



RESEARCH PAPER

Forensic Protocols and Investigation of Crimes in Pakistan: A Case of Sindh

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This study was conducted to examine the importance of the existing Forensic Protocol procedure adopted for the investigation of various crimes in Sindh, especially in the Karachi and Hyderabad areas. Forensic science plays an imperative role in any criminal investigation to identify the culprit using scientific methods. In current study, the forensic protocol discusses the roles of the following respondents: healthcare providers, lawyers, law enforcement agents, forensic scientists and the prosecution. Police in Sindh Province is a mix of human resources with different levels of education and training. When police participants were asked if they had ever studied forensics, it was found that 47.1% had studied forensics, while 52.9% denied it. It means that 52.9% of the surveyed police officers have poor forensic knowledge and experience. With the help of qualitative research methodology, this research has been analyzed. The potential of forensic science in Sindh is based on overcoming limitation and enhancing development characteristics. Barriers include traditional attitudes, lack of implementation, lack of funding, lack of trained personnel, equipment, and laboratories. Forensic scientific investigations are possible if the police establish a new professional culture, professional ethics, scientific methods and tools, amplifying training, and establishing forensic laboratories.

Introduction

The word 'forensic' means an argument or reasonable exercise is derived from the Latin word 'forensis', meaning 'forum, public debate or open court discussion'. The early Romans used it for various purposes such as forum, market, public debate, business and trade. These forums were played their Criticism, Scrutiny and the Role of Civil Law Created (Weizman, 2014). It contains a wide range of evidence bring to court for legal action against a criminal accused.

Forensic science (often referred to as forensics) is a tool for a wide range of sciences to answer queries of significance in a legal system. It could be an offense or a civil case. In addition to its compatibility with the legal system, forensic science generally covers conventional scientific methods and principles that help establish facts about an event, or a pattern, or any other physical object. In this regard, the perception is associated with the theory of affirmation, where there is an interest outside of legal form in determining whether something is desired, or claimed.

Forensic science begins at the crime sight and plays an important role in the criminal justice. Forensic science methods are more developed in developed countries (Farooq, & Waheed, 2013). It is also categorized into different categories according to its capacity and function. Like forensic medical jurisprudence, forensic anthropology is associated with forensic archeology, forensic psychology, criminology, and forensic hypnosis. It also includes research or techniques related to pathologist research, biologists, physicists and chemists (Narejo, & Avais, 2012).

The need for forensic science in crime investigation in Pakistan is increasing significantly as the pattern of crime is changing and becoming more complex. In the police department in particular, the majority of security personnel are of mixed ability qualification (Narejo, & Avais, 2012). The investigation is usually conducted on the basis of information provided by the victim or witnesses, the accused and their witnesses, or any incident reported. They then visit various forensic experts to record, collect and store various pieces of evidence found on the site. The methods of finding and protecting such crime sites have appreciated the standards that need to be met in order to reach effective results. If evidence is misrepresented at the scene of a crime, it can lead to a large loss of evidence that could direct to illegal detention. In order to stay away from such an accident, proper investigation should be carried out using modern research techniques, which requires forensic science.

Forensic Protocols

The forensic protocol provided special follow-up measures during the investigation. These protocols support and offer expectations and standards of action, so there is consistency and uniformity in every investigation. It also helps to reduce the risk of contamination (Sternberg, 2001).

Forensic protocols during criminal investigations include:

- Keep the crime scene safe
- Maintaining / set aside witnesses
- accomplish a walk-through of sight
- Investigate for verification
- testimony the crime sight
- Find all the proof
- gather and store all evidence

The forensic investigative protocol can be applied to first Acknowledgers, medical investigators, offense sight investigators, spies and other proficient concerned in a particular case. Following the forensic investigative protocol permits each member to play their part in the investigation and helps retain the reliability of the inquiry and the proof.

