



## Emerging Developments in DNA Technology and Their Potential Implications for the Criminal Justice System of Pakistan

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### ABSTRACT

DNA-based evidence has collected substantial trust in the Criminal Court system. DNA evidence possesses the utmost probative value among all reasonable and accurate claims in the realm of personal identity. An example of a standard step in a DNA investigation is comparing evidentiary samples, such as semen in the case of rape, with a known or reference sample, such as blood from the suspect. Utilizing forensic tools such as DNA profiling could significantly enhance the fairness of the justice system by ensuring equitable treatment for all individuals in court. Both scientific and legal communities have reached a consensus on the truth of this matter, as evidenced by their extensive literature that delves into its theoretical and practical dimensions. Frequently, courts have concurred with the DNA evidence. In recent years, Scientific and Expert Testimony has gained increased utility in complex and specialized domains. Undoubtedly, the assistance of a professional is vital when it comes to resolving a criminal case.



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## 1. Introduction

The Evidentiary value of DNA has assisted the Courts and Law enforcement agencies in including people in the list of suspects or excluding a large population from the purview of the investigation. The application of the Forensic tool of DNA as evidence in Legal proceedings may not be conclusive; rather, it is always supported by additional evidence. The type of support used will depend on the specifics of the alleged Crime, and the Courts will exercise their Judicial discretion to determine the scope and nature of the additional Evidence needed to support the acceptability of the DNA Technology as Evidence (Peterson, Sommers, Baskin, & Johnson, 2010). The perusal of a large number of Judgments reveals that, in the exercise of their discretion, Pakistani Courts have either accepted DNA as Evidence or have rejected it because it is more likely to be detrimental than persuasive or that it was obtained under circumstances that make it unfair to be used against the Accused. The Forensics involved in DNA makes it a matter of complexity to Non-Scientists, viz, The Judges and Advocates in analyzing the science behind it and determining its relevancy (Zia, Akhtar, & Hassan, 2021).

## 2. The Legislative Structure of Pakistan Relating DNA Evidence

Genetic profiling is less prevalent in Pakistan compared to the United States and the United Kingdom Yee (1991) due to variations in regulatory frameworks. The Investigating agency bears direct responsibility for the collection of evidence within our accusatorial

system. This implies that to construct a robust argument, the agency is compelled to engage in the fabrication and augmentation of evidence, while also employing a diverse array of misconduct. Due to the immense strain, they face, the specialists are compelled to employ a more stringent approach to collecting evidence (Munir, Abbas, & Arshed, 2021).

In cases where alternative forms of evidence prove insufficient to establish culpability or innocence, DNA testing emerges as the sole means of definitively identifying the true perpetrators. The utilization of DNA technology has facilitated and enhanced the precision of criminal investigations. DNA evidence obtained from the Crime Scene can aid in the identification and apprehension of the perpetrator. DNA testing is widely regarded as particularly valuable in determining the perpetrator of certain criminal acts, such as rape, murder, kidnapping, robbery, and burglary, particularly in cases when the body exhibits evident damage (Murphy, 2018).

Referring to Sections 376, 377-A, of the Pakistan Penal Code, 1860, the Pakistani Parliament enacted Section 164-B in the Criminal Procedure Code to authorize DNA testing in cases of sexual assault. The enactment of the Criminal Law (Amendment) Act, 2016, facilitated the implementation of DNA testing for both the victim and the defendant (Rasool & Rasool, 2020). The Zainab Alert, Response, and Recovery Act was passed by the Pakistani parliament in 2020 to protect the aim of protecting children and adolescents. As per this legislation, the hearing must conclude within a period of three months to expedite the administration of justice. Due to the high prevalence of criminal activity in Pakistan, this legislation ensures that individuals who commit sexual assault on children are subject to capital punishment.

