CAHIERS MAGELLANES-NS
Volume 07 Issue 1
2025

ISSN:1624-1940
http://magellanes.com/

ASSESSMENT OF KNOWLEDGE AND AWARENESS IN THE MANAGEMENT OF PATIENTS UNDERGOING ANTICOAGULANT THERAPY AMONG DENTAL STUDENTS, INTERNS, AND DENTISTS IN SAUDI ARABIA

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Abstract

Introduction:

Dentists frequently encounter patients with chronic illnesses who are often on long-term medications, including oral antithrombotic such as antiplatelets and anticoagulants. Oral anticoagulants and antiplatelet medications pose a challenge during dental procedures, as dentists must balance the increased bleeding risk discontinued. Traditionally, the practice has been to stop these medications before procedures involving bleeding. **Objective:** The main objective of this study was to measure the knowledge level among dental students and dental practitioners in the region of Saudi Arabia about patients undergoing anticoagulant therapy and dental considerations in the procedure of teeth extraction. **Methods:** This cross-sectional study, conducted in Saudi Arabia during 2024-2025, evaluates dental students', interns', and dentists' knowledge of managing patients on anticoagulant therapy for surgical extractions under local anesthesia. Participants are recruited using a structured questionnaire and stratified sampling to ensure diverse representation. A sample size of 385 was calculated for accuracy. The survey includes 23 questions covering demographics, knowledge, and clinical practices. Responses are scored based on Bloom's taxonomy, with participants categorized into low, moderate, and high knowledge levels. Data is collected via Microsoft Excel and analyzed using SPSS to determine awareness and adherence to management protocols. **Results:** The study assessed the knowledge and awareness of dental professionals regarding the management of patients undergoing anticoagulant

ISSN:1624-1940
http://magellanes.com/

therapy among 474 participants in Saudi Arabia. The findings revealed that while 78.3% of respondents had encountered patients on oral anticoagulants, only 19.6% reported daily consultations, indicating a gap in ongoing management. A significant 58.1% did not adhere to guidelines regarding aspirin abstinence before dental procedures, raising concerns about bleeding risks. Overall, 51.1% demonstrated moderate knowledge, with significant correlations found between knowledge and factors such as age, occupation, and duration of practice, highlighting a need for enhanced education in anticoagulant management. **Conclusion:** The findings of this study highlight significant gaps in knowledge and awareness among dental students and practitioners regarding the management of patients on anticoagulant therapy. The results underscore the urgent need for enhanced educational frameworks within dental curricula to better prepare future practitioners for the complexities of managing anticoagulated patients.

Keyword: Anticoagulant Therapy, management, knowledge and awareness, Saudi Arabia.

Introduction:

Dentists frequently encounter patients with chronic illnesses who are often on long-term medications, [1]. Oral anticoagulants and including oral antithrombotic such as antiplatelets and anticoagulants antiplatelet medications pose a challenge during dental procedures, as dentists must balance the increased bleeding risk discontinued. Traditionally, the practice has been to stop these medications before procedures involving bleeding [2]. Oral anticoagulants and antiplatelet medications are commonly prescribed to prevent a range of medical conditions, such as thromboembolism, atrial fibrillation, multiple venous thromboembolisms, congestive heart failure, and complications from artificial heart valves. The oral anticoagulants used today include Warfarin, Rivaroxaban, Dabigatran, and Apixaban [3]. Increased life expectancy has led to a higher incidence of cardiovascular diseases, especially in older age. Key risk factors include smoking, unhealthy diets, obesity, and diabetes. Smoking is linked to over 30% of coronary heart disease deaths and negatively affects endothelial function. Women are more susceptible to cardiovascular issues from smoking than men, with a 25% higher risk for the same level of tobacco use, potentially due to genetic factors related to thrombin signaling [4]. As societal well-being improves, cardiovascular diseases are on the rise. Clinicians use antithrombotic drugs, including both anticoagulants and antiplatelets, to combat these conditions [5]. Dentists are familiar with warfarin and aspirin, common anti-thrombotic medications, but recent years have seen the addition of many new anti-thrombotic agents and classes. Most reputable medical and dental organizations recommend not changing or stopping anti-thrombotic medications before dental procedures due to the rare but serious risk of thromboembolic events. If postoperative bleeding occurs, they support using local control measures in the dental office [6].

