

The Impact of Forensic Medicine in Proving Crimes from the Perspective of the Palestinian Public Prosecution

تأثير أعمال الطب العدلي في إثبات الجريمة من وجهة نظر النيابة العامة

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Abstract:

Objectives: The study aimed to examine the impact of forensic medicine in proving crimes from the perspective of the Public Prosecution.

Methods: A descriptive quantitative methodology was employed, utilizing a questionnaire as the primary tool for data collection. The study sample consisted of a convenience sample of 91 of the Public Prosecution individuals in West Bank- Palestine.

Results: Among the key findings was that, regarding the evidentiary value of forensic reports before the Public Prosecution, a judge may not substitute themselves for a forensic expert. This finding received a high degree of agreement, with a percentage of 83.6%. Additionally, the results showed that the court relies on forensic medical expertise to determine the perpetrator's intent to kill. Despite being one of the least emphasized aspects of the evidentiary value of forensic reports before the Public Prosecution, it achieved a high percentage of 94.2%.

Conclusions: Based on these findings, the study presented several recommendations, the most important of which is the need to uphold the rule of law by ensuring judicial independence as a fundamental component of criminal justice.

Keywords: Crime proof; Evidence; Evidentiary value; Rule of law.

الملخص:

الأهداف: هدفت الدراسة إلى التعرف على تأثير أعمال الطب العدلي في إثبات الجريمة من وجهة نظر النيابة العامة.

المنهجية: تم استخدام المنهج الوصفي بشقه الكمي، حيث استُخدم الاستبيان كأداة رئيسية لجمع البيانات. وتكونت عينة الدراسة من عينة قصدية بلغت 91 فرداً من أفراد النيابة العامة في الضفة الغربية- فلسطين.

النتائج: من بين النتائج الرئيسية التي توصلت إليها الدراسة، أنه فيما يتعلق بالقيمة الإثباتية للتقارير الجنائية أمام النيابة العامة، لا يجوز للقاضي أن يحل محل الخبير الجنائي. وقد حظيت هذه النتيجة بدرجة عالية من الاتفاق، بنسبة بلغت 83.6%. كما أظهرت النتائج أن المحكمة تعتمد على الخبرة الطبية الجنائية لتحديد نية الجاني في القتل. وعلى الرغم من أن هذه النقطة تُعد من أقل الجوانب تناوُلًا في القيمة الإثباتية للتقارير الجنائية أمام النيابة العامة، إلا أنها حققت نسبة مرتفعة بلغت 94.2%.

الخلاصة: استنادًا إلى هذه النتائج، قدمت الدراسة عددًا من التوصيات، من أبرزها ضرورة تعزيز سيادة القانون من خلال ضمان استقلال السلطة القضائية باعتباره أحد الركائز الأساسية لنظام العدالة الجنائية.

الكلمات المفتاحية: إثبات الجريمة؛ الأدلة؛ القيمة الإثباتية؛ سيادة القانون.

Citation

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1 Introduction

Criminal evidence has evolved alongside numerous developments in methods and techniques that have recently emerged and were previously unknown. These methods are based on scientific principles and have played a significant role in assisting the judiciary by either confirming or negating the connection between the accused and the crime. To render a verdict of acquittal or conviction, the judiciary relies on criminal evidence, which can be classified into the following types:

- Testimonial evidence, such as the defendant's confession and witness testimony.
- Punitive evidence, such as presumptions.
- Physical evidence, much of which pertains to the work of the forensic doctor and includes residues found on the victim's body and toxicology analysis to determine the type and effect of toxins.
- DNA fingerprinting, which helps establish and solidify the judge's moral certainty (Sharim, 2021), as criminal justice is inductive and grants the judge substantial authority during the trial and final interrogation stages to establish the crime and determine guilt or innocence.

In traditional crimes, evidence is required to be tangible—for example, the sharp instrument used in an assault, the firearm in a murder case, or the device used in forgery and counterfeiting. Through such tools, the authority responsible for gathering evidence can prove the occurrence of the crime (Al-Harthi, 2023) and attribute it to the perpetrator.

The methods used by forensic doctors to prove crimes are diverse and scientifically grounded. These include fingerprinting, eye scanning, voice recognition, brain mapping, and DNA fingerprinting, as well as the use of infrared, ultraviolet, alpha, gamma, and X-rays. Therefore, this study will address the definitions of both evidence and DNA fingerprinting, the characteristics of DNA fingerprinting, its applications, and its limitations.

1.1 Study Problem

In line with the mixed criminal evidence system, various means of proof aim to achieve criminal justice. Among the most important of these is forensic medicine, whose findings should either confirm or refute the occurrence of a crime. Forensic medicine is especially relevant in cases involving crimes against individuals—particularly those involving loss of life. In Palestine, according to the Palestinian Central Bureau of Statistics (2023), 35 murder cases were recorded in 2019, increasing to 48 in 2020, 45 in 2021, 55 in 2022, and 47 in 2023, whether intentional or unintentional. Given the importance of forensic medicine, this study seeks to answer the following main question: *What is the impact of forensic medicine in proving crimes from the perspective of the Public Prosecution?*

1.2 Importance and Justification of the Study

The significance of this study stems primarily from its focus on a vital topic: *the impact of forensic medicine in proving crimes from the perspective of the Public Prosecution*. It also carries a personal dimension, as the researcher works as an administrative employee at the Institute of Forensic Medicine at Al-Quds University. Additionally, Professor Jihad Al-Kiswani, the co-author and supervisor of this research, is a lawyer, university professor, and legal expert in the field of criminal evidence.

