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Role of Forensic Science in Homicide Investigation Critical Evaluation of Murder and Culpable Homicide Cases in Madhya Pradesh

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Role of Forensic Science in Homicide Investigation: Critical Evaluation of Murder and Culpable Homicide Cases in Madhya Pradesh

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Abstract

Forensic science has emerged as an indispensable pillar of modern criminal justice, particularly in the investigation of homicidal deaths. This research paper undertakes a comprehensive, critical evaluation of the role played by forensic science in the investigation of murder (Section 302 IPC / Section 101 BNS) and culpable homicide (Section 299 IPC / Section 100 BNS) cases in the state of Madhya Pradesh — one of India's largest states by geography and one of its most complex by crime landscape. Drawing upon judicial precedents from the Supreme Court of India and the Madhya Pradesh High Court, National Crime Records Bureau (NCRB) data spanning 2018–2023, and the operational framework of the Central Forensic Science Laboratory (CFSL) Bhopal and the State Forensic Science Laboratory (SFSL) Sagar, this paper critically examines how forensic disciplines including forensic pathology, DNA profiling, ballistics, fingerprint analysis, toxicology, and digital forensics contribute to the detection, investigation, and prosecution of homicidal offences.

The paper further investigates systemic challenges — inadequate infrastructure, delays in forensic reporting, evidence contamination, chain-of-custody violations, and the rural-urban forensic divide — that impair the efficacy of forensic evidence in Madhya Pradesh's criminal courts. A jurisprudential analysis of landmark Madhya Pradesh cases illustrates how courts have weighed forensic evidence against testimonial proof, and the evolving judicial attitude toward scientific evidence under the reformed evidentiary framework of the Bharatiya Sakshya Adhiniyam (BSA) 2023. The paper concludes with a set of policy recommendations aimed at strengthening the forensic infrastructure, reducing trial delays, and enhancing the admissibility and reliability of forensic evidence in homicide proceedings across the state.

Keywords: *Forensic Science, Homicide Investigation, Murder (IPC §302 / BNS §101), Culpable Homicide (IPC §299 / BNS §100), Madhya Pradesh, FSL Bhopal, Crime Scene Investigation, DNA Profiling, Forensic Pathology, Criminal Justice*

1. Introduction

1.1 Background and Rationale

Homicide — the intentional or unintentional killing of one human being by another — occupies the apex of the hierarchy of criminal offences in every legal system. In India, the legal architecture governing homicidal deaths is principally embedded in Sections 299 through 311 of the Indian Penal Code (IPC), 1860, now substantially reproduced under Sections 100 through 112 of the Bharatiya Nyaya Sanhita (BNS), 2023. The conceptual distinction between murder under Section 300 IPC (Section 101 BNS) and culpable homicide not amounting to murder under Section 304 IPC (Section 105 BNS) represents one of the most nuanced and frequently litigated debates in Indian criminal jurisprudence.

The resolution of this distinction — and more broadly, the delivery of justice in homicide cases — has increasingly come to depend not merely on testimonial evidence, but on the rigorous application of forensic science. Forensic evidence is uniquely positioned to transcend the limitations of eyewitness testimony: it does not forget, does not lie, and does not succumb to intimidation. The post-mortem examination, DNA analysis, ballistic study, toxicological screen, fingerprint comparison, and digital forensic investigation collectively constitute what scholars call the 'silent witness' of crime — evidence that speaks from the crime scene itself.

Madhya Pradesh presents an especially compelling case study for this inquiry. With a geographical area of 308,252 sq. km, a population exceeding 85 million, and persistent socio-economic challenges across its tribal, agrarian, and urban belts, the state records a significant volume of violent crime annually. According to the NCRB's Crime in India 2023 report, India registered 27,721 murders during that year, and Madhya Pradesh consistently features among the states with substantial absolute figures of violent crime. The state is served by a complex forensic infrastructure including the Central Forensic Science Laboratory (CFSL) Bhopal — one of six national CFSLs under the Ministry of Home Affairs — and the State Forensic Science Laboratory at Sagar.

