

Evaluation of the knowledge and attitude about forensic odontology among institutional caregivers

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Abstract: The aim & objective was to evaluate the knowledge and attitude of institutional caregivers towards recording of such mishaps. A cross sectional open ended survey was done; the questionnaire was distributed to 50 caregivers. Questions on knowledge were divided into three main domains- (i) Knowledge about forensic odontology (ii) Sources about forensic odontology (iii) Investigation regarding forensic odontology. The data collected was analysed using Statistical package for social sciences (SPSS) version 21.0. As the data was categorical, to compare responses according to gender and education status, Non parametric Chi-square test was applied. A p value <0.05 was considered statistically significant. Overall, out of 14 males, 7.14% was illiterate, 57.14% were graduated till higher education and 35.72% were graduated and out of 36 females, 33.3% were illiterate, 38.89 % were graduated till higher education and 27.78% were graduated. Responses of participants for source of information about knowledge in forensic odontology showed higher percentage through newspaper, followed by television, followed by radio. Attitude of participants for consideration of bite marks pattern of human teeth as an importance adjunct for assessing crime scene, 7 % answered it can be used by taking photographs. There was no significant difference between males and females. The results of our study suggest that in Bhopal city indicates that these caretakers are not at all prepared for any kind of forensic and medico legal needs.

Keywords: Awareness, Caretakers, Forensic odontology, Knowledge

INTRODUCTION

Forensic odontology has evolved as a new ray of hope in the field of crime investigation due to its wide range of applications in the identification of human remains through dental records at the scene

of crime.¹ According to Federation Dentaire Internationale (FDI), Forensic odontology is defined as branch of dentistry that deals with the proper handling and examination of dental evidence and with proper evaluation and preservation of dental findings.²

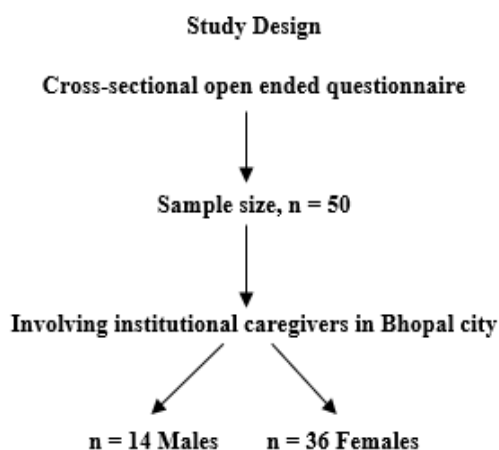
Tooth is one of the most indestructible structures and usually resistant to post-mortem decomposition. Human dentition can ever be same in two individuals. Morphology and arrangement vary from an individual to individual. Dental evidence is helpful to identify badly burned, traumatized, decomposed, or skeletonized remains and in mass disasters³. Dental impressions can serve as invaluable tool because they are more unique than DNA. It is a cornerstone in positive identification of persons depending on the characteristics of teeth and jaw.⁴

Forensic identification is a multidisciplinary teamwork which involves law enforcement official, forensic anthropologist, forensic dentist, pathologist, criminalist, serologist and other specialities⁵. The speciality of forensic dentistry generally covers three basic areas, namely Identification of human remains, Litigation relating to malpractice and Criminal proceedings, primarily in the areas of bite marks and abuse cases especially in paediatric patients⁶. Crime against a child may take place within the house or family⁷. Children are commonly seen as victims facing child abuse, neglect, dental trauma etc. This makes a pedodontist to play a pivotal role in investigating a child abuse case. Pediatric dentist can help legal investigations officers by implementing his expertise knowledge in recognition of signs and symptoms and identification of child abuse and neglect.

