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AWARENESS OF FORENSIC DENTISTRY AMONGST DENTAL PROFESSIONALS AT DENTAL COLLEGES AND CLINICS IN ABBOTTABAD, PAKISTAN - A QUESTIONNAIRE BASED STUDY.

Conhecimento sobre Odontologia Forense entre profissionais da área odontológica em faculdades e clínicas odontológicas em Abbottabad, Paquistão - estudo baseado em questionário.

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ABSTRACT

Introduction: Forensic Odontology is a specialized field within dentistry and forensic science, focused on the analysis and interpretation of dental evidence for legal purposes. It encompasses dental identification, bite marks, cheiloscopia, and rugoscopy, and plays a crucial role in identifying human remains, especially in mass disasters and criminal cases where other identification methods may fail. Objective: While widely recognized internationally, awareness of forensic odontology in Pakistan is limited, mainly due to insufficient exposure and education. In Pakistan, it is included under Oral and Maxillofacial Surgery at the undergraduate level. Material and method: This study aimed to evaluate the awareness, attitude, and practice regarding forensic odontology among 111 dental professionals in Abbottabad, KPK. A structured questionnaire was distributed to participants from both clinical and academic backgrounds, and ethical clearance was obtained prior to data collection. Results: The study surveyed 111 dental professionals in Abbottabad, revealing high awareness of forensic odontology basics, such as its role in identification and DNA sourcing from teeth. However, practical application was lacking—most participants had no formal training, didn't maintain dental records, and were unaware of child abuse indicators or job opportunities in the field. While interest in workshops and further education was high, 80.2% reported forensic odontology was not part of their curriculum. The statistically significant p-value (0.025) indicates a notable gap between knowledge and practice. Conclusion: The study reveals that dental professionals, regardless of experience, have limited knowledge, poor attitudes, and minimal practice in forensic odontology due to lack of formal education and curriculum inclusion. This gap can be addressed by integrating forensic odontology into dental education and training programs in Pakistan.

KEYWORDS

Awareness; Dentists; Forensic odontology.

INTRODUCTION

Forensic Odontology is a wide, challenging field within forensic science. Over the years, it has been recognized owing to its importance in the field of dentistry as well as forensic science. The Federation Dentaire International defines the field of dentistry known as "forensic odontology" as the specialization that deals with the proper management, analysis, and interpretation of dental evidence on behalf of justice. It is a specialty of dentistry that addresses medical and legal matters¹. Forensic dentistry comprises of four sections: dental identification, bite marks, cheiloscopy, and rugoscopy². Due to the integration of forensic odontology with forensic medicine, dentists assist in identifying human remains, assessing bite marks, estimating age, and looking into claims of social abuse³.

Forensic odontology derives data from the teeth in order to identify. This has led to its pivotal role in medico-legal scenarios as well as mass disasters, terror attacks and various acts of violence where bodies could be severely disfigured or incinerated. Knowledge of forensic dentist requires encompassing of number of disciplines, since the dental records obtained can identify an individual or afford the information needed by the authorities to establish identification of the case⁴.

Dental records and forensic odontology play an important role in both healthcare and the legal system, aiding in personalized patient care, human identification, and legal proceedings. Fingerprints are useless due to destruction, dental records are significant for

identification of deceased⁵. Dental tissues are resistant to changes in temperature and decomposition, making them a dependable and efficient source of DNA that is highly beneficial in identification⁶. In forensic odontology, dental records play a crucial part in human identification in mass disasters, age estimation, bite mark analysis, and cases of abuse and malpractice litigation⁷.

Forensic Odontology is a well-known/advanced subject amongst dental professionals worldwide but not in Pakistan when compared to other countries. Limited awareness has been observed regarding this field amongst dental practitioners in Pakistan primarily due to lack of exposure to the subject⁸. A general dentist apart from having a broad background knowledge of general dentistry, should also possess basic knowledge of the role of the forensic pathologist, methods used in autopsy, the role of a dentist in the identification of a person, and the importance of maintaining dental records of all patients. Disastrous incidents have highlighted the importance of forensic odontologists in the identification of victims from industrial blows, airline accidents, natural disasters, and terrorist attacks including that of explosive, chemical, radiological or nuclear, and may occur as a solitary catastrophe or sweeping event.

