

KAP STUDY

KNOWLEDGE, AWARENESS AND PRACTICE OF FORENSIC ODONTOLOGY AMONG DENTAL PRACTITIONERS IN KARACHI, PAKISTAN

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ABSTRACT

Background: Forensic odontology is an expanding field within the domain of forensic sciences, where dental knowledge is applied in identification of individual(s) through analysis of the dental related records. In this study we aimed to assess the knowledge, awareness and practices of dentists in the field of forensic odontology.

Methods: This cross-sectional study was conducted over 248 dentists practicing in teaching hospitals as well as private practice in Karachi, Pakistan. Multiple close-ended questions were answered by the respondents, in which their knowledge and awareness about forensic odontology was evaluated. They were also asked about their practices of maintaining dental records of the patients.

Results: Majority of the dentists had knowledge about importance of forensics in dentistry (86.2%) and mostly (88.7%) were aware that they could be of help to forensics experts if they maintain proper records. But when asked about their practices in maintaining dental records, only 64.5% responded positively.

Conclusion: The results of this study show that the dentists have sufficient knowledge and positive attitude in the field of forensic odontology. Lack of practice in dental record management was demonstrated amongst majority of the dental practitioners.

KEYWORDS: Dental Practices, Forensic dentistry, dental records

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INTRODUCTION

Forensic dentistry is an interesting sub-speciality of forensic sciences, that applies dental knowledge to compare ante- and post-mortem records of an individual¹. According to the World Dental Federation, forensic odontology is defined as a "branch of dentistry that deals with the proper handling of dental evidence in the interest of justice and with the proper evaluation and presentation of dental findings"². Identifying deceased individual(s) on the basis of dental record analysis, can be traced back to 66 AD; since then its use has played a vital role in forensics³. In the year 1849, first case was accepted by law in which forensic odontology was applied¹.

Forensic odontology is just not limited to identifying deceased individual but also in identifying suspects or criminals. The various materials used in identification of human remains are the personal belongings like pieces of clothing, jewelry, fingerprints, blood grouping and dentition. Human dentition is considered as hard tissue analog to the fingerprints which is almost unique to every individual³. Although globally forensic odontology has taken giant steps in the technical advancements, in Pakistan the field of forensic odontology is still miles behind in this regard. There is an increased need for dental surgeons to have good knowledge about forensic odontology, as it is useful in identification of an individual and to detect abuse among all ages⁴. Dentists are the

health-care professionals who routinely assess the head and neck of the patients and have a great chance in identifying the signs of abuse and neglect⁵. With the increase in road traffic accidents, criminal & violence cases, pandemic diseases and mass disasters, private dental practitioners may likewise bear an essential role in solving these types of cases. However, dentists working in their private clinics often maintain a low quality of dental record keeping which eventually may cause difficulty in identification of those patients on the basis of dental records⁶. Multiple factors such as lack of specialized staff and training centers, insufficient knowledge provided regarding the subject during undergraduate courses; are the significant obstacles in utilizing forensic odontology to advantage our society⁷.

Forensic dentistry is one of the emerging fields of dentistry all over the world, however, in Pakistan, it is included merely as a small topic in oral and maxillo-facial surgery with five didactic lectures as devised in the course outlined by the Pakistan Medical and Dental Council (PM&DC)⁸. Hence, the goal of this study was to assess the knowledge, attitude and practices of forensic odontology among dentist in Karachi, Pakistan through series of structured questions.

METHOD

This cross-sectional study was conducted between October & November 2017, through an organized questionnaire having 20 close-ended questions. Closed-ended questions were used due to the easy preceding of the responses. Dentists working in a private practice and/or in institutional job from all over Karachi were all included in this survey. Individuals who were currently practicing dentistry were selected for the survey. 300 forms were distributed among the dentists of whom 248 responded back with response rate being 82.6%. The participants were evaluated on the following components:

1. Knowledge and awareness: Importance of forensics odontology, management of patient's dental records, age estimation via dental analysis, techniques for an individual's identification and dentist as a potential court witness. The source of knowledge regarding forensic odontology and patient's data management was also assessed.

