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ASSESSMENT OF IRAQI DENTISTS' KNOWLEDGE, PRACTICE, AND ATTITUDES TOWARDS FORENSIC DENTISTRY: A QUESTIONNAIRE-BASED STUDY

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ABSTRACT

Background: Forensic dentistry is essential for victim identification and supplying evidence in criminal investigations. This research assesses the knowledge, practices, and attitudes of Iraqi dentists about forensic dentistry. **Method:** cross-sectional questionnaire survey was done with 300 dentists in Najaf Governorate, Iraq, from May to December 2024. Data were gathered from specialist institutes and private clinics. The questionnaire consisted of 22 items evaluating knowledge, practices, and attitudes. The statistical analysis used chi-squared tests and descriptive statistics using SPSS version 27. **Results:** Out of 300 distributed questionnaires, 250 valid replies were obtained, yielding a response rate of 83%. In all, 73.2% of participants were familiar with forensic odontology, and 72.0% acknowledged its significance. Nevertheless, just 29.2% expressed confidence in recognizing indicators of abuse, and the same proportion would report such incidents. Furthermore, 26.4% indicated a need for further training, while 30.4% were prepared to provide court evidence. Specialists had much superior knowledge ratings compared to ordinary dentists across many areas ($p < 0.05$). **Conclusions:** Although Iraqi dentists have a broad grasp of forensic dentistry, significant deficiencies are evident in practical applications, especially with abuse detection and legal involvement. There is an urgent need for improved educational programs and training efforts at both undergraduate and postgraduate levels.

KEYWORDS: Forensic odontology; dental practitioners; knowledge; attitudes; practices; Iraq; awareness.

INTRODUCTION

Forensic dentistry, alternatively referred to as forensic odontology, is a specialized subdivision of forensic science that includes the utilization of dental experience for legal objectives. It has been playing a crucial role in human recognition since the first legally recognized case in 1849.[1] The field of study includes three major ranges: the identification of human remains, jurisdictive procedures regarding dental malpractice, and criminal cases involving bite-mark investigation and abuse surveys.[2,3]

Dental components include certain characteristics that make them useful for criminal justice utilization. Teeth, lips, tongue, and facial bones undergo disintegrating, incineration, and exposure to the elements, serving as accurate evidence for identification.[4,5] Each individual has distinguishing dental configurations that are shaped by genetics and their past medical conditions. This makes dental records specific, comparable to human fingerprints.[6]

Forensic dentistry is important to determining victims of big disasters and criminal investigations. It is also important for keeping track of and documenting cases of domestic violence, child abuse, and sexual assault.[7] Furthermore, forensic odontologists are capable of ascertaining age, sex, ethnicity, socioeconomic background, and occupation based on dental and skeletal evidence.[8,9]

However, forensic odontology remains to be not utilized in several developing nations, which includes Iraq. Insufficient knowledge among dental professionals,

inadequate training programs, and a shortage of integrating into dental curricula contribute to this variation.[10] Prior research across many nations has shown differing degrees of understanding and involvement with forensic dentistry among dental practitioners.[11,12]

Iraq has distinct limitations necessitating strong forensic system for identification, such as persistent security concerns, large casualty events, and the need for effective victim identification procedures. Nevertheless, a thorough evaluation of Iraqi dentists' knowledge and perspectives about forensic dentistry has not been accomplished.

This research proposes to assess the knowledge, practices, and attitudes of dentists in Najaf Governorate, Iraq, relating the field of forensic dentistry. The results will highlight knowledge deficiencies and guide the creation of specific courses to improve forensic dental practices in Iraq.

MATERIALS AND METHODS

A cross-sectional, questionnaire-based study was conducted from May to December 2024 in Najaf Governorate, Iraq. The study included dentists working at the Martyr Nasser Specialized Center, the Specialist Center in Maysan District, and various private dental clinics throughout the governorate. The study population comprised licensed dentists operating in Najaf Governorate. We used convenience sampling to send out 300 questionnaires. The criteria for inclusion were: (1) dentists authorized to practice in Najaf Governorate, (2) willingness to participate, and (3) capacity to provide informed consent. There were no specific criteria for excluding people. After a careful review of the literature [11–13], the questionnaire was created. It had three main parts: (1) Demographic information: Gender and whether the dentist is a specialist or a general dentist.(2) Knowledge Assessment: Twenty questions with three possible answers (Yes, No, or Don't Know) that test how well someone knows forensic odontology, how it can be used to figure out a victim's age, sex, or race, analyze DNA, and help with abuse investigations.(3) Practice and Attitude Evaluation: Questions on how to keep dental records, how to spot signs of abuse, how eager you are to report abuse, how interested you are in training opportunities, and how involved you are in legal procedures. The questionnaire used simple English words and was evaluated with a small group of people to make sure it was clear and easy to comprehend. Questions were changed from validated instruments used in previous research[11,13] to fit the Iraqi setting.