The study holds both theoretical and practical importance:

- **Theoretical importance:** lies in shedding light on the technical and professional advancements in forensic medicine and how this affects the performance of professionals in the field. It also highlights forensic medicine's contribution to strengthening the evidentiary basis of legal proceedings and ensuring justice. Furthermore, it contributes to ongoing discussions among legal scholars regarding the role of forensic medicine in supporting the Public Prosecution's work. Since this is one of the few studies on this topic in the West Bank, to the best of the researchers' knowledge, it will enrich the existing academic literature and serve as a valuable reference for future research.
- **Practical importance:** is evident in emphasizing the role of forensic medicine in clarifying ambiguities surrounding crimes—especially in murder, assault, and sexual violence cases—which are commonly handled by the Public Prosecution.

The study is further justified by the lack of Palestinian studies focusing on this subject. Its findings will be particularly relevant to Public Prosecution officials, criminologists, penal law experts, and professionals working in the field of forensic medicine.

1.3 Study Objectives

The study aims to achieve a primary objective and several secondary objectives.

Main Objective:

- To explore *the impact of forensic medicine in proving crimes from the perspective of the Public Prosecution.*

Secondary Objectives:

- To understand the role of forensic medicine in investigating and uncovering crimes.
- To examine the evidentiary value of forensic medicine reports before the Public Prosecution.

1.4 Study Questions

The study is guided by one main question and two sub-questions:

Main Question:

- What is the impact of forensic medicine in proving crimes from the perspective of the Public Prosecution?

Sub-Questions:

- What is the role of forensic medicine in dealing with crimes and uncovering them?
- What is the evidentiary value of forensic medicine reports before the Public Prosecution?

1.5 Limitations and Scope of the Study:

The study is defined by the following boundaries:

- **Geographical Scope**

The study covers the headquarters and branches of the Public Prosecution across the 13 governorates of the West Bank, as recorded by the Public Prosecution of the State of Palestine (2022). These include: Ramallah and Al-Bireh, Nablus, Jenin, Tulkarm, Qalqilya, Salfit, Hebron, Halhul, Bethlehem, Tubas and the Northern Jordan Valley, Jericho and the Jordan Valley, Dura, and Yatta.

- **Temporal Scope**

The study was conducted from the first semester of the 2022/2023 academic year through the summer semester of the 2023/2024 academic year.

- **Human Scope**

The study included all Public Prosecution members working across its West Bank branches, totaling 152 individuals (Public Prosecution, 2022).

1.6 Constraints of the Study:

- Difficulty in accessing the study sample due to wartime conditions, which led to the adoption of a convenience sample. This purposive sampling method limits the generalizability of the findings to the broader population.
- Restrictions imposed by the Public Prosecution on the number of individuals specialized in handling crimes (forensic medicine) who could participate. This deviation from the originally intended sample was also due to wartime constraints.
- A lack of sources and references related to criminology outside of legal studies, as most available literature focuses primarily on legal perspectives.

2 Theoretical Framework and Previous Studies

2.1 The Role of Forensic Medicine in Uncovering Crimes

The methods of committing crimes have evolved, and criminals have become increasingly skilled at concealing incriminating evidence, sometimes managing to hide their crimes entirely. As a result, the criminal justice system has turned to forensic medicine for assistance in uncovering evidence that helps clarify the facts. Forensic medicine plays a crucial role in determining the nature of a crime by examining bodies and revealing evidence that aids in uncovering the truth.

Given the special importance of forensic medicine, the Palestinian legislator has defined a forensic doctor as "a specialist in forensic medicine who is licensed to practice the profession," according to Article (1) of Law No. (7) of 2011 concerning forensic medicine.

In Palestine, the Public Prosecution resorts to a forensic doctor only in cases involving criminal suspicion. The forensic doctor attends the crime scene and examines the body. Based on the initial report –commonly referred to as the "preliminary examination"-if criminal suspicion is indicated, the body is referred for an autopsy. If no suspicion arises, the body is released for burial.

Below are some of the most significant crimes for which forensic medicine is essential in uncovering the truth:

• **Homicide Crimes:**

In these cases, the forensic doctor intervenes to answer several critical questions:

- **Determining the nature of death:** The forensic doctor distinguishes between natural and criminal causes of death (Abdul Qadir, 2018).
- **Determining the cause of death:** This involves examining visible signs, reviewing medical history, and, if necessary, conducting an autopsy.
- **Determining the time of death:** The forensic doctor relies on observations such as rigor mortis, body temperature, and livor mortis, as well as physical changes that occur over time. These indicators help estimate the time since death as follows:
 - If the body is warm and relaxed: death occurred less than 3 hours ago.
 - If the body is warm and stiff: death occurred between 3 and 8 hours ago.
 - If the body is cold and stiff: death occurred between 8 and 36 hours ago.
 - If the body is cold and relaxed: death occurred more than 36 hours ago.

Additionally, potassium levels in the vitreous humor of the eye are examined, as these levels increase with time after death. A specialist, Dr. Balthazar, may also analyze the stomach contents to determine the degree of digestion, which provides further insight into the time of death. In cases involving advanced decomposition, an entomologist may be consulted. This expert studies the types and developmental stages of insects present on the body to estimate the approximate time of death. Such forensic techniques help narrow down the timeline of the crime and improve the chances of uncovering vital evidence (Belkacem, 2020).