Furthermore, pedodontist can furnish worthy information to physicians about oral and dental manifestations regarding child abuse and neglect⁵. Due to lack of awareness of pediatric forensic odontology conventional modes of investigation are still used. Caregivers are also the caretakers of children as they spend most of their time with the child and child is familiar.⁸

So at the time of any trouble/mishaps the caregivers would be the first one to encounter the problem and at time when needed the caregivers can approach to appropriate centres. The aim of study was to evaluate the knowledge and awareness of forensic odontology among institutional caregivers and a small questionnaire based survey was conducted in the city of Bhopal, Madhya Pradesh.

MATERIAL AND METHODOLOGY



In this cross sectional open ended study, all caretakers were distributed with questionnarie. The questions were framed to assess the knowledge and awareness of forensic odontology among institutional caregivers.

The survey was conducted in orphanages among the institutional caregivers. The study was approved by the Ethical Committee of institution, Bhopal. All the caregivers directly in contact with the children were included in the study and personnel that did not participate at the educational process were excluded from the study. The development of questionnaire was based on evaluation of the knowledge and awareness among institutional caregivers regarding investigation done in forensic odontology. The questions on knowledge were divided into three main domains (a) knowledge about forensic odontology, (b) sources about forensic odontology, (c) investigations used in forensic odontology.

Overall questionnaire included 17 questions on knowledge and awareness about the role of forensic odontology in safeguarding the children and their vicinity were included. Questions were made in easy language so that they are easily understood by the caregivers. The survey was held in between months of July to August, 2017. The questionnaire was distributed among the caregivers. Information on the nature of study was provided to all the participants and consent implied by an individual's voluntary completion of the questionnaire. The outcomes of the questionnaire were explained both in English and Hindi for better understanding. The main outcome variable was the total number of correct answers for each participant.

The data collected was analysed using Statistical package for social sciences (SPSS) version 21.0. As the data was categorical, to compares responses according to gender and education status, Pearson's Chi-square test was applied. P value <0.05 was considered statistically significant.

RESULT

A total of 50 questionnaires were distributed among the institutional caregivers in orphanages in Bhopal city.

Knowledge about forensic odontology:

Responses of participants for source of information about knowledge in forensic odontology showed higher percentage through newspaper, followed by television, followed by radio. As participants have opted multiple options, so statistical test was not applicable. (Figure 1)

When participants were asked for knowledge regarding the importance of DNA fingerprinting or DNA testing, only 12 % answered that it can be used for identification of dead bodies or identification of relatives. Participants were asked for knowledge about any criminal case solved with the help of forensic odontology, 24 % participants had knowledge about any criminal case solved with the help of forensic odontology, all of them responded this for Nirbhaya case, delhi 2012. Respondant were asked for knowledge about first step for the mean of identification for unclaimed bodies whether teeth can serve as a source of DNA, all the participants said for former visual inspection is the first step and for later no knowledge about tooth can serve as DNA. (Figure 2 & Figure 3)

Participants were asked for knowledge whether lip print pattern of human can be used for identification, both males and females showed negative response. (Figure 4)

Attitude regarding forensic odontology:

Attitude of participants for consideration of bite marks pattern of human teeth as an importance adjunct for assessing crime scene, 7 % answered it can be used by taking photographs. There was no significant difference between males and females. (Figure 4)

Awareness regarding forensic odontology:

Awareness of participants about bite mark pattern of teeth, 7 (100%) participants said conical, 3 (42.86%) said square and 2 (28.57%) said rectangular in shape. There was no significant difference between males and females for awareness regarding bite mark pattern of teeth.

When participants were asked for any formal training centers in india for forensic odontology, 90% participants were interested for training on forensic odontology. (Figure 4)

Awareness of participants for DNA profiling or DNA fingerprinting or DNA testing, only 12 % participants were answered that DNA profiling, fingerprinting or testing can be used to solve criminal case.

Awareness of participants for usefulness of dental impression in forensic investigation, both males and females were not aware regarding usefulness of dental impression in forensic investigation.

