

## **An Empirical Analysis of Police Perceptions about Role of Forensic Science in Crime Investigation**

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### ***Abstract-***

*The objective of the present study was to find out importance of forensic science from the point of view of the investigating officers i.e., police. The police officers who are involved in the work of crime investigation in the city of Nagpur, Maharashtra, India were selected as a sample of the study. The data was collected by personally visiting randomly selected police stations and distributing the questionnaire to the investigating officers there at. In all total 152 participants data was collected and analysed. The results indicated that near about all the investigating officers were aware about forensic science and its utility in the process of crime investigation. Similarly, participants agreed with the fact that crime scene management plays very important role in the process of investigation.*

**Keywords:** Police perspective, crime investigation, forensic science, importance, crime scene management.

### **I. Introduction**

Crime is an indivisible part of every society. There is no society in the world without the existence of crime. Thus, the role of criminal justice system becomes very essential in eradicating the menace of crime from the society. In every system of government, a separate wing is constituted to deal with the problem of crime by name Criminal Justice System of that country. Criminal Justice System which not only includes the investigating agencies such as police and other enforcement agencies, but it also includes the judiciary and prison administration

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as well. After occurrence of any crime in the society, the first agency which came into motion is the police machinery. Therefore, upon receiving information as to crime occurrence, it is the duty of police officers being first responding officers to immediately reach at crime scene and take all necessary steps as required by the law. Such duties of police officers include-

- Immediately reaching at crime scene and protecting the evidence present from contamination by securing crime scene.
- Begin taking crime scene security measures by using barrier tape, official vehicles, or other means, as required.
- Establish a crime scene security log to record any persons who enter or exit the crime scene and limit access to those who truly need it.
- Prevent contamination of the scene with materials brought in after the crime has occurred.
- Provide Assistance to the victims if required.
- Search for and arrest the suspect if he is still thereon
- Record statements of eyewitnesses and other witnesses. If possible, keep the witnesses separated to preserve their objectivity.
- Seize the articles, weapons etc if present on the crime scene.
- Document all movements, alterations, or changes made to the crime scene and pass this information to crime scene investigators.

## **II. What is Forensic Science?**

The term “forensics” means ‘the art or study of formal debate; argumentation.’<sup>3</sup> However, the word forensics now a day is used mostly in the area where assistance is provided by scientific community to the criminal justice system. Many dictionaries nowadays interchangeably use words “forensics” and “forensic science”. The Oxford English Dictionary describes the phrase “forensic science” as “a mixed science”.<sup>4</sup> As per this definition the early period of evolution of

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<sup>3</sup> THE AMERICAN HERITAGE® DICTIONARY, 2020.

<sup>4</sup> OXFORD ENGLISH DICTIONARY, 2005.

forensic science could be called as a mixed science as there at science served justice by its application to the questions before the court.<sup>5</sup> Forensic science describes the science of associating people, places, and things involved in criminal activities; these scientific disciplines assist in investigating and adjudicating criminal and civil cases. The discipline divides neatly into halves, like the term that describes it. “Science” is the collection of systematic methodologies used to increasingly understand the physical world. The word “forensic” is derived from the Latin forum for “public.”<sup>6</sup>

Forensic science is the application of the scientific method to legal questions. The laws themselves are enforced and upheld by the criminal justice system including federal, state, and local law enforcement agencies and the courts. The goal of the criminal justice system is the establishment of the guilt or innocence of a suspect or suspects accused of a crime.<sup>7</sup> The importance of forensic science to criminal law lies in its potential to supply vital information about how a crime was committed and who committed it. If the information survives the screening function of the rules of evidence, it can be accepted as evidence of a material fact in the ensuing trial.<sup>8</sup> The Forensic scientists are the agency which is a part of this criminal justice system but as it is endowed with function of assisting police in crime investigation, they are included in the wing of investigating agency.

“Forensic science is the scientific discipline which is directed to the recognition, identification, individualisation and evaluation of physical evidence by the application of principle and methods of natural sciences for the purpose of administration of criminal justice.”<sup>9</sup> As per Oxford Advanced Learners Dictionary “investigation is an official examination of facts about a situation, an event, crime etc., to find out the truth about it or how it happened.”

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<sup>5</sup> Max M. Houck, J. A. (2010). Fundamentals of Forensic Science.

<sup>6</sup> OXFORD ENGLISH DICTIONARY, 2005.

<sup>7</sup>, K. M. ELKINS, INTRODUCTION TO FORENSIC CHEMISTRY (First edition, 2018).

<sup>8</sup> STUART H. JAMES, J. J. FORENSIC SCIENCE- AN INTRODUCTION TO SCIENTIFIC AND INVESTIGATIVE TECHNIQUES (Fourth Edition ed. 2015).

<sup>9</sup> Nabar, B. S. (2002). Forensic science in crime investigation. Hyderabad: S.P.Gogia.

### III. Types of Forensic Evidence

The evidences which are found at the crime scene can be generally classified into four categories i.e., physical evidence, transfer evidence, trace evidence, and pattern evidence. Physical evidence includes the objects which can be seen by physical observation and is able to provide the understanding as to commission of offence. Weapons, arms, ammunitions, substances used in crime commission are examples of physical evidence.

