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## A Critical Study on Post-Mortem Examination in India Concerning Forensic Toxicology

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*A death can result due to various reasons and in some cases, the factors causing such a death remain undetermined except when an examination is carried out. Such an examination is known as the Mortem Examination or Autopsy Examination. An autopsy is a specialized surgical procedure involving the diagnosis of organs and tissues to understand the reason behind a person's death. Post-mortem examination of the corpse is required to understand the cause of death, identification of the deceased person, estimation of time since the death of the deceased, and other essential aspects to proceed to further process. Firstly, the article aims to understand the post-mortem examination of a corpse in-depth and subsequently its significance. Secondly, it analyses forensic autopsy and the legal framework for it in India. Thirdly, it attempts to understand forensic toxicology and the procedure involved in it. Thereafter, the paper brings out the challenges inherent in forensic toxicology and the recommendations to overcome them.*

**Keywords:** *post-mortem examination, forensic toxicology, autopsy.*

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### INTRODUCTION

Generally, a death can result due to various reasons, and in some cases, the factors causing such a death remain undetermined except when an examination is carried out. In such a scenario, the examination of the corpse becomes necessary to understand the cause of the death. Thus, the

examination or analysis of the body of an individual after his death is known as the post-mortem examination or Autopsy Examination. Post-mortem analysis is not a new subject in Indian medical jurisprudence and references to the same can be found in ancient texts. For instance, 'Kautilya's Arthashastra explained the need for autopsy in establishing the cause of death after smearing the body with oil to bring out bruises, swellings, and other injuries.'<sup>1</sup> However, the processes of conducting an autopsy have evolved over the period with the development of mankind and the advent of new tools and techniques required for different cases.

The word 'Autopsy' is derived from a Greek term called 'Autopsy' i.e., to see for oneself. An autopsy is a specialized surgical procedure involving the diagnosis of organs and tissues to understand the reason behind a person's death. For autopsy purposes, the manner of death has been broadly recognized as natural or unnatural and if it happens to be unnatural, it is further determined as to whether it is homicidal, suicidal, or accidental. It is also performed to infer the identity of the deceased person, time of death, etc. Post-mortem examinations are systematically categorized into three kinds i.e., Forensic Autopsy, Anatomical Autopsy, and Clinical Autopsy. All three autopsies are performed by professionals trained in the respective areas to identify the cause and nature of the death.

Firstly, forensic science and autopsy are intimately related to each other, wherein different forensic laboratories come into picture according to the nature of the death. 'Forensic science denotes a branch of medicine which deals with the application of principles and knowledge of medicine for law, both civil and criminal'<sup>2</sup>. It can be understood that therefore, forensic autopsy is performed by forensic pathologists to address medicolegal objectives in cases of suspicious or violent deaths provided the same is mandated by the application of law. It covers an examination of a wide range of deaths but the current research has taken up deaths resulting from toxicology.

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<sup>1</sup> Shilekh Mittal et. al., 'Evolution of Forensic Medicine in India' (2007) 29(4) Journal of Indian Academy of Forensic Medicine  
<[https://www.researchgate.net/publication/236590109\\_Evolution\\_of\\_Forensic\\_Medicine\\_in\\_India](https://www.researchgate.net/publication/236590109_Evolution_of_Forensic_Medicine_in_India)> accessed 3 June 2024

<sup>2</sup> *Ibid*

Secondly, anatomical or academic autopsies are performed by students pursuing the course of anatomy for their practical knowledge and experience. However, it is possible only when a person gives his consent for such an examination before his death or upon any unclaimed bodies by any individual.

Thirdly, clinical autopsies deal with those deaths that have occurred while the person is under the observation of doctors or other staff in the hospital and in those cases where physicians have failed to figure out the cause of the death necessitating an examination of the dead body. It helps to understand the standards of a particular hospital and to improve its clinical care.

Further, if the post-mortem examination is ordered by the concerned authorities, it shall be carried out either in full, limited, coronial, or non-coronial. A full autopsy requires both internal and external examination of the organs and tissues in the abdomen, head, and chest cavities, as collection, and retention of samples for other testing purposes. While a limited autopsy permits external examination internal examination is limited to certain parts of the body.

