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INNOVATIONS IN THE FIELD OF FORENSIC SCIENCE EDUCATION IN THE MODERN ERA INCLUDING PAKISTAN

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ABSTRACT

Over the past years, forensic science (FS) has emerged as a fascinating and captivating network in Pakistan and also worldwide. In south Asian country, Pakistan emerges in field of FS and this field is developed day by day. The training of FS starts from 1979 till now. The Hudood Ordinance, Qisas and Diyat Ordinance were first developed in Pakistan and then it enhanced to emerge many fields of FS such as forensic dentistry, forensic odontology, DNA forensic, finger printing and many more. The forensic education was not only in Pakistan but it was already spread worldwide. Many European countries like France Australia, Canada and Switzerland are much familiar about different fields of FS and does fascinating work on it have well developed lab and education system in the field of FS. But the FS networks are spread worldwide and these networks are as SARFS, AFS N, SMANZFL, and ASCLD, ENFS I and AICEF.

Keywords: Hudood Ordinance, Qisas, Diyat Ordinance, Finger Printing, Forensic Dentistry, Odontology.

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INTRODUCTION

Pakistan is a huge and overcrowded Southeast Asian country. The country comes with a legal medicine order which was built on investigation by the police and this has pursued as such [**1**]. There were not many facilities of law which needs medical examination and were mostly finite to dying due to criminal wound and even these approve the investigating agent to involve medical examination only if judge was possible.

In 1979, an absolute swap was conduct in the offender fairness order of nation with the administration of initial the *Hudood Ordinance* and then the *Qisas* and *Diyat Ordinance* in 1990 in series to Islamize the rules and regulations of Pakistan [**2**]. The first injunction was denote to revoke the rules and regulations preside over erotic crime. In the second revoke, the rules and regulations preside over forcefully injury [**3**]. The recently developed rules and regulations preside over the definition as well as the penalizing of each type of wound therefore at present the legal categorizing of wound vary from the curative categorizing [**4**]. The up to date laws involve practical by a curative agent arranged by the administration for this motive which was definitely a step ahead. These rules and regulations also established the idea of recompense (Diyat) for a wound, which denote that, turn on upon the kind of wound the criminal were essential to reward unlike kind of repayment to the wound persons or the licit next in line who could take or abandon the recompense. Through with other healthcare donor, tooth fairy experience instance of wounds which could be non-accidental. Observation, elucidation and supervision of these instances are major from a licit and humanitarian point of view. *Tooth fairy* should be appraised of the legal influence of those cases [**5**].

DIFFERENT FORENSIC FIELDS IN PAKISTAN

In spite of the reality that *forensic dentistry* is one of the demonstrate current meadow of odontology in all over the world but in Pakistan, this theme is involve as a subject in vocal and maxillofacial section with five academic speech as appear on the website of Pakistan Medical and Dental Council (PMDC). PM&DC is the official body in Pakistan

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concerning the medical and dental education. Management given by *PM&DC* are come behind by the universities; awarding BDS degrees in Pakistan. With the launch of forensic odontology in the beginner curriculum, it educate to undergraduate students is now compulsory. Its content in the curriculum is primary and that is all that is essential at the bachelor level.

THREE PRIMARY IDENTIFIERS IN FORENSIC SCIENCE

According to Interpol, the three primary identifiers in forensic science for human identification are:

Fingerprint Analysis – Unique ridge patterns on fingertips remain unchanged throughout a person's life, making fingerprints a highly reliable identifier.

DNA Profiling – Genetic material extracted from biological samples (blood, hair, saliva, etc.) is used for individual identification, as DNA is unique to each person (except identical twins).

Dental Records (Forensic Odontology) – Teeth and jaw structures are highly durable and can be compared with ante-mortem dental records to identify individuals, especially in cases of severe decomposition or disaster victim identification (DVI).

