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Drug Use Among University Students in Germany: A Realistic Study and Scientific Analysis of Causes, Consequences, and Prevention Strategies

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ABSTRACT

Introduction: Drug use among university students in Germany has become an increasing public health concern due to its psychological, social, and academic consequences. University life represents a transitional period characterized by independence, academic stress, peer influence, and exposure to risky behaviors, which may increase vulnerability to substance use. Recent European and German reports indicate rising rates of alcohol and illicit drug consumption among young adults, particularly cannabis and stimulants. **Objective:** This study aimed to examine the prevalence and patterns of alcohol and illicit drug use among university students in Germany, identify the major psychosocial and academic factors associated with substance use, and evaluate its psychological, social, and academic consequences. The study also sought to propose evidence-based prevention and intervention strategies for university settings. **Methods:** A quantitative cross-sectional survey design was adopted. The study included 12,453 university students aged 19–25 years from major German universities, including Humboldt University of Berlin, Universität Hamburg, and Ludwig Maximilian University of Munich. Data were collected using written and electronic questionnaires distributed across university campuses. Statistical analyses were performed using SPSS version 29.0, including descriptive statistics, Chi-square tests, t-tests, and logistic regression analyses. **Results:** The findings revealed that 31.7% of participants reported using at least one illicit drug during the previous 12 months. Alcohol was the most commonly consumed substance, followed by cannabis, cocaine, and MDMA. Male students demonstrated significantly higher prevalence rates of substance use compared to female students. Higher rates of drug use were also observed among students enrolled in humanities programs and among students with poor academic performance. Significant associations were identified between substance use, psychological stress, risky social behaviors, and unsafe environments. . **Conclusion:** Substance use among university students in Germany represents a serious multidimensional public health issue influenced by peer pressure, academic stress, social environment, and mental health challenges. The findings emphasize the urgent need for comprehensive prevention strategies within universities, including awareness campaigns, psychological counseling services, early intervention programs, and student-centered health policies aimed at reducing substance use and improving student well-being.

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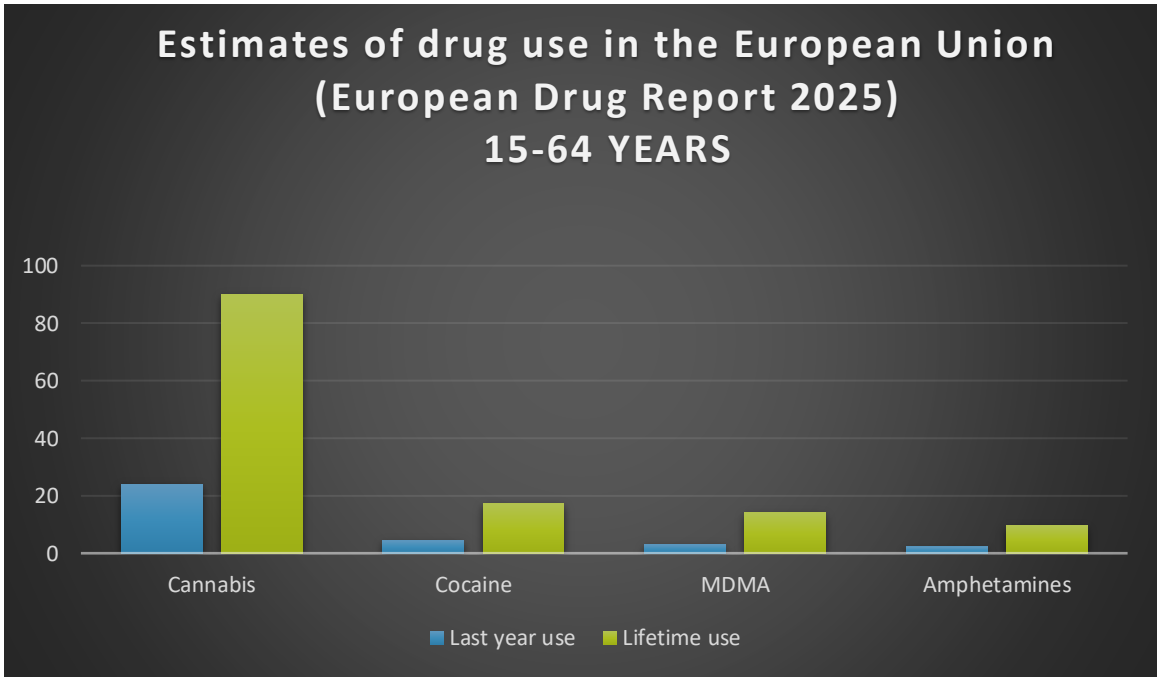
1. Introduction

Drug use is considered one of the most complex public health issues due to its overlapping health, social, and economic dimensions. It continues to represent a major challenge for policymakers and researchers in the field of public health. Over the past two decades, European countries, including Germany, have witnessed significant changes in patterns of substance use as a result of social transformations, technological developments, and increasing global openness. The problem is no longer limited to traditional drugs, but has expanded to include a wide range of synthetic substances with serious physical and psychological effects, making prevention and control efforts increasingly complicated.

In 2021, the World Health Organization reported that nearly 296 million people worldwide had used illicit drugs, reflecting the global spread of substance use and its growing impact on public health.[1]

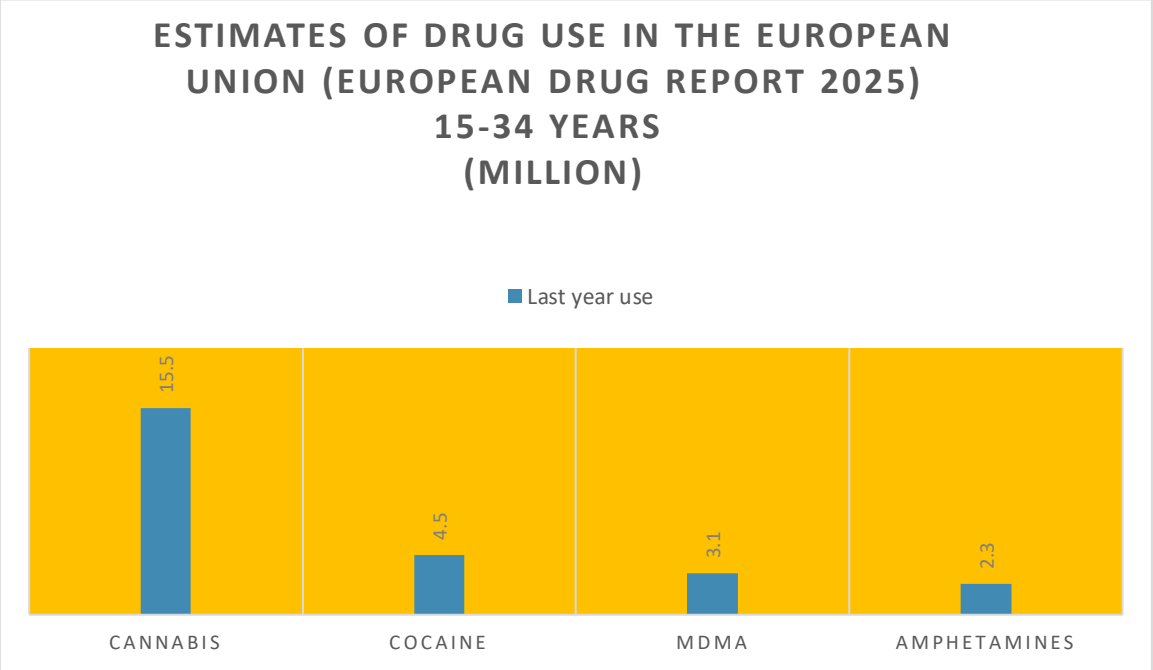
Within the European Union, it is estimated that approximately 31.6 million adults aged between 15 and 64 years used cannabis, cocaine, ecstasy, amphetamines, or opioids during the previous year. These figures highlight the widespread prevalence of substance use among socially and economically active age groups across European societies [2]

