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Exploring Adolescent Drug Usage Trends and Associated Health Implications in North Macedonia

Haris Sulejmani and Mia Kostovska

Abstract

A detailed analysis approach is used in this study to look into the complicated world of teen drug use and it's health effects in North Macedonia. The study uses quantitative data from the European School Survey Project on Alcohol and Other Drugs (ESPAD) 2019 along with reports from reputable medical and forensic institutions to try to give a more complete picture of how drug abuse affects students in the region who are 15 to 16 years old.

Besides the poll results, information from institutional records also helps to show how complicated the drug-related problems in the area really are. The University Clinic for Toxicology and Emergency Medicine in Skopje is a very important source of information because it shows trends of how often crises happen and the drugs that are most often linked to them, such as heroin, methadone, buprenorphine, and opioid painkillers. The study also looks at how teens think about drug availability and finds a worrying trend in how easy teens think it is to get drugs like cocaine and synthetic chemicals compared to regional rates.

The results make it clear that focused measures are needed to lessen the bad health effects of drug abuse among teens in North Macedonia. The fact that opioids and cocaine are so common in drug-related deaths highlights the urgent need for evidence-based methods to prevent drug abuse. The study also stresses how important it is to improve the ways data is collected and the abilities of institutions in order to make tracking and reaction systems stronger. By shedding light on the complicated relationship between drug use between teens and health effects, this study aims to inform policies that will improve the health of teens in North Macedonia.

Keywords: Adolescent Drug Usage, Substance Abuse, Public Health, Mixed-Methods Analysis, Health Implications.

Introduction

Substance use disorder (SUD) is a manageable psychiatric condition that impacts an individual's cognitive function and actions, resulting in their inability to regulate their consumption of substances such as legal or illicit drugs, alcohol, or prescriptions. SUD is a manageable psychiatric condition that impacts an individual's cognitive functioning and actions, resulting in their inability to regulate their consumption of substances such as illicit drugs, alcohol, or prescription prescriptions (Health, 2023).

Substance use disorder refers to a collection of physiological, behavioral, and cognitive symptoms that occur when individuals continue to use substances despite experiencing substance-related issues, distress, and impairment. These symptoms include poor control and engaging in dangerous usage. Addiction refers to a condition where an individual becomes psychologically and/or physically reliant on the use of drugs or other substances, such as alcohol, or on engaging in activities or behaviors, such as sex, exercise, and gambling.

The DSM-5-TR offers extensive guidelines for diagnosing drug use disorders, encompassing a range of substances including alcohol, opioids, stimulants, and cannabis. The classification differentiates between two categories: drug-use disorders, which are marked by persistent use despite negative outcomes, and substance-induced disorders, which include symptoms of intoxication and withdrawal resulting from substance use.

The criteria for drug use disorder encompass patterns such as escalated consumption, failed endeavors to reduce usage, and disregard of obligations as a result of substance abuse. The severity of a condition is determined by categorizing it as mild, moderate, or severe, depending on the number of symptoms that are present. Substance-induced illnesses encompass a wide spectrum of conditions, including psychosis and mood disorders, as well as sleep and sexual dysfunctions. These diseases are all caused by the use of substances. The DSM-5-TR now acknowledges stimulant-induced neurocognitive disorders, which is a result of studies on the enduring cognitive impacts of drugs such as methamphetamine and cocaine.

In addition, the guidebook provides a detailed description of the symptoms and hazards related to drug intoxication and withdrawal, which can vary in intensity and pose different levels of danger depending on the specific substance. These specific criteria assist physicians in precisely identifying and treating patients who are experiencing difficulties connected to substance abuse (Hartney, 2024).

