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Systematic Review

Weaponizing snakes: A forensic investigation into homicides using venomous snakes- A review article

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Abstract

Purpose: The use of snakes as tool for criminal homicide is an exceedingly rare yet highly deceptive method of murder. This article examines the phenomenon of "Weaponizing" venomous snakes to orchestrate homicides that are often staged as accidental encounters. Perpetrators exploit the deadly nature of snake venom to mask their crimes, presenting significant challenges for law enforcement and forensic professionals. The rapid degradation of venom in the body and absence of clear post-mortem evidence makes it difficult to differentiate between accidental envenomation and homicidal envenomation.

The article introduces a forensic guideline designed to raise suspicion of homicidal snakebites based on multiple bites or victims in the same incident. Ultimately, the paper calls for updated forensic protocols and heightened awareness of snake-related homicides to ensure accurate investigation and justice in these unconventional murder cases.

Methods: A systematic literature and media review were conducted using terms like "Snake bites" and "Crime" and "homicide" across database such as PubMed, Scopus and Google Scholar for articles, Relevant case reports, peer-review articles and forensic publications were analyzed alongside, also verified Online News articles and Court Judgments from publicly accessible portals.

Results: It provides a comprehensive overview of the weaponization of venomous snakes in planned homicides, examining real-world case studies, outlining forensic challenges encountered during autopsy and introduces to novel and complex forensic challenges encountered with the homicidal use of snakes as biological weapons in homicides.

Conclusion: A forensic guideline designed as "Rule of 2" to raise suspicion of homicidal snakebites based on various factors that needs due consideration in such cases, and advocating for updated investigative protocols to address this emerging and insidious method of murder. Thus, with the proposed specialized investigative techniques, it aids to possibly differentiate accidental bites from homicidal attack, thereby improving the reliability of medico-legal conclusions.

Keywords: Homicidal snakebite, Venomous snakes, Forensic investigation, Snakebite envenomation, Forensic pathology.

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1. Introduction

The use of snakes as instruments of homicide is an exceptionally rare and deceptive method of murder that challenges conventional forensic investigation.[1] Among the most unconventional means of causing death, the deliberate use – or "Weaponization" – of venomous snakes such as cobras, kraits and vipers has begun to draw forensic and public attention. By exploiting the natural lethality of snake venom, perpetrators can stage murders to appear as accidental wildlife encounters, thereby obscuring criminal intent and complicating efforts to determine the true manner of death.

Venomous snake possesses the biological capacity to deliver fatal envenomation through a single bite. Their venoms, composed of neurotoxins, hemotoxin and cytotoxins can lead to rapid physiological deterioration and death if untreated.[2,3] Although the harmful effects of snake venom are well known in medical settings, understanding these effects

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in forensic cases, especially when trying to distinguish between accidental and homicidal snakebites, is very difficult. Criminals might use their knowledge of snake to plan deaths that look like natural snakebites, making the scene appear like an accident instead of a murder.

From a forensic standpoint, such cases demand a multidisciplinary approach: identification of the snakes species, detection and analysis of venom in biological tissues and meticulous reconstruction of the circumstances surrounding the death. Complicating these efforts is the potential for staged crime scenes, where snakes are internally introduced and environmental conditions manipulated to mislead investigators. A forensic study from Sri Lanka underscores the importance of accurate species identification in snakebite investigations, emphasizing the need for herpetological expertise in suspected homicidal envenomation.[4]

The homicidal use of snakes as biological weapons in homicides introduces novel and complex forensic challenges. However, with specialized investigative techniques, it is possible to differentiate accidental bites from homicidal attack, thereby improving the reliability of medico-legal conclusions. This article provides a comprehensive overview of the weaponization of venomous snakes in planned homicides, examining real-world case studies, outlining forensic challenges encountered during autopsy and advocating for updated investigative protocols to address this emerging and insidious method of murder.

2. Methodology

2.1. Literature search strategy

This review adopts a multidisciplinary, integrative approach to examine the forensic complexities of homicidal envenomation involving venomous snakes. A systematic literature and media search was conducted following PRISMA (Preferred reporting items for systematic reviews and meta-analyses) guidelines.

A comprehensive search and document retrieval strategy were performed to find potentially relevant published and unpublished articles in the following electronic databases: PubMed, Scopus, Science Direct, and Google Scholar, Additionally, a manual search was undertaken to locate gray literature such as PubMed (7 articles found), Scopus (2 articles found) and Google Scholar (3 articles found), for articles in English-language as they contain broader range of general science research materials, Relevant case reports (n=2), peer-review articles and forensic publications were analyzed alongside, also verified Online News articles (n=2) and Court Judgments (n=2) from publicly accessible portals. A PRISMA-style flow diagram **Figure 1** summarizes the search process, including records identified, screened, excluded, and included, ensuring transparency in literature selection.

