model, 12 steps, CBT module, family intervention and spiritual programs. These programs were translated to Arabic language with review to take the cultural values of the patients into consideration. This presentation also will show the effectiveness of these programs from patient's recovery and relapse rates, and patient quality of life improvements. It will give an overview about psychosocial treatment standards that has been followed at Erada Centre. The Method of the research will be using internal and external secondary data; such as statistics, recovery and relapse rate, patients progress reports, and other national reports about substance abuse figures.

The Effectiveness of Cognitive Behavioral Therapy in Treating Post-traumatic Stress Disorder among Arab Addicts in a mandatory Rehabilitation Facility: Case Study Reports

Al Mughairbi F., Hamid A., Warrington S., Dadzie V.*

**UAE University - f.almughairbi@uaeu.ac.ae*

Introduction: Cognitive Behavioral Therapy (CBT) is the more commonly used approach with regards to psychological treatment, for a number of psychological disorders, including Post-traumatic Stress Disorder (PTSD). The current case studies discuss the efficacy of CBT when applied in a confined environment (an inpatient, rehabilitation facility) while considering the possible contribution of cultural responsiveness to treatment outcomes in a considerably conservative culture. Methods: Three adult patients in a rehabilitation center with post-traumatic stress disorder (PTSD) were treated using CBT. The patients' scores in GAD 7, PHQ9 and IES-R were noticeably reduced, and patients were relieved from PTSD symptoms. Key elements of CBT such as the use of in vivo exposure were not possible in the treatment, however, realistic and achievable goals set jointly by the clinician and the patients at the beginning of therapy were realized. Results: Patients applied learned skills in their daily life in the facility. Follow up after the patients were released from the facility was possible with one patient only. Conclusions: The limited follow up after he was released, makes it difficult to know if the patient had maintained the skills that he obtained during therapy sessions.

The Relationship between Self-Report Antipsychotics Side Effects and Depression in Saudi Arabia

*Al Ruthia Y.**

**King Saud University College of Pharmacy, KSA - yazeed@ksu.edu.sa*

Introduction: The relationship between antipsychotics' side effects and depression/anxiety among Arabic-speaking patients with different psychiatric conditions has not been examined before. Therefore, the aim of this study was to examine the association between antipsychotics' side effects and depression and anxiety. Methods: This was a single-centre prospective cross-sectional study in which Arabic-speaking adult (≥ 18 yrs.) patients, treated with antipsychotics in Riyadh, Saudi Arabia, were recruited. The Arabic versions of the Glasgow antipsychotic side effect scale (GASS), Patient Health Questionnaire 9-item (PHQ-9), and Generalized Anxiety Scale 7-item (GAD-7) were used to measure antipsychotics' side effects, depression, and anxiety, respectively. Multiple linear regressions were conducted. Results: One-hundred patients consented to participate and were included in the analysis. The mean age of the patients was 38 years, 72% were females, 40% had a college degree or higher, and 73% had no comorbidities. Patients with higher PHQ-9 scores ($\beta=0.883$, 95% CI [0.642–1.126], $p<0.0001$), and GAD-7 scores ($\beta=0.797$, 95% CI [0.412–1.182], $p<0.0001$) were more likely to have higher GASS scores controlling for age, gender, and education. Conclusions: Patients with more severe forms of depression and anxiety are more likely to report higher rates of antipsychotics' adverse events.

Saudi Forensic Toxicologists are Paving the Road Toward National and Regional Early Warning Systems (EWS) on the New Psychoactive Substance (NPS)

*Alzahrani F.F.**

**Presidency of state security, KSA - farouq.alzahrani@gmail.com*

The global expansion of NPS encouraged the proposal of alternative policies that seem to be effective in protecting public health. In Europe, the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) and Europol, with their partners, operate the EU Early Warning System (EWS), which disseminates information on trends in drug abuse across

the EU member states, Turkey, and Norway. Since NPS market is so dynamic, less developed countries, with limited analytical capabilities and lack of legislations, are in danger of NPS outbreak. In Saudi Arabia, we believe that there is a recognized opportunity for more systematic use and timely triangulation of existing data to rapidly assess and identify emerging illicit drug trends. The overarching aim of this scoping study was to determine the feasibility of establishing a national early warning system (EWS). The objectives were to identify existing data sources routinely collected and collated; and identify and describe the data sources feasible for inclusion in an EWS. A national level brainstorming, among forensic toxicologists, was carried out for months through online meetings, conference talks and epidemiological surveys, to identify and convince stakeholders, estimate the possible danger, and promote the idea of establishing a national NPS. From forensic toxicologist point of view, the analytical data of biological samples and seized material strongly suggests that there is an urgent need for national and regional EWSs. In this conference, we would like to share the most recent developments and our long-term goals and future plans. We firmly believe that establishment of a national EWS must be done in close collaboration with the existing international agencies, like the UNODC, the EMCDDA, or the EWS. Also, it must be supported by awareness campaigns showing the dangers of NPS use for potential consumers.

Prescription Drugs and the Hazard of Addiction

*Alzayed A.**

**Kuwait Centre for mental health (KCMH) - adelalzayed@icloud.com*

Introduction: It has been a known fact that prescription drugs make up a considerable portion of drug addiction in any community. It has estimated to form up to 60% of addict population in some countries. Methods: Accordingly, it is of great significance to discuss this medical and legal issue in a scientific approach, trying to figure which drugs are at a greater risk to be abused by patients who have the suspect ability to be addicted to any substance. Results: Try to develop a system that is able to prevent or at least reduces the risk. Conclusions: This speech aims to construct a frame to address these points.

From JWH-018 to OXIZIDS: Structural Changes in Newly Emerged Synthetic Cannabinoids in the European Union from December 2008 to December 2021

Andrews R., Jorge R., Christie R., Gallegos A.*

**University of Bath, UK - rh944@bath.ac.uk*

Introduction: With new synthetic cannabinoids (SC) appearing on the European drug market every year, regional early warning systems are key to detect, monitor, and respond to the threats posed by them. The European Union Early Warning System (EU EWS) implemented by the EMCDDA started monitoring these substances in 2008. Since then, various national, European, and international drug controls have been implemented aiming at tackling these compounds. As a response, new SCs have appeared in the market containing structural moieties not covered by controls in place, increasing the diversity of substances and complexity of forensic analysis. Methods: All SCs under monitoring by the EMCDDA by the end of 2021 were organised according to their 4 structural elements: core, tail, linker, and linked groups. SC structural evolution has been analyzed in tandem with European and international legislation. Results: This study describes the structural evolution of SCs that have appeared in the EU, employing an in-depth analysis of the core, linker, linked and tail groups. This data has been compiled into tree maps and histograms, and a timeline displaying key structural milestones. Conclusions: SCs in Europe have diversified far from the original compound, JWH-018. This diversification has run in tandem with the introduction of legislation in a game of cat and mouse. The SC market is fast moving, with new structural groups appearing on the market less than 5 months after the introduction of a general SC ban in China.

New Psychoactive Substances: the Surprise Guest in Clinical and Therapeutic Approaches

*Beyamina A.**

**Hôpital Paul-Brousse, France - amine.beyamina@aphp.fr*

Pharmacological identification and screening is one data point among many when approaching patients with polysubstance use disorders. This information must be completed with detailed clinical observations of subjects who use them in order to determine the potential dangers and adverse effects of NPS. NPS are used by a wide variety of persons from all walks of life. Their reasons for using, their expectations from the drug, their perceived satisfaction, and benefits from the substance as well as the adverse events and risks are key to repeating the experience. An individual's context is also key: how they obtain the substance and how they administer it and how often. These elements are not necessarily dependent on the pharmacological properties of the substance. NPS users are frequently polydrug users. The cumulative toxicity with other more habitual substances may present the greatest dangers to consumers. In this context, blanket legislation banning all potential psychoactive substances may encourage producers to more widespread innovation with potentially greater risks to users. Such legislation may actually prevent us from gaining access to clinically relevant data to make appropriate benefit-risk analyses of NPS. Encouraging efforts to support early warning systems, to rapidly identify upticks in overdoses and toxicity, remain important in our risk reduction efforts to consumers.

In Vivo Pharmacological Characterization of Brorphine and its Possible Emerging Analogues Orphine, Fluorphine, Chlorphine and Iodorphine

*Bilel S., Vandeputte M.M., Tirri M., Corli G., Stove C.P., Marti M.**

**Department of Translational Medicine, Section of Legal Medicine and LTTA Centre, University of Ferrara, Ferrara, Italy - mto@unife.it*

Introduction: Brorphine is a dangerous novel synthetic opioid (NSO) that has recently emerged on the illicit drug market of New Psychoactive Substances (NPS) and has been involved in multiple cases of intoxication and death worldwide. Although brorphine has recently been prohibited, its (halogenated) analogues orphine, chlorphine, fluorphine and iodorphine may be available on the NPS market, potentially posing new risks to public health. Therefore, the aim of this study is to characterize the acute effects of brorphine and its analogues in vivo. Methods: We investigated the acute effects after systemic administration of brorphine and 4 analogues (0.01–15 mg/kg i.p.) on mechanical and thermal analgesia, motor impairment, grip strength and cardiorespiratory changes in male CD-1 mice. Opioid receptor specificity was also investigated using naloxone (6 mg/kg i.p.) pre-treatment. Results: All compounds increased mechanical and thermal analgesia, and impaired motor and cardiorespiratory parameters. Brorphine was the most potent of all tested compounds. The pre-treatment with naloxone prevented partially the analgesic, motor and cardio-respiratory impairments induced by brorphine and its analogues. Conclusions: These findings confirm the dangerous profile of brorphine and increase the alert on the possible emergence of new brorphine analogues and their possible association with a new wave of intoxication and death worldwide.

The Potential of Paper Spray-Mass Spectrometry for the Analysis of NPS in Emergency Department

Bocuzzi S., Cowan D., Dargan P., Goucher E., Abbate V.*

**King's College London, UK - [email](#)*

Ambient ionisation has recently become an attractive addition to toxicology workflows, as it provides rapid analysis of drugs of abuse compared with traditional chromatographic techniques such as LC-MS. Based on electrospray ionisation mechanisms, paper spray ionisation (PSI) generates ions directly from a sample spotted onto a paper substrate, minimising the cost and time of analysis. PSI uses dried matrix spots (DMS), a well-established but evolving trend in toxicology providing an alternative to collection of venous blood samples. DMS also offer improved matrix and analyte stability due to fewer enzymatic processes taking place as a result of matrix dehydration. Using DMS and PSI combined introduces the possibility of less invasive sample collection for the patient, no sample extraction or chromatography required facilitating lower cost per analysis, and quicker turnaround with earlier results available to clinicians. Emergency department (ED) presentations due to acute drug toxicity can be life-threatening; currently clinicians rely on self-report and clinical patterns of toxicity to determine the drug(s) likely to be involved. The use of PSI for identification and quantitation of NPS/other drugs can provide results on drugs present to inform patient care early in the patients' ED presentation. With the NPS market continually expanding, PSI coupled to MS has the potential for a wide-reaching benefit to ED care, ultimately enabling clinicians to tailor patient care based on analytically confirmed NPS use. This presentation will illustrate our preliminary work using a VeriSpray PSI-MS.

MDDM - New Ingredient in Ecstasy Tablets

Byrska B., Masier K., Stanaszek R.*

**Institute of Forensic Research, Poland - bbyrska@ies.gov.pl*

Introduction: In 2020, the first Ecstasy tablets were sent to our Institute, in which, in addition to MDMA and MDA, new psychoactive substance - MDDM (3,4-methylenedioxydimethylamphetamine) were also detected. Methods: The research material consisted of 150 tablets seized in five cases from two cities in Poland between 2020-2022. The qualitative analysis of the tablets was carried out by GC-MS. Quantitative analysis was performed by UHPLC-PDA. Results: The main ingredient of the tested Ecstasy tablets was MDA. The second most abundant ingredient was MDDM and MDMA was at the lowest purity. All the tablets were shaped like “the head of a star wars stormtrooper” and in off-white colour. The mass of tablets was in range 0.32-0.36 g. The content of psychoactive substances in one tablet was in range: 38-74 mg MDA, 12-28 mg MDDM, and 3-9 mg MDMA. Conclusions: In the last three years new ingredient - MDDM was introduced to Ecstasy tablets. MDDM produces mild psychoactive effects that are not well characterized. It is a new psychoactive substance, and very little data exists about its pharmacological properties, metabolism, toxicity and dosage. Due to possible interactions between MDDM, MDA and MDMA, taking tablets containing such mixtures can lead to accidental overdose and dangerous synergistic effects.

A Scientometric Insight into 70 Years of Research in Performance-Enhancing Substances in Sports

Carollo A., Rabin O., Corazza O., Esposito G.*

**University of Trento, Italy - alessandro.carollo@unitn.it*

Introduction: The use of performance-enhancing substances is extremely high among athletes. Besides compromising the spirit of fair sport competition, performance-enhancing substances also pose a serious threat to athletes' health. The control of such substances requires a close dialogue between science, medicine, and legislation. Therefore, providing an updated review of the literature on performance-enhancers is paramount. Methods: The current study aims to identify the key publications and main thematic domains in the literature on performance-enhancing substances. To do so, a scientometric approach was used to analyze an amount of 4330 documents collected from Scopus. A document co-citation analysis was performed, and a network of co-cited documents was generated. Results: In the network, the most impactful document emerged to be authored by Ntoumanis et al. in 2014, who examined the psychosocial predictors of doping use in physical activity. Furthermore, seven major thematic clusters were identified. Overall, researchers focused on investigating specific substances, such as erythropoietin, growth hormone, and dietary supplements. Conclusions: In the literature, the discussion about adequate screening methods represented a strong and recurrent thematic interest. Additionally, the pivotal role of physicians and sports medicine practitioners in educating athletes was identified.

Evaluation of Ligand-Based Models on Opioids Receptors Form Street Emerged Hits

Catalani V., Abbate V., Floresta G., Schifano F.*

University of Hertfordshire, UK - v.catalani@herts.ac.uk

The misuse of opioids has become a major public health crisis worldwide. Synthetic opioids, in particular, pose a significant danger due to their potency and potential for addiction. In this study, we aimed to evaluate the reliability of ligand-based models for predicting the structure of new synthetic opioids. We used the Molecular Operating Environment (MOE) software to create ligand-based models for three opioid receptors: mu, delta, and kappa. We trained the models on a dataset of known opioids, and then used them to predict the structure of new opioids based on their chemical properties. Our results showed that the ligand-based models were reliable in predicting the structure of new synthetic opioids. In fact, some of the structures predicted by the models were later identified on the street as new synthetic opioids. This demonstrates the potential of in silico modelling to aid in the identification and prediction of new synthetic opioids. In conclusion, our study highlights the utility of ligand-based models in predicting the structure of new synthetic opioids. By leveraging in silico modelling tools, we can potentially identify and predict new synthetic opioids before they emerge on the street, providing a critical tool in the fight against the opioid epidemic.

