



## **Knowledge And Perception of a Forensic Lab Setup Criteria in India Among Health Care Workers.**

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### **ABSTRACT**

**Introduction:** Forensic science lab refers to the area of analysing, processing and evaluating the evidence collected . Forensic science implies applying the science to criminal and common laws. It can be characterized as the use of science and innovation to the criminal equity system. A Forensic Science research facility has a remarkable spot in organization of the equity framework.

**Aim:** The aim of the present study is to access the knowledge and perception of a forensic lab setup criteria in India among health care workers.

**Materials and methods:** Self administered questionnaire was prepared and it was distributed among undergraduate dental college students through online survey forms "GOOGLE FORMS". SPSS software was used to analyse the results. Chi square test was used as inferential statistics.

**Results:** In the present study, 91% think that security design like CCTV, escort only design are important in forensic lab setup. To the question, Which of these do you feel is more important in setting up a forensic lab, 31.67% responded to evidence preservation devices, 19.67% responded to software applications and 48.67% responded to all the above. In the present study, 75.67% of the participants think wearing a PPE is important inside the forensic lab.

**Conclusion:** The overall knowledge and perception on forensic lab setup criteria in India tends to be moderate among health care workers . From the present study, 5-10 years of experienced participants had good knowledge and perception on forensic lab setup criteria.

**Keywords:** Forensic science,lab, setup, health care workers, eco friendly

### **INTRODUCTION**

Forensic science lab refers to the area of analysing, processing and evaluating the evidence collected . Forensic science implies applying the science to criminal and common laws. It can be characterized as the use of science and innovation to the criminal equity system. A Forensic Science research facility has a remarkable spot in organization of the equity framework(1). Forensic science contributes in a huge way in organization of the criminal equity framework by giving logical and central data to exploring offices lastly to the courts. In addition, because of the effect of electronic media, exploring news coverage, tele-serials like clinical analyst, CSI and x-records contributed a ton in attention to the overall population about the utilization of scientific investigation in criminal justice (2). Criminological research facility hardware goes from magnifying instruments, rage hoods, chromatographs and spectrometers, to gear utilized for explicit measurable investigation, as cyanoacrylate smoldering chambers for lifting of dormant fingerprints (3). Equipment Devices, Software Applications, Specialized Accessories, Evidence Collections, Specialized Devices, Evidence Preservation, Specialized unit, Digital Data Investigation Kits, Other equipment Assemblage Tools, Transmission Cables and Data Connectors are the fundamental necessities required in measurable lab arrangement(4). Measurable researchers use brushes, cameras and tape to catch fingerprints. They likewise have PCs in the lab that are utilized to break down fingerprints and contrast the accumulated prints with a specimen's prints or to existing databases(5). The criminological researcher gathers proof at crime locations, dissects it in an innovative lab, and attracts on target science to reproduce the subtleties of the wrongdoing. Scientific Laboratory Equipment are Atomic Spectroscope, Arc Spark Spectrometer, Evidence Storage. Proof Drying Cabinet, Fingerprint Analyst, Fingerprint Development Chamber, Fluorescence Spectroscopy/Fluorometry, Forensic DNA Analysis, Forensic Light Sources, Forensic Toxicology, Gas Chromatography Equipment (6). Previously our team had conducted

numerous original studies and surveys over the past 5 years. Now we are focussing on epidemiological surveys. The idea for this survey stemmed from the current interest in our community. Our team has extensive knowledge and research experience that has translate into high quality publications(7),(8),(9),(10),(11),(12),(13),(14),(15),(16),(17),(18),(19),(20),(21),(22),(23),(24),(25),(26). The aim of the present study is to access the knowledge and perception of a forensic lab setup criteria in India among health care workers.

## MATERIALS AND METHODS

### Study design

A cross sectional study was conducted through an online survey from February to April 2021 among dental practitioners and specialist

### Study subjects

A simple random sampling was used to select the study participants.

### Ethical considerations

Returning the filled questionnaire was considered as implicit consent as a part of the survey. Ethical approval for the study was obtained from the Institutional Review Board (IRB), Saveetha Dental College.

### Study methods

Self administered questionnaire of close-ended questions was prepared and it was distributed among health care workers from February to April 2021 through the online survey “google forms”. The collected data were checked regularly for clarity, competence, consistency, accuracy and validity. Demographic details were also included in the questionnaire.

### Statistical analysis

Data was analysed with SPSS version (22.0). Descriptive statistics as percent were calculated to summarise qualitative data. Chi square test was used to analyze and the confidence interval level was 95% and of statistical significance  $P < 0.05$ . Finally, the result was presented by using bar charts, pie charts and percentage tables.