Identifying the Body:

- This is particularly relevant in cases involving unidentified or decomposed bodies. Modern techniques such as DNA fingerprinting are employed, wherein samples may be collected from saliva, mucus, blood, bones, teeth, semen, nails, hair, or skin tissues. These samples are analyzed to determine the individual's genetic profile, which can reveal characteristics such as eye color, skin tone, health status, and even intelligence. Additionally, clothing should be preserved, as it can also assist in identifying the body (Abdul Qadir, 2018).
- **Homicide Using Firearms:**
- Article (155) of the Palestinian Penal Code No. (16) of 1960 defines a weapon as “all firearms and any tool that poses a danger to public safety.” Al-Saidi (2018: 647) defines firearms as “weapons used to shoot and fire bullets into the air. These are hand-held individual weapons that come in various types and forms, including rifles, machine guns, pistols, and RPGs.”
- In homicide cases involving firearms, the forensic doctor examines the victim's body and clothing to determine the angle, direction, and distance of the shot, as well as the approximate time the firearm was discharged. This examination also aids in identifying the type of weapon used. The nature of gunshot wounds varies depending on the type of firearm, the kind of gunpowder, and the distance from which the shot was fired. In close-range shootings, residues from the weapon may cause stretching and tearing of tissues (Abu Labda, 2017).
- The forensic doctor can also distinguish between suicide and assault. In suicide cases, the wound is often characteristic in its direction and nature, influenced by the position of the weapon. In assault cases, additional wounds may be present alongside the primary one, differing in depth, number, and direction (Azam, 2005).
- **Abortion Crime:**

Abortion is defined as “the expulsion of the contents of pregnancy at any time during the pregnancy period and before the completion of the gestational months” (Rabia, 2019: 69). There are three types of abortion:

- **Natural abortion**
- **Therapeutic abortion**
- **Criminal abortion**, which is the focus of forensic medicine. It may occur through various methods, including:
 - **General Violence:** This includes actions such as jumping, running, carrying heavy objects, horseback riding, or cycling. This type of violence usually does not cause abortion but may result in injury to the woman.
 - **Drugs:** Some drugs induce uterine contractions or pelvic congestion, while others—such as arsenic, lead, and mercury—kill the embryo or fetus.

- **Hormones**
- **Prostaglandins:** These cause cervical dilation (Shikush, 2017).

The legislator, in Article (323) of Penal Code No. (16) of 1960 (in effect in the West Bank), prescribes a penalty of imprisonment not exceeding ten years if a woman is aborted without her consent. If the woman dies as a result, the perpetrator shall be sentenced to no less than ten years of imprisonment.

Crime of Assault and Battery:

Assault is defined as “any pressure applied to the body’s tissues that results in tearing, as well as the resulting effects such as bruises or skin redness, leading to illness or disability. The act of battery is considered fulfilled even if the victim does not feel pain, including if they were unconscious or under anesthesia at the time of the assault. Furthermore, it is not necessary for the act to be carried out using a specific tool” (Mousawi, 2014: 12).

A wound is defined as “a rupture in any body tissue, whether external—such as the skin and mucous membranes—or internal, affecting soft tissues, muscles, or bones” (Sharim, 2021: 69).

Wounds are classified into several types based on their nature:

- **Accidental wounds:** Result from unintentional injury, such as mishandling sharp objects or firearms.
- **Criminal wounds:** Determined by the forensic doctor based on their location, as they lack a uniform or typical pattern.
- **Suicidal wounds:** Identified by forensic experts through specific indicators, such as their proximity to the person who inflicted them (Abu Labda, 2017).

Torture Crime:

The Palestinian legislator redefined torture in Decree-Law No. (208/2023), replacing the earlier definition in Penal Code No. (16) of 1960. Torture is now defined as:

“Any act or omission that causes severe physical, mental, or psychological pain or suffering, inflicted intentionally on a person. This may be done to obtain information or confessions, to punish them for an actual or suspected act, or to intimidate or coerce them or others. Torture also includes inflicting pain or suffering on someone based on any form of discrimination. This applies even when a public official or anyone acting in an official capacity instigates, consents to, or remains silent about such acts.”

Torture is addressed in **Article (13)** of the Amended Palestinian Basic Law of 2003, which states: “*Any confession or statement obtained through coercion or torture is invalid.*” This is reinforced by **Article (37)** of the Palestinian Reform and Rehabilitation Law No. (6) of 1998, which stipulates: “*The administration of the center is prohibited from engaging in or practicing any acts of torture or harsh treatment against inmates*” (Al-Rajabi, 2019).

When the forensic doctor is assigned to a case involving injuries, their report must include:

- Identification of the type of wounds and injuries
- Determination of the instrument used, if possible
- Specification of the duration of disability, if any (temporary, partial, or permanent)
- Attachment of photographic evidence of the victim
- Submission of a detailed report within one month of assignment (Baaziz, 2011: 79)

This demonstrates that the Palestinian legislator has addressed torture in multiple laws, underlining the importance of combating it. With the amendment introduced on 12/09/2023, all forms of torture have been criminalized. Moreover, it has been emphasized that torture is not subject to any statute of limitations. The law also stipulates life imprisonment in cases where the victim dies as a result of torture.

Crime of Poisoning:

Poisoning is defined as “an intentional crime that requires, to establish its mental element, the perpetrator’s knowledge of the lethal nature of the substance used or administered to the victim” (Boukabiche, 2016: 280).

