Trend and changes of detected New Psychoactive Substances in Paris metropolis highlighted by hair testing in a cohort of hospitalized patients (2018-2020)

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Background/ Introduction

New Psychoactive Substances (NPS) continue to be on the rise posing a health and social risks. We previously reported a prevalence of New Psychoactive Substances (NPS) of 29 % in drug dependent or intoxicated adult patients admitted in Paris hospitals (n= 480) between 2012 and 2017. 4-MEC and mephedrone along with ketamine were the most detected in hair[1]. The current study's goal is to identify NPS that were used in Paris and its suburbs between 2018 and 2020.

Objective

To provide an insight on the evolution of NPS use between 2018 and 2020 in Paris metropolis using hair testing and to describe population characteristics.

Methods

341 hair samples were segmented and analyzed in addict followed-up and intoxications settings. A previously published LC-MS/MS method dedicated to the screening of drugs of abuse and NPS was used[1]. Briefly, 20 mg of hair was washed with dichloromethane, dried at room temperature and pulverized. It was hydrolyzed in phosphate buffer (pH 5.0, 95 °C, 10 min) and extracted using hexane/ethyl acetate and chloroforme/isopropanol. Separation was performed in a gradient mode using Hypersil PFP Gold column (100mmx2.1mm,1.9µm) and the detection used a Triple Quad TSQ Altis (ThermoFisher®) in MRM mode.

Results-discussion

NPS were detected 242 times in 112 cases. The prevalence was 33%, confirming the same trend of NPS use since 2012, with less occurrence of NPS between 2018 and 2020 than amphetamines (42%), cocaine (46%) or licit/illicit opioids (52%). Consumers were predominantly male (65%). The median age was 28 years (vs 33 from 2012-2017), with 18% of users < 20 years (vs 8% from 2012-2017). 50 different NPS (vs 27 from 2012-2017) were detected: ketamine (n=81, 75 pg/mg median), mephedrone (26, 295), DXM (16, 52), normephedrone (9, 4393), 4-MEC (6, 99), methylone (5, 6), ethylphenidate (5, 5), 3-MMC (5, 1570), Ethylphenidate (4, 5), flubromazepam (4, 192), etizolam (4, 5), α-PVP (4, 73), α-PHP (4, 10755), 5-APB (3, 255), 3-FPM (3, 1380), pentylone (2, 9), O-PCE (2, 20), MDPV (2, 3), m-CPP (2, 1069), harmine (2, <1), DMT (2, 7), 5F-PB-22 (2, 10), 5-MeO-DMT (2, 5), 4-FA (2, 315), 3/4-MeO-PCP (2, < 1), and one case respectively for N-methyl-2-AI (326 pg/mg), mitragynine (< 1), metizolam (4), MXE (<1), JWH-250 (40), JWH-200 (13), JWH-019 (27), ethcathinone (23292), ephenidine (190), DCK (1500), clonazolam (24), butylone (68), BB-22 (10), AM-2201 (10), ADB-PINCACA (10), AB-FUBINACA (22), 5F-AKB48 (11), 5-EAPB (60), 4-MePPP (10000), 4F-PHP (<1), 2F-DCK (4650), 25I-NBOme (15) and 25C-NBOme (2). 4-HO-MiPT and Isopentedrone were not quantified.

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Fig.1 : population : 43 patients were included (190 male and 153 with a median age of 30), more than half people had benn seen wether in ICU or addiction clinics.

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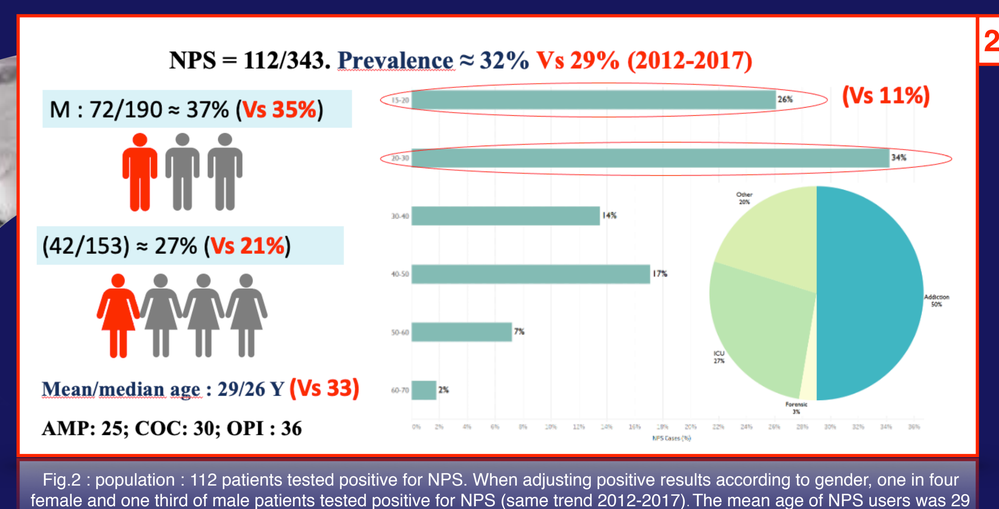

