

Evidence for public health on novel psychoactive substance use: a mixed-methods study

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Disclaimer: This report contains transcripts of interviews conducted in the course of the research and contains language that may offend some readers.

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Scientific summary

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Background

Novel psychoactive substances (NPSs) are contributing to the public health impact of substance misuse. The Advisory Council on the Misuse of Drugs (ACMD) defines NPSs as 'psychoactive drugs which are not prohibited by the United Nations Single Convention on Narcotic Drugs or by the Misuse of Drugs Act 1971 and which people in the UK are seeking for intoxicant use' [ACMD. *Consideration of the Novel Psychoactive Substances ('Legal Highs')*. London: ACMD; 2011]. As an umbrella term, utilised in a legal framework with multiple drugs grouped under this single heading, 'NPS' has become less helpful for exploring differential patterns of use and harm.

Objectives

The study aimed to provide public health-related research evidence on NPSs addressing 11 research questions:

1. What are the types and patterns of NPS use?
2. What are the developmental pathways into NPS use and are they different across types of NPSs?
3. Is there an association between NPS use and health and social outcomes?
4. What are the patterns of NPS use as they relate to the patterns of other substance use?
5. Why do individuals with similar sociodemographic profiles and illicit substance use differ in their decision to use or not use NPSs? What are the emerging factors that contribute to this decision to use or not use NPSs?
6. Does the drug-taking profile of a NPS user differ according to age, sex and social class and across traditional drug-using groups?
7. What are the harms associated with NPS use and how are these different from those of conventional illicit substances?
8. What are the appeals of NPSs and how are these the same as or different from those of traditional illicit substances?
9. What are the risks associated with NPS use and how are these different from those of traditional illicit substances?
10. What knowledge and experiences do NPS users have of treatment services for NPSs and how do these differ from their knowledge and experiences of services for other substances (licit and illicit)?
11. How can the research findings be integrated into a framework to inform existing service provision/policy formation and educational initiatives UK wide?

Methods

The study used a conceptually linked three-phase mixed-methods design in a multiple-context risk and protective factor framework.

Phase 1: quantitative phase – latent class analysis of the Belfast Youth Development Study (BYDS) using the 2039 BYDS participants at wave 7 to identify categories of drug use (including NPS use).

Phase 2: qualitative phase – analysis of narrative interviews ($n = 84$) sampled from BYDS ($n = 25$), drug and alcohol service settings ($n = 34$) and the prison estate ($n = 25$). The five-code-type framework was utilised to accommodate the integrated analytic approach. A taxonomy of groups was generated to explore how and where NPSs featured in an individual's drug trajectory. Subsequently, this structure was utilised to provide detailed appraisal of many other factors linked to NPSs.

Phase 3: quantitative phase – generalisability of the shared risk factor part of the model was tested using the manual three-step approach to examine risk factors associated with latent class membership. Several integration analyses were built into the design to allow emerging findings to be further explored and cross-validated and later-phase methodologies to be refined.

Results

Elucidating novel psychoactive substances in polydrug use trajectories

Latent class analysis of the longitudinal data revealed that only one class of substance use (polydrug) was characterised by NPS use, with NPS use being rare in the other three classes. In total, the polydrug group constituted 10% of the sample, and 71% of this group reported having ever used NPSs. The extensive statistical models of the analysis indicated that there was not a distinct 'NPS' class. The latent classes generated from the BYDS data highlighted the difficulty of unpicking the relative importance of a range of risk and protective factors as they relate to substance use at a population level. Through analysis of the narrative data, we clearly differentiated within this overall NPS/polydrug use premise.

Our integrated analytic approach yielded a four-group taxonomy of substance use as it related to NPSs:

