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Awareness of Health Professional Regulations, Associated Factors, and Malpractice Consequences among Dentists

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Keywords
Malpractice · Dentists · Health professional regulations · Knowledge · Saudi Arabia

Abstract

Introduction: The rising number of complaints against dentists in Saudi Arabia was the main motivator to conduct this study, which aimed to assess the level of knowledge regarding health professional regulations among dentists, identify the associated factors, and explore the consequences of malpractice experience. ***Methods:*** This was a cross-sectional study conducted between February and July 2022 among dentists working at public or private dental clinics in Saudi Arabia and who had medical malpractice insurance coverage. To conduct the research, a predestined questionnaire comprised three sections: section 1 included 13 questions aimed to assess the knowledge related to the health professional regulations in Saudi Arabia; section 2 evaluated the most significant changes in providing dental care as a result of complaint experience; and section 3 assessed the impact of the complaint on dentists' professional practice and physical and psychological conditions. ***Results:*** The study included 148 dentists who responded to the questionnaire. The dentists' median score of their knowledge concerning legal health regulations in Saudi Arabia was 7 (range: 6–9) out of 13. The median score was higher among dentists who had been sued compared with those who had never been sued (8 [IQR: 7–9.75] vs. 7 [IQR: 5.25–9], respectively), although no significant difference was detected ($p > 0.05$). A significantly higher median score ($p = 0.029$) was recorded among male dentists (median = 7 [IQR: 6–10]) compared to female dentists (median = 7 [IQR: 5–8]). ***Conclusion:*** The overall level of knowledge of dental care legal regulations among the included dentists was good to some extent. Several dentists with a history of malpractice changed their behavior toward patients. This change in behavior was more common among dentists who had been previously sued.

Introduction

Medical law is described as a branch of law that cares about the practices and duties of the healthcare providers toward different kinds of patients without racism [1–3]. This kind of law is covering the main topics of professional regulations related to healthcare providers, such as setting roles and responsibilities, establishing professional liability insurance, investigating medical malpractice, and defining blood money compensations [4].

Medical malpractice is one of the essential issues facing the healthcare providers nowadays as the malpractice litigations have become very common due to the easy

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Table 1. Characteristics of dentists included in study (*N* = 148)

Variable	*N* (%), mean ± SD
Gender	
Male	91 (61.5)
Female	57 (38.5)
Age, years	36.8±6.6
Years of experience in dental healthcare	11.1±7.4
Nationality	
Saudi citizens	116 (78.4)
Saudi residents	32 (21.6)
Working site	
Public dental clinics	106 (71.6)
Private dental clinics	42 (28.4)

access to the internet and social media [5]. There are several definitions of medical malpractice; however, it is defined by the World Health Organization (WHO) as "any preventable event that may cause or lead to inappropriate medication use or patient harm." Having good knowledge about the medical law will help the healthcare providers prevent medical malpractices and treat their patients more effectively [6]. In general, medical malpractice is either related to medical procedures or medications. Based on previous studies, medical malpractice was a risk factor for pneumothorax incidence among patients during hospital stays in the intensive care unit (ICU). Besides, several adverse events due to medication errors were also caused by medical malpractice [7]. Medical malpractices do not only cause patient suffering but also result in physical, psychological, and behavioral disorders in healthcare providers due to the lawsuits filed against them [8, 9].

Because dentists contribute to both medical procedure and providing medications, they have an intense responsibility to follow medical laws' instructions when dealing with their patients at the dental clinics [10, 11]. A recent study showed that dental specialty ranked as the second highest number of claims compared to other specialties, and the dentists were found guilty of more than half of malpractice claims and the majority of causes related to procedure errors, documentation, and lack of treatment plan [7, 12]. Other studies have shown that dentists have insufficient knowledge of the rules and regulations related to the dental profession and reported on the serious consequences of these medical malpractices for the patient [6, 9, 13, 14].

The health professional practices in Saudi Arabia, including dentistry practices, are governed by an official medical law organization, which called the Law of Practicing Healthcare Professions (LPHP). This law is based on the Islamic regulations and issued by the Saudi Royal Decree [15, 16]. One of the methods used to decrease medical errors and malpractices is that the Saudi Ministry of Health simplified the reporting of possible medical malpractice by responding around-the-clock to patients' claims through telephone calls, emails, and comments in social media [17, 18].