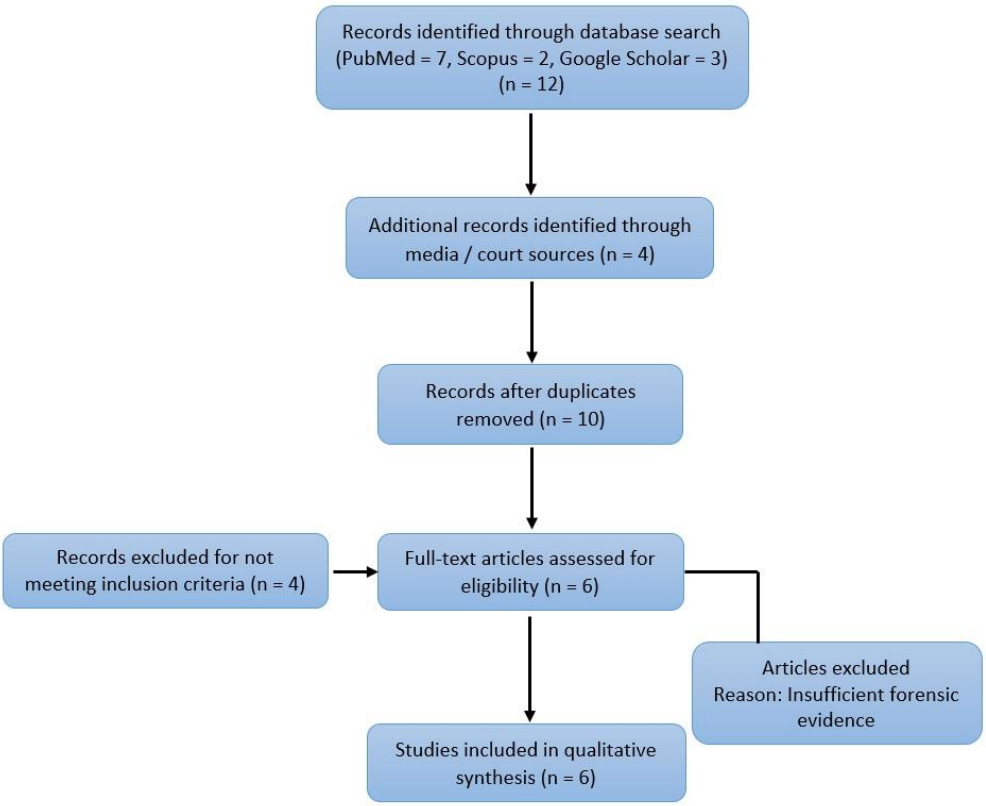

Figure 1: PRISMA flow diagram for study selection

2.2. Inclusion criteria

In this study cases involving *venomous* species (e.g., *Naja naja*, *Bungarus caeruleus*, *Daboia russelii*), Evidence suggesting forensic or legal involvement of a human agent in the envenomation process, Reports containing verified medico-legal or investigative findings implying homicidal intent were considered.

2.3. Exclusion criteria

Accidental, occupational, or self-inflicted bites, Bites involving non-venomous species, deaths misattributed to snakebite but later determined to have other causes, Fatalities due to injected venom rather than natural bite mechanisms, Reports lacking corroborative forensic or investigative evidence are excluded from the study.

2.4. Data extraction and analysis

A structured data extraction template was developed to standardize information retrieval and minimize selection bias. The template captured key variables, including:

1. Victim and perpetrator demographics (age, gender, relationship, motive).
2. Snake species involved.
3. Mode of venom delivery (natural or induced bite; use of handlers or intermediaries).
4. Forensic indicators (bite location, pattern, toxicological findings).
5. Investigative aspects (initial classification, delay in suspicion, expert consultation).
6. Legal outcomes (charges filed, convictions, defense arguments).

Data were analyzed thematically to identify recurring forensic markers, behavioral trends, and evidentiary challenges that aid in differentiating homicidal envenomation from accidental snakebites.

2.5. Ethical considerations

Given the limited availability of peer-reviewed forensic literature on homicidal envenomation, media reports and court judgments were included with caution. Their reliability was assessed based on sources that satisfied reliability criteria which include source credibility were included to maintain data integrity.

As this study utilized publicly available information without direct human participation, no consent was required. Ethical approval was obtained from the Institutional Ethics Committee

3. Result

3.1. Overview of selected studies

Through comprehensive searching, 12 articles were identified from the search databases (PubMed: n=7, Google Scholar: n=3, Scopus: n=2). Ten duplicate studies were excluded, and the remaining articles were screened based on their titles, abstracts, and full texts. Ultimately, 6 studies met the inclusion criteria and were incorporated into this systematic review. These 6 studies were used to synthesize data on infection prevention practices.

