

Awareness of Forensic Odontology among the Legal Professionals and the Police in Karnataka: A Questionnaire Study

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ABSTRACT

Introduction: In today's world, crimes are becoming more sophisticated. Police play an important role in collecting and producing evidence hence, legal professionals must have a major understanding of the same as this enables them to solve high-profile cases. Aim of our study was to understand the awareness of Forensic Odontology among police and the legal professionals in Karnataka state.

Materials and Methods: 194 participants (97 police officers and 97 legal professionals) were included in this survey. A questionnaire was designed to assess the awareness about Forensic Odontology. Data were analysed using statistical software SPSS version 24.

Result: The collected results highlighted the need for better training on Forensic Odontology for the police officers and legal professionals. According to this study, the result showed higher knowledge among legal professionals when compared to police officers.

Conclusion: The study highlights the need to educate and improve the awareness of Forensic odontology among legal professional and police officers as they are the first people to arrive at any crime scene.

Keywords: Awareness, Crime-scene, Forensic Odontology, Legal professionals, Police officers;

INTRODUCTION

Forensic odontology (FO) is a branch of dentistry that focuses on identifying unidentified crime victims. It also aids in the identification of crime and the prosecution of those responsible. Dentists have been instrumental in taking cold cases to a successful end on several occasions.¹ There are several methods used in resolving issues related to civil cases, criminal cases, and dental jurisprudence. Forensic odontology is widely recognized in dentistry, but its actual use is mainly by law enforcement and legal professionals. Collaboration between dentists, forensic experts, police, and lawyers is crucial for its effective application in legal cases. It's a team effort involving different disciplines to detect and investigate crimes.

Forensic odontology is of supreme importance because teeth are considered crucial biological evidence that is not affected by any type of external factors such as heat, decomposition process, etc. The fact that every human dentition and the treatment delivered on every patient is unique, makes it a chief identification key.³

In India, every police and legal professional must have a foremost understanding of forensic odontology as they are the ones who arrive first at the crime scene and take the chain of custody. The knowledge among them regarding the

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identification and collection of biological evidence, dental prostheses, and hard tissues is of utmost importance in the growing field of forensic odontology.⁴

The present study is aimed at understanding the level of awareness of FO in both the police and the legal professionals in Karnataka state through a survey.

MATERIALS AND METHODS

The study was commenced after obtaining an ethical exemption from the institutional ethics committee.

The legal professionals and police were asked voluntarily to participate in the study, and confidentiality was respected. An informed consent form and participant information sheet were distributed online through email and WhatsApp to the participants prior to the commencement of study.

A self-administered, structured, and validated questionnaire was used to compare and evaluate the awareness of forensic odontology between legal professionals and the police in Karnataka state in India (Table-1). Simple random sampling was used to draw the samples and the questionnaire was

distributed to 194 (97 legal professionals and 97 police).

The questionnaire consists of two parts (a set of 15 questions):

- The first set is the demographic detail of the participants.
- The second set is focused on assessing the awareness of forensic odontology

The options given in the questionnaire were: Yes, No, and Not Sure.

Statistical Analysis:

The data collected was entered in a Microsoft Excel sheet and the data analysis was done using statistical software SPSS version 24.

Simple descriptive with an appropriate method of presentation was used to describe the data. Continuous variables were compared using two samples with t-test. Fisher’s exact test and Mann-Whitney U-test were used to compare the categorical variables. A p-value less than 0.05 was considered statistically significant.

RESULT

A total of 194 individuals participated in the study, and the response rate was 99%. 45% of responders are Lawyers and 55% are police officers. The study group comprised lawyers and police officers in the age group between 25-63 years. Males comprised 69% and females 31% in our study.

