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Changes in the Patterns of Psychoactive Substance Use in Uzbekistan: From Assessment to Preventive Measures

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Abstract The increasing use of synthetic narcotic substances and psychoactive pharmaceutical drugs has raised public health concerns in Uzbekistan. New psychoactive substances (NPS), including synthetic cathinones and pharmaceutical drugs, have gained popularity, particularly among young adults. However, limited epidemiological research exists on demographic trends, substance preferences, and associated risk factors. **Methods**: This retrospective observational cohort study analyzed data on registered users of synthetic drugs and psychoactive pharmaceutical substances in Uzbekistan from 2022 to 2024. The study examined demographic characteristics, gender and age distribution, and substance use trends. Data were obtained from national reports, medical registries, and epidemiological summaries. Statistical analyses included descriptive statistics, chi-square tests, trend analysis, and correlation analysis to assess patterns of drug use and associated factors. **Results**: the findings indicate a significant rise in the total number of synthetic drug and psychoactive substance users, with an overall increase of 44.9% from 2022 to 2024, including a 24.3% rise in 2024 compared to 2023. Young adults (20–34 years) accounted for the largest proportion of users, with synthetic cathinones (α-PVP, mephedrone) and prescription anticonvulsants (pregabalin) emerging as the fastest-growing substances. In contrast, the use of opioid analgesics (tramadol, nalbuphine) and synthetic cannabinoids ("Spice") declined. Men constituted 90% of all registered cases, while women were overrepresented in pharmaceutical drug misuse (e.g., zopiclone, tropicamide, diphenhydramine). **Conclusions**: the shift towards synthetic stimulants and prescription drug misuse highlights the need for targeted prevention programs, regulatory measures on pharmaceutical drug sales, and improved monitoring of synthetic cathinones. Stricter policies on opioid painkillers have contributed to a decline in their use, while digital drug markets and changing consumption patterns have fueled the rise of synthetic stimulants. Future research should focus on long-term substance use trends and the impact of online drug distribution.

Keywords Synthetic cathinones, α-PVP, Mephedrone, Pregabalin, Opioid analgesics, New psychoactive substances, Drug epidemiology, Uzbekistan

1. Introduction

The growing prevalence of synthetic narcotic substances and psychoactive pharmaceutical drugs has become a significant public health concern worldwide [1,2,3]. In recent years, new psychoactive substances (NPS), including synthetic cathinones, synthetic cannabinoids, have emerged as dominant trends in substance abuse [4]. These substances often mimic the effects of traditional drugs but evade regulatory control, making them widely accessible and difficult to monitor [5].

Prior to the rise of synthetic cathinones and other novel psychoactives, the drug scene in Uzbekistan was predominantly characterized by the use of tramadol and sedative-hypnotic drugs throughout the early 2020s and the years leading up to it [6]. In Uzbekistan, synthetic drug use has been steadily increasing [7]. The rapid evolution of the illicit drug market, the accessibility of new stimulants via digital platforms, and shifting consumption patterns have contributed to this phenomenon.

Despite the increasing attention to the spread of synthetic drugs, there is a lack of comprehensive epidemiological studies analyzing the demographic distribution, trends, and associated

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risk factors in Uzbekistan. Understanding which substances are being used, who is using them, and how trends are evolving is crucial for developing effective prevention, intervention, and regulatory policies.

This study aims to analyze the trends in synthetic drug and psychoactive pharmaceutical substance use in Uzbekistan from 2022 to 2024.

2. Materials and Methods

Study Design

This study employs an observational retrospective cohort design to analyze trends and factors influencing the use of synthetic narcotic substances and psychoactive pharmaceutical drugs in Uzbekistan from 2022 to 2024. The research is based on official data on registered individuals using these substances, obtained from national reports and databases. The primary objective is to identify demographic characteristics, trends in substance use, and potential correlations between the use of various substances and socio-demographic factors.