This paper critically evaluates the interplay between forensic science and homicide investigation in Madhya Pradesh, situating the analysis within the broader frameworks of forensic jurisprudence, criminal procedure, and evidentiary law.

1.2 Objectives of the Study

- To examine the legal framework governing murder and culpable homicide in India, including the transition from the IPC to the BNS.
- To critically evaluate the role of key forensic disciplines in homicide investigation in Madhya Pradesh.
- To analyze landmark judicial decisions from Madhya Pradesh courts concerning forensic evidence.
- To assess the systemic challenges confronting forensic science in the state's criminal justice apparatus.
- To offer evidence-based policy recommendations for strengthening forensic science's role in homicide investigation and prosecution.

1.3 Methodology

This paper employs a doctrinal legal research methodology, supplemented by socio-legal and empirical analysis. Primary sources include Supreme Court and Madhya Pradesh High Court judgments sourced from Indian Kanoon and the Supreme Court Observer; NCRB 'Crime in India' reports (2018–2023); and official documentation from the CFSL Bhopal. Secondary sources include peer-reviewed academic articles, forensic science journals, and policy reports. The paper also critically engages with recent reforms introduced by the Bharatiya Nyaya Sanhita, 2023, Bharatiya Nagarik Suraksha Sanhita, 2023, and the Bharatiya Sakshya Adhiniyam, 2023.

2. Legal Framework: Murder, Culpable Homicide, and the Indian Penal Code

2.1 The Definitional Architecture: Sections 299 and 300 IPC

The Indian Penal Code, 1860, established a sophisticated, hierarchical taxonomy of homicidal offences. Section 299 IPC provides the foundational definition of 'culpable homicide' as causing death with: (a) the intention of causing death; (b) the intention of causing such bodily injury as is likely to cause death; or (c) knowledge that the act is likely to cause death. Section 300 IPC then elevates culpable homicide to the status of 'murder' under four specific conditions defined with increasing degrees of culpability and premeditation.

The distinction between the two provisions hinges on the subtlety of mens rea — the guilty mind. As the Supreme Court articulated in the seminal case of Virsa Singh v. State of Punjab (AIR 1958 SC 465), for a conviction under Section 300 clause thirdly, the prosecution must establish not merely that the injury inflicted was likely to cause death in the ordinary course of nature, but that the accused specifically intended to inflict that particular injury. This 'thin line problem,' as scholars have termed it, has given rise to prolific litigation in Madhya Pradesh courts, where charges of murder are frequently reduced to culpable homicide not amounting to murder on the grounds

of evidentiary uncertainty regarding the accused's precise mental state. A landmark Madhya Pradesh case illustrating this point is Maukam Singh v. State of Madhya Pradesh, adjudicated by the Supreme Court in 2025. The court modified the conviction from murder under Section 302 IPC to culpable homicide under Section 304 Part II, holding that while an elderly man was fatally injured during a dispute over a place of worship in Madhya Pradesh, the fatal assault was committed with knowledge rather than specific intention to cause death. This distinction — between 'intention' and 'knowledge' — is precisely where forensic evidence becomes indispensable.

2.2 The Bharatiya Nyaya Sanhita, 2023: Continuity and Reform

The Bharatiya Nyaya Sanhita (BNS) 2023, which replaced the IPC with effect from July 1, 2024, has substantially retained the definitional structure of homicide law while introducing clearer categorizations. Under the BNS, Section 100 (corresponding to Section 299 IPC) defines culpable homicide, and Section 101 (corresponding to Section 300 IPC) defines murder. The punishments are more systematically categorized under the BNS, depending on whether death was caused intentionally, knowingly, or by negligence, making the provisions more amenable to forensic evidence-based adjudication. Significantly for forensic practice, the Bharatiya Nagarik Suraksha Sanhita (BNSS) 2023 — the procedural code replacing the Criminal Procedure Code — mandates that forensic experts must visit the crime scene in cases involving offences punishable with seven or more years of imprisonment. This is a watershed reform that directly elevates the role of forensic science in homicide investigation, which historically attracted penalties of life imprisonment or death. The Bharatiya Sakshya Adhiniyam (BSA) 2023, replacing the Indian Evidence Act 1872, also strengthens chain-of-custody requirements and formalizes protocols for the collection and admissibility of electronic and forensic evidence.