Section 164-B explicitly mandates that a Doctor or Licensed Medical Practitioner must meticulously document the Physical examination of the victim, including any injuries or indications of abuse, along with a probable period for the occurrence of such symptoms or injuries. The documentation of the Clinical Examination, conducted by an authorized doctor or qualified professional. As a result of the latest revision to the pertinent provision, it is now mandatory for the State to conduct a medical examination on the suspect promptly, whenever it is feasible to do so (Manral, Panjattan, Saini, Roy, & Singh, 2023) .

The inclusion of DNA testing for both victims and accused individuals was established in legislation by the enactment in October 2016 of the Crimes Against Sexual Offences in Criminal Law (Amendment) Act. The Zainab Alert, Response, and Recovery Act was enacted by Pakistan's parliament in 2020 to safeguard minors and children. According to this legislation, to expedite the administration of justice, trials must be concluded within a period of three months. Due to the prevailing crime situation in Pakistan, this legislation must guarantee the imposition of capital punishment for individuals who engage in sexual offenses against minors (Khaliq & Sultan, 2022).

For DNA technology evidence to be deemed admissible by the court, it must be collected, preserved, and recorded properly. The prosecution can only demonstrate to the judge that the physical sample possessed a distinct chain of custody, spanning from its collection to its subsequent analysis, at that point. Consequently, a specific regulation is necessary. This regulation should not alone provide the investigative agency with a comprehensive understanding of how to manage DNA tests, but it should also assist the judges in determining the permissible utilization of DNA evidence throughout the trial. It is crucial to strike a harmonious equilibrium between the rights of the accused and the rights of the general public. Only comprehensive and innovative DNA legislation can do this. Several nations that already engage in extensive DNA testing have enacted legislation specifically targeting these concerns (Roth, 2020).

### **3. DNA Evidence in Criminal & Paternity Cases in Pakistan**

DNA tests can be employed to determine the paternity of a child born and victim of rape. Furthermore, the Federal Shariat Court asserted in State (2010) Case that the Quran and Sunnah do not explicitly prohibit the utilization of DNA tests. Instead, they strongly

advocate for the utilization of these scientific methodologies. The prosecution should utilize DNA tests as these are the most reliable evidence of rape.

While it has been argued in case of State (2009) that prudence should be exercised when placing reliance on the outcomes of a DNA test in situations where one lacks confidence in the laboratory's proficiency, competence, or integrity, as well as in the integrity of the test administrator, it is important to note that this does not imply that DNA tests should be deemed unnecessary in cases involving rape. The judge explicitly said that the defendant was precluded from invoking DNA test findings that established his innocence, despite the presence of contradictory evidence.

In addition, he asserted that mandating DNA tests in rape cases would not contravene Article 13 of the Constitution, which guarantees individuals the freedom to refrain from self-incrimination.

It is observed in case of State (2005) that a crucial evidentiary tool for a husband to employ is a DNA test to substantiate Zina's allegation against his spouse. Subsequently, he can employ this method to support the act of taking the oath, as mandated by Surah Al-Noor, thereby concluding the marriage. In addition to verifying the authenticity of a kid, the DNA test can also assist in establishing other forms of evidence. While it may serve as evidence in certain instances, it is not applicable in the context of Zina, which is subject to punishment under the Hadood Laws, which have their criteria for establishing proof.

The Supreme Court, in the case of Hussain (2021), affirmed that DNA evidence as the most reliable method for determining the identity of a defendant. Due to its high level of accuracy and definiteness, DNA testing is widely regarded as a very reliable kind of corroborative evidence, particularly in situations involving the use of modern methods and technology in the prosecution of rape. In Zareef (2021) case, the Supreme Court affirmed DNA testing as a highly reliable and definitive method for identification purposes, deeming it a gold standard and a robust kind of corroborative evidence. The Supreme Court of Pakistan, in the case of Raja (2013), expressed support for the utilization of DNA testing due to its scientific and reliable characteristics, as well as its established international usage. This approach is deemed suitable for making precise determinations in convicting the true perpetrators and absolving the innocent. To ensure admissibility in a court of law, evidence must be appropriately documented, packaged, and kept by legal and systematic norms.