Literature Review

Current literature suggests that forensic science is looking at the least probably disjointed, incomplete, unmanageable factor in an event. It is the residual (memory) and activity of the source that created it (Baskin, 2010). It takes to interpret and comprehend something to acquire some information about the event. A study of its environment, along with other signs of it, provides various and sometimes unforeseen indications about the event and the reality. Is a powerful source of information as well as experimentation as well as speculations? Traces are available on crimes that need to be deciphering through scientific methods such as laboratory testing using physics, biological and chemical procedures to detect an unidentified suspect. Such findings have a significant impact on the outcome of court proceedings, which require to be taken seriously before any criminal investigation can take place (Campbell, 2018).

Forensic DNA Laboratory

DNA is full form of Deoxyribonucleic Acid, an inherited substance found in each cell of the human body. A DNA found in one cell of someone is the exact replica of the DNA found in all the other cells of the similar person, but is not usually similar to the DNA of another person. Analysis of forensic DNA can provide the suspect or victim with a sample of evidence and as a result the flow of interrogation. Hence, taking benefit of this unique natural property of DNA, the profiles created from the proof sample are evaluated to the DNA from the suggested sample / sight of the offense sample (Dahm, 2008).

At National Forensic Science Agency i.e. the NFSA, a laboratory of DNA was established in 2006 with the cooperation and collaboration of the People's Republic of China. Since then, Laboratory of DNA has been providing tests of forensic in the following cases:

Types of Forensic Evidences

A victorious criminal investigation is based on the gathering and examination of a variety of evidence (Ralph, 2007). Forensic scientists categorize proof in diverse ways and have explicit conducts of dealing with it. Two types of evidences in crime investigation can be:

- Physical evidence
- Biological evidence

Physical Evidence

Physical evidence refers to everything that comes from a non-living being. The most imperative types of physical evidences are fingerprints, tire marks, footprints, fibers, paint, and building materials.

Biological Evidence

Biological evidence always comes from an organism. Biological proof comprises blood stains and DNA.

Evidence is an important element for an investigation, therefore it is imperative for investigators of crimes consider different legal definitions of evidence, the different evidence types, and the mode in which it is measured and seen by the court. Evidence forms the main component to the investigation procedure, in order to properly construct the final product, it is necessary to recognize, gather, document, preserve, validate, investigate, and unveil the evidence, and should be presented in a way which will be adequate to the court (Ventura, 2013).

Examination of Biological Evidence in the Laboratory

Blood, semen, and saliva are the biological fluids and face a variety of investigations of crimes as murder, sexual assaults, physical assaults, and burglaries. In poisoning cases, blood and viscera are collected for investigation.

Blood Test

Blood is the most important proof of assassination and physical attack cases (Barclay, 2013). Blood stains can be appeared as red, yellowish, reddish brown sometimes grey and tan. Detecting the shape of blood and blood stains on the clothing of the dead, the wounded and the accused can disclose important information.

Sputum Test

Saliva spots are usually not clear from visual assessment (McAllister, 2016). However, some types of evidence often include saliva marks such as drinking containers, cigarette butts, chewing gum, and adhesive surfaces of envelopes, bite marks, and nylon masks. If the stained substance is portable, present it to the laboratory.

Semen Test

In cases of sexual abuse, semen spots appear on the body parts of victim as well as on her dress, bed, rags, upholstery and other items (Johnson, 2012). Sperm spots can appear yellow, off-white, white, colorless or tan and have a crusty appearance. Semen spots cannot be detected for the independent eye. In cases in

which the victim is mild, in addition to semen spots, blood spots may also be originated. It can also be transmitted as victim blood, in the clothing of a suspect. Therefore, on the basis of evidence and stain-like features of the suspects' pants, underwear, or other clothing, it should be calm, tagged, sealed and sent to the testing laboratory. Gather alleged contaminants substance such as clothing, bedding, underwear or other

DNA Tests

Deoxyribonucleic (DNA) can be taken out from the body fluids, spots and with biological tissues collected from offense scenes as a part of proof. The consequences of the DNA profile on the proof samples are contrasted with the outcomes of the DNA profile achieved from the mention sample composed from known persons (accused, offended, sufferer and dead). Such assessments of profiles can link victims and defendants to each other, to the proof, or to the offense scene. The forensic science laboratory performs nuclear short tandem repeats or STR, Y-STR and mitochondrial DNA examination. Nuclear STRDNA testing or profiling is mainly extensively used to examine the evidence that identifies blood, hair, saliva, semen, body tissues, and with tissues at the roots (Taupin, 2016). The control of nuclear DNA testing lies in its aptitude to recognize an individual as the source of DNA. It has a great deal of discriminating power, the ultimate power of elimination, and is usually analyzed in the context of almost all evidence.