Substance use/misuse pertains to sporadic instances of substance use, as opposed to consistent, ingrained, or systematic use. Individuals may engage in occasional substance use without developing Substance Use Disorder (SUD); nonetheless, even a limited number of instances of consuming certain substances can result in the development of tolerance and dependence. Tobacco, heroin, cocaine, alcohol, cannabis, and benzodiazepines are all drugs that can lead to the development of tolerance and dependency. Substance use disorder can manifest in many degrees of severity, ranging from mild to moderate to severe. Addiction is the most extreme manifestation of Substance Use Disorder (SUD). It entails persistent drug usage in spite of adverse outcomes. Substance addiction occurs when the reward system in your brain becomes dominant and intensifies the need to seek and use drugs compulsively. Both entail the formation of physical and psychological reliance. Psychological dependence occurs when an individual's thoughts, feelings, and behaviors revolve around a substance to such an extent that they have a strong desire or urge to continue using it, even in the face of unfavorable outcomes. Physical dependency occurs when your body has acclimated to the substance and experiences withdrawal symptoms upon abrupt cessation or dose reduction. Previously, while discussing substance use, healthcare experts, organizations, and the general public frequently employed the phrases "addiction/addict," "abuse/abuser," and "dependence" (Clinic, 2020).

The DSM provides explicit diagnostic criteria for 10 categories of Substance Use Disorders (SUDs), including a broad spectrum of drugs including alcohol, cannabis, opioids, and stimulants such as cocaine or methamphetamine. These illnesses are characterized by a wide range of symptoms that can affect the physical, behavioral, and social aspects of a person. Individuals may display indications such as frequent absences from work or school, engagement in legal issues, covert conduct, fluctuations in mood, modified appearance, or alterations in social circles. Additionally, symptoms may encompass physiological manifestations such as red eyes, tremors, or compromised coordination.

Multiple risk factors contribute to the development of Substance Use Disorders (SUDs), indicating an intricate interaction between genetic, environmental, and social variables. The causes include genetic predispositions, early onset of substance use, drug availability, exposure to substance-related advertising, concurrent mental health disorders, insufficient parental supervision, family conflict, and experiences of abuse or neglect. It is crucial to identify and intervene early by recognizing these indications and risk factors. This will help provide effective treatment and support for persons dealing with substance-related difficulties (Fuller, 2023).

Typically, the initial motivation for someone to begin taking a substance is clear-cut, but it can become intricate and evolve with time. Approximately 20% of drug consumption is primarily driven by the pursuit of pleasure, often resulting in sensations such as euphoria, insensitivity, lethargy, or relaxation. Anxiety disorders are the most prevalent kind of mental condition, and a significant number of individuals rely on medications, mainly alcohol and benzodiazepines, to cope with their anxiety. One frequently seen motive for substance use is to treat bodily symptoms, such as pain. Regulating the accessibility of these substances requires political intervention and significant efforts from law enforcement and other enforcement agencies to identify and limit the importation and distribution of narcotics. (Geddes, 2021).

Substance abuse is the act of using a prescribed substance in a manner that deviates from its intended purpose, such as consuming larger quantities or more frequently than recommended, or using someone else's medication. Substance abuse is characterized as a consistent and recurring habit of consuming legal or illegal substances, resulting in significant negative effects on one's social, occupational, and/or physical well-being (Wecker, 2018)

Adolescents engage in risk-taking behavior since it is advantageous for their development of independence from their parents, establishment of connections and competition with peers, exploration of sexual and romantic experiences, and preparation for adult responsibilities as parents and workers. Simultaneously, however, many individuals begin experimenting with dangerous medications (Thapar, 2015).

There is increasing evidence that the use of both short- and long-term benzodiazepines (BZDs) has a detrimental effect on neurocognitive function. Benzodiazepine (BZD) is a widely used medicine for the treatment of anxiety and sleep disorders (Paul, 2020).

Diazepam, flurazepam, oxazepam, and chlordiazepoxide belong to the class of drugs known as benzodiazepines. While there is some evidence indicating a potential increased risk of dementia, a recent meta-analysis has discovered that the risk is particularly enhanced for individuals who use benzodiazepines with a longer half-life and those who have been using benzodiazepines for a period exceeding 3 years (Boland, 2022).