Autopsies are not only essential to find out the cause of the death of the deceased but also help doctors, lawyers, and investigating officers in their respective procedures. Generally, autopsies are performed during the investigation of a crime that resulted in the death of a person. But it is also conducted in ordinary cases to understand more about a particular disease, injury, or medical maladies that could help doctors in their treatments of other patients. Therefore, the subsequent chapters will deal with the importance of post-mortem examinations, procedures, and legal framework of forensic autopsy and then narrow down the scope of research to forensic toxicology and its challenges in India.

## **RESEARCH OBJECTIVES**

**The following are the research objectives that could be satisfied during this study:**

1. The research paper is aimed at understanding the post-mortem analysis and its importance in India.
2. It endeavours to analyze forensic autopsy and the legal framework for it in India.
3. The study attempts to understand forensic toxicology and the procedure involved in it.

4. The research paper also tries to bring out the challenges inherent in forensic toxicology and the recommendations to overcome them.

## RESEARCH METHODOLOGY

Research methodology is how the researcher conducts the research systematically to obtain the result of the research. Two types of research methodologies can be opted to conduct research i.e., doctrinal research and non-doctrinal research. The idea of referring to and analyzing existing data such as statutes, legal provisions, books, and articles implies doctrinal research. In simpler terms, it is the interpretation of documented information. While doctrinal research requires a researcher to undergo a certain amount of fieldwork to obtain the result. The methodology that has been undertaken herein to conduct this research is doctrinal. The topic undertaken for research is one of those kinds that is contemporary. A critical study on post-mortem examination concerning forensic toxicology from an overall perspective requires the effective interpretation of documented information such as the legal provisions, journal articles, books, etc. Therefore, doctrinal research has been taken up to satisfy the demand for the research. The researcher has also conducted qualitative research to gather information from scattered sources. Therefore, it is believed that the information procured for the current research is valuable and suitable. The primary sources for the research are the Indian Evidence Act 1872<sup>3</sup> and the Criminal Procedure Code 1973<sup>4</sup>. Whereas the secondary sources are books, journal articles, etc.

## RESEARCH QUESTIONS

**The following questions will be addressed by the researcher in this research paper:**

1. What is post-mortem analysis and discuss its significance in India?
2. What is a forensic autopsy and analyze its legal framework under Indian laws?
3. What is forensic toxicology and the procedure involved in it?

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<sup>3</sup> Indian Evidence Act 1872

<sup>4</sup> Criminal Procedure Code 1973

4. What are the challenges faced by forensic toxicology in India and how can they be addressed?

## LITERATURE REVIEW

1. Daniel Manoj, James Rajesh, Gerard Pradeep, Ganesh Rajendiran, *Post Mortem Toxicology Analysis in India: Rethinking the Future*<sup>5</sup>. The research paper has analyzed and reviewed the existing international standards of collection and preservation of samples for post-mortem toxicology analysis and compared them with the prevalent practice in India. It has further emphasized recommending changes and then the practical challenges in implementing those changes to the current system. The researcher has utilized this research paper to understand the challenges existing in the current framework related to forensic toxicology.

2. Divya Basan, *Evidentiary Value of Medio-Legal Autopsy in India*.<sup>6</sup> The research article has discussed the purpose, scope, prerequisites, and procedure of medicolegal autopsy in India. Furthermore, it has interpreted the evidentiary value of forensic autopsy reports under the Criminal Procedure Code, of 1973<sup>7</sup> and the Indian Evidence Act, of 1872<sup>8</sup>. It was opined that the report has to be considered as secondary evidence used for corroborating or contracting the substantive evidence. The researcher has used this paper to understand the evidentiary value of the report under the Indian Evidence Act, of 1872<sup>9</sup>.