According to a Saudi study published in 2022, there has been an increase in the number of claims against dentists since 2017 [19]. The rising number of complaints against dentists in Saudi Arabia was the main motivator to conduct this study, which aimed to assess the level of knowledge regarding health professional regulations among dentists, identify the associated factors, and explore the consequences of malpractice experience.

Methodology

Study Design, Setting, and Participants

This was a cross-sectional study conducted between February and July 2022 among dentists, working at public or private dental clinics in Saudi Arabia, who had medical malpractice insurance coverage with [anonymized], which is one of the major insurance companies that provide medical malpractice insurance for physicians in Saudi Arabia.

Sampling

The sample size was calculated using Openepi [20]. The sample size calculation was based on the number of dentists who had medical malpractice insurance coverage with [anonymized] Company (N = 20,418), a confidence level of 95% (z = 1.96), confidence limits of 5.5%, and the prevalence of malpractice among dentists (p = 13%). Accordingly, the minimum sample for the study was 148. Study participants were selected using a simple random sample from a list of dentists who had malpractice insurance coverage with [anonymized] for the period 2021–2022 (N = 20,418).

Data Collection

Based on an agreement between the researchers and [anonymized] insurance company, a pre-designed questionnaire was sent in the form of a mobile text message to the selected study participants. The researchers received the dentists' responses without any personal details.

The Questionnaire

The questionnaire started with a concise sociodemographic part, which consists of questions about dentists' age, gender, years of experience, nationality, and type of working site (governmental or private clinic). Following this part, dentists' knowledge regarding health professional regulations was assessed using 13 multiple-choice questions (MCQs), which mainly focus on particular definitions, blood money compensations, and procedures' ethics. Dentists choosing the best

Table 2. The questions regarding legal health regulations of dental care in Saudi Arabia and dentists' answers

Question number	Question aspect	Answer	*N* (%)
Q1	The system that aims to organize the work for health practitioner	Health professions practice system[a]	111 (75)
		Private health institution system	1 (0.7)
		Health system	12 (8.1)
		Don't know	24 (16.2)
Q2	You will be liable to accountability according to the system of practicing health professions and paying financial compensation to the patient in one of the following cases	The occurrence of damage resulting from a medical error and requires compensation[a]	99 (66.9)
		Submitting false data to obtain a professional license	18 (12.1)
		Impersonating one of the titles that are usually given to health professionals	10 (6.7)
		Don't know	21 (14.2)
Q3	What is the meaning of "Ersh (Arabic: الإرش)" in Islamic law	It is a compensation for a deficiency caused by a felony that not estimated mentioned in Islamic law[a]	25 (16.9)
		It is a compensation for a deficiency caused by a felony that is estimated and clearly mentioned in Islamic law[a]	26 (17.6)
		It is a compensation for a deficiency caused by an involuntary manslaughter that estimated by legal medical authorities	64 (43.2)
		Don't know	33 (22.3)
Q4	What is the difference between "Ersh" and bloodwit	"Ersh" compensation is not estimated in Islamic law, while bloodwit is clearly estimated[a]	45 (30.4)
		Bloodwit compensation is not estimated in Islamic law, "Ersh" is clearly estimated	26 (17.6)
		The process of "Ersh" compensation is different than the compensation related to bloodwit	8 (5.4)
		Don't know	69 (46.6)
Q5	How much money should be paid for the patient if all his/her teeth were extracted accidentally?	480,000 SR for males and 240,000 for females[a]	23 (15.5)
		640,000 SR for males and 320,000 for females	12 (8.1)
		300,000 SR either for males or females	10 (6.7)
		Don't know	103 (96.6)
Q6	How much money should be paid for the patient if one tooth was extracted accidentally?	15,000 SR either for males or females[a]	47 (31.8)
		20,000 SR either for males or females	11 (7.4)
		30,000 SR either for males or females	2 (1.3)
		Don't know	88 (59.4)
Q7	The punishment of not obtaining a professional license	Being in jail for no more than 6 months or paying no more than 100,000 SR, or both[a]	61 (41.2)
		Paying no more than 50,000 SR	8 (5.4)
		Paying no more than 20,000 SR	3 (2)
		Don't know	76 (51.3)
Q8	Is there an issue in this case: explaining the therapeutic procedures in orthodontic treatment to the patient without obtaining a written consent	Yes, the dentist is subject to legal accountability[a]	108 (72.9)
		Yes, the dentist is subject to legal accountability unless obtaining a verbal consent instead	7 (4.7)
		No, there is no issue in this case	6 (4)
		Don't know	27 (18.2)
Q9	The legal process that must be followed when filming or publishing any treatment procedure	Availability of an approval of the facility and should not contradict public morals	1 (0.7)
		Availability of a written consent	26 (17.5)
		All of the above[a]	102 (68.9)
		Don't know	19

