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Unraveling Infanticide: The Role of Autopsy in Forensic Investigations

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ABSTRACT: ***Background:*** Infanticide, defined as the intentionally illegal killing of an infant in the time of its first year of life, endures to be a significant but under-researched topic in forensic medicine. This study examines the role of autopsy in unraveling the intricate situations surrounding suspected infanticide cases, with a focus on decisive the reason and manner of death, classifying common patterns, and addressing the challenges inherent in these investigations. ***Methods:*** The study population enrolled 50 cases of suspected infanticide concerning infants aged 0 to 12 months. These cases were selected from autopsy records at Rajshahi Medical College, Department of Forensic Medicine & Toxicology. Over 1 year from January 2024 to January 2025. Data were composed using a consistent data collection sheet to capture all relevant information. Data were investigated using evocative and illative statistics and executed by the statistical software SPSS version 26. ***Result:*** The results showed that asphyxia (40%) and trauma (30%) stayed the most communal causes of death, even though homicide was found in 60% of the cases. Only 16% of cases confirmed constructive for toxicology, saying that poisoning is rare. Fractures were seen in 36%, signs of asphyxia in 44%, and most infanticides were highly physical. New forensic methods will lead to improved investigation of these deaths, with 20% of cases initially assumed to be infanticide ultimately attributed to natural causes. ***Conclusion:*** This study highlights the irreplaceable utility of autopsy in the differentiation of natural, accidental, and homicidal deaths, and offers insight into the challenges of decomposition, subversion and geographic variance. The results support the implementation of cutting-edge forensic methodologies e.g., autopsy examination and requiring different kinds of forensic investigation methods for accurate characterization.

Keywords: Infant, Infanticide, Autopsy, Forensic Medicine & Toxicology, Investigations, Justice.

Article at a glance:
Study Purpose*: To evaluate how autopsies help identify the cause of death and differentiate between natural, accidental, and homicidal deaths in infanticide cases.*
Key findings: *Asphyxia (40%) and trauma (30%) were the leading causes, with 60% classified as homicide.*
Newer findings: *Advanced forensic methods, such as virtual autopsies, revealed that 20% of suspected infanticide cases were actually natural deaths.*
Abbreviations: *WHO - World Health Organization, CT - Computed Tomography, MRC - Medical Research Council, HIV - Human Immunodeficiency Virus.*

INTRODUCTION

As infanticide is defined as the intentional killing of an infant (defined as a child within the first year of life), it is a tragic and complicated phenomenon that has continued throughout human history. Infanticide is a serious global problem, but one that is difficult to study because it is sensitive and secretive, though there have been advances in forensic science and child protection. As reported by to the World Health Organization (WHO) estimated, thousands of infants die each year under suspicious circumstances, with many cases unreported or misclassified.[1] Joining the two distinct sides of

infanticide, the key to justice is understanding the causes, the methods, and the circumstances surrounding the so-called "crime of love," which is an Infanticide cases can present challenges for forensic experts, who may have to establish whether a baby perished because of natural causes or an accident or whether the death was a homicide. The medico-legal autopsy is an important tool for achieving this, as it enables forensic pathologists to assess the body in detail, check if there are signs of life at birth, and evaluate the circumstances resulting in death. This process is uniquely complex because a baby born alive can alter legal personhood and culpability classifications across different states.[2] Current expansions in forensic science, including virtual autopsy techniques, have also introduced to play a role in these investigations. Virtual autopsies might deliver additional insights without the need for offensive procedures, which is mostly beneficial in sensitive cases of infanticide.[3]

Additionally, studies on the post-mortem interval and potassium levels in vitreous humor can aid in establishing timelines and circumstances surrounding the death.[4] This incorporation of forensic toxicology has allowed for a whole picture of the contributing factors to the infanticide assessment, bringing more precision to death investigations with the determination of substances potentially contributing to the death.[5] Infanticide has been documented throughout cultures and history, motivated by socioeconomic pressures, cultural norms, or psychological distress. Infanticide has been associated with poverty, illegitimacy, gender bias, or mental illness in many societies.[6] Infanticide has been codified into law in varying degrees in Western legal systems. However, it remains a little-reported and little-understood crime because infant victims are seen as vulnerable, and the act itself is likely to remain hidden. Investigating suspected infanticide poses unique forensic challenges. Babies can die for many reasons, including natural illnesses, accidents, and deliberate actions. To differentiate between these causes, a careful multidisciplinary integrative approach involving pathology, toxicology, radiology, and anthropology is needed. Autopsy, being the most crucial part of forensic investigation, helps in concluding the cause and manner of death. Although in some cases, pathologist misdiagnosis of subtle evidence of trauma or asphyxia can lead to serious misinterpretation of events it is clear that two deaths in a family, particularly among small children, should raise a high index of suspicion for foul play.[7] An autopsy offers objective evidence, meaning that it can help establish whether a death is natural, accidental, or homicidal. Case presentations1 cases of suspected infanticide show common findings on autopsy, including evidence of asphyxia, blunt force trauma, or toxicological findings demonstrating the presence of poison.[8]