3. Kamil Hatan, *Post Mortem Examination and Autopsy Current Issues from Death to Laboratory Analysis*.<sup>10</sup> This article has enunciated forensic medicine as a tool helping the death investigation to conclude the cause of the death of the deceased. It has further enumerated the importance of crime scene investigation before the autopsy examination in cases of a death

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<sup>5</sup> Daniel Manoj et. al., 'Post Mortem Toxicology Analysis in India: Rethinking the Future' (2021) 38(2) Journal Of Forensic Medicine & Toxicology <<https://jfmtonline.com/index.php/jfmt/article/view/228>> accessed 03 June 2024

<sup>6</sup> RB Kotabagi et. al., 'Clinical Autopsy vs Medicolegal Autopsy' (2005) 61(3) Medical journal, Armed Forces India <[https://doi.org/10.1016%2FS0377-1237\(05\)80169-8](https://doi.org/10.1016%2FS0377-1237(05)80169-8)> accessed 07 June 2024

<sup>7</sup> Criminal Procedure Code 1973

<sup>8</sup> The Indian Evidence Act 1872

<sup>9</sup> *Ibid*

<sup>10</sup> Kamil Hakan Dogan, *Post Mortem Examination and Autopsy: Current Issues From Death to Laboratory Analysis* (National and University Library of Zagreb 2018)

resulted out of a crime. This research paper has been utilized by the researcher to get an overall understanding of the importance of crime scene investigation before forensic autopsy.

4. Zorawar Singh, Forensic Toxicology: Biological Sampling and Use of Different Analytical Techniques.<sup>11</sup> The paper has discussed forensic toxicology dealing with the investigation of drugs of abuse or toxic substances. It further enunciated upon various biological samples and techniques used for such testing. It highlighted the significance of forensic toxicology and the various techniques used in it. The researcher has used this research paper to gain knowledge about the importance of forensic toxicology.

Manish Yadav, Anindhya Tiwari, Forensic Toxicology and its Relevance with Criminal Justice Delivery System in India.<sup>12</sup> This research paper has discussed the legal aspects involved in forensic toxicology and how it aids the justice system. It claimed that the primary concern of forensic toxicology is not only the legal outcome but also the technology and techniques to obtain and interpret the results. The researcher has utilized this research paper to understand the benefits rendered by forensic toxicology to the judicial system in deciding a case.

## IMPORTANCE OF POST-MORTEM EXAMINATION

As how proper treatment and diagnosis are important before a person's death, a thorough examination of his body after the death to determine its nature and cause is equally important in many cases. A post-mortem analysis is necessary to be conducted to understand the following aspects:

- To understand the cause of death i.e., criminal act or natural death.
- To identify the deceased person.
- To estimate the time since the death of the deceased.

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<sup>11</sup> Zorawar Singh, 'Forensic Toxicology: Biological Sampling and Use of Different Analytical Techniques' (2017) 4(4) Forensic Research & Criminology International Journal <[https://www.researchgate.net/publication/320001616\\_Forensic\\_Toxicology\\_Biological\\_Sampling\\_and\\_use\\_of\\_Different\\_Analytical\\_Techniques](https://www.researchgate.net/publication/320001616_Forensic_Toxicology_Biological_Sampling_and_use_of_Different_Analytical_Techniques)> accessed 10 June 2024

<sup>12</sup> Manish Yadav and Anindhya Tiwari, 'Forensic Toxicology and its Relevance with Criminal Justice Delivery System in India' (2017) 4(4) Forensic Research & Criminology International Journal <<http://medcraveonline.com/FRCIJ/FRCIJ-04-00121.pdf>> accessed 09 June 2024

- To identify and note down the circumstances that resulted in death i.e., the nature of physical injuries.
- To ascertain any influence of poison or drugs before the death of the deceased.

When a death has taken place, various medicolegal issues justify the need for conducting autopsies. First and foremost, the autopsy examination is important to make sure justice is served to everyone involved in the case i.e., the deceased, the accused person(s), their family members, and the respective insurance companies. Autopsy examinations do not only help as a tool to identify a criminal but also exempt an accused or suspect from criminal involvement. It acts as an important tool to understand the cause of death and other contributing factors.