Table 2 (continued)

Question number	Question aspect	Answer	*N* (%)
Q10	One of the following described as remiss at medical work	Occurrence of a medical error as a result of negligence or failure to provide healthcare[a]	108 (72.9)
		Medical complications occurred despite the availability of a written consent	2 (1.3)
		In case of no causal relationship between the medical error and the actual harm existed	4 (2.7)
		Don't know	34 (22.9)
Q11	The dentist described as guilty in this case and punishment is possible even if no harm occurred to the patient	Conducting experiments not approved by an official institutional review board (IRB)[a]	97 (65.5)
		Forget one of therapeutics principles	18 (12.1)
		Medical complications occurred despite the availability of a written consent	5 (3.4)
		Don't know	28 (18.9)
Q12	Which of these cases don't require a written consent	Emergency case[a]	128 (86.5)
		Blood transfusion	2
		Local or general anesthesia	3
		Don't know	15
Q13	According to the health professions practice system, the health practitioner has the right to not treat the following case	In the absence of a threat to the patient's life and provide justified reasons[a]	96 (64.9)
		In the absence of a threat to the patient's life and provide reasons related to religion and ethnicity	2 (1.3)
		The dentist has no right to refuse treating any case	20 (13.5)
		Don't know	30 (20.2)

Definition of "Ersh" in Islamic law: it is a compensation that is not well-estimated. Definition of "bloodwit" in Islamic law: it is a compensation that is clearly mentioned in Islamic law. SR, Saudi Riyals. [a]Correct answer.

answer in each MCQ will score 1 point, with a maximum score of 13 points (score range: 0–13 points). Dentists with low scores (0–4 points) indicate "poor knowledge" of legal health regulations, while scores of 5–8 and 9–13 points indicate "good to some extent" and "good" knowledge, respectively. The final section was evaluating the most significant changes in dentists' physical and psychological health, professional practice, and their behavior toward patients as a result of experiencing a complaint. The latter section utilized three binary yes/no questions and was only filled out by dentists who experienced complaints from patients, either sued or not sued in court.

To test the validity and reliability of the questionnaire, a pilot study was conducted among 30 samples. The value of Cronbach's alpha was 0.723, and the average inter-item correlation coefficient was 0.166. These values indicate an acceptable and reliable questionnaire.

Data Analysis

The data did not follow a normal distribution; therefore, Mann-Whitney U and χ^2 tests were performed using SPSS software version 25 to analyze the results. The results were considered significant when the p value was <0.05. Besides, we performed logistic regression and determined the odds ratio, which is referred to as the exponential value of B (Exp(B)), and 95% confidence interval (CI) regarding significant factors related to lower knowledge of legal health regulations.

Ethical Consideration

The Central Institutional Review Board (IRB) at the Saudi Ministry of Health reviewed and approved this study (IRB Log Number: 22–10 M). Participants' informed consent was obtained. By giving each participant a code number, confidentiality and anonymity were guaranteed. Every technique was used in compliance with the rules and regulations that were applicable.

