

# Awareness of Forensic Odontology among Undergraduates and Postgraduates of Various Dental Colleges: A Knowledge, Attitude and Practice (KAP) based Study

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**Abstract:** *Forensic dentistry involves application of dental science in the identification of child/sexual abuse or deceased individuals. It is the identification, processing, review, evaluation and presentation of dental evidence in the interest of justice. Our present study was to assess the awareness of Forensic Odontology among undergraduates and postgraduates of various dental colleges. A cross-sectional survey was conducted containing knowledge, attitude and practice based 15 questions on the concept of forensic odontology among dental students. Nearly 402 participants took interest in the study and filled out the questionnaire given to them. Our study revealed that there was adequate awareness on the concept of forensic odontology among undergraduate and postgraduate dental students however they lacked knowledge on the perception of existence and scope in the field of Forensic Odontology. Within the limits of our study, we feel that many dental students are interested and eager to learn the subject so it should be included as a topic in the curriculum of dental courses and sensitization programs should be conducted for dental students.*

**Keywords:** Forensic Odontology, Knowledge, Attitude, Awareness, Practice, Dental Colleges

## 1. Introduction

The term “forensic” is derived from the Latin word forensic which means “pertaining to forum” and “Odontology” means the “study of teeth”. It has been defined by the Federation Dentaire International as the branch of dentistry which, in the interest of justice deals with the proper handling and examination of dental evidence with proper evaluation and presentation of dental findings. It is a field of dentistry related to medico - legal matters. This unique discipline has been attributed by Dr. Oscar Amoedo (The Father of Forensic Dentistry) in the year 1897. The earliest identification began with Agrippina and the Lollia Paulina case in the year 49AD. The first forensic identification in India started when Jai Chand, the monarch of Kanauji was destroyed by Muhammad’s army and he was murdered. His mortal remains were identified by his false teeth<sup>1</sup>.

Forensic Odontologists play an important role during catastrophic events like in the identification of victims from industrial blows, airline accidents, natural disasters and terrorist attacks<sup>2</sup>. The subject of Forensic Odontology can be divided roughly into - Civil/non - criminal, Criminal and Research. Forensic Dentistry has become an integral part of forensic medicine over the past 100 years. Dental

practitioners are called to take in charge of crime cases where identification of a victim is not possible with physical outlook or fingerprints. Forensic Dentistry helps in examination and evaluation of injured teeth, jaw, oral tissues to establish a person’s identity where the individual is skeletonized, burnt, decomposed or diminished and cannot be identified by regular methods<sup>3</sup>. Examination of teeth present, missing, impacted and lost after death, restoration, prosthesis, periodontal and orthodontic analysis, peculiarities and pathology is done and recorded by the dentist. Dental professionals are also called to assist these cases which includes the identification of unknown remains, determination of age, and determination of sex of an individual, DNA analysis using forensic dentistry, specimen selection and age estimation on dental data. Dental professionals have a major role to play in maintaining accurate dental records and providing all necessary information so that legal authorities may recognize malpractice, negligence, fraud or abuse and identify unknown humans<sup>4</sup>. DNA extracted from teeth is an excellent source for victim identification due to their resistance to environmental factors and trauma. Dental identification has become crucial during recent times as there is lack of national fingerprint database.

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The entity of forensic dentistry comprises four major areas of interest: Dental identification, Bite Mark, Cheiloscopy (study of lip print) and Rugoscopy (study of palatal rugae patterns). In order to get more involved in forensic dentistry a dentist has to offer their service to a local medical examiner, coroner or police department<sup>5</sup>. This field of Dentistry has a lot of significance but is often underestimated in many countries mainly due to unawareness of the concept. So far several other studies have been conducted over the last decade on knowledge and awareness of forensic odontology using valid questionnaires in Indian states from North India to South India such as Kashmir, Delhi, Pune, Kanpur and Chennai. According to the study done so far majority of the people were unaware of the concept of forensic dentistry. Our study is to assess the knowledge, attitude and practice of forensic odontology among undergraduates and postgraduates students of various dental colleges.

