

Knowledge and Attitudes of Health Care Workers about Forensic Dentistry during COVID-19 in Saudi Arabia

Doaa S Alghamdi^{1*}, Khalid T Aboalshamat², Fatmah A Almaqboul¹, Duaa A Almarhabi³, Hala Aleissa¹, Tahani Alattas¹, Aljawharah A Aqely¹ and Rawan N Albishry¹

¹General Dentist, Jeddah, Saudi Arabia

²Dental Public Health Division, Preventive Dentistry Department, Faculty of Dentistry, Umm Al-Qura University, Makkah, Saudi Arabia

³General Dentist, Najran, Saudi Arabia

***Corresponding Author:** Doaa S Alghamdi, General Dentist, Jeddah, Saudi Arabia.

Received: November 05, 2020; **Published:** December 29, 2020

Abstract

Introduction: Forensic dentistry is a branch of medical science that has an effective role in resolving criminal cases, evaluating assault cases, and contributing to other criminal investigations. This study aimed to identify the level of knowledge and attitudes of health care workers regarding forensic dentistry during the COVID-19 pandemic in Saudi Arabia.

Methods: This cross-sectional study was conducted among 319 dental and medical professionals in Saudi Arabia. Levels of forensic dentistry knowledge, attitudes toward forensic dentistry during COVID-19, and attitudes toward a national dental registry were measured. Data were collected using a self-administered questionnaire (comprising 55 questions) that was distributed via social media to health professionals.

Results: In terms of knowledge, participants scored a mean of 12.19 with standard deviation (SD) of 4.52 from a possible range of zero to 21, which was the highest possible score. Males, Saudis, and dental participants had higher knowledge scores ($p < 0.05$). Participants had positive attitudes (42.64% - 70.86%) toward statements about using forensic dentistry in relation to COVID-19. A total of 80.98% were willing to register in a national dental records registry.

Conclusion: The level of knowledge regarding forensic dentistry among dental and medical professionals in Saudi Arabia is considered low. It is recommended to conduct continuing education courses about forensic dentistry for health professionals to increase their knowledge about it. Also, it seems that establishing a national dental records registry is crucial, especially for health crises such as the COVID-19 pandemic.

Keywords: Forensic Dentistry; Knowledge; Attitude; Dental; Registry; COVID 19

Introduction

Forensic dentistry is a branch of medical science that has an effective role in resolving criminal cases such as assaults and other crimes [1]. For instance, some countries use this field of dental science as part of their investigations in order to find evidence through a specific examination of dead bodies [2]. Forensic dentistry can be used to reveal the identity of a dead body even after some decomposition or damage has happened to the body. Also, forensic dentistry can be very helpful for investigators in cases with a lack of evidence like fingerprints or prominent injuries [3]. Forensic dentistry focuses on four important pillars: the bite record, palatal rugae record, dental record, and lip print [3]. These types of evidence are helpful in criminal cases by providing clues about a victim's sex, age, and race when combined

with DNA from the saliva [4,5]. Moreover, forensic dentists use some precise technologies that are used to identify the age and gender of a victim [6]. Therefore, each dentist keeping patient records and maintaining a proper history are key factors for helping in the detection of victims with forensic dentistry [7].

However, the field of forensic dentistry is still in its infancy [8]. One study in Saudi Arabia showed a very low level of knowledge about forensic dentistry among Saudi dentists, presumably because dental schools do not include the specialty of forensic dentistry as part of their dental curriculums [9].

In 2019, the world began facing the threat of a worldwide pandemic called the novel coronavirus 2019 (COVID-19), which is a tremendous challenge for the entire world but especially in medical sectors [10].

Aim of the Study

Thus, this study aimed to identify levels of knowledge and attitudes of health care workers toward forensic dentistry during the COVID-19 pandemic in Saudi Arabia.

Materials and Methods

This cross-sectional study was conducted between October 2020 and November 2020. It aimed to measure the extent of knowledge and awareness of health care workers about forensic dentistry during the COVID-19 pandemic in Saudi Arabia. Male and female participants older than 18 years old living in Saudi Arabia were recruited through social media. Data were collected by sharing a Google link to a self-administered Arabic-language online questionnaire. The study questions were taken from a previous study [11] and the questionnaire was validated for the present study by a pilot phase that assessed the validity. The study protocol was accepted by the institutional review board of the Faculty of Dentistry at Umm Al-Qura University.

Data analysis was conducted using Excel software and SPSS v.15 (IBM, Inc., Armonk, NY, USA). Statistical significance was assessed via ANOVA and t-test, with statistical significance set at a P-value of 0.05.