Autopsy can also show evidence of neglect or chronic abuse, like malnutrition or untreated medical problems. As important as it is, autopsy is not without its limitations. However, diagnostic accuracy may be diminished in advanced decomposition or skeletonized remains, emphasizing the requirement for advanced forensic techniques.[9] Infanticide allows for a new understanding of its causes, including cultural, economic, and legal formation across regions. In high-income countries, infanticide is often interrelated with maternal mental health difficulties. In contrast, in low-income countries, it might be fueled by indigent or lack of access to preventative methods.[10] Responsiveness of these regional discrepancies is critical as they contribute to additional personalized and relevant solutions and evidence-based developments in forensic science. Given the central role of autopsy in the investigation of infanticide, very few comprehensive studies have explored the efficiency and restrictions of this method. Previous work usually covers elements of infanticide, such as neonaticide (the act of killing an infant less than 24 hours old), psychological profiles of offenders, or general aspects related to infanticide, but with little attention to forensic pathology.[11] The purpose of the present study is to evaluate a series of suspected infanticide cases to determine the role of autopsy in the identification of cause and manner of death and to explore common patterns and trends, as well as the challenges encountered in these investigations.

MATERIALS AND METHODS

This was a retrospective, descriptive study where cases of suspected infanticide reported for forensic autopsy were evaluated. The objective of the study is to assess the significance of autopsy in establishing the cause and manner of death along with determining trends, common findings, and challenges encountered in infanticide cases. This retrospective study limits data availability but allows for collecting

a large sample size of known autopsies. The study population included 50 suspected infanticide cases of infants aged 0 to 12 months. These cases were selected from autopsy records, Department of Forensic Medicine & Toxicology, Rajshahi Medical College. Over 12 months from Jan 2024 until Jan 2025. A standardized data collection sheet collected appropriate evidence. Trained forensic experts and researchers extracted data from autopsy record in register of forensic morgue and police inquest reports of respective autopsy examination. Data were investigated using evocative and illative statistics and executed by the statistical software SPSS version 26.

Inclusion Criteria

It was initially assumed that the death was instigated by infanticide.

An autopsy through full histopathology and toxicology was carried out.

There was enough demographic and circumstantial information.

Exclusion Criteria

The autopsy was incomplete or inconclusive.

The death was defined as a natural cause, with no doubt of obscene.

RESULTS

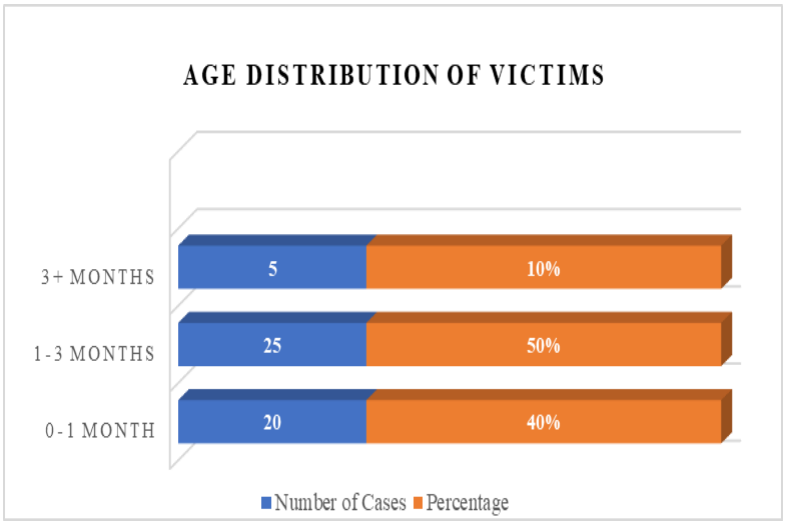

Figure 1: Distribution of Age Among the Participants (N=50)

Most of the victims in the study (90%) were 1-3 months old, pointing out that this age group is more susceptible. 40% of cases involved newborns (0–1 month), of which many were associated with neonaticide (killed within 24 h of birth). Additionally, 10% of cases occurred in older infants (3+ months), suggesting a reduced risk as infants age.