Participants were asked for consideration of forensic odontology as an efficient method to identify victims in a mass disaster, very less (0.8 %) considered it as an efficient method. There was no significant difference between males and females for the same. (Figure 5)

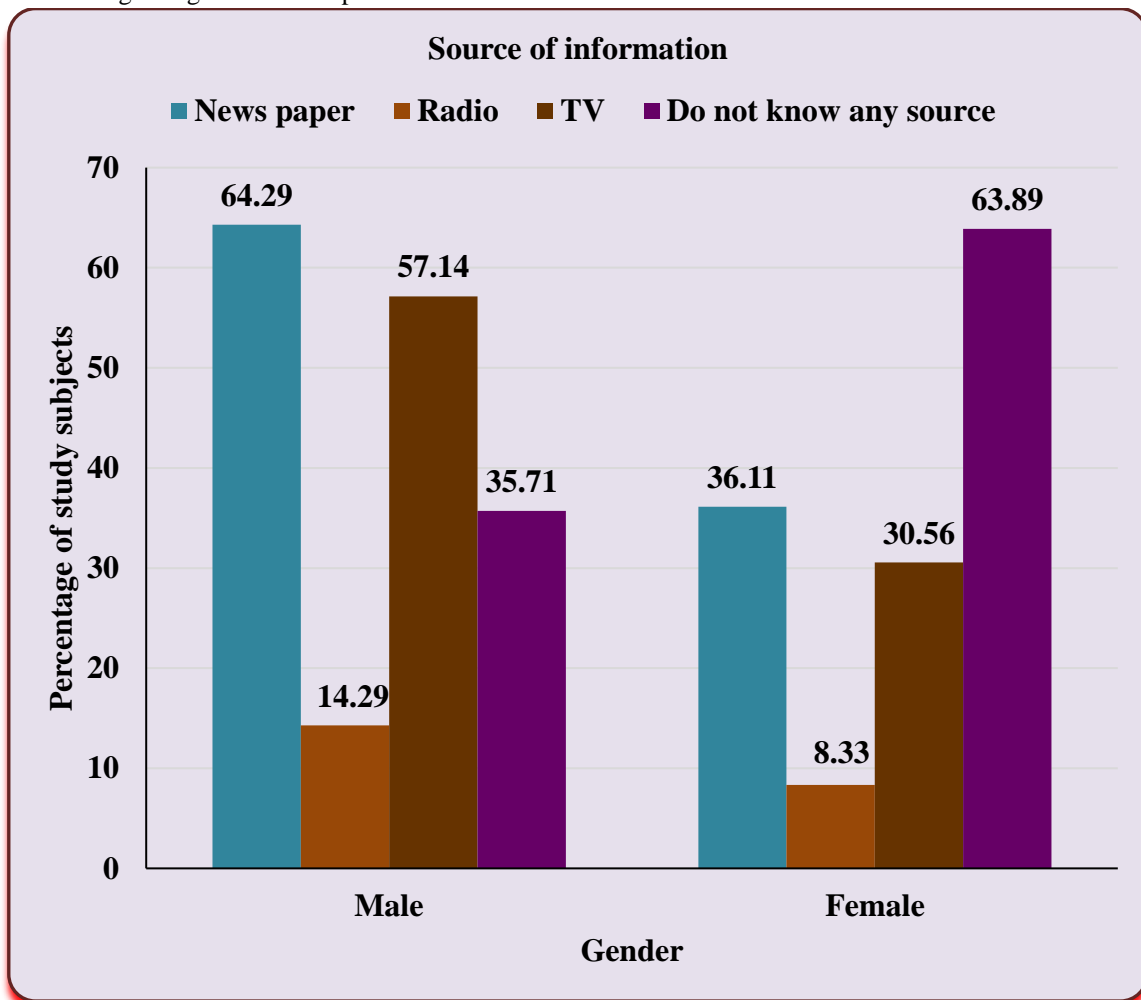


Figure 1 - Responses of participants for source of information about knowledge in forensic odontology according to gender