Material and Methods

Qualitative research depend on the researcher's first-hand observations, questionnaires, focus groups, interviews, contributor observations, documents in instinctive settings, documents and sample data. Statistics are usually innumerable.

Present research included different scurvies from police department stakeholders, forensic scientists, public prosecutors and judges. Semi-structured interviews are conducted with all the above stakeholders to collect relevant data from Pakistan's point of view. The study has examined the research problem using data from books, journals, periodicals, newspapers, magazines, the World Wide Web, unpublished articles, essays, seminar articles and other sources. Therefore this study is assessing the importance of the current method of forensic protocols and investigation of crimes in the Karachi and Hyderabad area of Sindh.

Shank described qualitative research as "a procedure of systematic experimental research in meaning" (Shank, 2006). Systematic it means "strategic, organized and public", subsequent the rules agreed upon by members of the qualified research community. Experimentally, this means that this type of investigation is based on the world of experience. Denzin and Lincoln declare that qualitative research involves an explanatory and instinctive approach, people try to comprehend or understand occurrences in terms of the meaning they bring to them (Denzin, 2006).

To adjust the qualitative research design, a survey was conducted. A questionnaire has been developed as the instrument to address the issues involved in the research problem. Qualitatively, data is collected through survey questionnaires. The results of the survey questionnaire are being analyzed using the SPSS (Statistical Package for Social Science). The frequency of each variable is analyzed and step wise Chi-Square test has been applied to determine the possible relationship between each variable.

In the present study, improbability sampling was used. The survey was conducted among total 165 out of them 68 stakeholders were from Police Department, 36 Judges, 31 Public Prosecutor/Lawyers and 30 Healthcare providers, Forensics Expert and Laboratory Analyst. Its purpose was to focus specifically to measure the importance of the existing procedure of the Forensic Protocol adopted for the investigation of various crimes in Sindh, especially in the Karachi and Hyderabad areas, so only those with knowledge of legal knowledge could provide valuable information in the survey. The survey was conducted to obtain respondents' feedback on procedure that describe indicators, sample groundwork, extraction, tools and controls that are standard for DNA investigation and data interpretation. Survey Questionnaire is the tool which has been specifically designed and distributed for collecting the response from the respondents.

Results and Discussion

The purpose of statistical analysis is to extract meaning from data and to examine how something occurs or exists. Once data was collected for this research, it was then screened and coded based on themes and categories.

To determine the international protocols of forensic science for gathering and handling evidence in criminal investigations

This objective is achieved through qualitative research methodology. A total of 165 respondents were recruited to take part in the survey, which aims to get their feedback on importance of the protocol for forensic investigation of DNA testing of various cases. The resulting results are used for qualitative data analysis. It is then used to guide the second objective of the study, which consists of interviews with 68 police stakeholders and professionals.

To determine the forensic procedure, adopt the compilation in multiple criminal cases and handling the evidence.

This objective is achieved by acquiring data from books, magazines, journals, newspapers, magazines, the World Wide Web, unpublished articles, articles, seminar articles and other sources and their theoretical concepts. With the help of qualitative research methodology this objective is achieved. It is then used to guide the third objective of the study, which consists of interviews with 30 Healthcare providers, Forensics Expert and Laboratory Analyst.

To determine the importance of the protocol for forensic investigation of DNA testing of various cases

With the help of Survey Questionnaire responses were collecting from the respondents. This Survey Questionnaire is designed to evaluate the significance of the Forensic Protocol for the forensic investigation of DNA testing adopted by the Healthcare providers, Forensics Expert and Laboratory Analyst in the laboratory for investigation of diverse offense in Sindh, particularly in the region of Karachi and Hyderabad. This will facilitate us to achieve a better perceptive of forensic procedures and protocol and the role of healthcare providers, forensic experts and laboratory analysts in any criminal investigation.