Transfer evidence is the second type of evidence which is exchanged between two objects as a result of contact. Trace evidence is the third category of evidence which exist in very small size like dust, soil, hair etc which can be transferred between two surfaces without being noticed. Pattern evidence is the fourth type of evidence which refers to evidence in which its distribution can be interpreted so as to ascertain its method of deposition as compared to evidence undergoing similar phenomena. This type of evidence can include fingerprint, footprint etc.<sup>10</sup> Forensic scientists examine firearms, tool marks, controlled substances, deoxyribonucleic acid (DNA), fire debris, questioned documents, fingerprint and footwear patterns, and bloodstain patterns etc. They provide information concerning the corpus delicti; reveal information about the modus operandi; link or rule out the connection of a suspect to a crime, crime scene, or victim; corroborate the statements of suspects, victims, and witnesses; identify the perpetrators and victims of crimes; and provide investigatory leads.<sup>11</sup>

The importance of forensic science is increasing day by day due to use of advanced technology by the offenders in commission of crime. Without use of scientific methods in crime investigation, it is highly impossible to resolve the mystery of the crime. The crime scene management is thus very important step in the process of crime investigation which involves scientific methods of handling the crime scene which further helps in effective investigation of crime. The proper identification, documentation, collection and preservation of physical evidence at a crime scene are the critical first steps in ensuring the integrity and admissibility

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<sup>10</sup> Maras H. Marie, M. D. (2014). Forensic Science. New York: Springer Science+Business Media.

<sup>11</sup> *Ibid.*

of the physical evidence.<sup>12</sup> Judiciary is also considering forensic evidence as an essential type of evidence during trial. Since 99% of the investigations of criminal cases are done only by police officers,<sup>13</sup> it becomes very important to understand the factual knowledge and viewpoint of police personnel about usefulness of forensic science in crime investigation.

#### **IV. Public Perceptions about Role of Forensic Science in Criminal Investigation**

The role of forensic science in Indian criminal justice administration is still at a very basic stage or prohibitory in nature, even though since last few decades, a tremendous technological advancement in scientific era has been made. The Indian legal system and its allied subsidiaries need to be remoulded towards the achievement of result oriented forensic investigation and trial, so that speedy remedy and justice to victims of heinous crimes may be provided.<sup>14</sup> The orthodox attitudes, lack of implementation, lack of funds, lack of training staff, equipment and laboratories etc are the main causes behind poor knowledge of forensic science among society. Not only public even law enforcement agencies such as police lacking the knowledge of forensic science. Society knows it is useful, but they do not know its application.<sup>15</sup> In a study examining the criminal justice system of Bangladesh with a view to find out the scope for the application of forensic science, it is observed that it is a great challenge to utilize the scientific and physical evidence in administration of justice in Bangladesh. There are some shortcomings in the existing laws with respect to applicability of forensic science, so the traditional judicial mechanism is not in favour of giving much importance

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<sup>12</sup>M. K. Fisher, *Crime Scene dynamics*. In A. M. Fisher, *Forensic Evidence management from crime scene to courtroom* (pp. 1-8). CRC Press, Taylor and Francis Group 2018.

<sup>13</sup> Sithannan, V. (2014). *Police Investigation- Powers, Tactics and Techniques*. Online: eBooks2Go.

<sup>14</sup>D. S. Shali, *Applicability of Forensic Science in Criminal Justice System in India. Medico-Legal Desire Media and Publications*, MEDICO-LEGAL REPORTER, Inaugural Issue 2018.

<sup>15</sup> M.A.Avais, *Examining the role of forensic science for the investigative- solution of crimes*. Vol 44 (2) SINDH UNIVERSITY RESEARCH JOURNAL (Sci. series) 251-254 (2012).

to forensic evidence.<sup>16</sup> Forensic Science can also be used to protect the people from false prosecution.<sup>17</sup> In a study to find out public perceptions as to accuracy of forensic science techniques, it is observed that individuals in the United States hold a pessimistic view of the forensic science investigation process, believing that an error can occur about half of the time at each stage of the process.<sup>18</sup> The criminal justice system heavily relies on the results of the forensic examination of evidence collected at crime scenes, especially fingerprint and DNA evidence. The proper collection and submission of this evidence is crucial to the prosecution of a case and the identification of an individual.<sup>19</sup> The evidence collection if done by variety of individuals, from the first responding law enforcement personnel to the highly trained civilian lab/crime scene personnel then multiple handling by leaving lacunas affect badly to the case at trial. The study shows that there is a difference in the results and are dependent on who does the evidence collection. The trained Crime Scene Investigators will give the best results.<sup>20</sup> Thus, it can be said that involvement of Forensic analysis can help in resolving crime mysteries by scientific way. It is high time that we realize the full potential of forensic science and crime scene investigation. The Forensic science labs and law enforcement agencies if provided with the necessary resources and funds to implement the latest technology in solving cases then we can say that we are moving towards reaching the goal of crime free society.<sup>21</sup> The role of forensic science in criminal investigation though corroborative in nature but is proved to be very helpful in dispensation of criminal justice in many influential and complicated matters. The police machinery being indivisible part of criminal investigation, it becomes necessary to find out their opinions as to their requirements with respect to forensic science. Therefore, to check and analyse the

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<sup>16</sup> Ali, A. *Role of forensic science in criminal justice: Bangladesh Perspective*. Vol.2, No.1 SOUTHEAST UNIVERSITY JOURNAL OF ARTS AND SOCIAL SCIENCES, (2017).

<sup>17</sup> A. K. Uzabakiriho, *The role of forensic science in crime investigation in Rwanda*, Vol 3(5), RESEARCH JOURNAL OF FORENSIC SCIENCES, (2015).

