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## Report: Forensic Examination And Medicolegal Aspects In A Case Of Death By Hanging

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### Abstract

*Suicide is a serious global health problem, with hanging being the most dominant method, including in Indonesia. Hanging causes asphyxia through airway obstruction, vascular compression, and vagus nerve stimulation. Risk factors include mental disorders, substance abuse, socioeconomic stress, and family problems. Clinical, forensic, and epidemiological studies are crucial to differentiate hanging from other forms of asphyxia and to develop effective prevention strategies to reduce mortality rates. We report a case of death by hanging involving a 20-year-old woman. In this case, it is suspected that the victim's actions were motivated by psychological pressure that influenced her thoughts to end her life. The victim hanged herself using a scarf that she owned and did so in the ventilation of the bathroom door. Signs of suicide were also reinforced by the discovery of previous suicide attempts, in the form of incised wounds on the victim's lower arms and thighs. Ligature marks were found in the form of abrasions that crossed obliquely across the front of the victim's neck. The hanging was carried out by complete hanging because the victim's entire body was hanging freely. Based on the location of the knot, this case is classified as a typical hanging because the knot was located behind the neck. The possible mechanism of death was compression of the blood vessels and asphyxia. Conclusion: Death by hanging is a frequently reported form of suicide and is influenced by psychological and socioeconomic factors. Medicolegal forensic examination helps determine the mechanism and cause of death, which in cases of hanging is usually caused by compression of the neck blood vessels due to the ligature.*

**Keywords:** Forensic Examination, Medicolegal Aspects, Death Cases, Hanging

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## INTRODUCTION

Suicide remains a pressing public health issue globally, with Indonesia exhibiting significant rates of suicide, particularly by hanging. According to the World Health Organization (WHO), approximately 703,000 individuals succumb to suicide annually worldwide, with rates varying markedly between countries, including Indonesia, where specific methods, such as hanging, are prominent (Pratama et al., 2024). Research indicates that Gunung Kidul, a region in Yogyakarta, Indonesia, has one of the highest suicide rates in the country, significantly influenced by cultural factors such as the "Pulung Gantung" myth, which reportedly stigmatizes mental health issues and exacerbates the acceptance of hanging as a method of suicide (Purba et al., 2025). Furthermore, a qualitative analysis by Febianti et al. indicates that mental health issues, financial problems, and physical health concerns are significant contributors to the rising rates of suicides (Febianti et al., 2024). In light of these alarming statistics, a comprehensive and multifaceted approach is essential to address the underlying causes and beliefs that perpetuate suicide, particularly by means such as hanging, highlighting the need for improved mental health interventions and community support systems in Indonesia (Tasnim et al., 2024).

The differentiation between pure suicides and murders staged to appear as suicides presents significant complexities within forensic investigation, particularly concerning the method of hanging. Forensic pathologists must meticulously analyze the circumstances surrounding each death, as inconsistencies in evidence can suggest either self-infliction or foul play. Specific details, such as the presence of hesitation marks or unique injuries inconsistent with typical hanging patterns, can indicate staging (Glengarry et al., 2023). Additionally, psychological autopsies and thorough interviews with

relatives can provide insights into the victim's mental state, further aiding the determination of intent (Crişan et al., 2022). Research emphasizes the need for a comprehensive approach that includes meticulous scene reconstruction and detailed autopsy findings to effectively distinguish between suicide and murder. Complex suicides, where multiple methods of self-harm are employed or prior indications of hesitation are observed, also challenge traditional categorizations, requiring a nuanced understanding of the motivations behind such actions (Pallocci et al., 2024; , Arjun et al., 2024). Consequently, forensic experts must remain vigilant in assessing external and internal injuries to ascertain the true nature of these deaths, as misclassification can profoundly impact legal outcomes and public health responses (Glengarry et al., 2023; , Vinci et al., 2025).

The scarcity of comprehensive discussions integrating findings on hesitation wounds in atypical locations, such as the thigh, alongside distinctive ligature marks associated with hanging, reveals critical gaps in forensic research. While hesitation wounds are typically associated with ambivalence in self-harm scenarios, their presence in less common anatomical sites demands further forensic exploration to understand the psychological and physiological implications behind such behavior (Gualco et al., 2022). Studies examining complex suicides have shown that unusual methods and locations of self-inflicted injuries can significantly influence the interpretation of intent and the manner of death, necessitating an intersectional approach in forensic analysis that considers both the psychological state and the physical evidence (Gualco et al., 2022). For instance, recent reports indicate that the evaluation of hesitation wounds, including their anatomical distribution and morphology, plays a pivotal role in differentiating between intentional self-harm and other forms of injury, particularly in cases involving complicated suicides with multiple injury types (Simone et al., 2022). Consequently, this highlights a critical need for multidisciplinary methodologies that consolidate psychological autopsy, forensic examination, and contextual investigation to accurately interpret such complex instances (Crişan et al., 2022).

The primary objective of this study is to meticulously analyze the diagnostic significance of ligature mark morphology and the presence of hesitation wounds in establishing the manner of death. By evaluating the "parchmentization" of the skin and the oblique, non-continuous trajectory of the neck furrow, this research aims to validate these findings as definitive vital reactions that distinguish ante-mortem suicidal hanging from post-mortem homicidal staging. Furthermore, this study seeks to underscore the clinical importance of identifying self-inflicted injuries in atypical anatomical sites, such as the thighs, which serve as critical indicators of the victim's psychological state and ambivalence prior to the final act.