Participants were asked to provide informed consent before answering the questionnaire, which took about 10 minutes to complete. All data were anonymized. The questionnaire contained four parts, with a total of 55 questions. Part one consisted of 13 demographic items, including questions about previous infection with COVID-19. Part two was composed of 22 statements designed to measure the level of knowledge about forensic dentistry. The four questions in part three assessed attitudes regarding forensic dentistry and its relationship to COVID-19. Part four was composed of 16 questions aimed at assessing attitudes regarding forensic dentistry and the public’s willingness to participate in a dental records registry. Cronbach’s alpha was calculated to assess the reliability of the results.

Results

Demographic data

A total of 319 participants completed the study questionnaire, and the demographic data are shown in table 1.

Variables		N	%
Gender	Male	63	19.7
	Female	256	80.3
Age	21-30 years	203	63.6
	31-40 years	85	26.6
	41-50 years	23	7.2
	More than 50 years	8	2.5
Nationality	Saudi	281	88.1
	Non-Saudi	38	11.9

City	Jeddah	251	78.7
	Riyadh	21	6.6
	Abha	1	0.3
	Onaizah	1	0.3
	Medina	17	5.3
	Najran	5	1.6
	Yanbu	3	0.9
	Alhassa	1	0.3
	Albaha	9	2.8
	Khobar	3	0.9
	Dammam	1	0.3
	Taif	2	0.6
	Dharan	1	0.3
	Qassim	1	0.3
	Qunfutha	2	0.6
Region	Western	274	85.9
	Middle	24	7.5
	North	4	1.3
	South	17	5.3
Marital status	Married	163	51.1
	Not married	156	48.9
Employment	Employed	270	84.6
	Student	49	15.4
Work area	Working in dentistry	169	53.0
	Health care worker	150	47.0

Table 1: Demographic variables.

Among the participants, 60 (18.8%) had an oral problem, while 259 (81.2%) did not have one. Some of the participants received treatment from a governmental hospital (n = 52, 16.3%), and others got treatment at a private hospital (n = 267; 83.7%). Around 14 (4.4%) had never visited a dental clinic, 193 (60.5%) visited a dental clinic only when they were in pain or had a problem, and 112 (35.1%) visited dental clinics regularly. Out of the 319 participants, 32 (10%) were infected with COVID-19.

Levels of knowledge

In regard to knowledge about forensic dentistry, participants' answers are shown in table 2. For the total correct answers to knowledge questions about forensic dentistry, participants had a mean score of 12.19 with standard deviation (SD) of 4.52 out of a possible range of zero to 21, which was the highest possible score. When the participants were asked about their general perception of knowledge about forensic dentistry, the mean score was 5.05 (SD = 2.54), where 1 was the lowest score and 10 was the highest. For the knowledge questions, Cronbach's alpha was 0.895.

Statement	Answer	N	%
Forensic dentistry aids in investigating the victims of fatal accidents	Yes*	261	80.06
	No	14	4.29
	I do not know	51	15.64
Forensic dentistry doesn't apply to live survivors of accidents	Yes	82	25.15
	No*	109	33.44
	I do not know	135	41.41
Forensic dentistry aids in investigating physical abuse (domestic violence)	Yes*	226	69.33
	No	25	7.67
	I do not know	75	23.01
Forensic dentistry aids in investigating sexual abuse	Yes*	179	54.91
	No	40	12.27
	I do not know	107	32.82
Forensic dentistry aids in investigating bite attacks	Yes*	269	82.52
	No	6	1.84
	I do not know	51	15.64
Forensic dentistry doesn't aid with parental neglect of children's teeth	Yes	107	32.82
	No*	98	30.06
	I do not know	121	37.12
Forensic dentistry helps in medico-legal cases	Yes*	182	55.83
	No	49	15.03
	I do not know	95	29.14
Forensic dentistry aids in estimating the age of an individual	Yes*	278	85.28
	No	8	2.45
	I do not know	40	12.27
Forensic dentistry aids in determining race	Yes*	200	61.35
	No	33	10.12
	I do not know	93	28.53
Forensic dentistry aids in determining some social health-related lifestyle factors	Yes*	234	71.78
	No	31	9.51
	I do not know	61	18.71
Forensic dentistry aids in determining the nature of someone's occupation	Yes*	153	46.93
	No	56	17.18
	I do not know	117	35.89
Forensic dentistry aids in determining the socioeconomic status of an individual	Yes*	166	50.92
	No	78	23.93
	I do not know	82	25.15
Forensic dentistry can determine the dental disease history of an individual	Yes*	235	72.09
	No	24	7.36
	I do not know	67	20.55