Understanding the Opioid Epidemic through Pharmacovigilance Signals: an Analysis of Pharmacovigilance Datasets collecting Adverse Drug Reactions (ADRs) reported to EudraVigilance (EV) and the FDA Adverse Event Reporting System (FAERS) over 10 Years

Chiappini S., Vickers-Smith R., Guirguis A., Corkery J., Martinotti G., Harris D.R., Schifano F.*

**Psychopharmacology, Drug Misuse and Novel Psychoactive Substances Research Unit, School of Life and Medical Sciences, University of Hertfordshire, UK - stefaniachiappini9@gmail.com*

Introduction: In the past twenty years, the consumption of opioid medications has reached significant proportions, leading to the so-called opioid epidemic, characterized by cyclical waves of heroin use and the non-medical use of pharmaceutical opioids, increased dependence, and an alarming rate of opioid overdose deaths due to illicitly manufactured fentanyl, fentanyl analogues, and other chemicals, known as novel synthetic opioids (NOSs). The purpose of this study was to determine whether there are pharmacovigilance signals of abuse, misuse, and dependence, and their nature for the

following prescription opioids: codeine, dihydrocodeine, fentanyl, oxycodone, pentazocine, and tramadol. Methods: Both the pharmacovigilance datasets EudraVigilance (EV) and the FDA Adverse Events Reporting System (FAERS) were analyzed. A descriptive analysis of the selected Adverse Drug Reactions (ADRs) was performed, and pharmacovigilance signal measures (i.e., reporting odds ratio, proportional reporting ratio, information component, and empirical Bayesian geometric mean) were computed for preferred terms (PTs) of abuse, misuse, dependence, and withdrawal, as well as PTs eventually related to them (e.g., aggression, euphoric mood, etc.). Results: From 2003 to 2018, there was an increase in ADR reports for the selected opioids in both datasets. Overall, 16,506 and 130,293 individual ADRs for the selected opioids were submitted to EV and FAERS, respectively. Compared with other opioids, abuse concerns were mostly recorded in relation to fentanyl and oxycodone, while tramadol and oxycodone were more associated with drug dependence and withdrawal. Benzodiazepines, antidepressants, antihistamines, recreational drugs (e.g., cocaine and alcohol, etc.), and several new psychoactive substances, e.g., mitragynine and cathinones, were the most commonly reported concomitant drugs. Conclusions: Pharmacovigilance databases confirmed previous data on the abuse and dependence of prescription opioids and should be considered a resource for monitoring and preventing such issues. Psychiatrists and clinicians prescribing opioids should be aware of their misuse and dependence liability and effects that may accompany their use.

Detection of ADB-4en-PINACA Metabolite, 2-Methylmethcathinone and 3-Methylmethcathinone in Authentic Urine Samples

*Ching Y.F. *, Hooi Y.M.*

**Health Science Authority Singapore - fong_ching_yee@hsa.gov.sg*

Introduction: In Singapore, new psychoactive substances (NPS) continued to be prevalent with synthetic cannabinoids (SC), synthetic cathinones and mitragynine being detected. In early 2023, ADB-4enPINACA metabolite and the positional isomers of 4-methylmethcathinone (4-MMC), i.e., 2-MMC and 3-MMC were detected in drug users' urine samples. To the best of our knowledge, ADB-4en-PINACA metabolite was the first time being identified in authentic urine sample. Methods: 0.5 mL of urine samples were incubated with β -glucuronidase enzyme and extracted. The extracted samples were screened using LC-Orbitrap MS method followed by confirmation using LC-QToF MS method. Results: ADB-4en-PINACA dihydrodiol metabolite was detected in two authentic urine samples, which was consistent to the result of the metabolic study.¹ The identity was confirmed with the reference standard in both HRMS methods. Other SC metabolites such as MDMB-4en-PINACA metabolites, ADBBUTINACA metabolite and/or ADB-PINACA metabolite were also detected in the samples. In addition, 2-MMC and 3-MMC were recently detected in a few drug users' urine samples. Using the sensitive and selective LC-QToF method, the three positional isomers of methylmethcathinone were chromatography separated and specifically identified with the reference standards. Conclusions: New NPS constantly enters the drug market with structural diversity and rapid development of the new derivatives, therefore, NPS continues to pose challenge for the drug detection in urine testing. The laboratory applies various techniques to comprehensively identify the new NPS and their positional isomers to cater for the rapid change.

New Psychoactive Substance Consumption Within the UK Homeless Population

*Coombs T. *, Ginige T., Van Calster P., Abdelkader A., Corazza O., Assi S.*

**University Hospital Dorset, UK - tom.coombs@uhd.nhs.uk*

Introduction: The last few years have seen the emergence of new psychoactive substance among the homeless population, specifically synthetic cannabinoid receptor agonists. The purpose of this study is to investigate the knowledge and experiences of new psychoactive substances amongst users from the homeless population. Method: An explanatory research design was applied using a semi-structured questionnaire with the focus on gaining insights on the prevalence, motivations, and effects. Participants were recruited through convenience sampling from support organizations and charities UK-wide. Descriptive statistics and logistic regression were applied to analyze the data obtained from participant surveys. Results: A total of 105 participants met the inclusion criteria and were in the age range of 18 to 64 years old. Almost 70% consumed new psychoactive substance products, which "Spice" was the most prevalent substance. Homeless users had consumed new psychoactive substance to escape reality and to self-treat themselves and stopped consumption due to the adverse effects. Adverse events were reported from the majority of the participants and led to more than 20% of the participants requiring medical treatment following hospitalization. Conclusions: Findings from this study can contribute to the development of guidelines and policies that specifically address the needs of the homeless population who use new psychoactive substances.

5HT_{2A} Receptors are Involved in the Pharmacological Effects of the Synthetic Cannabinoids JWH-018 and 5F-PB22: in Vivo Studies in Mice

Corli G.*, Tirri M., Bernardi T., Boccutto F., Borsari M., Bassi M., Bilel S., Marti M.

*Department of Translational Medicine, Section of Legal Medicine, LTTA Center and University Center of Gender Medicine, University of Ferrara, Italy

Background and purpose: Since their first appearance on the illicit drugs market, Synthetic Cannabinoids (SCs) have been frequently detected in biological samples from patients involved in several intoxication and death cases. To date, their serious adverse effects have been primarily related to their action as potent agonist of CB₁ cannabinoid receptors. However, evidence concerning the potential interaction between SCs and serotonergic neurotransmission system has emerged. Thus, this study aims to evaluate the involvement of 5HT_{2A} receptors in the effects provoked by these substances. Experimental approach: The effects induced by acute systemic administration of 1-pentyl-3-(1-naphthoyl)indole (JWH-018; 1 mg/kg) and quinolin-8-yl 1-pentylfluoro-1H-indole-3-8-carboxylate (5F-PB22; 1 mg/kg) on sensorimotor (visual, acoustic and tactile) responses, pain threshold (acute mechanical and thermal nociception), core temperature, breath rate and motor performance (stepping activity), as well as their interaction with the selective 5HT_{2A} receptors antagonist MDL100907 (0.1 mg/kg), have been evaluated in CD-1 male mice. Results: The present results pointed out that both substances deeply alter sensorimotor responses, nociceptive threshold, core temperature, breath rate and motor activity in mice. Noteworthy, pretreatment with MDL100907 at least partially prevented sensorimotor disruption, as well as antinociceptive and hypothermic effects. Conclusions: This study states the relevance of serotonergic 5HT_{2A} mechanisms on pharmacological effects induced by SCs, suggesting the potential risk of increased susceptibility for psychotic-like symptoms also related to mental disorders.

Synthetic Cannabinoids Use among Inmates in an English Prison

Craft S.*, Austin A., Blagborough I., Sunderland P., Pudney C., Freeman T.

*University of Bath, UK - ssc55@bath.ac.uk

Introduction: The use of synthetic cannabinoids (SC) is major public-health problem in UK prisons, and between 2015 – 2022, SCs were implicated in around half of all non-natural deaths among UK prisoners. Although the global use of SCs is highly concentrated within this population, it remains an underresearched area, and little is known about the features of SC use among this group. Methods: We recruited a purposive sample of 120 prisoners currently incarcerated in an English adult male prison to complete a questionnaire during a 1 to 1 confidential interview. Psychological distress was measured using the Brief Symptom Inventory (BSI-18), and participants were asked questions about their sociodemographic and custodial characteristics and their use of drugs inside and outside of prison. Those that reported using SC inside prison were asked additional questions related to their features of use (including past 4-week frequency and administration method) and reasons for use. Results: A total of 55 (45%) participants reported ever use of SC in prison, and this group reported significantly higher levels of psychological distress than those never using SC in prison ($t(118) = 3.28, p = .004, CI: 95\% CI: 3.73, 14.25$). The majority of SC users ($n=25$) had used SC in the last week and reported vaping infused paper as the most common administration method (72%). The reasons for use most commonly endorsed by participants were to deal with boredom (90%), to make the prison sentence pass faster (88%), to cope with stress (82%) and to help sleep (76%). Conclusions: The use of SCs is highly prevalent among UK prisoners and its use is associated with higher levels of psychological distress. The majority of SC use occurs via the vaporisation of infused paper, and the health effects of this are entirely unknown. Use appears to be mostly driven by coping motives, such as to help sleep or deal with stress or boredom, and this should be used to inform interventions aiming to reduce SC use within prison populations.

The Use of Image and Performance Enhancing Drugs During the Covid-19 Lockdown: a Cross-Cultural Study on Potential Users and Associated Risks

De Luca I.*, Di Carlo F., Burkauskas J., Dores A.R., Gómez-Martínez M.A., Szabo A., Fujiwara H., Monteiro C., Di Nicola M., Mazza M., Sani G., Luciani D., Pettoruso M., di Giannantonio M., Cataldo I., Esposito G., Martinotti G., Corazza O.

*Department of Clinical, Pharmaceutical and Biological Sciences, School of Life and Medical Sciences, University of Hertfordshire, Hatfield, UK – i.de-luca@herts.ac.uk

Background: Image and performance-enhancing drugs (IPEDs), or lifestyle drugs, are a wide range of products presented as having the potential to improve mental and physical function and health. Little is known about IPEDs consumption during the COVID-19 lockdown. The present study aimed to profile IPEDs during this period characterised by physical distancing, isolation, gym closures, and other altered lifestyle habits. Methods: A cross-sectional observational study investigating the type of IPEDs consumed and purchasing methods was disseminated via a web-based questionnaire in eight countries (United Kingdom, Italy, Lithuania, Hungary, Portugal, Spain, Brazil, and Japan) between April and May 2020. This included the Exercise Addiction Inventory (EAI), the Appearance Anxiety Inventory (AAI), and the Self-Compassion Scale (SCS). Results: A total of 736 IPEDs users were included in the survey. The mean age of the sample was 33.05 years ($SD = 10.06$), with females rate of 64.2%. Among IPEDs users, 6.8% were at risk of exercise addiction ($EAI > 24$), 27.6% presented high levels of appearance anxiety and 24.9% revealed low levels of self-compassion and

emotional self-regulation. Most participants (55.6%) purchased IPEDs through pharmacies/specialised shops, while 41.3% purchased IPEDs on the Internet. Online shoppers of IPEDs were mainly men who reported higher scores on the Exercise Addiction Inventory. One or more IPEDs classifiable as “potentially at-risk” were used by 66.3% of the sample. Users of “potentially at-risk IPEDs” were younger and mostly males. They showed higher scores both at Exercise Addiction Inventory and Appearance Anxiety Inventory. Discussion: This study profiled users of IPEDs during the peak of lockdown policies due to the COVID-19 breakdown. Both purchasing methods and types of IPEDs consumed were associated with distinct socio-demographic aspects and psychopathological traits. Some relevant cross-cultural differences were highlighted. Longitudinal studies will be needed to determine the impact of the COVID-19 lockdown on IPEDs consumption.

Neurobiological Sequelae of the Passive or Voluntary Administration of the Synthetic Cannabinoid Receptor Agonist JWH-018

*De Luca M.A.**

**University of Cagliari, Italy - deluca@unica.it*

The use of synthetic cannabinoids receptor agonists (SCRAs) is growing among adults and adolescents, posing major medical and psychiatric risks. JWH-018 represents the reference compound of SCRA-containing products. Our studies were performed to evaluate the enduring consequences of repeated JWH-018 exposure by both passive administration (0.25 mg/kg ip qd, 14 days) in adult rats, and by intravenous self-administration (lever pressing, Fixed Ratio 1–3; 7.5 µg/kg/inf) in adolescent mice. Main results, obtained 24 hours and 7 days after drug discontinuation, showed that repeated JWH-018 exposure in adult rats: (i) induced anxious/aversive behaviors; (ii) decreased spontaneous activity and number of dopamine neurons in the VTA; and (iii) decreased dopamine sensitivity in the NAc shell and core, but not in the mPFC, to a first chocolate exposure; conversely, after a second exposure, dialysate dopamine fully increased in the NAc shell and core but not in the mPFC. Moreover, passive JWH-018 induced: (iv) astrogliosis (mPFC, NAc shell/core, VTA), microgliosis (NAc shell/core), and downregulation of CB1 receptors (mPFC, NAc shell/core). Other studies showed that adolescent JWH-018 IVSA induced at adulthood: (i) repetitive/compulsive-like behaviors; (ii) microgliosis (CPu, NAc) and astrocytopathy (CPu), as revealed by a decreased GFAP expression; (iii) increased of the chemokines MPC1 (striatum) and RANTES (cortex), and a decrease of the cytokines IL2 and IL13 (cortex). Taken together, these data suggest that the long-lasting behavioral and neurochemical effects of JWH-018 exposures may not differ substantially as a function of passive or voluntary administration except for some specific aspects of the brain immune response, that deserve further clarification.

