Recent Advances in Clinical Trials

Dentists Knowledge about Dental Evidences in Persons Forensic Identification in Nineveh Province

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ABSTRACT

Aims: Evaluate the knowledge of dental practitioners about forensic odontology and emphasize their role and opinions about keeping dental records of patients.

Methodology: Cross Sectional study was conducted among different dentists in three main dental specialist centers in Nineveh. All dentists working in the Dental Specialized Centers in Nineveh. Questioner list distributed to 1000 participants. Google form of self-administered questions translated to Arabic language. Demographical Informations, set of questions related to knowledge of dentists and other three main question each have different answers and the dentist should choose the appropriate one. Likert Scale used to analyze data and differences between to variables using ANOVA test with P value ≤ 0.05.

Results: Female show high significant percent (67%) and forty percent with age group between 41-50 years. For their knowledge all dentists show highest percent for the ten questions with yes answers.

Conclusion: Dentists in Nineveh have good knowledge about their role and importance in forensic odontology. In spite of that efforts need to improve their education with different conferences, workshops and meetings as well as motivate them to keep the data records of each patient whether in institutions or private clinics can be used any time.

Keywords

Introduction

According to the World Dental Federation, forensic odontology is "the subspecialty of dentistry concerned with the study of teeth and their proper examination in criminal cases"[1].

Dental practitioners assess and display dental results to facilitate the judicial system [1]. Because of this, dental practitioners are unique and crucial, particularly in catastrophic situations [2]. From mass catastrophe management to identifying human remains, this unique field serves several purposes, such as evaluating bite marks,

patterned skin injuries, and dental materials used in evidence examination [2]. As far back as there have been disasters, dental identifications have been an important means for victims to prove their identities. Dentists should be well-versed in forensic dentistry and its requisite skills and expertise, including the proper handling of dental records, radiography, tooth morphology, anatomy, and DNA analysis of teeth [3].

It is the responsibility of dental practitioners to oversee criminal investigations when physical identification or a fingerprint record is inaccessible [4]. For the sake of their patients' health and the continuity of their dental treatment, dentists are required by law and professional standards to create and keep accurate dental records [5]. Because cadavers are so visually challenging to identify after they have completely disintegrated, dental records play an important part in the identification process. When this happens, researchers employ several techniques for tooth identification. The reason for this is that teeth and dental restorations naturally resist alterations caused by decay and heat, making them the most reliable source of DNA that can greatly aid in identifying a person [6]. Having easy access to accurate patient records is crucial for successful identification. Unfortunately, achieving dental identity can be difficult at times because dentists fail to keep accurate records, leading to ambiguity [7].

The literature [8] suggests that further exposures are necessary to increase the use of forensic odontology, which many countries underestimate despite its significance in criminal justice. Forensic cases are notoriously difficult for healthcare providers to handle; hence, a lack of data regarding these instances could make their identification impossible. Medical personnel who deal with forensic cases should have the necessary training to identify this type of incident [9]. There have been limited studies in the Iraq / Nineveh that looked at dental practitioner's knowledge bout forensic odontology [10]. Accordingly, this study performs.

Aims
The objective of this study is to evaluate the knowledge of dental practitioners about forensic odontology. As well as emphasize their role and opinions about keeping dental records of patients.

Materials and Methods
This study was conducted among different dentists in one of the main dental specialist centers (Al- Noor Dental Specialist Center, Left Dental Specialist Center and Right Dental Specialist Center), during the period from January to June 2024.

The questionnaire consisted of three sections based on previously published studies [10,11]:

Section 1: Demographical Informations includes
Age, Gender, Place of Work, Professional Position, Number of Work Years, Academic Affiliation,

Section 2: set of questions related to knowledge of dentists (10 questions). Answers are Yes / No and Never.
1. Have you heard about forensic odontology?
2. Can we identify a person by the teeth?
3. Can we know the DNA of person from the teeth?
4. Is there a lip print for each person?
5. Is it possible to determine the age from the teeth?
6. Can we identify the gender by the tooth and jaw shape?
7. Do you have an idea for a method to take bite marks and how to analyze it?
8. As a dentist do you think you have important role in mass disaster?
9. As a dentist do you think forensic odontology is important specialty?
10. Did you keep your patients records including bite marks or radiographic?