In Pakistan, Forensic odontology at an undergraduate level of dentistry is considered a part of Oral and Maxillofacial Surgery (final year dentistry subject)⁸ (8). Previous studies conducted assessed dental professionals knowledge, practice and attitude in relation to Forensic

Odontology in different cities of Pakistan⁸. However, no such study has been conducted in Abbottabad, KPK province of Pakistan. The aim of this study was to analyze and assess the awareness of forensic odontology amongst dental professionals at dental colleges and clinics in Abbottabad, KPK, Pakistan.

METHODOLOGY

This is a cross-sectional study which was conducted amongst the 111 dental professionals and clinicians of Abbottabad over a period of three months. The inclusion criteria for the study was; Dental professionals willing to participate and only practicing clinicians and Exclusion criteria was lack of availability in terms of time constraint and personal availability along with incomplete forms.

The participants of the study were informed about the purpose and objective of the study and informed consent was

obtained. Ethical clearance from the Institutional Review Board of AIDC was taken.

Data Collection

A structured questionnaire taken from a study done in Riyadh, Saudia Arabia written in English was distributed by survey among 111 professionals, which included 69 (62.2%) from clinical departments or clinics and 42 (37.8%) from academia. Males 43 (38.7%) and females 68 (61.3%) aged between 20 up to 40 and above years were included. The questions were both open-ended and close-ended. Information was obtained from demographic data of participants, which includes age, gender, and education level. The questionnaire was divided into three parts namely knowledge, attitude, and practice. The questionnaire (Table 1) consisted of twenty questions of knowledge-based, attitude-based, and practice-based questions.

Table 1 - Questionnaire taken for the Study.

Questions
1. Do you know about forensic odontology as a branch in dentistry? Yes/no
2. Can teeth serve as source of DNA? Yes/no/don't know
3. Is forensic dentistry useful in identifying criminals and the dead people? Yes/no/don't know
4. How do you identify the dental age in children and adults? a. Eruption patterns and calcification b. Histological methods c. Biochemical methods d. I don't know
5. How will you identify a deceased person's age and gender in mass disasters like fire, stampede and accidents? a. Reconstruct the fragmented deceased body

b. Dental records c. Fingerprints d. I don't know
6. What is the study of lip prints in forensic dentistry called? a. Lipology b. Cheiloscopy c. Dermatoglyphics d. I don't know
7. Are you aware of the significance of bite mark pattern of teeth? Yes/no
8. What is the source of your knowledge about forensic dentistry? a. Books b. Internet c. I don't have knowledge d. Scientific articles/journals e. Workshops f. Seminars g. Undergraduate lectures h. Postgraduate lectures
9. Do you think your knowledge and awareness about Forensic odontology is enough? Yes/no/don't know
10. Are you willing to take courses in forensic odontology, if introduced as a diploma or postgraduate course? Yes/no
11. Are you aware of jobs offers in forensic odontology in Saudi Arabia? Yes/no/don't know
12. Are you interested to join forensic dentistry as a profession? Yes/no If no, why? a. I don't like this subject b. I don't want to be an expert to give witness in courts c. I don't want to fall in legal matters concerning forensic dental cases d. I don't think any bright future in this science/course e. I don't earn enough money with this course
13. Are you interested to participate in workshops and seminars in forensic odontology? Yes/no
14. Do you maintain dental records in your clinic? Yes/no
15. How will you identify physical/neglected/sexual/psychological abuse of a child by