To recommend and propose possible measures that could improve adoption of forensic protocol in existing judicial procedures during criminal investigations

It is then used to guide the fourth objective of the study, which consists of interviews with 36 judges, 31 Public Prosecutor/Lawyers. Based on this study, further recommendation and implications will be developed to assist the Department of Police, the Forensic Science Institute, the Criminal Justice System, and other policy makers improve and enhance the way they deal with existing evidence handling procedures. The interim order clearly demonstrates the authenticity of the results of the research, survey and interview conducted here.

Findings

Statistical quantities of each variable have been analyzed through the frequency tables of and summarized to uncover the important characteristics of gathered data.

Research has been performed by conducting different surveys on:

1. Police department stakeholders
2. Judges
3. Public Prosecutor/Lawyers
4. Healthcare providers, Forensics Expert and Laboratory Analyst in the laboratory

Qualitatively, data is collected through survey questionnaires. The results of the survey questionnaire will then be analyzed using the SPSS (Statistical Package for Social Science). The frequency of each variable is being analyzed and step wise Chi-Square test will be applied to determine the possible relationship between each variable.

Police Department Stakeholders

This research is one of the first practical attempts to combine the significant role of forensic protocol in crime investigation. Survey Questionnaire is the tool which has been specifically designed and distributed for collecting the response

from the respondents. The sample size of the survey is of 68 police officers in the region of Karachi and Hyderabad. Respondents ranged from constables to inspectors. Therefore, insufficient knowledge of the police could be considered as the limitation of this study which has been observed during survey as given below: -

1. These were the traditional mindset of the police who were less trained with less educational background.
2. Police acquaintance about forensic science
3. Inadequate knowledge of forensic protocols used in criminal investigations.

Further, for this study, forensic methods and protocols used by of Sindh Police have been recorded which they adopt during any criminal investigation in Karachi and Hyderabad regions.

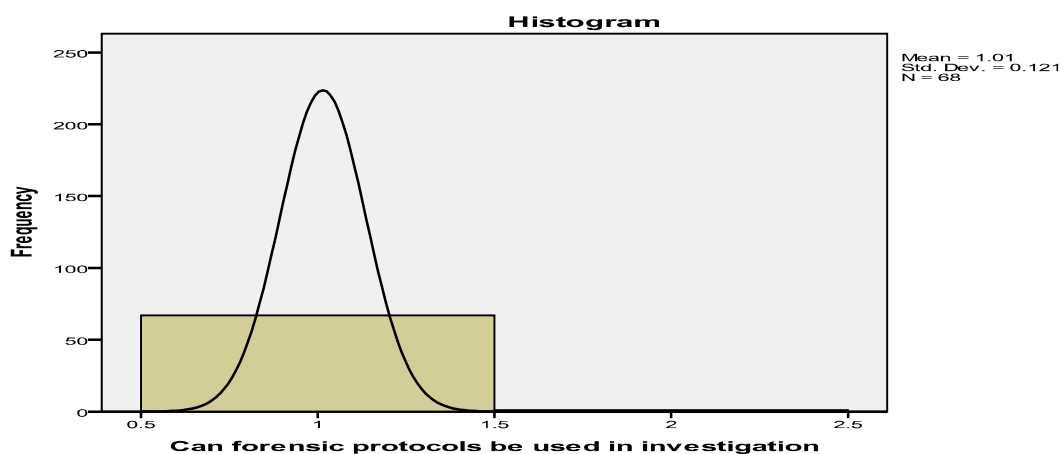
Therefore, this study has assessed the importance of the current method of forensic protocols adopted in the investigation of various crimes in Sindh, especially in the Karachi and Hyderabad regions.

Variable No: 1: Can forensic protocols be used in investigation?

Table1
Showing frequency of the variable 01
Can forensic protocols be used in investigation

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	67	98.5	98.5
	No	1	1.5	100.0
Total	68	100.0	100.0	

When participants were asked that forensic protocols be used in investigation, respondents' responses revealed that most of them agreed, with approximately 98.5% (67 out of 68), while 1% of respondents has denied this as comes out in the **Table** and similar statistics are shown in **Figure 1** below.