Furthermore, in certain cases, the results and data obtained from such post-mortem analysis can also be utilized in policy-making and preventive measures concerning reducing road accidents resulting in death, workplace-related accidents, etc. As postmortem examinations permit pathologists to dissect and analyze a body part, they provide valuable insights and evidence for different research purposes to delve deep into the unknown technicalities and a better understanding of diseases that caused the death. Post-mortem examinations also help to understand the medical professionalism of the doctors, and if the death has occurred during the treatment in the hospital to take legal actions and prosecute against them if it appears to be necessary.

By performing medicolegal autopsy analysis, the deceased can be identified, if he's unclaimed by anyone, the exact place of injuries can be found out and documented, the crime scene can be reconstructed (if no witnesses are present), any unrevealed diseases that caused the death could be understood and the traces and evidence remained on the corpse can also be collected to solve the case.

Anatomical post-mortem examinations benefit students pursuing the course to obtain a practical understanding of the subject for future purposes. Further, clinical post-mortem examinations will be carried out when the death has occurred due to natural causes. The post-mortem analysis in these cases is important to determine the nature of the disease, and the quality of treatment given before the death which doesn't support the deceased's survival and also provides a better

understanding of the disease and its abnormalities. On the other hand, it also plays a significant role in allowing physicians to analyze, correct, and confirm the treatment by improving their capability to diagnose by implementing new medical knowledge in the future.

In addition to the above, the post-mortem analysis provides information about peculiar diseases like cancer, which cannot be obtained from living subjects. Indirectly, the insight acquired from such analysis and then implemented on other patients with new techniques could also increase the number of surviving patients as well. Any chemical process that could cause changes in tissues or organs either inhaling or ingestion of chemicals, food additives or pollutants could also be found with the help of autopsy analysis.<sup>13</sup>

The ability to solve complex cases could also be improved with the traces and evidences taken from autopsy analysis. Besides, necropsies ascertain the efficiency of new medicines, collect accurate and important information that can be entered into national records and gain legal information regarding the human autopsy. Therefore, autopsy examinations are very important because they don't only answer why, how and when it happened but also aid medical education and practices by being a learning tool in the study of pathology.

## **FRAMEWORK OF FORENSIC AUTOPSY IN INDIA**

It is known that forensic or medicolegal autopsies are conducted with the objective of solving the crime by answering distinctive questions such as the cause and time of the death, the identity of the deceased person and the circumstances of death enabling the agencies to be involved. A forensic autopsy is performed only at the request of the investigating authority as part of the inquest procedure as it will assist them in the proper administration of justice. An inquest implies an inquiry ordered into the cause of the death of the individual as it didn't result out of natural causes. Such a request is usually made by the police of appropriate jurisdiction or the magistrate of the court. To conduct the medicolegal autopsy, the cause of death must be unidentified, uncertain or unnatural. Here, it is significant to understand that in many cases, the nature of death is known to the doctors and the attendants attended to the deceased. But in order to make the cause of death to be evident before the court of law with proper proof, post-mortem

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<sup>13</sup> Indian Evidence Act 1872



examinations are carried out by a registered pathologist. Such a pathologist also provides evidence in court or at an inquest as an expert.

***Documentary Pre-requisites:***

A pathologist requires the following documents before conducting a forensic autopsy:

1. An acknowledgement letter from the investigating officer requesting to conduct the autopsy and collect necessary materials from the body for other investigations.
2. Copy of panchanama prepared by investigating officer at the crime scene.
3. Dead body challan by the investigating officer having the answers to a particular set of questions relating to the death of the deceased.
4. Clinical case sheet declaring the person as died by the concerned doctor.

The pathologist or medical officer will accompany the investigating officer to the crime scene to make his observations of the crime scene, as it may help him during the post-mortem examination.

***Evidentiary Value of Forensic Autopsy Report in India:***

The law under sections 174<sup>14</sup> and 176<sup>15</sup> of the Criminal Procedure Code, 1973 (hereinafter referred to as the 'Code') has to be interpreted together to understand the legal framework of forensic autopsy in India. Both sections are complementary to each other and necessitate autopsy in case of unnatural deaths. Section 174 of the Code<sup>16</sup> requires the executive magistrate to make an inquest report in the cases of death caused by machinery, suicide, murder, animal attack or suspicion that some other person has committed the offence by considering the post-mortem report as well.