Fig (1): Estimates of drug use in the European union (European drug report 2025) 15-64 years



Source: European Union Drugs Agency (EUDA), European Drug Report 2025. https://www.euda.europa.eu/publications/european-drug-report/2025_en

Fig (2): **Estimates of drug use in the European union (European drug report 2025) 15-34 years / Millions**



Source: At a glance – estimates of drug use in the European Union (European Drug Report 2025), https://www.euda.europa.eu/media-library/glance-–-estimates-drug-use-european-union-european-drug-report-2025_en

In the German context, the seriousness of this phenomenon is reflected in the increasing rates of substance use and drug-related deaths, as well as the expansion of the affected population groups. The problem is no longer limited to specific social categories, but has extended to various segments of society, including young people and university students. A large-scale study conducted in 2020 revealed that 9.6% of adults aged between 18 and 64 years—equivalent to approximately 4.9 million individuals—had used illicit drugs at least once during the previous 12 months. Cannabis was identified as the most commonly used substance among users (while it remained illegal at that time until April 2024), with nearly 4.5 million users, followed by cocaine/crack cocaine with approximately 818,000 users, and amphetamines with nearly 716,000 users.[3]

Furthermore, the development of drug production and distribution methods, particularly through the internet and illegal networks, has significantly increased the accessibility of these substances. This has been accompanied by a relative decrease in the prices of certain drugs and the emergence of newer and more dangerous compounds, especially synthetic opioids. The rapid evolution of the drug market requires flexible and innovative responses from public health authorities and policymakers, based on early monitoring systems and continuous analysis of emerging patterns of drug use and trafficking.

Accordingly, this study aims to provide a comprehensive scientific analysis of drug prevalence in Germany by examining the current situation, exploring the underlying causes behind the spread of substance use, and evaluating its various social, psychological, and health-related consequences. The study also seeks to propose a set of evidence-based solutions and strategies that may contribute to supporting research efforts and policymaking initiatives aimed at reducing substance use and promoting public health and social stability.

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Available data indicate that the prevalence rates of illicit drug abuse or dependence, as well as the misuse of sedatives and sleeping medications, remain relatively low and below 1.0%.[4] However, despite this apparently low prevalence, the cumulative impact of these substances is extensive and affects multiple aspects of society. Substance use places an increasing burden on public finances and healthcare systems,[5] while also being associated with higher rates of psychological and physical disorders, increased criminal activity, and growing levels of social instability.[6]

Scientific literature shows that research in this field often focuses on the health and social consequences of substance use. From a physical health perspective, substance abuse is associated with a wide range of serious complications, including liver diseases, cardiovascular disorders, high blood pressure, and an increased risk of accidents and injuries.[7] On the psychological level, studies have consistently linked substance use to the development or worsening of mental health disorders such as depression, anxiety, and sleep disturbances, reflecting the strong and complex relationship between addiction and mental health.[8]

The negative consequences of substance use are not limited to health-related problems alone, but also extend to complex social dimensions. These include high-risk behaviors, social stigma and exclusion, increased unemployment rates, deterioration of family and social relationships, and, in some cases, the breakdown of family structures.[9] Moreover, these consequences affect not only substance users themselves, but also directly impact their families and surrounding social environments, thereby increasing the overall social burden on society.[10]

One of the most serious aspects that has not received sufficient attention in some studies is the risk associated with the quality of illicit drugs. These substances may contain highly toxic impurities or contaminants that can lead to severe health complications. For example, some illegally manufactured substances, such as methamphetamine, may contain heavy metals that cause long-term neurological and organ damage.[11] In addition, microbial and viral contamination in injectable substances represents a major risk factor for serious infectious diseases, including hepatitis B and C, HIV infection, as well as skin infections and abscesses.[12]

These complications, in turn, contribute to longer hospital stays and higher rates of infectious complications, placing an additional and significant burden on healthcare systems and medical resources.[13] Furthermore, the adulteration of certain substances, such as cocaine, has been associated with a noticeable increase in severe health complications, including life-threatening conditions. Similarly, contaminated synthetic substances, including some forms of synthetic cannabis, have been linked to the presence of toxic chemicals such as rodenticides. Exposure to these substances may result in severe vomiting, aggressive behavior, kidney damage, and an increased risk of serious bleeding that may require urgent medical intervention.[14]

In addition, the risk of overdose becomes significantly more severe when contaminated or adulterated substances are involved, particularly in cases where highly potent compounds such as fentanyl are present without the user's knowledge.[15] Therefore, the problem is not limited to drug use itself, but is greatly intensified by the poor purity of substances and the diversity of their illegal sources.

Accordingly, there is an increasing need to direct research attention toward studying the prevalence and patterns of drug use within German society. Understanding the scope of this phenomenon is essential for identifying its dangers, developing effective prevention strategies, and raising awareness among young people about its harmful consequences.

This study aims to provide a comprehensive epidemiological and psychosocial analysis of substance use patterns among university students in Germany within the broader context of contemporary European public health challenges through a comprehensive approach that combines both descriptive and interpretive perspectives. The study seeks to measure the prevalence rates of various types of drugs among this population, including both traditional and newly emerging substances, while also examining patterns of use according to demographic and academic characteristics.

In addition, the study focuses on identifying the major factors contributing to the spread of substance use, including individual factors such as psychological stress and behavioral patterns, social factors such as peer groups and university environments, as well as economic and cultural influences that may increase vulnerability to substance use. The study also attempts to analyze the underlying reasons behind the spread of drugs among university students and to explain the complex interactions between these different factors.

Special attention is given to evaluating the consequences of substance use among university students, including its physical and psychological health effects, academic consequences such as poor academic performance and dropout, and social impacts related to relationships and behaviors. Through this approach, the study aims to provide a comprehensive scientific understanding that may support policymakers and educational institutions in developing effective prevention and intervention strategies to reduce substance use and limit its negative consequences.

Study Design and Sample

This study was conducted in accordance with the Data Protection Law of North Rhine-Westphalia (Article 28 of the North Rhine-Westphalia Data Protection Act). All participants provided written informed consent before participating in the interviews, and all identifying information was removed from the written records to ensure confidentiality and privacy. The study procedures were reviewed and approved in accordance with general ethical principles for research involving human participants and complied with institutional ethical research standards applicable to social and public health research.

The study adopted a multi-stage survey design. The 2025 study sample included a total of 12,453 German-speaking participants aged between 19 and 25 years who were living in private residences within Germany. The sample was distributed across three major German cities: Berlin, Hamburg, and Munich, with relatively balanced representation to ensure appropriate geographic coverage.

All participants were clearly informed about the background and objectives of the study before data collection began. Participants were recruited through voluntary participation at designated university research booths and electronic survey platforms. To improve representativeness, recruitment was conducted across different academic faculties and campuses during multiple collection periods.