<sup>18</sup> M. C. Jacob kaplan, *Public beliefs about the accuracy and importance of forensic evidence in United States*, SSRN ELECTRONIC JOURNAL (2019).

<sup>19</sup> L, P. Police Chiefs/Sheriffs' *Views on Varying Forensic Response*, Vol. 4 Issue 1, JOURNAL OF FORENSIC SCIENCES & CRIMINOLOGY (2016).

<sup>20</sup> *Ibid*.

<sup>21</sup> V. Rathod, *Role of forensic science laboratory in investigation of crime*, JOURNAL OF CRIMINOLOGY & FORENSIC STUDIES (2018).

knowledge and requirements of investigative agencies with respect forensic science the present study is carried out.

## **V. Material and Method**

It is an empirical study based on primary data collected with the help of survey questionnaire method of data collection. This study was conducted on sample of 152 police officers belonging to different police stations in Nagpur city, Maharashtra State, India. The multistage random sampling technique is used for sampling of data. With respect to jurisdiction of police stations, the city of Nagpur is divided into Five Zones. Each zone contains six police stations except zone V wherein eight police stations are there. It means in totality 32 police stations and a cyber-cell is there in Nagpur. So, researcher randomly selected minimum two (2) and maximum three (3) police stations from each zone i.e., in total 14 police stations were selected for the survey. Then the police officers were also selected from amongst the officers involved in the process of investigation by using simple random sampling technique. The officers having rank above constable to Inspector were taken as a sample of the study. The sample is selected in such a way that all possible officers who work on crime scene should be covered in variety. The opinion-based data is collected by distributing structured questionnaire to the sample population and data required is collected accordingly. The collected data further tabulated with the help of MS Excel. The software advanced Excel is used to analyse and graphically represent the data results.

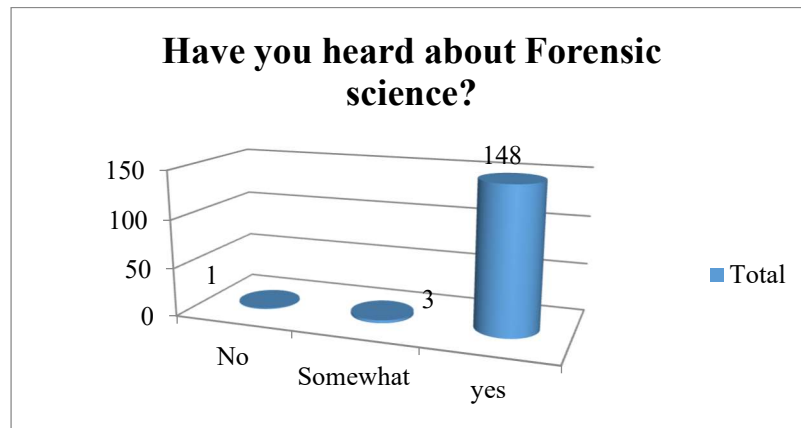
## **VI. Result and discussion**

### **A. Knowledge of Police Officers about Forensic Science**

For analysing the knowledge of police officers about the forensic science the basic question was asked to the sample population. Figure 1.1 provides the data regarding overall knowledge of police officers about forensic science.

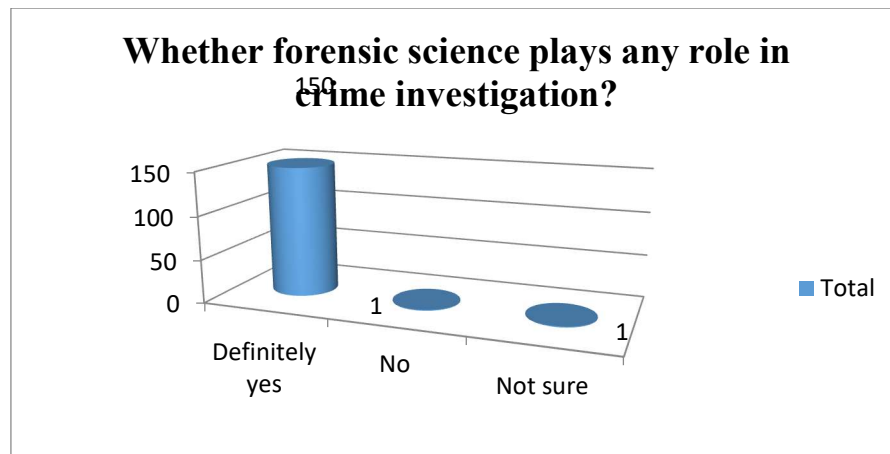
From the information provided in Figure 1.1 it came to know that 97% police officers are having knowledge about forensic science whereas only 1% officers are unknown as to what exactly forensic science is. It means that most of the people working in the process of crime investigation know about forensic science.