2. Practices: proper recording and management of patient's data by the dental practitioner; Statistical Package for Social Sciences (SPSS) version 20.0 (SPSS Inc., Chicago, IL, USA) was used to analyze the data using descriptive statistics and the results of the questionnaire were presented in form of frequencies and percentages.

RESULTS

The mean age of the 248 dentists included in this analysis was 29.05 years (range 20-50). Out of which 66.9% of the respondents were females and 33.1% were males. Majority of the respondents were postgraduate trainees (37%) followed by house officers and lecturers respectively (23.3% and 22.5%). Only a handful of the senior faculty consented to fill out the questionnaire (17.2%). More than a half of the respondents had less than 5 years of experience, whereas only (13%) of the respondents had an experience of more than 10 years.

Knowledge:

Greater than 80% respondents had adequate knowledge regarding importance of forensic odontology, its use in identifying victims in mass disasters and importance of bite patterns as an accessory for analyzing crime scenes. About 49.2% of the respondents knew that lip prints could be used for identification of an individual. About 34% respondents identified fingerprinting as the first step as a means of identification of the unclaimed bodies, followed by serological and genetic DNA comparison (22.6%) and visual examination (21%) respectively. When asked, how the respondents would react if they identified signs and symptoms of child abuse, almost half of the respondents said that they would inform the parents (44%), closely followed by informing the police (43%).

Awareness:

54% of dental practitioners were aware of the fact that they were legally qualified to present forensic dental evidence in court. 78.3% of the dentists were aware that enamel and dentine could be used as an aid for the identification of an individual and that the teeth serves as a source of DNA. When the respondents were inquired regarding the awareness of presence of any forensic odontologist in Pakistan, 92% were unaware of it. 96% dentists weren't aware of any formal training centers in Pakistan for Forensic Odontology. When the dentists were asked if they were aware that they could be of help to forensic odontologists, by maintaining records, 89% of the respondents replied in affirmative. The results are shown in Table 1.

Source of knowledge:

Only 47.6% of participants had knowledge of dental record management which was taught to them at the institutional level as part of the curriculum. When inquired about the source of information relating to their knowledge of forensic odontology, 34% chose electronic media closely followed by reading literature and journals (30%). The results are shown in Table 1.

Table 1: Knowledge and awareness of dentists regarding to forensic odontology

1	Forensic odontology is an important branch of dentistry	
	Agree	214 (86.2%)
	Disagree	22 (8.9%)
	Don't Know	12 (4.9%)
2	Forensic odontology is an efficient method to identify victims in a mass disaster.	
	Agree	222 (89.5%)
	Disagree	4 (1.6%)
	Don't Know	22 (8.9%)
3	As a dentist, can we help forensic experts by maintaining records?	
	Agree	220 (88.7%)
	Disagree	8 (3.2%)
	Don't Know	20 (8.1%)
4	Teeth serve as a source of DNA.	
	Agree	194 (78.3%)
	Disagree	12 (4.8%)
	Don't Know	42 (16.9%)
5	Can enamel/dentin act as an aid for identification of age?	
	Agree	194 (78.3%)
	Disagree	16 (6.4%)
	Don't Know	38 (15.3%)
6	Bite mark pattern of human teeth is an important adjunct for assessing crime scene.	
	Agree	206 (83%)
	Disagree	10 (4%)
	Don't Know	32 (13%)
7	Lip print patterns of human can be used for identification of a population.	
	Agree	122 (49.2%)
	Disagree	44 (17.7%)
	Don't Know	82 (33.1%)
8	What is the first step for the mean of identification for unclaimed bodies?	
	Fingerprinting	84 (33.8%)
	Serological and genetic DNA comparison	56 (22.6%)
	Visual examination	52 (20.9%)
	Physical and anthropological examination	34 (13.8%)
	Don't know	22 (8.9%)
9	What would you do if you identify signs and symptoms of child abuse?	
	Inform parents	110 (44.4%)
	Inform police	108 (43.5%)
	Inform NGO's	24 (9.7%)
	Take no action	6 (2.4%)
10	Are you aware that you are eligible to appear in the court to present forensic dental evidence?	
	Yes	134 (54%)
	No	114 (46%)
11	Did your teaching curriculum included how to maintain dental records, at institutional level?	
	Yes	118 (47.6%)
	No	130 (52.4%)
12	Are you aware of any forensic odontologist in Pakistan?	
	Yes	30 (12%)
	No	218 (88%)
13	Are you aware of any formal training centers in Pakistan for forensic odontology?	
	Yes	10 (4%)
	No	238 (96%)
14	If given a choice, would you like to undergo any such training?	
	Yes	218 (88%)
	No	30 (12%)
15	What is the source of information relating to your knowledge in forensic odontology?	
	Electronic media (TV, cell phones etc.)	134 (34%)
	Literature and journals	118 (30%)
	Lectures	70 (18%)
	Seminars and symposium	64 (16%)
	Other	8 (2%)

