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Awareness of dental students about forensic odontology in Karachi, Pakistan

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Original Article

Abstract

BACKGROUND AND AIM: Forensic odontology is a neglected field of dentistry despite its importance in profession. It must be considered as part of dental curriculum and undergraduate students must have insight into the subject. The objective of this study was to evaluate the awareness of dental graduates regarding forensic dentistry in Karachi, Pakistan.

METHODS: A cross-sectional study was conducted from January to June 2019 among different dental colleges of Karachi. About 500 participants including house officers, postgraduate trainees, and dental teaching faculty were recruited through convenience sampling. Inclusion criteria were undergraduate and graduate dental students of recognized dental colleges who verbally consented for study. All quacks and non-registered practitioners were excluded. A predesigned questionnaire was used to collect data which consists of two sections, i.e., basic demographic data and knowledge of dental practitioners regarding forensic dentistry, respectively. Data collected were entered and analyzed on SPSS.

RESULTS: Women were major participants, i.e., 68.29% (n = 341). 55.80% (n = 279) of participants were postgraduate trainees. Approximately, 61.20% (n = 306) of people believed in significance of maintaining dental record. In 67.80% (n = 339) of cases, investigators could estimate age of victim while 49.20% (n = 246) could identify gender. 46.20% (n = 231) of participants agreed that forensic odontology helped in testification as an expert witness. The most accurate method for identification was an anthological examination, followed by fingerprints, serological, and visual identification. Whereas, 47.80% (n = 239) of participants knew the identification of a person with the help of bite mark, majority of participants (90.00%, n = 450) suggested that awareness programs must be initiated.

CONCLUSION: The awareness of dentists regarding forensic dentistry is judiciously sufficient and knowledge of maintaining dental records was satisfactory. Burly initiatives must be taken to develop the specialty in Karachi.

KEYWORDS: Dentistry; Medical Jurisprudence; Awareness; Dermatoglyphics; Knowledge

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With time, different evolutions occurred in the human and world. With these evolutions, health challenges increased and different medical advancements occurred.[1] Forensic odontology is one of the branches of dental science and need of the modern world, not only helping in solving the mystical cases legally[2] but also exploring human evolution with time.[3] The forensic dentistry was defined by Keiser-Neilson in 1970.[4] The term "forensic" has its origin in the Latin word "forensis" from "forum," which means a place where legal matters are discussed.[3] Forensic odontology can be defined as the branch of dentistry that addresses the proper handling and examination of dental evidence and the evaluation and presentation of dental findings

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in the interests of justice.[5] So, according to definitional meanings, forensic odontology deals with legal aspects of dentistry.[6]

The Armed Forces Institute of Pathology (AFIP) in United States (US) for the first time initiated this field in 1960 to solve their legal matters and from that point, discipline of odontology developed in rest of the world.[6]

Although the traces of odontology were found in the past 20 years in solving poison cases, the field got its fame globally in the 19th century. The main role of forensic odontology is to investigate a person's identity that is affected in natural disasters (earthquakes and floods) or man-made disasters (e.g., murder, honor killing, fire victims or accidents, martial social disputes, insurance, etc.) through their teeth.[7]