Figure 1.1- Knowledge about forensic science



Source: Primary Data

Figure 1.2- Opinion as to role of forensic science in crime investigation

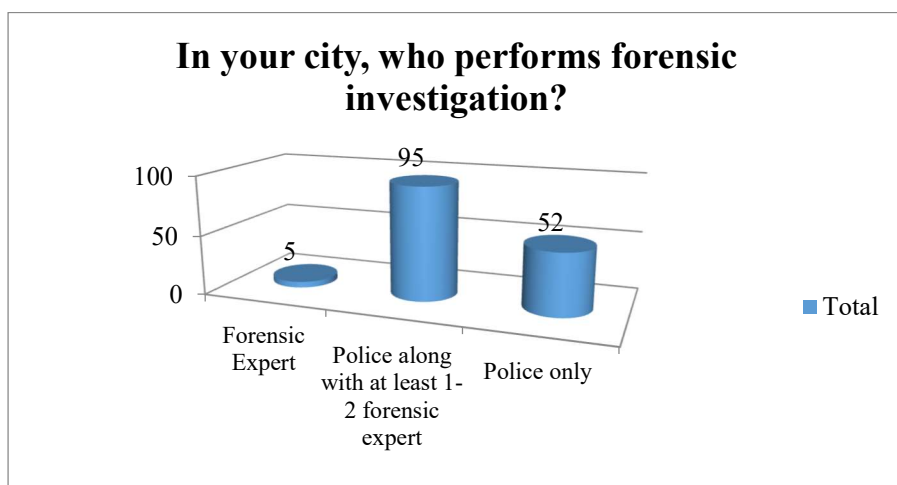


Source: Primary Data

The opinions of police officers as to role of forensic science in crime investigation were shown in Fig 1.2. According to the numbers, 99% of the population affirmed that forensic science plays important role in crime investigation. To assess the practical information about investigative procedure questions were asked to participant.



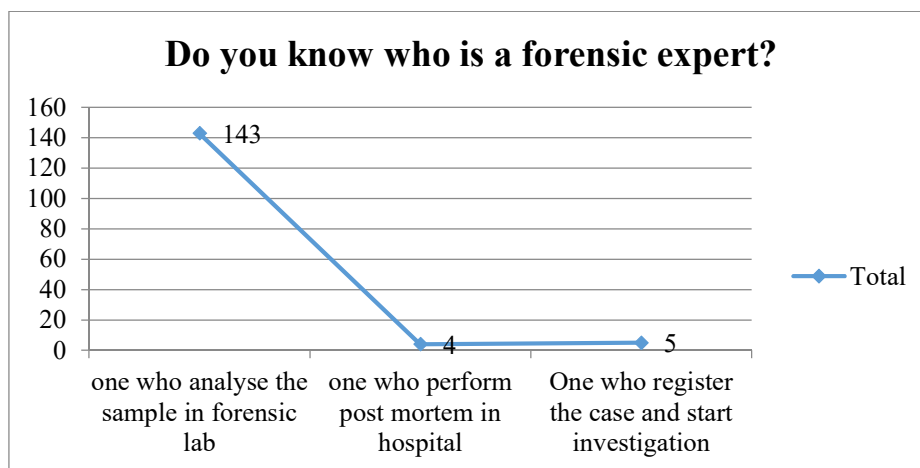
Figure 1.3- Knowledge about forensic investigation



Source: Primary Data

Fig 1.3 indicates that in city of Nagpur as a sample, near about 34% of the police opined that forensic investigation of crime scene is performed by Police only. Whereas 64% stated that police officers accompany forensic investigators at the crime scene. The figures revealed that still in many cases the management of crime scene is done by police personnel only.

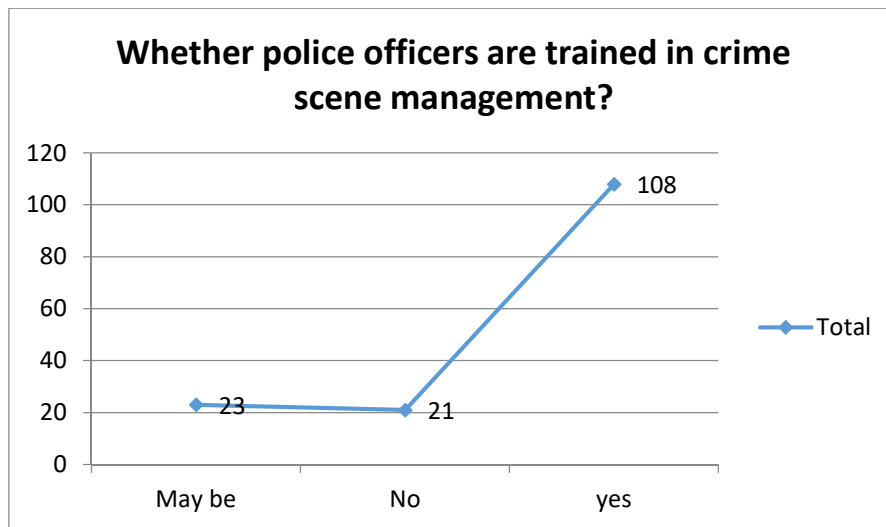
Figure 1.4- Knowledge about Forensic Experts



Source: Primary Data

For analysing whether police officers having knowledge when asked about who forensic experts is, 94% of the population answered one who analyse the sample in forensic lab whereas 3% answered that one who does post-mortem and 3% as one who register the case and start investigation. From Fig 1.4 it become crystal clear that majority of the population know about the forensic experts and what role a forensic expert performs.