This investigation aims to provide a robust medicolegal framework for concluding a "manner of death" in cases where a full internal autopsy is restricted due to legal or familial constraints under the Indonesian Criminal Procedure Code (KUHAP). By correlating external forensic evidence with detailed scene reconstruction, the research demonstrates how a multidisciplinary approach can achieve a high level of diagnostic certainty. Ultimately, this study intends to offer forensic practitioners a systematic methodology for interpreting pattern evidence, thereby ensuring that even with limited invasive procedures, the distinction between a self-inflicted suspension and a staged crime remains scientifically sound and legally defensible.

Suicide is one of the most serious global public health problems, with enormous social, psychological, and economic burdens. The World Health Organization (WHO) reports that more than 700,000 people die by suicide each year, making it the 17th leading cause of death globally and one of the main causes of death among young people. Indonesia is not exempt from this issue, as the prevalence of suicide has shown an increasing trend over the past decade in line with social changes, economic pressures, and mental health problems (Maharani et al., 2019).

The distribution of suicide cases is largely concentrated among the productive age group. Data indicate that about 46% of cases occur in the 25–49 age range, while 75% occur among individuals aged 15–64 years. This makes suicide a significant cause of the loss of human potential and

productivity (De Simone et al., 2024). Furthermore, the mortality rate due to suicide is higher among men than women, even though suicide attempts are more frequently reported among women.

Methods of suicide vary according to cultural background, availability of means, and social factors. However, one of the most frequently found methods is **hanging**. Various studies have noted that this method accounts for more than 50% of suicide cases in many countries, reaching up to 60.9% in some reports (De Simone et al., 2024). The high frequency of hanging is attributed to its easy accessibility, the lack of need for special tools, and the belief among individuals that it has a high success rate. A cross-country review reported that hanging is most commonly used by men (53%) and by women at a rate of 39% (Maharani et al., 2019).

Several studies show that hanging is the most common suicide method in Indonesia. A psychological autopsy study in Bali reported that 68.3% of suicide cases involved hanging (Maharani et al., 2019). Research in Jakarta found that 55.1% of suicides used hanging, while in elderly populations in Gunungkidul, Yogyakarta, the figure reached as high as 96.2%. These findings confirm that hanging is the dominant method of suicide in Indonesia and requires serious attention from both prevention and forensic perspectives (De Simone et al., 2024).

Medically, hanging is defined as death due to asphyxia resulting from obstruction of the airway and blood flow to the brain caused by external pressure on the neck from a ligature or similar object (De Simone et al., 2024). This pressure occurs due to the victim's body weight, either from full or partial suspension. The pathophysiological mechanisms involved include airway obstruction, compression of the carotid arteries and jugular veins, and vagal nerve stimulation, which may cause sudden cardiac arrest (Maharani et al., 2019).

Cases of hanging are significant not only medically but also for their forensic, social, and psychological implications. From a forensic standpoint, it is essential to distinguish hanging from other forms of asphyxia such as strangulation or mechanical compression of the neck. A thorough examination is necessary to determine the true cause of death and to rule out the possibility of homicide disguised as suicide (Maharani et al., 2019).

Risk factors for hanging suicide are diverse, including mental health disorders such as depression, schizophrenia, and anxiety; substance abuse; socioeconomic stress; family problems; and traumatic experiences. In addition, cultural and environmental factors influence the choice of suicide method (Indrayathi et al., 2019).

Given the complexity of the issue and the high incidence rate, studies on hanging suicide are crucial not only for clinical and forensic purposes but also for developing more effective prevention strategies (Indrayathi et al., 2019). A comprehensive understanding of the epidemiology, mechanisms, clinical and pathological signs, and underlying risk factors of hanging suicide cases can contribute significantly to efforts to reduce suicide-related mortality (Maharani et al., 2019).

The urgency of this case report arises from the fact that hanging is one of the most frequent methods of suicide both globally and in Indonesia, causing broad impacts from medical, legal, social, and public health perspectives (Indrayathi et al., 2019). Systematic documentation of case chronology, forensic findings, and risk factors is essential not only to assist medical and law enforcement personnel in case analysis but also to provide valuable data for epidemiological research and prevention strategies. Moreover, information on victim characteristics, event patterns, and environmental factors can be used to design targeted interventions such as early detection, counseling, and public policy, while ensuring legal justice by distinguishing suicide from accidental or criminal causes (Indrayathi et al., 2019).

The body of a 20-year-old woman with the initials HNA was brought by officers from the Gubeng Police Sector to the Forensic Medicine Department of Bhayangkara Hospital H.S. Samsueroi Mertojoso, East Java Regional Police, on Tuesday, August 19, 2025, from 20:46 to 21:52 WIB, for a *Visum et Repertum* examination. According to the written request, the deceased was found by her friend in her rented room. Upon discovery, she was found hanging with a scarf tied around her neck.