After the incidence of the terrorist attack on the World Trade Center, US, on September 11, Pakistan is considered an insecure country due to many terrorist attacks. In these attacks, many individuals lose their family members and some dead bodies cannot remain in a position to identify them.[7] At that time, the role of forensic odontology becomes significant.[8] In 1988, the case of the late president of Pakistan demonstrated the significance of forensic odontology, the death of General Zia-ul-Haq in a plane crash explosion. The dentition of late president recognized the jaw and teeth patterns of late Zia-ul-Haq which helped the investigators identify the body of the president. Same occurred in the case of Prime Minister Mr. Rajiv Gandhi's death in terrorist attack; he was also identified through his dentists.[9] The dentition and surfaces of teeth of dead bodies should be evaluated in legal cases. The periodontal tissues of teeth and odontograms (pictorial description of teeth) will help investigators solve the cases. The analysis of bite mark plays a tremendous role in solving sexual abuse and homicide cases because in that type of case, the victim tries to defend himself.[9] One method of identification is the age assessment of tooth; it is the best and reliable method to guide in further investigation. The other methods of forensic odontology include visual method, radiographic methods, histological method, and physical and chemical analysis of teeth.[10] Schour and Massler developed a chart in which they defined the parameters of eruption sequence and neonatal line formation which help the investigators estimate the dental age.[11] On the other hand, Gustafson set some parameters (attrition, apical migration of periodontal ligament, deposition of secondary dentin, cemental opposition, root resorption, and transparence of the root dentin) to examine the accurate dental age of the human body.[12] In many attacks, dentists encounter different cases of injuries, so dentists should know the new techniques of detection, management, and interpretation of these cases. The significant role of forensic odontology can be seen in the increased rate of crime all around the world. So, in many countries and researches, these questions were frequently asked.[10-13] In diverse cultures or environments, each person holds a specific identity and his/her body parts especially teeth are a significant part of a post-mortem examination to identify the identity of the person.[14] The discipline of forensic odontology would help out to identify or to investigates the victims or suspects in natural disasters, abuse, target killing, murders, and in many other legal cases.[15] In this scenario, it is the responsibility of a dentist to keep a forensic record of every patient. The significance of the study is that awareness regarding forensic odontology is very important because it will help us recommend establishing policies and start programs for qualified personnel.

After an in-depth search of data, few studies had been published on the topic. Therefore, this study was planned to evaluate the awareness of dental practitioners regarding forensic dentistry in Karachi, Pakistan.

Methods

A cross-sectional study was conducted from January to June 2019 among different dental colleges of Karachi. Permission to conduct

the study was obtained from the Institutional Review Board of Liaquat College of Medicine and Dentistry, Dar-ul-Sehat Hospital, Karachi. About 500 participants including house officers, postgraduate trainees, and dental teaching faculty were recruited. Data were collected from Karachi Medical and Dental College, Liaquat College of Medicine and Dentistry, Dar-ul-Sehat Hospital and Dow University of Medical Health Sciences, Ojha Campus. The sample size of 500 was calculated using Raosoft software through convenience sampling. Inclusion criteria were undergraduate and graduate dental students of recognized dental colleges who verbally consented for the study, while all quacks and non-registered practitioners were excluded. Convenience sampling was used to recruit participants for the study. Participants were asked for informed verbal consent to participate in the study. The confidentiality and anonymity of participants were maintained throughout the data collection procedure.

A questionnaire regarding knowledge, awareness, and practice of forensic odontology, whose validity and reliability has been approved, was answered by participants.[16] A predesigned questionnaire was used to collect data which consists of two sections, i.e., basic demographic data and knowledge of dental practitioners regarding forensic dentistry, respectively.

Basic demographic data included the name, gender, age, affiliated institute, and level of participants (house officer, postgraduate trainee, or dental teaching faculty).

Knowledge and awareness section included the significance of maintaining dental records, age estimation, gender identification, testification as an expert witness, awareness of the most accurate method for identification, and bite mark awareness.

The participants were also asked if they required any formal training as well as possible suggestions for the improvement of the field of forensic dentistry in Pakistan.

The questionnaire was modified further before the survey was undertaken. The data collected were entered into SPSS software (version 16, SPSS Inc., Chicago, IL, USA) and analyzed on it. Frequencies and percentages were calculated for gender, age, and awareness of knowledge of participants regarding forensic odontology.

Results

It was evident that women were major participants, i.e., 68.29% (n = 341). Figures 1 show the distribution of gender.

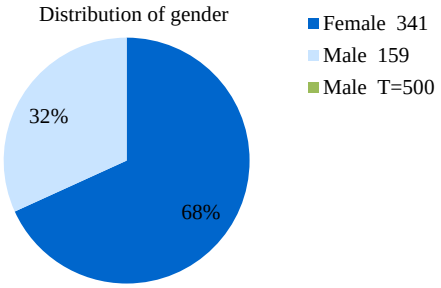

Figure 1. The percentage distribution of gender of participants

Figures 2 show the level of participants.