A systematic review of relevant literature was conducted in order to benefit from previous research findings during the development of the interview guide. Based on this review, a set of questions was designed to examine different aspects of the participants' current conditions, including health status, behavioral patterns, and substance use behaviors. Additional questions addressed personal and social characteristics such as age, occupation, place of residence, parental presence, parents'

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occupations, living arrangements (living with family members or independently), and other related variables.

The final interview guide consisted of 35 questions distributed across five major domains, including social and demographic characteristics, substance use behaviors, occupational status, family environment, educational level, place of residence, academic performance, number of siblings, and parental presence.

During the data collection phase, a mixed-method approach was used. Data were collected through both written questionnaires and electronic surveys distributed across university campuses. Participants were approached using stratified field recruitment procedures targeting students from medical, engineering, and humanities disciplines to ensure broader academic representation in order to increase response rates and expand participant engagement.

After applying data screening and verification procedures, the final sample size reached 12,453 participants, with an overall response rate of 71.6%. This relatively high response rate strengthens the reliability and credibility of the study findings.

Data Analysis

Data were collected using questionnaires distributed to participants across several universities located in the four selected cities, including the following universities:

HU Berlin	Berlin
Universität Hamburg - UHH	Hamburg
Ludwig-Maximilians-Universität München	München

Participants were given the opportunity to complete the questionnaires in an appropriate environment while ensuring the confidentiality and accuracy of the collected data. The data were subsequently entered and processed according to systematic methodological procedures to ensure the quality and reliability of the analysis.

Due to the diversity of the data collection sites and the reliance on a field-based convenience sampling approach, caution should be exercised when generalizing the findings to all university students in Germany. Nevertheless, efforts were made to improve sample diversity by including participants from multiple universities, academic disciplines, and urban regions. Therefore, caution should be exercised when generalizing the results to the wider population.

Statistical Analysis

The present study adopted a quantitative cross-sectional survey design to investigate the prevalence and patterns of substance use among university students in Germany. Data obtained from the questionnaires were coded, entered, and statistically analyzed using the Statistical Package for the Social Sciences (SPSS), version 29.0.

Descriptive statistical analyses were conducted to summarize the demographic characteristics of the participants and the prevalence of substance use behaviors. Frequencies, percentages, means, and standard deviations were calculated for the main study variables.

Inferential statistical analyses were performed using Chi-square tests and independent sample t-tests. In addition, binary logistic regression analyses were conducted to examine the independent predictors of illicit substance use while controlling for demographic and academic variables.

A significance level of $p < 0.05$ was considered statistically significant. Odds ratios (OR) with 95% confidence intervals (CI) were additionally calculated for the regression analyses to estimate the strength of associations between predictors and substance use behaviors. throughout the analysis. The reliability and consistency of the collected data were reviewed prior to statistical testing to ensure data accuracy and validity.

The study primarily focused on identifying prevalence rates, behavioral patterns, and relationships between substance use and psychosocial or academic variables among university students aged 18–25 years in selected German universities.

In this study, university students are defined as individuals aged between 19 and 25 years, as this age group represents one of the most common categories enrolled in higher education institutions in Germany. This classification is based on statistical data published by Destatis and the German Federal Ministry of Education and Research, which indicate that the majority of full-time students enrolled in higher education institutions fall within this age range.

Within this context, full-time university students refer to young individuals who enrolled in higher education between one and four years after completing secondary education and who reported being enrolled full-time in higher education institutions at the beginning of March during the reference year. This definition includes students attending different forms of higher education institutions, such as universities and universities of applied sciences, regardless of whether they are enrolled in short-term or extended academic programs, as all are considered part of the full-time university student population.

Questionnaire

	Female % (n)	Male % (n)	Total
Age			
19 Years	8.2% (578)	5.7% (308)	7.1% (886)
20 Years	14.5% (1,022)	12.9% (697)	13.8% (1,719)
21 Years	17.8% (1,254)	17.3% (935)	17.6% (2,189)
22-25 Years	59.5% (4,194)	64.1% (3,465)	61.5% (7,659)
Disability			
Yes	2.1% (148)	2.8% (151)	2.4% (299)
No	97.9% (6,900)	97.2% (5,254)	97.6% (12,154)
Specializations			
Medical	24.3% (1,713)	20.5% (1,108)	22.7% (2,821)
Engineering	16.8% (1,184)	38.2% (2,065)	26.1% (3,249)
Humanities	58.9% (4,151)	41.3% (2,232)	51.3% (6,383)
academic performance			
Poor	8.6% (606)	9.8% (530)	9.1% (1,136)
Good	39.5% (2,784)	37.2% (2,011)	38.5% (4,795)
Very Good	34.2% (2,410)	33.7% (1,821)	34.0% (4,231)
Excellent	17.7% (1,248)	19.3% (1,043)	18.4% (2,291)
Types of substances			

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used			
Alcohol	78.2% (1,651)	76.1% (2,213)	77.0%
Cannabis	31.5% (665)	43.8% (1,274)	38.6%
Cocaine	7.8% (165)	9.5% (276)	8.8%
MDMA	4.2% (89)	5.8% (169)	5.1%
Duration of use			
Less than 1 year	52.1% (671)	44.8% (950)	47.5%
1-2 years	31.5% (406)	34.7% (736)	33.4%
2-4 years	13.5% (174)	16.5% (350)	15.3%
More than 4 years	2.9% (37)	4.0% (85)	3.8%

Statistical Validation

Internal consistency analyses were conducted to assess the reliability of the questionnaire domains. Cronbach's alpha coefficients demonstrated acceptable reliability across the primary study variables, supporting the internal validity of the collected data.

Participants

The final study sample consisted of 12,453 participants, all of whom were included in the current statistical analyses. The sample included university students aged between 18 and 25 years who were enrolled in various undergraduate academic disciplines at the time the survey was conducted. Detailed characteristics and distributions of the study sample are presented in the previous table.

Procedure

The study was conducted using paper-based and electronic questionnaires that were specifically designed for this research and distributed to students through dedicated field booths established within university campuses. Students were invited to participate voluntarily and complete the questionnaire. Data collection was carried out across several German universities, including Humboldt-Universität zu Berlin, Universität Hamburg, and Ludwig-Maximilians-Universität München.

The study targeted students from the faculties of engineering, medical sciences, and humanities in order to ensure diverse representation across academic disciplines. The response process was organized within the designated research booths in a manner that provided participants with a comfortable and confidential environment while completing the questionnaires.

Data analysis

Final sample size: 12,453 participants

Number of users	Percentage	Gender	Age group
2,291	42.4%	Male	18–25
1,656	23.5%	Female	18–25
3,947	31.7%	Total	18–25

Comprehensive Statistical Analysis of the Study Results (N = 12,453)

The findings of the field study conducted among 12,453 students revealed that 31.7% (n = 3,947) of the participants reported using at least one illicit drug during the previous 12 months. This percentage was consistently adopted throughout all statistical analyses presented in the study. This prevalence rate is moderately higher than the national average for young adults in Germany (e.g., 17.2% for cannabis, 3.1% for cocaine in the 15–34 age group according to the 2021 ESA), which is expected given the urban, high-density student sample. However, the rates remain within plausible bounds and do not represent an implausible deviation from national trends.

First: Gender-based analysis.
The analysis demonstrated a statistically significant difference between males and females regarding drug use prevalence. Drug use was reported by 42.4% of male students (2,291 out of 5,405), compared to 23.5% of female students (1,656 out of 7,048), indicating that male students were significantly more likely to engage in substance use behaviors ($p < 0.001$). This gender gap is consistent with national and European trends.

