ORIGINAL ARTICLE

Investigation of the Criminal Suspects in Local Population Through Forensic Indicators, A Cross-Sectional Study

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ABSTRACT

The aims and objectives of current study were to identify the real criminal persons from suspects through modern scientific forensic technology.

Methodology: A wooden stick, assaulted person's cloth with blood strains, blood strains on the ground and some hairs from the hand of victim were collected at crime scene. And samples of accused ones were also collected. Dry blood sample was collected from the crime scene by Bloodstain Pattern Analysis while 3ml blood sample of 100 office employees were taken in the tube and was centrifuged at x10000 rpm for analysis and DNA profiling. Fingerprints were analyzed from the wooden stick by Latent printing and were compared to suspects. DNA sample also collect from hair follicle for analysis.

Results: DNA profiling of Aggravated Assault on different biological aspects were analyzed, the analysis were showed that blood strains on assaulted person's cloth has cross matching regression stranded mean deviation (1.0± 0.01) with office employees and blood strains collected from ground also have cross matched correlation with (3.0± 0.03) suspects respectively. The mitochondrial DNA of hair follicles which was in hands of Aggravated Assault at the time of crime scene has a significant (P<0.05) cross match with suspects (2.10± 0.02) DNA.

Conclusion: The findings of this study through biological and non-biological aspects were significant (P<0.05). Total five persons were marked as criminal from all selected suspects by considering their DNA profile cross matching and finger prints cross match correlations with Aggravated Assault.

Keywords: Aggravated Assault, suspects. Deoxyribonucleic acid

INTRODUCTION

The forensic profession offers a wide range of procedures for identifying offenders, including DNA profiling and other techniques [2]. Advancements in detection of different living and non-living aspects have made it possible to profile suspects quickly. In the near future, current discoveries in genomics, genetics, and molecular biology are anticipated to enhance forensic investigations [5]. In past, the use of short tandem repeats in forensic investigations were a fundamental component in human identification. But because of current advancement in scientific research the scenario of investigation about different incidences have totally changed [6].

Genetical analysis and research has developed a revolution in this world. New and advance approaches of inheritance and genome of human being is absolutely a new vision for researchers and investigators [8]. Mitochondrial Analysis through genetic engineering is also a very vast solution of many unresolvable matters. Identification of mitochondrial DNA and single nucleotide polymorphisms is a millstone for our multiple family issues [9]. Its version increase the number of people who can get a profile by adding more options. When other approaches fail to provide information of Micro RNAs, DNA methylation analysis. Microorganism genome sequencing provides scientific knowledge for criminal investigations. Forensic technology has enabled us to identify the criminal person with the use of DNA profiling and in modern world it is an effective way to stop criminal acts [11].

Currently both biological and non-biological indicators are applying for crime investigations [12]. For biological evidences saliva and blood samples are collected from crime scene these samples collected through swabs technology. Non- biological aspects like any weapon collected from crime scene are testified to check what was the range of shot if a person is hit by a bullet or any other weapon and what type of weapon was used for hitting [14]. Fingerprints on any evidences will be collected through latent prints which uses powder technique to pick up impressions. CCTV footage is viewed and checked weather it is in its original condition or is irrupted and other electronic devices are monitored [13]. Piece of cloth collected from the crime scene is testified to whom it belongs and does it have any blood strains on it thus DNA profiling can be done [9].

MATERIAL AND METHOD

Study Design: This is an experimental study based on evidences which was conducted in the duration of 6 month.

Sample Size: A case of Aggravated Assault was reported and all the criminal scene evidences were sent by a reliable source for further investigation of criminal. A person age 56 years old was accountant in public office and assaulted by several masked persons. For searching of criminal person 100 office employees were accused and nominated for further investigations.

Collected samples: A wooden stick, assaulted person's cloth with blood strains, blood strains on the ground and some hairs from the hand of victim were collected at crime scene. Blood samples of accused ones were also collected.

Sampling techniques: Dry blood sample was collected from the crime scene by Bloodstain Pattern Analysis while 3ml blood sample of 100 office employees were taken in the tube and was centrifuged at x10000 rpm for analysis and DNA profiling was done in RT-PCR and DNA was successfully amplified. Fingerprints were analyzed from the wooden stick by Latent printing and were compared to suspects. DNA sample also collect from hair follicle for analysis.

Data Analysis: Collected raw data, was bio-statistically analyzed with SPSS version 2020.The significant value (p <0.05) test and further analysis was operated through one way ANOVA and T-test.

