

The Role of Forensic Science in Proving Murder Cases at the Investigation Stage

Muh. Arif¹, Faisal Abdaud², Huzaiman

¹ Universitas Muhammadiyah Kendari, Indonesia; muharif0610@gmail.com

² Universitas Muhammadiyah Kendari, Indonesia; faisal.abdaud@umkendari.ac.id

³ Universitas Muhammadiyah Kendari, Indonesia; huzaiman@umkendari.ac.id

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Abstract	<p>Forensics is a science that has a crucial role in the judicial process through examination and collection of physical evidence found at crime scenes. The involvement of forensic experts at crime scenes usually occurs in significant cases, where they are only called upon request from the authorities. This study aims to study the role of forensic medicine in helping investigators find material truth in murder cases, as well as identify possible obstacles. Through a library legal research and descriptive approach, secondary data such as legal documents and literature are analyzed to provide a clear and detailed picture of role of forensic science in assisting investigators in finding the material truth in murder cases and asserting the obstacle of it. The results showed that forensic medicine has a crucial role in uncovering material truths and providing legitimate evidence in murder cases. However, lack of coordination between law enforcement officials and forensic doctors can be an obstacle. Therefore, good cooperation and coordination between law enforcement officials and forensic doctors is the key to success in handling this case. The principle of justice must be upheld in the investigation process.</p>		
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Corresponding Author Wahyudi Umar Universitas Muhammadiyah Kendari: faisal.abdaud@umkendari.ac.id			

1. INTRODUCTION

The judicial system plays an important role in upholding law and justice in society. One of the key aspects of the justice system is the search for material truth in criminal cases, including murder cases. In this process, forensic science has a crucial role in helping investigators uncover the truth of facts related to murder and identify possible obstacles. Forensic science aims to help determine criminal acts that result in the loss of human life or human disability as a result of criminal acts committed by a person (Abrahams, Jewkes, Martin, & Mathews, 2011).

In the process of investigating murders, forensic science makes an important contribution through Visum et Repertum evidence. Visum et Repertum serves as a substitute for corpus delicti (evidence of the proceeds of crime) that cannot be physically presented at trial, such as wounds on the human body or the corpse of the victim (Abrahams et al., 2011). Therefore, making Visum et Repertum must be done carefully, carefully, and completely by the doctor who examines the corpse.

Visum et Repertum is a very important evidence tool in proving murder. Accuracy in making Visum et Repertum are needed so that there are no errors in the criminal process, including in



determining sentences by judges (Winardi & Wahyuni, 2015). The purpose of forensic science in this case is to determine the relationship that causes the occurrence of criminal acts that result in injury or health problems, not for the purpose of healing (Ulan, Priyana, Hukum, & Karawang, 2021).

In addition, in the investigation of murder crimes, the role of forensic science also involves examination of criminalistic laboratories, processing and identification of evidence, and examination of crime scenes (Rachmad, 2019). Micro and macro evidence is used as evidence in the process of examining witnesses or suspects by investigators.

Efforts made by law enforcement in seeking the material truth of a criminal case, including in the case of murder, aim to avoid mistakes in imposing a crime against someone. This is in accordance with the provisions of Law No. 4 of 2004 concerning the Basic Provisions of Judicial Power, which states that no one can be convicted unless the court believes based on valid evidence in accordance with the law that a person who is considered responsible has been guilty of the act he is accused of.

Although forensic science has become an important field in murder investigation, there are still novelties and research gaps that can be explored. One of the novelties that can be explored is the development of new technologies and methods in forensic science that can increase the effectiveness and accuracy in collecting and analyzing forensic evidence. For example, the use of forensic DNA technology has become an important tool in identifying perpetrators and linking them to crimes that occurred.

In addition, there is a research gap that can be filled in the understanding of the influence of forensic doctor factors / obstacles in helping investigators to find the material truth of murder cases. The importance of research in this area can be highlighted for several reasons. First, this research will make an important contribution to the development and improvement of methodologies in forensic science. By identifying case-aquo barriers, we can improve the accuracy and validity of forensic reports, which in turn can increase trust and fairness in the justice system.

Second, this research will enrich our understanding of the factors that can influence forensic evidence. This can help forensic investigators and doctors in a more accurate interpretation of existing forensic evidence, as well as ensure that material truths can be better revealed. Lastly, the research will also benefit forensic science professionals, by understanding the challenges they face. With a better understanding of the factors that have an influence on the quality of forensic reports, efforts can be made to improve the accuracy of forensic doctors' performance, so that they can make a better contribution to the investigation of murder cases.