UNIVERSITIES OFFERING FS IN PAKISTAN

The various universities are offering BS and M. Phil in forensic science. The universities that start these programs are given in Table 1

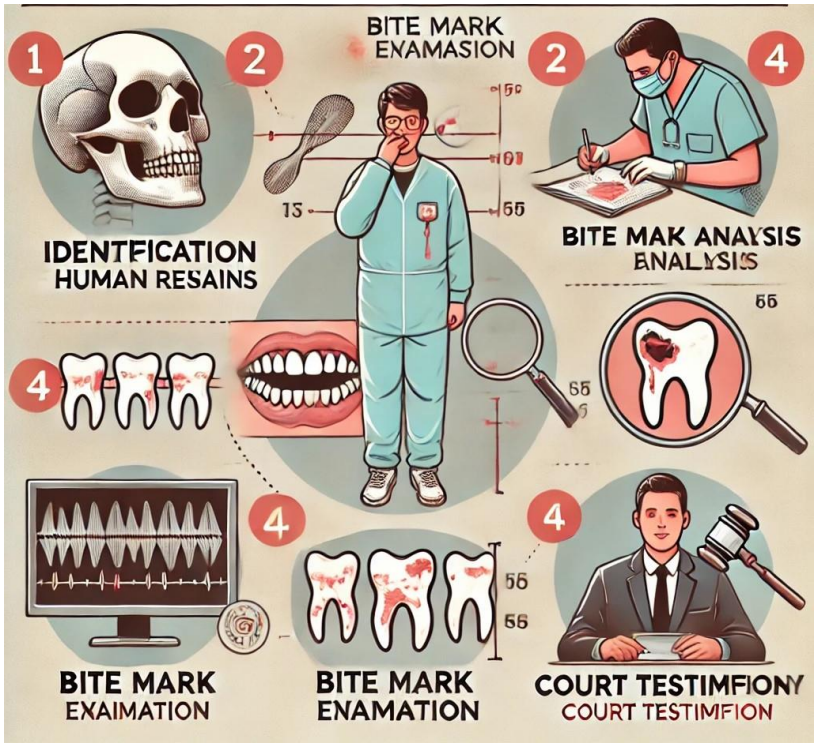


Figure 1: Working pattern of a forensic odontologist.

Table 1: Different Institutes of Pakistan offering degree programs in forensic science.

Institute	City	Degree, Duration
1. The Islamia University Of Bahawalpur	Bahawalpur	BS, 4 Years
2. Government College Women University	Faisalabad	BS, 4 Years
3. Khawaja Fareed University Of Engineering & Information Technology	Rahim Yar Khan	BS, 4 Years
4. University Of Swat	Swat	BS, 4 Years
5. The University Of Modern Sciences	Tando Muhammad Khan	BS, 4 Years
6. The Superior University	Lahore	BS, 4 Years
7. Emerson University Multan	Multan	BS, 4 Years
8. Government college university	Lahore	BS, 4 years
9. University of Veterinary and animal science	Lahore	BS, 4 years
10.University of Health science	Lahore	BS, 4 years
11. University Of Health Sciences	Lahore	M.Phil, 2 Years
12. The University Of Lahore	Lahore	M.Phil, 2 Years
13. University Of Central Punjab	Lahore	MS., 2 Years