Forensic dentistry can identify the sex of an individual	Yes*	212	65.03
	No	28	8.59
	I do not know	86	26.38
Each individual has a unique teeth imprint	Yes*	216	66.26
	No	27	8.28
	I do not know	83	25.46
All individuals have the same jaw structures	Yes	54	16.56
	No*	228	69.94
	I do not know	44	13.50
Each individual has the same lip prints or lines	Yes	202	61.96
	No*	37	11.35
	I do not know	87	26.69
Each individual has unique palatal rugae	Yes*	173	53.07
	No	43	13.19
	I do not know	110	33.74
DNA can be extracted from the teeth of live individuals	Yes*	199	61.04
	No	24	7.36
	I do not know	103	31.60
DNA cannot be extracted from dead bodies	Yes	57	17.48
	No*	154	47.24
	I do not know	115	35.28
Forensic dentistry does not require taking infection control measure when dealing with dead bodies	Yes	86	26.38
	No*	166	50.92
	I do not know	74	22.70

Table 2: Participants' knowledge of forensic dentistry.

*Correct answer for that item.

Upon examining the total level of knowledge in relation to the demographic variables, we found that some variables were significantly related to the total knowledge score, as shown in table 3. A t-test revealed that Saudi male participants had significantly higher total knowledge scores than non-Saudi females. Moreover, participants who work in dentistry had significantly higher total knowledge scores than other health care workers.

Variables		Total level of knowledge about forensic dentistry	SD	p-value
	Mean			
Gender	Male	13.71	4.07	0.003*
	Female	11.83	4.55	
Age	20 or younger	11.67	3.06	0.080
	21 - 30	12.73	4.14	
	31 - 40	11.26	5.33	
	41 - 50	12.48	4.37	
	Older than 50	11.25	4.49	
Nationality	Saudi	12.42	4.35	0.043*
	Non-Saudi	10.50	5.45	
Marital status	Married	11.93	4.63	0.343
	Not married	12.48	4.40	

Work status	Employed	12.06	4.56	0.051
	Student	13.33	4.35	
	Retired	9.43	2.37	
Health sector	Working in dentistry	13.76	3.63	< 0.001*
	Health care worker	10.49	4.78	
Have COVID19	Yes	12.50	4.72	0.753
	No	12.16	4.51	

Table 3: Total level of knowledge about forensic dentistry in relation to demographic variables.
*Significant at 0.05.

Attitude levels

The results of measures of participants’ attitudes about the use of forensic dentistry during the COVID-19 pandemic are shown in table 4.

Statement	Response	N	%
Forensic dentistry can help in determining the identity of a corpse during the COVID-19 pandemic	Agree	181	55.52
	Neutral	104	31.90
	Disagree	41	12.58
Forensic dentistry use during the COVID-19 pandemic requires extra infection control precautions	Agree	231	70.86
	Neutral	63	19.33
	Disagree	32	9.82
Forensic dentistry is important during pandemics that result in high mortality rates, such as the COVID-19 pandemic	Agree	175	53.68
	Neutral	105	32.21
	Disagree	46	14.11
There is a need for forensic dentistry to deal with the COVID-19 pandemic	Agree	139	42.64
	Neutral	117	35.89
	Disagree	70	21.47

Table 4: Participants’ attitudes about forensic dentistry usage during the COVID-19 pandemic.

National dental registry

Participants’ responses regarding the establishment of a national dental registry are displayed in table 5. The Cronbach’s alpha for national dental registry questions was 0.874.

Statement	Response	N	%
I believe that Saudi dentists would be competent at creating a record of my dental profile in a national dental registry	Agree	221	67.79
	Neutral	73	22.39
	Disagree	32	9.82
I believe Saudi dentists have the knowledge to assess my dental profile	Agree	223	68.40
	Neutral	72	22.09
	Disagree	31	9.51
I believe Saudi dentists are able to maintain my privacy and confidentiality in a national dental registry	Agree	253	77.61
	Neutral	53	16.26
	Disagree	20	6.13
I believe that forensic dentistry is an accurate and sensitive method for the identification of unknown victims	Agree	247	75.77
	Neutral	63	19.33
	Disagree	16	4.91