These cases are summarized in **Table 1** of the article for comparative analysis. A key finding across these incidents is the presence of either multiple victims and multiple bite marks or multiple attempts – evidenced by bite that are inconsistent with natural defensive strikes. Such patterns are biologically improbable and strongly suggest the potential for homicidal intent.

Table 1: Summary of key forensic and investigative findings in documented cases of homicidal snakebite

S. No.	Key Findings	Kerala Murder Case[7] (2020)	Nagpur Murder Case[8] (2012)	Egyptian Murder Case[9] (2016)	Odisha Murder Case[10,11] (2024)
1.	Age and Gender of Victims (s)	25 years / Female	(i) 84 years / Male (ii) 78 years / Female	(i) 9 years / Female (ii) 6 years / Female (iii) 4 years / Female	(i) 23 years / Female (ii) 2 years / Female
2.	Number of Paired Fang Marks	Multiple	Single pair on each victim	Multiple pairs on each victim	Single pair on each victim
3.	Number of Attempts by Accused	Two	One	One	One
4.	Bite Location	Right leg (20 cm above ankle) Left forearm	(i) Right forearm (ii) Right hand	(i) Right leg (ii) Left leg (iii) Right leg	Just above the right ankle in both victims
5.	Number of Persons Bitten in a Single Event	One	Two	Three	Two
6.	Use of Snake Charmer Assistance	Yes	Yes	Yes	Yes

Table 1 Continued…					
7.	Species of Snake Used	Common Cobra Russell's Viper	Common Cobra	Egyptian Cobra	Common Cobra
8.	Relationship Between Victim (s) and Offender	Wife	Parents (Father and Mother)	Daughters	Wife and Daughter
9.	Motive	Financial	Financial	Gender preference and extra marital affair	Financial
10.	Method of venom delivery	Induced	Induced	Induced	Not clear
11.	Initial misclassification as	Accidental	Accidental	Accidental	Accidental
12.	Delay in suspicion	Yes	No.		Yes

4. Discussion

4.1. Legal and forensic perspectives

Homicide fundamentally comprises two legal elements: *actus reus* (the guilty act) and *mens rea* (the guilty mind), both of which must coexist for an act to constitute a criminal offence. In case of murder, the act alone is insufficient unless it is coupled with a malicious intent to kill.[5] When venomous snakes are employed as instruments of homicide, the evidentiary significance of intent becomes paramount, especially in the absence of a conventional murder weapon at the crime scene. Unlike sharp-edged or blunt force weapons that typically use multiple visible injuries, even a single bite from a venous snake, regardless of location on the body, may be lethal.

Traditional homicidal injuries – such as those inflicted by knives, swords or iron rods – frequently display clear patterns of intent through repeated, targeted trauma.[5] Similarly, if an individual deliberately manipulates a snake to bite a victim with the intention of causing death, multiple envenomation may occur, depending on the control exerted over the animal.[6] However, snakes cannot testify; thus, the reptile, used as the weapon, leaves no direct eyewitness testimony. This lack of conventional weapon and witness complicates forensic investigation and court proceedings. Additionally, the snake may be released or disposed of by the perpetrator, further erasing traceable. Investigators may also hesitate to capture or handle the reptile due to fear or lack of training.

4.2. Case-based evidentiary challenges

Several documented cases illustrate the complexity and diversity of homicidal snakebite scenarios:

A man succeeded in killing his wife on a second attempt using a common cobra. The victim was sedated with fruit juice laced with sedatives before the snake was induced to bite her twice on the left arm. She had survived a previous attempt involving a viper two months earlier. The post-mortem examination revealed unusual bite patterns, including two closely space bites with significant differences in fang width. The accused, a 27-year-old male, was convicted and sentenced to life imprisonment.[7] The use of sedatives and repeated attempts pointed clearly toward intent.

An elderly couple were murdered by their son with the help of a snake charmer. The victims were abducted in a vehicle and a common cobra was used to inflict fatal bites. The driver was instructed to transport the victims to a hospital under the guise of an accidental bite. The autopsy revealed fang marks on the right forearm and right hand of the male and female victims, respectively. A detailed investigation uncovered a property dispute as the motive.[8]

A man trained in snake charming induced bites from an Egyptian cobra to murder his three daughters due to gender preference. He married another woman and had a male baby. Autopsy showed multiple paired fang marks on the lower limbs.[9]

