ORIGINAL ARTICLE

Status of forensic odontology in metro and in tier 2 city in urban India

Parul Khare,
Shaleen Chandra[1],
Vineet Raj[1],
Poonam Verma[2], Subha G.[3], Abhishek Khare[4]
Department of Oral and Maxillofacial Pathology, Maharana Pratap College of Dentistry, Gwalior, Madhya Pradesh, [1]Oral Pathology, Saraswati Dental College and Hospital, Lucknow, [2]Orthodontics, Rayat -Dahra Dental College and Hospital Sahauran, Chandigarh, [3]Oral Medicine, Sri Hasanamba Dental College, Hassan, Karnataka, [4]Oral and Maxillofacial Pathology, Daswani Dental College, Kota, Rajasthan, India

Address for correspondence:
*Dr. Parul Khare,
C/o V B Sinha, MZ 6, Kutumb Apartments, Phase I, Balwant Nagar, Gwalior - 474 001, Madhya Pradesh, India.
E-mail: parulsinha02@gmail.com*

Abstract

Dentist can play a significant role in identifying the victims or perpetrators of crime as well as in disasters. Knowledge about the various aspects of forensic science as well as dental and related evidences can help a dental practitioner in assisting the civil agencies in such cases. **Aim:** To evaluate the awareness and knowledge of forensic odontology among dentists in a metropolitan and a tier 2 city. **Materials and Methods:** Seven hundred and seventy four dentists were included in this survey. Questionnaire was designed to assess the knowledge, aptitude, and status of practice of forensic odontology. Data was analyzed by comparing overall awareness of forensic odontology among dentists in metro and tier 2 city as well as between the different groups. **Results:** Apart from the source of knowledge, no significant differences were seen in respondents of metropolitan and tier 2 city. Significantly higher proportion of subjects in metro reported journals as source of knowledge ($P < 0.001$), whereas it was newspaper in tier 2 city ($P = 0.001$). On comparing the mean scores of knowledge (k), aptitude (a), and practice (p) among different study groups, it was found that all the three scores were highest for practitioner cum academician (PA) group (k – 2.37, a – 0.69, P – 0.17). Knowledge scores were minimum for pure practitioner (PP) group (1.98), and attitude and practice scores of pure academician (A) group were minimum (a - 0.53, P – 0.06). **Conclusion:** Respondents had low knowledge about the applications of forensic odontology in routine practice; hence, steps must be taken to educate the dental practitioners about its clinical applications.

Key words: Dental practitioners, forensic odontology, metropolitan city, tier 2 city

Introduction

India has a significant history of forensic science. Application of science and technology for the detection and investigation of crime and administration of justice is not new to us. Although our ancestors did know the forensic science in its present form, scientific methods in one way or other seems to have been followed in investigation of crime. Its detailed reference is found in 'Kautilya's Arthashastra,' which was written about 2300 years ago. For example, papillary lines (now known as 'rugoscopy') were studied thousands of years ago by Indians.[1] First case of identification using dentition from India was of Raja Jayachandra Rathore of Canouj, who died on the battlefield in 1191 and his body was identified by his false anterior teeth.[2]

After reviewing the articles and knowing the fact that ancient India in its time was ahead in forensic sciences as compared to other countries of that era, we wanted to know the scenario of our country now. So, this survey was conducted with the aim to assess the knowledge and practice trends of forensic odontology in dental surgeons in

Access this article online	
Website: www.jfds.org	Quick Response Code
DOI: 10.4103/0975-1475.119783	

urban India. Survey was conducted in a metropolitan and a tier 2 city. The objectives of our study were to analyze knowledge of dentists related to forensic odontology, aptitude for forensic odontology, and status of forensic odontology practice among dental surgeons. Dentists from both metropolitan and tier 2 city included purely private practitioners (PP), purely academicians (dental surgeons teaching in dental colleges - A), and academicians cum practitioners (PA). Further comparison of the knowledge, aptitude, and status of practice between a metropolitan and a tier 2 city was done.

