

# Emerging substance abuse trends in Jammu & Kashmir: shifts, forensic challenges and strategic responses

## Abstract

Substance abuse and addiction have widespread impacts, threatening the public health, societal stability and affecting the security worldwide. The illicit drug trade exacerbates these challenges, fuelling crime and criminality, corruption and terrorism. This study investigates the evolving patterns of drug abuse in Jammu & Kashmir, particularly in the context of the COVID-19 pandemic, which may have precipitated a shift in substance use from heroin to alternative drugs. This shift, largely undocumented in existing literature, highlights the need for further research to understand the changing dynamics of drug use in the region. The study highlights the gaps in forensic infrastructure in J&K and emphasizes the critical role of continuous advancements in forensic science and analytical methodologies in identifying emerging drugs of abuse. This research underscores the importance of forensic reports in guiding public health and law enforcement responses, with the potential to shape policies and strategies aimed at mitigating the impact of substance abuse in conflict-affected regions. Such advancements are essential for safeguarding public health through early detection and warning systems while strengthening the justice system revolving around the rule of law. The manuscript reflects on the significant rise in drug abuse cases and unreported deaths in Jammu & Kashmir, underscoring the necessity for comprehensive and statistically valid research to better understand the epidemiology of substance abuse. The study also highlights the importance of empowering harm reduction services and reinforcing family values, social norms, and religious ethics to combat the growing drug crisis. The findings and recommendations aim to contribute to the development of robust forensic and public health frameworks that address the complex challenges of drug abuse in Jammu & Kashmir.

**Keywords:** drug abuse, addiction, overdose deaths, forensics

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**Abbreviations:** J&K, Jammu and Kashmir; NDPS, Narcotic Drugs and Psychotropic Substances; NPS, New Psychoactive Substances; MoSJE, Ministry of Social Justice and Empowerment; GOI, Government of India; AIIMS, All India Institute of Medical Sciences; IMHANS, Institute of Mental Health and Neurosciences

## Introduction

Substance abuse and addiction are well-documented issues with profound social and health-related consequences, leading to significant health devastations, economic burdens, personal suffering and far-reaching societal and legal implications.<sup>1,2</sup> Historically, global drug prohibition regimes were established to protect societies from the multifaceted threats posed by drug production, supply, and use, which endanger human, national, and international security.<sup>3</sup> These issues necessitate a holistic approach that combines legal and health-based strategies to effectively mitigate their impact.<sup>4</sup> It is worth to address the issues of substance abuse and addiction, which are closely related, but distinct phenomena's. Addiction, traditionally linked to substance use, is widely recognized as a chronic brain disease characterized by compulsive behaviours and a dependence on stimuli, resulting in negative consequences.<sup>5,6</sup> This view, while prevalent, is not without controversy as some scholars argue against the brain disease model of addiction.<sup>7</sup> Regardless, the interaction between environmental factors and brain dysfunction leads to a range of biological, psychological, and social manifestations, which are evident in both pathological and behavioral changes.<sup>8,9</sup>

Generally, substance abuse is considered as a maladaptive pattern of substance use that results in clinically significant impairment or

distress, characterized by recurrent use or continued use in situations where major roles and obligations are unfulfilled making it hazardous despite being associated with social, legal and interpersonal problems.<sup>10-12</sup> Notably, addiction can also manifest in behaviours not involving substance use, such as gambling, gaming, unhealthy sexual practices, and cyber addiction, among others.<sup>13,14</sup> Various factors are believed to contribute to the development of addiction, including genetic predispositions, personality traits, and life experiences, making the issue more complex and challenging to address.<sup>15-19</sup>