Sample Characteristics and Study Parameters

The study analyzes data on individuals registered as users of synthetic drugs and psychoactive pharmaceutical substances over a three-year period. The sample includes the following parameters: total number of registered individuals by year; gender distribution (male/female); age groups; categories of substances used, including:

- Synthetic cathinones (e.g., α-PVP, mephedrone)
- Opioids (e.g., tramadol, nalbuphine, desomorphine)
- Sedative-hypnotic drugs (e.g., zopiclone, diphenhydramine)
- Anticonvulsants (e.g., pregabalin, gabapentin, carbamazepine)
- Synthetic cannabinoids and other psychoactive substances

Data Collection Methods

Data were collected through a retrospective analysis of national medical reports and epidemiological summaries. The following sources were utilized: official statistics and national registries, which contain annual data on registered users of narcotic and psychoactive substances.

Independent and Dependent Variables

The study evaluates independent and dependent variables to analyze patterns in drug use and the factors influencing them. Independent variables included the type of psychoactive substance used and demographic characteristics (age, gender). The dependent variable was frequency of substance use, trends in substance consumption, age and gender-related differences in the consumption of various substance groups.

Statistical Data Analysis

The analysis was conducted using SPSS version 29.0.2.0. Descriptive and inferential statistical methods were employed for data analysis:

- Descriptive statistics (mean values, percentage distribution) to characterize the overall sample
- Chi-square test (χ^2) to compare categorical data, such as gender differences in substance use
- Trend analysis to assess the annual increase in the use of specific substances
- Correlation analysis to identify relationships between age, gender, and the choice of narcotic substances
- A significance level of $p < 0.05$ was used to determine statistical significance

Use of Large Language Models (LLMs)

To refine the text in English and ensure proper citation formatting, Large Language Models (LLMs) were utilized.

3. Results and Discussion

1. General Trends by Year

Statistics indicate a steady increase in the number of registered users of synthetic narcotic substances and psychoactive pharmaceutical drugs in Uzbekistan from 2022 to 2024. This reflects a significant expansion in the distribution of synthetic drugs over the observed period. The trend in the annual number of registered cases demonstrates a clear upward trajectory, with a particularly sharp increase from 2023 to 2024 (Table 1).

Table 1. Total Registered Cases by Year

Year	Total Registered Cases	Growth Rate Compared to the Previous Year
2022	893	– (baseline year)
2023	1041	+16.6%
2024	1294	+24.3%

Over the three-year period, the total number of synthetic drug and psychoactive substance users has increased sharply. The most notable surge occurred in 2024, which may indicate both greater availability of these substances and improvements in case detection. In either case, this trend is concerning and suggests a wider spread of new narcotic substances in the country.

2. Gender Analysis

The use of synthetic drugs remains a predominantly male issue; however, the proportion of female users has also been increasing. Each year, men account for approximately 90% of cases (Table 2).

Table 2. Distribution by gender by Year

Year	Men (n)	Women (n)
2022	823	70
2023	949	92
2024	1166	128

The absolute number of female drug users has increased (from 70 to 128), yet men continue to represent the overwhelming majority of cases. Despite the relatively small

proportion of female users, the steady rise in their numbers suggests a growing trend that requires further attention.

3. Age Analysis

An analysis of data over the three-year period reveals a steady increase in the number of registered individuals using synthetic drugs and psychoactive pharmaceutical substances. However, the concern is not only the rising numbers but also the changing age structure of drug users.

Increase Among Young Adults: A New High-Risk Group

The most significant changes have been observed in the 20-34 age group, where the share of registered users has increased sharply: among individuals aged 20-24, the proportion of registered cases rose from 8.51% to 11.67%. In the 25-29 age group, the percentage increased from 18.70% to 19.78%. Among 30-34-year-olds, the most significant rise was recorded —from 15.90% to 21.64%. These age groups, which were previously in the relative "shadow" compared to older categories, are now becoming the key segment of drug users. This may indicate greater availability and popularity of psychoactive substances among young adults, as well as insufficient effectiveness of prevention measures targeting this population.