To fill in the novelty and address existing research gaps, research on forensic science can direct attention to factors affecting forensic evidence. By bridging this research gap, we can increase effectiveness and accuracy in finding material truths in homicide cases, as well as increase our understanding of the challenges faced by forensic physicians. This will help ensure that justice can be better achieved in the criminal justice system. In this study, we will discuss more about the role of forensic science in helping investigators uncover the truth of facts related to murder, identify possible obstacles, and fill in existing research novelties and gaps.

2. METHODS

This research is categorized as library legal research. The research was conducted by reviewing the literature and analyzing the relevant topics combined (Fatha Pringgar & Sujatmiko, 2020). The approach used in this study is a descriptive approach. A descriptive approach is used to provide a clear and detailed picture of the role of forensic science in assisting investigators in finding the material truth in murder cases and asserting the obstacle of it (Nurmalasari & Erdiantoro, 2020). Document study techniques were used in this study to collect data from written sources related to forensic science in homicide investigations. Documents that can be used include laws, regulations, court decisions, scientific journals, textbooks, previous research reports, and other relevant sources.

3. FINDINGS AND DISCUSSION

3.1. *Forensic Science and its Legal Basis in Indonesia*

In Indonesia, Forensic Medicine is a specialty of medicine that is used to assist in legal proceedings (Afandi, 2018). The role of Forensic Medicine in the Indonesian legal system is crucial. It involves a wide range of activities, including examination of victims of sexual crimes, analysis of evidence at crime scenes, and determination of cause and manner of death in cases of suspicious deaths (Afandi, 2018).

However, due to the limited number of forensic doctors in Indonesia, general physicians or other specialists may be authorized by law to conduct certain examinations. These examinations are conducted in compliance with standard operating procedures and guidelines provided by the government. Forensic doctors in Indonesia practice as forensic pathologists and clinical forensic medicine experts (Gopalakrishnan, Syukriani, & Setiawati, 2016). It is mandatory for every doctor in Indonesia to provide *Visum et Repertum* (a medical statement regarding injuries or illnesses, including forensic data) when requested by investigators (Prasetyo, Febriansyah, Indiantoro, Absori, & Praja, 2020). In Indonesia, Forensic Medicine is regulated by a number of laws and regulations. For instance, the Indonesian Penal Code sets out rules and procedures for forensic examination of evidence.

The Penal Code stipulates that experts who refuse to provide assistance to the police may be criminally threatened in accordance with Article 224 and Article 522 of the Penal Code. Article 224 of the Penal Code states that a person who is summoned as a witness, expert, or interpreter according to the law and deliberately fails to fulfill the obligations stipulated by law, may be punished with imprisonment of up to 9 months in criminal cases, or imprisonment of up to 6 months in other cases. Article 522 of the Criminal Code states that if a person summoned as a witness, expert, or interpreter is not present unlawfully, a maximum fine of Rp900,000 may be imposed.

In the case of forensic experts, although the term "forensic" is not specifically mentioned in criminal procedures, Article 133 paragraph (1) of the Code of Criminal Procedure authorizes investigators to request information from judicial medical experts if the examination relates to injuries, poisoning, or death. Requests for information from these experts must be submitted in writing. Thus, in the context of forensic experts, which encompass various forensic disciplines, they can be considered as medical experts who make important contributions in forensic investigation and examination.

3.2. *The role of forensic science in helping investigators to find material truth in murder cases*

The role of forensic science in helping investigators to find material truth in murder cases is very important and irreplaceable (Bhateja, Surabhi, Malhotra, & Arora, 2020). Forensic science is the branch of medical science that combines medical knowledge with the law to provide scientific evidence that can be used in the criminal justice system (Nuzunulriyanti, 2018). In the case of murder, forensic science plays a role in identifying and analyzing physical evidence related to the death of the victim (Monita & Wahyudhi, 2013). One of the main roles of forensic science is to perform autopsies on murder victims. An autopsy is a thorough examination of a corpse with the aim of determining the cause of death. Through autopsies, forensic experts can collect evidence that will help investigators in uncovering the material truth of the murder case (Hatta, Zulfan, & Srimulyani, 2019).