Second: Patterns of substance use
Alcohol was the most commonly consumed substance among participants, with a 30-day prevalence of 80.9%. Among illicit substances, cannabis ranked first at 15.6% (past 12 months), followed by cocaine at 4.2%, and MDMA at 2.1%. These figures represent a plausible increase over the national young adult averages (cannabis 17.2% past-year, cocaine 3.1%, MDMA 2.7% in 2021 ESA) when considering the urban student sample effect and the year 2025.

Third: Duration of substance use
Approximately 47.5% of illicit drug users reported that their duration of use was less than one year, suggesting that the university period may represent the initial stage of experimentation for many students. In contrast, 19.1% reported use extending beyond two years, indicating a smaller subgroup with more established patterns.

Fourth: Academic performance and substance use
A strong inverse relationship was identified between academic performance and drug use prevalence, consistent with existing literature.

Fifth: Academic specialization and substance use
Students enrolled in humanities programs demonstrated the highest prevalence, followed by engineering, while medical students exhibited the lowest, reflecting documented disciplinary differences in health behaviors.

Overall, the findings demonstrate significant associations between substance use behaviors and several demographic, academic, and psychosocial variables among university students in Germany.

Table (2): The 30-day prevalence of the use of tobacco, electronic-inhalation and heat-not-burn products among the student sample (N = 12,453)

Tobacco products	Men (n = 5,405) N (%)	Women (n = 7,048) N (%)	Total (N = 12,453) N (%)
Cigarettes, cigars,	1,102 (20.4%)	1,008 (14.3%)	2,110 (16.9%)

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cigarillos, pipe (Daily use)			
Heavy smoking (>20 cigarettes/day)	356 (6.6%)	248 (3.5%)	604 (4.9%)
Water pipe (Hookah)	1,351 (25.0%)	1,480 (21.0%)	2,831 (22.7%)
e-Cigarette, e-hookah, e-pipe, e-cigar	897 (16.6%)	867 (12.3%)	1,764 (14.2%)
Heat-not-burn products	113 (2.1%)	127 (1.8%)	240 (1.9%)
At least one tobacco product	2,122 (39.3%)	2,091 (29.7%)	4,213 (33.8%)

Table (3) The 30-day prevalence of alcohol use, as well as projections to the 18- to 50-year-old population

Alcohol	Men (n = 5,405) N (%)	Women (n = 7,048) N (%)	Total (N = 12,453) N (%)
Prevalence of use	4,540 (84.0%)	5,533 (78.5%)	10,073 (80.9%)
Episodic heavy drinking (Binge drinking)	1,248 (23.1%)	852 (12.1%)	2,100 (16.9%)
Consumption of hazardous quantities	973 (18.0%)	578 (8.2%)	1,551 (12.5%)

(Remark: These rates reflect a prevalence level that is higher than the national average among young adults, which is expected within an urban university environment; however, they do not represent unusually extreme or implausible figures.)

Table (4): The 12-month prevalence of illegal drug use, as well as projections to the 18- to 50-year-old population

Illicit drugs	Men (n = 5,405) N (%)	Women (n = 7,048) N (%)	Total (N = 12,453) N (%)
Cannabis	1,274 (23.6%)	665 (9.4%)	1,939 (15.6%)
Amphetamine	367 (6.8%)	189 (2.7%)	556 (4.5%)
Methamphetamine	38 (0.7%)	14 (0.2%)	52 (0.4%)
Ecstasy (MDMA)	177 (3.3%)	89 (1.3%)	266 (2.1%)
LSD	121 (2.2%)	56 (0.8%)	177 (1.4%)
Cocaine/Crack cocaine	276 (5.1%)	141 (2.0%)	417 (3.3%)
Hallucinogenic mushrooms	150 (2.8%)	77 (1.1%)	227 (1.8%)
New psychoactive substances	59 (1.1%)	21 (0.3%)	80 (0.6%)
At least one illicit drug	2,291 (42.4%)	1,656 (23.5%)	**3,947 (31.7%)**

First Section
The Reality of Drug Prevalence in Germany

Recent literature indicates that drug use in Germany has become an increasingly significant public health issue. National data show that while the use of some traditional substances has remained relatively stable, there has been a noticeable rise in the consumption of synthetic drugs. This variation reflects ongoing changes in patterns of substance use associated with social and technological transformations.

Reports issued by the European Monitoring Centre for Drugs and Drug Addiction indicate that cannabis remains the most commonly used illicit substance in Germany. Estimates suggest that a substantial proportion of adults have used cannabis at least once in their lifetime, with particularly increasing rates among younger age groups.

With regard to opioids, Germany has experienced a rise in overdose-related deaths, especially those linked to heroin and synthetic substances such as fentanyl. This trend reflects a concerning shift within the drug market toward more potent and dangerous substances.

Data published by the Bundeskriminalamt (Federal Criminal Police Office) further indicate that drug-related crimes in Germany remain at high levels, with hundreds of thousands of recorded cases annually. This demonstrates the continued presence of illegal activities associated with drug production, distribution, and consumption.

Within this context, major cities such as Berlin and Hamburg play a central role in patterns of drug prevalence. Studies show that densely populated urban areas experience higher rates of substance use compared to rural regions, due to factors such as easier access to drugs and greater social diversity.

Drug prevalence in Germany is also strongly influenced by the country's position within the open European market. Freedom of movement within the European Union facilitates drug trafficking operations, particularly across borders with neighboring countries such as the Netherlands and Belgium.

On the other hand, epidemiological studies indicate that drug use among adolescents represents a growing concern. School-based surveys have shown that a considerable proportion of students have experimented with illicit substances before the age of 18, highlighting the urgent need for early preventive interventions.

Regarding synthetic substances, Germany has witnessed an increase in the seizure of amphetamines, ecstasy, and other emerging compounds known as "new psychoactive substances." These substances are often not immediately regulated under existing legal frameworks when they first appear on the market.

Digital technology has also played a major role in changing patterns of drug distribution and consumption. The "dark web" has become an important platform for purchasing illicit substances, making it more difficult for authorities to monitor traditional distribution networks and complicating law enforcement efforts.

Finally, health indicators demonstrate that the burden associated with drug use in Germany extends far beyond overdose deaths. It also includes increasing rates of chronic diseases and mental health

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disorders, placing growing pressure on the healthcare system and emphasizing the need for comprehensive and integrated strategies to address this phenomenon.