Section 3: Three main question each have different answers and the dentist should choose the appropriate one.
Q1. What do you think about this specialty?
Answers are:
- Dead persons only
- Living persons only
- Both
- I don't know

Q2. What a method its most commonly used to identify a person?
- Bite mark
- Lip print
- Hand Print
- Mixed

Q3: Dental professionals have a major role to play for help toward the forensic odontologist, do you know how?
- By keeping all the information and history in details for the patient
- By keeping all the records and radiograph for the patient
- Preserving was mentioned above from the damage and keeping it in good condition so the forensic odontologist can benefit from it
- All the above

Statistical Analysis
Using Excel program for data entry and calculation of percentage, mean. Likert Scale used to analyze data and using minitablet program to study differences between to variables using ANOVA test with P value ≤0.05.

Results
One thousand participant dentist share in this research distributed to different academic degree and professional titles.

Section 1: Demographical Information
Table one describe the demographical informations for the participants. Female show high percent (67%) and forty percent with age group between 41-50 years. More than 50% dentists are from Al-Noor Specialized Center. Sixty-four percent are Certified

or General Practitioner Dentists with period of work ranged from (15-25) and graduated from college of dentistry consequently (34% ,78%).

Table 1: Demographical Informations for the Participants Dentists.

Variables		Frequency	Percentage
Gender	Male	330	33%
	Female	670	67%
Age	Less than 30	323	32%
	31-40	160	16%
	41 - 50	400	40%
	More than 51	117	12%
Your Institution	Al-Noor Specialized Center	550	55%
	Left Sector Specialized Center	210	21%
	Right Sector Specialized Center	180	18%
	Al-Salam Teaching Hospital	60	6%
Years of Work	Less than 5 years	323	32%
	5 – 10	157	16%
	10 – 15	132	13%
	15- 25	343	34%
	More than 25 years	45	5%
Your Professional Title	Consultant	5	1%
	Specialist	216	22%
	Certified or general Practitioner	456	46%
	Intern / Resident	323	32%
Level of Education	College	781	78%
	M.sc	209	21%
	PhD	10	1%

Section 2: Dentist's knowledge

Three answers were organised with Triad Likert Scale (Yes, No and Never) for ten questions. Table 2 show the frequency of answers. No one answers Never. All dentists show highest percent for the ten questions with yes answers (93, 65, 72, 83, 98, 82, 100, 60, 55, 75%) consequently.

Section 3: Dentist's Role

For the role of dentists in Nineveh three main question each have different answers and the dentist should choose the appropriate one (Table 3). The highest percent for question (what do you think about this speciality?) where both that its include dead and living persons (59%). Question 2 focus on the method its most commonly used to identify a person; bite mark recording the uppermost answer (58%) while the lowest recorded answer is mixed methods include (Bite mark, Lip print and Handprint). For question three the peak answers of dental professionals role in forensic odontology where (D) which all the above (89%).

Comparison

Gender Comparison according to knowledge (ANOVA TEST). Female shows a significant differences in knowledge more than male in all questions from (1-10) except (Q8. As a dentist do you think you have important role in mass disaster? and Q9. As a dentist do you think forensic odontology is important specialty? 0.528 and .930 consequently (Table 4). In regard to role of dentist questions significant relation shown in question 2 only (0.001) Table 5.

Table 2: Questions related to Doctors' Knowledge about Forensic Medicine.

Question	Yes		No	
	Pt. No.	%	Pt. No.	%
1. Have you heard about forensic odontology?	930	93%	70	7%
2. Can we identify a person by the teeth?	650	65%	350	35%
3. Can we know the DNA of person from the teeth?	721	72%	279	28%
4. Is there a lip print for each person?	830	83%	170	17%
5. Is it possible to determine the age from the teeth?	980	98%	20	2%
6. Can we identify the gender by the tooth and jaw shape?	816	82%	184	18%
7. Do you have an idea for a method to take bite marks and how to analyze it?	1000	100%	0	0%
8. As a dentist do you think you have important role in mass disaster?	602	60%	398	40%
9. As a dentist do you think forensic odontology is important specialty?	548	55%	452	45%
10. Did you keep your patients records including bite marks or radiographic?	750	75%	250	25%

Table 3: Role of Dentists in Forensic Odontology in Nineveh.