1. The limited experimentals – reported substance use that was generally limited to alcohol and cannabis, cocaine and poppers, and excluded NPSs, thus providing an important comparator group. Generally speaking, their developmental trajectory was normative and most successfully transitioned to emerging adulthood and aged out of significant substance use without intervention.
2. The past recreationals – participants whose substance use was largely opportunistic and reasonably limited. NPS use was largely confined to mephedrone use pre legislative ban. Availability was a significant motive for use – none actively sought out NPSs. Experiences with synthetic cannabinoids (SCs) were generally isolated incidents. Risk factors included alcohol influence and peer and romantic partner pressure.
3. The contemporary regulars – had much wider repertoires than featured in previous groups and all reported NPS use. A primary driving force behind the transition from traditional illicit drugs to NPSs was market factors. Use of substances served adaptive purposes (e.g. maintaining social connections). Use was generally characterised by stimulant-type substances and linked to specific scenes and groups (e.g. punk and men who have sex with men). Decisions to use were highly premeditated and aimed at maximising effect as well as the optimal sequencing of combinations.
4. The dependents – consisted of 52 participants, forming the largest grouping within our taxonomy. They were a complex clustering of participants that were further divided into four subgroups (SGs), one of which was not considered in the analysis as its members did not use NPSs:
 - i. Generation NPS (SG1) – members had a dependency on only NPSs. A conflation of risk factors were noted and protective influences were rare. These individuals were young and neophyte, lacking user knowledge about NPS effects and harms. SCs were key and featured strongly in narrative accounts during interviews. For some, a trajectory of having used only alcohol to dependence on SCs was noted alongside rapid acceleration from experimental/social use to dependent use. Harms experienced through NPS use were significant.
 - ii. Availers (SG2) – members of this group 'availed' of NPSs when their drug of choice was unavailable. Reports of dependency on traditional illicit substances but not on NPSs were made. A clear and cumulative risk profile emerged (e.g. significant mental health issues, early-onset alcohol use).
 - iii. Persisters (SG3) – these were chronic and chaotic substance users, with all reporting multiple dependencies, including on NPSs. They initially believed that SCs offered a safer alternative to traditional illicit drugs. Comorbidities and vulnerabilities among this group made the potent effects of SCs particularly appealing, resulting in sustained use. Risk factors were commonly documented and protective influences were not.

Novel psychoactive substances as a potential 'snare' for more problem use

In accordance with Moffitt (Moffitt TE. Adolescence-limited and life-course-persistent antisocial behavior: a developmental taxonomy. *Psychol Rev* 1993; **100**:674–701), we posit as a result of our data that NPSs have the potential to operate as a 'snare' to problematic use patterns in numerous ways, linked to market and contextual factors. First, branding SCs with the descriptors 'legal' and 'herbal' by marketers as an alternative to cannabis suggested safety/minimal harm. When first introduced to the scene, knowledge levels surrounding these substances were negligible. Perceiving similarities to cannabis and having little or no awareness of the signs of growing dependence resulted in generation NPS having accelerated pathways to dependent use. Previous research has highlighted the possibility that brain development in adolescence may render younger users more susceptible to the potential psychotic and/or proconvulsant effects. Our data support this and also suggest an extension to vulnerabilities and to dependence.

Previous studies show that problematic NPS use often occurs in the same vulnerable groups that have Class A substance use problems. However, in our study, generation NPS clearly does not fit with that overall assertion. For those already reporting a dependency (the persisters), the effect of SCs surprised them. Despite legislative changes, our patient and public involvement discussions continued to highlight that NPSs are still viewed as being of less harm and carrying lower penalties for those caught in possession (without intent to supply) than other substances. Ensuring awareness that these substances are not akin to cannabis remains an important message to confer to users.

Second, when mephedrone was still 'legal', it acted as a conduit for crossover to alternative and potentially problematic scenes as indicated by the past recreationalists. In this vein, the 'moreish' properties of mephedrone were also noted by the contemporary regulars as having potential to alter their patterns of use, even for very drug-wise experimenters.

Conclusion

A consideration of our data raised important issues for policy and practice. We also considered Novel Psychoactive Treatment UK Network (NEPTUNE) guidance (Abdulrahim D, Bowden-Jones O, on behalf of the NEPTUNE Expert Group. *Guidance on the Management of Acute and Chronic Harms of Club Drugs and Novel Psychoactive Substances*. London: NEPTUNE; 2015) and other extant literature when making suggestions regarding interventions and treatment modalities.

Education

In our narrative interviews, peers emerged as key risk and protective factors for NPS use. Consequently, the involvement of peer educators is valuable in the creation of national drug education programmes aimed at providing harm reduction techniques to individuals who are using or at risk of polydrug/NPS use. Negative experiences in the school system were key contributory factors for individuals with the greatest problems related to NPS and polydrug use in our sample. Previous authors have suggested that prevention and intervention efforts for NPS use should focus primarily on young people who may be engaged in polydrug use but who are disengaged with schooling or who have been excluded from school. We suggest that future specific interventions for all young people who have been excluded from school should include a component that focuses on polydrug use including NPS use.