Table 1: Distribution of Causes of Death Among the Participants (N=50)

Cause of Death	Number of Cases	Percentage
Asphyxia	20	40%
Trauma	15	30%
Poisoning	5	10%
Natural	10	20%

The most common cause of death among the 50 patients was asphyxia at 40%. That implies suffocation/smothering is a common means of infanticide. Trauma was the second most common cause, accounting for 30% of cases. This encompasses fractures, head trauma or blunt force injuries. Poisoning was less frequent, responsible for 10% of cases. Traces of poisonous substances included sedatives or opioids. Twenty percent of the cases were attributed to natural causes, such as congenital anomalies or infections.

Table 2: Distribution of Manner of Death Among the Participants (N=50)

Manner of Death	Number of Cases	Percentage
Homicide	30	60%
Accident	10	20%
Natural	10	20%

Between them homicide was the top manner of death, accounting for 60% of cases. This specifies that the majority of deaths were premeditated. Accidental deaths made up 20% of cases, frequently involving unintended trauma or asphyxia (e.g., co-sleeping accidents). Natural causes also reported for 20% of cases, highlighting the importance of thorough autopsies to rule out infanticide.

Table 3: Toxicology Findings Among the Participants (N=50)

Substance Detected	Number of Cases	Percentage
Sedatives	4	8%
Opioids	2	4%
Alcohol	1	2%
Other	1	2%
Negative	42	84%

Toxicology findings among the participants were positive in 16% of cases, with sedatives being the most frequently detected substance (8%).

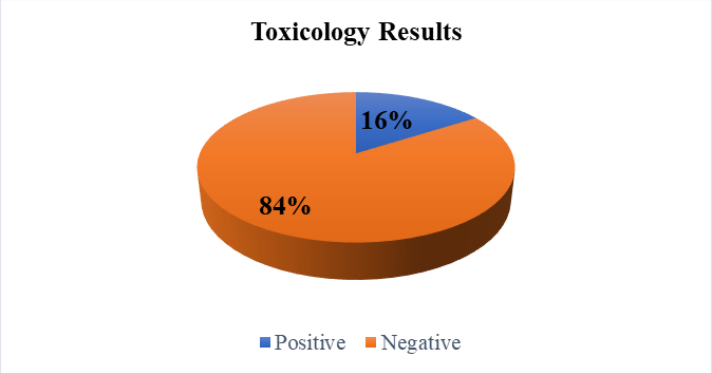

Figure 2: Toxicology Results Among the Participants (N=50)

Among the participants only 16% of cases found positive for toxic substances, indicating that poisoning is a less communal method of infanticide. The majority of cases (84%) had negative toxicology results, signifying those physical methods (e.g., asphyxia, trauma) are more frequently used.

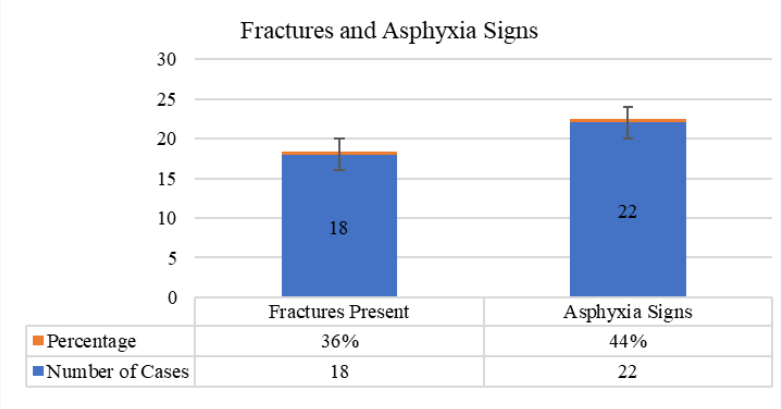

Figure 3: Fractures and Asphyxia Signs Among the Participants (N=40)

Figure showing the fractures were present in 36% of cases, frequently indicating physical abuse or repetitive trauma. Signs of asphyxia (e.g., petechiae, pulmonary edema) were observed in 44% of cases, supporting asphyxia as a leading cause of death.