DNA technology has made significant advancements, leading to a transformative impact on the area of forensic science through the development of DNA profiles. The courts may now confidently ascertain the identity of the culprits due to the utilization of DNA tests. Through the utilization of DNA technology, the courts enhance their capacity to identify the actual perpetrators, eliminate alternative potential attackers, and exonerate individuals who have been unjustly implicated.

#### **4. Suitability of DNA Research Facilities in Pakistan**

Forensic science plays a crucial role in criminal justice systems worldwide. Forensic science has been neglected in Pakistan for an extended period. The persistent acts of terrorism catalyzed the authorities to take action and put in relentless efforts to build and ensure the effective operation of the forensic laboratory, to aid criminal investigations. Since 2001, authorities have been improving the forensic science infrastructure nationwide to assist in criminal investigations. The National Forensic Science Agency (NFSA) was established as an autonomous body in 2002 by the Executive Committee of the National Economic Council (ECNEC). It comprises departments specializing in crime scene investigation, trace chemistry, questioned documents, and digital forensics. The primary aim was to facilitate the establishment of additional forensic science laboratories nationwide and to offer educational and training resources throughout Pakistan. However, this purpose has yet to be accomplished.

PFSA, Punjab Forensic Science Agency situated in Lahore, is a very sophisticated forensic Establishment in Pakistan.

Utilizing cutting-edge technology for DNA analysis, the facility is equipped with Polymerase Chain Reaction (PCR) machines, genetic analyzers, and other essential equipment. The organization provides an extensive array of forensic services encompassing crime scene investigation, DNA analysis, toxicology, and document examination. Medical officers are required to comply with the recommendations provided by the Punjab Forensic Science Agency (PFSA) regarding the collection, storage, and transportation of samples.

- a) A comprehensive and precise account of the incident is obtained from the victim of sexual assault, encompassing various aspects such as the nature of the assault, the duration of the assault, and the subsequent activities undertaken by the victim.
- b) If a medico-legal examination is conducted within 5-7 days following the occurrence of the sexual assault, cervical specimens are gathered and then submitted.
- c) The clothing worn by the victim during the incident, potentially containing stains indicative of

semen or sperm is submitted for DNA analysis.

- d) The PFSA collects and submits sexual murder and assault, typical examples should be referenced. All the specimens containing DNA have to be delivered to the forensic laboratory as soon as possible.

The High Court in case of *Shamas (2020)* issued a directive stating that the Health Department must ensure that there are enough self-administered emergency contraceptives (SAECKs) available throughout all of Punjab's hospitals, particularly those in the district and tehsil offices. Officers of the medical profession are required to consistently utilize these kits to gather forensic evidence in all instances of sexual assault.

Punjab's Primary and Secondary Health Department the Secretary must ensure strict adherence to the aforementioned processes. Medical professionals who exhibit negligence or non-compliance with it shall be subject to appropriate legal action. Due to financial limitations, developing nations such as Pakistan encounter significant challenges in maintaining a comprehensive and precise DNA database on a large scale. In Pakistan, DNA evidence is utilized in two primary categories of cases: one pertains to problems of legitimacy or paternity in civil trials, while the other is associated with sexual offenses in criminal cases. However, in matters of legitimacy, judges exhibit hesitancy due to the potential conflict with prevailing social standards (Malhotra & Jamir, 2024).

It is important to acknowledge that although these services are present, there may be variations in their capacities and provision of resources throughout various parts of Pakistan. Furthermore, ongoing endeavors to enhance forensic equipment and broaden services persist, motivated by the imperative for efficient criminal justice and law enforcement methodologies within the nation.

## **5. Ethical Considerations in Collecting DNA Evidence.**

It has been asserted that the violation of rights of Privacy occurs when an individual's autonomy is hindered. The use of a Centralized System has the potential to obscure the differentiation between Guilt and Innocence. The act of cross-referencing DNA samples in civil as well as criminal proceedings, without the individual's agreement, understanding, or knowledge, might be considered a kind of self-incrimination (McEwen et al., 2021).