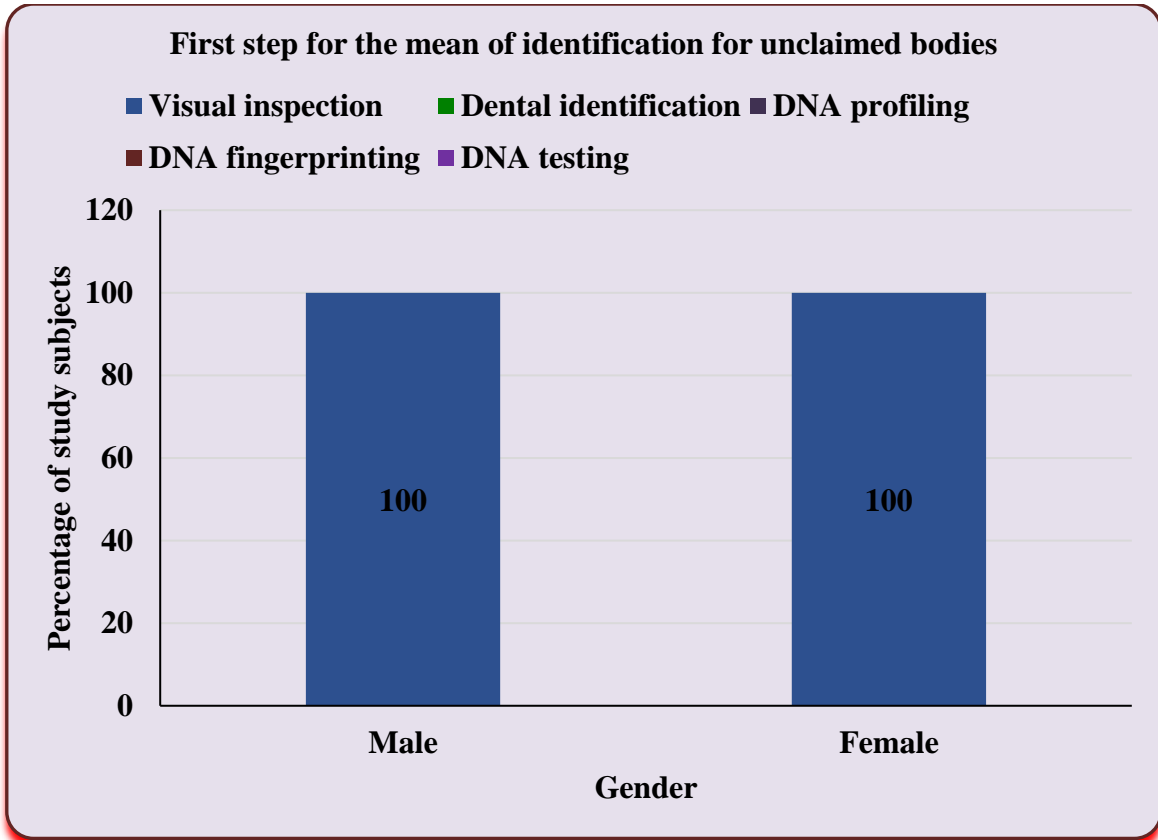


Figure 2-Responses of participants for knowledge about first step for the mean of identification for unclaimed bodies according to gender

