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Examining the Role of Forensic Science for the Investigative –Solution of Crimes

N.B. NAREJO, M.A. AVAIS*

Department of Criminology University of Sindh, Hyderabad

Corresponding author: N.B. NAREJO Email: Email: nbnarejo@gmail.com Cell: No, 0305-3523543.

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Abstract: This study was conducted to examine the value of forensic science in criminal investigation. Forensic science is a dynamic field of knowledge and skills which can be highly helpful and useful for criminal investigation. Forensic science applies technical skills to detect, identify and prosecute offenders. The application and awareness of forensic science is growing in Law Enforcement Agencies in Pakistan. The Police in Sindh province is a mix of the human resource having different levels of education and exposure to training besides variant thinking patterns and perceptions. The force with better education and training feel that forensic science is inevitable for successful criminal investigation. The traditional thinking police is totally unaware about role of new technology in helping investigators. The 81% of respondents were satisfied from police knowledge of forensic techniques. The 19% opined police has poor forensic knowledge and skills. The future of forensic science in Sindh depends on overcoming the constraints and strengthening the developmental factors. The constraints are orthodox attitudes, lack of implementation, lack of funds, lack of training staff, equipment and laboratories. Forensic science-investigation is possible if police adopts new professional culture, ethics of professionalism, scientific methods & tools, merit-based recruitment and promotion, discoraging political interference, enhancing training inputs and establishing the forensic laboratories.

Keywords: Forensic science, Investigation, Sindh Police, Hyderabad

1. INTRODUCTION

The adjective forensic is derived from Latin word forum The early Romans used forum for variety of purposes like market, public discussion, business and commercial transactions. These forums played their role of criticism, scrutiny and shaped civil law (Conner, 2007) It broadly includes the evidence brought in the court of law to prosecute a suspect of crime. Forensic science helps in solving crime by involving witnesses, victims and the experts in the court of law. Forensic science, 189 years old, helps to integrate criminal investigators and scientists to objectively analyze the evidence found on the crime scene (Wright and Miller, 2005).

Forensic science is very vast field in its scope and application. It is known by several identities like Forensics, Forensic/medical jurisprudence, besides its other disciplinary inter-linkages like Forensic Anthropology, Forensic Archeology, Forensic Psychology, Criminalistics and Forensic Hypnosis. The forensic science engages pathologists, biologists, physicists, chemists and medical officers to solve queries of crime. Forensic science can effectively help found missing persons, establishing their true identities, relate and prosecute through testimony who victimized whom through production of scientific evidence.

The hair and fibers found at the crime scene also provide meaningful leads in investigation. The suspect's identity, victim's circumstances (like rape) could be related by carefully examining the data. The fingerprints, footwear impressions and tool marks could be collected technically. The casting kit and other related forensic science tools are used (MacDonnell, 1983).The trace evidence may also provide clues to further lead towards the suspect and victim identification. There are biological fluids (body fluids) which include blood, semen, urine, vaginal secretions, saliva, feces and vomit (Lyman, 2002).They provide the DNA. They are collected in sterile container for laboratory analysis through a scalpel (Redsicker, 1991).

The trace evidence consists of small particles of matter and tiny fibers left at the crime scene. It must be recognized, documented, packaged and preserved. Human hair is usually the trace

*Secretary, Pakistan Society of Victimology and Justice Email: abdullahawais77@yahoo.com Cell: 0300-6600723.

evidence encountered by forensic investigators. Its examination and comparison serves many investigative purposes. The blood splatter patterns are highly valuable evidence in violent crimes. They need to be adequately collected, preserved and interpreted by forensic investigators. (Kubic and Petraco, 2005).

Forensic Odontology is sub-branch of forensic science dealing with dentistry and dentition. This method and approach is used extracting human remains and examining the teeth. The bite marks left on the victim body are matched with the suspect's teeth record. Forensic Archeology is the field dealing with buried human and animal remains and artifacts. Anthropology is the study of humans and their cultures. Forensic anthropology is the medicolegal study of human remains, especially human osteology (Kubic and Petraco, 2005).

The DNA (Deoxyribonucleic acid) has a shape of long spiral ladder. The DNA contains four nucleotides which are:

1. Thymine(T)
2. Adenine (A)
3. Cytosine (C)
4. Guanine (G)

The all human beings have unique DNA which provides a unique pattern helpful to relate to exact identity of the person (Adams, Julian 1990).

The DNA matching proves someone's innocence or guilt. The DNA evidence is highly useful in rape incidents, fire-related accidents/ disasters, paternity identity cases, and establishing identities of missing persons or unidentified dead bodies. This could be very helpful in criminal investigation process if the data base are developed and properly utilized. The forensic experts inspect type of firearms used, their casings and bullets connecting them to crime scene and suspect and victim of the crime. The documents, signatures, letters, diaries and books are examined by forensic team for handwriting matches to suspect and victim (MacDonnell, 1983). The Y-Chromosome is typically used in exploring the true contribution of biological evidence. The controversy on father, and involvement in rape could be successfully solved in this way. The DNA matching focuses on base pair repletion patterns. (Berghaus, 1991).