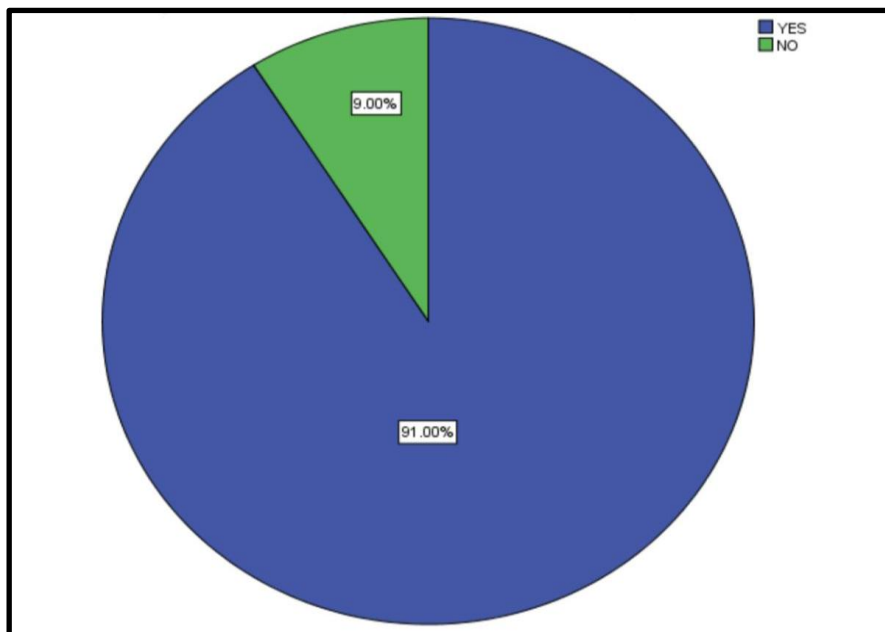
## RESULTS AND DISCUSSION

Among 104 participants, 37.9% were males and 47.1% were females. Among the health care workers, 20% of the participants had 0-5 years of experience ,30 % of the participants had 5-10 years of experience and 50% of the participants had above 10 years of experience . In the present study, 91% think that security design like CCTV, escort only design are important in forensic lab setup. To the question, Which of these do you feel is more important in setting up a forensic lab, 31.67% responded to evidence preservation devices, 19.67% responded to software applications and 48.67% responded to all the above. In the present study, 75.67% of the participants think wearing a PPE is important inside the forensic lab. It is interesting to see that 74.88% think setting security alarms inside a forensic lab is important. About 74.67% of the participants in the present study agreed that electrical design systems like UPS and emergency generators are compulsory. Regarding whether it is a safer job for females, 74.67% responded to yes. In the present study, 68% of participants think that setting up a forensic lab in India is expensive . Regarding the preference of the analysis method, 59.67% of participants responded to computer analysis and 40.33% of the participants responded to traditional methods. The percentage of responses on knowledge and perception of forensic lab setup criteria in India among healthcare workers is given in [Table 1].

**Table 1: Depicts percentage of responses on knowledge and perception of a forensic lab setup criteria in India among health care workers.**

S.NO	QUESTION	CHOICES	PERCENTAGE
1.	Gender	1. Male 2. Female	1. 37.9% 2. 47.4%
2.	Age	1. 20-30 years 2. 30-40 years 3. Above 40 years	1. 23.3% 2. 34.4% 3. 42.3%
3.	Year of experience	1. 0-5 years	1. 20%

		2. 5-10 years 3. Above 10 years	2. 30% 3. 50%
4.	Do you think security design like CCTV, escort only design are important in forensic lab setup	1. Yes 2. No	1. 91% 2. 9%
5.	Do you think wearing a PPE is important inside the forensic lab?	1. Yes 2. No	1. 75.67% 2. 24.33%
6.	Do you think setting up a forensic lab in India is expensive?	1. Yes 2. No	1. 68% 2. 32%
7.	Do you think it is a safer job for females?	1. Yes 2. No	1. 74.67% 2. 25.33%
8.	Which of these do you feel more important in setting a forensic lab ?	1. Evidence storage device 2. Software applications 3. All the above	1. 31.67% 2. 19.67% 3. 48.67%
9.	What do you prefer?	1. computer analysis 2. Traditional analysis	1. 59.67% 2. 40.33%
10.	Do you think a security alarm is important inside a forensic lab?	1. Yes 2. No	1. 74.88% 2. 25.12%
11.	Electrical design systems like UPS and emergency generators are compulsory.	1. Yes 2. No	1. 74.67% 2. 25.33%



**Figure 1: Pie chart representing percentage distribution of knowledge on security design of forensic lab. Blue colour denotes yes and green colour denotes no. About 91% had good knowledge on security design.**