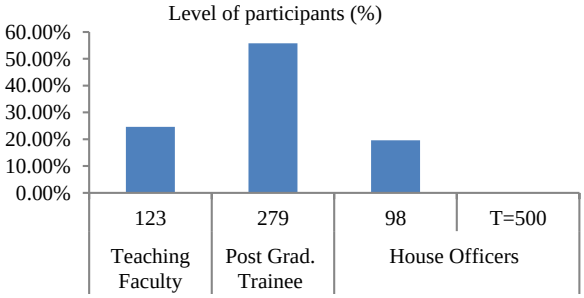

Figure 2. The percentage distribution of level of participants

Postgraduate trainees participated most, i.e., 55.80% (n = 279). The results of knowledge of forensic odontology are summarized in table 1.

The results indicated that 61.20% (n = 306) of people believed in the significance of maintaining the dental record. 67.80% (n = 339) of investigators could estimate the age of a victim while only 49.20% (n = 246) of cases identified gender. About 46.20% (n = 231) of participants agreed that forensic dentistry helped out in the testification as an expert witness.

Table 1. Different variables and their outcomes regarding forensic odontology

No.	Variables		Outcomes [n (%)]
1.	Significance of maintaining dental records		306 (61.2)
2.	Age estimation		339 (67.8)
3.	Gender identification		246 (49.2)
4.	Testification as an expert witness		231 (46.2)
5.	The most accurate method of identification	Visual identification	56 (11.2)
		Serological comparison	68 (13.6)
		Fingerprints	117 (23.4)
		Anthological examination	128 (25.6)
6.	Bite mark awareness		239 (47.8)
7.	Formal training of forensic odontology		116 (23.2)
8.	Willingness to study forensic odontology		313 (62.6)

The most accurate method for identification was an anthological examination, followed by fingerprints and serological and visual identification, respectively. Whereas, 47.80% (n = 239) of participants knew the identification of a person with the help of bite mark. In Karachi, only 23.20% (n = 116) of participants got a formal training of forensic odontology in their educational institutions. Most of the participants (62.60%, n = 313) wanted to promote the field of forensic odontology in Karachi.

Figure 3 shows the percentage distribution of suggestions given by the participants. Majority of participants (90.00%, n = 450) suggested that awareness programs must be initiated and undergraduate and postgraduate studies should be organized regarding knowledge about forensic odontology.

Discussion

Women were significant respondents in this investigation. It could be because of increased understudied women's look for affirmation in clinical and dental schools. Regarding the level of study, postgraduate students were the significant members. This is in opposition to the results of a study distributed in 2019 to take an assessment of forensic odontology lecturers about current education and standing of the subject. The greater part (72.20%) included men and most of them (84.60%) were additionally postgraduate learners.[17] The consequences of the examination demonstrated that 61.20% of experts had sources where they kept all dental records of patients. It shows the information and demeanor of members on the centrality of keeping up the dental record of their patients because legitimate record-keeping helps in assessing the age and sexual orientation of any individual (suspect or casualty) included in tragedy. Then again in India, 79.00% of dental specialists kept up their dental record and from them, just 12.00% kept up the total clinical records of their patients. The rest were apprehensive about the abuse of information that is the reason they do not keep the record of patients in their clinics.[18]

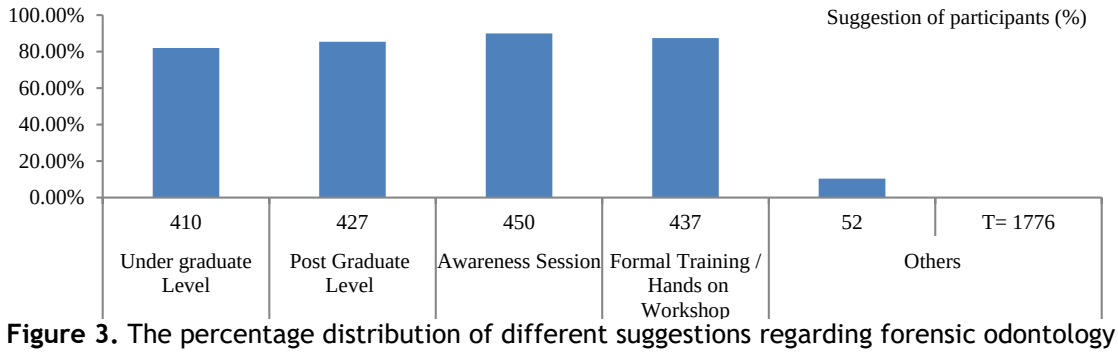

Figure 3. The percentage distribution of different suggestions regarding forensic odontology among participants