RESULTS

Table 1: DNA cross match analysis of suspects and crime scene evidences

Forensic indicators	Applied tests for DNA Control specimen	Employees DNA cross match test-1 Mean ±SD	Employees DNA cross match test-II Mean ±SD
Blood strains on assaulted person's cloth	DNA profiling	1.0± 0.01	1.0± 0.01
Blood strains collected	DNA profiling	3.0± 0.03	3.0± 0.03

from ground			
Nuclear DNA analysis for hairs	DNA profiling	2.10± 0.02	2.10± 0.02

(P<0.05)

Table 2: Latent printing analysis

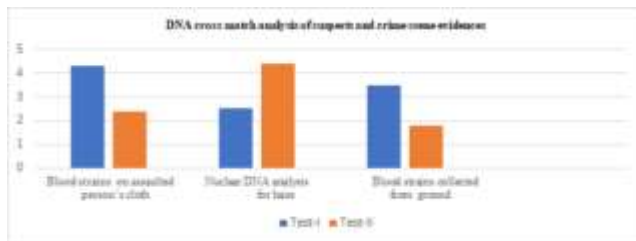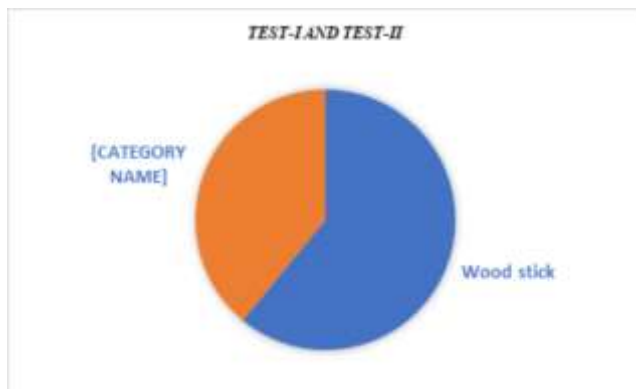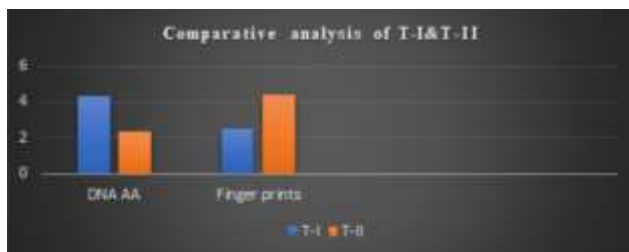| Nature of analysis	Applied test	Employees finger prints cross match test-1 Mean ±SD	Employees DNA cross match test-II Mean ±SD
finger prints on wood stick	Latent printing test	1.0± 0.01	1.0± 0.01

Figure 1

Figure 2

Figure 3

In this study different forensic indicators of Aggravated Assault were collected and analyzed in forensic laboratory. DNA profiling of Aggravated Assault on different biological aspects were analyzed in table-1, the analysis were showed that blood strains on assaulted person's cloth has cross matching regression stranded mean deviation (1.0± 0.01) with office employees and blood strains collected from ground also have cross matched correlation with (3.0± 0.03) suspects respectively. The mitochondrial DNA of hair follicles which was in hands of Aggravated Assault at the time of crime scene has a significant (P<0.05) cross match with suspects (2.10± 0.02) DNA. In table-2 the finger prints similarity index on wooden stick with suspects regarding stranded mean deviation was (1.0± 0.01). All the concluded results were presented graphically in figure-1, figure-2 and figure-3.

DISCUSSION

Akmal et al., (2016) in their study described and used new term i.e. Blood Spatter Analysis for the deep investigation of different crime scenes. Detecting patterns in blood spatter, often known as blood stain patterns, is a relatively recent field in forensics. The goal of this investigation is to figure out how a crime was committed. This is performed by paying close attention to the distribution of blood at the crime scene [3]. The directional slide of each droplet of blood when the bat impacts items in its path will show the direction of travel of these droplets of blood. Blood from a victim adhered to the bat can be dispersed during the bat's upstroke, which will be used for the next strike and possibly more [6].

Deoxyribonucleic acid is a molecule that contains the genetic blueprint used by all living creatures in their development, operation, and reproduction [7]. Each living organism has a specific DNA profile that can't be found in any other members of its species. In humans, DNA comparisons can be used to make high-probability matches between wasted body contents and the person from whom those substances originate [10]. History can be re-examined using DNA analysis to clear those wrongly imprisoned for crimes they didn't commit, thanks to the emergence of this new technology [15]. Deoxyribonucleic acid is a strong segment for deep investigators and may be considered each time discarded bodily material is collected at a crime scene. Even the tiniest amounts of material can be used for DNA comparison.

Fingerprint forensics has a lengthy history in law enforcement. It is widely acknowledged that fingerprints are different of each individual. Expert fingerprint matches accepted as proof of identity beyond a reasonable doubt by the courts are common. Fingerprints and dental x-rays were the only reliable techniques of making a conclusive identity using biometric scanning technologies. Currently fingerprints analysis search is done electronically by using a biometric scanning process called Automated Fingerprint Identification System. Present study was conducted by applying modern scientific techniques for identify criminal persons. In this study the researchers were considered latest practical technology for DNA profiling, blood stain analysis and fingerprints detection. Further scientific research crime finding in communities are required.

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