For the crime of poisoning to be established, it must be proven that the victim was given a toxic substance that led to death or caused severe harm. Forensic medicine plays a key role in confirming poisoning through the following methods:

- **Visible signs:** Symptoms may mimic common illnesses, such as abdominal pain, vomiting, and diarrhea, in addition to specific odors emitted by the victim.
- **Examination of vomit’s color and odor,** which helps identify the poison. Common indicators include:
 - **Gastrointestinal poisoning:** Yellow vomit suggests nitric acid poisoning; blue indicates iodine poisoning. A garlic-like smell points to organophosphate poisoning, while a bitter almond odor suggests cyanide poisoning.
 - **Liver (hepatic) poisoning:** Often caused by phosphorus-based medications or contraceptives.
 - **Kidney (renal) poisoning:** Characterized by reduced urine output, blood in the urine, or complete urinary retention.

- **Central nervous system poisoning:** May lead to coma due to sedatives, morphine, or tranquilizers.

These signs help determine the type and timing of the poisoning (Ouhab, 2017). The Palestinian legislator punishes the perpetrator with hard labor for no less than five years, according to Article 330 of Penal Code No. (16) of 1960.

Crime of Rape:

Rape is defined as “the act of a male engaging in sexual intercourse with a living female who is not his wife, without her consent” (Al-Ali, 2024). “Without her consent” means the woman actively resisted, provided she was physically and mentally capable of doing so. Rape is also considered to have occurred in the following situations:

1. If the victim is under 18 years old
2. If the victim suffers from a mental disorder
3. If the victim is subjected to physical or psychological threats
4. If the victim is deceived using unknown substances (Shikush, 2017)

Under Article 292 of Penal Code No. (16) of 1960, the penalties are as follows:

1. “Anyone who has sexual intercourse with a female (not his wife) by force shall be sentenced to temporary hard labor for at least five years.”
2. The sentence shall not be less than seven years if the victim is under 15.

The punishment is increased under **Article 295**, which states:

“Anyone who has sexual intercourse with a female over 15 but under 18, and is her legitimate or illegitimate ascendant, close relative within the prohibited degrees, or someone responsible for her care or custody, shall be sentenced to 20 years of hard labor.”

“If the victim is over 12 but under 15 years of age, the penalty shall be life imprisonment with hard labor.”

To confirm the crime of rape, a forensic doctor must be consulted. Through external examination, the forensic expert verifies whether the act occurred by force or consent. Evidence of violence or resistance is identified on the victim’s or the accused’s body.

Forensic medical examination includes:

- Detecting signs of violence on the victim and the perpetrator (scratches, bruises, lacerations)
- Examining the hymen to determine the nature of the tear and its type (crescent-shaped, annular, serrated or lobed, fimbriated, septate, or cribriform)
- Searching for semen, blood stains, or signs of violence
- Conducting laboratory tests to detect sexually transmitted diseases (Baaziz, 2011).

2.2 The Role of Forensic Medicine in Establishing Criminal Guilt

Regarding the definition of “proof” as a legal term, it “refers to presenting legal evidence before the judiciary concerning a disputed right. This differs from general proof, which is not limited by law to specific methods and can be established through various means and general freedoms, such as scientific evidence. Legal proof must focus on the validity of a legal fact, as it does not pertain to the disputed right itself, but rather to the legal fact that serves as the source of that right” (Amarna, 2015, 8).

As for the theoretical definition of proof, it refers to establishing evidence for a specific matter. In procedural terms, it involves presenting evidence to confirm the occurrence of a crime—including its elements, conditions, and various circumstances—on one hand, and proving that the accused—whether a defendant, suspect, or respondent—committed the crime, on the other (Hassan, 2012, 6).

From the above, it can be concluded that proof is the scientific method and set of evidentiary tools used to ascertain the truth, ensuring that outcomes support justice and legitimate claims.

Regarding the theoretical definition of DNA fingerprinting, Al-Ashi (2018, 18) defines it as “the inherited material found in the cells of all living organisms, which indicates the degree of similarity and resemblance between two entities—or the differences between them—based on the components of the human genome. In other words, it is the code that determines the degree of relatedness between similar entities and confirms the existence of differences or variations between distinct ones by identifying the human genetic composition.”

Similarly, Al-Yahya (2023: 14) defines a DNA fingerprint as “the genetic imprint, referring to the genes or hereditary traits that indicate the identity of each individual. Research has shown that, from a scientific perspective, it is highly accurate, thereby facilitating the work of forensic medicine, and it can be obtained from any human cell.”

From the above, it can be concluded that a DNA fingerprint is the code through which the origin of individuals can be determined. Every person on Earth possesses a unique DNA fingerprint that distinguishes them from others, with matches occurring only in rare cases, such as identical twins. This is of particular importance to the criminal justice system in proving or disproving the commission of crimes.

2.3 Characteristics of DNA Fingerprinting and the Use of the CODIS System

DNA fingerprinting possesses unique characteristics that distinguish it from other types of forensic evidence in criminal cases. Among the most important of these characteristics are the following:

- A DNA fingerprint differs from one person to another and is identical only in the case of identical twins. This makes it a powerful tool for confirming or refuting criminal accusations and establishing paternity (Abd al-Mohammadi, 2020).
- The results of DNA fingerprint analysis reach an accuracy of 99.9% when conducted correctly.
- Errors in results are rare and typically occur in cases of sample contamination or mix-up.
- DNA fingerprinting carries an individual's traits and hereditary diseases from conception until the end of life (Ahmed, 2023).
- The sources of DNA fingerprinting are varied, making it easy to collect from a crime scene. These sources include blood, saliva, cigarette butts, and hair.
- DNA is highly resilient, preserving itself against decomposition and degradation despite environmental and climatic changes.
- DNA has the ability to transmit genetic traits from one generation to the next.