## 2. Literature Survey

Forensic Odontology is a challenging and fascinating branch of forensic medicine that aids in the identification of abuse and death of an individual<sup>6</sup>. Limited information is available about this field, so the survey was done to know the awareness of the concept of forensic dentistry, to create awareness about career options and job opportunities in this field of forensic odontology and to determine whether forensic odontology should be included in the curriculum of dental colleges. Recently forensic odontology has evolved with a new ray of hope in assisting forensic medicine but this integral field of forensic dentistry is still in a state of progress in India. There are a lot of important applications in this field. The significance of forensic odontology can be attributed to the ability of the dental tissues to withstand environmental assaults and still retain some of its original structure. Dental clinicians just like other healthcare professionals are at the forefront of identification of violence appearing on their patients. A dentist can know child, adults or spouse abuse with the help of bite marks when confronted with other oral injuries such as anterior fractured teeth, mandibular or maxillary fracture, detached labial frenum and marks on face and neck. Apart from the identification of abuse, identification features also include displaced/rotated teeth, restorations, carious tooth, missing teeth, fractured teeth, diastema, prosthodontics appliances and dental anomalies. Even with so much importance for such an interesting subject, very few institutions offer formal training programs in this field, leading to lack of job opportunities for qualified forensic odontologists who have obtained their degree elsewhere. This study also focuses on what dental students are expecting to make this interesting subject more applicable and easy to reach.

## 3. Methodology

### 3.1 Data collection

A cross sectional, institutional - based survey was conducted among 402 dental students aged between 17 to 30 years. It is a self - administered English questionnaire given to dental students who were willing to participate. Google forms were

used for the survey and various social media platforms like Email, Whatsapp, and Instagram were used to circulate.

The questionnaire designed which consisted of knowledge, attitude and practice based 15 questions along with demographic data. Personal questions were kept optional to maintain anonymity. The data collected was analyzed using Chi Square Test for better understanding.

The Questionnaire consisted of questions to assess the following:

- 1) Knowledge and Awareness of Forensic Dentistry.
- 2) Concepts and applications of Forensic Dentistry.
- 3) Perception on existence and scope of Forensic Dentistry.

Statistical Analysis: Statistical Package for Social Sciences [SPSS] for Windows Version 22.0 Released 2013. Armonk, NY: IBM Corp., was used to perform statistical analysis.

Descriptive Statistics: Descriptive analysis includes expression of responses to the study questionnaire using frequency and proportions.

**Table 1.1:** Age wise distribution of study participants

Variable	Category	n	%
Age	< 20 yrs.	155	38.6%
	21 - 25 yrs.	225	56.0%
	26 - 30 yrs.	20	5.0%
	> 30 yrs.	2	0.5%
		Mean	SD
	Mean	21.24	2.18
	Range	17 - 32	

Inferential Statistics: Chi Square Goodness of Fit test was used to compare the distribution of responses for the study questionnaire among participants. Chi Square test was used to compare the responses for the study questionnaire based on the clinical exposure among the participants. The level of significance was set at  $P < 0.05$ .

Significant percentage of participants were females (74%). The responses were further subdivided into categories based on the questions which will be represented with graphs and tables in the following part of results and discussion.

## 4. Result and Discussion

The total number of participants included in the study were 402. It included 297 female participants and 105 male participants. It was circulated in the month of July - August 2021 through various social media platforms. Demographic data was collected and statistical analysis was done using Chi Square test after the responses were received.

### Section 1:

#### Demographic Details:

Personal questions had been kept optional to maintain anonymity of participants, i. e. name, email address, institution, etc.

**Table 1.1**

Table 1.1 represents age wise distribution of the participants included in the study.

The survey included 56.0% (n=225) participants between the age groups 21 - 25 years of age, 38.6% (n=155) participants <20 years of age, 5.0% (n=20) participants between the ages 26 - 30 years of age and 0.5 % (n=2) participants >30 years of age.

The mean was found to be 21.24 and SD (sample standard deviation) 2.18 and it ranges between 17 - 32.