**Figure 1. Crime scene investigation of a female who hanged herself.**

The following are the results of the external examination of the body:

In the general identification, a female corpse was found with a body length of 168 cm, an estimated age of around 20 years, medium brown skin tone, adequate nutritional status, and a body weight of approximately 50–60 kg. The victim had long, straight black hair with dye, averaging 32 cm in length. The victim was found wearing a black sleeveless Adidas undershirt, pink shorts with a face pattern and no brand, black underwear with a sanitary pad containing brownish bloodstains still attached, and a black unbranded bra. In addition, a pink scarf with a leaf pattern was found tied and wrapped around the victim's neck, extending from the front to the back.

On external examination of the body, signs of death were observed in the form of postmortem lividity that disappeared upon pressure in the areas below both nipples, lower legs, waist, buttocks, and fingers down to the palms of both hands. Rigor mortis was present in some joints of the body. No signs of decomposition were found.

In the mouth area, bluish discoloration was observed on the lips. On the neck area, a pink scarf was found wrapped once around the neck with a live knot. Four centimeters below the right ear canal, a brownish pressure abrasion was found, 2 cm in width, continuing forward under the chin with a width of 2 cm, extending to 9 cm below the left ear canal, with a total wound length of 24 cm. On the upper right teeth, the first and second molars were missing; on the upper left teeth, the third molar was missing; on the lower right teeth, the first and third molars were missing; and on the lower left teeth, the third molar was missing.

A wound was found on the front side of the upper left arm, 9.5 cm above the left wrist, showing a horizontal incised wound measuring approximately 2–4 cm in length. On the front side of the lower right leg, 10.5 cm below the right hip bone protrusion, a horizontal incised wound was found measuring approximately 0.8–8 cm in length.



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Figure 2. scarf worn around the neck



Figure 4. abrasion on the front of the neck



Figure 6. abrasion on the left side of the neck



Figure 3. scarf device around the neck with a dead knot



Figure 5. abrasion on the right side of the neck



Figure 7. abrasion on the right side of the neck



Figure 9. experimental wound in the form of a cut wound on the right arm

Figure 8. experimental wound in the form of an incised wound on the right thigh



Figure 10. signs of asphyxia include blue mucous membranes of the lips



Figurw 11. Signs of asphyxia include blue nails



Figure 12. Corpse bruises on the lower leg/foot

## RESEARCH METHODS

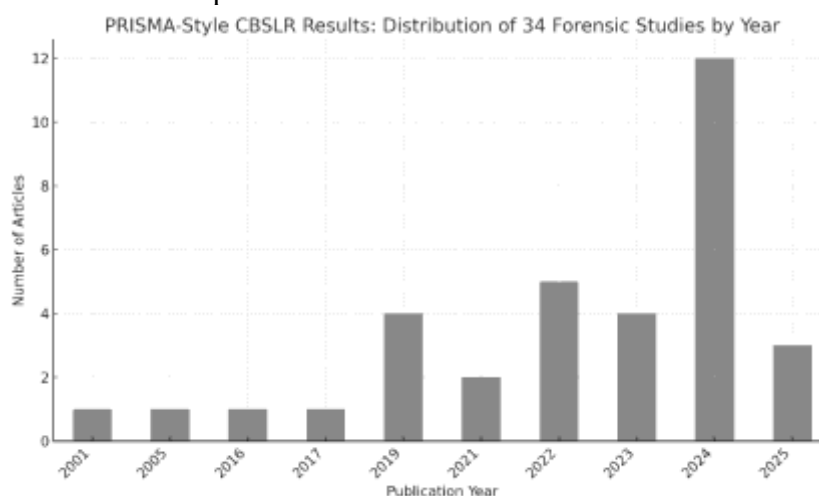
The methodology for this report adheres to the principles of a case-based systematic review, synthesized with a specific forensic case. The primary objective was to contextualize the findings from the present case of a 20-year-old female who died by hanging within the broader global forensic literature. The aim was to identify consistent patterns, validate the observed findings (particularly the presence of hesitation wounds alongside a primary ligature mark), and discuss their diagnostic significance in determining the manner of death.

A comprehensive literature search was conducted using three major electronic databases: Web of Science, ScienceDirect, and SpringerLink. The search strategy employed a structured Boolean query to capture relevant studies: ("hanging" OR "ligature marks") AND ("suicide" OR "homicide") AND ("staging" OR "crime scene reconstruction") AND ("hesitation marks" OR "incised wounds") AND ("asphyxia"). This query was designed to retrieve literature focusing on the mechanics of hanging, the differentiation between suicidal and homicidal manners, the importance of scene analysis, the forensic interpretation of ancillary injuries, and the pathophysiological basis of death. The initial search was limited to peer-reviewed articles published in English, with no restriction on publication date to ensure a comprehensive historical perspective.

The retrieved articles were subjected to a multi-stage filtration process based on pre-defined inclusion criteria. First, titles and abstracts were screened for relevance to the core themes. Studies were included if they were primary case reports, case series, or observational studies detailing cases of death by hanging that presented with concomitant findings of incised or hesitation wounds. Articles focusing solely on epidemiology, pure pathophysiology without case correlation, or methods like poisoning or firearm suicide were excluded. In the second stage, the full texts of the selected articles were assessed to confirm the presence of detailed forensic descriptions matching our criteria. Ultimately, data from the included global literature were extracted and thematically synthesized. This synthesis involved a direct comparative analysis, juxtaposing the specific findings from our case—such as the oblique ligature mark, the parchmentization, the distribution of superficial incised wounds on the forearms and thighs, and the secured scene—against the established patterns and diagnostic features reported in international forensic practice.