Declining Proportion Among Older Age Groups

Alongside the increase among young adults, a relative decline in the proportion of users aged 35 and older has been observed: in the 35-39 age group, the percentage of cases decreased from 19.14% to 16.07%. In the largest age category (40-64 years), the proportion fell from 35.16% to 29.44%. However, it is crucial to note that a decrease in the percentage does not imply a reduction in the absolute number of users in these age groups. On the contrary, their total number continues to grow, albeit at a slower rate than among younger individuals.

Adolescents: A Small but Concerning Group

Younger age groups, including 0-14 and 15-17 years, still represent a minimal proportion of the total cases. However, their presence in the statistics suggests that the issue is affecting adolescents as well. Despite their low absolute numbers, this remains a warning sign, indicating the potential for further expansion of psychoactive substance use among young people.

Key Trends

- Young adults (20-34 years old) have become the primary high-risk group, showing the most significant increase in the proportion of users. This necessitates a revision of prevention strategies and early intervention efforts aimed at this demographic.
- The declining relative share of older age groups (35-64 years) does not mean a reduction in the problem. The absolute number of registered cases in these age groups continues to rise, suggesting a persistent pattern of drug dependence among older users.
- The minimal but present proportion of adolescents (15-17 years) indicates an ongoing risk of youth involvement in drug use. This suggests the possibility of more hidden or underestimated forms of substance use within this age group.

Overall, the data indicate a shift in the profile of synthetic drug and psychoactive substance users. While older age groups previously dominated the statistics, there is now a clear shift towards younger adults, who are experiencing the most significant growth in drug use. This requires intensified prevention measures, tailored interventions, and stricter control over the availability of new psychoactive substances among young people.

4. Analysis by Substance Type

The structure of substance use has changed significantly from 2022 to 2024. Below is an overview of the main substance categories and the trends in their consumption.

Synthetic Cathinones – Leading in Growth. The total number of cases related to synthetic stimulant cathinones has surged from 183 cases in 2022 to 538 in 2024, almost a threefold increase. Within this group:

- α-PVP has seen an explosive rise in popularity. In 2022, only 36 cases were linked to α-PVP, but by 2023, this number had jumped to 208 cases, reaching 319 cases in 2024. This indicates that α-PVP has transitioned from a rare phenomenon to one of the most commonly used synthetic drugs.
- Mephedrone, on the other hand, exhibited a nonlinear trend. There were 133 recorded cases in 2022, followed by a decline to 102 cases in 2023, before rising again to 181 cases in 2024. This fluctuation may suggest that some mephedrone users switched to α-PVP in 2023 due to its availability, but as the overall market for synthetic cathinones expanded, mephedrone regained its popularity by 2024.

Opioid Analgesics and Their Analogues – A Declining Trend. Tramadol use has shown a steady decline, decreasing from 262 cases in 2022 to 205 in 2023 and 159 in 2024. Nalbuphine followed a similar pattern, with 14 recorded cases in both 2022 and 2023, dropping to 8 cases in 2024. Even desomorphine (commonly known as “Crocodile”, a homemade opioid) has experienced a slight decrease, from 148 cases in 2022 to 145 in 2023 and 146 in 2024, indicating stagnation at around 146 cases per year. The decline in tramadol and nalbuphine use may indicate stricter regulations on prescription opioids and their displacement by emerging synthetic stimulants.

Synthetic Cannabinoids (“Spice”) – Losing Popularity. The number of users of synthetic cannabinoid smoking mixtures has slightly declined over time: 23 cases in 2022 → 18 cases in 2023 → 17 cases in 2024. This suggests that “Spice” is becoming less popular compared to other drugs, although it remains available on the market.

Sedative-Hypnotic Drugs – No Significant Growth. The total number of cases involving tranquilizers and sleeping

pills used recreationally (often in combination with other substances) has remained relatively stable: 37 cases in 2022 → 27 in 2023 → 28 in 2024 (minor fluctuations). Zopiclone use dropped from 27 cases in 2022 to 11 in 2023 but rebounded to 17 cases in 2024. Diphenhydramine (Benadryl) remains at consistently low levels, with around 5 recorded cases annually. This indicates that interest in sedative medications has slightly decreased, possibly due to their weaker euphoric effects or a shift in user preferences toward stronger substances.