Fig.2 : population : 112 patients tested positive for NPS. When adjusting positive results according to gender, one in four female and one third of male patients tested positive for NPS (same trend 2012-2017). The mean age of NPS users was 29 years and the highest number of positive cases (34%) was observed in the 20–30 age group. In comparison, the median age of cocaine, amphetamines and opioids users within the same populations were 30, 25 and 36 years old, respectively. In our study, we found that 24 % (vs 11%) of NPS users were under 20 years-old, which confirms the use of designer drugs in a young population in Paris.

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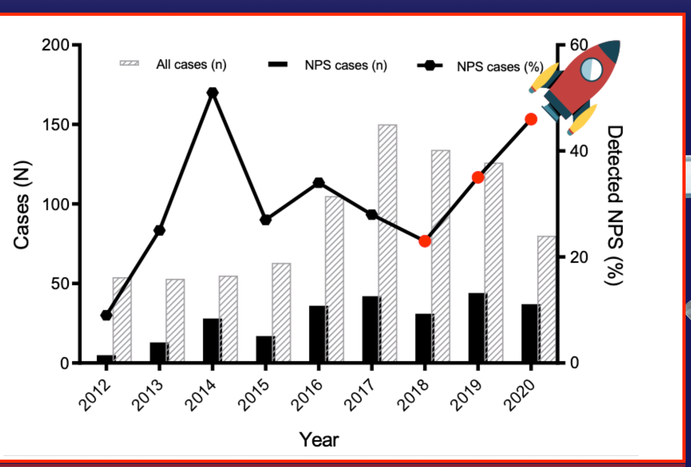

Fig.3 : trend : The number of detected NPS is increasing since 2018 and we could potentially see in the next few years a continuous uptrend as of 2015.

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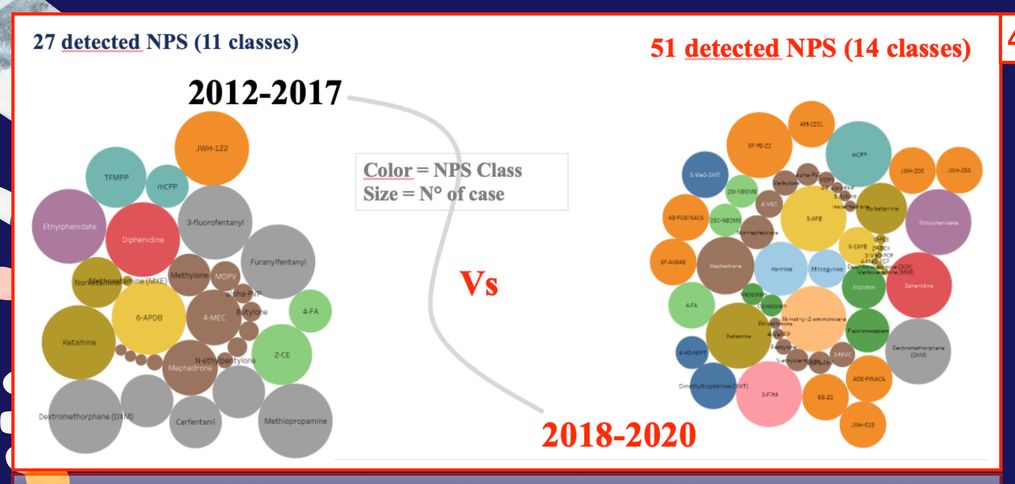

Fig.4 : detected NPS and classes.