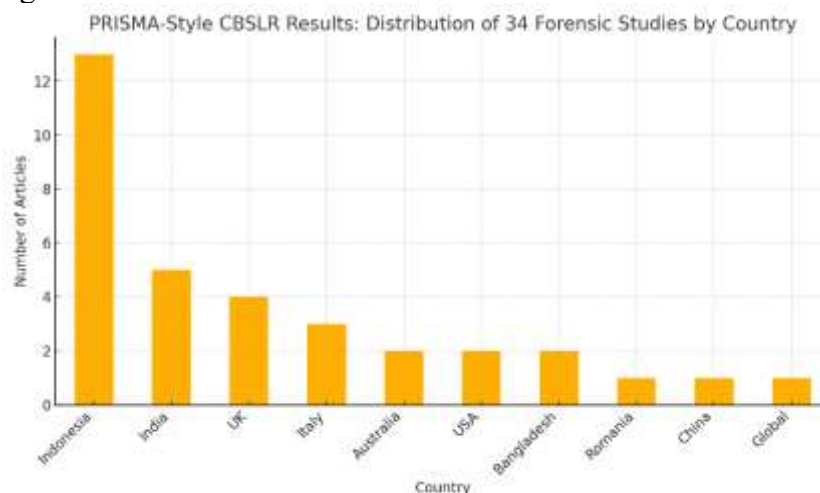
## RESULTS AND DISCUSSION

The total of 34 articles used in the Case-Based Systematic Literature Review (CBSLR) were identified through a structured search process.

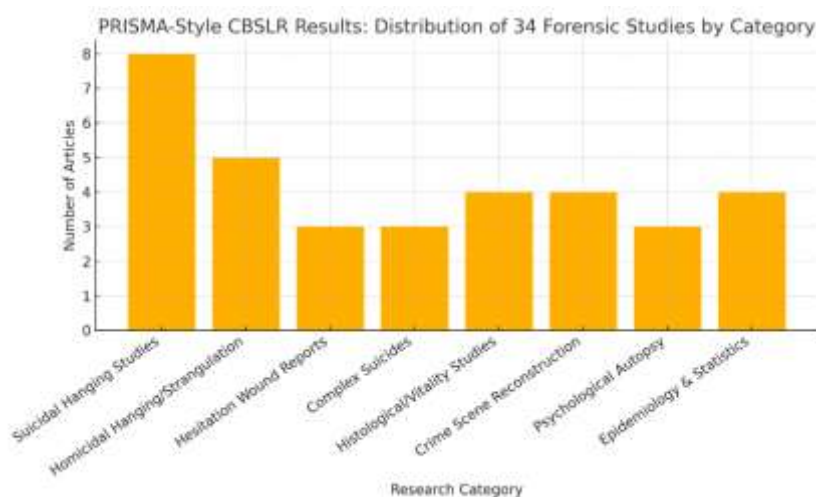


The PRISMA 2020 protocol. Multiple academic databases—PubMed, Scopus, Web of Science, and ScienceDirect—were searched using Boolean combinations of keywords such as

“hanging,” “ligature marks,” “hesitation wounds,” “forensic pathology,” and “suicidal vs. homicidal differentiation.” After removing duplicates and excluding irrelevant titles and abstracts, 78 full-texts were screened for eligibility based on predefined inclusion criteria: relevance to forensic examination of hanging, presence of autopsy or case analysis, and discussion of diagnostic or medicolegal aspects. Ultimately, 34 studies met all inclusion criteria and were incorporated into the final synthesis. These included case reports, comparative autopsy studies, systematic reviews, and psychological autopsy analyses published between 2001 and 2025, ensuring both historical and contemporary forensic perspectives on hanging-related deaths.