Correlation No 01: Have you knowledge of Criminal Laws with Can soil samples be part of proof?

In this analysis, both the variables 'Have_you_knowledge_of_Criminal_Laws' (Have you knowledge of Criminal Laws?) and 'Soil_samples_proof'(Can soil samples be part of proof?) have been put under Chi-square test for independence in order to determine whether they are related or not. Pearson Chi-Square Test for independence compares the frequency of cases found in 'Have_you_knowledge_of_Criminal_Laws' variable across those of 'Soil_samples_proof' variable.

Table 2
Showing Chi-Square Test results

Chi-Square Tests					
	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	68.000 ^a	1	.000		
Continuity Correction ^b	16.496	1	.000		
Likelihood Ratio	10.424	1	.001		
Fisher's Exact Test				.015	.015
Linear-by-Linear Association	67.000	1	.000		
N of Valid Cases	68				

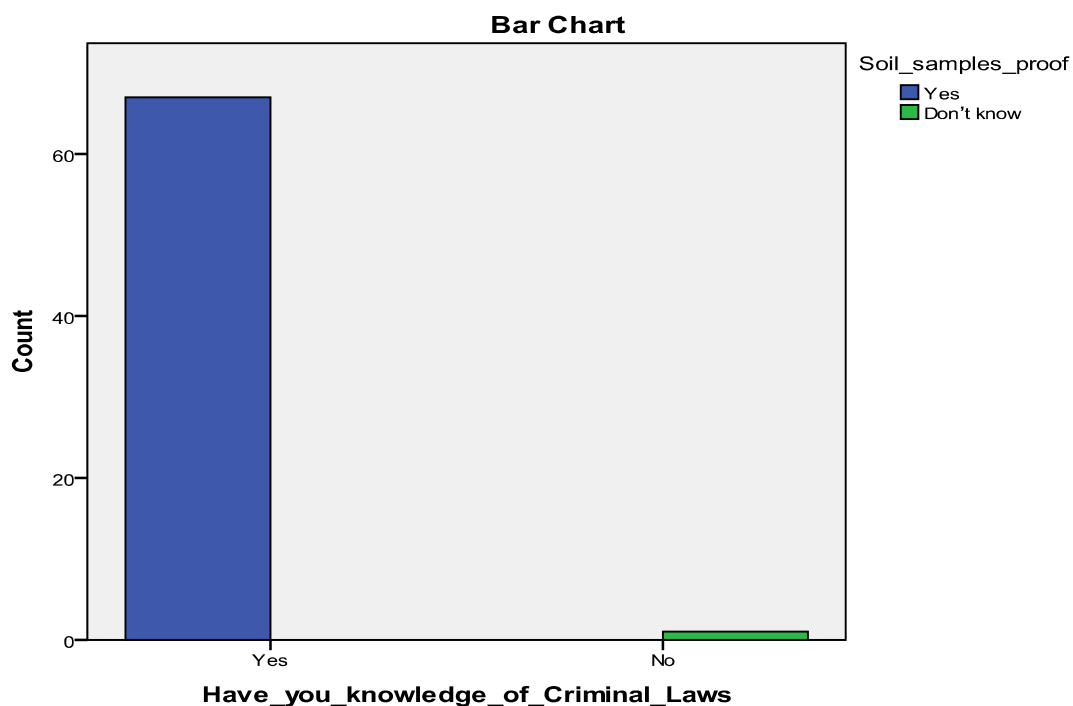
a. 3 cells (75.0%) have expected count less than 5. The minimum expected count is .01.

b. Computed only for a 2x2 table

Table 3
Showing Cross tabulation of Correlation No 01

knowledge_of_Criminal_Laws* Soil_samples_proof Crosstabulation				
		Count		
		Soil_samples_proof		Total
		Yes	Don't know	
Have_you_knowledge_of_Criminal_Laws	Yes	67	0	67
	No	0	1	1
Total		67	1	68

The results show that a large number of respondents who know about criminal law have shown strong agreement towards soil samples be part of proof, while one respondent who has no knowledge of criminal law has denied it as shown in **Table 3** both variable have significant effects in relation as p value is .015 which less than (0.05) similarly depicted in **Figure 2**.