2.3 Classification of Homicidal Offences: A Comparative Table

Offence	IPC Provision	BNS Provision	Key Mental Element	Punishment
Murder	§ 300 / § 302	§ 101	Specific intention to cause death	Death or life imprisonment + fine
Culpable Homicide (Part I)	§ 299 / § 304(I)	§ 105(a)	Intention causing death / injury likely to cause death	Life or 10 years + fine

Offence	IPC Provision	BNS Provision	Key Mental Element	Punishment
Culpable Homicide (Part II)	§ 299 / § 304(II)	§ 105(b)	Knowledge that act likely to cause death	Up to 10 years + fine
Death by Negligence	§ 304A	§ 106	Rash / negligent act	Up to 2 years + fine
Attempt to Murder	§ 307	§ 109	Intention to commit murder	Up to 10 years or life if hurt

Table 1: Classification of Homicidal Offences under IPC and BNS

3. Forensic Science in Homicide Investigation: Disciplines and Application

3.1 The Epistemological Foundation of Forensic Evidence

Forensic science, derived from the Latin 'forensis' (of the forum or court), denotes the application of scientific principles and methodologies to legal questions. In the homicide context, forensic science performs four fundamental functions: (i) determining the cause, manner, and time of death; (ii) identifying the victim and, where possible, the perpetrator; (iii) reconstructing the sequence of events at the crime scene; and (iv) providing scientifically grounded, court-admissible evidence that either incriminates or exculpates individuals.

The admissibility of forensic expert evidence in Indian courts is governed by Section 45 of the Indian Evidence Act, 1872 (now Section 39 of the Bharatiya Sakshya Adhiniyam, 2023), which treats such evidence as 'opinion evidence.' In the landmark case of Murari Lal v. State of Madhya Pradesh (1979 INSC 248), the Supreme Court held that expert opinion, when supported by sound reasoning and validated methodology, deserves significant evidentiary weight. The Court cautioned, however, that judges must critically evaluate the logical reasoning underlying any expert opinion rather than adopting it wholesale — a principle that continues to govern the admissibility of forensic reports in Madhya Pradesh homicide trials.

3.2 Forensic Pathology and Post-Mortem Examination

The post-mortem examination (PME) — or medicolegal autopsy — is invariably the first and most critical forensic procedure in any homicide investigation. Performed by a forensic pathologist or medical officer under Section 174 CrPC (now Section 194 BNSS), the PME seeks to establish the cause of death, manner of death, time since death (post-mortem interval), and the nature of injuries inflicted. The examination

scrutinizes internal and external injuries, the condition of organs and tissues, and any toxicological or histological findings. In the Madhya Pradesh context, a persistent challenge has been the quality and thoroughness of post-mortem examinations, particularly in rural districts where autopsies are conducted by general practitioners or medical officers rather than qualified forensic pathologists. Superficial PME reports that merely record the cause of death without detailed injury mapping, wound characterisation, or estimation of time since death have frequently been challenged by defense counsel in Madhya Pradesh sessions courts, leading to acquittals in otherwise strong prosecution cases.

The post-mortem interval (PMI) estimation is particularly crucial in cases where the body is discovered after a delay — a common occurrence in rural Madhya Pradesh where geographical remoteness means bodies may remain undiscovered for days. Forensic entomology, which estimates the PMI through the study of insect succession on the corpse, has begun to find limited application in such cases, though its systematic deployment across MP's forensic apparatus remains aspirational.

3.3 DNA Profiling and Serological Analysis

DNA profiling represents the gold standard of forensic identification in contemporary criminal investigation. Introduced in India's criminal justice ecosystem in the 1990s, and accorded express legislative recognition under Section 53A CrPC (Section 51A BNSS), DNA analysis enables the comparison of biological trace evidence — blood, semen, saliva, hair roots, skin cells — recovered from the crime scene with reference samples from the accused or victim. The unique genetic code of every individual ensures a match probability of 1 in several billion, making DNA profiling the most reliable tool for linking a suspect to the scene of a homicidal offence.