Figure 1.5- Does police officers provided with Training in crime scene management



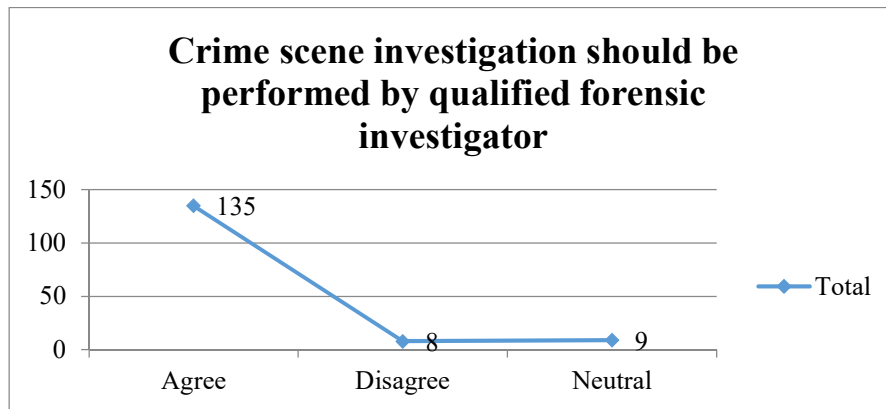
Source: Primary Data

In furtherance of this while answering question as to whether they get any training as to crime scene management or not, 71% participants voted in favour, 14% voted against whereas 15% voted for sometimes they get training (Fig 1.5).

#### **B. Opinion as to investigation of crime scene-**

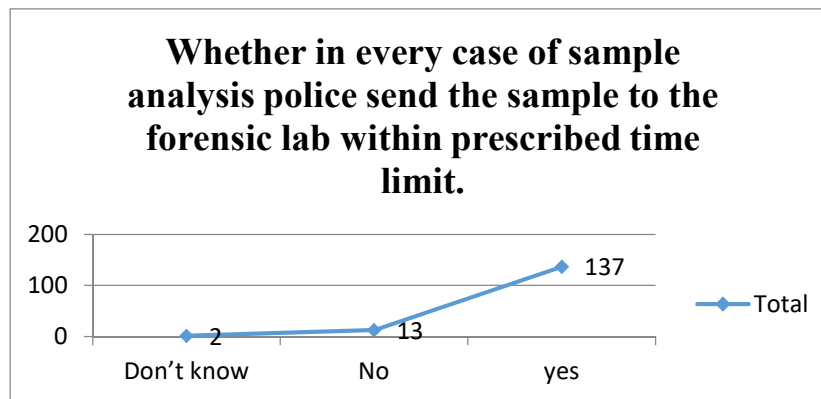
In above point the information as to forensic science and the knowledge of police officers about forensic science is analysed. As we came to know that in many cases crime scene investigation is performed by police, the opinions of the police officers were analysed for knowing their viewpoint as to crime scene investigation. Out of the total sample assessed, majority of the population opined that crime scene investigation should be performed by qualified forensic investigator whereas 5% are disagree and 6% are neutral with it (Fig 2.1)

Figure 2.1- Opinion as to investigation of crime scene



Source: Primary Data

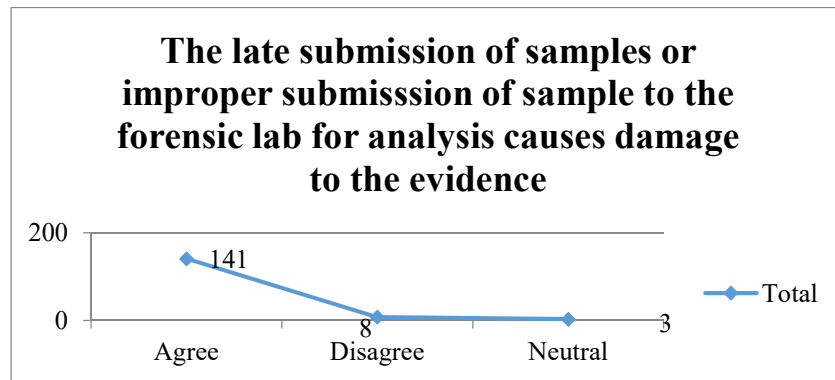
Figure 2.2- Opinion as to timely sending of sample for analysis to FSL



Source: Primary Data

Also, majority of the population knew that late or improper submission of sample may cause damage to the sample and in turn is prejudicial to the crime investigation (Fig 2.3)

Figure 2.3- Opinion as to effect of late submission of sample to FSL

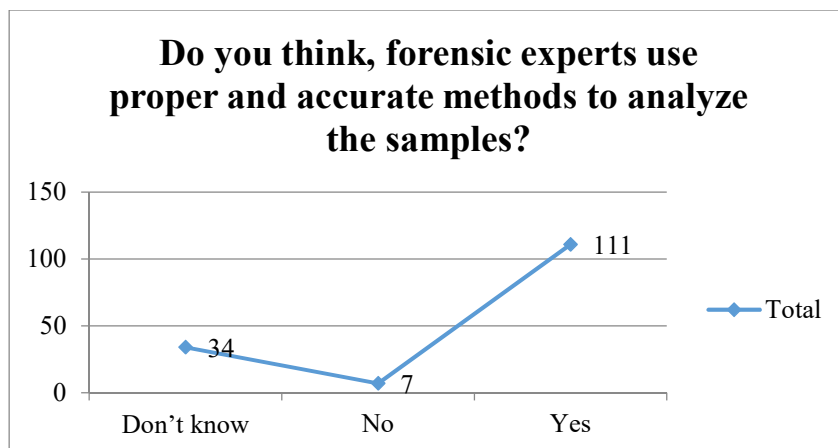


Source: Primary Data

**C. Testing efficiency of forensic laboratories-**

So as to analyse opinions as to working efficiency of forensic science laboratories (FSL's) some questions were asked to the sample population of police officers. As per the results of the study, 73% participants believe that forensic experts analyse the sample properly whereas 5% disbelieve upon the results of forensic labs (Fig 3.1).