In the context of Jammu and Kashmir, the region's geographical location, combined with socio-political challenges and the ability of traffickers to secure acquittals due to technical flaws in investigations, has exacerbated the issue of substance abuse, addiction and trafficking.<sup>20-23</sup> Despite stringent provisions under the Narcotic Drugs and Psychotropic Substances (NDPS) Act of 1985, drug-related offenses continue to proliferate. The seriousness of the drug abuse situation in Jammu and Kashmir has been a concern for nearly a decade, with calls for the incorporation of forensic science into the routine examination of drug seizures and the analysis of biological samples from addicts and suspects.<sup>12</sup> Such forensic interventions are crucial for identification, recovery, examination and analysis, probabilistic interpretation, determining appropriate sentencing and ascertaining the cause of death in drug-related cases. Lack of these well-defined corrective measures in the J&K is a foundation of this manuscript. To support this fact, the ongoing revelations about the substance abuse crisis in Jammu and Kashmir have garnered widespread attention from both the public and authorities. However, many individuals involved in drug abuse and addiction do not receive the necessary treatment or face legal consequences due to the stigmas associated

with these issues. This highlights the critical need for the mandatory incorporation of forensic principles, which are universally accepted and distinctive, into the investigation and management of substance abuse cases. Through the identification, recovery, examination, and analysis of scientific evidence, forensic science plays a vital role in implementing corrective measures and addressing the substance abuse crisis in the region.

### Challenges of substance abuse and addiction amid forensic and health facilities in Jammu & Kashmir

There is a growing consensus among health professionals and experts in the field of substance abuse and addiction that timely access to reliable information on the chemical composition of substances, including novel psychoactive substances (NPS), is crucial for effective health responses.<sup>24</sup> The urgency to identify and analyse suspicious substances from a forensic perspective is vital not only for public health but also for strengthening the judiciary and investigative agencies through universally accepted analytical approaches particularly at a time when NPS, known as “legal highs,” or synthetic drugs have been designed to circumvent drug regulations. These substances are often perceived by users as safer and ‘legal’ alternatives to conventional drugs, a misconception that exacerbates their spread and misuse.<sup>25</sup> The constant modification of their chemical structures, coupled with their rapid proliferation via the internet, has turned NPS into a significant social problem.<sup>26</sup>

One of the major challenges associated with NPS is their geographic heterogeneity, transient nature and the fact that many do not meet the criteria required for international control, despite being linked to hospital admissions and fatalities.<sup>27</sup> Under these circumstances and deficit forensic analytical testing’s in the Jammu and Kashmir, the issue of drug abuse and addiction has increasingly been associated with narcoterrorism, adding a layer of complexity to the region’s security challenges.<sup>28</sup> The sharp rise in heroin-related seizures, from 3,000 to over 10,000 between 2017 and 2022, underscores the severity of the problem.<sup>29</sup> The situation has been further complicated by the use of drones to smuggle drugs into the region, highlighting the need for robust drug-checking and chemical testing services.

In response to these challenges, the establishment of drug-checking agencies is crucial to address the health risks and security issues posed by the use of NPS and other substances. Currently, the information provided by victims of addiction is often self-reported, leading to potential inaccuracies that can only be verified through objective, quantifiable measures. Unfortunately, such measures are not yet taken seriously by the administration in Jammu and Kashmir. In environments where acute crises related to opioid or NPS use may arise, such as emergency departments or nightlife settings, timely analytical testing is essential for effective health and drug response, including the management of NPS-related incidents. However, in hospital emergency settings, toxicological confirmations in drug-related cases are not common practice, largely due to cost, ethical, and logistical challenges.<sup>30</sup>

Moreover, the costs associated with medical care, substance abuse treatment and workplace productivity losses are based on detailed studies with well-founded estimation procedures. Despite this, the costs related to analytical testing, which are crucial for decision-making, are often underestimated. It is argued that if such testing facilities are made available in health institutes or law enforcement laboratories, it would enable more accurate monitoring of emerging drug trends over time. There is thus an urgent need to expand substance identification capabilities, build competence among professionals and

disseminate risk information to relevant stakeholders. Neglecting underserved risk populations and failing to address the information needs of health professionals regarding emerging drugs, including NPS, could have unforeseeable societal consequences.