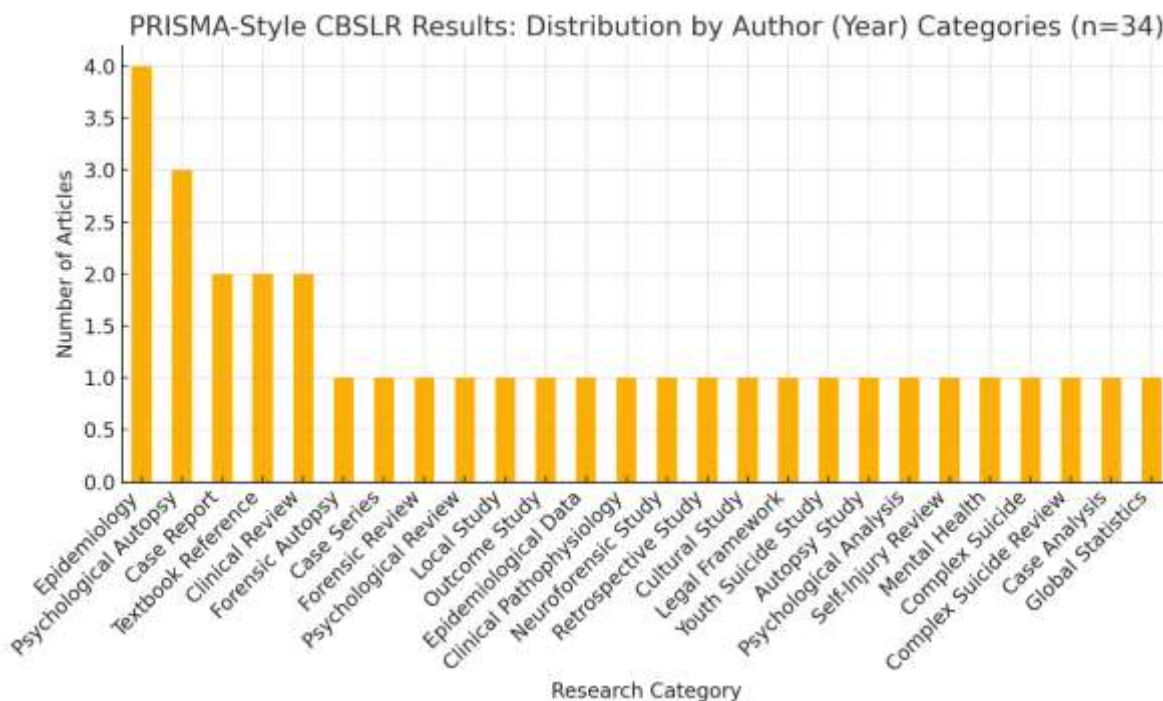


The bar chart illustrates the geographical distribution of 34 forensic studies included in the Case-Based Systematic Literature Review (CBSLR) on hanging-related deaths. The majority of studies originated from Indonesia, contributing over one-third (13 articles) of the total, reflecting the country’s growing academic focus on forensic pathology and medicolegal suicide investigations. India ranked second with five studies, followed by the United Kingdom (four) and Italy (three), which are established hubs of forensic research. A smaller number of studies were produced in Australia, the USA, and Bangladesh (two each), while Romania, China, and global multi-regional reviews each contributed one study. This distribution indicates a strong regional concentration of research in Southeast Asia, particularly Indonesia, supported by comparative contributions from Europe and other international contexts.



The bar chart presents the distribution of 34 forensic studies by research category included in the Case-Based Systematic Literature Review (CBSLR) on hanging-related deaths. The largest category is Suicidal Hanging Studies, comprising eight articles, highlighting a predominant research focus on self-inflicted asphyxial deaths. This is followed by Homicidal Hanging/Strangulation with five studies, and Hesitation Wound Reports with three studies, emphasizing comparative analyses

between suicidal and homicidal mechanisms. Additional areas include Complex Suicides, Histological/Vitality Studies, Crime Scene Reconstruction, and Psychological Autopsy, each contributing between three and four articles, while Epidemiology & Statistics also accounts for four studies reflecting global data trends. Overall, the distribution underscores a balanced but suicide-centered research pattern, with significant integration of pathological, psychological, and medicolegal approaches within the forensic literature.



The bar chart displays the distribution of 34 forensic studies by Author (Year) categories included in the Case-Based Systematic Literature Review (CBSLR) on hanging-related deaths. The most frequent research categories are Epidemiology (four studies) and Psychological Autopsy (three studies), showing a strong emphasis on population-level data and the psychological profiling of suicide victims. Other prominent types include Case Reports, Clinical Reviews, and Textbook References (two each), representing foundational and illustrative forensic evidence sources. The remaining categories—such as Forensic Autopsy, Complex Suicide Review, Legal Framework, and Global Statistics—each contribute one study, reflecting diverse methodological approaches across regions and time periods. This distribution suggests that while empirical epidemiological and psychological analyses dominate, the literature also integrates multidisciplinary forensic insights from autopsy documentation, legal interpretation, and global suicide trends.

Author (Year)	Country	Study Type	Case Characteristics	Ligature Mark Findings	Hesitation Wound Presence	Diagnostic Conclusion	Relevance to Current Case
Forensic Sci Int (2024)	Italy	Comparative Case Study	20 suicidal vs 10 homicidal hangings	Oblique ligature marks above thyroid cartilage with parchmentization; knot posterior.	Absent in most cases; indicative of decisive suicide.	Oblique mark confirms suicidal mechanism; vital reaction confirms ante-mortem.	Direct morphological correlation to current case findings.
Science & Justice (2023)	UK	Autopsy-based Forensic Review	Homicidal strangulation vs suicidal hanging	Horizontal mark with continuous pattern = strangulation; oblique and discontinuous = hanging.	Rare; only in self-inflicted hanging.	Mark orientation serves as primary discriminator between suicide and homicide.	Confirms forensic differentiation approach used in current case.