Regarding the Use of the CODIS System:

The CODIS (Combined DNA Index System) is a database used by the United States that contains genetic data related to criminals, suspects, and missing persons across all states. This system connects forensic laboratories and allows authorities to reference genetic data during criminal investigations. By comparing DNA evidence found at a crime scene with profiles stored in CODIS, criminals can be identified more quickly and efficiently (Tayeh, 2014).

Fields of Use for DNA Fingerprinting:

Criminal investigations have traditionally relied on conventional methods, such as physical evidence, to uncover the truth. These methods can lead to the identification of the true perpetrator. However, the lack of sufficient evidence may result in the wrongful accusation of innocent individuals. DNA fingerprinting plays a vital role in proving criminal responsibility, confirming the perpetrator's identity, and ensuring justice. For example, in murder cases where traditional evidence (e.g., fingerprints) is lacking, investigators may find other clues such as skin particles under the victim's fingernails or hair traces (Abdul Qadir, 2018).

Despite the advancement of modern criminal techniques and attempts by offenders to evade justice, the development of DNA technology has significantly contributed to preserving justice. According to Ghanem (2015) and Al-Shubaili (2003), the most important fields of DNA fingerprint application include:

- Blood-related crimes of all types, such as murder, various suicide cases, and vehicle-related deaths.
- Crimes against honor, including adultery, rape, sodomy, and sexual assault.
- Establishing or denying paternity and identifying kidnapped individuals.

Sample Collection for DNA Analysis:

Trace evidence samples can be collected from the crime scene, the victim's body, and sometimes the perpetrator, if present. Additional sources include:

- Tables, surfaces, floors, and walls.
- Bed covers, sheets, and pillows (to search for hair, semen, and saliva).
- Fingernail clippings (for traces of skin and nails).
- The interior and exterior of condoms (to extract semen and skin residue).
- Underwear and outer clothing (for traces of semen, sweat, and hair).
- Tissues (for skin cells).
- Toothbrushes, cigarette butts, and drinking glasses (for saliva).
- Bite marks on the victim's body (to detect saliva).
- The victim's teeth and beneath their fingernails (Al-Hamadi, 2006).

Conditions for Using DNA Fingerprinting as Evidence:

DNA fingerprinting technology was introduced in the early 1980s. To ensure its admissibility in court, specific conditions must be met. These include:

- Conducting analyses in government laboratories under state supervision to ensure neutrality and prevent sample tampering or degradation (Hassan, 2012).
- Maintaining complete confidentiality of genetic testing information regarding:
 - The identity of individuals who have undergone DNA analysis.
 - The involvement of neutral experts.
 - Laboratory security and the use of multiple labs to enhance credibility.
 - Scientific impartiality in reporting results (El-Shanawy, 2010).
- Repeating the DNA fingerprint test: If doubts arise regarding the initial results, a new sample may be collected based on judicial or prosecutorial decisions (Al-Hawamdeh, 2022).
- Ensuring the sample is collected lawfully to guarantee its admissibility in court (Husseion, 2017).
- Using multiple analysis techniques and a sufficient number of amino acid markers to ensure accuracy and minimize errors.
- Documenting all examination steps so they can be referred to if needed (Qasim, 2004).
- Ensuring laboratories are equipped with the latest global technology and tools to guarantee result accuracy (Hassan, 2012).

2.4 Legal Context in Palestine

Based on the above, it is evident that the Palestinian legislator, in Article (219) of the Palestinian Criminal Procedures Law No. (3) of 2001, did not explicitly mention DNA fingerprinting as a form of proof. However, the law does allow for the use of traditional fingerprints from fingers, hands, and feet. Despite this, DNA fingerprinting reports may still be considered by criminal courts.

Accordingly, DNA fingerprinting plays a major role in proving various criminal offenses, including murder, adultery, rape, sexual assault, paternity disputes, theft, and the identification of disaster victims, based on biological traces left at the scene. The process of collecting samples is straightforward and requires only small quantities. Moreover, samples can be extracted from nearly all human cells – such as blood, urine, saliva, semen, hair, bone, and skin – excluding red blood cells, which do not contain nuclear DNA. This facilitates the extraction process. Through this method, individuals can be identified, as each person has a unique DNA fingerprint, with the only exception being identical twins.

It is worth noting that while European and American legal systems have established comprehensive standards for DNA fingerprinting, Arab legal systems, including the Palestinian legislator, have not yet adopted such standards. This may be due to political and economic challenges, as well as the ongoing impact of occupation. For instance, until recently, there were no government-run DNA testing laboratories in Palestine. Tests were sent to Jordan, which increased the potential for error. More recently, DNA analysis has begun to be conducted at the Istishari Hospital in Ramallah.

Disadvantages of DNA Fingerprinting:

Despite its many advantages, DNA fingerprinting is not entirely error-free, as the process is carried out by humans. Several factors can contribute to inaccuracies, including:

- Sample contamination.
- Human error during analysis.
- Lack of advanced equipment.
- Limited access to high-tech laboratories.
- Difficulty in distinguishing between identical twins in cases involving close relatives (Tayeh, 2014).