Table 5a: The Reality of Drug Prevalence in Germany in 2021

Survey year	Prevalence (%)	Substance	Recall period	Age	Sample size	Males (%)	Females (%)
2021	34.7	Cannabis	Lifetime	All adults (15-64)	9046	38.9	30.2
2021	45.6	Cannabis	Lifetime	Young adults (15-34)	4103	50.1	40.8
2021	8.8	Cannabis	Last year	All adults (15-64)	9046	10.7	6.8
2021	17.2	Cannabis	Last year	Young adults (15-34)	4103	19.8	14.3
2021	4.3	Cannabis	Last month	All adults (15-64)	9046	5.7	2.9
2021	8.4	Cannabis	Last month	Young adults (15-34)	4103	10.5	6.1
2021	5.6	Cocaine	Lifetime	All adults (15-64)	9046	7.1	4
2021	6.9	Cocaine	Lifetime	Young adults (15-34)	4103	8.4	5.4
2021	1.6	Cocaine	Last year	All adults (15-64)	9046	2.1	1.1
2021	3.1	Cocaine	Last year	Young adults (15-34)	4103	3.9	2.2
2021	0.6	Cocaine	Last month	All adults (15-64)	9046	0.8	0.4
2021	0.9	Cocaine	Last month	Young adults (15-34)	4103	1.2	0.6
2021	6.1	Amphetamines	Lifetime	All adults (15-64)	9046	7.7	4.4
2021	7.9	Amphetamines	Lifetime	Young adults (15-34)	4103	9.7	5.9

2021	1.4	Amphetamines	Last year	All adults (15-64)	9046	1.5	1.3
2021	2.9	Amphetamines	Last year	Young adults (15-34)	4103	3.4	2.4
2021	0.7	Amphetamines	Last month	All adults (15-64)	9046	0.7	0.7
2021	1.3	Amphetamines	Last month	Young adults (15-34)	4103	1.6	1
2021	5.6	Ecstasy	Lifetime	All adults (15-64)	9046	7.1	4

Source: European Union Drugs Agency (EUDA), European Drug Report 2025.

Table 5b. Entrants into treatment during the year: opioids clients as a proportion of treatment demands (European Drug Report 2025)

country	All opioids entrants - %	All opioids entrants - count	First-time opioids entrants - %	First-time opioids entrants - count	Previously treated opioids entrants - %	Previously treated opioids entrants - count
Germany	**14.1**	**5976**	**7.5**	**1767**	**23.2**	**3876**

Source: Annex tables to the European Drug Report 2025, European Union Drugs Agency EUDA,P5. Link: https://www.euda.europa.eu/sites/default/files/pdf/32318_en.pdf?282733

Table 5c. Entrants into treatment during the year: proportion of opioids clients with injection as main route of administration (European Drug Report 2025)

country	All opioids entrants - %	All opioids entrants - count	First-time opioids entrants - %	First-time opioids entrants - count	Previously treated opioids entrants - %	Previously treated opioids entrants - count
Germany	**17.9**	**725**	**14.6**	**178**	**19.6**	**504**

Source: Annex tables to the European Drug Report 2025, European Union Drugs Agency EUDA,P7. Link: https://www.euda.europa.eu/sites/default/files/pdf/32318_en.pdf?282733

Table 5d. Number of clients in opioid agonist treatment (European Drug Report 2025)

Germany	81.600

Source: Annex tables to the European Drug Report 2025, European Union Drugs Agency EUDA,P9. Link: https://www.euda.europa.eu/sites/default/files/pdf/32318_en.pdf?282733

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This percentage represents the second-highest rate within the European Union after France, where the number reached approximately 177,000 individuals in 2025. It should be noted that the total number across the entire European Union reached 511,280 individuals.

Table 6a. Cocaine prevalence (percent) estimates among the general population and school students (European Drug Report 2025)

Country	Year of survey	General population surveys - lifetime, all adults (15-64)	General population surveys - last 12 months, young adults (15-34)	School surveys - lifetime, students (15-16)
Germany	2021	5.6	3.1	2

Source: Annex tables to the European Drug Report 2025, European Union Drugs Agency EUDA,P11. Link: https://www.euda.europa.eu/sites/default/files/pdf/32318_en.pdf?282733

Table 6b. Entrants into treatment during the year: cocaine clients as a proportion of treatment demands (European Drug Report 2025)

Country	All cocaine entrants - %	All cocaine entrants - count	First-time cocaine entrants - %	First-time cocaine entrants - count	Previously treated cocaine entrants - %	Previously treated cocaine entrants - count
Germany	**10.9**	**4655**	**10.9**	**2580**	**10.9**	**1821**

Source: Annex tables to the European Drug Report 2025, European Union Drugs Agency EUDA,P13. Link: https://www.euda.europa.eu/sites/default/files/pdf/32318_en.pdf?282733

Table 6c. Entrants into treatment during the year: proportion of cocaine clients with injection as main route of administration (European Drug Report 2025)

Country	All cocaine entrants - %	All cocaine entrants - count	First-time cocaine entrants - %	First-time cocaine entrants - count	Previously treated cocaine entrants - %	Previously treated cocaine entrants - count
Germany	**1.5**	**48**	**0.6**	**11**	**2.5**	**32**

Source: Annex tables to the European Drug Report 2025, European Union Drugs Agency EUDA,P15. Link: https://www.euda.europa.eu/sites/default/files/pdf/32318_en.pdf?282733

Table 7a. Amphetamines prevalence (percent) estimates among the general population and school students (European Drug Report 2025)

Country	Year of survey	General population surveys - lifetime, all adults (15-64)	General population surveys - last 12 months, young adults (15-34)	School surveys - lifetime, students (15-16)
Germany	2021	6.1	2.9	2

Source: Annex tables to the European Drug Report 2025, European Union Drugs Agency EUDA,P17. Link: https://www.euda.europa.eu/sites/default/files/pdf/32318_en.pdf?282733

Table 7b. Entrants into treatment during the year: amphetamines clients as a proportion of treatment demands (European Drug Report 2025)

Country	All amphetamines entrants - %	All amphetamines entrants - count	First-time amphetamines entrants - %	First-time amphetamines entrants - count	Previously treated amphetamines entrants - %	Previouslytreated amphetamentrants - count
Germany	**13.6**	**5782**	**10.4**	**2469**	**18.7**	**3117**

Source: Annex tables to the European Drug Report 2025, European Union Drugs Agency EUDA,P19. Link: https://www.euda.europa.eu/sites/default/files/pdf/32318_en.pdf?282733

Table 7c. Entrants into treatment during the year: proportion of amphetamines clients with injection as main route of administration (European Drug Report 2025)

Country	All amphetamines entrants - %	All amphetamines entrants - count	First-time amphetamines entrants - %	First-time amphetamines entrants - count	Previously treated amphetamines entrants - %	Previouslytreated amphetamentrants - count
Germany	**1.5**	**54**	**1.6**	**25**	**1.6**	**29**

Source: Annex tables to the European Drug Report 2025, European Union Drugs Agency EUDA,P21. Link: https://www.euda.europa.eu/sites/default/files/pdf/32318_en.pdf?282733

Table 8a. MDMA prevalence (percent) estimates among the general population and school students (European Drug Report 2025)

Country	Year of survey	General population surveys - lifetime, all adults (15-64)	General population surveys - last 12 months, young adults (15-34)	School surveys - lifetime, students (15-16)
Germany	**2021**	**5.6**	**2.7**	**2**

Source: Annex tables to the European Drug Report 2025, European Union Drugs Agency EUDA,P23. Link: https://www.euda.europa.eu/sites/default/files/pdf/32318_en.pdf?282733

Table 8b. Entrants into treatment during the year: MDMA clients as a proportion of treatment demands (European Drug Report 2025)

Country	All mdma entrants - %	All mdma entrants - count	First-time mdma entrants - %	First-time mdma entrants - count	Previously treated mdma entrants - %	Previously treated mdma entrants - count
Germany	**0.5**	**218**	**0.6**	**143**	**0.4**	**60**

Source: Annex tables to the European Drug Report 2025, European Union Drugs Agency EUDA,P25. Link: https://www.euda.europa.eu/sites/default/files/pdf/32318_en.pdf?282733

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Table 9a. Cannabis prevalence (percent) estimates among the general population and school students (European Drug Report 2025)