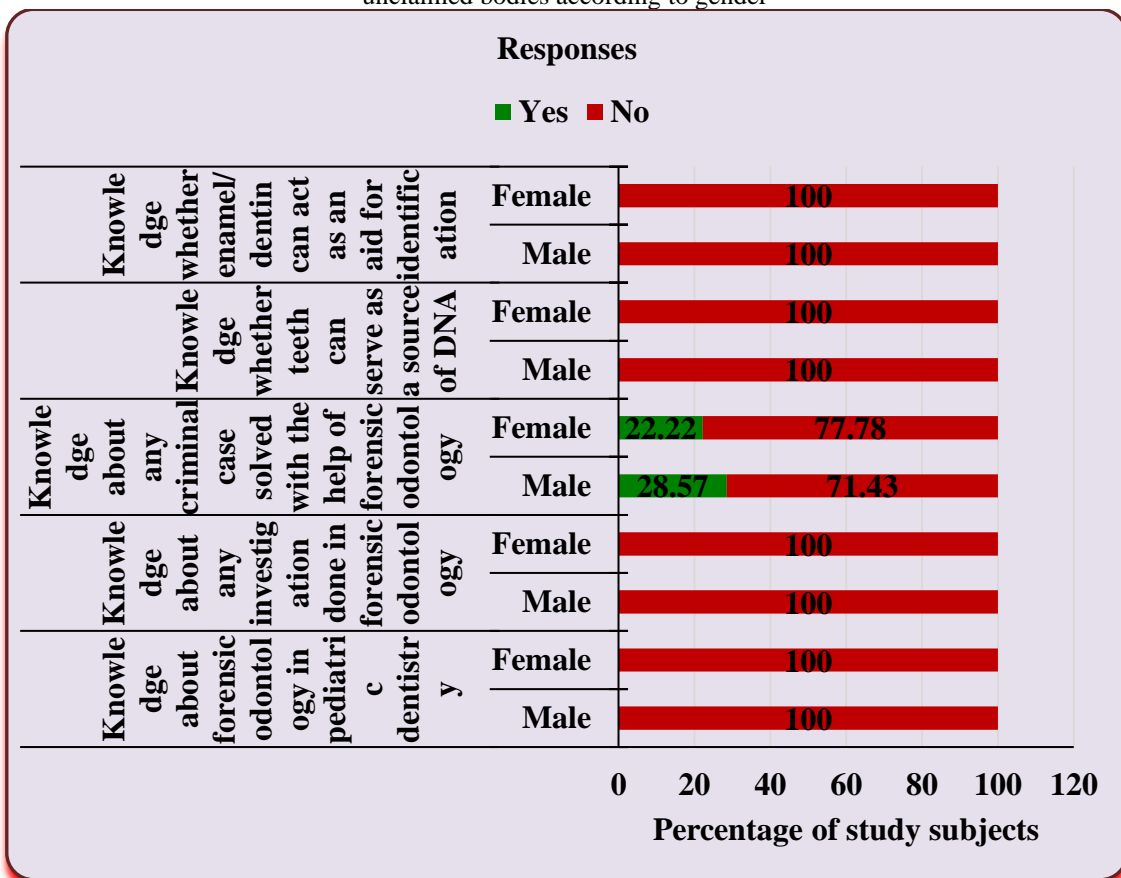


Figure 3 - Responses of participants for various items of questionnaire according to gender.