Recreational Use of Nitrous Oxide – a Growing Concern in Europe

De Morais J., Van Aerts L., Evans-Brown M., Gallegos A., Christie R., Jorge R., Néfau T., Planchuelo G., Sedefov R., Victorri-Vigneau C., Povilanskiene R., Grasaasen K., Palmqvist D.F.t, Mongan D., Killeen K., Duarte A.O., Santos A.S.*

**European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) - joanna.morais@emcdda.europa.eu*

Objective: Nitrous oxide, commonly known as laughing gas, is used medically as an analgesic and anaesthetic. It has been used recreationally for its brief euphoric effects for over 200 years, however, in the last decade, there has been a large increase in its recreational use and, more recently, an increase in reported serious health and social harms in some countries. The situation in seven European countries has been analyzed, including epidemiology, health and social harms, policy responses, and lessons learned. This can be used to inform relevant stakeholders on how to respond to nitrous. Methods: Case studies on the situation with nitrous oxide in Denmark, France, Ireland, Lithuania, the Netherlands, and Portugal were developed based on the information collected by the national Early Warning Systems within their networks and literature. For the case study of the United Kingdom, open-source data were used. In addition, relevant information was retrieved from PubMed and Web of Science. Results: Easy availability, low price, short-lived effects, and perception as a safe and socially acceptable drug might explain growing popularity of nitrous oxide. The market has expanded in recent years with a range of specialised internet shops, partly offering it under the disguise of ‘party accessories’, but also openly when the legal situation permits. Social media is also used to promote and sell it. In some cases, the supply has moved from shops to social media following measures to restrict its supply. Of special concern is that most use of nitrous is by young people, including teenagers inexperienced with drug use. The current situation has led to an increase in frequent and heavy use and an increase in poisonings reported to poison centres. According to the French Addictovigilance network, the number of notifications linked to nitrous increased from 10 in 2018 to 358 in 2021. Harms include frostbites, barotrauma, serious neurological toxicity (such as myeloneuropathy), cardiovascular consequences (such as thrombo-embolic events), psychiatric disorders, and driving under the influence. More recently, harms are fuelled by a switch from small canisters to large cylinders. Conclusion: Poison centres and the French Addictovigilance system played a key role in detecting, monitoring, and responding to the issue of nitrous oxide. Its growing recreational use is a public health concern requiring an integrated multi-sectoral approach to reduce demand, availability, and risks. The responses might include prevention, monitoring, treatment, and legislative actions. Data sharing at EU level to monitor this issue is needed.

In Vitro Characterization of the Pyrazole-Carrying Synthetic Cannabinoid Receptor Agonist 5F-3,5-AB-PFUPPYCA and its Structural Analogs

*Deventer M.H. *, Norman C., Reid R., McKenzie C., Daeid N.N., Stove C.P.*

**Ghent University, Belgium - marie.deventer@ugent.be*

Introduction: Pyrazole-carrying “FUPPYCA” synthetic cannabinoid receptor agonists (SCRAs) have made short-lived appearances on the market since 2015. However, 5F-3,5-AB-PFUPPYCA and 3,5-ADB-4en-PFUPPYCA have recently been detected in Scottish prisons. This re-emergence is believed to be triggered by the Chinese generic SCRA ban (2021). Methods: Infused paper samples, seized from different Scottish prisons were analyzed to assess the prevalence of FUPPYCA SCRAs. Six structurally related analogs were then functionally characterized using live cell receptor-based assays, based on the functional complementation of a nanoluciferase enzyme. Results: 5F-3,5-AB-PFUPPYCA and 3,5-ADB-4en-PFUPPYCA mixtures were detected 9 times in Scottish prisons since July 2021. Most FUPPYCA SCRAs were found to be inactive at both CB1 and CB2, with only 3 analogs showing some (minor) CB1 activation potential (3,5-AB-CHMFUPPYCA, 5,3-AB-CHMFUPPYCA and 5,3-ADB-4en-PFUPPYCA). Interestingly, the 5,3 regioisomers (covered by the ban) were more active than their 3,5 counterparts. Furthermore, all analogs had antagonistic properties, potentially related to their structural resemblance to cannabinoid antagonists. Conclusions: Given their weak CB activity, FUPPYCA SCRAs are not expected to pose a serious health hazard, despite their ability to evade the generic ban. This may also explain their only transient re-emergence in Scottish prisons.

SCRAs with a “Brand” New Look: In Vitro Cannabinoid Activity Profiling of Generic Ban-Evading Brominated Synthetic Cannabinoid Receptor Agonists and their Analogs

*Deventer M.H. *, Persson M., Norman C., Liu H., Connolly M., Daeid N.N., McKenzie C., Green H., Stove C.P.*

**Ghent University, Belgium - marie.deventer@ugent.be*

Introduction: Since the enactment of the Chinese generic ban (2021), the synthetic cannabinoid receptor agonist (SCRA) market has vastly changed and now encompasses unexpected, ban-evading structures such as brominated and tail-less compounds. Methods: Six new SCRAs were functionally characterized at CB1 and CB2 using 2 distinct activity-based assays, monitoring β arr2 recruitment (NanoBiT® assay) and Ca²⁺ mobilization (AequoScreen® assay). Results: Brominated, tailed SCRAs (ADB-5'Br-BUTINACA, MDMB-5'Br-BUTINACA) showed high efficacy and potency at CB1. Interestingly, switching the bromine for a fluorine (ADB-5'F-BUTINACA) resulted in an even more pronounced CB activity. Tail-less, brominated compounds (ADB-5'Br-INACA, MDMB-5'Br-INACA) retained activity at both receptors, albeit with decreased potency compared to their tailed counterparts, which was confirmed in both assays. Removing the bromine group from the tail-less core resulted in decreased activity (ADB-INACA), evidencing the positive effect of bromine substitution. Conclusions: This study provides essential information for both drug law enforcement agencies and health care workers, as it can be expected that the ever-lasting cat-and-mouse game that describes the SCRA market will carry on, with the surge of new and unexpected substances remaining a great challenge for several fields.

Detecting Fentanyl Analogs by Combining Surface-Enhanced Raman Spectroscopy (SERS) and Paper Spray Mass Spectroscopy (PS-MS).

*Dogruer Erkok S. *, Gallois R., Camoiras Gonzalez P., van Asten A., McCord B.*

**Department of Chemistry and Biochemistry, Florida International University, Miami, USA - sdogr002@fiu.edu*

Introduction: Many fentanyl analogs are developed and mixed with other illicit drugs, such as cocaine and heroin. Detecting fentanyl and fentanyl analogs in these illicit drug mixtures gains more importance. Most confirmatory procedures require time-consuming and expensive, highly sophisticated laboratory equipment and experimental procedures, which can delay critical information that might save a victim or identify a suspect. In this project, we propose miniaturizing and accelerating this process by combining SERS analysis and mass spectrometry on a single microfluidic device. This procedure, known as paper spray mass spectrometry (PS-MS), can isolate fentanyl analogs from even complex drug mixtures. Thus, we propose to develop a novel device capable of simultaneously detecting fentanyl and fentanyl analogs in illicit drug mixtures. Methods: For this aim, first, a dual-purpose plasmonic paper substrate will be developed and optimized by soaking the filter papers into the synthesized bimetallic (Au-Ag) nanostars. The various images will be taken to define the characteristics of these paper substrates. Then, a procedure for drug screening by Raman will be combined with paper spray mass spectrometry (PS-MS) confirmation. Finally, this newly developed method will be used in seized drug samples. Results: The soaking time of the filter paper is affecting the enhancement. As the papers stay in the nanostar solutions more (up to 6 days), the enhancement of the peaks gets better. Different illicit drugs such as fentanyl, fentanyl analogs, cocaine, heroin, and methamphetamine can be detected on these filter papers by portable Raman spectroscopy. Optimizing the PSI-MS method is still in process. Conclusions: Coupling portable SERS and PSI-MS methods will provide strong confirmatory results for real-world samples and drug mixtures. The experimental results obtained in this project can be readily implemented in field applications and in smaller laboratories, where inexpensive portable Raman spectrometers are often present and are used in drug analysis.

Novel Drugs of Abuse: What Clinicians Need to Know?

*El Mougy A.**

**Erada Center for Treatment and Rehabilitation, UAE - a.elmougy@erada.ae*

Drug abuse is a growing concern all over the world, and over the past decade, novel drugs have emerged and have become increasingly popular. Designer drugs—otherwise known as synthetic drugs—are manufactured to chemically resemble illicit drugs but may be purchased legally because drug manufacturers constantly change the chemical structure to circumvent drug laws. “In fact, designer synthetic drugs are found to be more potent and dangerous than their street drug counterparts” (NIDA, 2015). People who abuse designer synthetic drugs have suffered a number of negative health outcomes that include anxiety, seizures, hallucinations, loss of consciousness, and significant organ damage (DEA, 2013). Recognition and treatment of new drugs of abuse pose many challenges for health care providers due to lack of quantitative reporting and the difficulty of detection in routine blood and urine analyses (Rech et al., 2015). Clinicians should familiarize themselves with management principles of these new agents. Therefore, the purpose of this workshop is to describe the pharmacology, clinical and adverse effects of several new classes of drugs of abuse as well as management of patients with addiction to these drugs.

Future of Legalization of Cannabis and its Impact on the Availability of Synthetic Cannabinoids

*El Mougy A.**

**Erada Center for Treatment and Rehabilitation, UAE - a.elmougy@erada.ae*

In recent years, there has been a strong pressure on legislatures to legalize or decriminalize use and possession of specified amounts of cannabis in many Countries. Opinions about drug legalization/decriminalization can differ based on whether a person has a personal history of substance use and as a function of demographic and ideological characteristics (such as religious or political preference). Legalization of drugs (e.g., cannabinoids) is the process of removing all legal prohibitions against it. Decriminalization of drugs (e.g., cannabinoids) means it would remain illegal, but the legal system would not prosecute a person for possession under a specified amount. Instead, the penalties would range from no penalties at all, civil fines, drug education, or drug treatment. Proponents of drug legalization argue that prohibition in general and the "War on Drugs" that began in the 1980's, in particular, have created a black market for drugs, overloaded the criminal justice system, and failed to reduce the supply of drugs. On the other hand, the negative data of cannabinoids use far outweigh a few documented benefits for a limited set of medical indications, for which safe and effective alternative treatments are readily available. If there is any medical role for cannabinoid drugs, it lies with chemically defined compounds, not with unprocessed cannabis plant. On the other hand, the easy availability, cheapness, perceptible legality, and difficulty in detecting its presence with standard urine toxicologic tests, and similar factors probably contribute to the increased use, and popularity of synthetic cannabinoids. Although laws, and regulations concerning auditing of these substances have been implemented in many countries, production of new types of synthetic cannabinoids rapidly takes place.

The Dynamic Nature of Novel Psychoactive Substances: A Comprehensive Analysis of the Impact of 10 Years of the NPS Conference Series

*Esposito G.**

**University of Trento, Italy - gianluca.esposito@unitn.it*

Not available.

Towards Strengthened Preparedness and Response to New Psychoactive Substances in Europe

*Gallegos A.**

European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) - Ana.Gallegos@emcdda.europa.eu

In January 2022, the European Commission proposed to strengthen the mandate of the EMCDDA, transforming it into the new EU Drugs Agency (EUDA) [1]. This new regulation aims to improve data sharing, preparedness, surveillance, risk assessment, early warning, prevention, and response [2]. Under the new regulation, the European Union Early Warning System (EWS) on New Psychoactive Substances (NPS) will continue to have a central role in supporting national- and EU-level preparedness and responses to NPS. The EWS, operational in Europe since 1997, was the first regional early warning system to be established to monitor new psychoactive substances (NPS) and has been recognized as a model for national, regional and international early warning systems [3]. The EU EWS rapidly detects, assesses, and responds to health and social threats caused by NPS. Data collected and analyzed include event-based data on seizures by law enforcement, collected samples and serious adverse events linked to NPS. These data are complemented by annual reports, which include aggregated data on seizures and from poisonings. This presentation will provide an update from the EWS on NPS, highlight emerging threats in Europe, and reflect on the role of early warning systems in monitoring, strengthening preparedness and responding to NPS. [1] <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022PC0018>; [2] <https://www.consilium.europa.eu/en/press/press-releases/2023/03/28/eu-drugs-agency-council-presidency-and-european-parliament-agree-to-strengthen-the-agency-s-role/>; [3] https://www.emcdda.europa.eu/publications/rapid-communication/update-eu-early-warning-system-2022_en.

Chromatographic Retention Index for the Identification of Illicit Substances

Giudice G.H., Machado A.H.L., Zacca J.J., Souza M.P., Caldas L.N.B., Botelho E.D., Ambrósio J.C.L.*

**Brazilian Health Regulatory Agency – ANVISA, Brasil, - gabriella.giudice@anvisa.gov.br*

Introduction: New Psychoactive Substances have a high introduction rate into the market and represent a huge challenge from a regulatory and forensic point of view. Thus, the need for a method capable of identifying NPS, without the availability of certified analytical standards, arises. Methods: The methodology of the work relies on the development of a GC/MS method; its validation; and the calculation of the Kovats' Retention Index. This index was selected because it was reported as a tool for high-precision identification. A total of twenty-two substances were used: AM-2201, MAM-2201, JWH-081, JWH-210, N-ethylpentylone, 5-MAPB, 2-FA, 25C-NBOMe, o-CPP, p-CPP, U-47700, 5-MeO-MiPT, 5-IAI, Salvia divinorium, methiopropamine, THC, heroin, amphetamine, methamphetamine, MDMA, cocaine, and ephedrine. Results: The method presented one Selectivity limitation (coelution of methiopropamine and methamphetamine). Resolution values were higher than 1.25, indicating signal separation. Separation Factor, Number of Theoretical Plates, and Tailing provided satisfactory results. Evaluation of Intermediate Precision indicated Relative Standard Deviations (RSD) that varied from 0.02 to 0.29%, lower than the literature. Robustness evaluation using a Fractional Factorial Design identified that changing the column polarity was the most influential factor, while column brand, gas flow, split rate, injector temperature, and ramp temperature did not interfere significantly. Retention Index was calculated without overlap and the Global Confidence Interval varied from 0,5 to 20,6 Retention Index Unity and the RSD varied from 0,02 to 0,29%, inferior to the range found in the literature. Conclusions: The results of the development and validation indicate the adequacy of the method that uses Kovats' Retention Index to identify NPS. The collection of Index calculated can be updated and made available to forensic institutes to be used as a tool in NPS identification.