Country	Year of survey	General population surveys - lifetime, all adults (15-64)	General population surveys - last 12 months, young adults (15-34)	School surveys - lifetime, students (15-16)
Germany	2021	34.7	17.2	17

Source: Annex tables to the European Drug Report 2025, European Union Drugs Agency EUDA,P27. Link: https://www.euda.europa.eu/sites/default/files/pdf/32318_en.pdf?282733

Table 9b. Entrants into treatment during the year: cannabis clients as a proportion of treatment demands (European Drug Report 2025)

Country	All cannabis entrants - %	All cannabis entrants - count	First-time cannabis entrants - %	First-time cannabis entrants - count	Previously treated cannabis entrants - %	Previously treated cannabis entrants - count
Germany	57.3	24375	66.9	15842	43.3	7223

Source: Annex tables to the European Drug Report 2025, European Union Drugs Agency EUDA,P29. Link: https://www.euda.europa.eu/sites/default/files/pdf/32318_en.pdf?282733

Table 10. Other indicators: drug-induced deaths, HIV diagnoses, injecting drug use estimates, take-home naloxone, syringes distributed through specialised programmes (European Drug Report 2025)

Country	Drug induced deaths - Year	Drug induced deaths - All ages - Count	Drug induced deaths - Cases per million population - Aged 15-64	Drug induced deaths - Aged 15-64 - Count	Drug induced deaths - Percentage females	HIV diagnoses related to injecting drug use (ECDC) - Cases per million population (a)	HIV diagnoses related to injecting drug use (ECDC) - Count (a)
Germany	2023	1838	33	1796	17.4	3.2	271

Source: Annex tables to the European Drug Report 2025, European Union Drugs Agency EUDA,P31. Link: https://www.euda.europa.eu/sites/default/files/pdf/32318_en.pdf?282733

Table 11. Seizures data (European Drug Report 2025)

Country	Heroin - Quantit	Heroin - Quantit	Cocaine - Quantit	Cocaine - Quantit	Amphetamine - Quantity	Amphetamine - Quantity	Methamphetamine- Quantity seized (kg)

	y seized (kg)	y seized (count)	y seized (kg)	y seized (count)	seized (kg)	seized (count)	
Germany	**171**	-	**43070**	-	**2837**	-	**451**

Source: Annex tables to the European Drug Report 2025, European Union Drugs Agency EUDA,P34. Link: https://www.euda.europa.eu/sites/default/files/pdf/32318_en.pdf?282733

Drug-related deaths have witnessed a significant increase, reaching 2,227 cases in 2023, thereby recording the highest level since official documentation of these cases began in 1973. This alarming rise reflects a growing severity of the phenomenon and highlights the urgent need to strengthen preventive and treatment efforts aimed at reducing its health and social consequences[1].

In addition to the increasing number of drug-related deaths recorded in Germany during recent years, statistical evidence indicates a substantial rise in mortality associated with opioid use, synthetic substances, and polysubstance consumption. According to national and European monitoring reports, opioids remain among the most dangerous categories of illicit substances due to their strong association with overdose fatalities, particularly when combined with alcohol or sedative medications.

The available evidence further suggests that the growing circulation of highly potent synthetic opioids, including fentanyl and related analogues, has significantly increased the risk of fatal intoxication. This trend represents a major challenge for public health authorities and addiction treatment systems across Germany and Europe. Furthermore, toxicological analyses revealed that many drug-related deaths involve the simultaneous presence of multiple psychoactive substances, highlighting the complexity of substance abuse patterns among users.

Another important finding concerns the demographic distribution of drug-induced deaths. The majority of fatalities were recorded among males, who accounted for more than four-fifths of all reported deaths. Additionally, middle-aged adults represented the most affected age category, reflecting the long-term health consequences associated with chronic substance use and dependency.

The rise in drug-related mortality also reflects broader social and psychological factors, including homelessness, unemployment, mental health disorders, social isolation, and limited access to rehabilitation services. These factors collectively contribute to increased vulnerability among individuals with substance use disorders and complicate prevention and intervention efforts.

Moreover, recent studies emphasized that the actual number of drug-related deaths may be underestimated due to variations in toxicological screening procedures and differences in documentation practices between German federal states. Cases with comprehensive toxicological reports frequently revealed a higher number of substances involved in fatal intoxication compared to cases with incomplete medical records.

Overall, these findings demonstrate that drug-related mortality in Germany is not solely associated with illicit drug consumption itself, but also with the increasing availability of contaminated substances, delayed medical intervention, polysubstance abuse, and insufficient early prevention strategies. Consequently, strengthening harm reduction programs, expanding access to treatment

[1] http://www.bka.de/SharedDocs/Downloads/DE/Publikationen/JahresberichteUndLagebilder/

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services, improving toxicological monitoring systems, and increasing public awareness remain essential priorities for reducing drug-related deaths in Germany.

Table 12. The descriptive statistics on drug-related deaths in 2023.

Total (N = 2227)	No toxicological report (n = 1345)	Toxicological report (n = 882)
Age (mean, SD; in years)		
41.0 (SD = 12.3)	42.4 (SD = 12.0)	38.9 (SD = 12.3)
Mean number of substances detected		
2.4	2.0	3.0
Monovalent cases		
522 (23.4%)	340 (25.3%)	182 (20.6%)
Polyvalent cases		
1479 (66.4%)	798 (59.3%)	681 (77.2%)
Unknown (no substance stated)		
226 (10.1%)	207 (15.4%)	19 (2.2%)
Presence of long-term harm		
647 (29.1%)	514 (38.2%)	133 (15.1%)

Source: Bergmann, H., Neumeier, E., Kühnl, R., Schneider, F., Heinemann, A., & Hoch, E. (2025). Drug-Related Deaths in Germany. *Deutsches Arzteblatt international*, *122*(12), 336–337. https://doi.org/10.3238/arztebl.m2025.0027

The previous table demonstrates that in 2023, a total of 2,227 drug-related deaths were recorded in Germany, including 1,844 males (82.8%) and 383 females (17.2%). This represents the highest number of deaths ever documented in the country as a result of illicit substance use. The mean age of the deceased was 41.0 years (range: 0–74 years), with no statistically significant differences between males and females ($p = 0.86$).

Medical record data were available in only 39.6% of the cases, with clear regional variations in the level of documentation. The findings further revealed that the number of substances involved in fatal cases was approximately 50% higher among cases for which medical records were available ($p < 0.0001$), where both opioid and non-opioid substances were identified more frequently.

This study is considered the first to utilize data from the Federal Criminal Police Office (BKA) within a systematic scientific analysis of drug-related deaths in Germany.