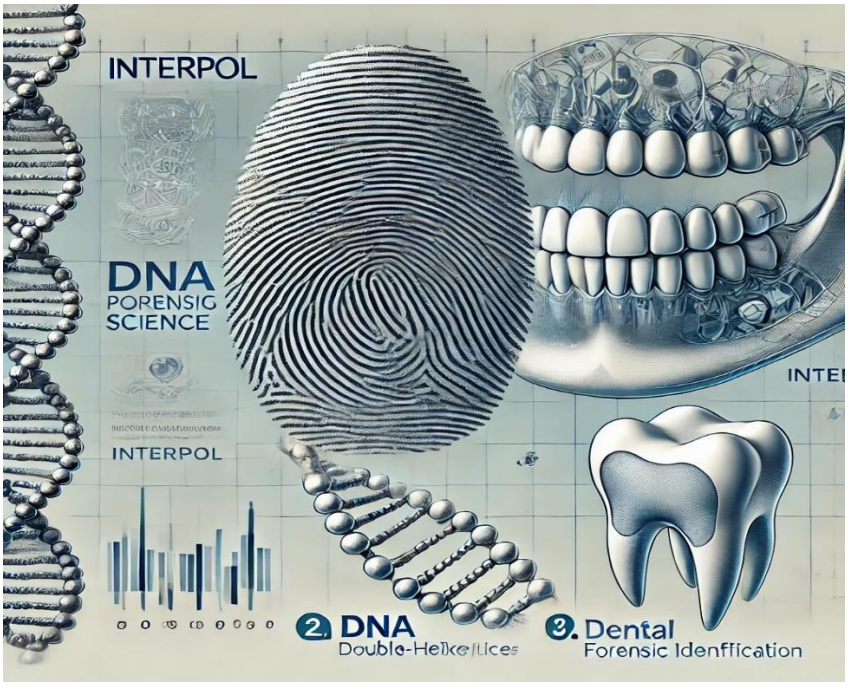


Figure 2: According to Interpol, the three primary identifiers in forensic science for human identification.

FORENSIC EDUCATION IN WORLDWIDE

Until the end of this era, FS has essentially summarized as such supplier for offender equity system following presiding and customary receptive law imposition. Regrettably, this focal point has finite its volume to supply awareness concerning crime systems and to hold up other shape of maintain law and order styles [**6**]. Details transports by track down live past the assessment foist by the offender fairness system and desegregated into energetic ways of maintain law and order and safety rules. Customary FS deals with focal point to inquire into features of a track down to obtain and evaluate clarification backing origin or activity, most significant to that track down in a given case it has a huge continual and harmonizing extent focusing onto offender pursuit to avert and lessen crime. The procedure depend upon forensic instance assemblage, examination, elucidation and point to lend a conclusion and act in exchange a number of method over operation from plans pattern to more functioning and prudent levels of maintain law and order. This is elaborated as forensic intelligence (FI) [**7**].

However, forensic intelligence analysis has frequently enlarged over some years. Although, from our understanding it's seldom of FS et in central of forensic educational teaching and testing programs, while some exponent (police, laboratories, agencies, private companies) use it correctly casually be contingent on company and administrative consider it in meaning of F.I. Here are not many anomaly academic way , but some are present as University of Lausanne (UNIL) and manage investigation and teaching FI from 1990s and not long ago, the University du Québec à Trois-Rivières (UQTR) and also University of Technology Sydney (UTS). Main provocation for grow and combine FI having basic across and to enterprising speak is that FS degrees are motionless follow and presiding a model that FS is mixture of limited regulation lend a hand to criminal fairness system. A movement in the direction of a comprehensive order that studies track down to express fairness and certainty questions are obligatory, where cooperation along with comprehension of another regulation, occupations like first witness, criminologists, crime analysts, investigators and executive is valued [**8**]. Apart from, FI existence carry out in executive domain from organized theoretically, hence FS does not of course discover its location within elevated education as well as in research, tolerate from habitual fence linking education and the exponent. Forensic intelligence (FI) has no practical model that educates in university scheme and also put into crime investigation executive system. It could not only hamper production of teaching as well as investigation programs of FI, but finite its execution into operation. At first forensic students consist of small or no understandings of FI when bring a technical occupation and at other side, enterprising maintain law and order in models are seldom take upper hand of knowledge possible of track down[**9**]. Deficiency of ratification for FI in educational scheme along with executive growth was missing-understand for enlargement of donation of forensic science. It is basket of growth, divide knowledge and experiences best exercise with link of professional and educational section from all sides of FI. Grow forensic intelligence scheme would authorize degree holder for recognition of FI

meaning and generate various opportunities of professional occupation, gradually move to presiding pattern through procedure. However, these programs activate moral circle. It is revealed that in FI the degree holders which know are from France Australia, Canada and Switzerland.