**Table 1.2:** Gender wise distribution of study participants

Variable	Category	n	%
Gender	Males	105	26%
	Females	297	74%

**Table 1.2:**

Table 1.2 represents gender wise distribution of the participants of the study.

The majority of the responses received were from female students 74% (n=297) and the remaining responses received by male students were 26% (n=105).

**Table 1.3:** Distribution of study participants based on year of study

Variable	Category	n	%
Year of study	I BDS	107	26.6%
	II BDS	112	27.9%
	III BDS	101	25.1%
	IV BDS	49	12.2%
	Interns	11	2.7%
	Post Graduates	22	5.5%

**Table 2.1:** Comparison of distribution of responses for the questions on knowledge & awareness of Forensic dentistry using Chi Square Goodness of Fit Test

Questions	Responses	n	%	$\chi^2$ Value	P - Value
1. Are you aware of the concept of forensic dentistry?	Yes	327	81.3%	417.000	<0.001*
	No	36	9.0%		
	Not sure	39	9.7%		
2. What is the source of your knowledge about forensic dentistry?	Seminars & Lectures	113	28.1%	144.408	<0.001*
	Books & Magazines	60	14.9%		
	Internet & Social Media	193	48.0%		
	Don't have any knowledge	36	9.0%		
3. Do you think forensic dentistry is an important topic to be included in your curriculum?	Yes	328	81.6%	429.194	<0.001*
	No	14	3.5%		
	May be	60	14.9%		
4. Do you have forensic dentistry as a part of a curriculum in your college?	Yes	136	33.8%	3.403	0.18
	No	148	36.8%		
	Not sure	118	29.4%		

**Graph 2.2:**

Graph 2.2 indicates comparison of distribution of responses for the questions on concepts and application of forensic dentistry.

Significant number of participants (72.9%) think that DNA can be extracted from a tooth specimen and few (21.9%) seem unsure. Cheiloscopy is the study of lip prints and 47.3% participants got that response right while many

**Table 1.3:**

Distribution of participants based on the year of study: Students from various years were a part of this study including a total of 26.6% (n=107) participants from 1<sup>st</sup> BDS, 27.9% (n=112) from 2<sup>nd</sup> BDS, 25.1% (n=101) from 3<sup>rd</sup> BDS, 12.2% (n= 49) from 4<sup>th</sup> BDS, 2.7% (n=11) interns and 5.5% (n=22) post graduate students.