Question		Yes	%
What do you think about this specialty?	a) Dead persons only	280	28
	b) Living persons only	65	7
	c) Both	589	59
	d) I don't Know	66	7
What a method its most commonly used to identify a person?	a) Bite mark	583	58
	b) Lip print	217	22
	c) Handprint	102	10.2
	d) Mixed	98	9.8
Dental professionals have a major role to play for help toward the forensic odontologist, do you know how?	a) By keeping all the information and history in details for the patient	0	0
	b) By keeping all the records and radiograph for the patient	0	0
	c) Preserving was mentioned above from the damage and keeping it in good condition so the forensic odontologist can benefit from it	108	11
	d) All the above	892	89

Table 4: Gender Comparison according to Knowledge (ANOVA Test).

Questions		F	Sig.
Q1. Have you heard about forensic odontology?	Between Groups	2.742	.042
	Within Groups		
	Total		
Q2. Can we identify a person by the teeth?	Between Groups	5.716	.001
	Within Groups		
	Total		
Q3. Can we know the DNA of person from the teeth?	Between Groups	12.274	.000
	Within Groups		
	Total		
Q4. Is there a lip print for each person?	Between Groups	2.489	.05
	Within Groups		
	Total		
Q5. Is it possible to determine the age from the teeth?	Between Groups	2.819	.038
	Within Groups		
	Total		
Q6. Can we identify the gender by the tooth and jaw shape?	Between Groups	2.063	.05
	Within Groups		
	Total		
Q7. Do you have an idea for a method to take bite marks and how to analyze it?	Between Groups	.	.
	Within Groups		
	Total		
Q8. As a dentist do you think you have important role in mass disaster?	Between Groups	.740	.528
	Within Groups		
	Total		
Q9. As a dentist do you think forensic odontology is important specialty?	Between Groups	.149	.930
	Within Groups		
	Total		
Q10. Did you keep your patients records including bite marks or X-Rays?	Between Groups	10.099	.000
	Within Groups		
	Total		

Table 5: Gender Comparison according to Dentist Role in Forensic Medicine (ANOVA Test).

Questions		F	Sig.
Q1. What do you think about this specialty?	Between Groups	1.717	.144
	Within Groups		
	Total		
Q2. What a method its most commonly used to identify a person?	Between Groups	4.883	.001
	Within Groups		
	Total		
Q3. Dental professionals have a major role to play for help toward the forensic odontologist, do you know how?	Between Groups	.376	.826
	Within Groups		
	Total		

Comparison between Different Professional Title (Knowledge and Role)

Duncan test shows there is no significant difference between the various professional titles in both knowledge and role.

Table 6: Duncan Test for Knowledge difference in Various Professional Titles.

Duncan Test for knowledge		
Title	N	Subset for alpha = 0.05
		1
Certified or General Practitioner Dr.	456	1.0987
Intern Dr.	323	1.1022
Specialist Dr.	216	1.1111
Consultant Dr.	5	1.2000

Table 7: Duncan Test for Dentist's Role in Forensic Medicine in Various Professional Titles.

Duncan Test for Role		
Title	N	Subset for alpha = 0.05
		1
Specialist Dr.	216	2.7176
Intern Dr.	323	2.7461
Consultant Dr.	5	2.8000
Certified or General Practitioner Dr.	456	2.8180

Discussion

Forensic odontology is an essential speciality of dentistry that seeks to identify and eliminate potential causes of death and maltreatment. It is critical to increase understanding and acknowledgement of this speciality among dental professionals. The field of forensic odontology has grown in significance in several developed nations worldwide.

However, in emerging nations like Iraq, the field of forensic odontology has yet to reach its full potential due to multiple political situations, such as the siege imposed in the early nineties and the government changes in the early 2000s. The Nineveh government (Mosul) also faced a critical situation during the ISIS occupation period, contributing to the late advancements in dentistry.