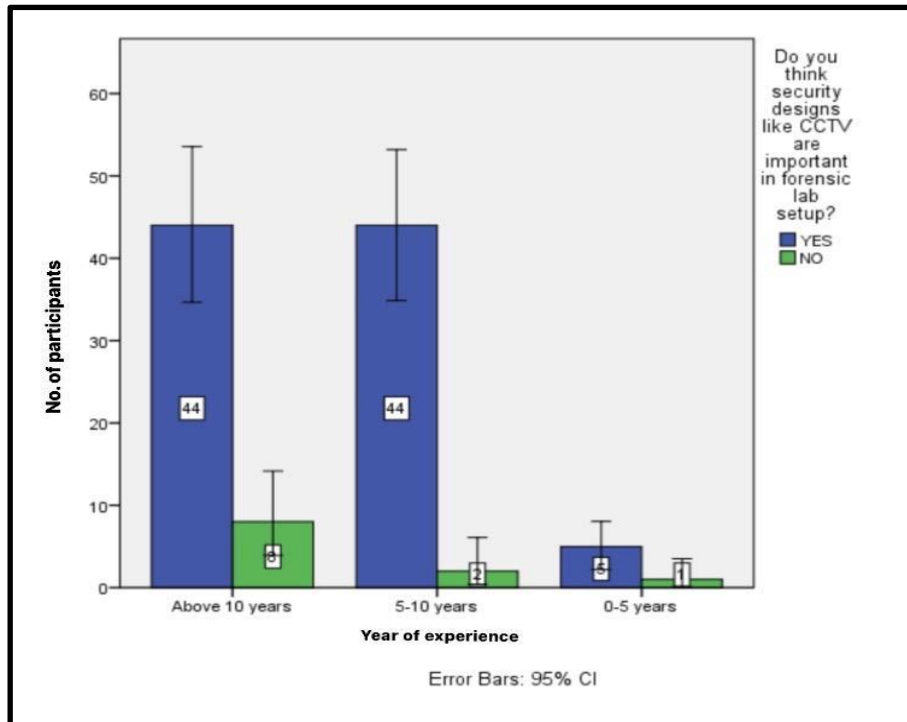


Figure 2: Bar graph representing the association of year of experience and knowledge on security design of forensic lab. X axis represents the year of experience and Y axis represents the number of participants responded, blue colour denotes yes and green colour denotes no. Majority of 44 participants were above 10 years and 5-10 years of experienced participants had good knowledge. There was no significant difference between the year of experience and knowledge on security design like CCTV are important in forensic lab setup. Pearson chi square test- 1.709, P value = 0.425 (>0.05) - statistically not significant.

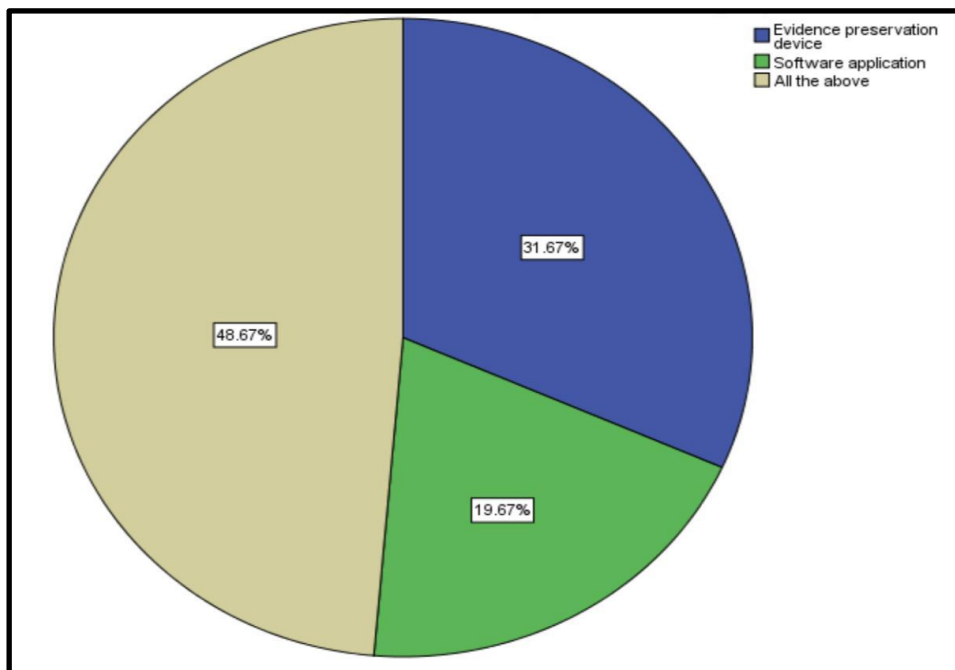


Figure 3: Pie chart representing percentage distribution to the question which of these do you feel more important in setting a forensic lab. About 31.67% responded to evidence preservation devices, 19.67% responded to software application and 48.67% responded to all the above.