Public health

In our study, groups 3 (contemporary regulars) and 4 (dependents) demonstrated highly sophisticated knowledge of how certain drug combinations could produce the most intense effect while also being knowledgeable of NPS harms. In addition, several established user participants (including injectors) conveyed their surprise at the strength and unintended effects of SCs and had difficulty anticipating the increasing complexity of SCs. There was also recognition of the toxic agents and additives in more traditional drugs, which

in itself presents a public health concern in terms of assessment and treatment. We concur with the public health approach propounded by the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), which is suited to the needs of the problematic users and calls for levels of integrated treatment provision.

Harm reduction

Harm reduction was a topic referred to primarily by group 3 (contemporary regulars) where it was reported that peer group members provided information and advice on specific substances. Our data clearly show that, although welcome, prior knowledge of harm reduction techniques does not guarantee safety when using NPSs. A number of participants discussed the symbiotic relationship between heroin use and SCs; a small number of participants moved from SCs to heroin because of SC withdrawal or limited heroin supply, whereas others progressed to using SCs alongside or after heroin use. Injecting behaviours associated with heroin use and other injectable drugs including NPSs are highly correlated with a range of harms that require much further attention.

Treatment

Limited evidence regarding the effectiveness of interventions on NPS-using populations is noted and probably linked to the relatively recent emergence of NPSs. Several participants made reference to NPS use withdrawal symptoms. Little information is available about the effectiveness of pharmacological interventions, and currently no specific substitute or maintenance pharmacological programmes are available for people with problems related to chronic NPS usage. There is universal recognition that research into the effectiveness of psychosocial and psychological interventions (PSIs) for NPS use should be conducted as a matter of urgency to inform best practice and policy directives.

Immediate responders and emergency department services

Immediate responses are often required in clubs, festivals and community or home environments. The European Drug Emergencies Network (EURODEN) provides guidance about when to call emergency services about drug use problems, a framework which is readily adaptable for use in situations in which someone becomes unwell because of NPSs.

A number of our participants reported a range of symptoms that required immediate response and attendance at primary care services, including extreme pain, cardiovascular issues, seizures, blackouts and kidney problems. It is vital to question the type of drug or NPS used and the method and frequency of consumption, and to assess acute and chronic harms associated with use. We posit that the overall assessment and management of care should be underpinned by this existing work with an ethos of empathy and a non-judgemental approach.

Mental health and addiction services

Numerous psychological harms were reported by all groupings, particularly by the higher-severity SGs. NPS use increased the risk of psychotic symptomology, which was largely short term; however, there were also reports of instances in which the psychotic episodes had become more persistent. Incarcerated members of SG4 reported a relatively greater lifetime use of drugs and more associated significant harms, as well as evidence that drug problems in prison continue to expand. Health intervention responses to NPSs have begun to emerge in some UK prisons, although there remains a lack of research. Accurate recording of NPS use prevalence in prisons and corresponding harms is lacking. An integrated multidisciplinary response to the situation based on presenting symptoms in each custodial establishment is important. Treatment guided by the principles underlined in NEPTUNE is valuable. Public Health England also highlighted models of good practice when working specifically with SCs, which we endorse based on our findings.

Recommendations for further research

The present research provides much needed further empirical data on the lived experiences of NPS users across a range of settings, not just those in problem populations. Our study elicited data from users who did not consider their use to be problematic and provided comparison with some individuals who opted not to use at all as well as high-risk populations such as prison and homeless populations. Future research

must generate improved epidemiological data on the extent and patterns of use and motivations for use as well as how these evolve over time. This study has potential to immediately deliver findings to help inform the agenda of such larger-scale epidemiological research by providing well-articulated, nuanced accounts of how NPSs sat within a range of polydrug use trajectories. The uniqueness of the knowledge and information concerning SCs points to a specific set of findings regarding the use of SCs not evidenced elsewhere in the literature. It is clear that the relationship between SCs and heroin was bidirectional as well as concurrent and both functional and instrumental. Highlighted too was the sheer intensity of withdrawal from SCs against a backdrop of limited or no medical intervention to ameliorate the very significant symptoms of withdrawal. As a consequence, future research must focus on the symbiotic link between SCs and heroin use and how the administration of SCs is influenced by heroin use and vice versa.

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