I believe that forensic dentistry is an accurate and sensitive method for the identification of victims	Agree	252	77.30
	Neutral	57	17.48
	Disagree	17	5.21
I believe that forensic dentistry is an accurate and sensitive method for the identification of criminals	Agree	238	73.01
	Neutral	66	20.25
	Disagree	22	6.75
I believe that the results of forensic dentistry are scientifically reliable	Agree	249	76.38
	Neutral	58	17.79
	Disagree	19	5.83
I believe that a national dental registry can assist with law enforcement	Agree	229	70.25
	Neutral	66	20.25
	Disagree	31	9.51
A dental registry should be maintained and controlled by the government	Agree	264	80.98
	Neutral	43	13.19
	Disagree	19	5.83
I believe dental records should be linked to my medical and personal profile	Agree	273	83.74
	Neutral	39	11.96
	Disagree	14	4.29
I am willing to provide my dental profile in case I am involved in a legal case	Agree	237	72.70
	Neutral	62	19.02
	Disagree	27	8.28
I should have the right to refuse to register in a national dental registry	Agree	166	50.92
	Neutral	104	31.90
	Disagree	56	17.18
If I enroll in a national dental record registry, I should have the right to withdraw my dental record in the future	Agree	153	46.93
	Neutral	121	37.12
	Disagree	52	15.95
I think a national dental records registry is liable to be hacked, and my personal information could be leaked	Agree	107	32.82
	Neutral	125	38.34
	Disagree	94	28.83
A national dental record registry can help a lot in dealing with pandemics such as COVID-19	Agree	158	48.47
	Neutral	118	36.20
	Disagree	50	15.34
Are you willing to register in a national dental records registry in the future?	Yes	264	80.98
	No	62	19.02

Table 5: Participants' responses about the establishment of a dental records registry.

Discussion

Forensic dentistry plays a crucial role in resolving criminal cases [12] by evaluating the characteristics of the teeth, jaws, lips, and palates of human beings [13]. Consequently, addressing the level of knowledge and the attitudes of health care workers regarding forensic

dentistry is considered important to dental practice. The results of the present study showed that the overall total knowledge was lower than the midpoint, indicating a low level of knowledge in this population. This result is similar to previously reported studies in Saudi Arabia. For example, in the eastern region [14], a study showed that dentists had low awareness of and poor attitudes toward dental forensic sciences. This was also found in a study in Riyadh, Saudi Arabia [8,9,15,16], which also revealed inadequate knowledge and a lack of practices of forensic dentistry among dental professionals. Another Saudi-based study revealed that, in addition to a shortage of continuing education opportunities in this field, there are no clear and solid forensic dentistry systems to follow in Saudi Arabia because it is not included in the teaching curriculum for dental students [17]. A recent systematic review of cross-sectional studies regarding the levels of knowledge and practical applications of forensic dentistry among dentists in India revealed inadequacy and considerable variation in the practice of forensic dentistry among the responding dentists [6].

In our study, 61% of the participants agreed that DNA can be extracted from the teeth of live individuals. However, Abdul, *et al.* [8] reported that 40% of graduates and 40.9% of undergraduates in Riyadh, Saudi Arabia, were aware that teeth serve as a source of DNA, while over 50% of postgraduate students were aware of that information [8]. Analysis of bite marks is one of the major responsibilities of a forensic dentist [18]. In this study, more than 80% of the participants agreed that forensic dentistry aids in investigating bite attacks. In contrast, a study that was conducted among general dental practitioners in Pune reported that about 72% of the dental practitioners did not know the significance of bite mark patterns of the teeth [5]. In our study, female participants were found to have higher knowledge scores than males. This agrees with the findings of a previous study as well [11] but contrasts with another study that showed no statistically significant difference between males and females [14]. Such differences might be due to cultural differences between cities in Saudi Arabia.

In this study, we highlighted participants' attitudes regarding the use of forensic dentistry in the COVID-19 pandemic, which has had a huge impact on health care providers, who are exposed to a tremendous risk of COVID-19 infection due to their direct contact and close proximity to patients' body fluids and their face-to-face communication with patients [19]. A recent review showed that COVID-19 has affected the treatment flow and number of visits to dental clinics [20]. Similar to our study, over 70% of the participants reported that forensic dentistry use would require extra infection control precautions during the pandemic.

Over 80% of the participants were willing to register in a national dental records registry in the future. This percentage is higher than what was previously reported by a study in Riyadh [11], which might be due to the influence of the COVID-19 pandemic around the world.

Several limitations were encountered in this study, including the use of a self-reported questionnaire, which increased the chances of a self-reporting bias, and the sample size was not very large. Further studies are needed to assess the knowledge and attitudes and give these results more generalizability. In addition, there is a need for further exposure and formal training to bring awareness about forensic dentistry to all health-care providers in Saudi Arabia.