Whereas, section 176(5) of the Code<sup>17</sup> states that the executive magistrate, police officer or metropolitan magistrate holding the inquiry is authorized to send the body for examination by

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<sup>14</sup> Criminal Procedure Code 1973, s 174

<sup>15</sup> Criminal Procedure Code 1973, s 176

<sup>16</sup> Criminal Procedure Code 1973, s 174

<sup>17</sup> Criminal Procedure Code 1973, s 176(5)

the civil surgeon or other qualified medical officer qualified for this purpose in the cases mentioned under section 174<sup>18</sup> of the code or where any person dies or disappears under the said section. Therefore, both the legal provisions assert that in cases of unnatural deaths, an inquest report will be prepared on the cause of the death by performing the post-mortem analysis as well. The apex court in the case of *Pedda Satya Narayana v State of A.P.*<sup>19</sup> stated that the objective of sections 174<sup>20</sup> and 176<sup>21</sup> of the Code is to determine whether the deceased has died under suspicious circumstances and if it is so, then what is the cause of such death.

Furthermore, the Indian legal system considers the experts opinions for the administration of justice. Therefore, the medical reports and opinions given by pathologists (i.e., an expert) are admissible as medical evidence under section 45 of the Indian Evidence Act, 1872<sup>22</sup>. An expert is a person who has knowledge, practical experience, observation or special skills beyond the range of common knowledge related to foreign law, science, art, handwriting and fingerprints.<sup>23</sup> Even though the post-mortem report forms a major part of the other evidence before the court for consideration, it doesn't form a substantive piece of evidence and is limited to the extent of corroboration to other evidence.

The status of forensic autopsy was discussed by the Court in the case of *Abdul Rahman Sheikh v State of M.P.*<sup>24</sup> that the autopsy report contains the findings of the experts on the aspects of cause, nature and the effect of the death. Such an opinion is admissible under section 45<sup>25</sup> of the Indian Evidence Act, 1872 after his examination in the court as mere certificate is not evidence.

Further, in the case of *Munshi Prasad v State of Bihar*<sup>26</sup>, the apex court stated that the autopsy report is itself not substantive evidence but it's the medical officer's statement in court, which has the credibility of substantive evidence and not the report, which in normal circumstances ought to be used only for refreshing the memory of the doctor or to contradict whatever he

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<sup>18</sup> Criminal Procedure Code 1973, s 174

<sup>19</sup> *Pedda Narayana & Ors v State of Andhra Pradesh* (1975) 4 SCC 153

<sup>20</sup> Criminal Procedure Code 1973, s 174

<sup>21</sup> Criminal Procedure Code 1973, s 176

<sup>22</sup> Indian Evidence Act 1872, s 45

<sup>23</sup> *Ibid*

<sup>24</sup> *Abdul Rahman Sheikh v State of M.P* (2002) 3 MPHT 330

<sup>25</sup> Indian Evidence Act 1872, s 45

<sup>26</sup> *Munshi Prasad And Ors v State of Bihar* (2001) 1 SCC 351

might say in the court.<sup>27</sup> Therefore, a post-mortem report accompanied by a medical officer's testimony in the court of law makes it an admissible evidence to decide a case involving unnatural death. However, in the present-day scenario, it will be in the interest of the justice that the report of the post-mortem conducted as per the procedure established by law should be used as secondary evidence to corroborate or contradict substantive evidence produced in the court.

In *Banwari Ram & Ors. v State of U.P.*<sup>28</sup>, the court upheld that if the prosecution is likely to prove the cause of death with the help of substantial evidence, then the creditworthiness of the post-mortem report need not be separately checked upon and can be used as corroborative evidence per se.

On the other hand, the forensic autopsy report has to be strong enough to establish the cause of the death of the deceased otherwise it cannot be made admissible. In the case of *Budha Satya Venkata S. Roa v State of Andhra Pradesh*<sup>29</sup>, it was observed that if the medical evidence is incompatible or inconsistent as to the cause of the death then no conviction will be made with a sense of safety.