Research conducted in North Macedonia has shown that cannabis is the predominant drug consumed in this region. Here are some answers to the question, "Why

did you consume herbal cannabis in the past year?" 76% of the current users reported using herbal cannabis for the purpose of relaxation and alleviating stress, but over 50% of the users stated that they used it to achieve a state of euphoria, for recreational purposes, to aid in sleep, or for socializing (Kjosevska 2022).

Cannabis is the most prevalent of all illegal narcotics. In the majority of contemporary societies, the initial consumption of cannabis has transitioned to occur during the middle to late stages of adolescence, a trend that has occurred over the course of the last four decades. The primary motivation for cannabis usage among most young individuals is to experience the euphoric effects, characterized by a state of moderate pleasure, relaxation, and altered perception, which are commonly associated with cannabis consumption. The user may experience cognitive changes that might lead to a decline in short-term memory and attention. This can make it easier for them to become lost in pleasant daydreams and more challenging for them to stay focused on specific mental tasks (Boland, 2022).

Opioids encompass a wide range of psychoactive compounds, which can be derived from natural sources or created artificially. Opioids have an extensive record of being utilized by humans as pain relievers and for other medicinal purposes, however, they also have a prolonged history of misuse because of their psychoactive characteristics (Boland, 2022).

Substance abuse, encompassing both alcohol and drug use, is a significant risk factor for disease burden (Lago, 2017). The tranquilizing and anxiety-reducing properties of alcohol, which resemble those of benzodiazepines, are probably due to its impact on that area. The enjoyable and habit-forming qualities of alcohol may be attributed to the activation of dopaminergic pathways (Ferberg, 2019).

Research Methodology

Meta analysis approach is used in this study to look into drug use trends among teens and the health effects of these trends in North Macedonia. The ESPAD 2019 poll data is used for quantitative analysis, and reports from respected medical and investigative institutions are used for qualitative analysis. The ESPAD 2019 poll gives a lot of information about drug use among 15–16-year-olds in the target areas.

Statistical methods are used to look at poll data and find patterns, trends, and connections in the drug use of teens in North Macedonia. Reports from institutions

give us qualitative information, mostly about patterns and trends in drug-related crises, chemical data, and forensic tests in all four countries. Thematic coding of written information is used to find important themes connected to how people use drugs and their health effects.

Together, quantitative and qualitative data are used to examine how drug use among teens is changing in North Macedonia, and its implications to their health.

Discussion

The Clinic of Toxicology reported a total of 2237 instances of acute poisonings involving alcohol and psychotropic substances between 2018 and 2020, according to statistics.When it comes to alcohol poisoning cases, there is a significant disparity between genders, with males accounting for 79% of reported patients and females accounting for 21%. Among patients, males had a significantly higher proportion of acute poisonings involving alcohol combined with psychoactive substances (91% vs. 9% for females), heroin (89% vs. 11% for females), methadone (90% vs. 10% for females), cocaine (94% vs. 6% for females), amphetamines (94% vs. 6% for females), marijuana (83% vs. 17% for females), and alcohol combined with benzodiazepines (53% vs. 47% for females) as shown in Table 1 below. An equal distribution of acute poisonings induced by opioid analgesics and ecstasy was seen between genders, with 50% of cases occurring in males and 50% in women. The data shows a higher prevalence of acute poisonings in females, especially in instances involving benzodiazepines. Specifically, 73% of these poisonings were recorded in women, whereas only 27% were reported in men (Kostovska, 2022).

Table 1. Persons who were treated for addiction in PHI Psychiatric Hospital "Skopje", Dispensary of the hospital "Skopje" - "Prolet", "Kisela Voda" addiction dispensary and GOB "September 8" in the period 2018-2020

Substance	**2018**	**2019**	**2020**
Alcohol	643	540	392
Cocaine	3	4	4
Opioids	1384	1328	1295
Marijuana	12	11	3
Sedatives	27	19	18

Source: Kostovska (2022)

Kjosevska et al. (2017) did a general population study in North Macedonia and found that drug use is considerably low among the people there. Cannabis is now the most common illegal drug. About 8.2% of adults aged 15–64 and 15% of young people aged 15–34 say they have used it at some point in their lives. The total incidence rates for other illegal drugs are much lower. People between the ages of 15 and 24 are most likely to have used illegal drugs at some point in their lives, with use dropping with age. Male respondents generally say they use illegal drugs more often than female respondents, and this is especially true for cannabis.