A man orchestrated the death of his wife and daughter using a monocled cobra to fraudulently claim Rs. 8 lakh in ex-gratia Government compensation – Rs. 4 lakh per death as per the state's policy. Initially perceived as an accidental snakebite, further investigation revealed that the accused had procured the snake from charmer and had used the snake to cause the deaths.[10-12] In both cases, bite marks were found in the same location: above the ankle bone of the right leg.[11]

4.3. Biological behavior and venom use patterns

Venomous snakes typically bite humans only when provoked.[13] Even then a significant percentage of bites are "dry", meaning no venom is injected.[14] Since humans are not prey, snakes tend to conserve venom. The volume delivered is adjusted based on perceived threat.[15] Multiple envenomation in rapid succession or targeting specific body sites – especially while victims are sedated or asleep – strongly suggest external manipulation. Additionally, repeated bites with varying fang widths suggest that the snakes was manually held and repositioned. Measuring inter-

fang distance and comparing bite patterns can help infer species, snake size and number of attacks.

4.4. Proposed diagnostic criteria: The "Rule of 2"

Based on the above patterns, we propose a practical diagnostic guideline for forensic pathologists and investigating officers, termed the "Rule of 2". The Table 2 of the article depicts the "Rule of 2" – Diagnostic Criteria for Suspected Homicidal Snakebite and its interpretations, that may assist in identifying suspicious snakebite deaths.

Table 2: "Rule of 2" – Diagnostic criteria for suspected homicidal snakebite

Criterion	Interpretation
1. Two or more individuals bitten in a single incident	Highly unusual in natural circumstances; suggests coordinated or staged attack
2. Two or more pairs of fang marks on the same individual without provocation	Implies snake was held or manipulated to bite multiple times
3. Two or more successive bites on one victim within a short time interval or linked incidents in close sequence	Repeated attempts may indicate intent to ensure lethality; also suggests planning, especially if one attempt failed and another followed

These criteria are not definitive but should raise suspicion and guide further inquiry. Their utility lies in directing investigators toward deeper scrutiny rather that confirming homicide conclusively.

4.5. Role of interdisciplinary experts and legal recommendations

When snakes are weaponized for criminal purposes, a systematic and scientifically grounded forensic approach is essential. Any recovered snake, whether alive or dead, should be properly preserved, photographed, and documented to maintain the chain of custody and facilitate species identification. The involvement of a herpetological expert is critical for correlating the behavioral patterns and ecological characteristics of the snake with the circumstances of the incident, which may help determine whether human manipulation was involved.

Furthermore, the forensic extraction of digital evidence—such as messages, videos, GPS data, or online purchases—is crucial to uncover any premeditated intent or the involvement of accomplices. In cases where the snake belongs to a protected species, the incident must be duly registered under the relevant provisions of the Wildlife Protection Act, as the illegal handling or use of such fauna constitutes a punishable offense under environmental law.

There is a lack of standardized protocols or universally accepted methods to conclusively distinguish between accidental and homicidal snakebites during autopsy. The rarity of such incidents results in limited case data, which in turn hampers the statistical validation of proposed criteria such as the "Rule of Two." Additionally, there is potential for false positives; for instance, multiple fang marks or bites may sometimes result from accidental handling or defensive behavior of the snake. This is exemplified by a case in Bangladesh where two brothers were bitten—one accidentally and the other while attempting to handle the snake.[16]

A retrospective review of individuals with multiple snakebites over their lifetime, based on data from the North American Snakebite Registry, revealed that 64.9% had a history of intentional snake handling (such as by snake charmers), while 29.5% had maintained snakes in captivity as pets.[17] In recent times, such multiple bites from intentional handling are increasingly being reported among social media content creators.

5. Limitation

A notable limitation is the small number of studies included in the final review, this limited pool of evidence restricts the generalizability of the findings across broader populations.

6. Conclusion

The use of snakes as tools of murder represents an unusual and deceptive form of homicide. It demands high forensic suspicion, careful bite pattern analysis and cross-disciplinary coordination. While the proposed diagnostic indicators offer a practical approach, more research, case documentation and methodological standardization are essential. As such crimes may exploit cultural myths and biological unpredictability, forensic vigilance is crucial to prevent misclassification of homicide as misfortune.

7. Authors Contribution

Manoj Kumar Mohanty: Conceptualization, Data curation, Formal analysis, Methodology, Resources, Software, Supervision, Validation, Visualization, Writing – original draft.

Manas Ranjan Sahu: Conceptualization, Formal analysis, Methodology.

Sudipta Ranjan Singh: Conceptualization, Supervision, Validation.

Sindhu Sudha Sahu: Conceptualization, Data curation, Formal analysis, Methodology, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

Rajanikanta Swain: Conceptualization, Investigation, Supervision.

Subhendu Mallik: Conceptualization, Formal analysis, Supervision.

8. Source of Funding

None.

9. Conflict of Interest

None.

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