The Central Forensic Science Laboratory at Bhopal, one of six national CFSLs under the Directorate of Forensic Science Services, Ministry of Home Affairs, serves as the principal forensic repository for DNA analysis in Madhya Pradesh cases referred for central laboratory examination. State-level DNA analysis is conducted at the Sagar SFSL. High-profile homicide cases from Madhya Pradesh — including the 2009 Indore kidnapping and murder case adjudicated by the Supreme Court as recently as 2026 — have illustrated both the power and the procedural vulnerabilities of DNA evidence. In the Indore case, the Supreme Court upheld a murder conviction despite the defense's challenge that DNA testing had not been conducted, holding that identification by close relatives and a strong chain of circumstantial evidence was sufficient — though it simultaneously acknowledged DNA analysis as the preferred evidentiary instrument.

The Aarushi Talwar murder case, though not originating in MP, established a national precedent on the pivotal role of forensic toxicology — specifically the discovery of sedatives through post-mortem toxicological screening. In Madhya Pradesh cases involving alleged poisoning — a category of homicide that presents significant investigative challenges — forensic toxicology has proven indispensable, since the external appearance of the deceased rarely reveals the cause of death.

3.4 Ballistic and Firearms Analysis

Madhya Pradesh has historically recorded significant incidence of firearm-related homicides, particularly in regions with a prevalence of country-made weapons and a tradition of armed agrarian conflict. Forensic ballistics — the scientific analysis of firearms, bullets, cartridge cases, gunshot residue (GSR), and wound morphology — provides critical evidence in such cases. Ballistic analysis can determine the type of weapon used, the direction and distance of firing, the trajectory of projectiles, and, through barrel striations, match a specific bullet to a specific firearm.

In homicide trials across Madhya Pradesh's sessions courts, ballistic expert evidence under Section 293 CrPC (Section 313 BNSS) has been crucial in corroborating eyewitness testimony, establishing the sequence of shots fired, and defeating defenses of accidental discharge. The evidentiary standard for ballistic evidence was refined by the Supreme Court in Pantangi Balarama Venkata Ganesh v. State of Andhra Pradesh, where the Court held that ballistic expert opinion is admissible and must be evaluated in conjunction with the totality of circumstantial evidence.

3.5 Fingerprint and Trace Evidence Analysis

Fingerprint analysis — the oldest systematized forensic discipline — retains its primacy in crime scene investigation. India established the world's first fingerprint bureau in Calcutta in 1897, and the Central Fingerprint Bureau under the NCRB continues to maintain the national fingerprint database. In Madhya Pradesh, the Fingerprint Manual of the state has been specifically referenced by the Madhya Pradesh High Court and the Supreme Court in evaluating the admissibility and weight of fingerprint expert evidence.

The Supreme Court, in evaluating fingerprint evidence in Madhya Pradesh cases, has held — referencing both the MP Fingerprint Manual and international standards including those of the FBI and Scotland Yard — that 'no hard and fast rule' can be prescribed for the minimum number of matching ridge characteristics required for a positive identification. This case-by-case approach places significant responsibility on the forensic expert to present enlarged photographs, clearly explain the matching

points, and provide reasoning accessible to the trial judge. Trace evidence — hair, fibres, soil, glass fragments, tool marks — while less prominently developed in rural MP investigation, has increasingly been deployed in urban homicide cases in Bhopal, Indore, and Jabalpur, where the FSL teams deployed to crime scenes have access to more sophisticated collection kits.

3.6 Digital and Cyber Forensics in Homicide Investigation

The proliferation of mobile telephony and digital devices has introduced a new dimension to homicide investigation in Madhya Pradesh. Call Detail Records (CDRs), mobile location data, CCTV footage, WhatsApp communications, and social media activity have become standard investigative resources in urban homicide cases. Digital forensics — the recovery and analysis of electronically stored information — is now routinely employed to establish the movements of both victim and accused before the homicidal event, identify communications indicating motive or planning, and corroborate or challenge testimonial accounts.