Anticonvulsants – A New Trend. This category includes prescription medications such as pregabalin, gabapentin, and carbamazepine, which can produce psychoactive effects when misused. The total number of cases involving anticonvulsants has risen significantly, from 201 cases in 2022 to 286 in 2023 and 365 in 2024—an 81% increase over three years. Pregabalin is the primary driver of this trend, with its usage increasing from 171 cases in 2022 to 213 in 2023 and 274 in 2024. This makes pregabalin one of the fastest-growing drugs in terms of use. The rise in pregabalin use is likely linked to its availability on the black market. Gabapentin use has remained stable, with around 20 cases per year (21 → 20 → 22 cases, respectively). Carbamazepine is rarely misused, with no more than 5–7 cases annually.

By 2024, the drug consumption landscape has shifted toward stimulants. Synthetic cathinones (especially α-PVP and mephedrone) and prescription pregabalin have become the fastest-growing substances, whereas the use of opioid painkillers (tramadol, nalbuphine) and other substances (desomorphine, synthetic cannabinoids) has either declined or stagnated.

This transformation is likely driven by the availability and affordability of new psychoactive substances compared to traditional drugs. At the same time, stricter regulations on pharmacy opioids (such as tramadol) have reduced their illicit use.

5. Correlation Analysis (Gender, Age, and Substance Type)

The relationship between gender, age, and preferred substances is clearly reflected in the data:

Gender and Drug Type

Men dominate all substance categories, but their prevalence is particularly pronounced in certain psychoactive substances. For example, among α-PVP and mephedrone users, the proportion of men exceeds 90–95%. Women, although a minority, tend to be overrepresented in categories involving pharmaceutical drugs. In 2024, approximately 16–17% of cases involving tropicamide and zopiclone were female users. Additionally, diphenhydramine (Benadryl) misuse shows a relatively high proportion of female users (40–60% across different years, albeit with low absolute numbers). This may indicate that women are more likely to misuse legally available medications, possibly starting their use for medical reasons, whereas men are more likely to experiment with illicit synthetic substances. However, there are exceptions—pregabalin users include approximately 11% women in 2024.

Age and Drug Type

Different substances attract specific age groups, showing a clear trend: new synthetic drugs tend to be more popular among younger users, whereas older age groups remain loyal to traditional substances. For example, synthetic cathinones are most common among users aged 18–30. In 2024, the peak consumption of α-PVP was among men aged 20–34, with approximately 75% of users falling within this age range, particularly 20–29 years old. Mephedrone was also predominantly used by younger individuals, with a significant portion falling within the student demographic (18–25 years old). The reason behind this trend is likely the method of distribution—these powdered substances are sold via messaging apps and marketed as "club drugs" in youth social circles. Conversely, older age groups are more associated with traditional drugs such as desomorphine and tramadol. The average age of desomorphine users in Uzbekistan is 40–45 years, and cases among younger individuals are nearly nonexistent. Tramadol misuse was primarily observed among men aged 30–50. In 2022, approximately 40% of tramadol-related cases occurred in individuals aged 40–64 years.

4. Conclusions

This study analyzed the demographic trends and substance preferences among synthetic drug users in Uzbekistan from 2022 to 2024. The results indicate a significant increase in synthetic stimulant use, particularly among young adults aged 20–34. The rapid growth of α-PVP, mephedrone, and pregabalin use highlights shifting drug trends and the need for updated intervention strategies. In contrast, opioid analgesic use has declined, likely due to stricter regulations. These findings underscore the importance of targeted prevention measures, stricter control over pharmaceutical drug distribution, and continued surveillance of emerging psychoactive substances. Future research should explore long-term trends and evaluate the impact of digital drug markets on substance accessibility.

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