## FORENSIC TOXICOLOGY IN INDIA

As the research paper has understood the forensic autopsy and its legal framework under Indian laws, the scope of the research is narrowed down to the autopsy of toxicology deaths and its challenges in the current chapter.

A poison is any chemical or substance that can induce disease, damage or death when a body is exposed to it.<sup>30</sup> It was opined by a physician called Paracelsus that all things are poison, and nothing is without poison, the dosage alone makes it, so a thing is not a poison.<sup>31</sup> Toxicology studies the effects of poisons, drugs and other chemicals on the biological systems of human beings and deals with the means to prevent or ameliorate the same. Whereas, the subject of

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<sup>27</sup> *Ibid*

<sup>28</sup> *Banwari Ram Ors v State of UP* (1997) 9 SCC 3

<sup>29</sup> *Budha Satya Venkata S. Roa v State of Andhra Pradesh* (1994) 3 SCC 611

<sup>30</sup> Kotabagi (n 8)

<sup>31</sup> Manish Yadav and Anindhya Tiwari, 'Forensic Toxicology and its Relevance with Criminal Justice Delivery System in India' (2017) 4(4) Forensic Research & Criminology International Journal <<http://medcraveonline.com/FRCIJ/FRCIJ-04-00121.pdf>> accessed 09 June 2024

forensic toxicology is concerned with the science of applying the principles of analytical chemistry and toxicology to those subjects having medicolegal consequences and whose results are usually used in the court of law. It provides the report mentioning the key aspects as to the kind of substances existing in the deceased body and checks the quantity of those substances as to whether they are consistent with a therapeutic dosage or are above a harmful level. And these results can be utilized to infer a substance's potential effect contributing to his death. This science is ever-developing and includes within its ambit, the death investigation, diagnosis and management of patients with a high drug dosage, medical errors, undeclared prescription of drugs, chemical or toxin exposure, etc.

Forensic toxicology is categorized into two broad areas i.e., post-mortem toxicology and behavioral toxicology. The post-mortem or death investigation toxicology deals with the cause of death resulting from poisons, drugs, alcohol or any other chemical. Here, the quantification of the chemical concentration in any tissue or blood is necessary to establish a cause-and-effect relationship. During the autopsy, the samples of blood, tissues and if present, urine is collected. The tissue samples can be taken from the spleen, liver, eyes and brain. In some cases, it can also be taken from the contents of the deceased stomach and bile as well. If anything is detected in the first test, then further tests will be carried out. To conduct the tests, the toxicologists, pathologists and chemists work together during the whole process. Firstly, the basic screening of poisons, drugs or any other chemical in the urine and blood is observed.

The second and more complex test is conducted if the presence of a poison or drug is figured out with the help of first-round tests. This test includes the measurements of mass and other characteristics to detect chemicals in those substances. It is pertinent to note that not every drug can be screened i.e., many of the new drugs can be detected either in urine or blood but it will not be possible to be measured. The process would be lengthened in case multiple drugs are found in an individual's body and necessitates different tests and calculations. The pathologist has to figure out what poisons or drugs are present in the body, then measure how high the levels are and then look out for any drug interactions.

Human performance or behavioural toxicology is the analysis of the use and presence of substances found in illicit trafficking with no legitimate medical purpose. The samples for these

examinations are taken from living beings and are mainly classified into five classes i.e., depressants, hallucinogens, narcotics, stimulants and anabolic steroids.