Results

The study included 148 dentists who responded to the questionnaire. The majority of those dentists were male, Saudi citizens, and working in governmental organizations. Their mean age was 36.8, while their mean years of experience in the dental healthcare field was 11.1 (Table 1). The dentists' median score of their knowledge of legal health regulations in Saudi Arabia was 7 (range: 6–9)

Table 3. The relationship between dentists' knowledge of legal health regulations in Saudi Arabia and their characteristics

Dentists' characteristics	Total (N = 148)	Median [IQR] score (out of 13)	Mean ± SD	p value[a]	Good knowledge (score range 9–13) (N = 48)		Good to some extent (score range 5–8) (N = 75)		Poor knowledge (score range 0–4) (N = 25)	
					N	%	N	%	N	%
Male	91	7 (6–10)	7.53±2.70	**0.029***	34	37.4	45	49.5	12	13.1
Female	57	7 0 (5–8)	6.40±2.76		14	24.6	30	52.6	13	22.8
χ^2, df, p value[b]	–	–		–	2.62, 1, 0.105		0.14, 1, 0.706		2.31, 1, 0.128	
Age <36 years old	68	7 (6–9)	7.22±2.89	0.555	24	35.3	32	47.1	12	17.6
Age ≥36 years old	80	7 (5–9)	6.99±2.68		24	30	43	53.7	13	16.3
χ^2, df, p value[b]	–	–		–	0.47, 1, 0.492		0.66, 1, 0.417		0.05, 1, 0.821	
<9 years of experience	72	7 (6–9)	7.28±2.78	0.435	25	34.7	35	48.6	12	16.7
≥9 years of experience	76	7 (5–9)	6.92±2.76		23	30.3	40	52.6	13	17.1
χ^2, df, p value[b]	–	–		–	0.34, 1, 0.562		0.24, 1, 0.624		0.005, 1, 0.943	
Saudi citizen	116	7 (6–9)	7.14±2.71	0.631	35	30.2	64	55.2	17	14.6
Saudi resident (non-Saudi)	32	6.5 (4.75–10)	6.94±3.00		13	40.6	11	34.4	8	25
χ^2, df, p value[b]	–	–		–	1.25, 1, 0.263		**4.34, 1, 0.037***		1.91, 1, 0.166	
Working at public clinics	106	7 (6–9)	7.25±2.63	0.368	32	30.2	59	55.7	15	14.1
Working at private clinics	42	7 (5–9)	6.71±3.09		16	38.1	16	38.1	10	32.8
χ^2, df, p value[b]	–	–		–	0.86, 1, 0.354		3.71, 1, 0.053		1.99, 1, 0.157	

SD, standard deviation. χ^2, χ^2 test. df, degree of freedom. [a]Mann-Whitney U test performed. [b]χ^2 test performed. *p value <0.05.

out of 13. The median score was higher among dentists who were sued compared with those who were never sued (8 [IQR 7–9.75] vs. 7 [IQR 5.25–9], respectively); however, no significant difference was recorded ($p > 0.05$).

Table 2 displays the 13 questions related to dental care legal health regulations in Saudi Arabia and corresponding dentists' responses. Over 50% of the dentists were not able to provide correct answers for 5 questions (Q3, Q4, Q5, Q6, and Q7). For the other 8 questions, the percentage of correct answers ranged from 64.9% to 75%.

Higher median score was showed among male dentists (median = 7 [range 6–10]) compared to female dentists (median = 7 [range: 5–8]), and the difference between median scores was significant ($p = 0.029$). Moreover, poor knowledge of dental care legal health regulations in Saudi Arabia was more frequent among non-Saudi dentists, as 25% of them scored 0–4, while 14.6% of Saudi dentists had this score range. Nevertheless, good to some extent knowledge of dental care was statistically common among Saudi dentists, as 55.2% of them scored 5–8 compared to 34.4% of non-Saudi dentists having this score range ($p = 0.037$). In contrast, other dentists' characteristics (i.e., age, years of experience, and working organization) seem to have no significant impact on the knowledge of health regulations (Table 3). When poor knowledge of dental care legal health regulations was used as a dependent variable for the logistic regression analysis, the Exp(B) for non-Saudi dentists was 3.113 (1.052–9.213, $p = 0.040$), while that for female dentists was 1.903 (0.741–4.889, $p = 0.181$) (Table 4).