The emergence of new substances always brings new challenges, including drug-related crimes, toxicological risks and analytical difficulties in identifying these substances. This raises critical questions for emergency physicians and toxicologists regarding appropriate therapies for adverse reactions and overdoses, as well as their potential implications in forensic cases.<sup>31</sup> Harm reduction services, which aim to decrease the risk of adverse effects, prevent overdose deaths and offer safety services, are increasingly recognized as more cost-effective and humane than policies focused solely on prohibition.<sup>32–34</sup>

In light of these challenges, there is a pressing need for a multi-pronged approach that includes expanded access to substance use disorder treatment, the formulation of harm reduction policies, and the provision of uninterrupted access to these services. Emphasis should be placed on risk reduction strategies and providing a safe drug supply for addicts, who should be treated as victims rather than criminals. Furthermore, the forensic investigation of drug-related cases would greatly benefit from the discriminatory identification and individualization of seized drugs or samples collected from suspected or self-reported victims. Such efforts would not only aid in investigations but also enhance the justice delivery system, ultimately contributing to the effective management of substance abuse and addiction in Jammu and Kashmir as well as the areas facing similar or comparable challenges.

### Drug abuse crisis in Jammu & Kashmir pre and post COVID-19 pandemic

The COVID-19 pandemic significantly impacted global public health, not only through the direct effects of the virus but also by exacerbating existing social issues, including deaths due to drug abuse.<sup>35</sup> A recent report by the Union Ministry of Social Justice and Empowerment (MoSJE), Government of India, in collaboration with the All India Institute of Medical Sciences (AIIMS) New Delhi, revealed alarming statistics about drug abuse in Jammu & Kashmir (J&K), including Ladakh. The study showed that 4.9 percent of the population, equating to over 600,000 individuals as per the 2011 Census, are abusing opium derivatives such as “doda,” “phukki,” poppy husk, heroin (including brown sugar and smack) and pharmaceutical opioids. This places J&K among the top five states and union territories in India for opioid abuse.<sup>36</sup> Further evidence from the Institute of Mental Health and Neurosciences (IMHANS) Srinagar indicates a worrying trend. In 2016, the facility registered 489 drug abuse cases, with numbers skyrocketing to 7,420 in 2019, reflecting an exponential increase in substance abuse.<sup>37</sup> The situation in the Kashmir Valley is particularly concerning, with reports indicating that 2.8% of the population, or 52,404 individuals, are substance users, 95% of whom are heroin users.<sup>38</sup> Another report suggests that there are over 67,000 drug abusers in Kashmir with 90% being heroin addicts.<sup>39</sup> The Central Government has revealed that J&K has around 1 million registered drug addicts, the majority of whom are heroin users with others addicted to inhalants, cocaine, Amphetamine-Type Stimulants (ATS), and hallucinogens.<sup>40</sup> Despite these alarming figures, there is a lack of chemically identified substances and statistically validated reports to support these claims, complicating the situation further and highlighting the need for comprehensive research.

The COVID-19 pandemic exacerbated these issues, leading to widespread socioeconomic disruption, including in the health

sector. Early reports during the pandemic indicated an increase in depression, anxiety, suicidal tendencies and deaths due to drug overdoses, raising significant concerns.<sup>41-43</sup> Drug overdose deaths, often linked to opioids, cocaine and amphetamines, reflect a broader pattern of drug poisoning, encompassing a variety of substances and circumstances.<sup>41</sup> According to the World Health Organization (WHO), there were an estimated 3 million excess deaths worldwide in 2020 due to the COVID-19 pandemic. However, these estimates lack detailed location-specific mortality data. In 2020, the number of drug-related cases handled by IMHANS J-K dropped to 3,536, likely due to the strict government-imposed restrictions related to the pandemic. Notably, 90% of drug users in these cases were aged 17-33. Studies of excess mortality during different stages of the pandemic reveal that India had one of the highest cumulative excess deaths, estimated at 4.07 million, followed by the USA, Russia, Mexico, Brazil, Indonesia, and Pakistan. Russia and Mexico had the highest excess mortality rates per 100,000 people.<sup>44-46</sup>