Forensic Education in Ghana

The utilization of FS carries on with increase in size above the world. In *Ghana,* vital development took off in 2011, inclusive of the institution of modern DNA describes and the setting up of a robotic fingerprint identification system [**10**]. These evolution have conduct to some positive collision on the transportation of fairness, inclusive of the vindication of an incorrectly imprison individual. However, analysis of the policy-related feature of FS is visible opening in law-making, governance, service provision, quality word of honor and accreditation, education and investigation. An important counsel to upgrade FS in Ghana is the design of a "national policy strategy", a blueprint literate by apposite stakeholders, best operation from other countries and the standing of the meadow. Intention to the plans matter recognize in this analysis will make certain a more strong application of FS in providing secure fairness and increase general security [**11**]..

Forensic Education in UK

FS has emerged an increasingly fascinating area of science within the last 10 years. The enhanced notable link with mode in the subject has seen the number of novice students studying FS linked route at UK Universities increase rapidly in just 5 years and there are no small word signs of this tendency decline. In 2005, there were 450 routes with forensic in the first place provide by elevated education organization. Despite the fact that the forensic company has convey its deal with that job, expectation for these students desire to follow occupation as forensic scientists will be finite numbers of students promise science route have motionless increased [**12**]. The increase in students studying FS comes in a period of lessening science numbers in higher education with the possible to manufacture high merit science graduates with look for after expertise in analytical thinking, analysis, elucidation and transmission.

Forensic Network Worldwide

In future, the forensic systems will be developed more and connected worldwide. The teaching of FS demands a balance among the skills and knowledge. Just like many courses, forensic teaching have diverse and a range of background knowledge, academic as well as practical experiences.

DISCUSSION

Forensic education in Pakistan and worldwide has experienced considerable growth, driven by the increasing role of FS in supporting criminal justice systems [**13**]. However, the state of forensic education in Pakistan contrasts with the more developed infrastructure and resources seen in other countries. While Pakistan has taken steps to establish forensic programs in universities and research centers, challenges such as limited funding, outdated facilities, and a lack of standardized training continue to impact its effectiveness. Leading universities like the University of Punjab and COMSATS Institute offer FS courses, yet the number of institutions dedicated to this field remains limited. In contrast, countries like the United States, the United Kingdom, and Australia offer a more comprehensive array of forensic programs, featuring hands-on training and partnerships with advanced laboratories and law enforcement agencies [**14**]. This discrepancy between resources and institutional support underscores the need for a more standardized approach to forensic education in Pakistan, where such resources can empower students with the skills and exposure needed to thrive in forensic professions [**15**].

Globally, forensic education programs are marked by a high degree of standardization and accreditation from bodies such as the FS Education Programs Accreditation Commission (FEPAC) and the American Academy of Forensic Sciences (AAFS) [**16**]. These organizations ensure that educational institutions maintain rigorous standards, which include curricula design, laboratory equipment, and faculty qualifications. However, Pakistan's forensic programs face constraints that affect their ability to match international standards. The limited access to training facilities, modern laboratory equipment, and exposure to advanced techniques restricts students from obtaining the same level of skill and knowledge as their counterparts in developed countries. Addressing these challenges may require both government and private sector investment to bridge the gap and support a more rigorous educational structure [**17**].

The introduction of certifications and professional development opportunities has proven critical to advancing FS education globally. In countries with established forensic institutions, certifications from organizations like the International Association for Identification (IAI) and the International Society for Forensic Genetics (ISFG) enable professionals to specialize in areas like fingerprint analysis, forensic toxicology, and digital forensics. For Pakistan, however, access to these certifications can be challenging due to financial constraints and limited availability of training centers, especially in rural areas. Expanding access to certifications and creating pathways for continuous learning would allow Pakistani forensic professionals to stay updated on the latest methodologies and developments in forensic science, fostering greater credibility in the field and enabling Pakistan to meet international standards.