Table 5 shows a comparison between dentists with ($N = 14$) and without ($N = 134$) history of medical errors in relation to their knowledge of dental care legal and health regulations. It was found that there was no significant difference between them regarding the median scores (7 [5.25–9] vs. 8 [7–9.75], $p > 0.05$). Moreover, there was no significant difference in the frequency of correct responses regarding their knowledge of legal health regulations. However, dentists with a history of medical errors had correct responses to Q5 and Q6 compared to those with no history of medical errors (frequencies of correct answers for Q5 were 35.7% vs. 13.4%, respectively, $p = 0.028$, and for Q6 were 57.1% vs. 29.1%, respectively, $p = 0.032$). No significant differences were found with regards to the change of behavior toward patients, physical and psychological health, and professional practice among dentists with a history of medical errors who were sued ($N = 10$) and those not sued ($N = 4$) in Table 6.

Table 4. Logistic regression regarding lower knowledge of legal health regulations in Saudi Arabia in the presence of specific dentists' characteristics

Dentist characteristic	Exp(B)	95% CI for Exp(B), *p* value
Female	1.903	0.741–4.889, 0.181
Non-Saudi	3.113	1.052–9.213, **0.040***

Dependent variable: poor knowledge of legal health regulations. **p* value <0.05.

Discussion

The current study showed that the overall level of knowledge of dental care legal health regulations among dentists in Saudi Arabia was good to some extent and revealed that non-Saudi migrant dentists have significantly lower knowledge than Saudi citizen dentists. The study also found that at least 50% of included dentists confessed they had changed in regard to their physical and psychological health and behavior toward patients. This behavioral change was more common among dentists who had been previously sued.

In other studies, Budimir et al. [21] showed that Croatian dentists have limited knowledge of dental regulations, and the awareness of patients' rights is imperfect. Similarly, Tahani et al. [12] reported that over 74% of dentists in Isfahan city, the Islamic Republic of Iran, have poor knowledge of dental regulations. In contrast, Kesavan et al. [22] showed that dentists working in an Indian southeastern state have average knowledge of dental regulations and patients' ethics, while Muralidharan et al. [23] reported poor knowledge of dental morals and jurisprudence among dentists located in another Indian northwestern state.

The issue found in the current study regarding lower knowledge of dental regulations among non-Saudi migrant dentists was also found among Canadian immigrant workers, who had less knowledge about acquiring their skills [24]. Likewise, Yuen Xin Er et al. [25] found that migrant workers in Singapore lack awareness of some country-specific laws and regulations.

Although the current study revealed that years of experience were not a significant factor affecting the knowledge of dental regulations, newer generations of dentists with experience less than 9 years have somewhat better knowledge compared to dentists who have been working for 9 years or more. Likewise, Budimir et al. [21] showed that years of experience did not affect the overall dental ethics among dentists; however, a single ethical issue was significantly more common among dentists with fewer years of practice. These findings differ from that of Tahani et al. [12] who found that dentists with more years of experience (≥9 years) have a significantly higher knowledge score.

Initial analysis of the data for this study revealed a significantly lower median knowledge score among female dentists. However, logistic regression performed on the same data showed no significant difference in median knowledge scores between both genders. Similarly, there was no statistical difference between male and female dentists regarding the means of knowledge scores in Tahani et al. [12] study, though a higher mean score was seen among the female group.

This study found that dentists working in public clinics have a relatively higher score on knowledge of dental regulations when compared to private clinics. Yet, there was no significant difference between the two groups. There are no or limited studies that have assessed the working place with regard to knowledge of dental regulations; thus, no comparisons can be made with these results.

In Tahani et al. [12] study, it was reported that knowledge of dental regulations was not significantly different among dentists with or without a history of legal complaints. Similarly, the current study did not find a significant difference in the overall median knowledge scores among the two groups. Nonetheless, the research found that dentists who experienced one or more medical errors showed significantly better knowledge regarding the questions related to the amount of money that should be paid for the patient if one tooth or all his/her teeth were extracted accidentally.

Regarding the behavioral, physical, and psychological health consequences of malpractice experience among included dentists, Tahani et al. [12] reported similar results, as most of the dentists confirmed they changed or would change their behavior toward patients after malpractice claims. Despite strengths found in this study, several limitations are noticed, including the cross-sectional study design with the subjective assessment of knowledge about dental care legal regulations among dentists. Besides, the current distribution between compared groups was not equal and did not have an ideal distribution, which was mainly caused by the low response rate.