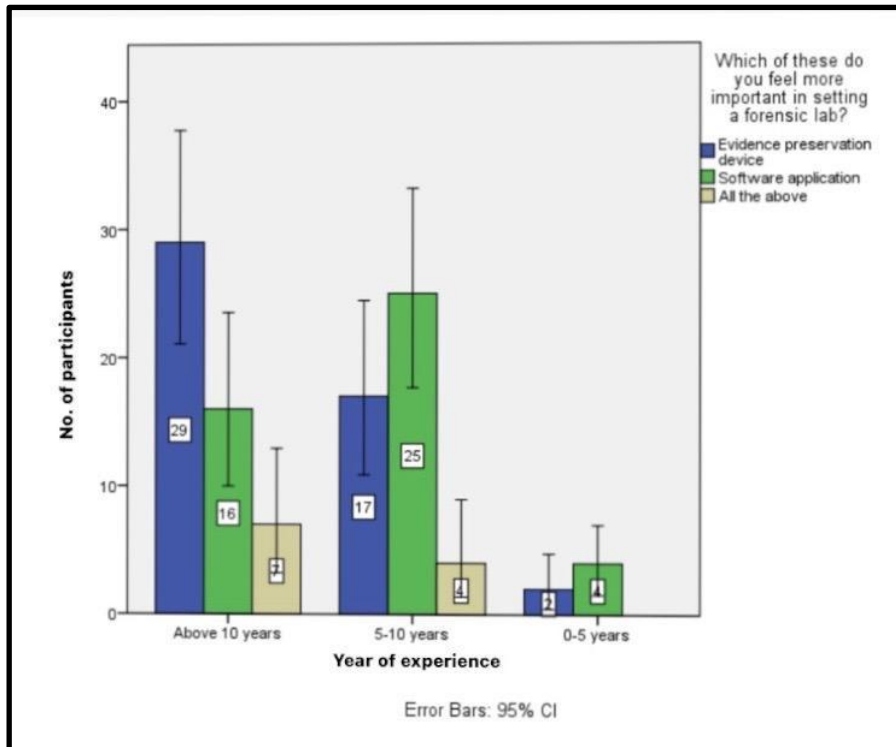


Figure 4: Bar graph representing the association of year of experience and which of these do you feel more important in setting a forensic lab. X axis represents the year of experience and Y axis represents the number of participants responded, blue colour denotes evidence preservation device, green colour denotes software applications and sandal colour denotes all the above. Majority of 29 participants were above 10 years of experienced participants responded to Evidence preservation device. There was a significant difference between the year of experience and knowledge. Pearson chi square test- 86.947 , P value = 0.000 (<0.05) - statistically significant

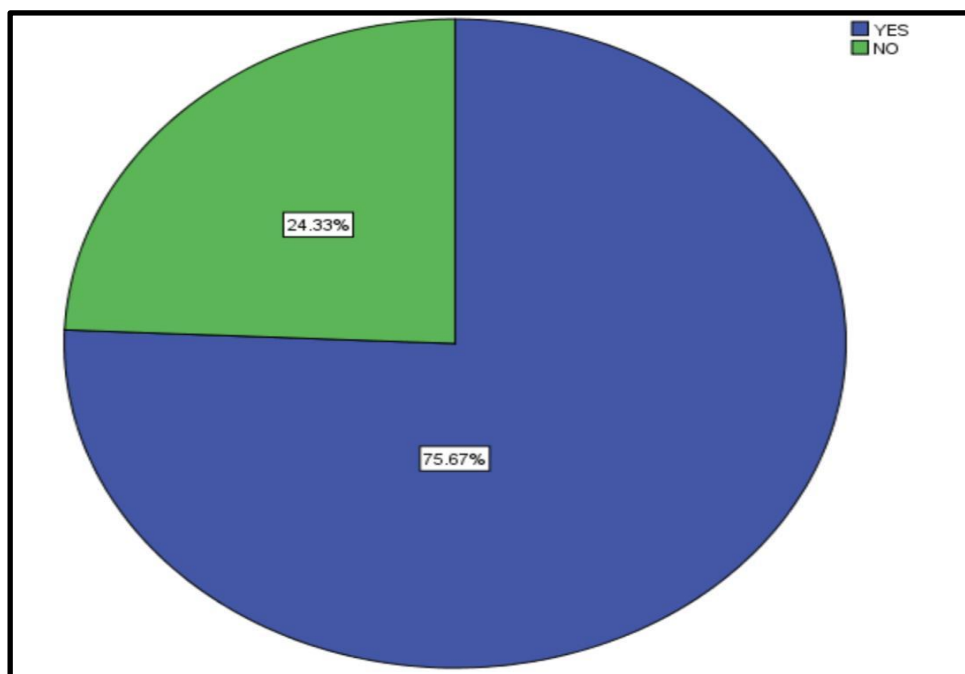


Figure 5: Pie chart representing percentage distribution of knowledge on wearing PPE inside forensic lab. Blue colour denotes yes and green colour denotes no. 75.67% had good knowledge on PPE.