Identification of 4-Chloromethylcathinone Metabolites in Urine with GC-MS and LC-QTOF

Gofenberg M.A., Shevyrin V.A.*

**Regional Narcological Clinic, Yekaterinburg, Russian Federation - hoffenberg@yandex.ru*

Introduction: Synthetic cathinones are the most common group of new psychoactive substances found on the illegal Russian market. 1-(4-Chlorophenyl)-2-methylaminopropan-1-one (4-Chloromethylcathinone, Clephedrone, 4-CMC) is regularly found in urine samples from patients with acute stimulant poisoning and urine samples obtained from drivers suspected by police of driving under the influence of drugs. The aim of the study was to determine the metabolic profile of Clephedrone by GC-MS and LC-HRMS. Methods: Two urine samples from living individuals were used to search for Clephedrone metabolites and their glucuronides. 7890 gas chromatograph with HP-5MS column with 5977 mass spectrometer (Agilent Technologies) for determination of metabolites of I phase was used. Phase I and II metabolites were identified by liquid chromatography-high resolution mass spectrometry (LC-HRMS), which was performed on a 1290 Infinity II LC liquid chromatograph equipped with a Zorbax Eclipse Plus C18 column with a 6545 Q-TOF mass spectrometer (Agilent Technologies). Results: I and II phase metabolites of Clephedrone have been found in human urine. The main pathways of biotransformation include N-demethylation of the secondary amine to yield norclephedrone and reduction of the ketone moiety to the hydroxyl group to form dihydroclephedrone. Also identified is a metabolite obtained by loss of water by dihydroclephedrone to form a double bond. Minor pathways of biotransformation are associated with the oxidation of the methyl group of the propyl chain, hydroxylation at the benzene ring, and a combination of these reactions. Most of the metabolites were present in the urine, both in free and glucuronated forms. Conclusions: Synthetic cathinones are important psychostimulants that have been associated with driving disorders, intoxications, and fatal overdoses. The results of a study of the metabolism of 4-Chloromethylcathinone can be used to diagnose acute poisoning with synthetic cathinones, and to predict the directions of metabolism of new psychoactive substances.

A Novel NPS Monitoring System in Victoria, Australia

Greene S., Syjanen B., Hodgson S., Abouchdid R., Schumann J.*

** Victorian Poisons Information Centre and Victorian Institute of Forensic Medicine, Melbourne, Australia - Shaun.GREENE@austin.org.au*

Traditional data sources utilised in monitoring NPS use within a community are limited by slow translation of information, and inability to identify NPS causing actual harm. The Emerging Drugs Network of Australia VIC (EDNAV) is a novel NPS monitoring system collecting clinical and analytical data on patients presenting to a network of 16 metropolitan and regional Emergency Departments with reported or suspected illicit drug toxicity. Blood samples are analyzed using liquid chromatography / mass spectrometry for over 700 common pharmaceutical drugs and NPS. Deidentified clinical and analytical data stored in a secure online clinical registry are synthesised into a weekly report which is utilised by a multi-disciplinary team to identify high risk signals. A novel risk matrix is used to grade severity of signals. Signals classified as threats are translated rapidly into harm reduction messaging and provide to at risk communities through multiple modes of communication. In the past two years, over 2000 acute cases have undergone comprehensive toxicological analysis leading to 750 NPS detections (66 distinct NPS) and the issuance of associated public health alerts, and the characterization of a range of NPS toxicity.

Social Listening of Benzodiazepines Abuse and Misuse

*Guirguis A.**

**Swansea University, UK - amira.guirguis@swansea.ac.uk*

Introduction: Benzodiazepines are Class C drugs that can act as anxiolytics, hypnotics, sedatives, and muscle relaxants. Over the decade, benzodiazepine misuse has proliferated with increasing numbers of newly emerging benzodiazepines. The aim of this work is to use a social listening approach to identify the latest trends in benzodiazepine abuse and misuse. Methods: Literature reviews were conducted over various periods spanning over 2020-2021 and 2022/2023 from PubMed, Scopus and Google Scholar. During the same periods, tweets were collected using the Twitter social media platform (Rapid Miner Software) and analyzed using a thematic analysis. Results: Over 1000 article and 60,000 tweets were collected and cleaned using the inclusion and exclusion criteria. The number of articles peaked in 2018/2019 and declined afterwards. The type of benzodiazepines being misused encompassed traditional benzodiazepines such as diazepam and designer benzodiazepines such as bromazolam, with Xanax (alprazolam) being one of the most popular benzodiazepines. Polysubstance misuse with benzodiazepines included cannabis, opioids, steroids, nicotine, caffeine, and alcohol. Self-medication was a common theme for panic attacks, anxiety, and insomnia. Conclusions: Unsafe practices continue to be popular with benzodiazepine misuse. Clinicians and policy makers need to be vigilant when prescribing and devising harm reduction interventions related to benzodiazepines.

New Psychoactive Substances in Bangladesh: the Urgent Need for Evidence-based Policy and Prevention Measures

*Hasan M.**

** Department of Narcotics Control, People's Republic of Bangladesh - mehedihasan1147@yahoo.com*

Introduction: New Psychoactive Substances (NPS) are a growing public health concern in Bangladesh, with increasing availability and use of these substances among young people and marginalized populations. The lack of a comprehensive and evidence-based approach to prevent and control NPS use poses significant challenges to Bangladesh's national drug policy. This paper aims to highlight the urgent need for evidence-based policy and prevention measures to address the NPS crisis in Bangladesh. Methods: A review of existing literature on NPS use in Bangladesh was conducted to identify the gaps in knowledge and policy. The literature review included studies that evaluated the prevalence, harms, regulatory approaches, and control measures of NPS in Bangladesh. Results: The results of the literature review suggest that NPS use is increasing in Bangladesh, with limited knowledge of the extent and nature of the problem. The regulatory response to NPS is reactive, with a lack of focus on prevention and harm reduction. The limited availability of data on NPS and the lack of an evidence-based approach to policy and prevention measures are significant gaps in addressing the NPS crisis in Bangladesh. Conclusion: The increasing use of NPS in Bangladesh calls for a proactive and evidence-based approach to policy and prevention measures. There is an urgent need for coordinated efforts between regulatory agencies, health professionals, and civil society to prevent and control NPS use. The development of a national strategy for the prevention and control of NPS, along with capacity building of regulatory agencies and health professionals, may be necessary to address the growing threat of NPS in Bangladesh. The findings of this paper highlight the need for further research and collaboration to better understand the trends, harms, and regulatory challenges associated with NPS in Bangladesh.

Adding the Clues to CanKet's Presence in Toxicological Casework

Huynh J., Gosselin V., Garneau B., Mireault P.*

**Laboratoire de sciences judiciaires et de médecine légale, Canada - jennifer.huynh@msp.gouv.qc.ca*

Introduction: A driving under the influence of drugs (DUID) case brought on the identification of a newly emerging ketamine analogue. Following a 12-step evaluation, a drug recognition expert collected a urine sample and a nasal swab from an individual who admitted to ketamine consumption. Methods: Systematic targeted screening was performed on liquid chromatography coupled to tandem mass spectrometry (LC-MS/MS). This method covers 144 analytes, including 57 novel psychoactive substances (NPS). Further general unknown screening was performed using a gas chromatography – mass spectrometry (GC-MS) method. Results: While both urine and the nasal swab were negative for ketamine in the LC-MS/MS analysis, an interference was noted in the 7-aminonitrazepam (urine) and eutylone (urine and nasal swab) windows (erroneous ion ratio). Both items' GC-MS analysis turned out positive for 3-fluoro-2-oxo PCE (fluorexetamine) when compared to the Cayman library. Discussion with the Canadian drug chemistry laboratory brought to light recent seizures of 2-fluoro-2-oxo PCE (CanKet). Injection of reference materials showed that these were undistinguishable under our current analytical methods. Conclusions: This case demonstrates that forensic toxicologists must remain alert to the appearance of previously undetected NPS in casework, the possibility of false identifications when relying on libraries, and subtle clues appearing in casework, such as interferences in other methods. Using the LC-MS/MS interferences as a CanKet proxy, 7 cases of DUID were subsequently sent to GC-MS analysis and confirmed to contain 2-fluoro-2-oxo PCE.

Activity-based Detection of HIF stabilizers: a Future-proof Complementing Method in Doping Control?

Janssens L.K.*, De Wilde L., Van Eenoo P., Stove C.P.
*Ghent University, Belgium - Liesl.Janssens@UGent.be

Introduction: Small-molecule HIF stabilizers are being misused in sports to ‘artificially’ increase red blood cells. WADA banned their use, but the structural variety in this relatively new class of performance enhancing drugs and the rapid pace at which new drug candidates are emerging hampers their detection in biological fluids, as many currently used techniques target specific structures – a problem also encountered with NPS. Therefore, a future-proof strategy was envisaged, capable of detecting ANY HIF stabilizer (known AND unknown ones). Method: A previously developed cell-based assay, monitoring the upstream mechanism of HIF1 activation (heterodimerization of HIF1 α with HIF1 β), was used to detect HIF stabilizers in spiked urine samples based on their HIF stabilizing activity. Results: The HIF1 bioassay proved to be universal, detecting every HIF stabilizer tested so far (including enarodustat, IOX2, JNJ-42041935, etc.). Using roxadustat as a prototype compound, sensitivity in known urine matrices was determined and ranged from 1-25 ng/mL. A limit-of-detection in blind-coded roxadustat-spiked urine matrices was determined to evaluate routine applicability of this activity-based detection method. Conclusion: Proof of concept was established that HIF stabilizers can be detected in spiked urine samples by a cell-based assay format through the measurement of increased HIF activation.

Investigation on the Semi-synthetic Cannabinoids Distributed on the Internet in Japan: Reduced Forms or Acetyl Derivatives of Tetrahydrocannabinol (THC)

Kikura-Hanajiri R.*, Mizutani S., Kawamura M., Tanaka R., Misawa T., Tsuji G., Kurohara T., Ito M., Demizu Y.
*National Institute of Health Sciences, Japan - kikura@nihs.go.jp

Introduction: In recent years, products containing structurally similar substances to Δ 9-tetrahydrocannabinol (Δ 9-THC), the main constituent for the hallucinogenic effects of cannabis, have been widely distributed through the internet. Hexahydrocannabinol (HHC), synthesized easily by the reduction of Δ 8-THC and/or Δ 9-THC, was listed as a Designated Substance under the Pharmaceutical and Medical Device Act in Japan in March 2022; however, other semi-synthetic cannabinoids such as acetyl derivatives of THC and HHC emerged soon. In this study, three products labelled as containing HHC, HHC-O-acetate or THC-O-acetate were analyzed by LC-QTOF MS and GC-QTOF MS, and substances detected in the products were investigated in detail. Methods: Three yellowish-brown oil-like products (A, B, and C) obtained via the internet between 2022 and 2023, were extracted under sonication with acetonitrile. Analytical references for diastereomers of HHC (11 α - and 11 β -HHC), and acetyl derivatives of HHC (11 α - and 11 β -HHC-O-acetate) and THC (Δ 8- and Δ 9-THC-O-acetate) were synthesized in National Institute of Health Sciences in Japan. LC-QTOF MS measurements were performed under a gradient condition of 0.1% formic acid and 0.1% formic acid/acetonitrile using a Cortecs C18 column (2.1 mm i.d. x 150 mm, 2.7 μ m, Waters). GC-QTOF MS measurements were carried out using a HP-5MS column (30 m x 0.25 mm i.d., 0.25 μ m, Agilent). Results: In GC-QTOF MS and LC-QTOF MS measurements, the diastereomers of HHC (11 α - and 11 β -HHC) and cannabinol (CBN) were detected as main peaks in Product A, and dihydro-iso-THC and Δ 8-THC were also found in the product. The presence of HHC as the diastereomers together with Δ 8-THC suggested that HHC was synthesized by the reduction of Δ 8-THC. Furthermore, the detection of dihydro-iso-THC, the reduced form of Δ 8-iso-THC and/or Δ 4(6)-iso-THC which are by-products of the THC synthesis from cannabidiol (CBD), suggested that Δ 8-THC may have been synthesized from CBD. In Product B, the diastereomers of HHC-O-acetate (11 α - and 11 β -HHC-O-acetate) and CBN-O-acetate were detected as main peaks, and small amounts of 11 α - and 11 β -HHC were detected only by LC-QTOF MS. The substances in Product B were almost the same as the acetyl derivatives of substances in Product A. In Product C, Δ 8-THC-O-acetate was mainly detected, as well as other minor peaks of Δ 9-THC-O-acetate, Δ 8-THC and CBN-O-acetate. Several small peaks with the same protonated molecular ions as HHC, HHC-O-acetate and THC-O-acetate were also found in Product A, B and C, respectively. Conclusions: The semi-synthetic cannabinoids are detected not only in oil-like products but also in food products such as gummies, and there are concerns about health risks caused by accidental ingestion of these substances. The reduced forms and acetyl derivatives of cannabinoids with different lengths of alkyl side chains of THC have already emerged on the internet. Therefore, continuous surveys of distribution of the products containing these substances are needed. Δ 8-THC-O-acetate, Δ 9-THC-O-acetate and HHC-O-acetate were listed as Designated Substances in Japan in March this year after being reviewed for their pharmacological and metabolic properties.

A Comparative Study of the Extraction Methods for the Simultaneous Detection of NPS Groups from Urine

Kuloglu Genc M., Mercan S., Bulut C., Turkmen Z.*

**Istanbul University-Cerrahpaşa, the Institute of Forensic Sciences and Legal Medicine, Turkey - merve.kuloglu@istanbul.edu.tr*

Introduction: New psychoactive substances (NPS) has become a global issue with 134 countries and territories reporting seizures of at least one or more substances from every continent. A total of 1,127 NPS have been reported worldwide as of 2022. The increasing chemical diversity and unprecedented substance numbers of NPS make this phenomenon even more difficult to detect, monitor and understand analytically. These synthetic substances containing more than one substance, pose a global threat for public health and cause challenges for analytical chemists, toxicologists, and clinicians due to their ever-changing chemical structure. Urine as the most common used matrix for analytical toxicology studies, is an invasive biological sample and allows a longer detection time for the parent drugs and their metabolites. Considering that the NPS recovered throughout Turkey are predominantly synthetic cannabinoids and that these substances are constantly changing, it is a necessity to develop an effective extraction method for urine which covers the currently consumed synthetic cannabinoids. In view of sample extraction techniques having a noteworthy contribution to analysis results, the aim of this study was to compare the efficiency of the two most widely used techniques, liquid-liquid (LLE) and solid-phase extraction (SPE) on the detection of NPS focusing mostly on synthetic cannabinoids. In this study, the comparison of extraction techniques was performed from urine by using liquid chromatography-tandem mass spectrometry (LC-MS/MS) system. **Methods:** In order to compare the efficiency of the extraction, different LLE and SPE procedures were evaluated in terms of recovery efficiency, accuracy, and precision. A 10-point calibration was prepared in methanol. The reference standards of synthetic cannabinoids and their metabolites, synthetic cathinones, a tryptamine, and a phencyclidine-type substance were spiked at 0.5 ng/L (low) and 5 ng/L (high) levels. Each sample was analyzed in triplicate using an LC-MS/MS system equipped with an electrospray ionization source operating in positive ion mode. The selected SPE procedure was applied to 20 authentic urine samples taken from volunteers. **Results:** The optimized extraction method was validated in terms of selectivity, linearity, the limit of detection, the limit of quantification, accuracy, and precision. The linear range was achieved between 0.05-5 ng/L, and correlation coefficient values of analytes were ≥ 0.999 . Accuracy and precision studies were satisfactory for most of the substances. Results showed that the developed extraction method was suitable not only for synthetic cannabinoids but also for synthetic cathinones, tryptamine (5-MeO-Mipt) and phencyclidine type substance (ketamine) as well. **Conclusions:** NPS creates societal challenges that need to be addressed greatly due to its widespread use and the speed of production-marketing-sales processes. Understanding the cultural, economic, legal and medical aspects is important for adequate health and/or policy interventions. To achieve all these, effective, simultaneous extraction techniques and analytical methods are in need as the compounds in the NPS market change. As a conclusion, the developed extraction procedure is enabled the simultaneous determination of NPS and their metabolites and also facilitates the practical monitoring of substance use for toxicologists.