Awareness data: 81% of the responders were aware of the branch called Forensic Odontology (FO), 13% were not sure about it and 6% of the responders were not aware of Forensic Odontology. 5% of the participants have already been involved in cases involving FO, 84% have not worked in a case involving FO and 11% were not sure about their response. Only, 7% and 6% of the total responders answered correctly that the age estimation and gender examination need not involve only teeth respectively. About 68% of the participants think that teeth help in DNA analysis. 52% of participants responded that fingerprint has no role in identifying victims in FO. 42% of participants responded correctly that the tooth does not undergo decomposition and charring. 65% of the participants responded rightly that FO uses bite marks, lip prints, and rugae patterns for victim identification. 75% responded that

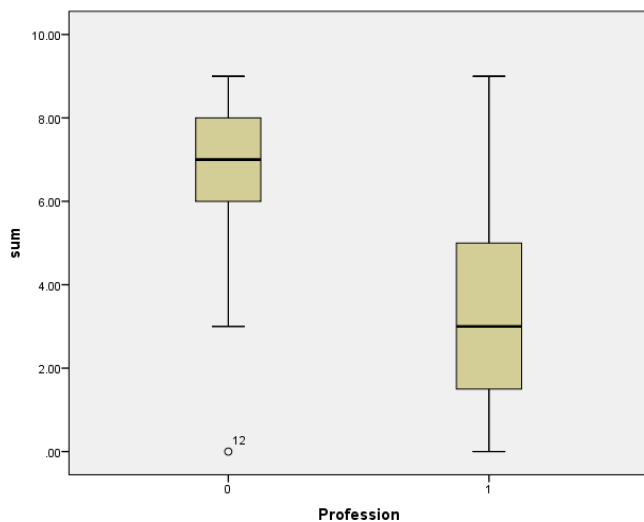
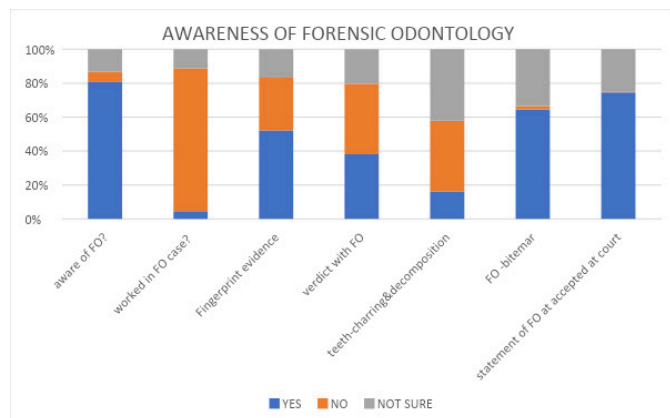
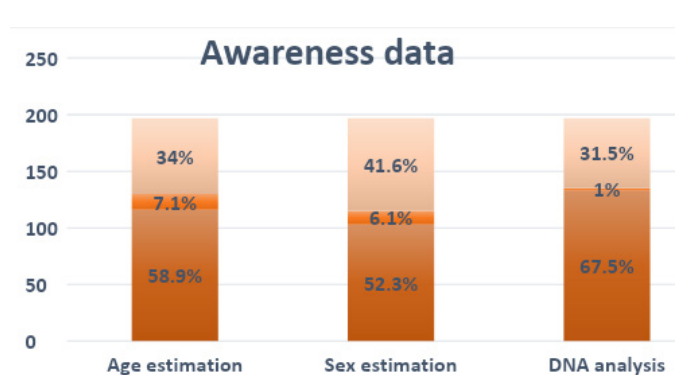


Fig.1: Awareness score of legal professionals and police officers

Graph1: Awareness of FO among legal professionals and police officers



Graph 2: Comparison of age estimation, sex estimation and DNA analysis



the statement of a Forensic Odontologist as an expert witness is accepted by the court of law. Only 20% of the participants were aware of the case that got a verdict with the help of FO (Graph: 1 and 2).