<p>a. Physical injuries</p> <p>b. Behavioral changes</p> <p>c. Clothing</p> <p>d. Any scars</p> <p>e. All the above</p> <p>f. Don't know</p>
<p>16. What action would you take, if you identify child abuse?</p> <p>a. Inform police</p> <p>b. Inform parents</p> <p>c. Take no action</p>
<p>17. Do you have any formal training related to forensic odontology?</p> <p>Yes/no</p>
<p>18. Do you have forensic odontology as part of your curriculum or course outline?</p> <p>Yes/no</p>
<p>19. Do you think Saudi Pakistan has very limited resources/equipment to study forensic science?</p> <p>Yes/no</p>
<p>20. Are you aware that you can testify as an expert witness in the court to present forensic dental evidence?</p> <p>Yes/no</p>

Data analysis

The collected data were analyzed using IBM SPSS Statistics, Version 25.0 (Armonk, NY, USA). The descriptive analysis was performed by calculating the percentage. Statistical significance was assessed via Descriptive statistical analyses. Accordingly, tables were generated to display various variables of the study. Bivariate analysis was conducted using Pearson chi-square (χ^2) to present the outcomes across various exposures. Statistical significance was set at $P < .05$.

RESULTS

A total of 111 dental professionals completed the questionnaire, which included 69 (62.2%) from clinical departments or clinics and 42 (37.8%) from academia, Males 43 (38.7%) and females

68 (61.3%) aged between 20 up to 40 and above years were included. The age group of the data collected was divided into five groups, Between 20-25 years 9 (8.1%), 26-30 years 59 (53.2%), 31-35 years 18 (16.2%), 36-40 years 17 (15.3%) and 41 and above were 8 (7.2%). On the basis of years of experience, between 0-5 years lie 49 (44%), 5-10 years 40(36%), 10-15 years 12 (10.8%), 15-20 years 6(5.4%), 20 years and above 4(3.6%). Out of total 111 participants 31 (27.9%) were working in government sector and 80 (72.1%) were working in private sector, 69 (62.2%) were working in clinical departments or clinics and 42(37.8%) were working in academia.

Questions 1–9 were knowledge-based, questions 10–13 were attitude-based, and from 14 to 20 were practice-based questions on forensic odontology.

Below are detailed responses (in percentages) to individual questions being asked in the questionnaire.

Q1. Do you know about forensic odontology as a branch in dentistry?

In our study, 92.8% of the participants were aware of the branch of science called forensic dentistry and about 7.2% of the participants were unaware of it.

Q2. Can teeth serve as source of DNA?

In our study, 88.3% were aware that teeth serve as a source of DNA, 2.7% were unaware and 9% had no idea that tooth serve as a source of DNA.

Q3. Is forensic dentistry useful in identifying criminals and the dead people?

In this study, 96.4% found forensic dentistry useful in identifying criminals and dead people and 3.6% did not know about it.

Q4. How do you identify the dental age in children and adults?

According to the data collected in this study, 97.3% marked eruption patterns and calcification and 2.7% marked histological methods as a method to identify age in children and adults.

Q5. How will you identify a deceased person's age and gender in mass disasters like fire, stampede and accidents?

With the data collected, 79% participants marked dental records, 12% mentioned reconstruction from the fragmented deceased body, 11% marked finger prints and 8% were unaware about it.

Q6. What is the study of lip prints in forensic dentistry called?

Around 55% participants mentioned Cheiloscopy, 7.2% marked lipology, 2.9% mentioned Dermatoglyphics and almost 35% did not know about it.

Q7. Are you aware of the significance of bite mark pattern of teeth?

About 65.8% of the participants were aware of the significance of bite mark and 34.2% were not aware of it.

Q8. What is the source of your knowledge about forensic dentistry?

Regarding source of knowledge about forensic dentistry, 46.8% mentioned electronic media, 20.7% mentioned books and journals, workshops and seminars/lectures constituted 13.5% and 10.8% respectively. 6.3% did not have any knowledge about it.

Q9. Do you think your knowledge and awareness about Forensic odontology is enough?

About 87.4% were aware that their knowledge is not enough, 5.4% mentioned that they are well aware and 7.2% did not know about it.