Preliminary investigations during the early stages of the pandemic suggested that drug overdose deaths contributed to excess mortality, especially as the pandemic disrupted normal patterns of drug abuse and access to treatment.<sup>34</sup> The pandemic's impact on substance abuse patterns included a rise in female drug users, decreasing age at first use, and increased use of solvents and injectable opiates, along with an uptick in drug-related deaths due to overdoses and accidents.<sup>36</sup> Despite these troubling trends, there are no comprehensive reports documenting drug overdose deaths, including the male-to-female ratio, in India, particularly in J&K, during the COVID-19 period. Although the total national COVID-19 death toll in India remains undetermined,<sup>47</sup> evidence suggests that deaths from drug overdoses remained relatively stable between 2017 and September 2019, but saw a significant increase following the onset of the pandemic.<sup>48</sup>

Several factors likely contributed to this surge, including the temporary closure of treatment centres, reduced capacity at de-addiction and detoxification centres, and the shift to telehealth services, which created barriers for many addicts. Additionally, substances needed to reverse overdoses were not readily available, further complicating the situation. The restrictions imposed by governments in response to the public health threat of the pandemic also had an unprecedented impact on global drug abuse patterns.<sup>49</sup> It was more difficult for those struggling with addiction to seek help, leading to an increase in drug-related overdoses and deaths. This period highlighted the vulnerabilities in public health systems and underscored the need for comprehensive approaches to addressing substance abuse during times of crisis. Given the unique challenges faced by J&K, it is possible that drug-related deaths were underreported due to these various factors, including the lack of comprehensive chemical analyses.

A key limitation of existing research is the absence of studies focusing on the most emergent drugs in J&K, the impact of COVID-19 on drug overdose-related deaths, and identifiable shifts in drug use. Such studies, if conducted, could provide a more accurate picture of the situation and lead to a revision of reported or underreported deaths during the COVID-19 period. Addressing these gaps is essential for developing effective strategies to combat substance abuse and its consequences in J&K.

### **International verses national perspective on a case where scientific opinion matters the most**

In a case from a district in Kashmir, four male friends, aged 19-21, embarked on an overnight trip to a hill station. They rented a room

for the night, but the situation took a tragic turn when one of them fell critically ill. Rushed to a local hospital with suppressed medical history, the individual was pronounced dead on arrival. The local police were called in and proceedings under Section 174 of the CrPC (Code of Criminal Procedure) were initiated to investigate the circumstances of the death. The next day, a post-mortem examination was conducted and the three surviving friends were arrested under suspicion of foul play. As part of the investigation, blood and urine samples were collected from the deceased and the accused for toxicological analysis. The specimens were forwarded to the Forensic Science Laboratory (FSL) to determine the presence and concentration of drugs or other toxicants. Establishing the drug concentrations in blood was crucial for assessing recent drug ingestion, understanding the potential effects on the deceased at the time of death and determining the condition of the accused at the time of sampling.

The family of the deceased, devastated by their loss, demanded a thorough investigation. The forensic report, however, provided only a qualitative analysis, revealing the presence of Tramadol, a narcotic analgesic, in the specimens from both the deceased and the accused. No attempt was made to quantify the drug levels, a critical omission that could have helped establish the role of Tramadol in the death. Tramadol is a synthetic opioid-like analgesic commonly used to manage moderate to severe pain. However, to conclude that the death was solely due to Tramadol overdose, the forensic analysis should have included a quantitative assessment. Such an analysis would determine whether the drug concentration was within therapeutic levels or had reached toxic, potentially lethal levels. The lack of quantitative data raises significant concerns, as it leaves the cause of death open to interpretation and undermines the scientific foundation required for an accurate determination of the cause. Scientific literature indicates that Tramadol overdose can lead to death through mechanisms such as resistant shock, cardiorespiratory depression, asystole, and liver failure.<sup>50</sup> Furthermore, the potential concomitant use of Tramadol with other substances, such as barbiturates, benzodiazepines, or alcohol, is known to increase the risk of fatal toxicity.<sup>51,52</sup> These factors should have been meticulously investigated to provide a comprehensive understanding of the case.