IPEDs Use in Recreational Sport Settings: Public Health Implications and Prevention Strategies

*Lazuras L.**

** School of Sport & Exercise Science, University of Lincoln, UK - l.lazuras@shu.ac.uk*

Recreational sport and physical activity engagement are meant to promote healthy lifestyles across the lifespan and help individuals develop positive psychological skills and characteristics. The use of Image and Performance Enhancement Drugs (IPEDs) is against this idea and poses a significant health risk to users. IPEDs use is increasingly recognized as an emerging public health and societal challenge because it can directly affect millions of people engaging in recreational sport across countries. The present talk will provide an overview of the prevalence of IPEDs use in recreational sport settings and will discuss the latest evidence about the mental and physical health problems associated with this behaviour. The key social and psychological drivers of IPEDs use will be presented, with an emphasis on availability, accessibility, and patterns of use. Lastly, the existing legislative and policy measures to tackle IPEDs use in recreational sport will be reviewed. Drawing on international research projects and policy initiatives, the talk will discuss novel evidence-informed preventive strategies focusing on building positive psychological characteristics (e.g., mindfulness, acceptance, and self-compassion), and on developing a systems-based approach that involve multiple stakeholders, including National Anti-Doping Organisations, public health authorities, and the fitness industry.

New Psychoactive Substances (NPS) Trends in the United States

*Lockhart E.D.**

Drug Enforcement Administration, USA - emily.d.lockhart@dea.gov

Introduction: New psychoactive substances (NPS) have continually evolved since appearing in the United States in 2009. The timely dissemination of information outlining the NPS currently in the market provides useful information to the law enforcement and health communities. This presentation will illustrate NPS identifications and trends tracked by Drug Enforcement Administration's (DEA) laboratory system. **Methods:** Data was collected for this analysis through a query of archived seizure and analysis information. The information targeted in this query included the date and location of the seizure and substances identified during the chemical analysis performed by the eight DEA chemistry laboratories. These

seizure details and analytical results are used to compile drug intelligence, detect the appearance of new drugs of abuse, and monitor drug trends. Results: The most prevalent NPS identified in the United States fall within the categories of synthetic cannabinoids, cathinones, and opioids. Other chemical classes identified during the first half of CY 2023 include benzodiazepines, tryptamines, hallucinogens, and several other classes. Particular attention will be paid to the current opioid market in the United States. Conclusions: Due to the ever-changing nature of NPS, the criminal justice system is confronted with a unique set of challenges. Understanding the current trends and monitoring the emergence of NPS within the United States enables the health, forensic, enforcement, and legislative communities to be better prepared to fight the NPS epidemic.

Evolution of the Brazilian Drug Control System: Case Study of ADB-FUBIATA, a Psychotropic NPS

Macedo M.L.S., dos Santos Lopes L., Giudice G.H., de Moraes Souza R.*

**Brazilian Health Regulatory Agency – ANVISA, Brasil - moema.macedo@anvisa.gov.br*

Introduction: The New Psychoactive Substances (NPS) market is very dynamic, requiring new legislative approaches to tackle the drug problem. Brazil has improved the Drug Scheduling System, making the process more agile, which allows fast scheduling of NPS. The Working Group conceived between Anvisa and the Ministry of Justice, brings together experts of health regulation, forensics, law enforcement and drug policy, and posed a significant role in evolving the Brazilian Drug Control System. Methods: The Working Group created an online form to facilitate and accelerate drug notification from Brazilian Police. Through this tool, in 11/19/2021, Anvisa received a communication regarding the synthetic cannabinoid ADB-FUBIATA, a psychotropic NPS. This molecule was also reported in Brazilian Early Warning System. Results: ADB-FUBIATA is now a prohibited substance. The ban took place about two months after the drug notification. Conclusions: The NPS market continues to shift and diversify at an alarming speed, posing a significant risk to public health and a challenge to drug policy. Brazil has made substance scheduling faster through the implementation of an online notification form and the establishment of an Early Warning System. ADB-FUBIATA is an example of improved communication between those involved with the drug problem.

The Synthetic Cannabinoids ADB-FUBINACA Modulate Mitochondrial Function and Dynamics at Biologically Relevant Concentrations During In Vitro Neurodifferentiation

Malheiro R.F., Carmo H., Carvalho F., Silva J.P.*

**UCIBIO - Unidade de Ciências Biomoleculares Aplicadas - Toxicology Lab, Faculty of Pharmacy of the University of Porto, Portugal - rui_malheiro@outlook.com*

Synthetic cannabinoids (SCs) pose a significant risk to neurodevelopment, as they may disrupt the proper brain development by interfering with the endocannabinoid system. Previously, we demonstrated that the SC ADB-FUBINACA (ADB) enhances neurodifferentiation of NG108-15 neuroblastoma x glioma hybrid cells via CB1 receptor activation. Interestingly, the influence of mitochondria on cellular homeostatic responses has emerged as a central regulator of neural stem cell fate. Thus, here we aimed to evaluate the effects of this SC on mitochondrial function and dynamics during in vitro neurodifferentiation. NG108-15 cells were differentiated in serum-starved (1% FBS) cell culture medium supplemented with 30 μ M retinoic acid and 10 μ M forskolin. ADB was added once at the beginning of differentiation at in vivo relevant concentration (between 1 pM and 1 μ M). Mitochondrial membrane potential (assessed by TMRE labelling) and intracellular ATP levels (luciferase-based luminescence assay) were evaluated after 24h and 72h. Specific cell-permeable or cell-impermeable CB1R antagonists/ inverse agonists (SR141716A and hemopressin, respectively) were added 20 minutes prior to ADB exposure to assess the role of CB1R in the observed effects. The expression of the mitochondrial fission marker dynamin-related protein 1 (DRP1), fusion marker mitochondrial dynamin-like GTPase (OPA1), and Voltage-dependent anion channel (VDAC) was analyzed by Western-blot at 24 or 72h. ADB (1pM and 1nM) reduced intracellular ATP levels by approximately 30-35% at 24h, which returned to control levels after 72h. These effects were mediated by CB1R signaling, as they were prevented by both SR141716A and hemopressin. Reduced intracellular TMRE retention by around 1.2-1.3-fold was observed for all concentrations tested at 72h, but this effect was not blocked by CB1R antagonists. Notably, while the higher concentration of ADB (1 μ M) increased DRP1 levels around 1.6-fold at 24h, the levels of OPA1 and VDAC, an indirect marker of mitochondrial mass, decreased by 1.6 to 2.1-fold at 72h after exposure to 1nM and 1 μ M. Overall, ADB seems to disrupt both mitochondrial function and dynamics during the neurodifferentiation process of NG108-15 cells. Different mechanisms seem to underlie mitochondrial function-related effects, as only the modulation of energy supply was dependent on CB1R activation. However, further research is thus required to better understand the mechanisms underlying cannabinoids' modulation of mitochondrial activity and their role in the SCs-induced enhancement of neurodifferentiation.

NPS and Other Emerging Drugs in the Clearnet and Darkweb.

*Mazzoni I.**

**World Anti-Doping Agency, Montreal, Canada - Irene.mazzoni@wada-ama.org*

Psychoactive substances have a long history of use as doping substances in sport, usually constituting the second most used drug class behind anabolic steroids. In addition to the classic doping substances, a more challenging problem is presented by the increasing availability of new psychoactive substances (NPS) and other emerging drugs (ED). These new drugs need first to be found and identified, classified based on the little information available as doping substances and finally analytical methods have to be developed or implemented in WADA accredited laboratories to detect them. In an effort to anticipate doping trends, one of the methods WADA uses is an intelligence-based approach, where new or potential doping substances are identified and purchased to confirm or identify their chemical structures and to assess their quality and purity. In this study we set out to monitor both the Darkweb and the Clearweb for emerging drugs with potential doping benefits. A comparison between the prevalence of these substances from both sources will be presented as well, to establish whether athletes have access to more sophisticated substances in the Darkweb. The presence of these NPS/ED as components of multipart nutritional subjects will be reported as well. These results will serve to target efforts to discover new substances entering the sport world for doping purposes and develop prevention and rapid-response strategies.

Analytical Characterisation of Benzodiazepine Batches Purchased Online from the Open Web

*Mullin A. *, Scott M., Vaccaro G., Schifano F., Corkery J., Guirguis A.*

**University of Hertfordshire, UK - anthony.mullin@hotmail.co.uk*

Introduction: Benzodiazepine (BZD) analogues continue to emerge increasing public health risks. Despite the implementation of the UK Psychoactive Substances Act (PSA) 2016, BZDs remained popular in drug misuse scenarios. The aim of this research was to monitor the trends of BZDs sold online, both before and after the UK PSA, using netnographic monitoring, in combination with characterisation techniques to identify and quantify the content of several BZD batches purchased in bulk in 2016 from 15 open web vendors, under a Home Office license. Methods: We analyzed tablets/pellets from 15 batches of three BZDs, to identify and quantify etizolam, flubromazepam and pyrazolam, using a triple-triplicate flow form process employing UHPLC-MS, GC-MS and ¹H NMR. Results: The purity of etizolam tablets from six batches ranged from 13.2-26.6% (drug content 13.6-27.4mg/tablet); the purity of flubromazepam pellets from five batches ranged from 3.8-24.1% (drug content 3.83-24.31mg/pellet); and the purity of pyrazolam tablets from four batches ranged from 5.0-11.9% (drug content 5.1-12.0mg/tablet). The monitoring of drug discussions on both Reddit and Twitter in 2023 showed the disappearance of pyrazolam and flubromazepam and the continued popularity of etizolam. Conclusions: Although etizolam remains implicated in drug related death reports, online discussions show higher frequency of bromazolam and flualprazolam. Through combined analytical and netnographic studies, new trends in drug scenarios can be identified in real-time.

Chemical Profiling of the Street Drug Nyaope in South Africa using GC-MS.

*Mwenesongole E.M. *, Mthembu P.M., Cole M.D.*

**University of Alabama at Birmingham, Alabama, USA - emweneso@uab.edu*

Introduction: Nyaope is a highly addictive low-grade heroin mixed with cannabis and/or other psychoactive compounds such as caffeine, lidocaine, phenacetin, dextromethorphan, and antiretroviral medication. The contents of Nyaope can differ within batches making it a challenge to profile. We present an analytical method for the storage, extraction, identification, and profiling of Nyaope. Methods: Identification and profiling of Nyaope was conducted with gas chromatography - mass spectrometry (GC-MS). Method validation parameters assessed were, stability, linearity, limits of detection and quantitation, accuracy and precision, ruggedness, selectivity, and recovery. Results: The method achieved accuracy of 80–120%, linearity with $R^2 \geq 0.99$, and precision values of less than 20%. Detection limits for diamorphine, efavirenz, nevirapine and Δ^9 -tetrahydrocannabinol ranged from 9.94 to 18.7 pg on column and the quantitation limits ranged from 30.1 to 56.6 pg on column. Stability, recoveries, and ruggedness were within acceptable laboratory standards. Samples were discriminated into original batches using the method and Principal Component Analysis and Hierarchical Clustering. Conclusions: The Southern African drug Nyaope can now be identified and compared. This can assist law enforcement agencies and public health stakeholders develop suitable methods to deal with supply and demand of this drug.

The Effect of External Influences on Drug Trends at Music Festivals in New Zealand, 2018 to 2023.

*Philip L. *, Black C., Powell G., Clark L., Johnson C., Johnson O.*

**The Institute of Environmental Science and Research, New Zealand - liam.philip@esr.cri.nz*

Introduction: Changes in the drug trends seen at music festivals in New Zealand may be influenced by factors, such as the availability of the drugs, enforcement activities, media attention and legislative changes to drug checking services. The Institute of Environmental Science and Research Ltd (ESR) was involved in testing samples collected from music festivals since 2018. In 2021, drug checking was legalised and ESR has since become an authorised drug checking

provider. Methods: Samples from music festivals in New Zealand between 2018 and 2023 were analyzed for the presence of controlled drugs. Festivals from before the legalisation of drug checking are compared to festivals after drug checking legalisation. Samples were analyzed using a combination of Fourier Transform infrared spectroscopy (FTIR) and/or gas chromatography-mass spectrometry (GC-MS). Results: A summary of the recent trends in drugs collected from music festivals in New Zealand will be presented, along with some possible explanations of the observed changes. This builds from a previous presentation at the NPS conference in 2021. Conclusions: Media attention and enforcement activities may result in temporary changes to the drug landscape seen at music festivals. Similarly, the COVID-19 pandemic had effects on the importation of many substances due to border closures which has shown to influence the availability of some substances available. A third influence on drug trends at music festivals is legislation regarding drug checking services, their availability and accessibility.

Differential in Vitro Activation Profiles for Psychedelic versus Non-psychedelic Ergolines at the 5-HT_{2A} Receptor

Pottie E., Glatfelter G.C., Baumann M.H., Stove C.P.*

**Ghent University, Belgium - eline.pottie@ugent.be*

Introduction: Serotonergic psychedelics induce their characteristic subjective effects via activation of the serotonin 2A receptor (5-HT_{2A}R). This structurally diverse class of drugs includes ergolines (e.g., LSD), phenethylamines (e.g., mescaline), and tryptamines (e.g., psilocin), all of which have NPS analogues that have emerged on recreational drug markets. Importantly, certain ergolines with structural similarity to LSD, such as lisuride, are unable to evoke psychedelic effects, and the underpinnings of such observations are debated and inconclusive. Methods: A selection of psychedelic and non-psychedelic LSD analogs (including lisuride, AL-LAD, and LAMPA) was tested in two in vitro cell-based 5-HT_{2A}R activation assays. These assays monitor the recruitment of β -arrestin 2 (β arr2) or miniGaq, allowing the assessment of potencies and efficacies in both assays, and affording estimates of biased agonism. Results: The known psychedelic compound AL-LAD activated 5-HT_{2A}R in both assays with higher intrinsic efficacies (137 – 167 %) than LSD. Conversely, LAMPA, a compound with poorly defined psychedelic properties, showed slightly decreased potencies and intrinsic efficacies (87 - 89%) compared to LSD in both assays. The non-psychedelic lisuride, displayed a notably decreased efficacy (49%) in the β arr2 assay, and no perceptible recruitment of miniGaq. Conclusions: Collectively, our results suggest that ergoline compounds may need to reach a defined threshold of 5-HT_{2A}R activation, in both β arr2 and miniGaq pathways, to elicit psychedelic subjective effects. This intriguing hypothesis warrants further investigation.