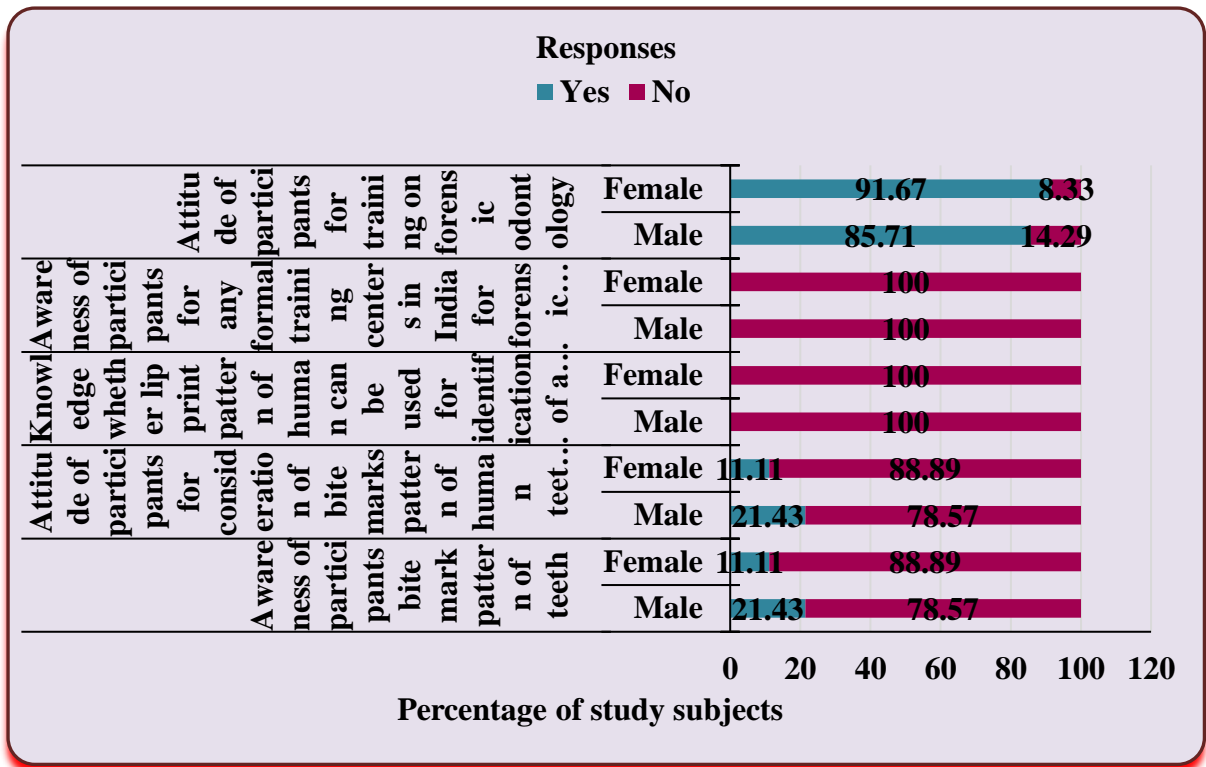


Figure 4 - Responses of participants for various items of questionnaire according to gender