The current study was conducted to assess dental practitioners' knowledge of forensic odontology. As well as emphasise their role and opinions about keeping dental records of patients in order to keep pace with the development in forensic dentistry. The ability of dental tissues to endure environmental trauma and yet maintain part of their original structure explains the significance of forensic odontology. This makes teeth a great and reliable source of DNA substance [12].

The questioner's list is divided into two sections: the first ten questions evaluate dentists' knowledge of forensic odontology. The second part of the questions discusses the extent to which dentists understand their role in the development of forensic dentistry to bridge the gap in their information by applying scientific training programs in the future and also to achieve the required development in this branch.

In this current study, the dentists show a high percent in regard to knowledge with good information. This can be attributed to that forensic odontology, a newly added speciality which attracts the dentist to be qualified in it. In comparison to [13] show in adequate knowledge and even half of them don't know how to estimate age from teeth examination.

According to Kumaraswamy et al. [14], 87% of dentists understood what forensic odontology was, how it fit into forensic medicine, and how it contributed to criminal analysis. These results are consistent with the current findings. In contrast, Ali and Sardar found that 83.7% of participants lacked a formal education in forensic dentistry. Most respondents (84.8%) said they don't know much about forensic odontology [15]. The age and gender of an individual is a crucial determinant in forming their identity. The estimation of human age is a method employed by anthropologists, archaeologists, and forensic technicians [16,17]. In this study the dentist reflects highest agreement to age estimation by teeth which is a basic knowledge earned by all dentist from the undergraduate studies in comparison to other researches more than third of dental practitioners don't know if age can be estimated by teeth or not. The dental record serves not only for forensic purposes but also as a future reference for practitioners when needed. Additionally, it serves as a consumer resource. evidence presented in court and for

dental insurance claims [14]. There have been growing awareness among the general population about legal matters.

Healthcare concerns justify any dental treatment and dentists must possess a comprehensive understanding of dental records significance. One comprehensive and valuable resource for forensic dentistry would be consider one pertinent question. Most dental practitioners were fully cognisant of the rationale for the maintenance of dental records is compelling [15].

In regard to question related to if the forensic odontology is an important specialty or not about near half of participant answers as no it's not important in this current study; this can be reasoned to that forensic odontology is a newly added speciality and very few educational institutions provide structured instruction in forensic odontology in Nineveh as well as the majority of the practitioners lacked formal training. There are a limited number of annual workshops or conferences in forensic odontology specifically designed for dental surgeons, which may incite interest of dentists [18,19].

Researches demonstrates the durability of dental restorations and human teeth over extended periods and in challenging conditions such as fire. Therefore, a dentist may play a crucial role in the identification of severely disfigured, unidentified people's bodies has taken place. In certain situations, teeth can also serve as weapons in case of biting [20]. Consequently, dentist could reveal details about the identity of the biting. Examining bite marks is the second primary duty and significant role of dentist practicing forensic dentistry. The dental professional has a primary function to fulfill in providing them with accurate dental records on the foundation for a lot of forensic activity [21].

Conclusion

Dentists in Nineveh have good knowledge about their role and importance in forensic odontology. In spite of that efforts need to improve their education with different conferences, workshops and meetings as well as motivate them to keep the data records of each patient whether in institutions or private clinics can be used any time. Identify a globally recognized program for collecting patient data including lip print and bite marks to be setted as base line.

Study Design: Cross Sectional.

Case Definition: All dentists working in the Dental Specialized Centers in Nineveh.

Exclusion Criteria: Incomplete Google form.

Sampling Size: 1000 participants.

Ethical Approval

The study follows the ethical principles of Declaration of Helsinki. Approval to conduct this study was obtained from the Institutional Review of the Authorised Scientific Committee in Nineveh Health Directorate with the numbered session 252 in 7/ 2 / 2024 with research number 2023021 (No. 5944, Date 8 / 2 / 2024). Sharing in this study was depending on willing (voluntary) with obscure

identity. Google form of self-administered questions in the Arabic language were distributed to the centers.

References

1. Alisha Chugh, Shalini Kapoor, Amit Bhardwaj, et al. Forensic Odontology Science Skills and Future Prospects. Indian Journal of Forensic Medicine and Toxicology. 2023; 17: 1-6.