The role of forensic science is to support the justice system by providing scientifically sound and legally defensible analyses. In cases of suspected drug overdose, the integration of analytical chemistry, toxicology and pharmacology is vital for delivering accurate conclusions. Failure to perform quantitative analysis in such critical cases not only hampers the investigation but also jeopardizes the integrity of the justice system. This case underscores the importance of adhering to international standards in forensic investigations where the quantification of toxicants is not just a scientific necessity but a legal imperative.

### **Importance of laboratory detection in modern drug policy and forensic services**

In the current landscape of drug policy, where government interventions and regulatory enforcement face significant challenges, particularly due to the proliferation of novel psychoactive substances (NPS) designed to circumvent existing regulations, the role of forensic laboratories has never been more crucial. The identification of these emerging drugs is imperative, not only for law enforcement but also for public health and safety. By accurately identifying and subsequently scheduling these substances, authorities can respond more effectively and swiftly to the evolving drug landscape.

To achieve this, the development and application of reliable methods for the accurate identification of substances must be



prioritized. These methods, grounded in the principles of analytical chemistry, toxicology and pharmacology are essential for investigating compounds of forensic interest. Such compounds may be present in samples collected during drug seizures, death investigations, cases of drug-influenced driving, doping control, drug-facilitated crimes, and overdose deaths.

Currently, routine testing for emergent compounds, including NPS, in individuals presenting with recreational drug toxicity is not typically performed. This gap in testing means that patients in clinical settings are often treated based solely on the observed toxicity patterns, which can lead to improper screening and consequently, suboptimal clinical management. This underscores the critical need for comprehensive laboratory testing in both forensic and clinical settings. Forensic laboratories must develop advanced testing protocols that consider the additional use of over-the-counter medications and other illicit drugs by NPS users. This is particularly important as many NPS compounds may be contaminated<sup>53,54</sup> or mixed with diluents<sup>55</sup> to evade legal sanctions and increase profitability. Such contaminants can complicate both the detection and the treatment of drug toxicity, making precise and thorough laboratory analysis essential.

The importance of laboratory detection extends beyond just identifying substances; it plays a pivotal role in shaping drug policy, guiding clinical management and supporting legal processes. In the context of an ever-evolving drug market, the capacity of forensic laboratories to detect and analyse emergent substances is a cornerstone of effective public health and safety strategies.

### Addressing the global standards for drug abuse and forensic investigations

Substance abuse and addiction continue to be critical issues worldwide, marked by individuals' persistent abuse of substances to achieve an artificial sense of well-being, despite significant negative physical, psychological or social repercussions. This problem is exacerbated by the emergence of new addicts and the activities of traffickers. To effectively address these issues, a collaborative approach involving the development of best practices and consensus on standards is essential. A survey titled "Emerging Issues of Drug De-addiction and Tobacco-Free Generations," conducted by the Directorate of Health Services in Kashmir, revealed that approximately 70,000 individuals are involved in substance use across the 10 districts of Kashmir Valley, with 52,000 of them using intravenous (IV) heroin.<sup>56</sup> Other reports indicate that 2.8% of the population in the Kashmir Valley, or about 52,404 individuals, are dependent on drugs, with 95% of them using heroin.<sup>38</sup> Another study by Wani in 2023 found over 67,000 drug abusers in Kashmir, 90% of whom are heroin addicts.<sup>39</sup> These figures align with data from the Central Ministry, which reports over 1 million drug addicts in Jammu and Kashmir, including significant numbers of both male and female users of cannabis, opioids, sedatives, and other substances.<sup>40</sup>