Judges

Judges questionnaire is designed to measure the importance of the existing procedure of the Forensic Protocol adopted for the investigation of various crimes in Sindh, especially in the Karachi and Hyderabad areas. This will help us better understanding the role of the judges. Based on this research, further suggestions and implications will be developed to help the Department of Police, the Forensic Science Institute, the Criminal Justice System and other policy makers to improve and enhance the way they deal with existing evidence handling practices.

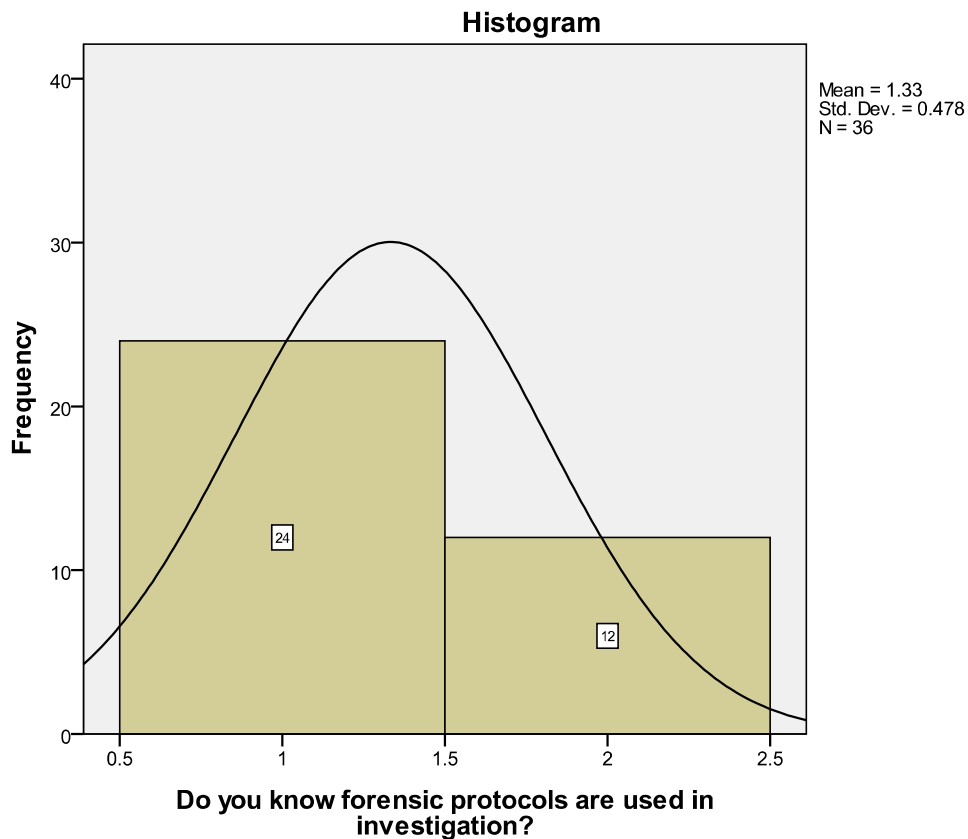
Variable 02: Do you know forensic protocols are used in investigation?

Table 4
Showing frequency of the variable 02

Do you know forensic protocols are used in investigation?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	24	66.7	66.7	66.7
	No	12	33.3	33.3	100.0
	Total	36	100.0	100.0	

When participants were asked that forensic protocols are used in investigation, respondents' responses revealed that most of them are aware that forensic protocols are used in interrogations, with approximately 66.7% (24 out of 36), whereas 33.3% of respondents have negate the same as comes out in the **Table**

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Correlation No 02: Do you know forensic protocols are used in investigation with should training sessions be held in Law institutions and Bar to improve knowledge about Forensics of new era?