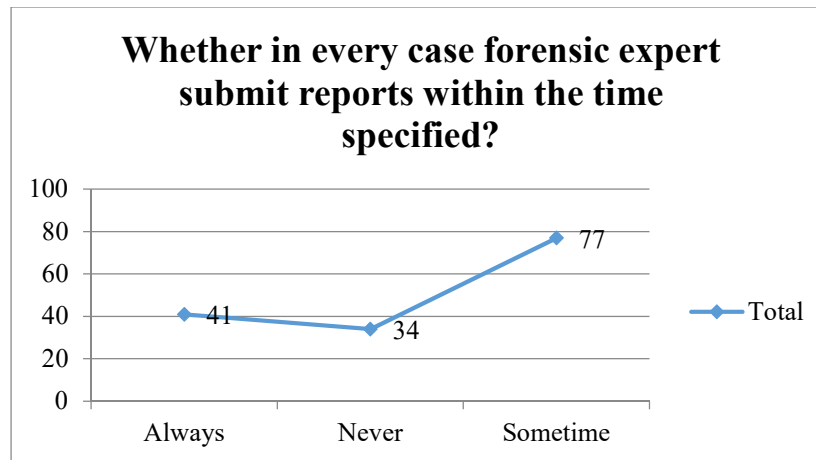
Figure 3.1- Opinion as to accuracy of sample analysis by FSL



Source: Primary Data

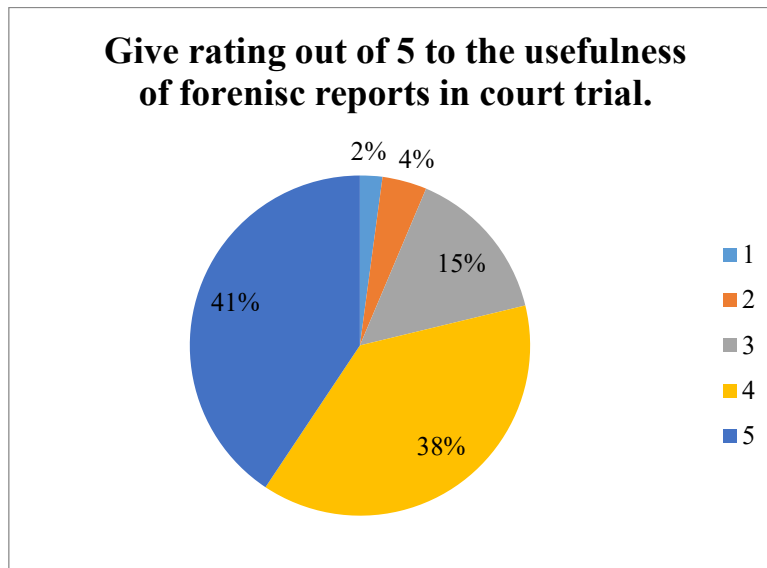
Further as to timely submission of Reports by forensic labs, only 27% population answered in positive whereas 22% answered in negative. Rest of the 51% population said that sometimes they submit on time (Fig 3.2).

Figure 3.2- Submission of Reports by Forensic Labs within time



Source: Primary Data

Figure 3.3- Usefulness of Forensic Reports in Trial



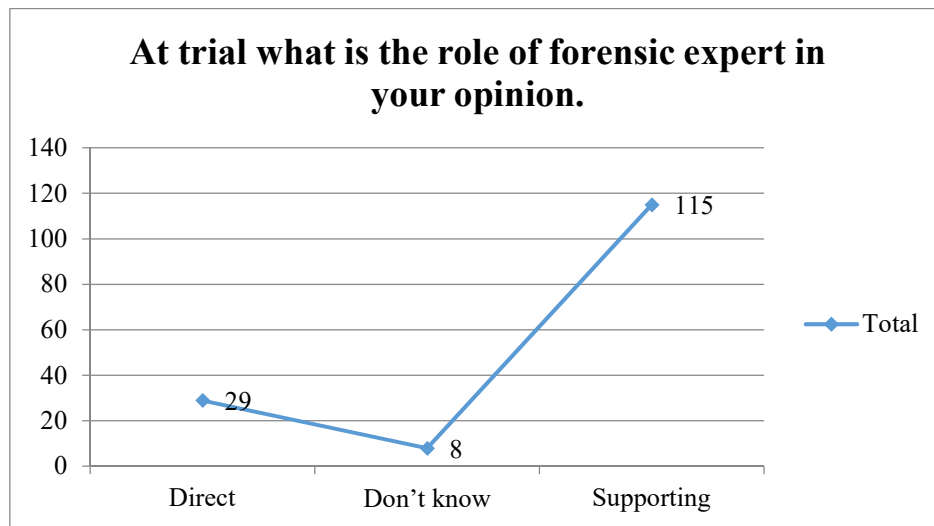
Source: Primary Data

Further when took point of view of police officers as to usefulness of forensic Reports during trial, 79% opined in favour whereas 31% voted against it (Fig 3.3). From the above analysis it become clear that no doubt forensic labs reports are useful for crime investigation and also during trial but are many times not submitted on time and police population is not satisfied with working of forensic labs due to the late submission of Forensic reports by it.