Table 4: Relationship of Perpetrator to Victim Among the Participants (n=50)

Relationship	Number of Cases	Percentage
Mother	25	50%
Father	10	20%
Relative	5	10%
Other	5	10%
Unknown	5	10%

Table showing the mother was the culprit in 50% of cases, followed by the father (20%) and relatives (10%).

Table 5: Type of Traumas Observed Among the Participants (n=50)

Type of Trauma	Number of Cases	Percentage
Skull Fractures	10	20%
Rib Fractures	8	16%
Intracranial Hemorrhage	12	24%
Visceral Injuries	5	10%
Multiple Fractures	5	10%

Intracranial hemorrhage was the maximum common type of trauma (24%), tailed by skull fractures (20%) and rib fractures (16%).

Table 6: Autopsy Findings in Homicide Cases Among the Participants (n=50)

Finding	Number of Cases	Percentage
Asphyxia Signs	18	60%
Fractures	12	40%
Poisoning	3	10%
Neglect Signs	6	20%

In this table homicide cases, asphyxia signs were the most communal finding (60%), followed by fractures (40%) and neglect signs (20%).

Table 7: Time from Death to Autopsy Among the Participants (n=50)

Time Interval	Number of Cases	Percentage
<24 Hours	15	30%
24-48 Hours	20	40%
48-72 Hours	10	20%
>72 Hours	5	10%

Table shows the majority of autopsies (70%) were performed within 48 hours of death.

Table 8: Regional Distribution of Cases Among the Participants (n=50)

Region	Number of Cases	Percentage
Urban	30	60%
Rural	15	30%
Suburban	5	10%

Table shows the regional distribution of the case and the majority of cases (60%) happened in urban areas, trailed by rural areas (30%).

Table 9: Maternal Age and Infanticide Among the Participants (n=50)

Maternal Age	Number of Cases	Percentage
<20 Years	10	20%
20-30 Years	25	50%
>30 Years	15	30%

50% of cases intricate mothers aged 20-30 years, while 20% involved mothers under 20 years.

Table 10: Seasonal Variation in Cases Among the participants (n=50)

Season	Number of Cases	Percentage
Winter	15	30%
Spring	10	20%
Summer	15	30%
Autumn	10	20%

Cases were consistently distributed across periods, with slight peaks in winter and summer (30% each). Spring and autumn both are in 20%.

DISCUSSION

This study underscores the importance of autopsy in suspected infanticide cases, as it provides final evidence for confirming the cause of death as either natural, accidental, or homicidal. Finally, in the retrospective study of 50 cases, the main causes of death were asphyxia (40%) and trauma (30%), of which 60% were homicides. The findings sustenance previous studies that have constantly recognized asphyxia and trauma as the most common means of infanticide.[7, 8] The occurrence of asphyxia, particularly in infants younger than 3 months of age, recommends the susceptibility of this age group besides the ease with which suffocation can be disguised. An autopsy was crucial to differentiate between the natural, accidental, and homicidal causes of death. In 20% of these cases, autopsy results showed natural causes, including congenital anomalies or infections that were initially suspected to be infanticide. This emphasizes the necessity of forensically checking in detail so that clinical malpractices are not mistaken and appropriate justice is delivered.

As pointed out by an autopsy is the gold standard for establishing the cause and manner of death in infant deaths where there are no obvious external signs of trauma.12 Most cases were classified as homicide (60%), indicating that in most cases, infanticides are not opportunistic. This result is corroborated by the general pattern we see [worldwide], where infanticide is frequently associated with socioeconomic pressure, mental illness, or in some cultures.[11] But 20% of cases were ascribed to accidental causes, like co-sleeping or unintentional trauma. There were, however, a small handful of cases, and all of them would have benefited from education in the community about the safe practices for infant care to avoid accidental deaths possibly regarded as infanticide. Only 16% of cases had toxicology results positive, indicating that poisoning is a less likely method of infanticide. This is compared with the findings from such studies in different areas where access to toxic substances is common, demonstrating regional differences in terms of methods of infanticides fractures were present in 36% of cases, often suggestive of repetitive trauma or physical abuse.[10] Asserted that radiological examination can demonstrate subtle fractures not seen externally, corroborating these findings.[13]