However, there are some discrepancies in the data. The Ministry of Home Affairs (GOI) has stated that no recent data suggests an increase in smuggling or drug consumption in Jammu and Kashmir over the past five years.<sup>57</sup> These methodological differences and contradictory reports underscore the need for precise, statistically significant studies to determine the true extent of substance abuse, identify prevalent drugs, and pinpoint vulnerable populations in Jammu and Kashmir.<sup>36,37</sup> The global context also provides critical insights. A review study on the impact of COVID-19 on drug overdose deaths in the United States and Canada found that such deaths increased by 2% to 60% in various U.S. jurisdictions and by 58% in Canada in 2020.<sup>41</sup>

Macmadu et al.,<sup>58</sup> observed significant increases in overdose deaths involving synthetic opioids like fentanyl from 2019 to 2020, coupled with a decrease in heroin-related deaths.<sup>58</sup> The COVID-19 pandemic disrupted drug markets, affecting the availability, accessibility, price and potency of drugs, which led to an increase in the use of alternative substances. Internet-based drug-seeking activities also rose during this period.<sup>59,60</sup> These disruptions may continue to grow, posing increased risks to drug users due to the variability of drug purity and the potential adulteration and contamination of heroin supplies with synthetic opioids like fentanyl.<sup>61,62</sup> Despite these concerns, no statistically validated report or study has emerged to confirm drug overdose deaths in India, including Jammu and Kashmir, during and after the COVID-19 period.

From a forensic standpoint, the detection and analysis of drugs in post-mortem examinations are crucial for establishing the cause of death.<sup>63</sup> Often, minor alterations to known drugs for the purposes of avoiding legal detection or enhancing profitability can complicate the identification process.<sup>32,64</sup> In the case study mentioned earlier, where a young man died after ingesting Tramadol, the failure to quantify the drug in the specimens rendered the forensic investigation incomplete. Tramadol, a synthetic opioid-like analgesic, is used for pain management and mere detection without quantification cannot differentiate between a first-time user and a clinically managed patient. The complexities of drug-related deaths underscore the need for robust forensic investigations. Accurate data collection, comprehensive toxicological observations and detailed chemical reports are essential to establish clear causes of death and to trace the source of the substances involved. For instance, Rather et al.,<sup>37</sup> found that 22% of respondents in their study used pharmaceutical opioids like Tramadol, highlighting the drug's easy accessibility in pharmacy markets. In the broader context of harm reduction, the goal is to decrease the adverse effects of drug abuse by offering safer alternatives and preventing overdose deaths. This approach is considered more cost-effective and humane than strict prohibition policies. However, the clandestine involvement of individuals in drug abuse and addiction remains a significant challenge, despite the efforts of law enforcement and harm reduction agencies.<sup>33,34</sup> Therefore, addressing substance abuse and addiction requires a multifaceted approach that combines accurate forensic analysis, effective law enforcement and comprehensive harm reduction strategies. Ensuring the proper identification and quantification of substances in forensic investigations is vital for delivering justice and preventing future drug-related deaths.<sup>65-70</sup>

### Policy implications

The study has several critical policy implications which are outlined here:

- I. There should be enhancement in Drug De-Addiction policies by re-evaluating the existing policies. Our findings suggest the need for a comprehensive re-evaluation and update of J&K's drug de-addiction policies. The existing frameworks may need to incorporate modern, evidence-based approaches to treatment and prevention, ensuring that they align with the latest international standards.
- II. There should be integration of harm reduction strategies as our study underscores the importance of integrating harm reduction strategies such as needle exchange programs, opioid substitution therapy and the provision of naloxone for overdose prevention into public health policies.