The recent Twisha Sharma case in Bhopal (2026) — involving the death of a model and the initial police conclusion of suicide, subsequently challenged and transferred to the CBI — illustrates the centrality of digital forensic evidence. The investigation involved seizure of mobile phones, laptops, and metadata analysis, with the crime scene being reconstructed by the SIT. The case underscores how digital forensics has become inseparable from modern homicide investigation in Madhya Pradesh, even in cases that initially appear to be non-homicidal deaths.

4. Forensic Infrastructure in Madhya Pradesh

4.1 The Central Forensic Science Laboratory, Bhopal

The Central Forensic Science Laboratory (CFSL), Bhopal, established under the Directorate of Forensic Science Services (DFSS), Ministry of Home Affairs, Government of India, is one of six national CFSLs and serves as the premier forensic analytical institution in central India. The CFSL Bhopal handles complex, high-stakes forensic examinations referred by investigating agencies across Madhya Pradesh and neighbouring states, including DNA profiling, advanced toxicological analysis, questioned document examination, and explosives analysis. Forensic reports issued by the Director, Deputy Director, or Assistant Director of the CFSL are admissible in court under Section 293 CrPC (Section 313 BNSS) without necessitating the physical presence of the expert, significantly expediting the evidentiary process.

4.2 State Forensic Science Laboratory and Regional Units

The State Forensic Science Laboratory (SFSL) headquartered at Sagar, Madhya Pradesh, constitutes the primary forensic analysis facility for the state's investigative agencies. In April 2025, the Bhopal Police Commissioner implemented a landmark structural reform: the deployment of zone-wise dedicated FSL teams for each of the four police zones in Bhopal, replacing the previous single-team arrangement that had chronically struggled with the volume and simultaneity of crime scene work. This reform — providing each zone its own senior-officer-led FSL team equipped with advanced forensic tools and high-tech investigation kits — represents a significant step towards reducing evidence collection delays in the state capital.

However, the state continues to face a sharp urban-rural divide in forensic accessibility. A crime committed in a remote tribal district of Bastar, Alirajpur, or Sheopur may not receive an FSL team visit for days, significantly compromising the integrity of the crime scene, the quality of evidence collection, and ultimately the prosecutorial outcome. The recommendation of mobile forensic units — forensic laboratories embedded in vehicles that can rapidly deploy to remote areas — is particularly salient for a geographically vast state like Madhya Pradesh.

4.3 Crime Statistics in Madhya Pradesh: A Quantitative Overview

Year	Murder Cases (India)	Culpable Homicide (India)	MP Rank (Violent Crime)	National Charge-Sheet Rate (%)
2019	28,918	–	High	~77.2
2020	29,193	–	High	~76.5
2021	29,272	–	High	~78.1
2022	28,522	–	High	~77.4
2023	27,721	–	High	~78.9

Table 2: National Homicide Statistics (NCRB, Crime in India 2019–2023). Note: MP consistently records above-average violent crime per capita.

5. Judicial Analysis: Landmark Cases from Madhya Pradesh

5.1 Murari Lal v. State of Madhya Pradesh (1979 INSC 248)

This landmark Supreme Court decision remains the foundational precedent on the evidentiary treatment of forensic expert opinion in Indian criminal law. The appellant had been convicted under Section 302 IPC for murder, with the prosecution relying

significantly on handwriting expert evidence. The Supreme Court, while affirming the conviction, laid down enduring principles: expert opinion constitutes admissible opinion evidence under Section 45 of the Indian Evidence Act; courts must not simply adopt expert opinions without scrutinizing the underlying reasoning; and the probative value of expert evidence depends on the coherence and substantiation of the expert's methodology. This case established that forensic expertise is not a substitute for judicial reasoning, but a scientific tool that courts must critically evaluate.

5.2 State of Madhya Pradesh v. Dharkole @ Jitu (Supreme Court, Murder/Wife Death Case)

This Madhya Pradesh murder case, involving the killing of a wife whose body was clandestinely cremated by the accused, reached the Supreme Court after the Madhya Pradesh High Court acquitted the accused, citing unreliable testimony and procedural lapses. The Supreme Court reversed the acquittal and restored the murder conviction, holding that circumstantial evidence — including the accused's exclusive knowledge of the cause of death under Section 106 of the Indian Evidence Act — was sufficient to sustain conviction. The case is significant for its recognition that where forensic evidence is unavailable due to the accused's deliberate destruction of evidence (clandestine cremation), the law permits strong adverse inferences against the accused.