The crime scene contains the proof who has committed the crime. The procedures are being followed by the criminal investigator like reconstruction of the crime scene, identity of the suspect and valuable evidence which is presented before the court (Redsicker, 1991). The Physical evidence confirms the commission of the crime, connecting the crime to the suspect and proving who was victimized (Swanson, *et al.,* 1998). The forensic science techniques help minimize the suspect number. The matching of the information clues found on the crime scene and witness and victim interviews narrows down criminal suspects and effectively assists detecting the crime. The techniques like psychological profiling, polygraph testing and hand-writing expertise further assist investigators for identifying true suspects in crime. This ensures predominance of justice over injustice as the victim is quickly provided justice and no one is unduly/wrongly punished for the crime he/she has not committed.

Scope of the Study

The forensic science explains the identity (who) of the suspect who committed the crime. The evidence clearly indicates the type (what) of the crime committed. The circumstances speak out about the time (when) of the incident. The forensic evidence proves the location of the offence (where/crime scene).The forensic investigation finds out the modus operandi (how) of the offender. Lastly, it establishes the motive behind the crime. The forensic investigators reconstruct identity of the offender and the victim. There can be primary, secondary and tertiary crime scenes depending on the incident.

The technological advances, the forensic techniques and forensic laboratories are very significant factors/actors in solving crimes. The applied role of areas of Natural and Physical sciences is defined as forensic science. The forensic science depicts a clear picture of the type of the crime, motive underlying it and the person responsible for it. The Forensic Science includes within its scope the disciplines like Criminology, Criminal Justice, Psychology, Chemistry, Anthropology, Biology, Entomology, Engineering, Medicine (Pathology and Odontology), Physics and Geology as crime-solving sciences.

Criminal Investigation is defined as "a lawful search for people and things useful in reconstructing an illegal act or omission and the mental state accompanying it. It is a probing from the known to the unknown, backward in time" (Weston and Lushbaugh, 2003).

The Criminalistics is the meeting point between criminal investigation and forensic science. The criminalists engage scientific methods to develop, examine, record and interpret the physical evidence found on the location of crime. The types of

evidence include physical evidence, biological evidence, trace evidence, impression evidence, documents, arson& explosive evidence, and drug and toxicological evidence (Wright and Miller, 2005).

The investigator primarily determines whether or not crime has been committed. The crime scene and evidence are protected. Besides, to locate victim and apprehend the offender are also important tasks. The information is sought using it for testifying in court. Thus the suspect is prosecuted in court of law (Osterburg and Ward, 2000).The initial investigation can categorize crime committed as organized and disorganized. The organized crime is well-planned that leaves little or no evidence. The disorganized crime is ill-panned (Lyman, 2002). Thecrimescenedocumented, usingvideo, photography, recording and sketching techniques by investigators.

Crime scene search patterns help in collection of evidence on the crime scene. The ever-widening techniques start searching from center towards outside the circle. The ever-narrowing style starts from the outside and reaches the focal point (Weston and Lushbaugh, 2003)

2. MATERIAL AND METHODS

This study is one of its first methodical efforts to link significant role of Forensic science in investigating crimes. The study was conducted on the sample of one hundred (100) police officers in Hyderabad. The respondents were from the level of Constable up to Inspector. The subjects were selected using random sampling technique. The study includes primary and secondary data. The secondary data on the topic was utilized which was conducted in Karachi by Riaz, 2008, on Sindh Police.

3. RESULTS AND DISCUSSION

Forensic science and Investigation: The above figure (a) provides the results of the questions asked from the subjects. The success of criminal investigation was linked to application of the forensic science. The results are reflective of thinking

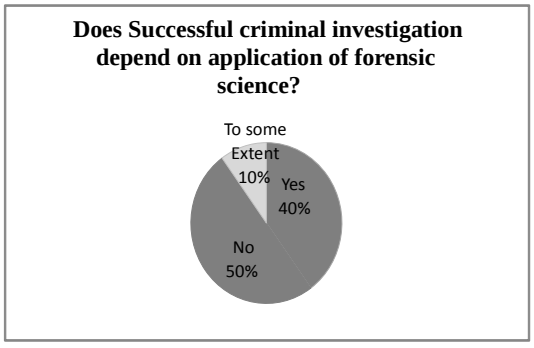

Fig. a. Source: District Police Hyderabad

of the subjects having varying nature of exposure towards forensic science. There are police officers with normal education, with moderate education and others with better opportunities and training exposures. The 40% respondents believed in positive linkage and the determinism of criminal investigation and applied role of forensic science. This majority's views in this way prove the growing realization of importance of the forensic science among Sindh Police. The 50% respondents opined that there is no success- related dependence of criminal investigation on forensics. These were views of the traditional police mindset that are poorly trained with low educational backgrounds. The remaining 10 % subjects also weakly supported that forensics may help the investigators.