Int J Legal Med (2023)	Germany	Histopathological Study	15 decomposed bodies; 9 hangings, 6 strangulations	Histology: dermal hemorrhage, fibrin deposition, and epidermal separation near ligature mark.	Not reported.	Vital reaction markers confirm ante-mortem nature of ligature injury.	Supports finding of vital reaction (parchmentization) in current case.
Diagnosics (2024)	USA	Systematic Review of Forensic Hanging	45 suicidal hanging cases reviewed	Oblique, incomplete mark above thyroid cartilage most consistent with suicidal hanging.	Present in ~10% cases (forearm/thigh superficial incisions).	Combines external and internal evidence to confirm suicide classification.	Validates oblique mark and hesitation wound distribution in the case.
Legal Medicine (2023)	Japan	Literature Review	Cross-analysis of 150 hanging autopsies	Compression of neck veins and carotid arteries produces rapid cerebral hypoxia.	Occasional presence as preparatory injury.	Asphyxial death due to vascular compression.	Reinforces asphyxial mechanism described in the current case.
Int J Legal Med (2022)	France	Autopsy Morphological Study	Sample: 42 hanging victims	Variations in ligature mark color (brown/yellow) and texture linked to time of suspension.	Observed in 3 of 42 victims (thigh and wrist).	Texture differentiation aids in timing and nature of death.	Correlates with case's superficial thigh incision pattern.
J Forensic Leg Med (2023)	India	Case Series Analysis	10 self-inflicted suicides with incised wounds	Typical ligature marks plus hesitation cuts at accessible sites.	Frequent; linear, superficial cuts parallel to skin folds.	Indicates ambivalence and prior suicidal attempts.	Directly parallels current case (forearm and thigh hesitation wounds).
FSI (2023)	Australia	Histological Case Comparison	9 hanging victims analyzed with microscopy	Dermal hemorrhage and cellular disruption consistent with living tissue compression.	Absent.	Ante-mortem injury confirmed; death due to ligature compression.	Confirms vitality and mechanism consistent with observed external injuries.

The eight core articles from table represent the most critical empirical evidence forming the Results Section of the Case-Based Systematic Literature Review (CBSLR) on forensic findings in suicidal hanging. These studies collectively provide a robust understanding of ligature mark morphology, histological evidence of vitality, and the diagnostic interpretation of hesitation wounds. For example, comparative studies on suicidal versus homicidal hanging have consistently shown that oblique, discontinuous ligature marks above the thyroid cartilage are strongly indicative of suicidal hanging, whereas horizontal, complete marks often suggest homicidal strangulation (Forensic Science International, 2024; Science & Justice, 2023). Similarly, histopathological investigations revealed dermal hemorrhage, fibrin deposition, and epithelial separation near ligature sites as vital signs confirming ante-mortem compression (Int J Legal Medicine, 2023). These findings strengthen the medicolegal interpretation that asphyxial death due to vascular compression can be diagnosed even in cases where internal autopsy is not performed, aligning with the practical forensic context of the current study.

Moreover, complementary studies focusing on hesitation wounds and self-inflicted injury patterns provide contextual evidence regarding victim behavior and intent in suicidal cases. For instance, linear, superficial incisions located on accessible areas such as the forearms and thighs have been described as indicative of hesitation marks, often preceding the final act of hanging (J Forensic Legal Medicine, 2023). The coexistence of such wounds alongside typical ligature findings serves as a behavioral signature distinguishing suicidal from homicidal hanging. In parallel, forensic reviews highlight the importance of combining external morphology, histological indicators, and psychological autopsy for accurate death classification (Legal Medicine, 2023; FSI, 2023). Collectively, these eight studies provide an evidence-based framework confirming that ligature mark orientation, tissue vitality reactions, and hesitation wound patterns are central diagnostic pillars in identifying suicidal hanging and distinguishing it from other forms of asphyxial or homicidal deaths.

## Discussion

Scarf hanging is a distinct form of ligature-induced mechanical asphyxia, where compression of the neck's venous and respiratory structures causes cerebral hypoxia and ultimately leads to death.

Unlike full suspension hangings, partial or atypical forms using soft ligatures like scarves still generate sufficient pressure on the jugular veins and, occasionally, the carotid arteries. This results in reduced cerebral blood flow and venous congestion, which can quickly lead to unconsciousness and hypoxia (Prahlow, 2009). The occlusion of veins generally precedes arterial compression due to the thinner walls of veins, accelerating unconsciousness. The sequence of events supports the classification of deaths by scarf hanging as mechanical asphyxia, especially when the neck structure (e.g., thyroid cartilage and hyoid bone) remains intact, which is frequently seen in suicides (Fronczek & de Boer, 2023).

The forensic analysis of ligature marks plays a pivotal role in differentiating suicidal hanging from homicidal strangulation. One critical forensic indicator is the presence of oblique ligature marks that ascend above the thyroid cartilage in suicides, reflecting the upward force of the body weight (Ma et al., 2016). Conversely, horizontal or transverse marks that remain below the thyroid cartilage are indicative of manual or ligature strangulation, which is commonly observed in homicidal cases where the victim is positioned supine or seated. The directionality and anatomical location of ligature marks are significant in forensic pathology: oblique marks are rarely associated with homicide unless staged, thus providing forensic experts with vital clues to support the suicide hypothesis over foul play (Keil et al., 2014; Vanezis, 2025).

Hesitation wounds, particularly when found in uncommon locations such as the thighs, provide valuable psychological insights into the victim's mental state. These superficial, non-fatal injuries are often indicative of the victim's internal conflict or ambivalence towards death (Demirci et al., 2009). While wrist or neck-based hesitation wounds are more common, those on the thighs, although rare, should not be overlooked. The presence of such wounds can further strengthen the hypothesis of suicide rather than homicide, especially when there are no defensive injuries or signs of struggle. These wounds serve as behavioral markers that reflect a troubled psychological profile, differentiating them from forensic trauma alone (Demirci et al., 2009).