Table 1: Questionnaire

<p>Demographic details: 1.Age: 2.Gender: 3.Years of experience: 4.Profession: a) Legal professional b) Police officer 5.Cadre/ Designation/ Specialization:</p> <p>Questionnaire: 1.Are you aware of the specialty called Forensic Odontology/ Forensic dentistry? (Yes/ No/ Not sure) 2.Have you ever worked on a case involving Forensic dentistry? (Yes/ No/ Not sure) 3.Age estimation can be done only by examining the teeth? (Yes/ No/ Not sure) 4.Can gender determined only with the help of teeth? (Yes/ No/ Not sure) 5.Do you think teeth helps in DNA analysis? (Yes/ No/ Not sure) 6.The role of forensic dentistry expert is to identify victim/ deceased and criminals with the help of evidence related to fingerprints? (Yes/ No/ Not sure) 7.Enamel is more vulnerable to the external factors and undergoes decomposition and charring? (Yes/ No/ Not sure) 8.Forensic dentistry expert plays an important role in victim and criminal identification with Bite mark analysis, Lip print analysis and Rugae analysis? (Yes/ No/ Not sure) 9.The statement of dentist as an expert witness involving civil and criminal case is accepted by the court of law? (Yes/ No/ Not sure) 10.Are you aware of any cases that used forensic odontology evidences and got the justice? (Yes/ No/ Not sure)</p>
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Descriptive statistics showed that lawyers had more awareness of FO with a 50% percentile score of 7 whereas, police had a score of 3 (Table- 2 and Figure 1). Mann-Whitney U test showed a statistically significant result with the value of less than 0.005 with U score of 972.5 (Table-3)

DISCUSSION

Forensic odontology was defined by Keiser-Nelson as “that branch of forensic medicine which deals with proper handling, examination, and presentation of dental evidence in the best interest of justice.”⁵ FO is a specific field of dentistry that solves legal problems where tooth, bite mark, lip print, and rugae patterns is used as the prime evidence for the identification of victims. The main advantage of a tooth being an evidence specimen is that it is the hardest tissue in the human body and is extremely resistant to decomposition and charring.⁶ Forensic odontologists are rarely involved in crime scene investigation in India.⁵ A proper role of police officers and lawyers is mandatory for any crime investigation. Crime scene assessment and evidence collection are the prime responsibilities of the police. It is also very important for lawyers to have a thorough knowledge of forensic odontology to deal with a criminal case.⁷ The aim of any investigation is to correctly interpret the facts and evidence, reconstruct the events and understand the consequences of events. Defective knowledge, equipment and expertise may result in compromising the entire investigation.⁸

There are a lot of cases that got verdicts where FO has been applied in solving them. For example, the body remains of our former Prime Minister Mr. Rajiv Gandhi were identified with the help of his dentition.⁹ Serial killer Ted Bundy was convicted as a rapist and murderer through his bite mark.¹⁰ Recently, bite mark analysis in the victim’s body of the Nirbhaya rape and murder case proved guilty all the accused involved in the

Table 3: Mann- Whitney statistics

Mann-Whitney Test Statistics	
	sum
Mann-Whitney U	972.500
Z	-9.699
Asymp. Sig. (2-tailed)	.000
a. Grouping Variable: Profession	

Table 2: descriptive statistics showing comparison of awareness among the two professions

Descriptive Statistics								
Profession	N	Mean	Std. Deviation	Minimum	Maximum	Percentiles		
						25th	50th (Median)	75th
Legal professionals	89	6.9775	1.49223	.00	9.00	6.0000	7.0000	8.0000
Police officers	108	3.2870	2.35237	.00	9.00	1.2500	3.0000	5.0000



crime.¹¹

In our present study, Legal professionals had more awareness about FO when compared to police officers. According to the study of Selvajothi et al, 91% of the lawyers were aware of age estimation and 76% about the gender estimation.¹² Another study done by Bhaskar et al, showed that the majority of the advocates were aware of bitemark analysis.¹³ According to Iyer PK et al, the percentage of lawyers who knew about the estimation of age and gender determination using teeth and facial bones were 97% and 94% respectively.¹⁴

Legal professionals and police officers who lack knowledge of FO will be unable to competently assess and handle scientific evidence and hence the pursuit of justice can be seriously hampered potentially, leading to factual errors.¹ This study is mainly highlighted to create awareness among dentists and forensic odontologists to conduct more workshops or hands-on programs among police personnel and legal professionals regarding the application of forensic odontology in solving medico-legal cases. Presently, the curriculum does not include forensic odontology as a subject for police and legal professionals. Basic knowledge of forensic odontology can be more beneficial in solving cases independently regarding this subject.

CONCLUSION

The study highlights the need to improve the awareness of Forensic odontology among legal professionals and police officers as they are the first people to arrive at any crime scene. They also should have the utmost knowledge about identifying & handling scientific evidence because lack of knowledge can lead to errors, hence the pursuit of justice can be seriously hampered. This kind of comparative study among Legal professionals and Police officers is the first of its kind and has

not yet been documented in the literature.

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