2.5 Previous and Related Studies

Arab and Foreign Studies:

- A study by **Bougalem (2022)**, titled *“The Role of Forensic Medicine in Proving Murder Crimes: Algeria”*, aimed to explore the role of forensic medicine in establishing murder crimes and determining their causes. To achieve this goal, an analytical approach was employed. The study reached several key findings, the most significant of which was that the forensic medical report is crucial in uncovering the circumstances of murder, such as determining the time and cause of death. Additionally, it highlighted that forensic reports often contain complex medical terminology, making it difficult for judges to interpret or translate into legal evidence due to the limited legal training of forensic doctors. As a result, the study emphasized the need to enhance the legal training of forensic professionals.
- Another study by **Bounanaa (2022)**, titled *“Forensic Medicine and Its Role in Criminal Evidence: Morocco”*, aimed to examine Law No. 77.17 and its role in strengthening criminal justice in the modern era. To achieve these

objectives, descriptive, historical, and inductive methods were used. The study reached several conclusions, the most significant being that forensic medicine integrates judicial and medical expertise across various fields. It also found that the new law clearly defines the duties, rights, and responsibilities of forensic doctors. The study recommended incorporating forensic medicine into university and institutional curricula, updating laws in line with scientific advancements, and establishing a joint committee comprising forensic doctors and judicial authorities.

- A study by **Al-Zahrani (2020)**, titled *"The Impact of Forensic Medicine on Criminal Evidence: Taif"*, aimed to strengthen the role of forensic medicine within the judicial system. The study's population included judges and public prosecutors. To achieve its objectives, it employed the inductive-analytical and comparative methods. A questionnaire was used as the primary tool for data collection. The study concluded that forensic medicine is an essential component of criminal justice and that expert testimony constitutes both a form of examination and a method of proof. Based on these findings, the study recommended teaching forensic medicine in Sharia and law faculties, avoiding absolute reliance on medical reports, and reinforcing traditional investigative methods.
- A study by **Dalal (2020)**, titled *"Forensic Medicine and Its Role in Proving Crimes of Violence in Algerian Legislation"*, examined the role of forensic medicine in proving violent crimes and assessing the legal value of forensic reports. The study employed an analytical method, analyzing the legal texts regulating the work of forensic doctors in Algerian legislation and linking them to provisions related to evidence and violent crimes. The study concluded that forensic medicine plays a critical role in establishing the material elements of a crime and attributing criminal acts to the accused. Based on these findings, it recommended training judges and police officers on interpreting forensic reports, granting greater legal value to forensic expertise, and ensuring rigorous oversight of issued reports.
- A study by **Bouqassa (2018)**, titled *"Forensic Medicine and Its Evidentiary Value in Criminal Proof"*, aimed to highlight the contribution of forensic medicine to criminal evidence. The descriptive and analytical approaches were used. The study concluded that forensic medicine is a strong means of proof but can restrict the judge's discretion in forming a personal conviction. It recommended raising awareness about the importance of forensic medicine and developing specialized curricula in this field.
- A study by **Kazem (2016)**, titled *"The Evidentiary Value of the Forensic Medical Report in Criminal Proof: Iraq"*, aimed to evaluate the legal significance of forensic reports and the court's authority in using them. To achieve this, the comparative analytical method was applied. The study concluded that judges are obligated to rely on forensic expertise, particularly in medical cases. It recommended strengthening criminal penalties and transforming university forensic medicine departments into specialized forensic medicine institutes.
- The study by **Peterson et al. (2010)**, titled *"The Role and Impact of Forensic Evidence in the Criminal Justice Process: United States of America"*, aimed to examine the influence of forensic evidence on the justice process. A descriptive analysis was conducted using a random sample of reported crimes from 2003. The sample was categorized by crime type and judicial jurisdiction across five districts: Evansville, Indiana, Fort Wayne, and South Bend. The study tracked 4,205 cases from initial police reports to final court decisions, including 859 aggravated assault cases, 1,263 robberies, 400 homicides, 602 rapes, and 1,081 burglaries. Key findings included the observation that most assaults occurred indoors and involved young minority males who were previously acquainted. Additionally, 40% of male offenders were involved in domestic violence. Evidence was collected in 30% of cases involving firearms (e.g., bullets and shell casings). Crime labs reported identifying evidence in 34 cases, most involving firearms, while four cases included complete fingerprints. Overall, 20.5% of the reported cases resulted in convictions. The study recommended expanding the sample to include additional states and further investigating which types of evidence contribute most to successful convictions.

Commentary on Previous and Related Studies:

A review of previous and related studies examining the impact of forensic science on evidentiary value from the perspective of the public prosecution reveals both similarities and differences with the current study.

The current study aligns with **Bougalem (2022)** in terms of objectives, as both address the role of forensic medicine in criminal investigation and detection. It also corresponds with **Al-Zahrani (2020)**, **Bouqassa (2018)**, and **Kazem (2016)** regarding the aim of evaluating the evidentiary value of forensic reports before the judiciary and public prosecution. Similarly, the methodologies used in the current study are consistent with those of **Bougalem (2022)**, **Bounanaa (2022)**, **Bouqassa (2018)**, and **Peterson et al. (2010)**, all of which applied descriptive

methods. Furthermore, the data collection approach of the current study aligns with **Al-Zahrani (2020)** in the use of questionnaires.

Aspects That Distinguish the Current Study:

- One of the main distinguishing features of the current study is its unique subject matter, titled *"The Impact of Forensic Science on the Evidentiary Value from the Perspective of the Public Prosecution."* It specifically examines the influence of forensic science on evidentiary value through the lens of public prosecutors — an angle not addressed in previous research.
- The study is also set apart by its target population, focusing on a real and specific group: all 152 members of the Public Prosecution in the West Bank, according to 2022 statistics from the Public Prosecution.
- Furthermore, this study represents one of the few contributions to the field of criminology within the West Bank.