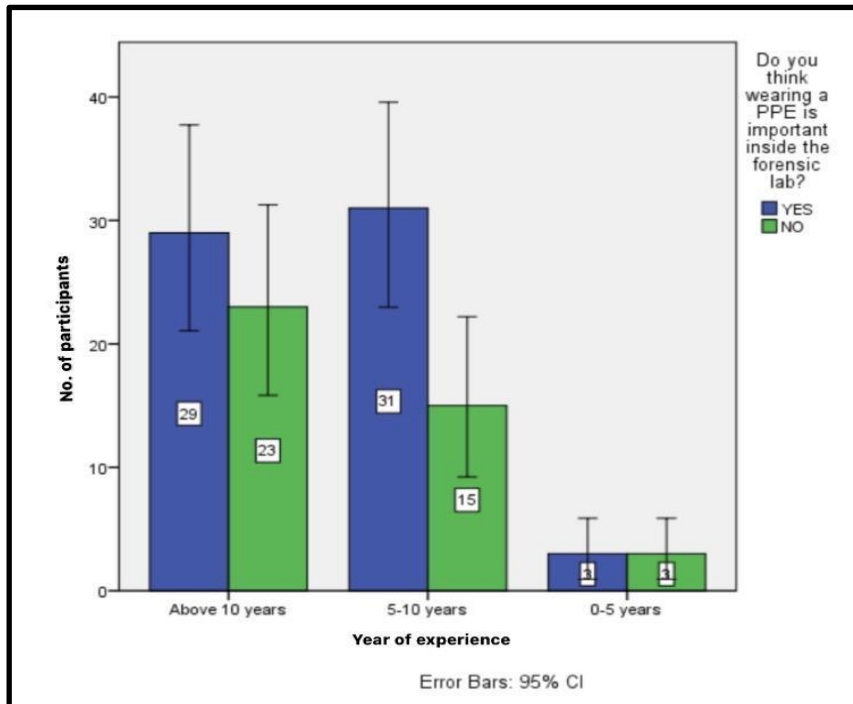


Figure 6: Bar graph representing the association of year of experience and knowledge on wearing PPE. Xaxis represents the year of experience and Y axis represents the number of participants responded, blue colour denotes yes and green colour denotes no. Majority of 31 participants were 5-10 years of experienced participants had good knowledge . There was a significant difference between the year of experience and knowledge. Pearson chi square test- 80.526 , P value = 0.000 (<0.05) - statistically significant