#### **D. Opinions as to role of forensic science at Trial-**

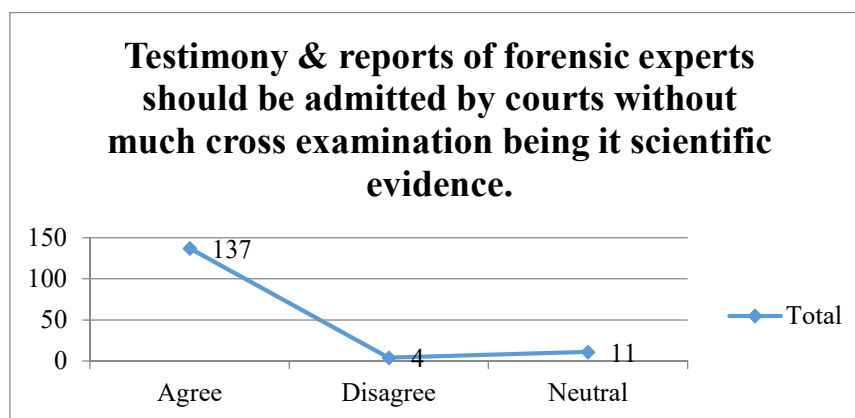
From the above discussion it is clear that forensic reports are useful in the process of crime investigation but what role they exactly play during trial and does police officers had knowledge about it or not some questions further asked and analysed. From the study it become clear that majority of the police officers knew that role of forensic experts is supportive and not direct (Fig 4.1) and being it scientific evidence, it should be admitted by Courts without much cross examination (Fig 4.2).

Figure 4.1- Opinion as to role of forensic expert during trial



Source: Primary Data

Figure 4.2- Opinion as to admissibility of forensic reports

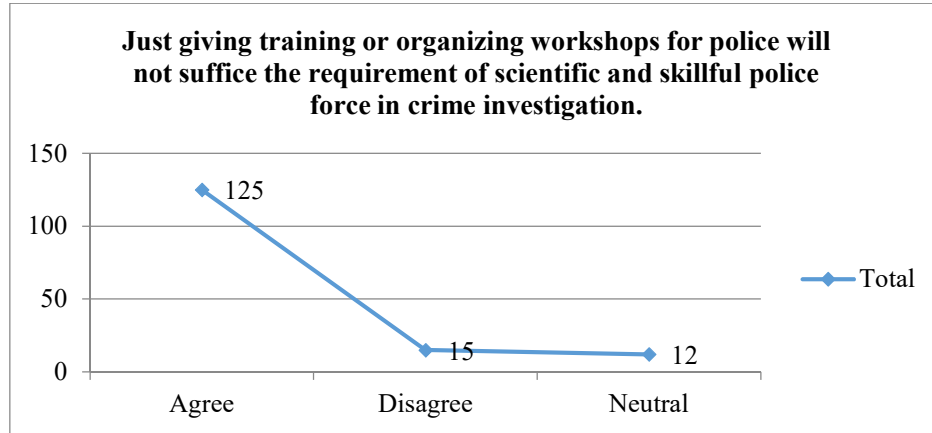


Source: Primary Data

#### E. Opinions as to need and necessity of forensic experts in crime investigation-

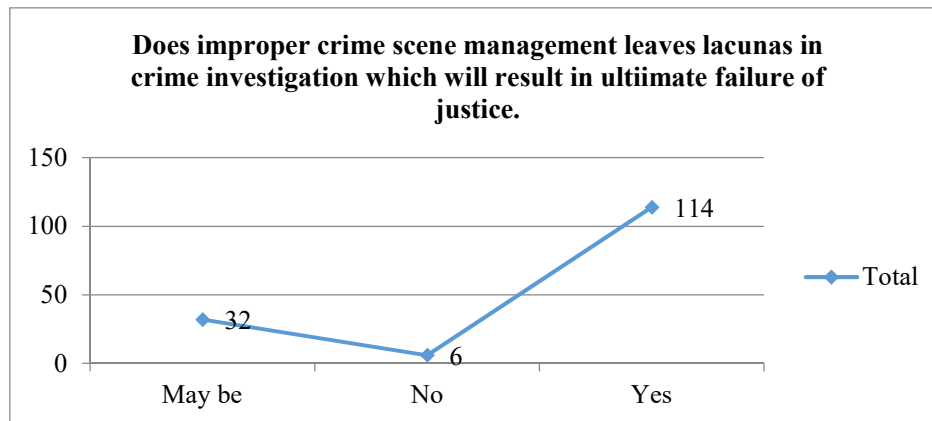
Finally with a view to analyse need and necessity of forensic experts in crime investigation further analysis is done. As per the view of most of the sample population, just giving training or organizing workshops for police will not suffice the requirement of scientific and skilful police force in crime investigation (Fig 5.1). Majority of the sample viewed that improper crime scene management may leave lacunas in crime investigation and ultimately in delivery of justice (Fig 5.2). Therefore 89% population opined that crime scene investigation should be performed by qualified forensic experts only (Fig 5.3). Therefore, majority of the population suggested that appointment of forensic expert at every police station can be a solution for efficient and accurate crime scene management which ultimately help in speedy investigation (Fig 5.4) and should be performed by qualified forensic experts only (Fig 5.3).