Over four-fifths of drug users live in cities, which shows that the study has an urban bias. The poll had a sample size of 3,768 people between the ages of 15 and 64, with 1,798 people between the ages of 15 and 34. A two-step stratified random sample selection process was used for the survey, and simple random sampling was used to choose the places that would be surveyed.

In-person interviews were used to collect the data, and 62.5% of the respondents were men and 37.5% were women. This was done on purpose. These results put light on how common drug use is and the types of people that use drugs in North Macedonia. This is useful information for public health efforts and policymaking (The University Clinic for Toxicology and Emergency Medicine, Skopje 2022).

Table 2. The prevalence of drug usage among sixteen-year-old students in North Macedonia (ESPAD 2019)

Drug	Lifetime prevalence (%)			Prevalence in the last year (%)		
	Boys	Girls	Total	Boys	Girls	Total
Cannabis	8.2	4.2	6.1	6.0	3.7	4.8
Heroin	0.9	0.1	0.5	0.5	0.1	0.3
Cocaine	1.5	0.3	0.9	1.5	0.3	0.9
Ecstasy	1.1	1.1	1.1	0.9	0.6	0.8
Amphetamine	0.7	0.4	0.6	0.8	0.3	0.5
LSD or other hallucinogens	1.0	0.5	0.8	N/A	N/A	N/A
Any illegal drugs	10.0	5.1	7.3	N/A	N/A	N/A
Alcohol	69.0	64.0	67.0	N/A	N/A	N/A
Tobacco	40.0	36.0	38.0	N/A	N/A	N/A

Source: The University Clinic for Toxicology and Emergency Medicine, Skopje 2022

In North Macedonia, researchers looked at how 16-year-old students felt and behaved around tobacco, booze, and illegal drugs, as well as the social and financial issues that were involved. Students from all over the country and from different racial and ethnic groups filled out the ESPAD 99 uniform questionnaire for the poll. There were big differences in the rates of tobacco and alcohol use between

racial groups, according to the results. Boys were more likely than girls to try illegal drugs. Also, students said they felt lonely, and there were differences between ethnic groups in how satisfied they were with their financial situations. The study shows how important it is to have health promotion programs in schools to keep teens from abusing drugs and to urge them to make healthy living choices (Onceva, 2001).

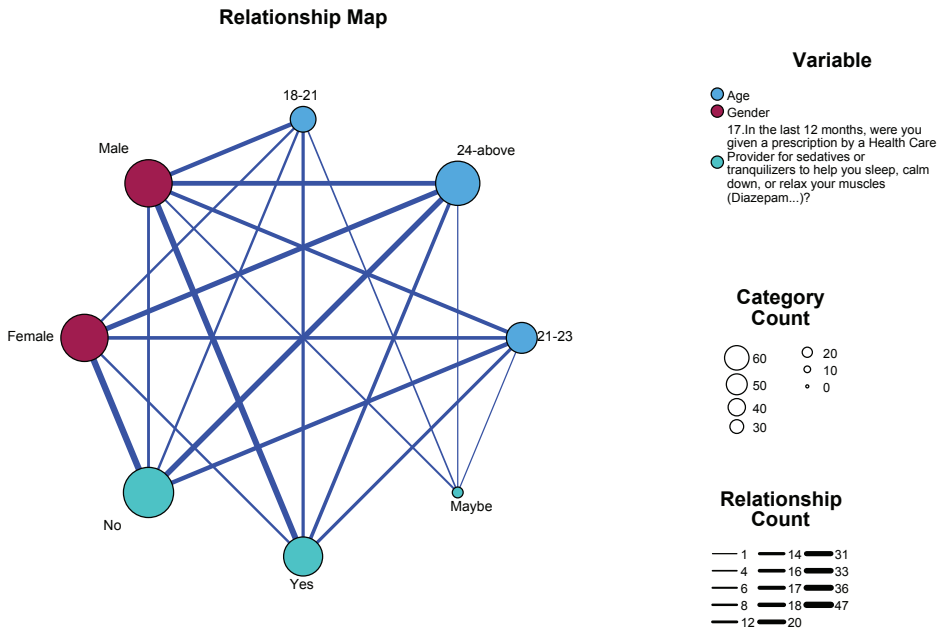
The 2019 European Drug Report shows that drugs are still very easy to get. Cocaine is becoming more popular, and there is a worrying possibility that heroin use will rise. Cannabis is still the most common reason people go to rehab for addiction, and new psychoactive drugs are still hard to deal with. The study also talks about how globalization and technology progress have changed drug markets, which has led to new ways of making drugs and trafficking them.