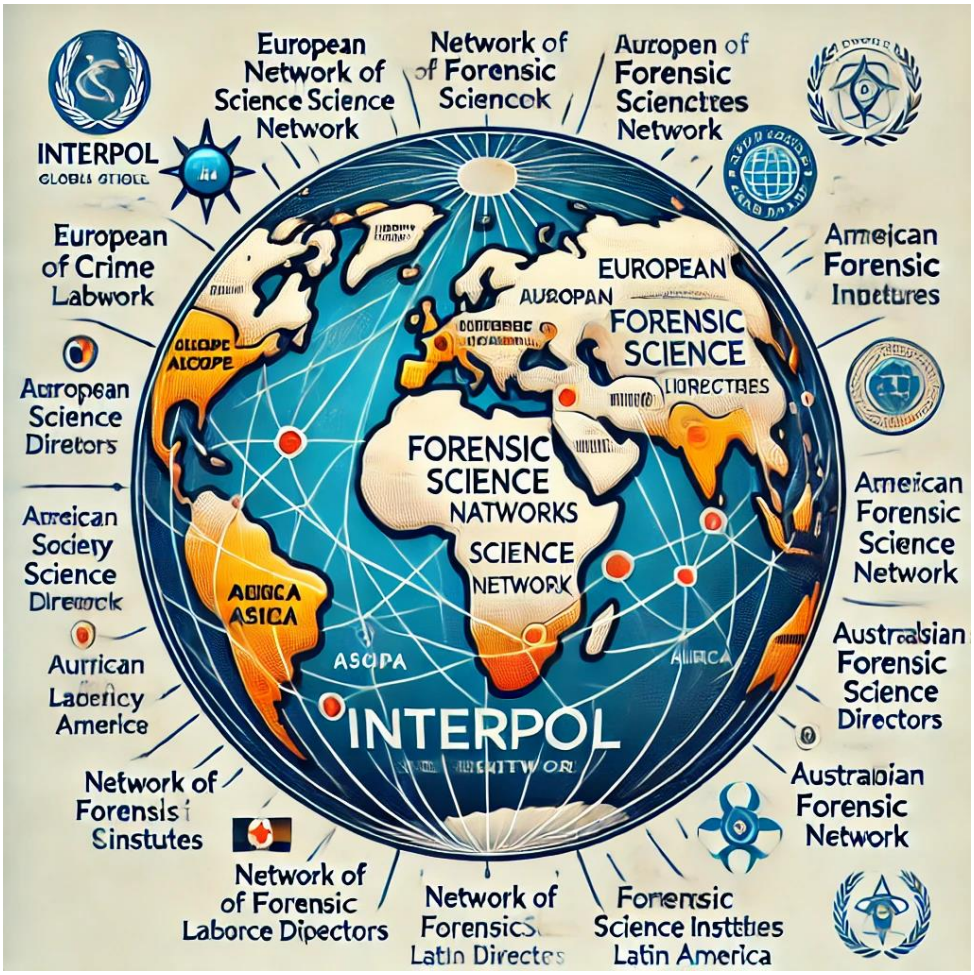


Figure 3: Globe highlighting the regional networks of forensic science laboratories.

In terms of technological advancements, forensic education worldwide increasingly leverages tools like artificial intelligence (AI), virtual reality (VR), and machine learning to enhance forensic training. These technologies offer transformative learning opportunities, particularly in fields like digital forensics, where students can simulate real-world crime scenes and practice investigative techniques. However, implementing these advanced tools in Pakistan remains a challenge due to funding limitations and the limited availability of modern technology in many educational institutions. Investing in technology and infrastructure can significantly improve forensic education outcomes in Pakistan by providing students with training experiences that are closer to real-world applications. Furthermore, ethical considerations are essential in forensic education globally, particularly as forensic investigations often involve sensitive information. Training in data privacy, consent, and ethical case handling has become a critical component of curricula in many countries. This emphasis on ethics is vital for Pakistani institutions as well, to ensure that future forensic professionals are well-prepared to handle cases with integrity and respect for legal boundaries.

Finally, international collaboration plays an indispensable role in enhancing forensic education standards. Conferences, workshops, and partnerships with international organizations like Interpol and the United Nations Office on Drugs and Crime (UNODC) facilitate the sharing of knowledge and resources across borders. While these opportunities exist for Pakistani students and professionals, ongoing support through grants, exchange programs, and partnerships with foreign institutions can further enrich Pakistan's forensic education landscape. Establishing sustainable international collaborations can provide Pakistani forensic educators and students with the insights and resources they need to keep pace with global advancements in the field.