Conclusion

The level of knowledge regarding forensic dentistry among dental and medical professionals in Saudi Arabia is considered low, particularly with regard to their specialties. Participants who were male, Saudi, and/or work in the dentistry field had higher knowledge scores than females, non-Saudis, and participants in the medical field. More than half of the participants had positive attitudes to utilize forensic dentistry during COVID-19. The majority of participants were keen to register in a national dental records registry in the future. It is recommended to establish a continuing education course about forensic dentistry for health professionals to increase their knowledge levels. Also, it seems that establishing a national dental record register is crucial during health crises such as the COVID-19 pandemic.

Acknowledgment

We would like to thank Saeed Saifuddin for helping with data acquisition.

Bibliography

1. Rajendran R and Sivapathasundharam B. "Shafer's Textbook of Oral Pathology, 6th edition". Elsevier India (2009).
2. Pretty IA and D Sweet. "A look at forensic dentistry-Part 1: The role of teeth in the determination of human identity". *British Dental Journal* 190.7 (2001): 359-366.
3. Avon SL. "Forensic odontology: The roles and responsibilities of the dentist". *Journal Canadian Dental Association* 70.7 (2004): 453-458.
4. Singh K., et al. "Teeth and their secrets-Forensic dentistry". *Journal of Forensic Research* 3.1 (2012).
5. Harchandani N., et al. "Awareness of forensic odontology among general dental practitioners in Pune-A cross-sectional study". *Journal of Advanced Medical and Dental Sciences Research* 2.3 (2014): 10-16.
6. Gambhir, Ramandeep Singh, et al. "Knowledge and awareness of forensic odontology among dentists in India: A systematic review". *Journal of Forensic Dental Sciences* 8.1 (2016): 2.
7. Shamim Thorakkal. "Forensic odontology". *Journal of the College of Physicians and Surgeons Pakistan* 22.4 (2012): 240-245.
8. Abdul NS., et al. "Awareness of forensic odontology among undergraduate, graduate, and postgraduate dental students in Riyadh, Saudi Arabia: A knowledge-, attitude-, and practice-based study". *Journal of Forensic Dental Sciences* 11.1 (2019): 35-41.
9. Al Sheddi M and Al Asiri A. "Awareness of the scope and practice of forensic dentistry among dental practitioners". *Australian Journal of Forensic Sciences* 47.2 (2015): 194-199.
10. Fauci AS., et al. "Covid-19-Navigating the uncharted". *New England Journal of Medicine* 382 (2020): 1268-1269.
11. Salam M., et al. "Public awareness of forensic odontology and willingness to enroll in a prospective dental registry: A survey conducted in Saudi Arabia". *The Saudi Dental Journal* 32.1 (2020): 21-28.
12. Balachander N., et al. "Evolution of forensic odontology: An overview". *Journal of Pharmacy and Bio Allied Sciences* 7.1 (2015): S176-S180.
13. Stark MM. "Clinical forensic medicine: A physician's guide". *Springer Nature* (2019).
14. Nazir Muhammad Ashraf., et al. "Determinants of knowledge and practice of forensic dentistry amongst dental practitioners". *European Journal of Dental Education* 23.4 (2019): 491-497.
15. Alshaq M., et al. "Knowledge and awareness of forensic odontology among the dental practitioners in Riyadh City: A survey-based study". *Donnish Journal of Dentistry and Oral Hygiene* 4.2 (2018): 54-62.
16. Al Shareef A., et al. "Forensic dentistry and its importance in general dental practice: Knowledge and attitude of undergraduate and postgraduate dental students of Riyadh Elm University". *Donnish Journal of Dentistry and Oral Hygiene* 5.3 (2019): 93-98.
17. Al Qahtani S., et al. "Reality of forensic odontology in Saudi Arabia". *Revista Brasileira de Odontologia Legal* 4.2 (2017): 12-21.
18. Babar MG., et al. "Essential guidelines for forensic odontology". *Pakistan Oral and Dental Journal* 27.1 (2007): 79-84.
19. Peng X., et al. "Transmission routes of 2019-nCoV and controls in dental practice". *International Journal of Oral Science* 12.1 (2020): 1-6.
20. Azim AA., et al. "Clinical endodontic management during the COVID-19 pandemic: A literature review and clinical recommendations". *International Endodontic Journal* 52.11 (2020): 1461-1471.

Volume 20 Issue 1 January 2021

All rights reserved by Doaa S Alghamdi., et al.