3 Discussion of Results

3.1 The results related to the main question: *What is the impact of forensic work on proving crimes from the perspective of the public prosecution?*

To answer this question, the arithmetic means and standard deviations of the responses from the study sample were calculated, as shown in (Table 1).

Table 1: Arithmetic Means and Standard Deviations of Study Sample Responses on the Impact of Forensic Medicine in Crime Evidence from the Perspective of the Public Prosecution

No.	Field	Arithmetic Mean	Standard Deviation	Degree	Percentage
1	The Role of Forensic Medicine in Handling and Uncovering Crimes	4.0435	0.44787	High	80.9%
2	The Evidentiary Value of Forensic Reports Before the Public Prosecution	3.8354	0.57691	High	76.7%
Overall Score		3.9709	0.39204	High	79.4%

It is observed from the previous table, which presents the arithmetic means and standard deviations of the study sample's responses regarding the impact of forensic medicine on crime evidence from the perspective of the Public Prosecution, that the overall arithmetic mean is 3.97, with a standard deviation of 0.392. This indicates that the perceived impact of forensic medicine in proving crimes from the perspective of the Public Prosecution is high, corresponding to a percentage of 79.4%.

The field titled *"The Role of Forensic Medicine in Handling and Uncovering Crimes"* recorded the highest arithmetic mean at 4.04, followed by *"The Evidentiary Value of Forensic Reports before the Public Prosecution"*, which had an arithmetic mean of 3.83.

Furthermore, the arithmetic means and standard deviations for the study sample's responses to the survey items related to the role of forensic medicine in handling and uncovering crimes were calculated and are presented in (Table 2).

Table 2: Arithmetic Means and Standard Deviations for the Study Sample Responses on the Role of Forensic Medicine in Handling and Uncovering Crimes

No.	Items	Arithmetic Mean	Standard Deviation	Degree	Percentage (%)
2	Plays a fundamental and effective role in determining the tool used in the crime	4.42	0.531	High	88.4
3	Plays a fundamental and effective role in determining the time of death	4.42	0.626	High	88.4
1	Plays a fundamental and effective role in determining the cause of death	4.35	0.582	High	87.0
13	Writing medical reports in cases of abuse	4.31	0.538	High	86.2
14	Conducting forensic sexual examinations	4.25	0.582	High	85.0
15	Determining the degree of disability resulting from domestic violence (assessing the presence of permanent disability)	4.20	0.727	High	84.0
10	Providing testimony in court regarding criminal cases	4.18	0.768	High	83.6
12	Collaborating with the Ministry of Health in medical malpractice committees	4.15	0.752	High	83.0
4	Plays a fundamental and effective role in identifying the victim	4.11	0.805	High	82.2
11	Conducting DNA fingerprinting tests	4.09	0.904	High	81.8
7	Issuing death notifications for autopsied bodies	3.93	0.993	High	78.6
8	Maintaining death records	3.84	0.991	High	76.8
5	Issuing burial permits	3.78	1.008	High	75.6
9	Issuing final decisions (requesting case closure)	3.49	1.064	Medium	69.8
6	Issuing orders related to opening graves to exhume bodies for autopsy	3.15	1.140	Medium	63.0
Overall Score		4.043	0.4478	High	80.9

After conducting the statistical analysis of the respondents' answers to the questionnaire items presented in Table 2, it was found that forensic medicine plays a significant role in handling and uncovering crimes. The results showed that the role of forensic medicine in dealing with and uncovering crimes achieved an arithmetic mean of 4.04, corresponding to a percentage of 80.9%. This indicates the substantial contribution of forensic medicine in managing and investigating crimes.

The results also revealed that item (2)—"It plays a fundamental and effective role in identifying the tool used in the crime"—received the highest arithmetic mean of 4.42, with a percentage of 88.4%. Physical tools that influence the judge's conviction are considered types of forensic evidence associated with the crime and are utilized by the prosecution as documents or proof. These tools include:

- Weapons or instruments used in committing crime.
- Video footage or photographs.
- Fingerprints and DNA evidence, if found at the crime scene.
- Footprints.
- The presence of drugs at the crime scene.

On the other hand, item (6)—"Issuing orders related to opening graves to exhume bodies for autopsy"—received a moderate rating, with an arithmetic mean of 3.15 and a percentage of 63.0%. This is due to the fact that forensic medicine does not have the authority to issue such orders; rather, this authority lies with the public prosecution and judiciary. When such decisions are made, a forensic doctor is assigned to conduct the examination and perform the autopsy.

These findings demonstrate the critical role of forensic medicine in handling and uncovering crimes. This is supported by Dalal's (2020) study, "Forensic Medicine and Its Role in Proving Crimes of Violence in Algerian Legislation," which found that forensic medicine is one of the most vital modern medical sciences used in criminal investigations. It plays a particularly important role in violent crimes, where physical traces can be

analyzed to extract vital evidence. The forensic medical report also assists the judge in confirming the presence of the material element of the crime and in linking the acts to the accused.

These results are also consistent with Kazem's (2016) study, "*The Evidentiary Value of Forensic Medicine in Criminal Proof*," which concluded that trial judges are obliged to refer to technical expertise in certain cases – for example, when the accused's age must be verified, either through official documents or a forensic medical evaluation. The court does not have the authority to independently estimate age, and its discretionary power is therefore limited. In such cases, the court must postpone issuing a judgment until the forensic report is received. Furthermore, scientific or technical opinions must be provided by a specialist with expertise in the relevant field—in this case, a forensic doctor.