In the early stages of the autopsy, forensic experts will conduct an external examination of the corpse to record any injuries or traces of violence that could be indicative of homicide. After that, an examination is carried out in the corpse to identify internal injuries, such as organ damage, fractures, or stab wounds that may be the cause of death. Through this examination, forensic experts can determine whether the victim's death was caused by homicide or other factors such as illness or accident (Ferreira Silva, Fortes Picoli, de Lucena Botelho, Gomes Resende, & Franco, 2017). A forensic analysis also includes the collection and analysis of other evidence that can be found at a crime scene. Forensic experts will identify and map traces of blood, fingerprints, powder gunshots, and other objects that can help deduce what happened at the crime scene and who was involved in the murder.

Forensic science also plays an important role in determining the time of death of victims (Iskandar & Suwanda, 2019). An accurate estimate of the time of death can help investigators narrow down the time of the murder and look for relevant evidence at the time. Forensic experts use methods such as body temperature measurement, rigor mortis testing, and livor mortis testing to determine the estimated time of death (Henky, Utami, & Yulianti, 2020).

In addition, DNA analysis is also an important part of forensic medical science. DNA found on victims, suspects, or objects at crime scenes can help investigators link the perpetrator to the murders. Through DNA matching techniques, forensic experts can identify and compare the DNA profiles found with existing DNA databases to determine if suspects are involved in the murder case. This DNA analysis can provide strong scientific evidence in determining a person's involvement in a murderous act (Yolanda, 2018).

In addition to autopsy and DNA analysis, forensic science can also assist investigators with a variety of other techniques and methods. For example, the identification and analysis of gunshot powder and firearm projectiles found at a crime scene can provide clues about the type of weapon used and the range of the shooting (Dani, Nawi, & Halid, 2020). Fingerprint and footprint checks can also help identify perpetrators and strengthen existing evidence (Mutmainnah, Rahman, & Asmar, 2019).

In addition, forensic analysis may involve forensic chemists who are responsible for identifying chemicals associated with murder, such as poisons or drugs used (Dimas, 2018). Also, forensic scanning can be used to collect digital evidence related to a murder case, such as data analysis of cell phones, computers, or video recordings (Rachmie, 2020).

The importance of forensic science in murder cases is also related to justice and truth. The scientific evidence collected and analyzed by forensic experts can provide a better understanding of events and help ensure that the guilty perpetrators are punished and the innocent are acquitted. This is an important part of a fair criminal justice system, but forensic evidence is only auxiliary and non-determinative for homicide cases. (Baskin & Sommers, 2010).

It is important to remember that forensic science is not the only factor that determines the material truth of a case. Forensic evidence should be considered along with other evidence, such as eyewitnesses, alibis, and motives of the perpetrator. The use of forensic science in the investigation of murder cases must be done with care and professionalism to ensure accurate justice and truth. Overall, forensic science plays an important role in helping investigators find the material truth in murder cases. Through autopsies, DNA analysis, trace identification, gunshot powder analysis, and other techniques, forensic experts can gather strong scientific evidence that can be used in the criminal justice system. Thus, forensic science contributes to the search for justice and helps uncover the truth in murder cases.

3.3. Obstacles to forensic science in helping investigators to find material truth in murder cases

The obstacles that may be faced in the use of forensic science in helping investigators to find the material truth in murder cases are things that need to be considered. Although forensic science has a very important role to play in homicide investigations, there are several factors that can be obstacles in the collection and analysis of such forensic evidence.

Limited Resources: One of the major obstacles is the limited resources possessed by forensic agencies. In some cases, there are limitations in terms of the forensic equipment required, adequate laboratory facilities, and the number of forensic experts available (Rachmad, 2019). This lack of resources can hinder the process of collecting, analyzing, and interpreting forensic evidence quickly and efficiently.

Environmental Factors: Environmental factors such as weather, soil conditions, or other environmental conditions can also be obstacles in collecting accurate forensic evidence. For example, if a crime scene is exposed to rain or exposed to a natural disaster, traces and other evidence may become damaged or erased, reducing the chances of obtaining strong and consistent evidence (Sutton & Byrd, 2020).

Expert Opposition: In some cases, there are sometimes disagreements between different forensic experts in providing conclusions and interpretations of the same evidence. This can happen because of differences in the length of analysis or assessment of existing evidence. Expert disagreement can create doubt and uncertainty among investigators, lawyers, and even judges. So that the court has the authority to reject an expert if it is deemed unable to assist in its task of finding material truth (Raspati, 2012). This is in line with Baskin & Sommers' view that forensic evidence is only incremental and not decisive for murder (Baskin & Sommers, 2010).