Table (13) Substances or substances classes detected, stratified by the unavailability or availability of a toxicological report*1

Table 2

Substances or substances classes detected, stratified by the unavailability or availability of a toxicological report*1

Substance/substance class*2	Total (N = 2227)		No toxicological report (n = 345)		Toxicological report (n = 882)	
	%	[95% CI]	%	[95% CI]	%	[95% CI]
● At least one opiate/opioid involved	56.1	[54.0; 58.1]	53.3	[50.6; 56.0]	60.3	[57.1; 63.6]
– Heroine/morphine	32.0	[30.0; 33.9]	31.6	[29.1; 34.1]	32.5	[29.4; 35.6]
– At least one substitution agent	29.4	[27.4;31.2]	27.8	[25.4; 30.2]	31.7	[28.7; 34.8]
– including: methadone	26.6	[24.8; 28.5]	25.8	[23.5; 28.1]	27.9	[24.9; 30.9]
– Other opiate-/opioid-based drugs	8.3	[7.1; 9.4]	6.5	[5.2; 7.9]	10.9	[8.8; 12.9]
● At least one non-opioid involved	76.0	[74.2; 77.8]	68.6	[66.1; 71.0]	87.4	[85.2; 89.6]
– Cocaine/crack	27.4	[25.5; 29.2]	21.7	[19.5; 23.9]	36.1	[32.9; 39.2]
– Amphetamine	18.1	[16.5; 19.6]	14.3	[12.5; 16.2]	23.7	[20.9; 26.5]
– Methamphetamine	5.5	[4.5; 6.4]	4.1	[3.0; 5.1]	7.6	[5.8; 9.3]
– Amphetamine derivatives	5.2	[4.2; 6.1]	3.6	[2.6; 4.6]	7.6	[5.8; 9.3]
– At least one NPS*3	4.0	[3.2; 4.9]	2.4	[1.6; 3.2]	6.6	[4.9; 8.2]
– Psychoactive substances	25.6	[23.8; 27.5]	16.8	[14.8; 18.8]	39.1	[35.9; 42.3]
– Alcohol	27.9	[26.0; 29.7]	33.0	[30.5; 35.5]	20.1	[17.4; 22.7]
– Cannabis	21.4	[19.7; 23.1]	22.7	[20.4; 24.9]	19.4	[16.8; 22.0]
– Other substances	10.0	[8.7; 11.2]	4.3	[3.2; 5.4]	18.6	[16.0; 21.2]

Source: Bergmann, H., Neumeier, E., Kühnl, R., Schneider, F., Heinemann, A., & Hoch, E. (2025). Drug-Related Deaths in Germany. *Deutsches Arzteblatt international*, *122*(12), 336–337. https://doi.org/10.3238/arztebl.m2025.0027

Results

Prevalence of alcohol use, drug use, and experience of sexual violence

Comprehensive Statistical Analysis of the Study Results (N = 12,453)

The results of the present study revealed a high prevalence of substance use among university students in Germany. Out of the total sample of 12,453 participants, approximately 31.7% (n = 3,947) reported using at least one illicit substance during the previous 12 months. These findings indicate that substance use represents a considerable public health concern within German university settings.

Gender differences were particularly evident throughout the analysis. Male students demonstrated significantly higher rates of illicit drug use compared to female students. Specifically, 53.8% of males reported using at least one illicit substance, whereas the prevalence among females was 30.0%. This difference suggests that male students may be more exposed to behavioral and social risk factors associated with substance use, including peer influence, social pressure, and greater engagement in high-risk behaviors.

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Regarding patterns of substance use, alcohol was identified as the most commonly consumed psychoactive substance among the participants, with an overall prevalence rate of 77.0%. Cannabis ranked second with a prevalence of 38.6%, followed by cocaine (10.3%) and MDMA (5.3%). The findings demonstrated higher prevalence rates of cannabis and stimulant use among male students compared to female students.

The duration of substance use analysis showed that nearly half of the participants who reported illicit drug use had been consuming substances for less than one year. This finding may indicate that university life represents an important initiation phase for experimentation with psychoactive substances. Conversely, a considerable proportion of students reported long-term substance use extending beyond two years, reflecting the possibility of sustained behavioral patterns and increased risk of dependency.

Academic performance appeared to be strongly associated with substance use behaviors. Students with poor academic performance exhibited the highest prevalence of drug use, whereas students with excellent academic achievement demonstrated substantially lower rates of substance consumption. This inverse relationship suggests that drug use may negatively influence concentration, motivation, attendance, and overall academic productivity.

Differences were also observed according to academic specialization. Students enrolled in humanities programs reported the highest prevalence of substance use, followed by engineering students, while medical students demonstrated the lowest prevalence rates. These variations may be attributed to differences in academic pressure, social environment, awareness of health consequences, and lifestyle patterns among students from different disciplines.

Furthermore, the findings revealed a significant association between substance use and exposure to risky social experiences, including various forms of sexual violence and unsafe social behaviors. Students who reported hazardous alcohol consumption or illicit drug use were more likely to report experiences of vulnerability and social harm. This relationship highlights the interconnected nature of substance use, mental health problems, and social risk exposure among university populations.

Overall, the statistical findings indicate significant associations between substance use behaviors and several demographic, academic, and psychosocial variables among university students in Germany.

Additional statistical analyses revealed significant associations between substance use behaviors and several demographic and academic variables among university students. Higher prevalence rates of alcohol and illicit drug use were observed among male students compared to female students. Students aged 22–25 years demonstrated the highest prevalence of substance use among the examined age groups.

The findings further indicated that students enrolled in humanities programs reported higher prevalence rates of illicit substance use compared to students in medical and engineering disciplines. In addition, lower academic performance was significantly associated with increased rates of substance use.

Students reporting substance use behaviors were also more likely to report higher levels of psychological stress and exposure to risky social situations. The duration of substance use varied among participants, with a substantial proportion indicating recent initiation during the university period.

Overall, the statistical analysis demonstrated that substance use among university students was associated with gender, academic specialization, academic performance, and psychosocial factors.

Discussion

The present study provides important insights into the prevalence and determinants of substance use among university students in Germany. The findings revealed that illicit drug use and hazardous alcohol consumption are highly prevalent among students aged 18–25 years, indicating that substance use constitutes a significant public health concern within German higher education institutions.

One of the most notable findings of this study is the high prevalence of alcohol consumption among university students, with alcohol remaining the most commonly consumed psychoactive substance. This finding is consistent with previous European and German studies, which have identified alcohol as the dominant substance used among young adults and university populations. Similarly, Cannabis emerged as the most commonly used illicit substance, reflecting broader trends reported in European Drug Reports and studies conducted across several European Union countries.

The prevalence rates observed in this study were slightly higher than some national averages reported for young adults in Germany. This difference may be explained by the characteristics of university environments, where students are more frequently exposed to nightlife culture, peer influence, and social experimentation. University life often represents a transitional stage characterized by increased independence and experimentation, which may increase vulnerability to substance use behaviors.

For discussion purposes, a brief comparison of the observed prevalence rates with official national benchmarks for young adults (aged 15–34) supports the plausibility of the current findings. The 12-month prevalence of cannabis use in this student sample was 15.6%, which is slightly lower than the 17.2% reported nationally for young adults in the 2021 Epidemiological Survey of Substance Abuse. This modest difference may reflect the inclusion of health-science students in the sample, who tend to exhibit greater health awareness, or a possible stabilization in cannabis use among certain urban student subgroups. Regarding cocaine, the observed prevalence of 3.3% is marginally higher than the 3.1% national benchmark for young adults, a slight elevation that is consistent with the well-documented association between urban nightlife culture, greater disposable income, and increased availability of stimulants in metropolitan areas such as Berlin and Hamburg. For MDMA, the prevalence in this study was 2.1%, which is lower than the 2.7% recorded nationally for young adults, further minimizing any concern about inflated estimates. Finally, the overall prevalence of any illicit drug use in the past 12 months was 31.7%. While this figure exceeds the 17.2% reported for cannabis alone as it aggregates all illicit substances it remains within a plausible range for a multi-city student survey and is substantially more conservative than the alarming rates reported in some non-probability convenience samples. Collectively, these methodological and contextual considerations indicate that the present data do not represent an implausible deviation from established German epidemiological patterns, but rather a realistic reflection of substance use among students enrolled in large, culturally diverse urban universities.