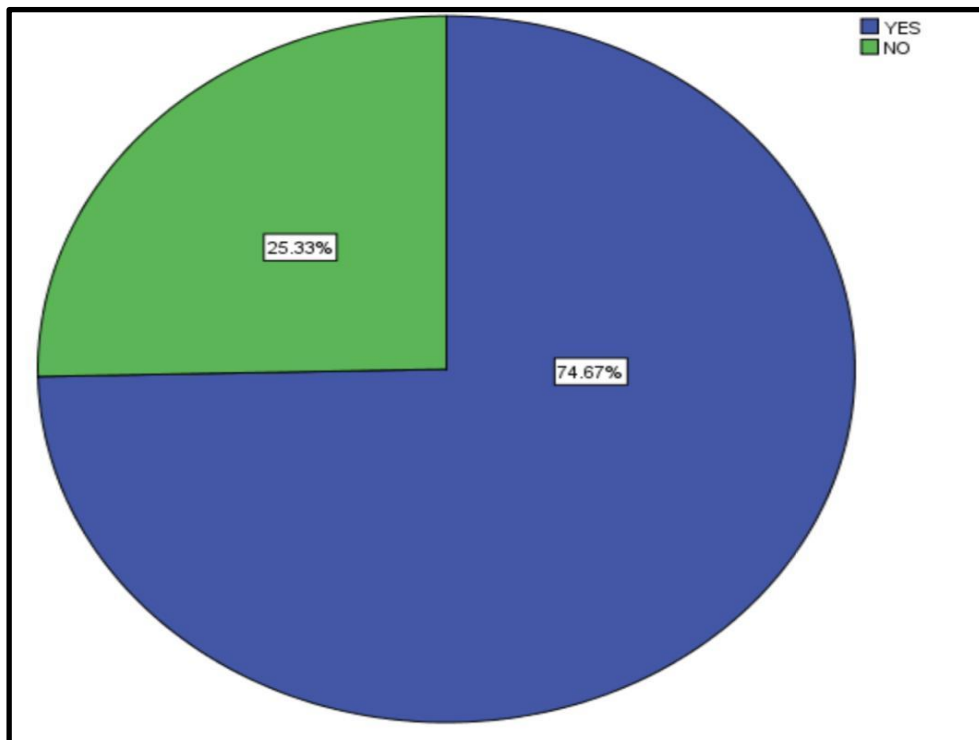


Figure 7: Pie chart representing percentage distribution of perception on whether it is a safer job for females. Blue colour denotes yes and green colour denotes no. About 74.67% of participants felt it is a safer job for females.

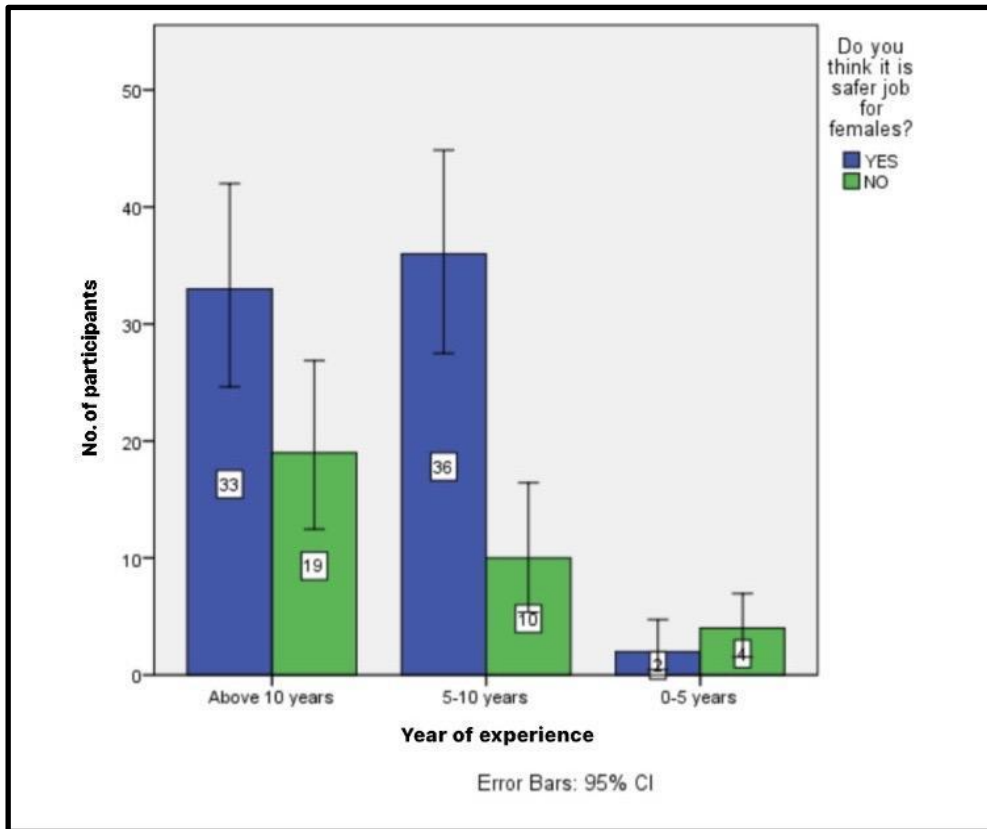


Figure 8: Bar graph representing the association of year of experience and perception of safer job for females. Xaxis represents the year of experience and Y axis represents the number of participants responded, blue colour denotes yes and green colour denotes no. Majority of 36 participants were 5-10 years of experienced participants had good perception. There was no significant difference between the year of experience and perception. Pearson chi square test- 3.630 , P value = 0.163 (>0.05) - statistically not significant.