Practices:

The response to questions pertaining towards prac-

tices of the dentists in their clinical practice was variable.

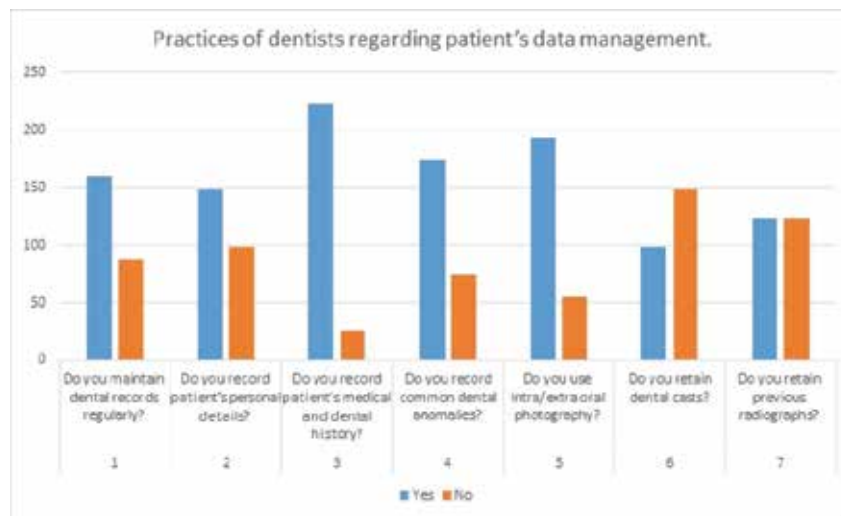


Figure 1: Practices of dentists regarding patient's data management

DISCUSSION

Analysis of ante and post-mortem dental records can serve as a vital tool for a person's identification.⁶ Although forensic odontologists being specialized in the field can identify an individual by dental means, but role of all the dentists is important in managing patient's dental records which if required can be used in identification of the individuals by comparing ante- and post-mortem dental records⁹. These patient records may include hand written or digitized notes, dental radiographs, models and intra- & extra-oral photographs. This being said, there are severe challenges to forensic odontologists as they have to deal with deficient or inaccurate dental records, which may interfere in the process of a person's identification¹⁰. To overcome this growing challenge in the field of medicine, dental practitioners need to have sufficient knowledge and awareness of forensic odontology. With increasing requirement in mostly the developed countries across the world, application of forensic odontology has gained an ample value¹¹.