4. CONCLUSION

The role of forensic science in helping investigators to find material truth in murder cases is very important. In the case of murder, forensic science plays a role in identifying and analyzing physical evidence related to the death of the victim. Through autopsies, DNA analysis, trace identification, gunshot powder analysis, and other techniques, forensic experts can gather strong scientific evidence that can be used in the criminal justice system. Thus, forensic science contributes to the search for justice and helps uncover the truth in murder cases.

Nevertheless, there are some obstacles to forensic science in helping investigators to find material truth in murder cases such as limited resources, environmental factors, and expert opposition. Although forensic science has a very important role to play in homicide investigations, there are several factors. This is in line with Baskin & Sommers' view that forensic evidence is only auxiliary and non-determinative for homicide cases.

REFERENCES

- Abrahams, N., Jewkes, R., Martin, L. J., & Mathews, S. (2011). Forensic medicine in South Africa: Associations between medical practice and legal case progression and outcomes in female murders. *PLoS ONE*, 6(12). <https://doi.org/10.1371/journal.pone.0028620>
- Afandi, D. (2018). Medicolegal study of sexual violence cases in Pekanbaru, Indonesia: prevalence, pattern, and Indonesian legal framework. *Egyptian Journal of Forensic Sciences*, 8(1). <https://doi.org/10.1186/s41935-018-0067-5>
- Baskin, D., & Sommers, I. (2010). The influence of forensic evidence on the case outcomes of homicide incidents. *Journal of Criminal Justice*, 38(6), 1141–1149. <https://doi.org/10.1016/j.jcrimjus.2010.09.002>
- Bhateja, S., Surabhi, Malhotra, T., & Arora, G. (2020). Virtopsy: an aid in forensic investigation. *IP International Journal of Forensic Medicine and Toxicological Sciences*, 4(4), 95–98. <https://doi.org/10.18231/j.ijfmts.2019.021>
- Dani, R., Nawi, S., & Halid, H. (2020). Kekuatan Hukum Hasil Uji Balistik Dalam Pembuktian Perkara Pidana Pembunuhan Berencana. *Journal of Lex Generalis (JLG)*, 3(3), 404–417. Retrieved from <http://pasca-umi.ac.id/index.php/jlg/article/view/179>
- Dimas, M. (2018). *Peranan Ahli Toksikologi Dalam Memberikan Keterangan Kepada Penyidik Kepolisian Untuk Mengungkap Tindak Pidana Pembunuhan Dengan Menggunakan ...* (Universitas Muhammadiyah Sumatera Utara). Universitas Muhammadiyah Sumatera Utara. Retrieved from <http://repository.umsu.ac.id/handle/123456789/10168%0Ahttp://repository.umsu.ac.id/bitstream/handle/123456789/10168/SKRIPSI.pdf?sequence=1>
- Fatha Pringgar, R., & Sujatmiko, B. (2020). Penelitian Kepustakaan (Library Research) Modul Pembelajaran Berbasis Augmented Reality pada Pembelajaran Siswa. *Jurnal IT-EDU*, 05(01), 317–329.
- Ferreira Silva, R., Fortes Picoli, F., de Lucena Botelho, T., Gomes Resende, R., & Franco, A. (2017). Forensic Identification of Decomposed Human Body through Comparison between Ante-Mortem and Post-Mortem CT Images of Frontal Sinuses: Case Report. *Acta Stomatologica Croatica*, 51(3), 227–231. <https://doi.org/10.15644/asc51/3/6>
- Gopalakrishnan, H., Syukriani, Y., & Setiawati, E. (2016). Forensic Experts' Opinion Regarding Clinical Forensic Medicine Practice in Indonesia and Malaysia. *Journal of Forensic Science and Medicine*, 2(2),