A Public Health Institute study (2017) on drug use among the general population in North Macedonia shows that a lot of people use drugs. Cannabis is the drug that most people use, especially young adults. Reports also come in about other drugs, like ecstasy and heroin. Different drugs have different average ages at which people try them for the first time. Most of the people who answered think it's hard to get drugs, and the number of new substances is still significantly low. Also, a study from 2015 on drug, drink, and cigarette use among school-aged kids in North Macedonia shows that marijuana use has been steady, with only small rises in recent years. The amount of use of other psychoactive drugs varies. For example, heroin and LSD use has been slowly going down, while cocaine use has been going up and down.

Overall, these reports show how common drug use is, how it is changing, and what problems it causes in North Macedonia. They also show how important it is to monitor and work to stop people from using drugs (National Drugs Strategy, 2021).

According to a study published by Sulejmani and Ziberi (2023), drug abuse and addiction are big problems around the world, especially among young people. Through an online questionnaire conducted in North Macedonia, key insights into substance use disorder (SUD) among youth were uncovered. Notably, 76.9% of respondents said they used marijuana, usually for fun and ease. This made it the most widely abused drug. Also, prescription drugs, especially benzodiazepines, were often abused, which shows that there needs to be tighter rules on prescriptions and more education for doctors (Graph 1). The results show how important schooling and support systems are for dealing with drug abuse in a healthy way (Sulejmani, 2023).

Graph 1: Frequency of Prescription Drug Abuse, Particularly Benzodiazepines, Among Adolescents in North Macedonia



Source: Sulejmani (2023)

Drug-related health and security threats in the Western Balkans by European Monitoring Centre for Drugs and Drug Addiction (EMCDDA):

Trafficking drugs and criminal networks: North Macedonia, Kosovo, Serbia, and Albanian criminal networks have become major players in the drug markets in the EU and in the area. The main reason for their fame is that they are strategically located at the intersection of major crime paths. Some of the illegal drugs that are trafficked through these networks are heroin, cocaine, and weed. Notably, they are involved in more than just the usual routes. There are signs that they may be moving into new routes as well, which could include dealing cocaine. There is also proof that some of these criminal networks have set up operational bases in the European Union. This shows that they have power and reach across borders.

Drug Use Patterns:

Even though drug use isn't very common in these countries compared to the rest of the world, there are big differences in how people of different ages and types of drugs use drugs. Because drug use is seen as socially unacceptable, especially

among women, prevalence statistics are often not as accurate as they could be. A big problem is people who use drugs that are very dangerous, especially painkillers like heroin. Also, new patterns of cocaine use mean that ongoing tracking and intervention methods are needed to deal with possible effects.

Problems and Solutions:

It's hard to deal with the bad effects of drug use in this area because it's hard to get help and other services that lessen the harm. Services that help people who have problems with drugs other than opioids are especially weak and often depend on money from other countries. Data gaps make it harder to get a good picture of how big drug problems are and how to best solve them.

Drivers and Facilitators of the Drug Market:

The drug market in the area is complicated and flexible because of a number of factors. The location of drugs, globalization, and advances in technology all make it easier for people to trade drugs. Criminal networks use new technologies like private contact and online platforms to improve their activities, such as selling people and laundering money. These factors working together show how important it is to work together to effectively fight drug-related problems.