Study design

In tier 2 city, a total of 678 dental surgeons were surveyed, which included- 361 purely practitioners (PP), 170 purely academicians (A), 147 academicians cum practitioners (PA). In metropolitan city, a total of 96 dental surgeons were surveyed irrespective of their status of practice, as a pilot study for comparison with tier 2 city. Questionnaire was designed to assess the knowledge, aptitude, and status of practice of forensic odontology among participants.

Scale Composition: Total number of questions - 9, related to knowledge - 3, related to attitude - 2, related to practice - 3, related to source of knowledge - 1 (Questionnaire attached).

Results

On comparison of data obtained from metro and tier 2 city regarding knowledge, source of knowledge, and about Indian Association of Forensic Odontology (IAFO), it was found that respondents in metro had comparatively slightly more information than in tier 2 city [Table 1, questions 1 to 3].

Question 4 of Table 1 shows results of source of knowledge in metro and tier 2 city. Significantly higher proportion of participants in metro had the journals as source of knowledge ($P < 0.001$), whereas newspaper was the source of knowledge amongst significantly higher proportion of tier 2 city ($P = 0.001$).

On analysis of participants having interest to become member IAFO [question 5 of Table 1], it revealed that respondents in tier 2 city were slightly more interested to become members than in metro.

Practice-related questions 6 to 9 showed that cases related to forensic odontology and child abuse in metro were less than in tier 2 city. Further cases solved related to forensic odontology were more in metro, and steps taken to solve child abuse cases were more in tier 2 city.

Finally, overall comparison of mean scores of knowledge, attitude, and status of practice in metro and tier 2 city showed no significant difference in mean scores for knowledge, attitude, and practices [Table 2].

Comparison of data among different group of dental surgeons in tier 2 city

In next phase of the study, we divided dental surgeons in 3 groups as purely practitioner (PP), purely academician (A), and private practitioner cum academician (PA), and same questionnaire was analyzed.

On comparison of these 3 groups PP, A, and PA for knowledge in tier 2 city, it was found that PA and A group had more knowledge of forensic odontology, recognition of forensic odontology as subject and about IAFO than PP group [Table 3].

Further, on comparison of these groups for source of

Table 1: Comparison on awareness of forensic odontology in metro and tier 2 city

Question	No. of respondents with positive response	Metro (n=96)		Tier 2 city (n=678)	
		No.	%	No.	%
Knowledge about forensic odontology	742	93	96.9	649	95.7
Knowledge about recognition of forensic odontology as a subject	494	67	69.8	427	63.0
Knowledge about IAFO	401	41	42.7	360	53.1
Source of knowledge*					
As a subject in college	263	30	31.3	233	34.4
Journals	280	54	56.3	226	33.3
Internet	467	47	49.0	380	56.0
Newspaper	229	14	14.6	215	31.7
Interest to become member of IAFO	395	44	45.8	351	51.8
Availability of cases related to forensic odontology in routine practice	29	3	3.1	26	3.8
Solved cases related to forensic odontology	12	2	2.1	10	1.5
Cases related to child abuse	36	4	4.2	35	5.2
Steps taken to stop child abuse	37	2	2.1	32	4.7

Chi-square test has been used, *A person can have more than one source of knowledge, Table represents results of survey between metropolitan and tier 2 city and their response of knowledge of forensic odontology, where '*n*' denotes number of participants and '%' for percentage of response, IAFO: Indian association of forensic odontology

knowledge in tier 2 city, it was found that significantly higher proportions of academicians (A and PA) used Internet and journals to get access to the knowledge. While newspapers were preferred source of PP group followed by PA and A groups [Table 3].

Our survey revealed that PA group was more interested to become member of IAFO followed by PP and A group. Furthermore, on analyzing status of practice, it was found that 4.8% cases related to forensic odontology are received by PA group in routine practice and the same amount of cases are solved by them. Similarly, child abuse cases received by them and solved by them are almost same. Followed by PP, they received 4.2% forensic odontology cases and solved 0.6% of them, and academician group received 2.4% cases of forensic odontology cases and solved 0.6% cases. Child abuse cases received and solved by PP are same 4.4%. Academician group received 7.5% cases and solved 6.8% cases related to child abuse [Table 3].