Police Knowledge of Forensic science

The police investigators in Sindh are constrained in terms of lack of forensic knowledge, expertise, funds and national database. The role of forensic education and training is critically important for police investigators and successful investigation (Riaz, 2008).

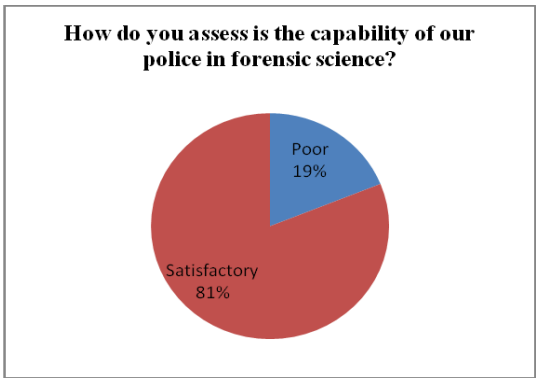

Fig. b. Source: Interviews of District Police Hyderabad (2009)

The 81% of the interviewees were satisfied with capability (knowledge and skills) of the police. This further reaffirms the positive belief in forensic science –related investigation. The 19% of respondents were of the opinion that police are poorly capable of the science. This relates to negative experiences and past understanding of the subjects regarding the police performance in the typical investigation cases.

Factors responsible for Inadequate Knowledge of the police

The education, training, funds and establishment of forensic laboratories of could enhance police investigators' capabilities in solving many simple and complex crimes (Riaz, 2008).

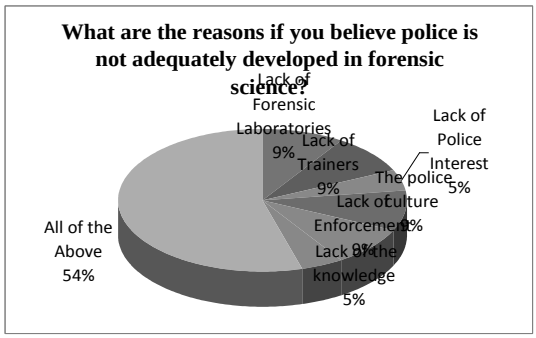

Fig. c. Source: Interviews of District Police Hyderabad (2009)

The 9% subjects point towards constraints like lack of forensic laboratories in Sindh province, lack of trainers (9%), lack of police interest (4%), the police culture (9%),lack of enforcement and implementation (9%), lack of knowledge (5%) and all of the above factors (55%).

Enhancing Police Capability

The DNA database, the safety of the biological evidence, and control on political pressures could enhance result-oriented investigation. The education, training, funds and establishment of forensic laboratories of could enhance police investigators' capabilities in solving many simple and complex crimes (Riaz 2008).

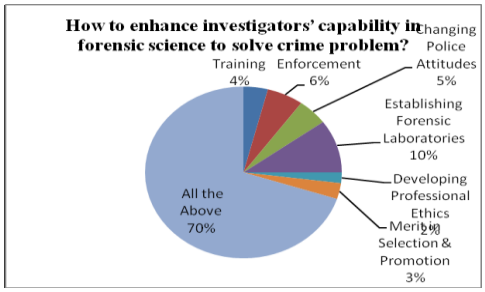

Fig. d. Source: Interviews of District Police Hyderabad (2009)

The forensic science can effectively solve crimesif trainings (4%), implementation (6%), changing policeattitudes (5%), forensic laboratories (10%), professional ethics (2%), merit-based police selection and promotion, and all of the above factors (70%) are ensured.

3. CONCLUSION

'Forensic science is a versatile and enormously powerful tool in the investigation of a crime.' Forensic tools and techniques must be aided by the knowledge, experience, intuitive detectives, police and other experts' role (Platt, 2003).Forensic science engages all evidences collected on the crime scene to solve query of the crime. The processes are procedures are carefully followed. The evidences are vital linkages providing pointers towards suspects and victims of the crimes. The search patterns help in collecting the physical and other evidences. The DNA experts recover fingerprints through use of technical tools and kits. The shoeprints and tyre tracks provide hints towards criminal identity, type of vehicle, height and gait of the criminal. Forensic science helps investigators in investigating homicide ,rapes and accident-related incidents. Besides, unidentified bodies, missing persons and fraud and forgery cases are also solved (Platt, 2003)

5. ACKNOWLEDGMENT

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