5.3 Maukam Singh v. State of Madhya Pradesh (Supreme Court, 2025)

In this recent decision, the Supreme Court modified the murder conviction of three accused who had fatally assaulted an elderly man during a dispute over a place of worship in Madhya Pradesh. Despite the concurrent findings of the Sessions Court and the Madhya Pradesh High Court convicting all three under Section 302 IPC, the Supreme Court held that the prosecution had not established the specific intention to cause death required for murder under Section 300 IPC. Instead, the evidence — which included a medical examination of the deceased's injuries — supported a finding that the act was committed with knowledge that it was likely to cause death, attracting Section 304 Part II IPC. The case illustrates the critical role of forensic medical evidence in determining the mens rea element, and the consequences of inadequate injury documentation for the outcome of murder trials.

5.4 Archana @ Pinki Murder Case, Indore (Supreme Court, 2026)

The Supreme Court's 2026 judgment in this Indore kidnapping and murder case represents a recent and particularly instructive exercise in the evaluation of forensic and circumstantial evidence. The accused had kidnapped a woman and made ransom calls from her mobile phone to her family. The recovery of the deceased's body from

a specific well, pursuant to the accused's disclosure statement under Section 27 of the Evidence Act, was held to constitute a crucial incriminating circumstance. The Court upheld the murder conviction, and — significantly — rejected the defense's argument that the absence of DNA testing weakened the prosecution's case, holding that reliable identification by close relatives, corroborated by other evidence, was legally sufficient. The Court simultaneously affirmed DNA analysis as the preferred investigative tool, while recognising that its absence does not automatically vitiate a well-constructed prosecution case.

5.5 Fingerprint Evidence and the Madhya Pradesh Fingerprint Manual

The Madhya Pradesh High Court's and Supreme Court's jurisprudence on fingerprint evidence has been particularly instructive. Courts have referenced the Madhya Pradesh Fingerprint Manual alongside standards of the FBI and Scotland Yard, holding that the weight accorded to fingerprint evidence depends on the expert's methodology, the quality of enlarged photographs, and the clarity of explanation of matching ridge characteristics. The principle that 'no hard and fast rule' can govern the minimum number of matching points reflects a nuanced understanding of the empirical limitations of fingerprint science — an understanding that Indian courts have arrived at through engagement with the developing international literature on forensic epistemology.

6. Systemic Challenges in Forensic Investigation of Homicides in Madhya Pradesh

6.1 Infrastructure Deficits and Forensic Backlogs

India's forensic science infrastructure faces well-documented systemic deficits that are acutely felt in a large, heterogeneous state like Madhya Pradesh. The concentration of sophisticated forensic analytical capacity in the urban centres of Bhopal and Sagar, while vast rural regions lack proximate access to FSL services, creates a geographical inequity in the quality of homicide investigation. This has concrete consequences: evidence collected at crime scenes in remote areas may degrade during extended transportation to distant laboratories, compromising both the quality of forensic analysis and the admissibility of resulting reports in court.

The recent initiative to deploy zone-wise FSL teams in Bhopal (2025) acknowledges that even in the state capital, a single FSL team was previously insufficient to handle the volume of simultaneous crime scenes — frequently being required to rush between multiple spots in a single day. If this inadequacy exists in a major metropolitan centre, the implications for rural investigative quality are even more severe.

6.2 Chain of Custody Violations and Evidence Contamination

The chain of custody — the documented, unbroken sequence of custody, transfer, analysis, and storage of physical evidence from the crime scene to the courtroom — is the foundational guarantee of forensic evidence integrity. A break in this chain renders evidence vulnerable to defense challenges of tampering, contamination, or planting, potentially causing its exclusion or significant diminution of weight. Indian courts have consistently held that chain-of-custody deficiencies go to the admissibility, not merely the weight, of forensic evidence.