Data Collection

Dentists were provided with questions at their places of employment. During certain times between or after the clinic, subjects answered questions without giving their names. The goal of the inquiry was explained orally, and written informed consent was obtained. People who collected data were taught how to react to requests without changing the findings.

Statistical Analysis

Microsoft Excel 2025 and SPSS version 27 (IBM Corp., Armonk, NY, USA) werer used to input and analyze the data. Frequencies, percentages, averages, and standard deviations were all examples of statistical descriptions. The chi-squared test was used to assess the ratios between dental specialists and general practitioner dentists . Mean scores were calculated for Likert-scale answers (coded as: 1 = No, 2 = Don't know, 3 = Yes), and independent t-tests were performed for group comparisons. Statistical significance was determined at $p < 0.05$.

Ethical Considerations

The Ethics Committee of the College of Dentistry at the University of Alkafeel in Iraq gave ethical authorization its stamp of approval under protocol code (ECD-202504). The Results Of the 300 questionnaires provided out, 250 were acceptable replies, which means that 83% of those who responded. them answered. There were 124 men (49.6%) while 126 females (50.4%) in the sample. Of them, 44 were specialists (17.6%) and 206 were general dental professionals (82.4%). the specialists, females were predominant (56.8%), whereas general dentists exhibited an approximately equal gender distribution.

A total of 73.2% of the respondents were familiar with forensic odontology. Specialists exhibited much greater awareness (90.9%) than general dentists (69.4%) ($\chi^2 = 8.825$, $p = 0.012$) (Table 1).

Table 1: Study awareness of forensic odontology.

Response	Specialists (*n* = 44)	General Dentists (*n* = 206)	Total (*n* = 250)	χ^2	*p*-Value
Yes	40 (90.9%)	143 (69.4%)	183 (73.2%)	8.825	0.012 *
No	4 (9.1%)	53 (25.7%)	57 (22.8%)		
Don't know	0 (0.0%)	10 (4.9%)	10 (4.0%)		

* Statistically significant ($p < 0.05$)

Concerning the significance of preserving dental records for forensic applications, 66.8% acknowledged that this practice is crucial, with specialists demonstrating much greater concordance (84.1%) compared to general dentists (63.1%) ($p = 0.01$). When requested about the significance of forensic odontology in dentistry, 72.0% recognized its importance, with specialists exhibiting more awareness (90.9% vs. 67.9%, $p = 0.021$).

Knowledge showed substantial differences across certain applications (Figure 1). The highest level of knowledge was noted for DNA extraction from teeth (79.6%), followed by age estimate (75.6%), mass catastrophe victim identification (73.2%), and gender determination (70.0%). Although understanding was considerably confined by race detection (15.6% accuracy) and lip print recognition (10.8%).

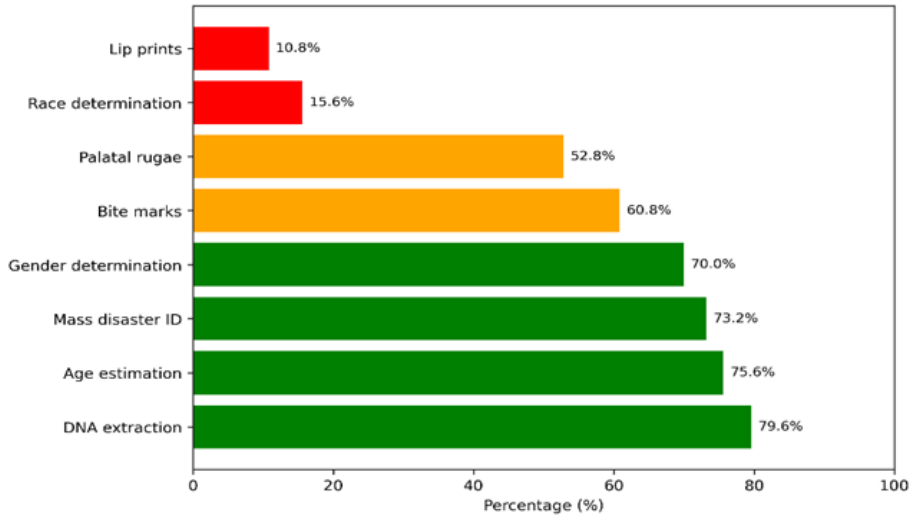

Figure 1: Awareness of certain uses of forensic odontology (n = 250) Distribution of Knowledge (% Accurate Responses).