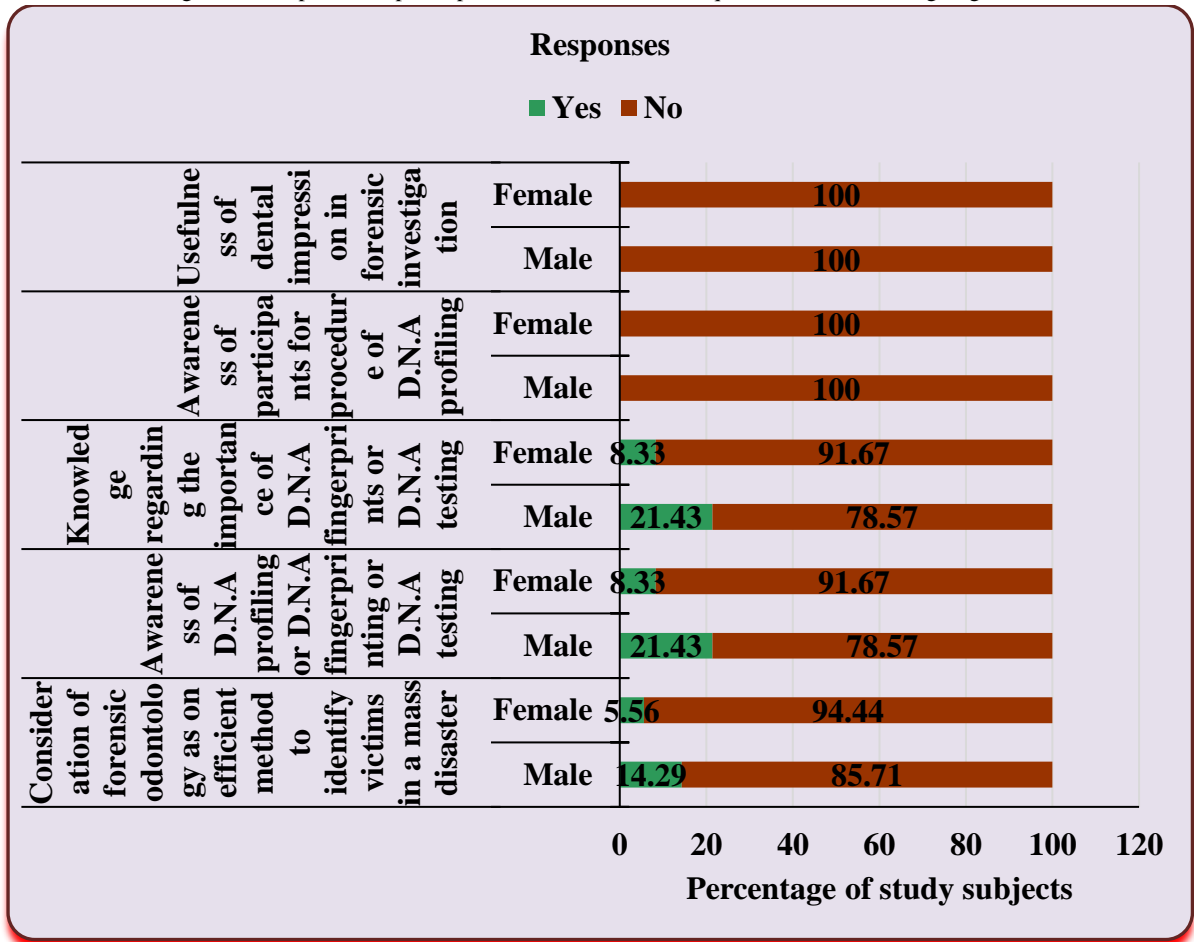


Figure 5- Responses of participants for various items of questionnaire according to gender

DISCUSSION

Forensic odontology is an important branch of the study of dentistry that would assist in solving cases and identifying victims of abuse and deaths.⁹

Teeth and associated structures have played a major role in forensics. The history dates back to 66AD when the first victim was identified using teeth.¹⁰ to the recent incidents, where bite marks had the potential to serve as corroborative evidence that supplemented fingerprints and DNA.¹¹ Now-a-day practice of forensic odontology has gained importance in a number of countries across the world.

During crime investigations, assaults are commonly encountered out of which biting is a primitive type. The bite mark is “a mark made by teeth either alone or in combination with other mouth part”. Analysis of this type of evidence presumes that the dentition of the biter (animal or humans) is unique, can be compared scientifically, and can be related to the resultant pattern mark on the surface of victim or object.¹²

The external surfaces of lips have numerous elevations and depressions forming a characteristic pattern called lip prints. Palatal rugae are ridges and grooves in the roof of mouth radiating out tangentially. Just like fingerprints, the pattern of lip prints and rugae are considered to be unique to every individual. However, there are certain limitations in these forensic odontological techniques, as various factors can alter the lip print recording. Lip print pattern depends on whether the mouth is opened or closed. In closed mouth position, the lip exhibits well-defined grooves; while in open mouth position, the grooves are relatively ill defined and difficult to interpret.¹³

Recent tragedies and situations have shown the importance of dental evidence and the literature search covering the last 5 years that describe the novelties referred to buccodental studies in comparative identification, buccodental evaluation of reconstructive identification, human bites as a method for identifying the aggressor, and the role of DNA in sex identification. Oral cavity is a rich and noninvasive source of DNA that can be used to solve problems of a social, economical, or legal nature.^{14 15} The institutional caregivers should be aware of these forensic odontological techniques, as these methods are used in criminal judicial system worldwide.

The purpose of this cross-sectional study was to identify the level of knowledge and attitude about

forensic odontology among institutional caregivers in Bhopal city. The results showed that there is lack of knowledge regarding forensic odontology.