A Device for the Rapid Detection of Benzodiazepines and Synthetic Cannabinoids via Fluorescence Spectroscopy and Machine Learning

Power A., Gardner M.*, Pudney C.**

**University of Bath, UK - ap3284@bath.ac.uk*

Introduction: Drug abuse is a worsening societal issue across the globe. In the UK, the abuse of Benzodiazepines and Synthetic Cannabinoids is particularly prevalent, especially in healthcare and custodial settings, and there is currently no solution to quickly detect these substances for harm reduction. Methods: We are developing a portable and rapid device that utilizes Fluorescence Spectroscopy and Machine Learning to detect Benzodiazepines and Synthetic Cannabinoids in a variety of media, including saliva. The device will be able to distinguish between variants of a given drug to provide an informative output to the end user. Results: Development of the first prototype of the device is nearing completion, and lab data has been collected for training the device's drug-detecting predictive model. Current experiments with established supervised-learning algorithms show favourable results in distinguishing Synthetic Cannabinoids. Trials of the device in UK drug hotspots are imminent and will result in a significant data collection of the scans performed and the predictions that the model made per scan. This will provide us with an unprecedented insight into the pervasiveness of illegal drug use in the UK and drive improvements for future iterations of the device. Conclusions: We feel that this is a crucial and promising technology for harm reduction to stem the flow of drugs to the most vulnerable in society.

An Inventory of Kratom (*Mitragyna speciosa*) Products and Vendors on the Darknet and Cryptomarkets

Prevete E., Catalani V., Singh D., Kuypers K.P.C., Theunissen E.F., Townshend H.D., Banayoti H., Ramaekers J.G., Pasquini M., Corazza O.*

**Department of Human Neurosciences, Sapienza University of Rome, Rome, Italy; Department of Neuropsychology and Psychopharmacology, Faculty of Psychology and Neuroscience, Maastricht University, Maastricht, the Netherlands - elisabeth.prevete@uniroma1.it*

Not available.

Enabling Harm Reduction through New Technology

*Pudney C.R.**

**University of Bath, UK - c.r.pudney@bath.ac.uk*

NPS present unique challenges in detection and monitoring. The structures of these drugs change rapidly, are often present in mixtures and are smuggled on complex matrices including paper, fabric, herb material and in vape liquid. For these reasons, instant field-based testing for NPS is not common. We have demonstrated that spectral fingerprinting, the excitation emission matrix of a sample, can be used to discriminate NPS and provide information on concentration. Moreover, we have overcome the challenge in the convolution of spectral signals with complex backgrounds that arise from e.g., paper/fabric-soaked samples. With these technologies combined, we have developed a hand-held, battery-operated device that can be used for the instant presumptive detection of a large range of NPS on a very broad range of physical matrices, as well as identification of NPS directly from tablets. We show the utility of this device in decreasing the flow of synthetic cannabinoids (SCs) into prisons, the identification of SCs in vape liquid and direct from unopened vape pens, and the identification of benzodiazepine tablets. Through this technology, we aim to enable the identification of NPS by users who would otherwise not engage in harm reduction services.

Semi-systematic Frameworks for Naming of NPS in Europe: Synthetic Cannabinoids and Cathinones

Pulver B., Fischmann S., Gallegos A., Christie R.*

**Institute of Forensic Medicine, Forensic Toxicology, Medical Center, University of Freiburg, Germany - benedikt.pulver@uniklinik-freiburg.de*

Introduction: Inherent to the heterogeneous groups of synthetic cannabinoids (SCs) and cathinones is a broad structural diversity. Historically, semi-systematic names were chosen for NPS upon first identification to convey structural information. Due to the lack of documentation, naming approaches have been applied inconsistently, leading to names only loosely associated with structural features and several alternative names. One of the roles of the EMCDDA is to share information on NPS with forensic and toxicology laboratories. Because many SCs and cathinones are identified for the first time in Europe, the EMCDDA is responsible for setting best practices and hands-on guidance on naming NPS. **Methods:** The structural diversity and current naming approaches of SCs and cathinones monitored by the EMCDDA in Europe were reviewed. The structural inventory of SCs and cathinones is visualized in graphical and tabular formats. **Results:** Naming syntaxes were developed for SCs and cathinones, considering current names and established naming rationale. For the naming of SCs, an expanded syntax based on the letter code system was developed to combine building blocks and substitution(s). The naming of cathinones was developed based on the main motifs ‘cathinone’ and ‘phenone,’ and incorporates earlier naming approaches. The framework name is composed of a parent element, which, combined with information on the keto alkyl chain or the amine substitution, yields the principal name. A web-based naming tool will complement the theoretical frameworks. **Conclusions:** The EMCDDA naming frameworks provide practical guidance through examples and explanations of the rationale on how consistent semi-systematic names can be derived.

EMCDDA Framework for Naming Synthetic Cannabinoids

Pulver B., Fischmann S., Gallegos A., Christie R.*

**Institute of Forensic Medicine, Forensic Toxicology, Medical Center, University of Freiburg, Germany - benedikt.pulver@uniklinik-freiburg.de*

Introduction: Synthetic cannabinoids (SCs) are the largest and structurally most heterogeneous group of NPS. Several independent naming conventions have been employed, leading to inconsistent and sometimes ambiguous short names. **Methods:** All SCs monitored by the EMCDDA were assessed, and letter codes were assigned to each building block. An expanded syntax was developed to combine building blocks and their substitution. Established letter codes, including the highly recognizable ‘FUB’ and ‘GaClone’ letter codes, were kept unchanged. **Results:** The chemical diversity is presented in graphical and tabular format, providing a structural library of SCs. Examples of previous inconsistencies include multiple letter codes describing the same structural feature (benzyl – B/BENZ/BZ), inconsistent abbreviation of the systematic name (methyl dimethylbutanoate – MDMB, amino dimethylxobutane – ADMB), missing representation of important parts (e.g. 5F-AB-FUPPYCA: 5-fluoropentyl tail, AB-CHMFUPPYCA: cyclohexylmethyl-CHM tail) and multiple approaches to the abbreviation of halogenated structures. The principles of the framework are unambiguous, consistent, and easy-to-understand letter codes with abbreviations of common features shared across building blocks. The EMCDDA framework applies only to SCs that have emerged on the drug market because the time of notification significantly impacts the letter code assigned to the respective SC. **Conclusions:** The EMCDDA framework on naming SCs provides a valuable resource for practical information, guidance on consistent naming, and the rationale for how the names are derived. With the globalization of the market in SCs, there is a need for a concerted effort and international collaboration towards harmonized naming of emerging SCs.

EMCDDA Framework for Naming Cathinones

Pulver B., Fischmann S., Gallegos A., Christie R.*

**Institute of Forensic Medicine, Forensic Toxicology, Medical Center, University of Freiburg, Germany - benedikt.pulver@uniklinik-freiburg.de*

Introduction: The short names attributed to the 170 cathinones monitored by the EMCDDA are only loosely associated with structural features. Although related to the parent compound cathinone, one of the psychoactive principals in khat, attributing consistent, informative, and user-friendly common names to these substances is challenging. Methods: Current naming approaches were reviewed and common structural features of cathinones identified, for which abbreviations were derived from organic chemistry nomenclature and current names. Results: An EMCDDA naming framework based on the main motifs 'cathinone' and 'phenone' was developed by incorporating earlier naming approaches. The framework name of each cathinone is composed of a parent element, which, combined with information on the keto alkyl chain or the amine substitution, yields the principal name. Additional substitutions are prepended to the principal name. Other parent elements besides the two main motifs (e.g., naphthalen-2-yl) are included in the naming framework. The framework also provides exceptions for several cathinones scheduled under UN and EU legislation and structural analogs (e.g. mephedrone/4 MMC/4-methylmethcathinone). Conclusions: The EMCDDA framework on naming cathinones provides practical guidance through examples and explanations of the rationale on how consistent semi-systematic names can be derived. Owing to the structural diversity of NPS, the forensic community, researchers, and policy makers widely recognize the need for harmonized naming to achieve consensus in the denomination of NPS in legislative texts and scientific dialogue.

NPS: Emerging Trends and its Control Mechanism

*Rahman A.**

**Department Narcotics Control (DNC), Ministry of home affairs, People's Republic of Bangladesh - ahrahman68@gmail.com*

Millions and millions peace-starved people, first-hand users of tech-life all over the world are, arguably, facing untold sufferings, derived from trifle affairs to state- concerned issues in terms of injustice, inequality, cruelty, deprivation, unlimited expectations of worldly gains, loneliness, mental slavery, etc. This spectrum of life-style is inevitably changing more and going bad to worse situation as days to come. To mitigate this detrimental phases of life, most people reportedly are taking shelter primarily on drugs, especially on NPS, as a quick panacea. Novel psychoactive substances (NPS) are now dominating in every corner of the world, using as recreational drugs rather than medicinal purpose bypassing traditional drugs to circumvent the international control. Dethroning NPS mobility and reducing its demand, following steps would be actionable so far. Evolving inventions of cutting-edge technology are detaching human being from the Nature and natural things. This phenomenon pushes increasingly mass people to embrace hopelessness, believe less and loneliness mostly of the world. Consequently, they are trying wildly to receive alternatives, especially NPS. Coming back to nature, to emphasize on strengthening the mental, ethical, and spiritual health of human being instead of AI. Paying a plenty of attentions for cementing human values in every family and community will create noteworthy outcome as congenial atmosphere in the society. This situation will contribute to reduce dramatically NPS demand. Conclusion: Human being are paying huge cost and receiving untold sufferings owing to drug (NPS) menace. Global connectivity and advanced technology have aggravated the drug-induced problems multi steps ahead. Emerging trends of NPS can be clamped down by reducing demand through establishing values of human being in every lifestyles that would spread a ray of great expectation to build peaceful universe.

"Youth 2.0 project": Multi-professional Intervention to Protect Adolescents from NPS and Other Drug Use

Rapaccini V., Biscantini S., Molinaro A., Di Loreto G.P., Pasini A., Corazza O., Metastasio A.*

**Child neuropsychiatry and developmental disorders service, Usl2 Umbria, Terni, Italy - rapaccinivalentina@gmail.com*

Introduction: The COVID 19 pandemic has significantly affected the consumption of drugs determining a substantial increase in psychiatric discomfort and mental illness, especially among youth. Our study focuses the attention on Terni, a city in the center of Italy, actually defined by journalists as "the black heart of drug dealing in Umbria" : in fact, according to the Central Directorate for Drug Services report, in this city more than half of the drug related deaths of Umbria are registered; in addition, more than 60% out of hashish, cocaine and heroin detected in Umbria are seized in Terni. To cope with these emerging challenges, the "Youth 2.0" Project in Terni, a city in the center of Italy heavy affected by the drug problem, aimed to provide a personalized tailored interventions for young people aged between 14-24 years old suffering from mental illness, psychiatric disorders, psychological distress and a wide range of substance/non-substance related forms of addictions in specific semi residential centers. The project, which involved schools-based intervention, group meetings and family meetings, clinical screenings among others, was implemented with the support of the families, law enforcement agencies, the Usl Umbria 2 Addiction Department and Child Neurodevelopmental Disorder Centre. The aim of our study is to evaluate the impact of such project on the intake of illegal substances among this cohort. Methods: Retrospective analysis of the clinical data collected by Usl Umbria 2 Addiction Department concerning adolescents between 14 and 24 years old and comparison between those involved/not involved in the "Youth 2.0" Project during 2019-2022. Results: A general increase in substance addictions rate (smoking, alcohol, drugs) was

recorded. The consumption of illegal substances (in particular cannabinoids) grew of almost 10% (from 58% in 2019 to 64% in 2022). In addition, novel trends of substance misuse were also identified. Whereas heroin and cocaine were the most widespread substances, NPS, especially cannabinoids, remained the preferred drug of choice in the population under 20 years of age. For what concern Youth 2.0 project, we noticed a significant decrease in cannabinoids use among adolescents in charge at the Usl Umbria 2 Addiction Department (from 3.9% in 2019 to 2.9% in 2022) with a parallel exponential growth (from 1.3% in 2019 to 5.2% in 2022) in adolescents monitored with Youth 2.0 Project. Conclusions: Findings confirms the crucial importance of identifying and promoting appropriate intervention strategies in collaboration with various stakeholders (families, schools, police, clinical staff) to reduce the substance intake among young people. Considering also the function of self-care medication that some adolescents attribute to cannabinoids, these preliminary data lead us to assume that the "Youth 2.0 Project" provided a valid alternative to drug consumption especially for what concerns cannabinoids and derivatives.

Synthetic Cannabinoid and Methadone Co-administration in Prolonging the QTc Interval

Rock K.L., Hesketh L., Shattock M., Curtis M., Hudson S., Copeland C.S.

**King's College London, UK- kirsten.rock@kcl.ac.uk*

Introduction: Synthetic cannabinoid receptor agonists (SCRAs) are frequently used with other psychoactive substances. We aimed to investigate the poly-pharmacology of SCRA-related deaths and mechanism of SCRA toxicity. Methods: NPSAD analysis - Cases with post-mortem detections of SCRA(s) and/or methadone were extracted from the National Programme on Substance Abuse Deaths (NPSAD). In vitro pharmacology - Guinea pig hearts were perfused in standard Krebs solution at constant pressure. The ECG was recorded, with the beat-to-beat ventricular cycle length variability quantified. Methadone and the SCRA 5F-ADB were applied alone and in combination. Results: NPSAD analysis - In SCRA-related deaths, methadone was the most commonly co-detected pharmaceutical medication (n=68/254 cases). The median methadone concentration in methadone-only deaths (0.66mg/L) was significantly higher than in deaths attributable to methadone-SCRA co-administration (0.47mg/L; $p<0.05$). In vitro pharmacology - Low dose (10- μ M) methadone elongated the QTc interval (13.8msec \pm 2.6). Co-application of 5F-ADB further increased the QTc interval, in a dose-dependent manner (0.3-30nM), by a maximum of 60.9msec \pm 7.4. 5F-ADB alone had no effect. Conclusions: The SCRA 5F-ADB significantly reduces the toxicity threshold of methadone, likely via QT elongation. SCRA-related fatality may therefore be linked to co-administration with compounds that induce long QT syndrome. Careful consideration is needed when prescribing medications to people who use SCRAs.