Comparative Examination: Specialists vs General Dentists

Specialists had substantially higher mean scores compared to general practitioners in several areas of expertise (Table 2). Considerable variations were identified in ethnicity recognition (p = 0.003), familiarity with the term (p = 0.006), and consistent record keeping (p = 0.008).

Table 2: Comparative of knowledge, attitudes, and practices between specialists and general dentists.

Variable	Specialists (Mean ± SD)	General Dentists (Mean ± SD)	*p*-Value
Knowledge Domain			
Awareness of forensic odontology	2.82 ± 0.58	2.44 ± 0.87	0.006 **
Importance of maintaining records	2.68 ± 0.74	2.40 ± 0.84	0.039 *
Race determination	2.80 ± 0.55	2.43 ± 0.77	0.003 **
Gender determination	2.77 ± 0.57	2.50 ± 0.77	0.027 *
Age estimation	2.73 ± 0.62	2.64 ± 0.67	0.406
DNA as source	2.73 ± 0.62	2.56 ± 0.62	0.164
Practice Domain			
Regular record maintenance	2.68 ± 0.60	2.33 ± 0.83	0.008 **
Recognition of abuse signs	2.52 ± 0.79	2.25 ± 0.73	0.041 *
Willingness to report abuse	2.05 ± 0.81	2.26 ± 0.84	0.131
Ability to estimate age	2.84 ± 0.48	2.53 ± 0.78	0.011 *
Attitude Domain			
Interest in training	2.59 ± 0.76	2.58 ± 0.72	0.945
Willingness for court testimony	2.51 ± 0.73	2.52 ± 0.72	0.504

Values based on Likert scale (1 = No, 2 = Don't know, 3 = Yes). * $p < 0.05$; ** $p < 0.01$

Significant shortcomings were identified in practice-related areas (Figure 2). Approximately 29.2% of participants expressed confidence in recognizing indicators of domestic or sexual abuse, with no notable difference in practical confidence between specialists (mean: 2.52) and general dentists (mean: 2.25). Additionally, just 29.2% expressed an intention to report occurrences of abuse to authorities (p = 0.131 across groups). The curiosity in further forensic dentistry training was minimal (26.4%), with no statistically significant difference seen between specialists and general dentists (p = 0.945). Regarding authorized participation, only 30.4% expressed a willingness to provide forensic dental evidence in court, with no significant differences observed among groups (p = 0.504).

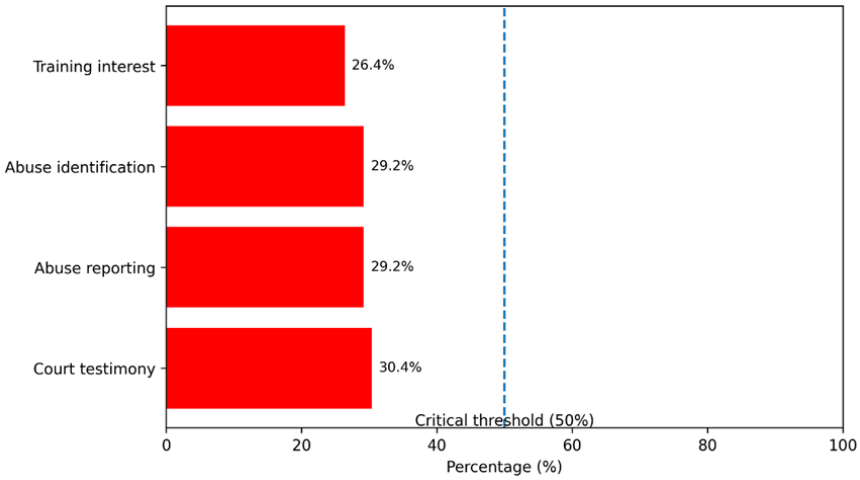

Figure 2: Significant deficiencies in forensic dental practice (n = 250).

DISCUSSION

General Awareness and Knowledge

Our study found that 73.2% of people were aware of something, which is similar to the 75% rate found in studies in India[11] and higher than the 45–60% rates found in some African countries.[14] However, this basic information does not lead to a full understanding of how to use it in specific situations. The notably deficient understanding of race determination (15.6%) and lip print identification (10.8%) indicates that dental education in Iraq prioritizes fundamental concepts over specialized forensic methodologies.