The implementation of DNA analysis as a forensic technology has presented considerable challenges to several rights of individuals, encompassing both legal and moral issues. These rights include the freedom of privacy and the right to avoid self-incrimination in cases when a person is charged with a crime. Collecting DNA specimens through the body of a person constitutes a violation of their right to bodily privacy (Smith, Miller, Smith, & Miller, 2021).

In the case of *Regina v Robert Naughton (2011)*, it is imperative to mandate the preservation of DNA samples to enable DNA testing even after a significant duration has elapsed from the occurrence of the rape.

The potential consequences of a delay in medical examination include the possibility of obtaining inaccurate results, as well as the exacerbation of the victim's suffering due to the need for frequent travel for legal documents. To alleviate unnecessary stress for the victim, it is advisable to construct specialized centers that provide all necessary services in one location, eliminating the need for the traumatized victim to go to several locations for police reporting or psychiatric management. The significance of DNA evidence in a criminal inquiry is negligible unless it is duly acknowledged, recorded, gathered, and preserved. The utilization of DNA evidence in the pursuit of justice is contingent upon the precise adherence to all prescribed protocols.

## **6. Conclusion**

There is a pressing need to gradually interpret the QSO, namely Articles 59 & 164, along with Section 510 of the Criminal Procedure Code 1898, are relevant legal provisions. Moreover, it is necessary to update section 510 of the Criminal Procedure Code 1898 to expedite the administration of justice, as there is presently no established definition for the term "Chemical Examiner". Relevant workers may be obligated to utilize SAECKs Kits by the PFSA recommendations for the collection, preservation, and transportation of forensic evidence samples in sexual assault investigations. The government has the potential to facilitate the distribution of SAECK kits to relevant staff, enabling them to promptly transfer DNA specimens to a forensic lab.

This measure aims to reduce the possibility of damaging evidence. There exists an urgent necessity to provide education to individuals with specialized expertise in the legal and medical domains to guarantee the proficient utilization of the technology of DNA. Furthermore, it is necessary to improve the forensic facilities to accelerate the testing procedure and prevent delays caused by queues. Moreover, it is necessary to establish a National governing body to oversee all forensic laboratories, which can establish regulations and guidelines to make sure everything is consistent, and the testing procedure is more reliable. Influence from society and shame are significant contributing causes to the delay in medical examinations. Consequently, it is imperative to implement safeguards that safeguard the privacy and anonymity of the victim from public scrutiny.

DNA profiling is widely regarded as the most effective scientific method for uncovering the truth. However, its admissibility within the criminal justice system has been significantly restricted, resulting in a lessened impact and rendering it a plain inefficient allocation of resources. The judiciary, being progressive and proactive, can elevate the status of main evidence using judicial endorsements. The judiciary has the potential to facilitate a transition from oral to material evidence, including DNA evidence, so transforming the impasse within Pakistan's criminal justice system. In addition, the creation of a forensic DNA database necessitates legislative approval, financial backing, and court approval. The continued existence and effective functioning of the entity are contingent upon consistent deliberations and mutually agreed-upon agreements among many parties are involved.

Therefore, the current technology that takes advantage of the genetic characteristics of individuals can only be effectively used after consistent and intentional changes at the legislative, judicial, operational, and infrastructure levels. There exists a necessity to establish a unified system wherein all constituent elements operate in synchronization to attain a shared objective. However, it is important to note that currently, the paths of Forensic scientists and Advocates do not connect, even though both fields often focus on the same subject. Despite the convergence of their trajectories, the outcome frequently leads to misinterpretation rather than productive exchange of ideas.

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Ishfaq Ahmad: Conceptualization, methodology, writing - original draft preparation, and writing - review & editing

Faiz Bakhsh: Supervise and assist in the incorporating of the comments and finalizing the draft.

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