2. Babar MG, Iqbal S, Jan A. Essential guidelines for forensic dentistry. Pakistan Oral Dent J. 2008; 27: 79-84.

3. Savić Pavičin I, Jonjić A, Maretić I, et al. Maintenance of dental records and forensic odontology awareness A survey of Croatian dentists with implications for dental education. Dent J Basel. 2021; 9: 37.

4. Sarode GS, Sarode SC, Choudhary S, et al. Dental records of forensic odontological importance Maintenance pattern among dental practitioners of Pune city. J Forensic Dent Sci. 2017; 9: 48.

5. Waleed P, Baba F, Alsulami S, et al. Importance of dental records in forensic dental identification. Acta Inform Med. 2015; 23: 49-52.

6. Isher DK, Singh Isher PP, Kaur N, et al. Knowledge awareness and practice of forensic odontology among the dentists of Punjab. J Indian Acad Oral Med Radiol. 2019; 31: 239-245.

7. Dutta S. Awareness of Forensic Dentistry among Dental Practitioners. Indian Journal of Forensic Medicine and Toxicology. 2020; 14: 553.

8. Gambhir RS, Singh G, Talwar PS, et al. Knowledge and awareness of forensic odontology among dentists in India A systematic review. J Forensic Dent Sci. 2016; 8: 2-6.

9. Rathod V, Desai V, Pundir S, et al. Role of forensic dentistry for dental practitioners A comprehensive study. J Forensic Dent Sci. 2017; 9: 108-109.

10. Roweda Al-Dulaimy, Harth Rashidi, Rania Alghurary, et al. Knowledge Practice and Attitude Evaluation of Forensic Dentistry among Iraqi Dentists Questionnaire-Based Study. Med J Babylon. 2023; 20: 709-714.

11. Salam M, Al-Rawashdeh N, Almutairi AF. Public awareness of forensic odontology and willingness to enroll in a prospective dental registry A survey conducted in Saudi Arabia. Saudi dent J. 2020; 32: 21-28.

12. Abdul NS, Alhazani L, Alruwail R, et al. Awareness of forensic odontology among undergraduate graduate and postgraduate dental students in Riyadh Saudi Arabia A knowledge attitude and practice-based study. J Forensic Dent Sci. 2019; 11: 35-41.

13. Sasanka K. Awareness on Forensic Odontology among Dental Undergraduates. European Journal of Molecular and Clinical Medicine. 2020; 7: 1605-1621.

14. Kumaraswamy J, Nagarajachar RB, Keshavaiah R, et al. A cross-sectional study to assess knowledge attitude and awareness of forensic odontology among medical students An emergency concern. International Journal of Forensic Odontology. 2018; 3: 17.

15. Ali A, Sardar KP, Nasir S, et al. Knowledge attitude and practice of forensic odontology among graduates and post graduate students at Dow University of Health Sciences DUHS. JPDA. 2016; 25: 111.

16. Al-Azri AR, Harford J, James H. Awareness of forensic odontology among dentists in Australia are they keeping forensically valuable dental records. Aust Dent J. 2016; 61: 102-108.

17. Almutairi AF, Alkhtheri BA, Aleidan HN, et al. Examining the perceived versus the actual knowledge about forensic odontology A cross-sectional survey among dentists. Clin Exp Dent Res. 2018; 4: 297-304.

18. Hannah R, Ramani P, Natesan A, et al. Evaluation of knowledge attitude and practice of forensic odontology among undergraduate dental students. Int J Orofac Biol. 2017; 1: 16-20.

19. Govindaraj S, Jayanandan M, Vishnu Priya V, et al. Knowledge and attitude among senior dental students on forensic dentistry A survey. World J Dent. 2018; 9: 187-191.

20. Duraimurugan S, Gokkulakrishnan S, Karthikeyan M, et al. Awareness of forensic dentistry among dental students and practitioners in and around Kanchipuram district. Int J Recent Sci Res. 2017; 8: 16749-16752.

21. Ahmed NHM, Naidoo S. Oral Cancer Knowledge Attitudes and Practices among Dentists in Khartoum State Sudan. J Cancer Educ. 2019; 34: 291-296.