- III. There should be strengthening of forensic infrastructure by way of investment in forensic capabilities as the challenges identified in forensic facilities necessitate policy-driven investments in forensic infrastructure, including advanced technology, training and capacity building. Strengthening forensic science capabilities is essential for accurate drug identification, which is crucial for both law enforcement and healthcare interventions.
- IV. There should be standardization and certification such that the policies promote the standardization of forensic procedures and encourage certification and accreditation of forensic labs to ensure consistency and reliability in drug testing and analysis.
- V. There should be improvement of healthcare access and quality by way of expansion of treatment facilities and that the revealed gaps in the availability and accessibility of treatment facilities overcome. Policies should focus on expanding the number of drug rehabilitation centres, especially in underserved areas, ensuring that they are equipped to handle the growing number of substance use cases.
- VI. Arrangements should be made for training the healthcare professionals through such policies that mandate continuous professional development for healthcare providers, emphasizing the latest treatment protocols for addiction and substance use disorders.
- VII. Enhancement should be brought in surveillance and data collection so as to development of a Centralized Database and monitor the trends to evaluate the effectiveness of interventions and tracking substance abuse cases. Policies should facilitate the creation of such a system, ensuring that it is integrated with both healthcare and law enforcement agencies.
- VIII. There should be regular epidemiological surveys through such policies that mandate regular epidemiological surveys and studies to gather data on substance use patterns, emerging drugs, and the effectiveness of current interventions.
- IX. There should be policy reform and legislative action and legislative support for new initiatives: The findings may lead to the formulation of new legislative measures to support the introduction of innovative treatment methods, harm reduction strategies and forensic improvements.
- X. There should be decriminalization and legal reforms by way of prompting discussions on the decriminalization of certain substances or the revision of punitive measures associated with drug use, in favour of more rehabilitative and therapeutic approaches.
- XI. Community engagement and public awareness should be made a practice through public education campaigns. Policies should support large-scale public education campaigns aimed at raising awareness about the dangers of substance abuse, the availability of treatment options, and the importance of early intervention.
- XII. There should be international collaboration for best practices as such initiative will help in managing substance abuse. Policies should encourage collaboration with global organizations, exchange of knowledge and the adaptation of successful models from other regions.
- XIII. There should be compliance with international standards ensuring that the J&K's drug enforcement and treatment policies are in compliance with international standards, enhancing the region's ability to combat drug abuse effectively.
- XIV. Socioeconomic and psychological factors must be addressed in comprehensive socioeconomic policies as our study suggests that substance abuse in J&K is influenced by socioeconomic factors. Policies should address these underlying issues by providing social support, employment opportunities and mental health services to at-risk populations.
- XV. There should be mental health integration with substance abuse treatment programs that should be a key policy focus, recognizing the dual impact of addiction on mental health enabling robust and effective response to the growing challenge of substance abuse and addiction.

## Recommendations

In the backdrop of above studies, following recommendations are drawn out to aim for creation of a robust, multi-faceted response to the evolving challenges of drug abuse and forensic investigation in Jammu & Kashmir that extend beyond the region to inform global practices.

- I. Establish a comprehensive post-mortem toxicology laboratory in Jammu & Kashmir to improve the detection, analysis and interpretation of substances involved in drug-related deaths. In order to enhance forensic capabilities this facility should be equipped with the latest technology to identify both traditional and emerging drugs of abuse.
- II. There should be an investment in the continuous development and application of cutting-edge analytical approaches in forensic science, including toxicology, pharmacology and chemistry. These advancements will enable rapid and accurate identification of new and synthetic drugs, aiding law enforcement agencies and public health efforts.
- III. There must be an integrated public health and forensic strategies in place to foster collaboration between forensic experts, public health officials and law enforcement agencies to create a unified response to substance abuse. This approach should include the establishment of early warning systems for emerging drugs and the integration of forensic data into public health initiatives to prevent and mitigate the impact of substance abuse.
- IV. A rigorous research for data collection need to be conducted that throws light on statistically valid, error-free research to understand the epidemiology of drug abuse in Jammu & Kashmir, especially in the context of post-COVID-19 shifts in drug consumption. This research should focus on the prevalence, patterns and socio-demographic factors contributing to substance abuse, as well as the identification of new drugs and their sources.
- V. Legal and policy framework must be strengthened to ensure that the government's anti-drug policies are grounded in the rule of law, transparency and accountability. This includes the need for accurate chemical identification of substances, stringent enforcement of drug laws, and the development of just regulations that address the complexities of emerging drug trends.
- VI. Public awareness and education campaigns must be undertaken routinely so as to launch comprehensive public health campaigns to raise awareness about the dangers of drug abuse and the importance of harm reduction strategies. These campaigns should involve trusted community leaders, healthcare providers and harm reduction service providers, who can effectively communicate messages about prevention and treatment.