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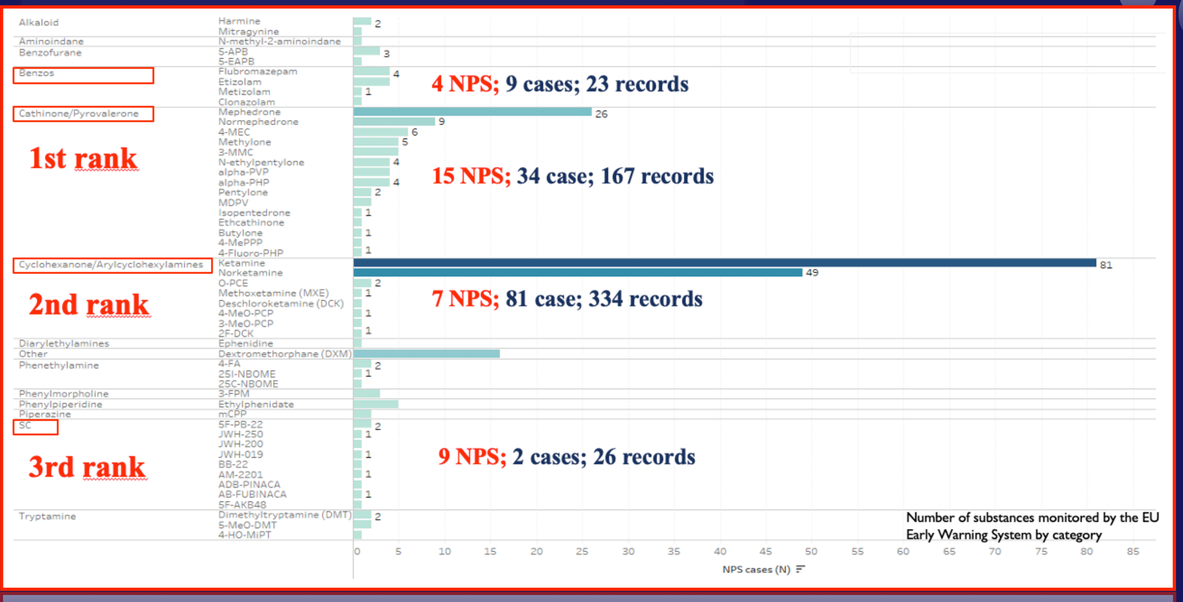

Fig.5 : detected NPS and classes : cathinones are the most prevalent group of NPS, with more mephedrone cases than 4-MEC (we had the same number of cases in 2012-2017).

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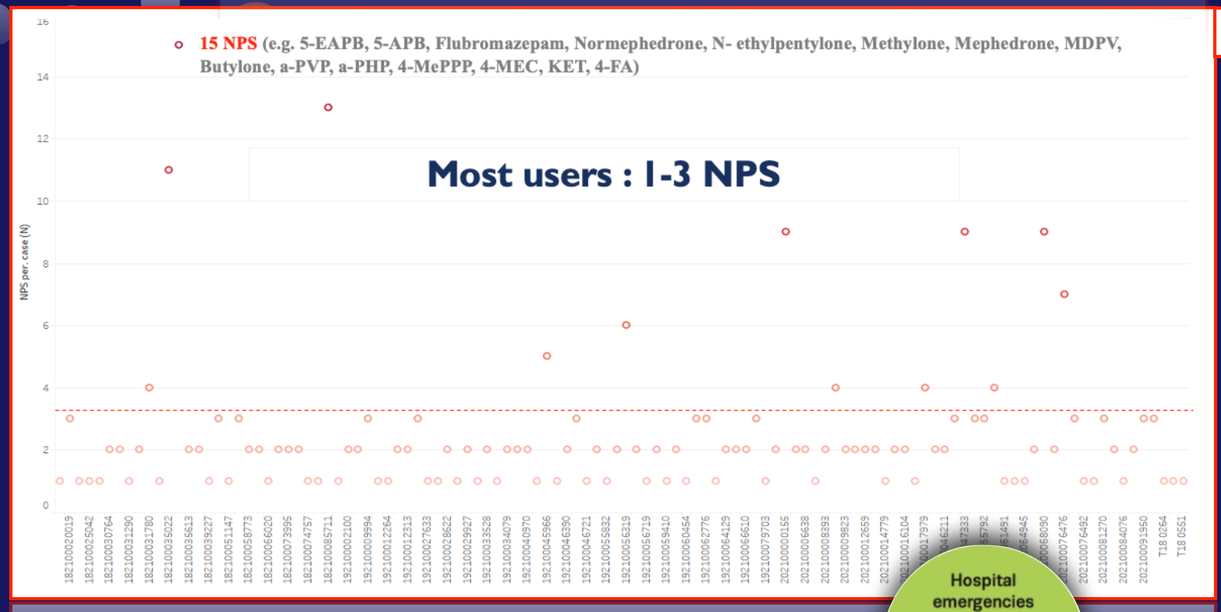

Fig. 6 : number of consumed NPD : Most NPS users had experienced more than one NPS in the same period (within two-months), more often in combination with conventional DOA (cocaine, amphetamines or opioids).

Conclusion

To our knowledge, this is the most comprehensive study based on hair testing demonstrating the use of qualitatively and quantitatively different NPS in Paris metropolis from 2018 to 2020. It also provides relevant, timely and complementary data that offer valuable insights into drug use.

Reference :
[1] Larabi, I.A et al., 2019; Drug and Alcohol Dependence, 204, 107508.

Keywords :
New psychoactive Substances, hair, prevalence, Paris