Q10. Are you willing to take courses in forensic odontology, if introduced as a diploma or postgraduate course?

About 86.5% of the participants were willing to take courses and 13.5% were not interested in it.

Q11. Are you aware of jobs offers in forensic odontology in Pakistan?

Regarding job offers, 18% knew about them, 69.4% were unaware and 12.6% did not have any idea about it.

Q12. Are you interested to join forensic dentistry as a profession? If no, why?

Around 55% were interested to join forensic dentistry as profession and 45% were not interested in it because 34.6% did not want to fall in legal matters, 32.7% don't like this subject, 21.2% don't want to be an expert to give witness in courts, 9.6% don't think any bright future in this and 1.9% thought that enough money can't be earned with this course.

Q13. Are you interested to participate in workshops and seminars in forensic odontology?

Amongst the participants, 87.4% were interested in workshops and seminars in forensic odontology and 12.6% were not interested.

Q14. Do you maintain dental records in your clinic?

Regarding the dental records, 59.5% mentioned maintaining dental records in clinic and 40.5% did not maintain them.

Q15. How will you identify physical/neglected/sexual/psychological abuse of a child by?

About the signs of abuse, 85% did not know, 9% mentioned behavioral changes, 8.1% mentioned physical injuries and around 2.7% mentioned scars or clothing.

Q16. What action would you take, if you identify child abuse?

According to the responses, 50.5% would inform parents and 48.6% would inform police whereas 0.9% would take no action.

Q17. Do you have any formal training related to forensic odontology?

Regarding formal training related to forensic odontology, 94.6% did not have any and 5.4% had training related to it.

Q18. Do you have forensic odontology as part of your curriculum or course outline?

Around 80.2% did not have forensic odontology as a part of curriculum or course outline and 19.8% had it as a part of their curriculum.

Q19. Do you think Pakistan has very limited resources/equipment to study forensic science?

According to 88.3% of the participants, Pakistan has limited resources whereas 11.3% said the resources are sufficient.

Q20. Are you aware that you can testify as an expert witness in the court to present forensic dental evidence?

About 54.1% were aware about being an expert witness in court to present forensic dental evidence and 45.9% were not aware about it.

The p-value for questions associated with the knowledge and practice for the participants came out to be 0.025 which is less than 0.05, hence significant.

DISCUSSION

Forensic dentistry is a challenging branch of forensic science which involves the application of dental science to the identification of living or dead persons. Research data on this area in Pakistan is very limited. This study aims to fill this gap as it will help explore and assess dentists'

knowledge, attitudes and awareness of forensic odontology.

The present study revealed that 71.2% of the participants were aware of the role of dentists in mass disaster, which, in contrast to other studies that showed 69% awareness in this aspect⁹. Around 97.3% were aware that eruption patterns and calcifications are involved for age estimation which is higher in comparison with a study which showed 67.8%¹⁰. In this study, 55% were aware that study of lip prints in forensic dentistry is called cheiloscopy which is more than a study done in past where 38% were aware about it¹¹.

There is a need for maintaining dental records officially and professionally to protect against any medicolegal litigation. In our study, 60% dentists kept dental records which is less than a study done in karachi, 61.2% were aware of the significance of maintaining dental records¹⁰. The records were more than a study done in Chennai, where only 12% kept complete dental records¹². In the present study the source of knowledge for the participants was mostly through electronic media 46.8% and 20.7% via books and journals. A large number of participants, 97% wanted to take forensic odontology diploma, courses or workshops which is higher than a previous study which showed 60% participants wanted to attend them¹⁰. Around 55% of the participants wanted to join it as a profession which is less in comparison to a study which showed 62.6% wanted to join it as a formal profession. Knowledge about bite marks was found to be adequate; 65.8% which was higher as compared to a study

done previously which showed the bite mark significance to be 47.8%¹⁰.