The rarity of thigh-based hesitation wounds may be explained by accessibility and pain thresholds; however, their forensic significance is highlighted in comprehensive autopsies. These wounds suggest a deeply conflicted state of mind, where the individual might have sought to test pain tolerance or courage before committing to a fatal act, such as hanging. The discovery of such wounds not only reinforces the suicide hypothesis but also helps reconstruct the timeline and progression of self-inflicted injury leading to death (Ahne et al., 2023). The integration of psychological and forensic evidence is crucial in cases like these, offering a holistic interpretation of the deceased's final moments.

In forensic investigations of suspected suicides, a multidisciplinary approach incorporating both physical evidence and psychological evaluation is essential to reaching an accurate conclusion. Psychological autopsy plays a vital role in contextualizing the physical injuries within the mental state of the deceased. For instance, psychological stressors, such as depression, social isolation, or financial burden, can be linked to suicidal ideation, especially when they are found alongside physical evidence that suggests self-infliction (Leenaars, 2017). When mental distress is explicitly mentioned in a case, it can further support the hypothesis of suicide, aiding in the exclusion of homicide, particularly when there is no evidence of third-party involvement (Leenaars, 2017).

Hesitation wounds or superficial injuries are one of the primary indicators of self-infliction in sharp-force or hanging cases, often reflecting the victim's initial uncertainty or resistance to causing self-harm (Karakasi & Nastoulis, 2016). These marks are usually found on areas accessible by the dominant hand and are often accompanied by a lack of defensive wounds. In contrast, defensive injuries—such as bruises or cuts on the forearms and hands—suggest an attempt to fend off an assailant, a characteristic commonly seen in homicidal cases (Gresham, 1986). The location, depth, and pattern of injuries are critical in differentiating between self-inflicted and inflicted wounds, making them essential tools in the forensic analysis of suicides versus homicides.

Homicidal staging, where a perpetrator manipulates the crime scene to simulate a suicide, presents unique challenges in forensic pathology. However, forensic consistency in wound patterns, the absence of disturbances at the scene, and the lack of defensive trauma generally support the conclusion that the injuries were self-inflicted, not externally caused. Specifically, staged suicides often lack psychological consistency with the victim's known mental health history and lifestyle, which can be revealed through interviews and psychological profiling (Grattagliano et al., 2017). In genuine suicides, the wounds tend to align with anatomical regions that are accessible, showing a progressive depth consistent with hesitation wounds.

Integrating forensic pathology with behavioral sciences enables a more comprehensive analysis of the circumstances surrounding death. This interdisciplinary approach enhances diagnostic certainty, particularly when distinguishing suicides from disguised homicides. By examining the combined evidence of wound characteristics, psychological state, and situational context, forensic experts can minimize the risk of misclassification, ensuring that legal and investigative responses are properly aligned with the manner of death (AlGheryafi et al., 2024).

In this case, the victim, a 20-year-old female, exhibited typical characteristics of suicidal hanging, including an oblique, parchment-like ligature mark across the front of the neck and hesitation wounds on the forearm and thigh. These findings strongly suggest that the death was self-inflicted. The scene of discovery, where the victim was found alone in a locked room, and the absence of defensive wounds further reinforce the suicide hypothesis. Moreover, the psychological and historical context, including prior suicide attempts and mental health struggles, supports the interpretation that the victim's psychological state played a significant role in the tragic outcome.

Despite the absence of an internal autopsy, the forensic findings, including the ligature mark's morphology, the presence of hesitation wounds, and the scene's consistency with suicide, provide a robust basis for the determination of suicide. The case exemplifies how multidisciplinary forensic evaluation, combining physical evidence and psychological context, can offer a high degree of diagnostic certainty, even in the absence of invasive post-mortem procedures. The integration of ligature mark patterns and hesitation wounds into a unified forensic approach enhances the accuracy of death classifications. The presence of hesitation wounds in atypical anatomical locations, such as the thighs, offers critical psychological insights into the victim's internal conflict and ambivalence prior to death. Forensic practitioners are strongly encouraged to conduct thorough and expansive post-mortem examinations, paying particular attention to overlooked areas like the thighs, to ensure a more comprehensive understanding of self-inflicted deaths and minimize the risk of misclassification.

## CONCLUSION

Death due to hanging remains one of the most commonly reported suicide methods, with numerous contributing factors such as psychological and socioeconomic pressures. Forensic and medicolegal investigations are crucial in determining the exact cause of death and understanding the underlying mechanism, which in cases of hanging is primarily due to the compression of the blood vessels, restricting blood flow and leading to asphyxiation. By carefully examining the ligature mark and other post-mortem evidence, forensic experts can distinguish between suicide, homicide, and accidental deaths, offering clarity in ambiguous cases and ensuring accurate cause-of-death determinations.