In the end, while Pakistan has made progress in establishing forensic education programs, addressing resource limitations and regional disparities remains crucial. With a more cohesive framework that includes standardization, technological advancement, ethical education, and international collaboration, Pakistan can strengthen its forensic education system and prepare a skilled workforce capable of supporting its criminal justice system. Globally, forensic education is evolving

rapidly, and by aligning its programs with these advancements, Pakistan can ensure that its FS professionals are equipped to meet the demands of an increasingly complex investigative landscape.

CONCLUTION

In conclusion, forensic education in Pakistan, though developing, faces significant challenges compared to the established systems in many countries worldwide. Addressing issues such as limited funding, outdated facilities, lack of standardized training, and restricted access to advanced technologies and certifications is essential for Pakistan to bring its forensic education on par with international standards. The incorporation of ethical education, modern technological tools, and a focus on continuous professional development will prepare forensic professionals to navigate complex investigative challenges effectively. Furthermore, fostering international collaborations can provide the resources and expertise needed to bridge knowledge gaps and offer students hands-on training opportunities that align with global practices. With concerted efforts in funding, technology, and international partnerships, Pakistan can build a robust forensic education system that contributes significantly to its criminal justice system, ensuring that FS becomes a reliable and integral part of justice delivery.

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REFERENCES

1. Shahidullah SM, Das S. Globalization and Reforms in Juvenile Justice in South Asia: A Comparative Study of Law and Legal Advances in India, Pakistan, and Bangladesh. Crime, Criminal Justice, and the Evolving Science of Criminology in South Asia: India, Pakistan, and Bangladesh. 2017:173-218.
2. Khan TM. Institutions Not Intentions: Rethinking Islamist Participation in Muslim Democracies (Doctoral dissertation, Columbia University).
3. Gruber A. Sex Exceptionalism in Criminal Law. Stan. L. Rev.. 2023;75:755.
4. Muller GO. Doctor or Soldier First? Ethical and Legal Dichotomies in the Practice of Medicine in the Armed Forces (Doctoral dissertation, University of Pretoria (South Africa)).
5. Patcas R, van Waes HJ, Daum MM, Landolt MA. Tooth Fairy guilty of favouritism!. Medical Journal of Australia. 2017 Dec;207(11):482-6.
6. Ampoma E. Exploring Public Attitude Regarding a Single National Securities Regulator in Canada. Northcentral University; 2012.
7. Omar TM. Detecting and Classifying Malware in Electrical Power Grids via Cyberdeception (Doctoral dissertation, Oakland University).
8. Davis MS. Fairness and Crime: A Theory. Taylor & Francis; 2024 Mar 12.
9. Lupo MF. The Importance and Evolution of Forensic Accounting.
10. Affia AA, Finch H, Jung W, Samori IA, Potter L, Palmer XL. IoT health devices: exploring security risks in the connected landscape. IoT. 2023 May 25;4(2):150-82.
11. Smith C, Brooks DJ. Security science: The theory and practice of security. Butterworth-Heinemann; 2012 Dec 31.
12. Cage EC. The science of proof: Forensic medicine in modern France. Cambridge University Press; 2022 Sep 1.
13. Nilendu D. Enhancing forensic education: exploring the importance and implementation of evidence-based education system. Egyptian Journal of Forensic Sciences. 2024 Jan 10;14(1):6.
14. Amoako A, Justice C. An exploration of virtual criminal investigations in Ghana: legal issues and challenges.
15. Wu Y, Gapinska-Serwin A, Knaap W, Soong R, Luk V. The Application of Cross-course Collaboration between Forensic Chemistry and Forensic Identification. Journal of Chemical Education. 2024 Feb 14;101(3):753-65.
16. Jones SR. Meeting the standards during a global pandemic: a mixed methods study of FEPAC accredited FS educational programs (Doctoral dissertation, Oklahoma State University).
17. Dunbar M. Engaging the private sector in skills development. Health & Education Advice and Resource Team. Oxford Policy Management, Oxford, England. 2013 Jan 31.