In Madhya Pradesh, chain-of-custody violations manifest in several recurring forms: failure to seal and label evidence properly at the scene; delays in preparing panchnama (spot inspection documents); absence of contemporaneous photographic documentation of evidence in situ before collection; inadequate tamper-evident packaging; and informal transfers between investigating officers without proper documentation. The Bharatiya Sakshya Adhiniyam 2023 has introduced enhanced chain-of-custody requirements, including provisions for tamper-evident packaging and stricter documentation protocols, but the legislative intent will only translate into investigative practice through sustained training, monitoring, and accountability mechanisms.

6.3 Quality of Post-Mortem Examination

A significant proportion of Madhya Pradesh's district hospitals, particularly in tribal and remote areas, conduct post-mortem examinations under conditions that fall well short of established standards. Medical officers without forensic pathology training may fail to document injury patterns with the specificity required by forensic standards, render ambiguous conclusions on cause of death, or estimate the time since death imprecisely. These deficiencies in the PME — which is typically the primary forensic report in any homicide case — can undermine the prosecution's ability to establish the cause of death beyond reasonable doubt, inviting defence challenges that lead to acquittals or charge reductions from murder to lesser offences.

6.4 Delay in Forensic Reporting

Prolonged delays between evidence submission and forensic report generation represent one of the most practically consequential challenges in Indian forensic practice. Laboratories overwhelmed by the volume of cases from across the state face inevitable backlogs, leading to delays that extend trials, prolong the detention of accused individuals awaiting the results of forensic tests, and frustrate the constitutional guarantee of speedy trial. In homicide cases, where conviction may depend on the DNA match between crime scene biological evidence and the accused's

reference sample, a report delayed by twelve to eighteen months — not uncommon in Indian practice — has profound implications for justice delivery.

The BNSS 2023 has introduced provisions mandating video recording of crime scene investigations and forensic examinations in serious cases, which may both accelerate documentation and reduce disputes about evidence integrity. However, the implementation of these provisions requires significant investments in personnel, technology, and institutional capacity that have not yet fully materialised across Madhya Pradesh.

6.5 Judicial Training and Forensic Literacy

A frequently underappreciated dimension of the forensic evidence challenge in India is the limited forensic literacy of legal professionals — judges, prosecutors, and defense counsel — who must evaluate, present, and challenge forensic evidence in court. Many trial judges lack exposure to basic forensic science principles, making them susceptible to overvaluing or undervaluing forensic evidence, accepting methodologically flawed reports uncritically, or failing to appreciate valid challenges to forensic methodology. The adversarial legal system amplifies this problem: defense counsel may deploy aggressive cross-examination techniques to undermine technically sound forensic testimony by exploiting judges' unfamiliarity with scientific concepts.

The National Judicial Academy (NJA), headquartered in Bhopal, Madhya Pradesh — and thus in a unique geographic position to serve the state's judiciary — has developed training programmes in forensic science appreciation. However, systematic, mandatory forensic training for all judicial officers handling Sessions Court trials remains aspirational rather than universal.

6.6 Corruption and Evidence Tampering

The integrity of forensic science investigations in India is compromised by pervasive concerns about corruption and political interference. Evidence tampering, manipulated forensic reports, and undue influence on experts — while difficult to document empirically — have been raised in numerous publicised cases and academic commentaries. When forensic evidence itself becomes suspect, the epistemological foundation of the criminal justice system's fact-finding function is fundamentally undermined. Independent oversight of forensic laboratories, transparency in case assignment, and external accreditation are essential safeguards against this systemic risk.

7. Policy Recommendations and Reform Agenda

7.1 Establishment of District-Level Forensic Science Laboratories

The single most impactful structural reform for Madhya Pradesh's forensic science ecosystem would be the establishment of functional forensic science laboratories in each of the state's 55 districts. Modelled on Karnataka's initiative to establish FSLs in all district headquarters, district-level FSLs would dramatically reduce evidence transportation delays, improve the quality of rural crime scene investigation, and decentralize forensic analytical capacity. Each district FSL should be equipped with at minimum a basic toolkit for biological evidence preservation, fingerprint analysis, and digital forensics, with complex analyses referred to the SFSL Sagar or CFSL Bhopal.