On analyzing the collected data, we found that newspapers were the main source of knowledge among a high proportion of subjects. The results regarding the questions related to investigations used in forensic odontology such as the analysis of bite mark, lip print, rugae and DNA were obtained. Some of the participants were aware of the bite mark analysis as compared to lip print analysis, while none of them having knowledge about enamel as the hardest part in the body and it can also be use as an investigation aid. 12% of the participants were answered that DNA can be used as an efficient aid.

Similarly Krishan et al.¹⁶ in 2015 has suggested that forensic odontologists are involved in assisting the law enforcing gencies in proper presentation of the dental evidence collected from the scene of crime or mass fatality incidents. The dental evidence is compared with the antemortem records available to the dentists for identification of the deceased.

Another study was conducted by Sowmya Venkatesh¹⁷ in 2017 to evaluate the awareness and knowledge about the utilization of forensic odontology during evidence collection by the crime scene investigation (CSI) officers and concluded even though the respondents have knowledge about forensic odontology, there is a lack of communication and facilities in their system; hence, steps must be taken to educate the police personnel about the application of forensic odontology and it is attributed to same study.

Similarly Selvajothi P, Lavanya C, Joshua E, Rao U, Ranganathan K¹⁸ in 2017 conducted a study was to find the awareness level of scope and utility of forensic odontology among lawyers in Chennai, and this study highlighted the knowledge of forensic odontology among legal professionals and also identified the areas in which they need further appraisal.

Similarly R Hannah et al¹⁹ in 2019 conducted a study was to evaluate the knowledge, attitude, and practice of forensic odontology among undergraduate dental students and concluded that the dental undergraduates need to be sensitized toward this specialty and encouraged to be part of investigation and identification teams which went in accordance with current study. Further research is required on a larger scale to verify the results of the current study.

CONCLUSION

Forensic odontologist plays a major role in medicolegal cases, there is an urgent need to promote this specialty. The caretakers need to be encouraged to be a part of investigation and identification teams. The results of our study suggest that in Bhopal city indicates that these caretakers are not at all prepared for any kind of forensic and medico legal needs. The overall quality of record-keeping was poor in line with the records findings of other worldwide studies. Periodic training and participation in routine death investigations will be helpful in providing the knowledge and teamwork is needed for a successful response.

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QUESTIONNAIRE FOR SURVEY

1. Do you know about forensic odontology in pediatric dentistry ? Yes/No If Yes ___?
2. What is the source of information about your knowledge in forensic odontology_____?

3. Do you know about any investigation done in forensic odontology. Yes\No, If yes___?
4. Do you know about any criminal case solved with the help of forensic odontology? Yes\No, If yes___?
5. What is the first step for the mean of identification for unclaimed bodies___?
6. Can teeth serve as a source of D.N.A. Yes/No___?
7. Can enamel\ dentin act as an aid for identification of age. Yes /No ___?
8. Are you aware of the bite mark pattern of teeth? Yes / No If Yes ___?
9. Do you consider bite mark pattern of human teeth as an important adjunct for assessing crime scene. Yes / No If Yes ___?
10. Do you think lip print pattern of human can be used for identification of a population? Yes /No If Yes___?
11. Are you aware of any formal training centers in india for forensic odontology? Yes /No If Yes___?
12. If given a choice, would you like to undergo any such training? Yes/ No___?
13. Do you consider forensic odontology as an efficient method to identify victims in a mass disaster? Yes/No___?
14. Have you heard about D.N.A. profiling or D.N.A fingerprinting or D.N.A. testing? Yes / No If Yes___?
15. What is the importance of D.N.A. fingerprints or D.N.A. testing___?
16. Are you aware of how they do D.N.A. profiling? Yes/ No If Yes___?
17. Are you aware about dental impression can be helpful in forensic investigation? Yes/ No If Yes___?