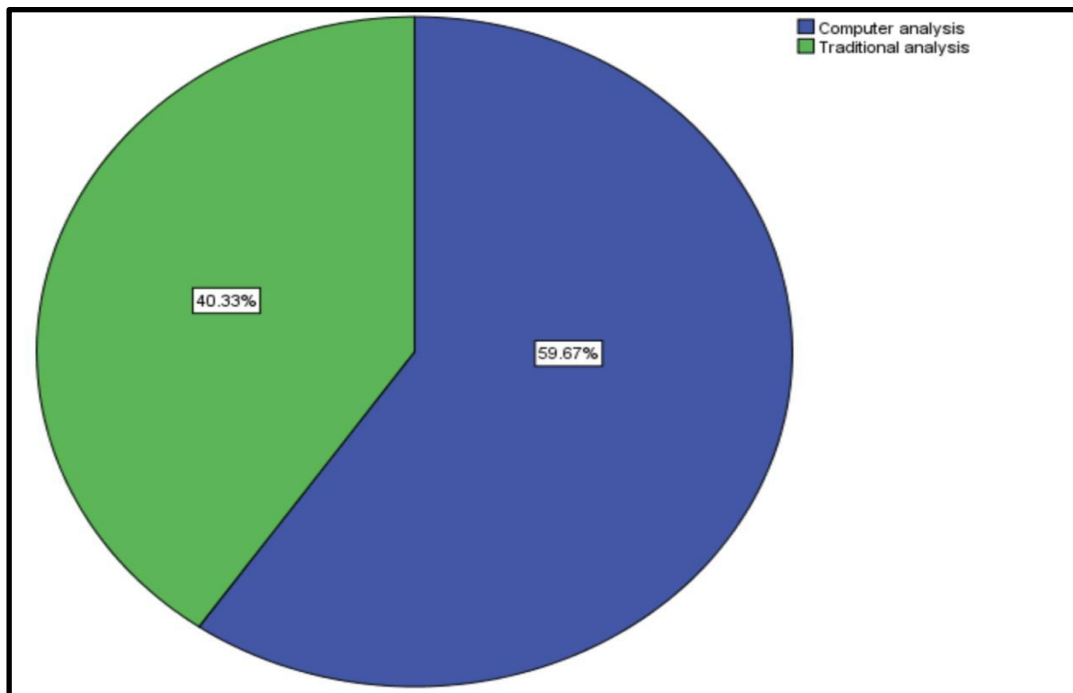
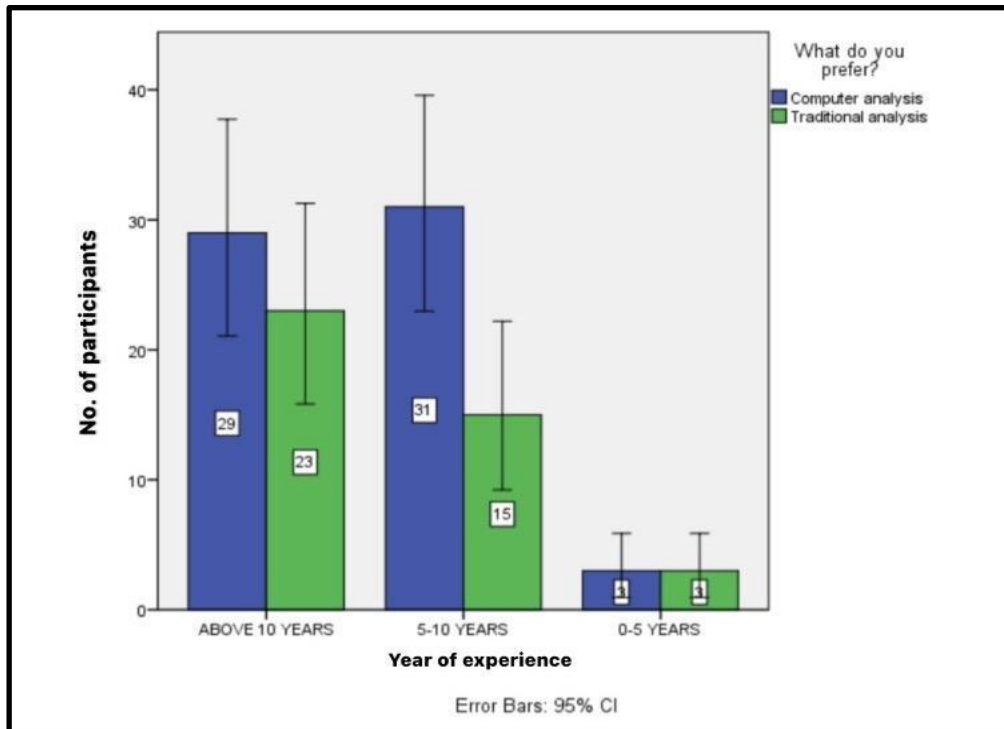


Figure 9: Pie chart representing percentage distribution of preference of analysis methods. Blue colour denotes computer analysis and green colour denotes traditional analysis. About 59.67% of participants prefer computer analysis.