**Section 2:**

**Statistical Data:**

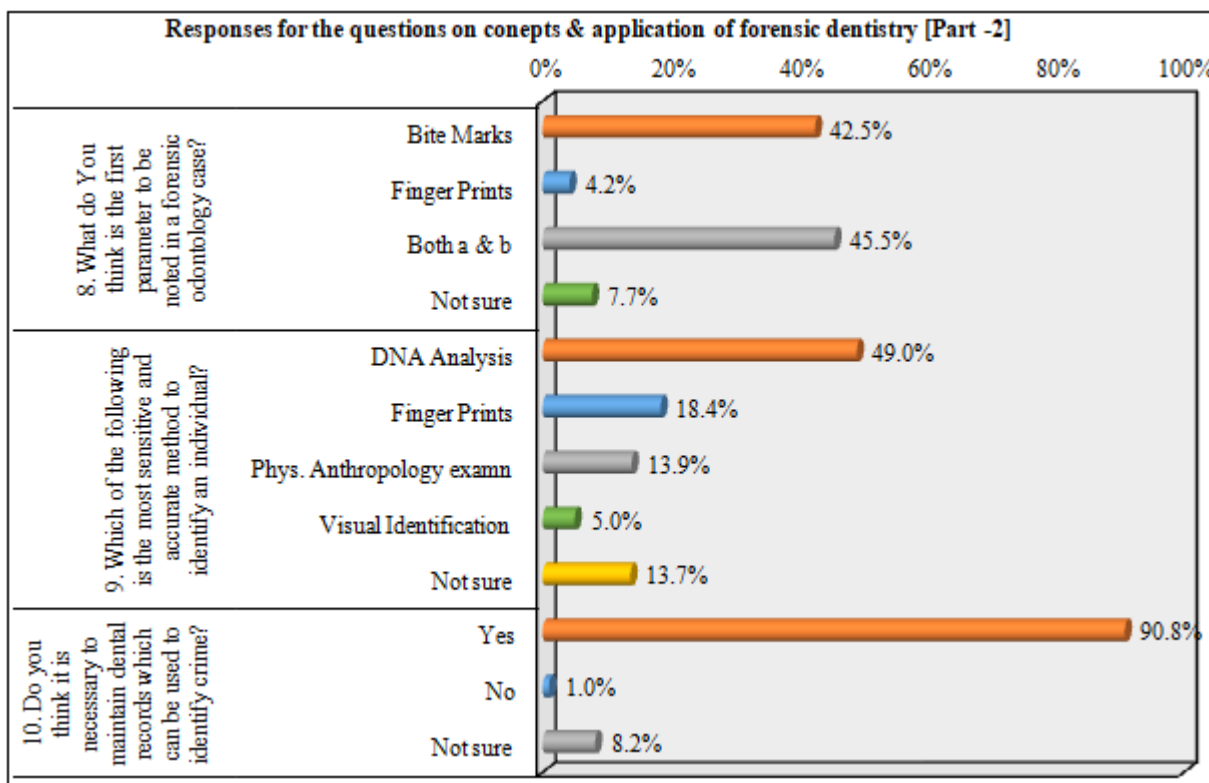
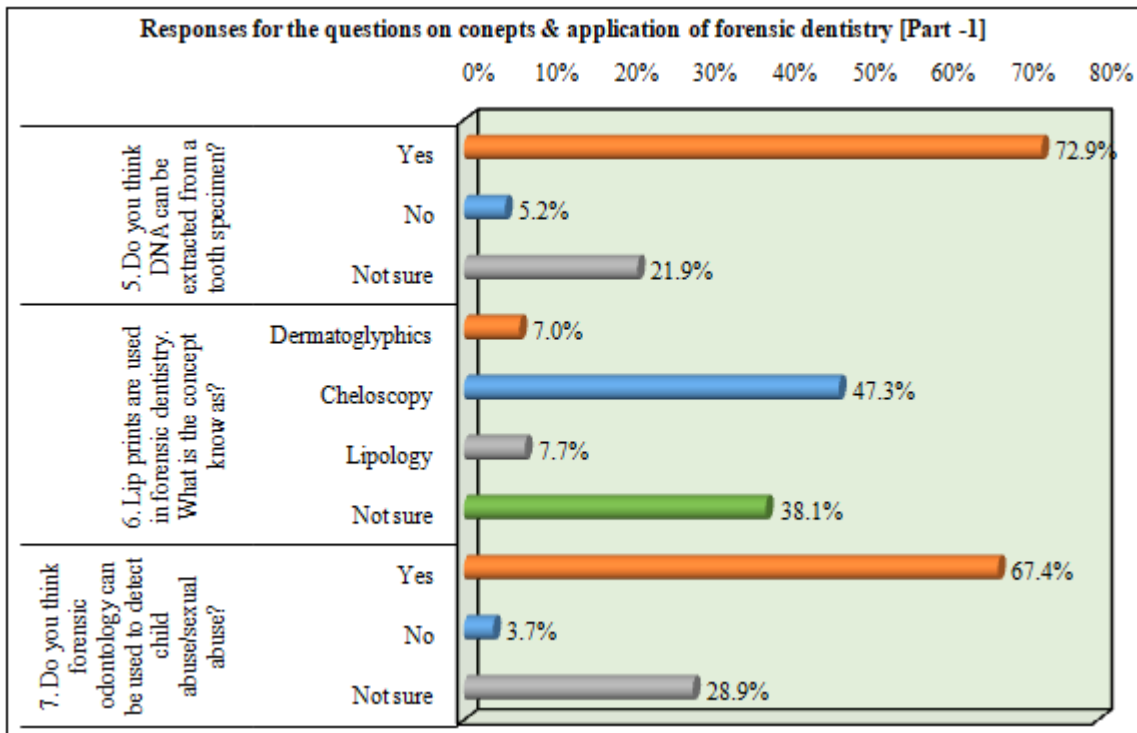
Statistical analysis was carried out using Chi Square Goodness of Fit Test and values were interpreted based on that.