Applications of forensic odontology are extensive which includes identification of suspects in criminal investigations, suspected child or adult abuse, bite marks or other physical injuries, determination of age and gender of the living or a deceased person, presenting forensic dental evidence as an expert witness in the court of law and identification of humans via the decomposed and mutilated remains from the mass disasters^{12,13}. Regarding the importance of forensic odontology, and it being an efficient means to identify victims of mass disasters,

more than 80% of the respondents showed adequate knowledge in this study¹⁴. This is consistent with the results of the Rahman et al². More than 80% of the respondents in the present study, agreed that human bite mark patterns are an important adjunct for assessing crime scenes. These results are consistent with results shown by Preethi et al¹⁵ and Rahman et al².

Le Moyne Snyder was the pioneer for suggesting use of lip prints for identification of an individual in the year 1950¹⁶. However, it was during the period between 2000 & 2012 that various studies were carried out by several researchers from other countries^{1,17} relating to lip prints and their use in forensic odontology. Different aspects of lip prints like stability, morphological patterns and sex determination were studied among different groups of population and the researchers suggested that cheiloscopy could be used as an adjuvant technique in identification^{1, 18, 19}. When inquired if human lip prints could be used for identification of a population, the results of this study showed that half of the respondents agreed with it. These results are in contrast with the studies carried out by Nagarajappa al¹ and Rahman et al² where about 70% of the respondents answered this question in affirmative.

In the present study, 34% of the respondents recognized fingerprinting as the first step as a means of identification for unclaimed bodies. Another study carried out in Karachi – Pakistan, is consistent with our results (29.3%)⁸. However, the results of this study are in contrast to the study carried out by Preethi et al¹⁵. Child abuse poses a serious social problem in most parts of the worlds, regardless of the socioeconomic status, ethnicity or race. Sadly, cases of child

abuse are being reported at an alarming rate that needs intervention as early as possible by being reported immediately to childcare authorities after detection. A research suggests that parents may physically abuse children and nearly 1 in 10 children witnesses such violence and over 80% of the cases the culprits were parents²⁰. However, the result of the present survey showed that 45% of the practitioners suggested that it is important to first inform the parents rather than the police or the NGOs as they were unaware of the fact that in most cases parents are actually the main culprits. These results are in accordance with the results of other studies⁵.

Dentists who play a part in identification of the deceased individual(s) and/or in a criminal investigation, are then required to present their findings in the court of law as an 'expert witness'^{21, 22}. More than half of the dental practitioners were aware of the fact that they could testify as an expert witness in the court of law to present forensic dental evidence. The results are consistent with those of Rahman et al 2 (60%) however in contrast to those found in a study by Sharma et al⁶. The dental hard tissues have the capacity to withstand environmental assaults, hence being able to retain some of its original structure. Due to the ability of withstanding decomposition, teeth are an excellent and accurate source of an individual's DNA¹⁵. Most of the techniques involve nuclear DNA but mitochondrial (mt) DNA can also be used that is more abundantly found in tissues and can be used when nuclear DNA is insufficient. Dental tissues, such as dentin and cementum, are rich in mtDNA. Even in a small amount of source material, DNA can be amplified using polymerase chain reaction (PCR) technique, and this amplified DNA is then compared with ante mortem samples, such as blood, hair, clothes, cervical smear, and biopsy²³. When the respondents were inquired regarding the awareness of presence of any forensic odontologist in Pakistan, surprisingly, 92% were unaware of it. In contrast, a study conducted by Rubel M et al²⁴, 55% of the respondents knew forensic odontologists in India. 89% of the dentists agreed that maintaining records would be helpful for the forensic experts for identification. This is consistent with the results of numerous studies^{15, 25}. However, these results are in contrast to a study carried out by Rubel et al in India in 2017²⁴.

CONCLUSION

248 dental practitioners from Karachi, Pakistan took part in this survey based study. Questions were asked from them regarding their knowledge, awareness and practices of forensic odontology, of which the results revealed that they had adequate levels of knowledge and awareness, however the knowledge and awareness is not being implemented in the clinical practice. There is a major lack of trained forensic odontologists and training institutes

in Pakistan. This study may represent the current status of dental practitioners in the field of forensic odontology.

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