- VII. Social and family structures should be strengthened so as to promote the reinforcement of social values, family bonds and religious ethics as protective factors against substance abuse. Community-based programs should be developed to support families in fostering a drug-free environment and to provide resources for those affected by substance use disorders.
- VIII. There should be an international collaboration and knowledge sharing so as to encourage collaboration with international forensic and public health institutions to share knowledge, best practices and technological advancements. This will ensure that Jammu & Kashmir remains at the forefront of global efforts to combat drug abuse and improve forensic investigations.
- IX. There should be harm reduction integration which will integrate harm reduction services into the broader public health framework, ensuring that these services are accessible, trusted and effective in mitigating the risks associated with drug abuse. Harm reduction strategies should be recognized as a critical component in reducing overdose fatalities and improving public health outcomes.
- X. There should be continuous monitoring and adaptation to implement ongoing monitoring of drug trends and forensic practices to adapt strategies as needed. This proactive approach will enable stakeholders to respond swiftly to changes in drug availability, patterns of abuse and associated risks, thereby enhancing the effectiveness of interventions.

## Conclusion

The statistics on drug abuse in Jammu & Kashmir suggest a potential shift in drug use patterns during and after the COVID-19 pandemic, with a possible move away from heroin or heroin-like substances to other drugs. This shift is not well-documented in existing literature, indicating a gap that warrants further research. The emergence of these findings underscores the urgent need to address the proliferation of drug use through continuous advancements in technology and analytical methods. Such strategic developments are crucial for the rapid identification of both emerging and novel drugs of abuse, thereby enhancing public health protection through effective warning systems. From a legal standpoint, forensic science plays a pivotal role that cannot be underestimated. This manuscript's reflections are intended as an analytical observation rather than a critique of government efforts. The ongoing government-led campaign against drug abuse must adhere to universal principles of the rule of law, which include accurate chemical identification of substances, transparency, accountability and just laws. To achieve better health outcomes and informed forensic evaluations, it is essential to conduct rigorous, error-free and statistically valid research that deepens our understanding of the epidemiology of drug abuse and addiction. The literature review and case study presented herein indicate a significant rise in drug abuse cases and unreported deaths in Jammu & Kashmir. This trend calls for professionals addressing substance abuse issues to adopt remedial strategies that involve collaboration and cooperation across clinical, demographic and socioeconomic domains. Such an approach will enable more effective responses and precise identification of the substances involved. Given the critical role of forensics in ensuring justice and managing overdose fatalities, the establishment of a comprehensive post-mortem toxicology laboratory is strongly recommended. Such a facility would enhance teaching, analysis and interpretation capabilities. The widespread involvement of individuals in drug abuse and addiction, coupled with a perceived governmental distrust among concerned stakeholders,

presents a significant challenge. Strengthening forensic services for scientific identification, investigation and the dissemination of accurate information and justice is therefore imperative. Moreover, harm reduction services should be empowered as trusted messengers, equipped to provide and promote public health messaging during drug crises. Finally, it is advocated that efforts be made to reinforce family values, social norms, and religious ethics to foster a stable and drug-free society.

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## Conflicts of interest

The author declares there is no conflict of interest.

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