About 76% participants were unaware to identify the signs of child abuse which is higher in comparison with a study done in Peshawar where 61.8% were unable to identify signs of child abuse¹⁴. The results were less than a study done in Chennai, India where 60% were able to identify the signs¹². The results showed that 50% would take action if they identify child abuse but since they are unable to detect, most cases would go unreported as it is in corroboration with a study where 50% participants did not have adequate knowledge regarding identifying and reporting such cases¹³ and dental professionals had no formal training in their institutes¹⁰. Another study indicated that 66% would do child/parent counseling or report to child care services, which was more in comparison with our study; if they are able to identify such cases¹².

In our study, 66% were aware of the significance of bite marks which is more in comparison to another study where only 18% were aware of its significance¹¹. Regarding formal training of forensic dentistry, 95% did not have it which was in corroboration with another study where 93% did not have formal training^{12,13}. The determination of deceased person's age and gender in mass disasters like fire, stampede and accidents can be done by their dental records was known to 80% participants which is more than a previous study where only 60% were aware about it¹². Regarding the use of forensic dental evidence, 54% participants were aware

about it which is better than a study done in past where only 41% were aware about it¹⁵.

In our study, 86% wanted to take courses in forensic dentistry which was less than a previous study where only 52% wanted to take such courses. In case of pursuing forensic dentistry as a profession, 55% wanted to take it which is less than a study which reported that 83% participants wanted to take it as a profession¹⁵.

This study concluded that there is no solid forensic odontology system in Pakistan which is in corroboration with a previous study which showed.

CONCLUSION

Our study shows that dental professionals, irrespective of the years of experience have inadequate knowledge, poor attitudes and lack of practice regarding forensic odontology. The reasons for the lack of knowledge are the lack of formal education, lack of teaching materials and the inclusion of forensic odontology as part of the dental curriculum in Pakistan. However, this situation can be improved if necessary steps are taken to include forensic odontology as part of dental education.

RESUMO

Introdução: A odontologia forense é uma área especializada dentro da odontologia e da ciência forense, focada na análise e interpretação de evidências dentárias para fins legais. Abrange a identificação dentária, marcas de mordida, queiloscopia e rugoscopia, e desempenha um papel crucial na identificação de restos mortais humanos, especialmente em desastres em massa e casos criminais onde outros métodos de identificação podem falhar. **Objetivo:** Embora amplamente reconhecida internacionalmente, a conscientização sobre odontologia forense no Paquistão é limitada, principalmente devido à exposição e educação insuficientes. No Paquistão, ela está incluída na Cirurgia Bucomaxilofacial no nível de graduação. **Material e método:** Este estudo teve como objetivo avaliar a conscientização, a atitude e a prática em relação à odontologia forense entre 111 profissionais da odontologia em Abbottabad, KPK. Um questionário estruturado foi distribuído aos participantes, tanto da área clínica quanto acadêmica, e a aprovação ética foi obtida antes da coleta de dados. **Resultados:** O estudo entrevistou 111 profissionais da odontologia em Abbottabad, revelando um alto nível de conscientização sobre os fundamentos da odontologia forense, como seu papel na identificação e na obtenção de DNA a partir de dentes. No entanto, a aplicação prática deixou a desejar — a maioria dos participantes não tinha formação formal, não mantinha registros odontológicos e desconhecia os indicadores de abuso infantil ou as oportunidades de emprego na área. Embora o interesse em workshops e educação continuada fosse alto, 80,2% relataram que a odontologia forense não fazia parte de seu currículo. O valor p estatisticamente significativo (0,025) indica uma lacuna notável entre conhecimento e prática. **Conclusão:** O estudo revela que os profissionais da odontologia, independentemente da experiência, têm conhecimento limitado, atitudes inadequadas e prática mínima em odontologia forense devido à falta de formação formal e inclusão curricular. Essa lacuna pode ser sanada com a integração da odontologia forense aos programas de educação e treinamento odontológico no Paquistão.

PALAVRAS-CHAVE

Conscientização; Dentistas; Odontologia legal.

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