Through this examination, it was apparent that roughly 67.80% (n = 339) of members could assess the age of an expired while 49.20% (n = 246) of members might distinguish and identify the gender of including people. Around 46.20% (n = 231) of members concurred that the investigator could assist in the authentication as a specialist witness. Conversely, in a study led in Karachi in 2016, 63.20% of Karachi doctors could appraise the dental age of an individual while 58.30% could assess the ordered age of a person.[19] One of the investigations directed in India states that in 84.00% of cases, the gender of an expired can be followed with the assistance of legal forensic odontologist[20] while in Pakistan, just 66.30% of dental specialists observed the age of dead individual and 15.75% of cases separated the gender by applying legal strategies to inspect the teeth of a dead person.[21] On the other hand, we observed the opposite relationship of various investigations with our exploration. In our exploration, in 89.20% of cases, dental specialists of Karachi could foresee the data old enough though just 64.70% of cases were noted in which they distinguished the sex of the perished individual.[19] This opposite relationship of the same variable in various investigations portrays the mindfulness level among the populace about forensic odontology and scientific practices of old systems.

Another significant variable that assumes a critical job on account of wrongdoing is the genuine recognizable proof of fingerprints and information on particular qualities (morphology and arrangements of teeth) of human and nonhuman bites.[22] In our investigation, 47.80% (n = 239) of members knew about the identity of an individual with the assistance of bite mark. Approximately, 62.90% of our members had total information about the morphology and arrangements of teeth to recognize the nibble of human and other creatures. In the meantime, in Pakistan, just 59.50%-62.90% thought about the bite mark identification.[22] However, in an ongoing investigation in India, 83.00% of specialists concurred with the implication of bite marks in measurable odontology.[23] Comparing with the Nigerian examinations, the level of bite mark mindfulness is similarly high among them. In Nigeria, 66.70% of dental specialists perceived the essentialness of bite marks.[24]

According to this study, the most accurate method for identification was anthological examination (25.60%, n = 128) followed by participants' fingerprint (23.40%, n = 117), serological samples (13.60%, n = 68), and visual identification (11.20%, n = 56). The results of forensic odontology (fingerprint, visual identification, serological comparison, and anthological examination) were quite positive in our study compared to the other studies conducted in Pakistan.[21]

In Karachi, only 23.20% (n = 116) of participants acquired formal training of forensic odontology in their educational institutions. Most of the participants (62.60%, n = 313) wanted to promote the field of forensic odontology in Karachi. This is inconsistent with Indian research which revealed that the training percentage at the institutional level was as low as (24.8%) that in Pakistan.[24]

The suggestions given by participants for the improvement of forensic odontology revealed positive results. The majority of them encouraged to initiate awareness programs as part of the curriculum at the undergraduate level, formal training at postgraduate level, and hands-on workshops about the discipline. This is inconsistent with the study conducted in Saudi Arabia which emphasized the importance of forensic odontology and recommended it to be part of the curriculum at the undergraduate level.[25]

The cross-sectional study design and the small sample size are the potential limitations of our study.

It is recommended that further longitudinal studies should be planned on the topic. As it has been discussed that fewer data are available regarding awareness and practices of forensic odontology in Pakistan;

therefore, it is recommended that workshops and seminars should be planned regarding awareness of forensic odontology in Pakistan. We also need to introduce new dental advancements in forensic dentistry and promote our health sector by giving extra budget. We recommend promotion and teaching forensic odontology in the educational sector and it should be taught as a separate dental subject at the undergraduate level. We also recommend introducing those new models of practice of forensic odontology along with postgraduate programs in the field so that our students could play a valuable role in the field.

Conclusion

It has been concluded that the awareness of dentists regarding forensic dentistry was judiciously sufficient. The knowledge of maintaining dental records was satisfactory. Burly initiatives must be taken to develop the specialty in Karachi.

Conflict of Interests

Authors have no conflict of interest.

Acknowledgments

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