Table 5. Comparison between dentists with and without history of medical error regarding their knowledge of legal health regulations of dental care

Question number	Question aspect	Dentists with correct answer		*p* value
		no history of medical error (*N* = 134)	history with medical error (*N* = 14)	
Q1	The system that aims to organize the work for health practitioner	99 (73.8)	12 (85.7)	0.330
Q2	You will be liable to accountability according to the system of practicing health professions and paying financial compensation to the patient in one of the following cases	87 (64.9)	12 (85.7)	0.115
Q3	What is the meaning of "Ersh (Arabic: الإرش)" in Islamic law	24 (17.9)	1 (7.1)	0.306
Q4	What is the difference between "Ersh" and bloodwit	42 (31.3)	3 (21.4)	0.442
Q5	How much money should be paid for the patient if all his/her teeth were extracted accidentally?	18 (13.4)	5 (35.7)	**0.028***
Q6	How much money should be paid for the patient if one tooth was extracted accidentally?	39 (29.1)	8 (57.1)	**0.032***
Q7	The punishment of not obtaining a professional license	54 (40.3)	7 (50)	0.482
Q8	Is there an issue in this case: explaining the therapeutic procedures in orthodontic treatment to the patient without obtaining a written consent	97 (72.4)	11 (78.5)	0.620
Q9	The legal process that must be followed when filming or publishing any treatment procedure	93 (69.4)	9 (64.3)	0.693
Q10	One of the following described as remiss at medical work	97 (72.4)	11 (78.5)	0.620
Q11	The dentist described as guilty in this case and punishment is possible even if no harm occurred to the patient	89 (66.4)	8 (57.1)	0.487
Q12	Which of these cases don't require a written consent	117 (87.3)	11 (78.5)	0.362
Q13	According to the health professions practice system, the health practitioner has the right to not treat the following case	88 (65.6)	8 (57.1)	0.524
All questions		*p* value = 0.332		

Table 6. The change of behavior toward patients, physical and psychological health, and professional practice among dentists who had history of a medical error (*N* = 14)

Variable	Dentist not sued (*N* = 4) (%)	Dentist sued (*N* = 10) (%)	Total dentists with history of medical error (*N* = 14) (%)	χ^2	df	*p* value
Change in behavior toward patients				1.4	1	
No	3 (75)	4 (40)	7 (50)			0.236
Yes	1 (25)	6 (60)	7 (50)			
Change in physical and psychological health				3.7	1	
No	3 (75)	2 (20)	5 (35.7)			0.052
Yes	1 (25)	8 (80)	9 (64.3)			
Change in professional practice				3.7	1	
No	3 (75)	2 (20)	5 (35.7)			0.052
Yes	1 (25)	8 (80)	9 (64.3)			

χ^2, χ^2 test. df, degree of freedom.

Conclusions

The overall level of knowledge of dental care legal regulations among the included dentists was good to some extent. Among dentists with a history of malpractice, half of them reported to have changed their behavior towards patients and that the experience has affected their physical and psychological health and professional practice. This change in behavior was more common among dentists who had been previously sued.

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Statement of Ethics

The Central Institutional Review Board (IRB) at the Saudi Ministry of Health reviewed and approved this study (IRB Log Number: 22–10 M). The confidentiality and anonymity of the participants' data were preserved. Written informed consent to participate was not directly obtained but inferred by completion of the questionnaire.

Conflict of Interest Statement

The authors have no relevant affiliations or financial involvement with any organization or entity with a financial interest in or financial conflict with the subject matter or materials discussed in the manuscript. This includes employment, consultancies, honoraria, stock ownership or options, expert testimony, grants or patents received or pending, or royalties.

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Author Contributions

Amjad Aldahmashi and Abdullah Alkattan contributed in conceptualization, writing – original draft preparation, and resources. Fahad Al-aydaa contributed in writing – review and editing. All authors have read and agreed to the published version of the manuscript.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request. The data are not publicly available due to containing information that could compromise the privacy of research participants.

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