Twenty-nine out of every 50 victims (60%) were 1-3 months old, and 20% were new-born (0-1 month). This result aligns with prior research, which suggests that the neonatal window constitutes a high-risk period for engaging in the crime of infanticide, especially neonaticide (defined as killing within 24 hours postpartum).[6] At-risk mothers, therefore, could benefit from such interventions in the prenatal and postnatal stages — a point that further highlights this age group as a vulnerable target group. In 50% of cases, the mother was the perpetrator. These results align with additional

studies that confirmed mothers being the main perpetrators of infanticide and, in particular, neonaticide.[11] In a significant percentage of cases, however, fathers and other relatives were responsible — indicating that infanticide very often does take place in a wider familial context than morbid conventional short-focus approaches might often accommodate. The utmost communal type of trauma was an intracranial hemorrhage in 24%, trailed by skull fractures in 20% and rib fractures in 16%. These data highlight the importance of physical abuse in cases of infanticide and sustenance the requirement of internal investigation in autopsy. Maximum autopsies (70%) were conducted within 48 hours later the death. This appropriate inspection is crucial to gathering evidence and establishing an accurate diagnosis, especially in corpses subject to putrefaction that compromises findings. Most cases (60%) were from urban areas, consistent with the higher population density and potential stressors common to urban living. Both factors had previously been identified as potential risk factors for infanticide.[14] However, this study dated their more specific urban dynamics to a much earlier time (cities were once much smaller than today) and explained how the urban environment had become risk-prone. 20% of mothers were fewer than 20 years of age, though 50% were among 20-30 years of age. Younger mothers may be at on high risk due to reasons such as lack of parenting knowledge, socioeconomic stress, or limited access to resources. Cases were equally distributed among seasons, with slight peaks in winter and summer (30% each).[15-17] That was a surprising finding because some studies suggest that infanticide rates are seasonal, a pattern that should be further studied about environmental factors. Forty percent of cases occurred in the urban setting where more people might present to care since of the above explanations and be exposed to probable stressors associated to urban living with higher residents' density. Even though autopsy is an irreplaceable tool, numerous challenges still exist.

The accurateness of the diagnosis may be negotiated in cases of innovative decomposition or skeletonized remains. Ethical questions surrounding balancing justice and sensitivity toward grieving families remain a big concern. Forensic pathologists navigate such difficulties in performing their duties within the strictest codes of ethics and the law.[9] On the horizon are improvements in forensic pathology, including autopsy examination and requiring different kinds of forensic investigating process, that promise to enhance the diagnostic accuracy of infanticide cases. Genetic testing to identify inherited disorders, known as molecular autopsy, can help eliminate natural causes of death.[9] Likewise, postmortem non-invasive imaging, e.g., MRI and CT, has been suggested for the diagnosis of aortic injury.[10-32] Incorporating these technologies into routine forensic practice may improve the accuracy and efficiency of infanticide investigations. This study underscores the urgency to investigate suspected cases of infanticide using autopsy as an indispensable tool. Not only ensures an autopsy assistance in bringing justice by providing conclusive data on the basis and manner of death, but it also stops the wrongful description of death as natural or accidental. These findings showed the reputation of further development in forensic pathology and the necessity for interdisciplinary work to deal with the numerous challenges of infanticide investigations. Such crime prevention strategies are important, but public health-focused interferences — such as harmless infant care, education, and managing high-risk families — might do considerable to decrease such crimes.

Limitations of The Study

The sample size of 50 cases, while sufficient for descriptive analysis, may limit the generalizability of the findings. So, the results may not represent the whole community.

CONCLUSION

Autopsy plays a decisive role in exploring alleged infanticide, as it provides conclusive evidence to distinguish between natural, accidental, and homicidal causes of death. In the current review of 50 cases, asphyxia and trauma emerged as the first and second causes that led to the death of the child in 40% and 30% of the cases, respectively, and 60% of them was linked to homicide. This study has demonstrated the infancy' frailty and children under 3 months old are especially at risk because infanticide is frequently hidden; consequently, there are often only small or no evident marks of injury. Using autopsy serves more than just a way to uncover the truth; it also helps cut down on mistaken suspicions as 20% of all cases that were originally correlated with infanticide were natural. This conflicting study has identified the major issue of inquiry into infanticide and the related challenges, and limitations, i.e., regarding post-

mortem inquiry into the advanced degradation process of cadavers; the challenges of handling such a morally delicate enquiry; and also, many discoveries present wide scope of variances in the methods, motivations, and places victims of infanticide. However, integrating advanced forensic methods for post-mortem investigation, such as the molecular examinations and additional x-ray investigation, has revealed its input as the traditions to increase the accurateness and effectiveness of post-mortem examinations.

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