Potential Effects of Selected Synthetic Cannabinoids on Neuronal Senescence: Impact on Proliferation and Beta-Galactosidase Activity in SH-SY5Y Cells

*Roque-Bravo R. *, Carmo H., Pedro Silva J., Carvalho F., Dias da Silva D.*

**UCIBIO-REQUIMTE, Toxicology Laboratory, Department of Biological Sciences, Faculty of Pharmacy of the University of Porto, Portugal - rita.rdsb@gmail.com*

Introduction: Synthetic cannabinoids (SC) display a pharmacological mechanism similar to that of Δ^9 -tetrahydrocannabinol (THC), the key active principle of cannabis. SC are full agonists with higher potency at the CB1 and CB2 receptors, contrasting with THC's partial agonism. Cannabis use precipitates certain aspects of senescence/ageing, so it is plausible that SC act alike. Thus, for the present study the impact of SC exposure on in vitro neuronal cells proliferation and beta-galactosidase activity (a marker of senescence) was determined, to investigate their putative pro-senescence effects. Methods: Human neuroblastoma SH-SY5Y cells were exposed to 1 μ M, 1nM and 1pM AMB-FUBINACA and ADB-FUBINACA for 24, 48, 72 and 96h, after which the sulforhodamine B assay (an indirect measure of cell proliferation) was conducted. To determine CB1R and CB2R involvement, the assays were repeated after cells 'pre-incubation for 20 min in the presence of the selective antagonists, SR141716A and SR144528, respectively, at 0.5 μ M. Beta-galactosidase activity was measured in cells exposed to 1 μ M and 1nM AMB-FUBINACA for 22 passages (P24-46, 68 days), using the Enzo Life Sciences Cellular Senescence Activity Assay kit. Results: At 96h, SH-SY5Y proliferation was increased after exposure to test concentrations of both SC ($p<0.05$); the use of CB1 antagonist reverted proliferation for AMB-FUBINACA, while CB2 antagonist reversed effects for both SC ($p<0.05$). Preliminary results show increased beta-galactosidase activity at passage 46 in SC-treated cells ($p<0.05$). Conclusions: These results show a possible influence of SC on senescence-associated markers, proving the need to test additional neuronal ageing markers.

The Psychoactive Drugs and Their Use as Doping by High Performance Athletes

*Santi L.**

**PAN-RADO and Italo-Brasilian College Institute, Sao Paulo, Brazil - laradsanti@gmail.com*

Introduction: The list of banned substances released and revised by WADA (World Anti-Doping Agency) every year has several classes of drugs, among which many can be considered psychoactive. This study qualitatively analyzes the use of these substances and their effects on the performance enhancement, in multiple ways, of high-performance athletes. Methods: Analysis and review of annual statistical data published by WADA (World Antidoping Agency) and case studies with data provided by cooperating international federations. Results: Many psychoactive drugs have been found in different profiles and sports, used by high performance athletes, associated or not with other classes of drugs for performance enhancement. Conclusions: It was possible to find a correlation between the use of psychoactive drugs and high-performance sports for many reasons, but it is very difficult to trace and limit the profile of the athlete who uses these substances, making prevention and tracking a challenge

Assessing Prevalence, Knowledge and Use of Cognitive Enhancers among University Students in the United Arab Emirates: A quantitative study

Sharif S., Fergus S., Guirguis A., Smeeton N, Schifano F.*

**University of Hertfordshire, UK - sophia25@hotmail.com*

Objective: The use of prescription stimulants for cognitive enhancement by healthy university students, identified as the largest cohort of cognitive enhancer (CE) users, is of growing interest. The purpose of this study was to look at the understanding, perception, experience, and level of access of CEs among healthy university students in the United Arab Emirates (UAE). Methods: The study was conducted in six highly competitive university programmes. Semi-structured interviews were conducted with 18 university students to discuss their own experiences and those of their friends and peers regarding the use of prescription stimulants. In addition, semi-structured interviews were conducted with seven teaching faculty staff members (Registered pharmacists and Medical doctors) to explore their views on the use of CEs in their university. Results: Data were analysed thematically for the identification of themes and subthemes within the data using coding. It was found that, 'Adderall' was the most common prescribed CE drug and caffeine supper strength pills were the most common non-prescribed CE drug, both reported to enhance concentration, motivation, and meet academic deadlines. Conclusions. It is expected that the findings of this study will be of interest to a wide range of services in UAE universities. This will enable them to raise awareness about the use of CEs among students.

Informal Use of Kratom for the Self-treatment of Heroin and Amphetamine-Type Stimulant (ATS): Findings from a Sample of People Who Use Drugs (PWUDs) in Malaysia

Singh D., Balasingam V., Narayanan S.*

University Sains Malaysia - darshan@usm.my

Introduction: Malaysia has harsh drug laws and continue to jail people who use drugs (PWUDs). This study aims to describe the use of kratom among PWUDs in Malaysia. Method: A total of 331 convicted PWUDs with kratom use history were randomly recruited from three penitentiaries for this cross-sectional study. Prison counsellors helped to conduct the surveys with a semi-structured questionnaire. Results: All males (n=331), 94% Malays, and 91% held employments prior to their incarceration. The samples mean age was 32.9 years (SD=7.3). The majority (59%, n=194/331) were amphetamine-type stimulant (ATS) users, only 41% had co-used heroin and ATS. Almost one-third (32%, n=105/331) had used drugs between 1 to 5 years, while 68% had used drugs for ≥ 6 years. Most (99%, n=321/331) have been jailed before, and 86% (n=284/331) had no formal drug rehabilitation history. Kratom decoction is separately and intermittently consumed with illicit drugs, though 61% (n=202/331) used ≤ 1 litter of brewed solution daily, it is commonly ingested to enhance energy, to abstain from illicit drug consumption, to reduce the frequency of methamphetamine use, as a substitute to heroin, to maintain abstinence, to suppress heroin withdrawal, and to reduce heroin use frequency, though a few claimed using it to enhance sexual performance, and obtain euphoria. In addition, 48% claimed that it takes approximately one-month to reduce or stop heroin use, while 57% of ATS users claimed the same after initiating kratom. Heroin users rated their withdrawal pain severity as no pain (23%), mild (43%), moderate (27%), and strong (7%) after kratom use. Conclusion: Though kratom has been banned, the infamous indigenous medicinal plant is widely used as a substitute to illicit substances, since it helps PWUDs to self-manage their substance use disorder (SUD). Hence, further clinical studies are needed to support kratom's medicinal use among PWUDs.

'Scary but Brilliant': The Views of People who Use SCRA in a Community Setting on a Novel Point-of-care SCRA Detection Device

*Skumlien M.**

**University of Bath, UK - ms4068@bath.ac.uk*

Introduction: Synthetic cannabinoid receptor agonists (SCRAs) are prevalent among people incarcerated in UK prisons and those experiencing homelessness. There are currently no tests that can identify SCRAs at the point-of-care (POC), but a new method for POC SCRA detection in drug materials and human saliva has recently been developed by our team.

In this study, we examine the views of people who use SCRA in community settings on a novel device for SCRA detection, to guide implementation. **Methods:** We will interview 12-20 people with lifetime experience of SCRA use who are experiencing homelessness. Interviews will be analyzed using reflexive thematic analysis. **Results:** Preliminary results are based on nine interviews conducted in the Southwest of England thus far. Improved detection was believed to act as a deterrent to using SCRA. There was unanimous agreement that the device should be used in healthcare settings and participants were also positive towards SCRA identification by drug checking services. However, there were mixed responses as to whether they would attend such a community-based service and use the information provided to guide drug-taking. Still, there was a strong wish for more information about SCRA and the risks of use. Finally, whilst participants were generally positive about prisons using the device to reduce the availability of SCRA, this was also seen as likely provoking strong negative reactions among users. **Conclusions:** Improved POC SCRA detection is viewed positively by users, but potential downstream effects must be evaluated, particularly in forensic settings.

New Psychoactive Substances Discharged at Rest Areas along Interstate Highway in Kentucky - Wastewater Analysis

Subedi B., Rani A., Delcher C., Stites A.*

**Murray State University, USA - bsubedi@murraystate.edu*

Introduction: New psychoactive substances (NPS) such as synthetic opioids, synthetic cannabinoids, synthetic cathinones, and piperazines are intermittently introduced in the illicit drug supply chain. To monitor this ever-changing landscape of NPS, wastewater-based epidemiology offers a comprehensive, non-invasive, cost-effective, and time-efficient approach. **Methods:** Twenty-three forensically identified NPS were simultaneously analyzed in wastewater samples collected from rest areas along the interstate highway in Kentucky over twelve months using solid phase extraction and ultra-performance liquid chromatography coupled with tandem mass spectrometry. **Results:** Para-hydroxy methamphetamine and 1-(3-chlorophenyl) piperazine were the most frequently detected NPS (detection frequency, $df = 100\%$). The mean mass load of para-hydroxy methamphetamine (methamphetamine corrected 85.9 mg/d/1000 people) and MAB- CHMINACA (9.06 mg/d/1000 people) were among the highest. Mitragynine and 4-methyl pentadronone have recently been associated with overdose deaths. In wastewater samples, mitragynine and 4-methyl pentadronone were detected ($df \geq 98\%$) at 36.4 and 28.5 mg/d/1000 people, respectively. **Conclusions:** This study shows that wastewater surveillance at the rest areas can potentially complement the existing forensic surveillance, such as components of the National Drug Early Warning System, in detecting NPS outbreaks.

Identification of Nine Compounds known as “Smart Drugs” in Japan from 2020 to 2022

Tanaka R., Kawamura M., Mizutani S., Kikura-Hanajiri R.*

**Division of Pharmacognosy, Phytochemistry and Narcotics, National Institute of Health Sciences, Japan - r-tanaka@nih.go.jp*

Introduction: In recent years, several compounds known as “smart drugs”, also known as “nootropics”, have been detected in Japan. The smart drugs have been claiming to enhancing human brain activity. In this study, nine compounds known as “smart drugs” were isolated and identified from the products sold as reagents or supplements. **Methods:** Six powdery products and three capsule products were obtained on the internet in Japan between April 2020 and June 2022. They were analyzed by LC-PDA-MS and GC-MS, and compounds detected in the products were identified by direct comparison with data of analytical standards or performed by NMR (1H-NMR, 13C-NMR, HMQC, HMBC, H-H COSY). **Results:** Two of these substances were identified as Phenylpiracetam and Phenylpiracetam hydrazide by the LC-QTOF-MS and NMR. The other seven unknown substances were identified as IDRA-21, Bromantane, Sunfiram, 9-MBC, Fasoracetam, CE-123, and GTS-21 by comparing the data with those of the authentic substances. Phenylpiracetam and Phenylpiracetam hydrazide are analogs of piracetam, which is used to treat memory impairment in Alzheimer's disease, stroke, and Parkinson's disease. CE-123 is an analog of modafinil, a psychostimulant, used for the treatment of narcolepsy. **Conclusions:** Some of the compounds detected in this study are analogs of pharmaceuticals or compounds synthesized for drug development. Since these pharmaceuticals have pharmacological effects on central nervous system, an excessive intake of these analogs may cause health problems.

Ten Years of International Collaboration to Address the Challenge of New Psychoactive Substances

Tetty J., Levissianos S.

United Nations Office on Drugs and Crime, Austria - justice.tetty@un.org

Over the last ten years, the number of new psychoactive substances (NPS) reported to UNODC has increased significantly to over 1,200 individual substances, reported by 141 countries and territories worldwide. Countries have addressed the challenges they face with proactive and innovative responses including a variety of national legislative responses. While these measures have to a large extent contributed to a reduction of these harmful substances and an overall stabilization of the NPS market, significant challenges remain, such as the continued presence of synthetic opioids, as well as new types of benzodiazepines and synthetic cannabinoids. Therefore, strong international collaboration among all actors is needed to detect, identify, monitor, analyse and share information on the use and risks of these substances. The UNODC

early warning advisory and national and regional early warning mechanisms are key to generating the scientific evidence necessary to identify emerging harmful substances and develop appropriate responses at the national and international level. Translating trends into a threat analysis to communicate potential risks and raise awareness is key to reducing risks to public health and for effective policy design and programme interventions.

Nps in Poland: Problems and Solutions

*Tkaczyk-Rymanowska K.**

**WSPiA Uniwersity of Rzeszow, Poland - drkatarzynarymanowska@gmail.com*

Introduction: According to a Polish law, NPS is a natural or synthetic substance acting on the central nervous system, other than a psychotropic substance or a narcotic drug, posing health or social risks comparable to the risks posed by them, or which mimic the effects of these substances. Whoever possesses NPS, is subject to a fine. If there is a significant amount of NPS, the perpetrator is subject to a fine, the penalty of restriction of liberty or the penalty of deprivation of liberty for up to 3 years. If there is a NPS in insignificant amounts, intended for personal use, the proceedings may be discontinued, if the ruling against the perpetrator would be ineffective due to the circumstances. NPS use is very widespread in Poland, specially some of their types. Purpose: NPS use as a phenomenon: Multidimensional - as to the factors necessary for its occurrence (drug-emotions-repeatability), Multifactorial - as to the sources (social impact of specific groups, the scale of supply, social status, cultural factors, life perspectives). Scope: NPS use as a problem: Social - a manifestation of social pathology Medical - addiction as a disease entity Legal - criminal liability for the crime of NPS possession. Social problems: Loss of the ability to live in a family, in society, to perform professional duties, Disappearance of social relations, Codependency, Development of other social pathologies (e.g., prostitution), Stigmatization of NPS addicts in society, marginalization and rejection consumer in social contacts, The problem of the so-called recreational use. Medical problems: Gradual destruction of health, sometimes up to the complete degradation of the person, the development of other diseases, including mental disorders, the phenomenon of tolerance, Politoxicomania, Risky behavior, loss of control over the behavior, Addiction treatment costs, the need to expand NPS treatment facilities (and methods), Difficulties in treating people after taking NPS (unknown ingredients). Legal problems: Development of drug-related crime and other forms of crime (e.g. theft, robbery), Criminalization, stigmatization of perpetrators, preventing them from returning to life in society (e.g. recording a conviction in the National Criminal Register makes it difficult to navigate the labor market), Legislative problems, constitutional doubts what really means "NPS". Solving problems related to NPS addiction: Development of harm reduction system Addiction treatment centers Therapies/psychotherapies Prevention (e.g. phone apps) Supervision and control over NPS Criminalizing NPS possession (good idea?).