7.2 Mandatory Forensic Expert Presence at Homicide Crime Scenes

Building on the mandate introduced by the BNSS 2023, Madhya Pradesh should implement strict protocols requiring forensic expert presence at all homicide crime scenes before any evidence is disturbed, moved, or collected. The zone-wise FSL team model implemented in Bhopal in 2025 should be extended to all divisional headquarters. A system of on-call forensic officers — similar to the forensic medical officer model — would ensure 24-hour availability for scene attendance.

7.3 Blockchain-Based Chain of Custody Management

The implementation of a blockchain-based evidence tracking system — where each stage of evidence custody is recorded in an immutable, timestamped digital ledger — would represent a transformative solution to the chain-of-custody problem. Such systems, piloted in select police forces internationally, eliminate the possibility of retroactive tampering with custody records and provide courts with an auditable, verifiable account of evidence handling from scene to laboratory to courtroom. Madhya Pradesh's existing digital infrastructure investments provide a foundation for such a system.

7.4 Capacity Building in Forensic Pathology

The state government should ensure that all district hospitals maintain at least one forensic pathology-trained medical officer, and that post-mortem examination facilities are equipped and staffed to conduct thorough, standardised autopsies. Partnerships between medical universities — notably AIIMS Bhopal and the government medical colleges — and the state forensic science establishment would strengthen training pipelines. Detailed post-mortem guidelines, aligned with the standards of the Board of Forensic Medicine and Toxicology, should be mandated by the State Health Department.

7.5 Forensic Literacy Training for Legal Professionals

The National Judicial Academy, Bhopal, should develop and deploy mandatory forensic science appreciation modules for all newly appointed Sessions Judges and Public Prosecutors in Madhya Pradesh. Continuing legal education programmes should ensure that practising advocates and sitting judges receive periodic updates on developments in forensic science methodology. A dedicated forensic science resource centre within the NJA would support this initiative.

7.6 Independent Accreditation and Oversight of FSLs

Forensic Science Laboratories in Madhya Pradesh should be subject to mandatory accreditation by the National Accreditation Board for Testing and Calibration Laboratories (NABL), and the accreditation status of each laboratory should be publicly disclosed. An independent oversight board, comprising forensic scientists, legal experts, and civil society representatives, should review laboratory performance, investigate complaints of bias or manipulation, and recommend systemic improvements.

8. Conclusion

Forensic science occupies an increasingly central — and constitutionally indispensable — role in the investigation and prosecution of murder and culpable homicide in Madhya Pradesh. From the post-mortem examination that first determines whether a death is homicidal to the DNA profile that places a suspect at the crime scene; from the ballistic analysis that corroborates an eyewitness account to the digital forensics that reconstructs a perpetrator's movements — forensic evidence provides the scientific substratum upon which the edifice of homicide prosecution is built.

Yet the critical evaluation undertaken in this paper reveals deep structural tensions between forensic science's evidentiary promise and the operational realities of criminal investigation in Madhya Pradesh. Geographic inaccessibility, inadequate infrastructure, chain-of-custody violations, substandard post-mortem practices, protracted reporting delays, limited forensic literacy among legal professionals, and the ever-present spectre of evidence contamination and corruption collectively undermine the potential of forensic science to deliver the reliable, objective, and science-based evidence that justice demands.

The legislative reforms embodied in the Bharatiya Nyaya Sanhita, Bharatiya Nagarik Suraksha Sanhita, and Bharatiya Sakshya Adhiniyam 2023 signal a clear parliamentary intent to embed forensic science more deeply in India's criminal justice architecture. The mandatory forensic scene attendance for serious crimes, enhanced chain-of-custody requirements, and formalized digital evidence protocols represent important statutory advances. But legislative mandates require institutional capacity

to become operational reality. In Madhya Pradesh, bridging the gap between forensic law on paper and forensic justice in practice demands sustained political will, adequate resource allocation, and a systemic commitment to scientific evidence as the foundation of criminal truth-finding.

The 'silent witness' of forensic evidence — impartial, objective, and immune to intimidation — has the potential to transform homicide investigation and prosecution in Madhya Pradesh. Realizing that potential is not merely a matter of scientific advancement; it is a matter of constitutional justice.

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