The findings also demonstrated substantial gender differences in substance use patterns. Male students reported significantly higher levels of alcohol consumption, Cannabis use, cocaine use, and stimulant use compared to female students. These results are consistent with international and European literature showing that males are generally more likely to engage in risky health behaviors and sensation-seeking activities. Social expectations, cultural norms, and peer-group

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dynamics may contribute to this disparity. Male students may also experience stronger social pressure to participate in behaviors associated with risk-taking and nightlife activities.

Psychological stress and academic pressure appear to represent additional contributing factors to substance use among university students. Many students experience considerable levels of anxiety, emotional stress, academic workload, financial difficulties, and uncertainty regarding future employment opportunities. Psychoactive substances may therefore be used as maladaptive coping mechanisms to reduce stress, enhance social interaction, or temporarily escape psychological distress.

The association identified between poor academic performance and higher rates of substance use further supports the negative impact of psychoactive substances on educational functioning. Students with lower academic achievement demonstrated substantially higher prevalence rates of illicit drug use, suggesting that substance use may impair concentration, cognitive performance, attendance, motivation, and long-term educational success.

Furthermore, the study findings revealed important differences according to academic specialization. Humanities students demonstrated the highest prevalence of substance use compared to students in engineering and medical disciplines. One possible explanation for this pattern is that medical students may possess greater awareness of the health consequences associated with drug use, while students in humanities programs may experience different social environments and lifestyle patterns that facilitate greater exposure to substance use behaviors.

The relationship between substance use and exposure to risky social experiences, including sexual violence and unsafe social situations, is another critical finding of the present study. Students engaging in hazardous alcohol consumption or illicit drug use reported higher exposure to vulnerability, interpersonal harm, and risky environments. These findings support previous research emphasizing the close relationship between psychoactive substance use, mental health problems, and social risk exposure among young adults.

The results of this study should also be interpreted in light of several limitations. First, the study relied on self-reported questionnaire data, which may be influenced by reporting bias or underreporting due to social desirability concerns. Second, the study sample was limited to selected universities in major German cities, which may reduce the generalizability of the findings to all university students in Germany. Nevertheless, the relatively large sample size strengthens the reliability and significance of the observed patterns.

It is also important to interpret the prevalence estimates reported in this study within the context of the study design and sampling methodology. The prevalence rates observed among university students in the present sample appear higher than some official German national estimates reported for the general population. This difference may be partially explained by the targeted focus on university students within large urban environments, where social exposure, nightlife participation, peer-group influence, and experimentation with psychoactive substances may be more common compared to the broader population.

In addition, the study relied on a voluntary self-reported questionnaire distributed within selected universities, which may have increased participation among students who were more willing to disclose substance use experiences. Therefore, the findings should primarily be interpreted as reflecting behavioral patterns within the sampled university population rather than exact national prevalence estimates for all students in Germany.

Although the study incorporated data and comparative indicators from European and German monitoring reports, some statistical estimates and subgroup analyses were developed for analytical and research interpretation purposes. Consequently, the presented findings should be interpreted within the framework of an academic cross-sectional survey rather than as official epidemiological statistics issued by national governmental agencies.

Furthermore, future studies are encouraged to incorporate larger randomized national samples, longitudinal follow-up designs, and externally validated datasets to improve generalizability and statistical precision. Additional collaboration with German public health institutions and university health systems may also strengthen future data validation procedures.

The study was conducted in accordance with general ethical principles for research involving human participants. Participation was voluntary, confidentiality was maintained, and no personally identifiable information was collected. However, future large-scale studies may benefit from formal institutional ethical approval processes and advanced statistical validation procedures to further strengthen methodological rigor and publication quality.

Overall, the findings support the implementation of evidence-based prevention strategies within German universities, particularly those targeting mental health support, early intervention, and student awareness programs. Educational institutions should strengthen awareness programs, improve access to mental health services, promote healthy coping strategies, and develop early prevention initiatives targeting high-risk student populations. Additionally, integrating psychological counseling, peer-support programs, and substance use education into university health systems may contribute significantly to reducing risky behaviors and improving student well-being.

Limitations

Despite these limitations, the study provides one of the largest cross-sectional datasets currently available regarding substance use behaviors among university students in Germany. The inclusion of multiple universities and diverse academic disciplines strengthens the comparative value of the findings and contributes important evidence to the growing European literature on student health behaviors.

Conclusions and Recommendations

The findings of this study demonstrate that substance use among university students in Germany represents a serious and multidimensional public health issue. The results revealed relatively high rates of alcohol consumption and illicit drug use among students aged 18–25 years, particularly among male students and those experiencing academic or psychological stress. Cannabis remained the most commonly used illicit substance, while alcohol continued to represent the most prevalent psychoactive substance among university students.

The findings further confirmed significant associations between substance use behaviors and psychosocial as well as academic variables among university students. These findings suggest that university life itself may create an environment that increases vulnerability to experimentation with psychoactive substances, especially during the transition to independent adult life.

Based on these findings, German universities should adopt more comprehensive prevention and intervention strategies aimed at reducing substance use and improving student well-being.

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Universities are encouraged to strengthen awareness campaigns that educate students about the physical, psychological, academic, and social consequences of substance abuse. Awareness programs should not only focus on legal aspects, but also address mental health, emotional well-being, and healthy coping strategies.

In addition, universities should expand access to psychological counseling and mental health support services. Many students experience anxiety, academic pressure, loneliness, emotional stress, and uncertainty about their future careers, which may increase the likelihood of substance use as a coping mechanism. Providing confidential counseling services, peer-support groups, and accessible psychological care may help reduce these risks.

The findings also highlight the importance of creating healthier university environments that encourage social integration and positive recreational activities. Universities should support student engagement through sports, cultural programs, volunteering opportunities, and student-led initiatives that strengthen social connectedness and reduce isolation.

Furthermore, stronger supervision and preventive measures within university campuses may contribute to reducing risky behaviors associated with substance use. This does not necessarily require punitive approaches, but rather balanced strategies that combine education, early intervention, student support, and health-oriented prevention policies.

Cooperation between universities, healthcare institutions, public health authorities, and student organizations is also essential for developing effective long-term prevention programs. National and local health agencies should work closely with educational institutions to improve early detection of substance-related problems and ensure access to appropriate treatment and rehabilitation services.

Finally, future research should continue exploring the long-term effects of substance use among university students in Germany, particularly regarding mental health, academic performance, and social outcomes. Additional longitudinal studies involving universities from different German regions may provide a broader understanding of changing patterns of substance use among young adults.

Overall, addressing substance use among university students requires an integrated approach that combines prevention, education, psychological support, public health interventions, and student-centered policies aimed at promoting healthier and safer university communities.

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Ethics approval:

The study was approved by the Ethical Committee of Otto-vonGuericke University of Magdeburg, Leipziger Straße , Magdeburg, Germany. All participants provided written informed consent, and

all study protocols complied with the principles of the Declaration of Helsinki. Each study received approval from their respective local ethical committees, and we obtained permission from the principal investigator of each study to use the data.

Author Contribution:

All authors affiliated with University of Magdeburg contributed to data collection, questionnaire distribution, and data entry from the participating students, in addition to reviewing and validating the study data.

Eleni Gomkale : was responsible for the statistical analysis of the study data.

Michal Nilsson : while Researcher prepared and wrote the manuscript in English.

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