In this analysis, both the variables 'forensic_protocols_Investigation' (Do you know forensic protocols are used in investigation) and 'Trainingimp_knw' (Should training sessions be held in Law institutions and Bar to improve knowledge about Forensics of new era?) have been put under Chi-square test for independence in order to determine whether they are related or not. Pearson Chi-Square Test for independence compares the frequency of cases found in "forensic_protocols_Investigation" variable across those of 'Trainingimp_knw' variable.

Table 5
Showing Chi-Square Test results
Chi-Square Tests

	Value	Df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.255 ^a	1	.263		

Continuity Correction ^b	.010	1	.921	
Likelihood Ratio	1.630	1	.202	
Fisher's Exact Test				.452
Linear-by-Linear Association	1.214	1	.270	
N of Valid Cases	31			

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is .45.

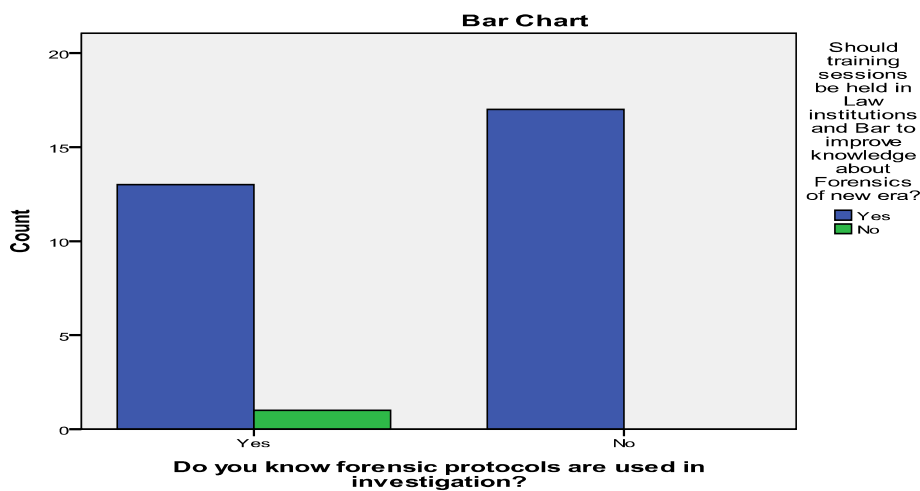
b. Computed only for a 2x2 table

Table 6
Showing Cross tabulation of Correlation No 02

Do you know forensic protocols are used in investigation? * Should training sessions be held in Law institutions and Bar to improve knowledge about Forensics of new era? Cross tabulation

		Count		Total
		Should training sessions be held in Law institutions and Bar to improve knowledge about Forensics of new era?		
		Yes	No	
Do you know forensic protocols are used in investigation?	Yes	13	1	14
	No	17	0	17
Total		30	1	31

The results are showing that the large number of respondents who know that forensic protocols are used in investigation have shown strong agreement towards considering training sessions be held in Law institutions and Bar to improve knowledge about Forensics of new era, whereas few respondents whom have no knowledge about forensic protocols are used in investigation have negate the same as comes out in **Table 6** that both variable have significant effects in relation as p value is 0.452 which less than (0.05) similarly depicted in **Figure 4**.



Legal Protocols in Pakistan

There is no specific legal protocol that deals exclusively with DNA evidence in Pakistan, and that is why courts still have to withdraw within the legal framework. DNA evidence has been published in the context of Articles 59 (Gingras, 2009) and 164 (Smith, 2015) of the QSO (Qanun-e-Shahadat Order). The previous provisions state that expert opinion on matters such as science and art falls within the scope of appropriate evidence', while the latter provides for recognition of the various methods available due to advances in science and technology. Under the current legal protocol framework, a technician who specializes in examining DNA evidence is considered a specialist whose proof / opinions are acceptable in court. This legal protocol framework is no diverse from the one leading the acceptability of medical estimation, which provides the sense that DNA is an additional type of medical proof, and that a DNA specialist is like a doctor. If DNA is examined exclusively in this context, we may not be able to take full advantage of its use. The main difference between medical estimation and DNA proof is that the earlier does not identify the culprits, while the latter does so with a high scale of accurateness. Therefore, it would be more suitable to examine it from a diverse legal point of view. However as we will see, the courts have not commented on the progress of this law, and there is a lot of scope to cover it.