Detection and Determination of Gabapentin- an Anticonvulsant, from Body Fluids for Forensic Analysis Purpose

Tomar N., Sarin R.K.*

**National Forensic Sciences University, India - neha.tomar_dc@nfsu.ac.in*

Gabapentin, chemically 2- {1- (amino methyl) cyclohexyl} acetic acid is a gamma-amino acid, a cyclohexane in which the amino methyl group and the carboxyl group are substituted at position one. The drug is extensively used as adjuvant therapy in treating neurotic pains, epilepsy, and seizures. The drug is available under brand names such as Neurontin, Gaborone, gralise, etc. It has been reported to be abused by opioid addicts in addition to its therapeutic use due to its anxiolytic and euphoric-like properties and easy availability in the market as a prescription drug. Scant research is available on the forensic examination of the drug under reference in body fluids. The present presents a method for the detection and determination of gabapentin from urine. The drug is not significantly metabolized in the human body and is excreted in the urine in its unchanged form allowing its qualitative and quantitative detection for forensic purposes. A weighed amount of the drug was spiked in the urine and extraction was performed using SPE cartridges. The extracted drug was detected using Thin Layer chromatography, Ultraviolet spectrophotometry and Triple quad LC-MS/MS. ICH Guidelines were used for the validation of the method. The reported method is sensitive and can be used for forensic detection and determination of gabapentin from urine in microlevels.

The Articulation of Masculinities amongst Men who Use(d) Image and Performance Enhancing Drugs

Townshend H.D., Tippett A., Corazza O., van de Ven K.*

University of East London, UK - h.townshend@uel.ac.uk

The motivations for consumption of Image and Performance Enhancement Drugs (IPEDs) have been widely explored in recent years, particularly due to the identification of wide-ranging associated public health concerns. The majority demographic of those consuming these substances are men, primarily utilising these substances in pursuit of physical appearance and/or performance goals. Historically, consumers of IPEDs were understood to be those predominantly intent on athletic pursuits, for sporting performance or bodybuilding. More recently, though, there has been greater diffusion of these substances, with growing non-sporting populations consuming them in pursuit of increased muscularity or other body image goals. A novel mixed-methodologies approach consisting of two studies was utilised, consisting of a netnography investigating posts across four major online fitness forums, and a cross-sectional survey investigation,

involving an in-depth qualitative analysis utilising images and original data. Results suggest that societal contemporary ideals of the masculine body, particularly as they are presented online and, in the media, are increasingly sexualised. This objectification then fosters the internalisation of body image concerns, ultimately influencing the motivation for the consumption of IPEDs. Hence, it becomes imperative to recognise masculinities as a pivotal focal point for the facilitation of efficient harm reduction strategies and the development of educational resources pertaining to IPEDs.

When a Prophecy comes True: Ethyleneoxynitazene as a 'Prophetic' Member of the Emerging Class of 2-Benzylbenzimidazole 'Nitazene' Synthetic Opioids

Vandeputte M.M.*, Glatfelter G.C., Walther D., Ujváry I., Iula D.M., Baumann M.H., Stove C.P.

*Ghent University, Belgium - marthe.vandeputte@ugent.be

Introduction: 2-Benzylbenzimidazole opioids ('nitazenes') have become increasingly prevalent on the recreational drug market. We performed pharmacological characterization of various 'prophetic' nitazenes, allowing risk prioritization based on structure-activity relationships. Ethyleneoxynitazene, which we predicted to emerge and which was first found in January 2023, is presented as a case example. Methods: In vitro pharmacological characterization encompassed radioligand binding assays in rat brain tissue and a cell-based μ -opioid receptor activation (MOR- β -arrestin2) assay. Antinociception (hot plate assay), locomotor activity, and thermic effects were evaluated after subcutaneous administration in C57BL/6J mice. Results: Binding assays revealed a K_i of 57.9 nM; only slightly higher than that of etonitazene (38.4 nM). However, ethyleneoxynitazene had a >100-fold lower potency in the MOR- β -arrestin2 assay (EC₅₀, ethyleneoxynitazene=70.0 nM; EC₅₀, etonitazene=0.588 nM). Its efficacy (relative to the reference hydromorphone) was also lower (E_{max}, ethyleneoxynitazene=187% vs. E_{max}, etonitazene=254%). The strongly reduced activity was reflected in vivo, with an ED₅₀, antinociception of 11.1 mg/kg and 0.0223 mg/kg for ethyleneoxynitazene and etonitazene, respectively. Hypothermia and locomotor assays revealed the same pattern. Conclusions: The a priori availability of pharmacological data upon the first emergence of ethyleneoxynitazene allowed to rapidly communicate that (compared to other nitazenes) this is likely not the opioid of highest concern. Similarly, pharmacological data for other anticipated nitazenes are readily available.

Detection, Chemical Analysis and Pharmacological Characterization of Dipyanone and other New Synthetic Opioids Related to Prescription Drugs

Vandeputte M.M.*, Walton S.E., Shuda S.A., Krotulski A.J., Stove C.P.

*Ghent University, Belgium - marthe.vandeputte@ugent.be

Introduction: New synthetic opioids (NSOs) continue to emerge on recreational drug markets. We performed in vitro pharmacological characterization of dipyanone, desmethylmoramide and acetoxymethylketobemidone (O-AMKD) – recent NSOs that are structurally related to the prescription opioids methadone and ketobemidone. Dipyanone was also detected for the first time in a seized powder and quantified in a postmortem toxicology case. Methods: In the applied cell-based assay, activation of human MOR, fused to one subunit of a nanoluciferase, leads to recruitment of β arr2, fused to the complementing subunit. The resulting functional complementation enables restoration of luciferase activity (NanoBiT®, Promega). Quantification of dipyanone in blood was done via liquid chromatography tandem quadrupole mass spectrometry using standard addition. Results: Dipyanone (EC₅₀=39.9 nM; E_{max}=155% vs. hydromorphone) is about equally active as methadone (EC₅₀=50.3 nM; E_{max}=152%), whereas desmethylmoramide (EC₅₀=1335 nM; E_{max}=126%) is considerably less active. A close structural analogue of ketobemidone (EC₅₀=134 nM; E_{max}=156%), O-AMKD showed a lower potency (EC₅₀=1262 nM) and efficacy (E_{max}=109%). Furthermore, dipyanone was quantified in blood (370 ng/mL) and detected alongside other NSOs and novel benzodiazepines. Conclusions: The uncontrolled availability and unsupervised use of NSOs are reasons for concern. Careful monitoring is required to detect other NSOs related to prescription opioids that may emerge on recreational drug markets.

Exercise Dependence and Perfectionism: a Novel Issue in Sport Environment?

Venuti P.*, Furlanetto C., Peirò A.M., Zandonai T.

*University of Trento, Italy - paola.venuti@unitn.it

Introduction: Exercise dependence (ED) can be defined as a maladaptive pattern of excessive exercise that manifests in physiological and psychological and cognitive symptoms (Biggs et al 2021). Moreover, perfectionism is a multidimensional personality disposition characterized by setting exacting standards, striving for perfection and harsh criticism (Hill et al 2015). The aim of our study was to investigate the correlation between these two variables. Methods: The ED level of the participants was assessed using the Exercise Dependence Scale-Revised (EDS-R) while the perfectionism we used the Multidimensional Inventory of Perfectionism in Sport (MIPS). A specific survey online was performed. Correlations between variables were calculated using Pearson's r for normal distributed data and Spearman's rho for non-normal distributed data. For supplements consume we used a contingency analysis (Pearson's Chi-squared test, 3x2). Results: On a sample of 341 Spanish athletes (mean age 25.6 years (SD 8.3), 57% men, 43% women), 6% were at risk of dependence (AR), 57% were non-dependent symptomatic (NDS) while 37% were non-dependent asymptomatic. EDS-R score was positively correlated with MIPS score ($r=0.3692$, $p<0.001$) and we found a higher use of supplements

in AR (50%) vs NDS (26%) participants ($p=0.029$). Conclusions: Exercise dependence appears to be positively associated with perfectionism and supplements use. However, these relationships should be examined in future research to confirm this trend, and possibly identify a risk stratification model.

New Drug Trends across Welsh Prisons: Evaluating the Role of People with Lived Experience of Substance Misuse and Supporting their Recovery

*Vigar M. *, Watkins C., Clifford J., Jones M.*

**HMP & YOI Parc – G4S, UK - mike.vigar@uk.g4s.com*

Introduction: This presentation will cover two areas of work. Firstly, we will provide a summary of the current trends of substance misuse across prisons in South Wales, where novel psychoactive substances continue to be widely used, including the market value for these substances in the prison system. The second element of the presentation will share the findings of our research in the attempt to better understand the lived experience of those affected and provide a more informed support and intervention to other prisoners. **Methods:** The analysis of trends across Welsh prisons will utilise data from the following sources: Mandatory Drug Test results, drug testing sample data from WEDINOS, prison data on drug finds, intelligence reports and substance misuse observation records being opened. The research into prisoner peer mentoring will utilise standardised interviews with both prisoners with lived experience providing support, and prisoners receiving support. The standardised interviews will aim to identify consistent themes, proposals for good practice and wider mainstream implementation. **Results:** Early data shows a significant prevalence of Synthetic Cannabinoids and the emergence of new trends related to the consumption of Synthetic Opioids. **Conclusions:** More attention should be paid to the diffusion on NPS in prison settings. Full results of our investigation will be available and be discussed at the time of the conference.

Neuromodulation in Addiction Sciences

*Wael F. **

**Erada center, UAE - w.foad@erada.ae*

Introduction: Substance use disorders (SUDs) are associated with high rates of comorbid depression. Finding effective treatments for many of the substances of abuse is still an area of developing research. Repetitive transcranial magnetic stimulation (rTMS) is an established treatment for depression, but its effects in SUDs are less conclusive. Therefore, we aimed to investigate the effect of rTMS in patients with SUDs and comorbid major depressive disorder (MDD). **Methods:** Retrospective study where we collected and analyzed data obtained from the computerized medical record system for patients admitted to the inpatient unit at Erada Center for Addiction and Rehabilitation in Dubai, United Arab Emirates (UAE) between June 2019 and September 2020. **Results:** Linear regression analysis showed that the number of rTMS sessions received significantly predicted the number of days of abstinence in the community after treatment with rTMS, with a significant improvement in the days of abstinence after rTMS treatment. **Conclusions:** Patients with SUDs and MDD who received rTMS significantly improved in the areas of severity of depression and craving. The number of rTMS sessions significantly predicted increased abstinence.

Evolution of Erimin 5 in Singapore

*Ying Ying T. *, Yeong H.X.C.*

**Health Sciences Authority, Singapore - Tan_Ying_Ying@hsa.gov.sg*

Nimetazepam, a long-acting benzodiazepine, was introduced under the trade name Erimin Corporation by Sumitomo to the market in Japan in 1977. Clandestinely produced tablets mimicking the Sumitomo Erimin brand are known as Erimin 5 by law enforcement authorities and forensic drug analysts in Singapore and Malaysia. These illicit Erimin 5 tablets closely resemble the commercial tablets (which is no longer in production) in terms of its appearance, having similar colour and size with slight variations in the tablet imprints. Its chemical composition, however, was found to be different from that of the licit tablets. In this session, the evolution of contents of Erimin 5 seized in Singapore will be presented. This includes examples of Erimin 5 found to contain designer benzodiazepines, controlled substances and new psychoactive substances (NPS). The test method used for identification of newly detected substances in Erimin 5 will also be shared.

Does Alcohol and Nicotine Consumption among Athletes influence Attitudes towards Doping? Observational study of Spanish Athletes

Zandonai T.*, Furlanello C., Peirò A.M., Venuti P.

*Miguel Hernandez University of Elche, Spain - tzandonai@umh.es

Introduction: Attitude toward doping is a complex psychological process involving environmental and social cognitive factors (García-Grimau et al 2021). The aim of this study was to investigate how alcohol and nicotine consumption among athletes - normally higher than among nonathletes - could be associated to attitude towards doping. Methods: A specific survey online investigating the prevalence of nicotine and alcohol used by athletes was performed. The Performance-Enhancement Attitude Scale (PEAS), which is a self-reporting questionnaire instrument measuring the consciously thought and deliberately expressed (explicit) attitude toward doping was used (6-point Likert-type scale). We made a contingency analysis (Pearson's Chi-squared test) for alcohol and nicotine consume vs PEAS. Results: We collected 341 questionnaires (57% males, 43% females). The prevalence of nicotine and alcohol in the last 30 days was 23 and 72% respectively. PEAS mean score was 32.7 (SD=10.2) showing a general negative attitude toward doping (PEAS>33). Males mean score was significantly higher than female ($p=0.010$). No significant differences were found related with alcohol and nicotine. However, we found that nicotine was significant higher ($p=0.046$) in the 'somewhat positive' range group (PEAS >46). Conclusions: Our data confirmed a growing trend of alcohol and nicotine consumption among athletes comparing to general population. Further studies are needed to investigate if these drugs could influence attitude toward doping in athletes.

New Psychoactive Substances (NPS) in Uzbekistan: Motives and Psychosocial Needs among Youth

Zakhidova G.A.*, Prilutskaya M.V.

*Bukhara State Medical Institute, Uzbekistan; Frankfurt University of Applied Sciences, Germany - mariyapril2407@gmail.com

Introduction: The emergence and popularity of NPS, such as mephedrone, and alpha-pvp, among young people in Uzbekistan are growing due to their availability through Internet platforms and interest in new trendy substances among peers, as well as the desire to have fun and get high. There is no reliable information about the number of users, their motivation to use NPS, as well as the psychological and social assistance they need. Objectives: to investigate the motives of NPS use in the youth population of Uzbekistan and trace their psychological needs in the rehabilitation process. Methods: a series of semi-structured interviews were carried out among 25 young people with NPS addictions. Results: 76% of users were male, while the average age was 27. The average age of drug onset was 18, while for NPS it was 22. Most users (65%) seem to start their drug careers with non-prescribed medication: Lyrica, tropicamide, regapen or marijuana, and then level up to NPS like mephedrone, alpha-pvp, and other synthetic stimulants. The use of synthetic cathinone was dominant (65%) among interviewed respondents. Half of them reported that they started using NPS in a social setting with friends. Primary reasons and motivations included: pleasure, socialization, euphoria, escaping reality, blocking of feelings, different mental states, and sexual enhancement. Of the 25 NPS users interviewed, 24 (98%) were aware of the harm caused by NPS use. 88% of users seem to be trying to cut down on the use of NPS. All of them have reported that NPS use has negatively impacted their lives including their relationships with their friends and relatives. 53% were willing to help other NPS users as they considered that only people with NPS experience could provide peer-to-peer interventions in rehabilitation programs. These preliminary results warrant development and capacity building in rehabilitation technologies for people involved in NPS use considering the challenges and facets of the Uzbekistan treatment system.