To prevent such complications in routine dental practice, dentists must possess adequate knowledge regarding managing these patients. However, the majority of dental procedures carry a minimal risk of bleeding and self-limiting hemorrhage that can be controlled with local hemostatic measures [7]. Numerous estimated medical and dental societies and associations strongly advocate against modifying or ceasing antithrombotic medication in advance of dental procedure it is generally

ISSN:1624-1940
http://magellanes.com/

acknowledged that administration of warfarin should not be suspended before any dental procedure when the level of International normalized ratio (INR) is 3.5 [8]. In order to educate students and enhance their practice in treating patients taking antiplatelet and/or anticoagulant medications, Alabdulkarim's study demonstrates a lack of knowledge and awareness among dental students and internship trainees regarding antiplatelet and anticoagulant medications. Workshops and educational programs on this subject are therefore necessary [5]. There is a significant difference in risk between thromboembolic and bleeding complications. Local measures can be used to achieve adequate hemostasis. In his study, Shin-Yu Lu described a female patient who had stopped taking her warfarin five days before the procedure and was saved from acute MI with complete occlusion of the right coronary artery by percutaneous coronary intervention two days after tooth extraction [9]. Discontinuing anticoagulant medication may cause an ischemic stroke, which may be fatal or severely harming. In a survey conducted by Chinnaswami et al., (96.2%) of dentists responded that in the case of surgical operations such periodontal therapy, implants, impaction surgeries, and multiple tooth extractions (more than three teeth each visit), they would discontinue the use of oral antithrombotic medications (OAM) [1]. Nonetheless, the majority of dentists in Mohammad Ali study (71.4%) frequently asked patients using warfarin for blood testing. (38%) of Saudi dentists advised INR tests before the treatment [8]. According to AlSheef et al.'s research, 10.8% and 11.5% of Saudi dentists stated that they would prescribe a laboratory test for patients using clopidogrel or aspirin. (10) Based on available data, local hemostatic agents can be used to control bleeding during minor surgical procedures and the risk of thromboembolism exceeds the risk of bleeding [5]. According to Alabdulkarim and Ramalingam (2022), while dental students are aware of the risks associated with anticoagulant medications, they often lack the practical knowledge and confidence necessary to effectively manage these patients [11]. This highlights the importance of enhancing the dental curriculum to provide more comprehensive education and training. Similarly, Kelly et al. (2023) underscores the same issue, stressing the need for improved educational frameworks to prepare students for these challenges [12]. Additionally, Al-Omair et al. (2024) explored the compliance of Saudi patients undergoing long-term oral anticoagulant therapy, revealing that despite patients' awareness of their medication's importance, the complexity of regimens and monitoring posed significant challenges. The study suggests that better patient education and support are crucial for improving adherence and ensuring safety during dental procedures [13]. This research helps to improve the quality of care by knowing the level of awareness and knowledge on anticoagulant medication management in dental treatment.

There have been few studies that have been published in regards to this topic in Saudi Arabia. The main objective of this study was to measure the knowledge level among dental students and dental practitioners in the region of Saudi Arabia about patients undergoing anticoagulant therapy and dental considerations in the procedure of teeth extraction.

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Methodology:

Study Design and Setting:
This cross-sectional study, conducted during 2024, is based on a structured questionnaire developed by the authors to evaluate the knowledge and awareness of dental students, interns, and dentists in Saudi Arabia regarding the management of patients undergoing anticoagulant therapy for surgical extraction under local anesthesia.

Participants, Recruitment, and Sampling Procedure:
Participants in this study include dental students, interns, and practicing dentists from various regions across Saudi Arabia. Recruitment conducted through a structured questionnaire designed to collect data on their knowledge and awareness regarding the management of patients on anticoagulant therapy. A stratified sampling method employed to ensure representation from different educational stages and geographical regions.

Sample size:
To determine the minimum number of respondents required for a representative sample of the entire population, we calculated the sample size using the Raosoft sample size calculator. With an indicator percentage of 0.50, a margin of error of 5%, and a 95% confidence interval (CI), the sample size needed was found to be 385.