**Figure 10: Bar graph representing the association of year of experience and preference of analysis method. Xaxis represents the year of experience and Y axis represents the number of participants responded, blue colour denotes computer analysis and green colour denotes traditional analysis. Majority of the 5-10 years of experienced participants prefer computer analysis . There was a significant difference between the year of experience and perception. Pearson chi square test- 96.182, P value = 0.000 (<0.05) - statistically significant**

In the present study, 91% think that security design like CCTV, escort only design are important in forensic lab setup(Figure 1). 1 participant of the 0-5 years of experience , 44 participants of the 5-10 years of experience and 44 participants of the above 10 years of experience thought security designs like CCTV are important in forensic lab setup . Among all the years, 5-10 years of experienced participants had good knowledge on security designs. There was no significant difference between the year of experience and knowledge on security design. Pearson chi square test- 1.709 , P value = 0.425 (>0.05) - statistically not significant (Figure 2). Generating a quality high resolution image has become an essential for variety purposes especially in the forensic field. Compressed and at low resolution video frames of common security surveillance videos are found to be very low in clarity and degraded with many noises, distortions, blurs, bad illumination and video compression artifacts. This could interfere during the image interpretation and analysis process(27).

To the question, Which of these do you feel is more important in setting a forensic lab, 31.67% responded to evidence preservation devices, 19.67% responded to software applications and 48.67% responded to all the above (Figure 3) . 2 participants of the 0-5 years of experience , 17 participants of the 5-10 years of experience and 29 participants of the above 10 years of experience responded to evidence preservation device as important in forensic lab setup. Among all the years, above 10 years of experienced participants had good knowledge on forensic lab setup criteria . There was a significant difference between the year of experience and knowledge on forensic lab setup. Pearson chi square test- 86.947 , P value = 0.000 (<0.05) - statistically significant (Figure 4). The increase in digital evidence storage presented for analysis to digital forensic laboratories has been an issue for many years, leading to lengthy backlogs of work . This is compounded with the growing size of storage devices. While setting up a forensic lab, it is important to allot separate places for data collection,evidence preservation and evidence storage(28).

In the present study, 75.67% of the participants think wearing a PPE is important inside the forensic lab(Figure 5). 3 participants of the 0-5 years of experience , 39 participants of the 5-10 years of experience and 29 participants of the above 10 years of experience agreed that wearing a PPE is important inside the forensic lab. Among all the years, 5-10 years of experienced participants had good perception on wearing PPE. There was a significant difference between the year of experience and perception on forensic lab setup. Pearson chi square test- , P value = 0.000(<0.05) - statistically significant (Figure 6). Preventing exposures to infectious material in

the forensic lab is a fundamental part of prevention. It is important to wear a PPE inside the forensic lab. It prevents the spread of disease and helps in the safety of the workers(29).

Regarding whether it is a safer job for females, 74.67% responded to yes(Figure 7).

2 participants of the 0-5 years of experience , 36 participants of the 5-10 years of experience and 33 participants of the above 10 years of experience agreed that it is a safer job for females. Among all the years, 5-10 years of experienced participants had good perception. There was no significant difference between the year of experience and perception. Pearson chi square test- 3.630, P value = 0.163(>0.05) - statistically not significant(Figure 8). 25 years ago, females were not considered much for the forensic job's, while compared with the past and present years, the role of females in forensic science have been raised unconditionally and females are doing wonders in the field of forensic science(30).

Regarding the preference of the analysis method, 59.67% of participants responded to computer analysis and 40.33% of the participants responded to traditional methods(Figure 9). 1 participants of the 0-5 years of experience , 31 participants of the 5-10 years of experience and 29 participants of the above 10 years of experience preferred computer analysis. Among all the years, 5-10 years of experienced participants had good perception. There was a significant difference between the year of experience and preference of analysis methods. Pearson chi square test- 96.182, P value = 0.000(<0.05) - statistically significant (Figure 10). Computer forensic science was created to address the specific and articulated needs of law enforcement to make the most of this new form of electronic evidence. Computer forensic science is the science of acquiring, preserving, retrieving, and presenting data that has been processed electronically and stored on computer media. As a forensic discipline, nothing since DNA technology has had such a large potential effect on specific types of investigations and prosecutions as computer forensic science(31).

The present study is a novel study, hence there is no existing previous studies. The reason for the better knowledge and perception among the 5-10 years of experienced participants is that they follow different curriculum patterns and they are better exposed to clinical cases than 0-5 years of experienced participants . Limitation of the study is less sample size. In future an extensive study with large sample size and varied population can be used to assess the knowledge and perception on forensic lab setup criteria in India among health care workers.

## CONCLUSION

The overall knowledge and perception on forensic lab setup criteria tends to be moderate among health care workers. From the present study, 5-10 years of experienced participants had good knowledge and perception of a forensic lab setup criteria in India.

## Author Contributions

Author 1 (Indumathi M), carried out the study by collecting data and drafted the manuscript after performing the necessary statistical analysis. Author 2 (Dr.Abirami Arthanari) aided in conception of the topic, has participated in the study design, statistical analysis and has supervised in preparation of the manuscript. All the authors have discussed the results among themselves and contributed to the final manuscript.

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## CONFLICTS OF INTEREST

The authors declare that there were no conflicts of interest in the present study.

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