On comparing the mean scores of knowledge (K), aptitude (a), and practice (p) to type of practice, it was found that all the three scores of PA were maximum (k – 2.37, a – 0.69, *P* – 0.17). Knowledge scores were minimum for PP (1.98), and attitude (0.53) and practices scores (0.06) of A were minimum.

Table 2: Mean scores for knowledge, attitude and status of practice between metro and tier 2 city

Dimension	Metro (*n*=96)		Tier 2 city (*n*=678)		"*P*"
	Mean	SD	Mean	SD	
Knowledge (Max 3)	2.09	0.88	2.12	0.84	0.793
Attitude (Max 3)	0.48	0.54	0.57	0.55	0.135
Practices (Max 2)	0.09	0.41	0.10	0.38	0.876

ANOVA has been used; Table shows no significant difference in mean scores for knowledge, attitude, and status of practice between metro and tier 2 city, where '*n*' denotes number of participants and '*P*' denotes significant value

Discussion

The term 'forensic' implies 'court of law.' Forensic odontology has been defined as that branch of dentistry which, in the interest of justice, deals with the proper handling and examination of dental evidence and with the proper evaluation and presentation of dental findings.[3] Dentistry plays a small but significant role in identifying the victims of crime and disaster through dental records. The most common role of the forensic dentist is in the identification of deceased individuals.[4] They play important role in establishing ante-mortem and post-mortem dental records.[5]

The results of our survey revealed that although the knowledge of forensic odontology among dental practitioners in India is adequate, what lacks is the attitude and application of that knowledge. No significant differences in mean score for knowledge, attitude, and practice were found between metro and tier 2 city [Table 2]. On analyzing the data, we found that scientific journals were the main source of knowledge among a high proportion of subjects in a metro ($P < 0.001$), whereas dentists in tier 2 city mainly depended on news papers for the same ($P = 0.001$). This may be possibly because of easier access to journals in metro. Apart from the source of knowledge, no significant differences were seen in the levels of knowledge, attitude, and practice [Table 1].

On comparison of data among different groups of dental surgeons, we found no significant difference related to knowledge about forensic odontology, its recognition as

Table 3: Differences on the basis of type of practice

Item	No. of respondents with positive response (*n*=680)	Practitioners (PP) (*n*=361)		Practitioners+Academicians (PA) (*n*=147)		Academicians only (A) (*n*=170)		*P*
		No.	%	No.	%	No.	%	
Knowledge about forensic odontology	649	345	95.6	145	98.6	159	93.5	0.079
Source of knowledge								
As a subject in college	233	116	32.1	56	38.1	61	35.9	0.391
Journals	226	87	24.1	68	48.3	71	41.8	<0.001
Internet	380	186	51.5	84	57.1	110	64.7	0.016
Newspaper	215	125	34.6	44	29.1	46	27.1	0.189
Knowledge about recognition of forensic odontology as a subject	427	195	54.0	108	73.5	124	72.9	<0.001
Availability of cases related to forensic odontology in routine practice	26	15	4.2	7	4.8	4	2.4	0.483
Self-assessment of ability to solve the cases	10	2	0.6	7	4.8	1	0.6	0.001
Cases related to child abuse	35	16	4.4	10	7.5	9	5.3	0.221
Steps taken to stop child abuse	32	16	4.4	10	6.8	6	3.5	0.149
Knowledge about IAFO	360	175	48.5	96	65.3	89	52.4	0.003
Interest to become member of IAFO	351	178	49.3	91	61.9	82	48.2	0.021

IAFO: Indian association of forensic odontology

a subject, and about IAFO. However, as regards source of knowledge, significantly higher proportion of academicians used Internet to get access to the knowledge, while journals were least preferred source of knowledge amongst practitioners. This shows that practitioners are not aware of journals of forensic odontology and are not having much of access. Knowledge about recognition of forensic odontology as a subject was reported in significantly higher proportion of respondents affiliated with academic activity. This again highlights the lack of awareness of purely practitioners about this new subject, introduced by DCI in BDS curriculum. On overall screening of PP, A, and PA for their interest to become member of IAFO, we found that academicians were more interested to become member than purely practitioners.