Specialists consistently outperform general dentists across multiple knowledge domains, exhibiting statistically significant differences in eight out of 22 criteria. This trend corresponds with global research indicating that additional training and skill development improve forensic awareness.[12,15] The notable disparities in race determination ($p = 0.003$) and gender determination ($p = 0.027$) indicate that postgraduate education imparts knowledge of advanced forensic concepts absent in undergraduate curricula.

The heightened comprehension of DNA extraction (79.6%) and age prediction (75.6%) emphasizes the significance of these subjects within the dental profession and their prevalent depiction in scientific literature and media. The inadequate understanding of lip prints and palatal rugae signifies a lack of incorporation of these novel forensic techniques in Iraqi dental education.

Essential Practice Deficiencies

The first important thing to note is that there is a big gap between knowing something and using it. About 29.2% of the people who took part said they were sure they could recognize evidence of abuse, and the same percentage indicated that they would report such instances. These numbers are considerably lower than those in industrialized countries (65–75%).[16,17] This fragility presents considerable threats to patient safety and community stability, since dentists often detect victims of abuse during routine examinations.[18]

There are several variables which might cause this difference. Most Iraqi dental schools concentrate on clinical dentistry and not so much on forensic training. Second, dentists may not report abuse cases because they are unsure of how to do so and are afraid of getting in trouble with the law.[20] Third, cultural sensitivities about internal issues within Iraqi society may provide further challenges to reporting.

The lack of significant differences between specialists and general dentists in abuse detection ($p = 0.041$) and reporting intentions ($p = 0.131$) suggests systemic rather than educational barriers. Even highly skilled experts demonstrate reluctance, indicating that knowledge alone is insufficient without suitable legal frameworks and institutional systems.

Training and Continuing Professional Education

The lack of interest in additional training (26.4%) and participation in the legal system (30.4%) constitutes significant obstacles to the advancement of forensic dentistry in Iraq. This is significantly distinct from studies done in developed countries, where 60–70% of dentists are interested in forensic education.[21,22] There are many reasons why this is of significance. The absence of established job opportunities in forensic dentistry in Iraq may reduce the motivation for additional training. Iraq is short of mandatory positions that require knowledge of forensic odontology, unlike countries with developed forensic odontology services. Second, people may not want to do unpaid training because they think they don't have enough time or money. Third, not knowing how important forensic dentistry is in legal situations may make it seem less valuable. The significantly lower willingness of specialists to participate in court (13.6%) compared to general dentists (34.0%) is noteworthy, though not statistically significant ($p = 0.154$). This may suggest that professionals are aware of the complex legal duties and

potential medicolegal risks associated with expert evidence.

Implications for Education

These results have a major impact concerning how dentists acquire knowledge Forensic dentistry should to be a mandatory subject in collegiate curricula, rather than an elective. Identifying victims, figuring out their age, finding abuse, and knowing the law are all important skills. Second, it is important to stress the need for hands-on training on how to find and report abuse. Dentists need to know how to recognize signs of abuse and what their legal responsibilities are. Working with the police may make this training better and give people clear ways to report problems

Third, it's necessary to set up postgraduate training programs and ongoing educational events to fill up the gaps in the expertise of current practitioners. These programs need to combine what students learn in school with real-life case studies and the law. Fourth, institutional support systems are very important. Hospitals and dental groups need to set up clear procedures for reporting abuse, provide dentists who disclose abuse legal protection, and create teams of forensic experts, social workers, and lawyers.

Comparison with Global Research

Our findings align with generally acknowledged prevalent patterns. A study from Saudi Arabia showed that people were generally quite informed (67.5% were ready to sign up for a national dental registry), but they didn't comprehend how to use some programs very well.[23] Indian studies show that the level of knowledge is about the same (70–75%), but the level of engagement in forensic practice is higher (40–50% ready to provide expert evidence).[11,24] This could mean that the forensic odontology organization is more advanced. The big gap in abuse detection is similar to what has been found in developing countries, where cultural, legal, and educational barriers make it hard for dentists to get involved in abuse cases.[25] However, some wealthy countries have been able to solve this problem by making reporting laws and offering thorough training programs.[26]

Study Limitations

There are many challenges that needs to be comprehended. The research was confined to Najaf Governorate, thereby restricting its relevance to the entire population of Iraqi dentists. In addition, there might be variations in levels of education and clinical experience among various regions. Second, using self-reported data might provoke response bias because people might lie about how much they know or give answers that are socially acceptable. The questionnaire evaluated theoretical knowledge rather than practical skills, which may have revealed more significant issues. The cross-sectional method does not allow for the evaluation of changes in knowledge over time or following educational interventions.

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Conflicts of Interest

The authors report no conflicts of interest.

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