Responsible aspect of insufficient police knowledge

Knowledge of police regarding forensic protocols

Police investigators in Sindh are forced to deal with a lack of forensic protocol knowledge, skills, resources and a national database. The role of forensic science education and training is seriously significant for police investigators and victorious investigations (Naqvi, 2019).

Enhancing the Capacity of the Police

DNA databases, protection of biological proof, and power over political pressure can enhance outcomes of the forensic investigation. The education, resources, training, funding and forensic laboratories can enhance the capabilities of police investigators in solving many simple and complex offenses (Pyrek, 2010).

Logical Issues

Policing in Pakistan

The Pakistani legislature has empowered the police not only with the security administration, but also with some legal powers. The police are inefficiently trained, under-resourced and under-compensated, thus becoming vulnerable to corruption, bribery and incompetence at most levels. The police are not only accountable for filing the first crime report. They are also the investigating authority to investigate crimes and offenses. Unfortunately, the police in Pakistan lack the necessary resources to conduct investigations and are poorly trained for conducting proper

investigation. The Sindh government has done little to train police for forensic investigations. It is very important that the essential and appropriate resources be developed for police training and reform in the Sindh province so that there is a strong regulation of law in the province.

Lack of defense and Security during the Prosecution:

Individuals involved in the prosecution process, such as the plaintiff, defendant, prosecutor's counsel, and court staff, will all face security issues at some point in their careers. Sindh High Court lawyer, police officials face the greatest security threats (Behrens P., 2016). The cases registered by the police in terrorism or high profile cases face serious consequences. The witnesses also face serious security risks. In Pakistan's urban centers, the problem is even more acute. Witnesses who testify endanger their own lives as well as those of their loved ones. Thus, especially with regard to street crime, witnesses refrain from testifying. Unfortunately, very little has been done by the government to ensure the safety and security of witnesses, as evidenced by the partial or almost unenforceable law on witness defense.

Conclusion

From this study it is concluded that Forensic science protocols are flexible and extremely authoritative tools for investigating a crime. During crime investigation Forensic tools and techniques must support knowledge, practice, and the role of intuitive spies, police and other experts. The procedures and processes must be carefully followed by all the stake holders of crime investigation as evidence is an important link between suspects and victims of offense. Search patterns helps to gather physical and other evidence. A DNA expert retrieves fingerprints using technical tools and kits. The shoeprints and tire tracks, vehicle type, height and offender's gait also provides indications of criminal identification. Therefore Forensic science protocols assists investigators in investigating murders, rapes and accidents. In addition, cases of anonymous bodies, missing persons and fraud and forgery are solved.

Recommendations

In order to endure as crime control agents and respond to a more vigilant society, the police, police organizations must pay attention to imitation and therefore more consistent sources such as material evidence and forensic protocol standard. Furthermore, for counter-terrorism efforts in Pakistan, it is imperative that the evidence from crime scenes be correctly handled and stored for downstream forensic laboratory examination so that the recognition process can be completed.

The PFSA, which was established more than a decade ago, is not enough to cover a population of 200 million in Pakistan due to the complete provision of forensics alone. There is also an urgent need to set up more forensic labs on a

temporary basis. In each province, however, in case of any untoward incident, as current research limitation is only based of two regions of Sindh i.e. Hyderabad and Karachi so for better crime control and forensic investigation government should implement more forensic laboratories to overcome the crime. There is no any particular forensic procedure adopted by investigation team, so there should be some proper training of all stakeholders in term of forensic procedure adoption in their crime investigation.

Proper training of a law enforcement agency that prioritizes the police force can prove to be a good approach as first responders are crucial at the crime scene. This could be done by designating a police department for personnel who are trained in this field.

Police must provide CSI vans with state-of-the-art forensic technology such as proof-collection kits, UV flashlights, laser-built treasury devices, safety suits, open print supplies, remnant gunshot kits, blood stain proof kits, blood detection kits, treatable and lighting equipment and supplies in remote areas.

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