PP group gets more cases of forensic odontology, and they solve these cases comparatively more than PA and A group. Child abuse cases and steps taken to solve these cases are again seen to be more for this group. Although, overall, no significant difference related to availability of cases of forensic odontology in routine practice, ability to solve these cases, availability of cases related to child abuse, and steps taken to stop child abuse among different types of practitioners were observed.

On surveying dental surgeons regarding their status of practice, we noticed lack of their understanding about cases that are included in forensic odontology. Most of them did not know what kind of cases are to be included under child abuse cases.

Overall, mean scores of PA were maximum, knowledge scores were minimum for practitioners alone, while attitude and practices scores of academicians alone were minimum. A statistically significant difference among different types of practitioners was observed for the knowledge ($P < 0.001$). However, attitude and practices seemed to be independent of type of practice.

Though there was knowledge about existence of forensic odontology as a subject and knowledge about forensic odontology was available to majority, it seemed that the respondents had low knowledge about the applications of forensic odontology in routine practice, which highlights the fact that to popularize forensic odontology and to ensure its growth as an independent specialty, steps must be taken to highlight its clinical use.

The attitude and practice scores indicate the fact that medical professional still tries to keep away from any case that might involve medico-legal/legal consequences. Indifferent attitude of dental surgeons for practice of forensic odontology may be because financial remuneration to solve the case of forensic odontology is not commensurate with the efforts and the time involved.

Conclusion

It is vital that a person interested in forensic odontology be properly educated and trained.[6,7]

There is an urgent need to organize workshops at different cities to highlight the practical aspects of forensic odontology in routine practice. It may also be added as a continuing medical education in the subject for existing practitioners, at different dental colleges throughout India, to strengthen the knowledge, remove the self-held misbelieves, and highlight the practical uses of forensic odontology.

References

1. Tiwari RK, Ravikumar KV. History and development of forensic science in India. J Postgrad Med 2000;46:303-8.
2. Sansare K. Forensic odontology, historical perspective. Indian J Dent Res 1995;6:55-7.
3. Kavitha B, Einstein A, Sivapathasundharam B, Saraswathi TR. Limitation in forensic Odontology. J Forensic Dent Sci 2009;1:8-10.
4. Jones DG. Odontology often is final piece to grim puzzle. J Calif Dent Assoc 1998;26:650-1.
5. Sweet D, DiZinno JA. Personal identification through dental evidence-tooth fragments to DNA. J Calif Dent Assoc 1996;24:35-42.
6. Herschaft EE, Rasmussen RH. The teaching of forensic dentistry: A status report. J Dent Educ 1978;42:532-6.
7. Johanson G, Drinnan AJ, Keiser–Nielsen S. Education in forensic odontology. Int Dent J 1981;31:6-13.

How to cite this article: Khare P, Chandra S, Raj V, Verma P, Subha G, Khare A. Status of forensic odontology in metro and in tier 2 city in urban India. J Forensic Dent Sci 2013;5:134-7.

Source of Support: Nil, **Conflict of Interest:** None declared

Questionnaire Used in Survey

1. Do you know about Forensic Odontology?
   Yes □ No □
2. Have you read about Forensic Odontology? If yes, where
   As a subject in college □
   Journals □
   Internet □
   News paper □
3. Do you know it is subject recognized by DCI?
   Yes □ No □
4. Do you get cases related to Forensic Odontology in your practice?
   Yes □ No □
5. Have you solved any cases related to Forensic Odontology?
   Yes □ No □
6. Have you got any cases of child abuse?
   Yes □ No □
7. Have you taken any step to help the child?
   Yes □ No □
8. Do you know about IAFO?
   Yes □ No □
9. Do you have interest to become member of IAFO?
   Yes □ No □