**Table 2.1:**

Table 2.1 represents comparison of distribution of responses for the questions of knowledge and awareness of Forensic dentistry.

A significant number of participants 81.3% (n=327) were aware of the concept of forensic dentistry. The participants mainly received their source of knowledge from internet and social media (48.0%) followed by seminars and lectures (28.1%), few of them got their knowledge from books and magazines (14.9%). Majority of the participants (81.6%) think that forensic dentistry is an important topic to be added in the curriculum. The participants have mixed responses to the question if they have forensic dentistry as a part of their curriculum in college, 36.8% of them said No while 33.8% said Yes and the rest were Not sure (p value=0.18).

(38.1%) were not sure of what is was known as. Majority of the participants (67.4%) think that forensic odontology can be used to detect child/sexual abuse. The participants thought bite marks and finger prints were equally important and both have to be noted in a forensic case. The most sensitive and accurate method to identify an individual has always been through DNA analysis and participants seem to be aware of that while many still remain unsure. Many of them (90.8%) understand the importance to maintain dental records in order to identify crime.



**Table 2.3:**

Table 2.3 represents comparison of distribution of responses for the questions regarding perception on existence and scope of Forensic Dentistry in India.

This table indicates that mixed responses were obtained with the question if anyone was aware of forensic odontologists in India, While few said yes (31.8%) the others said no (46.0%) and not sure (22.1%). The same kind of response was obtained for the following question when asked if anyone knows a certified forensic courses in India, many of them were unaware (44.0%) while 27.4% said yes and the

rest (28.6%) were unsure. When asked if the participants want to undergo training, majority said yes (69.4%) and many said maybe (25.6%). A significant percentage of participants (83.3%) feel that the concept of forensic dentistry should be given more importance and public should be made aware of it. In general our study showed the lack of knowledge in the perception on existence and scope of forensic dentistry.



**Table 2.3:** Comparison of distribution of responses for the questions regarding perception on existence & scope of Forensic Odontology in India using Chi Square Goodness of Fit Test

Questions	Responses	n	%	$\chi^2$ Value	P-Value
11. Are you aware of any forensic odontologists in India?	Yes	128	31.8%	34.791	<0.001 *
	No	185	46.0%		
	Not sure	89	22.1%		
12. Do you know any certified forensic courses conducted in India?	Yes	110	27.4%	20.791	<0.001 *
	No	177	44.0%		
	Not sure	115	28.6%		
13. If given a choice, would you like to undergo forensic odontology training?	Yes	279	69.4%	261.060	<0.001 *
	No	20	5.0%		
	May be	103	25.6%		
14. Do you think the concept of forensic dentistry should be given more importance and the public should be made aware of it?	Yes	335	83.3%	457.358	<0.001 *
	No	15	3.7%		
	May be	52	12.9%		

NOTE: We also noticed that the clinical students mainly got their knowledge from seminars and lectures while non-clinical students got the knowledge from social media and internet. Clinical students are well aware of the concept while non-clinical students haven't still got exposure to the concept but in our study we clearly notice that all dental students are eager to know and learn more on the concept of Forensic Odontology

Non - Clinical Category includes I & II BDS; Clinical Category – includes III, IV BDS, Interns and PG's.

## 5. Conclusion

Forensic Odontology is an important concept as it helps in identification of an individual. We carried out this survey as we noticed other survey results showed poor, inadequate knowledge and awareness on the concept. The results of our study reveals adequate knowledge and awareness on the concept of forensic odontology among undergraduate and postgraduate dental students but lacked knowledge of perception on existence and scope of forensic dentistry. Within the limits of our study we conclude that: - Forensic dentistry should be included in the curriculum of dental colleges and there is a need for sensitization of the subject among dental students. We also noticed that the dental students are willing to enhance their knowledge on the subject. We the authors feel that forensic odontology courses should be introduced as a separated course by the Dental Council like other specialities in order to provide practioners and dentists more information to specialize in this field.

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