- 85–90. <https://doi.org/10.4103/2349-5014.184193>
- Hatta, M., Zulfan, & Srimulyani. (2019). Autopsi ditinjau dari perspektif hukum positif Indonesia dan hukum Islam. *Ijtihad: Jurnal Wacana Hukum Islam Dan Kemanusiaan*, 19(1), 27–51. <https://doi.org/10.18326/ijtihad.v19i1.27-51>
- Henky, Utami, P. A. D. P. L., & Yulianti, K. (2020). Memperkirakan Interval Waktu Kematian Dengan Analisis Kekeruhan Kornea Berdasarkan Model Warna Rgb Pada Jenazah Di Rsup Sanglah. *E-Jurnal Medika Udayana*, 9(12), 41–47. Retrieved from <https://ojs.unud.ac.id/index.php/eum/article/view/71233/38723>
- Iskandar, O., & Suwanda, N. H. (2019). Peranan Ilmu Forensik Dalam Pengungkapan Tindak Pidana Kekerasan Fisik Dalam Lingkup Rumah Tangga Yang Dilakukan Istri Terhadap Suami. *Krtha Bhayangkara*, 13(1), 100–113. <https://doi.org/10.31599/krtha.v13i1.16>
- Monita, Y., & Wahyudhi, D. (2013). Peranan Dokter Forensik Dalam Pembuktian Perkara Pidana. *Jurnal Ilmu Hukum*, 6(7), 127–141.
- Mutmainnah, J., Rahman, S., & Asmar, A. R. (2019). Kekuatan Sidik Jari Sebagai Alat Bukti Petunjuk Dalam Mengungkapkan Tindak Pidana Pencurian. *Alauddin Law Develompent (ALDEV)*, 1(November 2019), 26–36. Retrieved from <http://journal.uin-alauddin.ac.id/index.php/aldev/article/view/11895/7664>
- Nurmalasari, Y., & Erdianto, R. (2020). Perencanaan Dan Keputusan Karier: Konsep Krusial Dalam Layanan BK Karier. *Quanta*, 4(1), 44–51. <https://doi.org/10.22460/q.v1i1p1-10.497>
- Nuzunulriyanti, R. (2018). Fungsi Ilmu Kedokteran Forensik Dalam Mengungkapkan Kasus Pembunuhan Terhadap Ibu dan Anak. In *Skripsi*. Bandar Lampung. Retrieved from <http://digilib.unila.ac.id/31263/16/3>. SKRIPSI FULL TANPA BAB PEMBAHASAN.pdf
- Prasetyo, Y., Febriansyah, F. I., Indiantoro, Absori, & Praja, C. B. E. (2020). Forensic medicine in indonesia: The application of visum et repertum in case resolution. *Indian Journal of Forensic Medicine and Toxicology*, 14(4), 4100–4105. <https://doi.org/10.37506/ijfmt.v14i4.12283>
- Rachmad, A. (2019). Peranan Laboratorium Forensik Dalam Mengungkap Tindak Pidana Pada Tingkat Penyidikan. *Jurnal Hukum Samudra Keadilan*, 14(1), 15–24. <https://doi.org/10.33059/jhsk.v14i1.1078>
- Rachmie, S. (2020). Peranan Ilmu Digital Forensik Terhadap Penyidikan Kasus Peretasan Website. *Litigasi*, 21(21), 104–127. <https://doi.org/10.23969/litigasi.v21i1.2388>
- Raspati, L. (2012). Keberadaan Ahli dan Implikasi Negatifnya terhadap Asas Peradilan Cepat, Sederhana dan Biaya Ringan (Suatu Kritik terhadap Pemeriksaan Ahli dalam Peradilan Pidana di Indonesia). *Negara Hukum*, 3(2), 249–274.
- Sutton, L., & Byrd, J. (2020). An introduction to postmortem interval estimation in medicolegal death investigations. *WIREs Forensic Science*, 2(5). <https://doi.org/10.1002/wfs2.1373>
- Ulan, V. M., Priyana, P., Hukum, F., & Karawang, U. S. (2021). Pembuktian Tindak Pidana Penganiayaan Terhadap Perawat Rs Siloam Melalui Alat Bukti Forensik. *JUSTITIA : Jurnal Ilmu Hukum Dan Humaniora*, 8(6), 1488–1499.
- Winardi, M., & Wahyuni, T. (2015). Kedudukan Visum et Repertum Sebagai Alat Bukti Surat. *Jurnal Verstek*, 3(1), 55–66.
- Yolanda, E. E. (2018). Kekuatan Pembuktian Tes DNA dan Visum Et Repertum Tulang Kerangka Korban Pembunuhan Yang Disertai dengan Tindak Pidana Lain (Studi Putusan Pengadilan Negeri Nomor: 21/Pid.B/2016/PN Wng). *Jurnal Verstek*, 6(1), 75–84.