Types of Drugs:

Cannabis is still the most widely used illegal drug in the area, and more and more people are growing it and possibly taking it for healing purposes. There is a clear trend toward more people using cocaine, and there are worries that crime networks are involved in the drug's supply chain. Heroin is still a big problem, and the fact that opioid replacement drugs could be abused makes the problem even more complicated. Synthetic drug markets are always changing, especially when it comes to amphetamines. This makes it harder to control drug use.

North Macedonia, Kosovo, Serbia, and Albania all have to deal with a lot of problems that come from drug trade and the harm it causes. Criminal networks play a big role in regional drug markets, and drug use trends are changing all the time. This shows how important it is to have thorough and coordinated responses. To deal with these problems, we need better data collection, policies that are in line with international standards, and stronger efforts to stop new drug trends and the harms they cause. To successfully deal with the complicated problems of drug use and trafficking in the area, people must work together, invest, and focus their efforts (Drug-related health and security threats in the Western Balkans, 2022).

North Macedonia does not have a specific database for keeping track of drug-related deaths (DRD) Table 3. Instead, information about DRDs comes from the Institute of Forensic Medicine, Criminology, and Medical Deontology's body record, which is part of United Kingdom Institute of Medical Ethics. Every year, the Institute does 300 to 400 exams, which cover a population of about 1.2 million people living in different parts of the country. The Lab of Forensic Toxicology Tab is where toxicological data is gathered.But there are major problems with the way things are now. There isn't a special DRD file at the national level, which makes it harder to collect and analyze all the data. Better ways are needed right away. These should include a clear definition of DRD and a network for hospitals, emergency rooms, and forensic medicine units to regularly share data with each other. There is no clear trend in the DRD statistics from 2017 to 2021. Most cases of DRD involve using drugs like methadone and valium at the same time. In 2018, there were more deaths linked to cocaine, but this trend has not continued. The COVID-19 pandemic may have had an effect on autopsy rates, which could explain why the number of DRD cases dropped so sharply in 2021. On the other hand, deaths that were not directly caused by drug use went up during the same time frame.

Table 3. Number of deaths in the presence of drugs (direct and indirect deaths) by gender and Toxicity-Source: Institute of Forensic Medicine, Criminology and Medical Deontology, Medical Faculty, UKIM, Skopje

Year	With opiates			Without opiates			Total		
	M	F	All	M	F	All	M	F	All
2017	3	1	4	8	1	9	13	2	15
2018	8	1	9	14	3	17	22	4	26
2019	4	0	4	15	2	17	19	2	21
2020	4	0	4	10	1	11	14	1	15
2021	5	1	6	13	3	16	18	4	22

Source: The University Clinic for Toxicology and Emergency Medicine, Skopje 2022

Table 4. Number of drug-related crises by substance (alone or in combination), Skopje, 2019–2021.Heroin, methadone, buprenorphine or opioid analgesics, either alone or with another drug

	2019	2020	2021
Any opioid*	32	41	37
Cocaine	24	19	21
Amphetamine	15	6	4
Cannabis	31	13	18
MDMA/ecstasy	3	0	1
LSD	2	0	1
Total	**102**	**76**	**81**

Source: The University Clinic for Toxicology and Emergency Medicine, Skopje 2022

In Skopje, the University Clinic for Toxicology and Emergency Medicine is very important for dealing with drug-related situations and helping people who use drugs. Services include treating sudden overdoses, taking care of physical problems caused by long-term drug use, checking for infectious diseases through blood tests, and treating withdrawal syndrome.

The number of drug-related cases between 2019 and 2021 went down, especially for drugs used at night. This is likely because of the COVID-19 lockdown steps. But the number of opioid-related emergencies stayed the same. Most drug-related emergencies involve guys, and a significant number of them involve people under the age of 20. About one-fifth of cases led to hospitalization, and this percentage has stayed the same over the years.