Figure 5.1- Does giving training can suffice the requirement of Forensic investigators



Source: Primary Data

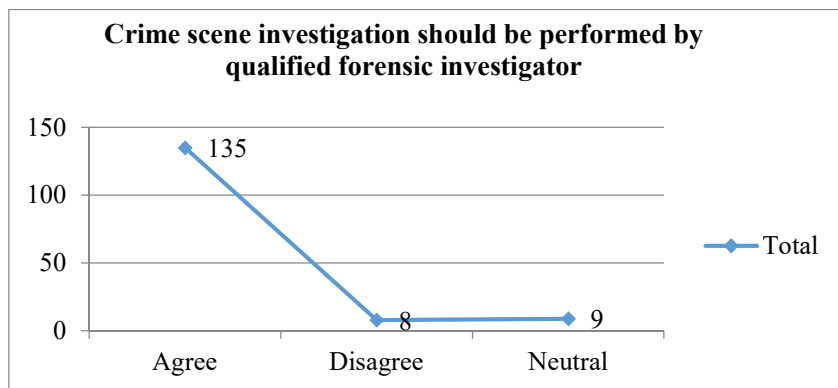
Figure 5.2- Does Improper crime scene management leaves lacunas in investigation



Source: Primary Data

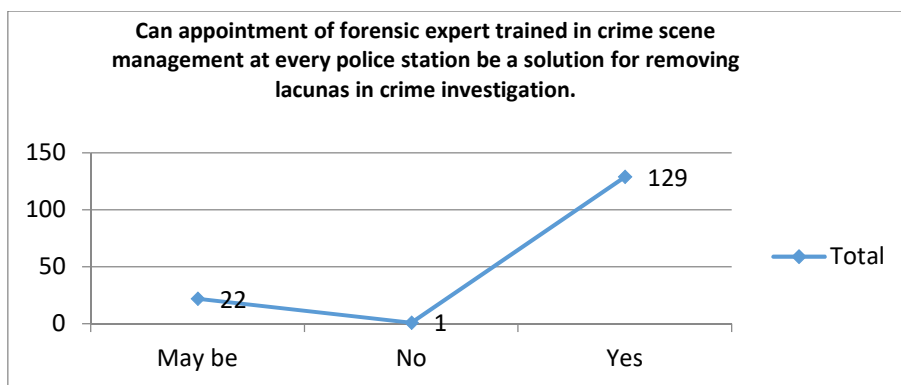


Figure 5.3- Opinion as to who should perform crime scene investigation



Source: Primary Data

Figure 5.4- Opinion as to Appointment of Forensic investigators at police stations



Source: Primary Data

From analysis of the above data researcher came up with some findings as to importance of forensic science in crime investigation from the perspective of the police officers-

1. Majority of the police officers who are involved in the task of crime investigation have knowledge about what exactly forensic science is and is helpful in investigation of crime. The investigation of crime no doubt is the work of police machinery, but they need assistance of forensic experts, and it is lacking. Still many crime scenes are handled by police themselves. They are of the view that if training is given to them, they can handle the task more efficiently. It means that

now the task of creation of awareness about importance of forensic science among different stakeholders already accomplished. So instead of organising awareness workshops, if advanced training is given to police personnel's it will help more to them in performing their duties. It is observed that still no advanced training is given to police, and they are left only with teaching the basic concepts of forensic science through lecture method and therefore police officers feel that they need expert guidance. Instead, if advanced training is given, they can manage the crime scene without any errors, and it can help in effective administration of justice.

2. About forensic laboratories, police officers are not very happy with the working of it as according to them laboratories fail to submit report of analysis on time. The sending of sample is done by police on time, but laboratories sometimes send report on time and sometime not.

3. The report of forensic analysis plays very important part at trial and so forensic experts should be very careful and cautious while analysing the sample. It is admitted that in complicated cases judiciary always rely and put trust upon forensic analysis and thus if reports are not up to the mark, then it causes irreparable damage, and all the efforts of investigating agencies turn out to be useless and thus duty of forensic expert is very crucial in this regard.

4. About forwarding assistance of forensic experts, police officers are of the view that if crime scene investigator is appointed for assistance in crime investigation it can be a solution for reaching at speedy and effective investigation of crime.

## **VI. Suggestions and Conclusion**

In the present era of technological advancement, criminals already moved from traditional modes of commission of crime to using advanced methods. Being techno savvy criminals now have very easy access to advanced tools and techniques which can easily save them from the clutches of law. Forensic science thus plays very important role in crime investigation. No doubt police machinery is well trained in handling crime scene but as they didn't have scientific education with respect to crime scene management some lacunas may be left by them which can affect adversely to the case. In this study researcher tried to find out police perspectives with regard to usefulness of forensic science in crime investigation process. Among the total population 99% respondents agree with the usefulness

of forensic science in the process of crime investigation. As improper handling of crime scene may leave lacunas in the process of investigation which raise questions on efficiency of investigating machinery therefore it is essential that the investigating machinery should be equipped with the skilled manpower trained in forensic science. At present no police station is equipped with skilled manpower specialised in forensic science. The police officers are trained in that regard by organising training sessions but the study shows that it will not suffice the requirement of skilled crime scene handling machinery and therefore it is recommended at every police station at least one crime scene investigator should be appointed who will help in handling and collection of samples at crime scene. Also, the appointment of forensic crime scene investigator will open opportunities of job for the forensic students, and it will also help in reaching the object of more scientific and accurate investigation by police which ultimately resulting into speedy and effective administration of justice.