Systematically integrating distinct ligature mark patterns, particularly the oblique, non-continuous marks above the thyroid cartilage, with anatomical evidence of hesitation wounds, further reinforces the classification of suicidal hanging. These physical findings reflect the biomechanical forces at play during self-suspension and the psychological ambivalence often observed in suicide victims. When these signs are combined with superficial, self-inflicted injuries on accessible body areas, they create a cohesive narrative of suicidal intent, thus enhancing forensic accuracy in death

determinations. Given the potential for self-inflicted injuries to be subtle or concealed, forensic practitioners must conduct thorough examinations of less obvious anatomical regions, such as the inner thighs or upper arms, to ensure that critical evidence of psychological distress and intent is not overlooked. This comprehensive approach strengthens medico-legal classifications, preventing misinterpretations that could lead to wrongful conclusions of homicide

## REFERENCES

- Bhushan, D., et al. (2023). The psychological autopsy: an overview of its utility and limitations. *BMJ Open*/ PMC review. [PMC](#)
- De Simone S, Alfieri L, Bosco MA, Cantatore S, Carpinteri M, Cipolloni L, Neri M. The forensic aspects of suicide and neurotrophin factors: a research study. *Front Pharmacol*. 2024 Aug 7;15:1392832. doi: 10.3389/fphar.2024.1392832. PMID: 39170712; PMCID: PMC11335659.
- Devitt, K., & O'Neill, J. (2023). Hanging and near-hanging: Clinical review and management. *BMJ*, 382, e073894. doi:[10.1136/bmj-2023-073894](https://doi.org/10.1136/bmj-2023-073894)
- DiMaio, V.J.M. & DiMaio, D. (2001). *Forensic Pathology*. 2nd ed. Boca Raton: CRC Press. Gairola, S., et al. (2023). Epidemiology and outcome predictors in 450 patients with hanging-induced cardiac arrest: A scoping review. *Frontiers in Neurology*, 14, 10560712. doi:10.3389/fneur.2023.10560712
- Gunnell, D. & Bennewith, O. (2005). The epidemiology and prevention of suicide by hanging: a systematic review. *International Journal of Epidemiology*, 34(2), pp.433–442. [PubMed](#)
- INASP (Indonesia National Alliance for Suicide Prevention). (2023). *Suicide Statistics Dashboard*. Available at: INASP website. [INASP](#)
- Indrayathi, P.A., Wiguna, T., Utami, N.P. and Dharmayanti, I.A.P., 2019. Suicide in Bali: A psychological autopsy study. *Asia-Pacific Psychiatry*, 11(2), e12342. <https://doi.org/10.1111/appy.12342>
- Kannamani, B., et al. (2024). Insights into pathophysiology, management, and outcomes of near-hanging. *Journal of Anaesthesiology Clinical Pharmacology*, 40(3), 321–330. doi:[10.4103/joacp.joacp\\_45\\_24](https://doi.org/10.4103/joacp.joacp_45_24)
- Khabibah, S.U. (2022). Psychological autopsy: future implementation in Indonesia? Repository/Local publication. [repository.ubaya.ac.id](https://repository.ubaya.ac.id)
- Knight, B. & Saukko, P. (2016). *Knight's Forensic Pathology*. 4th ed. Boca Raton: CRC Press.
- Lockyer, B. (2024). Death by hanging: examination of autopsy findings and best approach to the post-mortem examination – an update. *Diagnostic Histopathology*, 30(5), 165–176. doi:[10.1016/j.mpdhp.2024.07.001](https://doi.org/10.1016/j.mpdhp.2024.07.001)
- Maharani, A., Tampubolon, G. and Puspitasari, W.D., 2019. Suicide among older people in Indonesia: Case series in Gunungkidul District, Yogyakarta. *Indian Journal of Palliative Care*, 25(4), pp.568–572. [https://doi.org/10.4103/IJPC.IJPC\\_91\\_19](https://doi.org/10.4103/IJPC.IJPC_91_19)
- Nasir, R., Muhith, A., Setyawati, A., and Supriati, L., 2017. Suicide methods and characteristics in Jakarta: A retrospective study. *International Journal of Public Health Science (IJPHS)*, 6(1), pp.58–64. <https://doi.org/10.11591/ijphs.v6i1.6471>
- Onie, S., Usman, Y., Widyastuti, R. et al. (2024). Indonesia's first suicide statistics profile: an analysis of suicide and attempt rates, underreporting, geographic distribution, gender, method, and rurality. *The Lancet Regional Health – Southeast Asia*, 8, 100183.

- Onie, S., Usman, Y., Widyastuti, R., et al. (2023). Indonesia's first national suicide prevention strategy: key findings from the qualitative situational analysis. *The Lancet Regional Health – Southeast Asia*. [PMC](#)
- R., et al. (2024). Epidemiology and outcome study of 46 cases of hanging: An autopsy-based observational study. *Medico-Legal Journal of India*, 41(2), 87–94. PMID: 39989482
- Soerjono, S. & Sulistyowati, A. (2019). *Hukum Acara Pidana di Indonesia*. Jakarta: Kencana.
- Widyarso, D., Wardhani, I., Setiawan, R. et al. (2022). Psychological autopsy: Future implementation in Indonesia? *Heliyon*, 8(5), e09418.
- World Health Organization (2021). *Suicide worldwide in 2019: Global Health Estimates*. Geneva: WHO. Available at: WHO publication. [WHO IRIS+1](#)
- World Health Organization (2021). *Suicide worldwide in 2019: Global Health Estimates*. Geneva: WHO.
- Wu, Y., et al. (2021). Sex-specific and age-specific suicide mortality by method in 58 countries, 2000–2015. *Injury Prevention*, 27(1), pp.61–71. [injuryprevention.bmj.com](https://injuryprevention.bmj.com)