These results make it clear that more needs to be done to stop the harms caused by drugs in North Macedonia. This includes better data collection, focused interventions, and a wide range of support services for people who are harmed by drug use (The University Clinic for Toxicology and Emergency Medicine, Skopje 2022).

Prevention and Treatment Responses

As part of the National Drug Strategy, North Macedonia's prevention efforts are handled by a number of governmental groups that are coordinated by the Ministry of Health (MoH). A lot of the money comes from the government fund, and foreign groups like UNODC, the Global Fund, and the Pompidou Group also help. The National Drug Strategy stresses the need to set up a strong system for preventing

drug use in the health and education sectors. This includes making national standards for the quality of protection programs and putting them into the health and school systems. Some local governments, like the one in Skopje, also help with prevention. A lot of different groups, like the government, civil society organizations (CSOs), and schools, work together on protection projects all the time. There are public health centers, family doctors, and family nurses in the health sector, which is split into three protection levels: primary, middle, and tertiary. Non-profits like HOPS, Trust, HERA, and Choice work with private facilities like Narconon to offer preventative services. The media also help with teaching projects as part of the system for preventing crime.

Campaigns, which are paid for by groups like UNODC, try to stop 13–18-year-olds from using drugs and booze. The goal of Neighbor Patrol is to make parents more aware of the places and activities that teens and young adults enjoy. Along with these attempts, educational workshops and talks by experts are also being held. Seminars for teachers and mental health services are geared toward keeping teens and young adults from using drugs in secondary schools. Roma and other kids can get preventative therapy at youth centers. Online resources such as Drughelp.eu help find people who might be using drugs early and get them help. The Institute of Public Health (IPH) puts on events and classes, and the media and social networks hire experts to teach people how to stay away from drugs.

Treatment attempts are in line with the goal of the National Drug Strategy to offer high-quality treatment services for everyone, regardless of gender, age, or drug type. The Ministry of Health pays for the Addictions Treatment Program, which provides both outpatient and hospital services, such as detoxification and opioid agonist treatment (OAT). Treatment services are offered all over the country, but there are problems like not enough division of OAT services, a lack of staff, and not enough rehabilitation centers. Data on treatment availability shows that drug use is most common. In recent years, more people have been seeking treatment, which may be because probation offices have been sending them to institutions that provide rehabilitation services as part of their probation requirements.

Conclusion

According to substantial research undertaken in North Macedonia, Albania, Kosovo, and Serbia, teenage drug use poses major public health risks in the region. The data highlight the prevalence of drug usage among minors, with cannabis, opioids, and benzodiazepines being regularly utilized. Furthermore, the study offers insight on the intricate interactions of sociological, economic, and healthcare variables that influence drug patterns and their health consequences.

In North Macedonia, specifically, the findings show a disturbing tendency of prescription medication addiction among teenagers, notably benzodiazepines. This emphasizes the urgent need for tighter prescription laws and more education for healthcare providers in order to reduce the hazards connected with substance misuse. Furthermore, the study stresses the need for comprehensive preventive and treatment strategies to meet the various issues faced by drug usage. Effective initiatives should include integrated efforts from the government, healthcare, education, and civil society sectors to implement evidence-based therapies, enhance data gathering procedures, and expand support services for people with drug use disorders.

In conclusion, the comparative analysis offered in this study sheds light on the complicated terrain of teenage drug use and its health consequences in North Macedonia, Albania, Kosovo, and Serbia. By recognizing major trends and concerns, policymakers, healthcare experts, and stakeholders may create tailored initiatives to encourage healthier habits and enhance the well-being of the region's adolescents.

Funding Statement and Conflict of Interest Declaration

This research project was conducted without receiving any external funding. The authors declare that this paper has not been published elsewhere and is not under consideration for publication in any other journal. Additionally, there are no conflicts of interest to disclose. The research was conducted with the sole aim of contributing to the understanding of adolescent drug usage trends and associated health implications in North Macedonia, Albania, Kosovo, and Serbia, and to inform evidence-based interventions and policy decisions in this critical area of public health.

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