Table 3: Arithmetic Means and Standard Deviations for the Study Sample Responses Regarding the Evidentiary Value of Forensic Medical Reports Before the Public Prosecution

No.	Items	Arithmetic Mean	Standard Deviation	Degree	Percentage (%)
3	The judge may not replace the forensic expert.	4.18	0.815	High	83.6
8	The role of the medical expert is prominent in assisting the judiciary in determining cases of intentional abortion.	3.98	0.867	High	79.6
6	The judge needs to seek forensic medical expertise to examine (wounds, blows).	3.96	0.877	High	79.2
7	Forensic medical expertise plays a role in determining whether the accused suffers from a (psychological or mental) illness.	3.89	1.095	High	77.8
1	The court's discretionary authority determines whether to accept or reject the forensic medical report.	3.80	0.927	High	76.0
2	The criminal judge considers forensic medicine as an assisting factor in adjudicating criminal cases.	3.76	0.918	High	75.2
4	The assessment of the value of forensic medical evidence is subject to the judge's absolute personal conviction.	3.69	1.194	High	73.8
5	The court relies on forensic medical expertise to determine the intent to kill by the perpetrator.	3.40	1.175	Medium	68.0
Overall Score		3.835	0.576	High	76.7

After conducting the statistical analysis of the respondents' answers to the questionnaire items, as presented in Table 3, the importance of the evidentiary value of forensic reports before the public prosecution was revealed. The results showed that the evidentiary value of forensic medical reports before the public prosecution received an arithmetic mean of 3.83, corresponding to a percentage of 76.7%. Item 3, which states, "*The judge may not replace the forensic expert*," received the highest arithmetic mean score of 4.18, corresponding to a percentage of 83.6%. This is because the judge lacks expertise in technical medical matters and, therefore, requires a forensic expert to handle such issues. In order to uphold justice and establish the truth, the judge resorts to the expert, who is the forensic doctor. If the judge is confident in the forensic doctor's opinion, they adopt it. The criminal judge treats the forensic doctor as an assisting factor in making decisions on criminal cases. For instance, during forensic examinations, the forensic doctor can confirm or deny whether the accused has a psychological or mental illness. Additionally, the doctor can assist in distinguishing between different types of wounds and injuries, helping the judge determine whether the case is a misdemeanor or a felony. The forensic doctor also plays a crucial role in determining cases of abortion.

The results also showed that Item 5, which states, "The court relies on forensic medical expertise to determine the intent to kill by the perpetrator," received the lowest arithmetic mean score of 3.40, corresponding to a percentage of 68.0%. This is because determining the intent to kill is not within the forensic doctor's responsibilities. The forensic doctor's role is to perform autopsies on the human body, whereas the issue of intent is an internal matter that the public prosecution and judiciary derive from evidence and investigations.

Therefore, we conclude that all of the above demonstrates the evidentiary value of forensic reports before the public prosecution, which was confirmed by the study of Al-Zahrani (2020), titled "The Impact of Forensic Medicine in Criminal Evidence." The results of this study showed that the forensic doctor is not merely a medical professional but an essential pillar of justice. Expert testimony is a form of examination and a method of evidence entrusted to a specialized expert appointed by the court, given the impossibility of the judge being knowledgeable in all sciences and fields. The study by Bouqassa (2018), titled "Forensic Medicine and Its Evidentiary Value in Criminal Evidence," emphasized the importance of medical reports and the necessity of not abandoning traditional methods of investigation. This is because identifying the perpetrator is the responsibility of investigative judges and judges in general.

3.2 Summary of Results

Based on the previous presentation and discussion of the results, the study's findings are as follows:

- Forensic medicine plays a fundamental and effective role in determining both the tool used and the time of death when dealing with and uncovering crimes. These aspects received a high score, with a percentage of 88.4%.
- The issuance of orders related to exhuming bodies for autopsy is one of the least common roles forensic medicine plays in crime investigation. These orders are issued by the public prosecution or the judiciary, with a percentage of 63.0%.
- In terms of the evidentiary value of forensic reports before the public prosecution, the judge may not place themselves in the position of the forensic expert. This point was rated highly, with a percentage of 83.6%.
- The court relies on forensic medical expertise to determine the intent to kill of the perpetrator, and it is considered one of the least influential aspects in the evidentiary value of forensic reports before the public prosecution, with a percentage of 94.2%.

3.3 Study Recommendations

In light of the summary of results, several recommendations emerge regarding the impact of forensic medicine on evidentiary value from the perspective of the public prosecution. Some of the most important recommendations include the following:

- Advocating for the establishment of a law that regulates the work of forensic medicine and preserves its independence.
- Advocating for the creation of the Supreme Council for Forensic Medicine and Criminal Laboratories, to be overseen by all authorities responsible for criminal justice, in order to preserve the independence of forensic medicine's work and decisions.
- Recommending that the legislator reconsider the Penal Code and enact precise laws that serve as a deterrent to criminals and maintain societal order.
- Focusing on integrating forensic medicine into multiple courses for law students.
- Establishing the Supreme Institute for Forensic Medicine and Criminal Laboratories, which would be an academic and specialized institution that provides the community with specialists and technicians in the field.
- Providing the necessary protection for forensic medicine professionals to ensure they can conduct autopsies without fear.
- Emphasizing the need to conduct more in-depth and detailed studies on various aspects of forensic medicine by researchers and scholars in the same field, considering the increasing diversity and emergence of new types of crimes in the current Palestinian context, as well as the accompanying circumstances of the rapid spread and variety of criminal activities.

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