### *The Challenges of Forensic Toxicology in India:*

In the current scenario, there are different kinds of poisons and drugs, whose testing is taking longer time than usual to obtain results in light of the complexity of forensic toxicology. On the other hand, the forensic toxicologist also faces several problems in analysis and interpretation of autopsy samples. Some of the challenges are listed out as the following:

- The autopsy interval between the death and the collection of samples is highly invariable leading to more interactions in the body.
- The toxicologists are not only required to analyze the samples to ascertain the presence of a poison or drug but are also often asked to check the concentration levels. The lack of enough literature on all of the new compounds makes the job difficult for them to give an accurate opinion.
- In some cases, the samples are not collected properly during the post-mortem examination or there has been an inordinate delay in transportation of those samples or the autopsy surgeon may fail to give a control sample for analysis, where all these factors further lead to complexity in the interpretation and analysis of the samples provided.
- A history of what happened to the deceased serves as a hint regarding what to test for or his previous medical history can also help the forensic toxicologist in analyzing the samples. However, these records are never provided to the toxicologist.
- The advent of new psychoactive drugs and poisons and their combinations in the market introduces new challenges to the toxicologist during testing.
- Although there are many forensic toxicology labs in every state, not all of them are well equipped with sophisticated machinery, which is necessary for comprehensive toxicology analysis.
- Further, the forensic toxicologist needs not only to conduct the tests and provide the results but also to testify in a court of law. The shortage of trained toxicologists in the labs results in a backlog of samples to be tested leading to delays in the investigation and

judicial proceedings. Some studies have shown that over seven years, the reports of more than 49% of the samples sent for analysis have been exorbitantly delayed.<sup>32</sup>

## WAY FORWARD

The collection and preservation of samples are important to detect the presence of poisons or drugs in the deceased. Unfortunately, the number of forensic medicine experts is very low in India resulting in most of the autopsies not being conducted by experts with knowledge of the guidelines. This often leads to incorrect sample collection and preservation as well. Further, sending of samples in large quantities in containers with inadequate preservatives can lead to the release of putrefactive gases which can hinder the sample analysis.<sup>33</sup> Therefore, given the challenges and the advancement in analytical techniques, the guidelines for sample collection and preservation should be revised. A proper set of national guidelines must also be introduced regarding the information that has to be provided for the toxicologist in the interpretation of the post-mortem analysis. Those guidelines should also address the special samples and give recommendations related to their collection and preservation as well.

Furthermore, the states must also allocate sufficient funds for the running and maintenance of the advanced machinery as many labs are underutilized due to a lack of technical expertise or funds. If there is no increase in funding by states, the labs will not be upgraded with new technology that is efficient and faster. The number of experts employed in the labs must also be increased to speed up the analysis to avoid the delay of other processes followed by it. Some of the committees have also warned against the collection of samples in every post-mortem examination as a matter of routine even if it is not necessary. They have opined such a practice to be unethical and an indication of the medical officer's incompetence. Therefore, the samples shouldn't be collected where it is not warranted.

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<sup>32</sup> Amandeep Singh et. al., 'Delay in final opinion of autopsy requiring Histo-pathological and chemical analysis' (2021) 8(4) International Journal Of Medical Toxicology & Legal Medicine  
<<http://dx.doi.org/10.18231/j.ijfmts.2023.033>> accessed 17 June 2024

<sup>33</sup> *Ibid*

## **SUGGESTIONS AND CONCLUSION**

After the thorough analysis of post-mortem examination with reference to forensic toxicology, it can be concluded that the autopsy examination is essentially required in cases of unnatural deaths to determine the cause of death. It also helps the pathologists to understand the identity of the deceased, and the manner and time of the death. The forensic autopsy among clinical and anatomical autopsies serves and aids the courts as well in the proper administration of justice. Such a report of the forensic pathologist has to be made admissible as secondary evidence to corroborate or contradict a substantive piece of evidence in a court of law.

Further, forensic toxicology has developed leaps and bounds to reach the current stage. But the new poisons and drugs coming up in the market are making the job of the toxicologist even more difficult in addition to the problem of lack of technical expertise and sophisticated labs. The respective state governments must contribute to the establishment of new labs and the development of the existing labs in terms of machinery, employing experts with proper training, etc. A proper set of guidelines has to be recommended for the collection and preservation of samples for toxicological tests to determine the presence of drugs, poisons and chemicals in the body of the deceased. Therefore, the above-mentioned suggestions have to be taken into account in order to develop forensic toxicology and serve the judicial system with proper results to decide a case.