Method for data collection and instrument (Data collection Technique and Tools):
Scoring system: Analyzes and entry method: This proposal outlines a scoring system based on Bloom's taxonomy for evaluating responses to a Dental Practice Survey. The survey gathers demographic data, including gender, age, region, occupation, and years of practice. Study questions focus on respondents' awareness and management of patients on oral anticoagulant medications (OAM), with specific attention to their knowledge, comprehension, and application of best practices. Each response is scored according to its alignment with evidence-based guidelines, with higher scores awarded to answers demonstrating a deeper understanding and correct application of dental care protocols for patients on OAM. This approach ensures a comprehensive assessment of practitioners' preparedness and adherence to recommended practices in managing OAM patients in a dental setting.

Scoring system:
In total, the survey comprised 23 questions designed to evaluate participants' demographics, knowledge, and practices regarding dental care in patients taking oral anticoagulant medications. The survey included 5 questions addressing demographic information, 13 questions assessing knowledge, and 5 questions focused on clinical practices. Participants were awarded points based on their responses: correct answers received 1 point, while incorrect answers or responses indicating uncertainty received 0 points. The scoring utilized a Likert scale, incorporating Dichotomous, Three-Point, and Quality

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Scales. The maximum achievable score was 21 points, which was categorized into three levels: low (0-9 points), moderate (10-13 points), and high (14-21 points). This classification allowed for a clear distinction between participants with varying levels of knowledge and awareness in managing patients on oral antithrombotic medications.

Analyzes and entry method:
The questionnaire was distributed on 20 individuals and asked to fill it. This was done to test the simplicity of the questionnaire and the feasibility of the study. Data of the pilot study was excluded from the final data of the study. Collected Data was entered on the computer using the Microsoft Excel program (2021) for windows. Data was then transferred to the Statistical-Package of Social-Science Software (SPSS) program, version 20. To be statistically analyzed.

Results:
Table (1) displays various demographic parameters of the participants with a total number of (474). The mean age of participants was 25.7 years, with a good proportion (about 61.2%) located in the 23–25 age group, indicating that this sample is dominated by younger individuals. Overall, gender distribution is more male than female (58.0%) versus female (42.0%) indicating possible gender implications for the dental education and practice environment. Regional distributions show that there were more participants from the Central (36.7%) and Western (31.2%) regions, perhaps due to regional access to dental programs or differences in local demographics. A large majority of them are either general practitioners (41.6%) or interns (20.5%) and have a long experience in dentistry because they represent 83.3% either of whom has been practicing for less than 5 years.

Table (1): Sociodemographic characteristics of participants (n=474)

Parameter		***No.***	***Percent (%)***
Age (Mean:25.7, STD:4.1)	23 or less	120	25.3
	24 to 25	170	35.9
	26 to 27	70	14.8
	28 or more	114	24.1
Gender	Female	199	42.0
	Male	275	58.0
Residential region	Northern Region	90	19.0
	South Region	34	7.2
	Central Region	174	36.7
	Eastern Region	28	5.9
	Western Region	148	31.2
Occupation	1st year in Dental College	8	1.7
	2nd year in Dental College	16	3.4
	3rd year in Dental College	17	3.6

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	4th year in Dental College	52	11.0
	5th year in Dental College	29	6.1
	General Practitioner	197	41.6
	Intern	97	20.5
	Resident	49	10.3
	Specialist	9	1.9
How long have you been practicing Dentistry?	1-2 years	193	40.7
	3-5 years	202	42.6
	6-10 years	69	14.6
	More than 15 years	10	2.1

As shown in figure 1, Insightful trends emerge from this data regarding the frequency of consultations related to patients on oral antithrombotic medications within a population of 474 respondents. Notably, a significant portion (46.5% n=223) reported consulting one or two times a year which suggests a less frequent, however perhaps influential interaction with this patient group. However, 19.6% (n=93) of respondents reported daily consultations which indicated the use of consistent and ongoing management of a subset of patients. Reports on monthly and weekly consultations were given 19.4% (n=92) and 13.9% (n=66), respectively. All these figures, taken together, highlight the different levels of engagement of healthcare professionals.

Figure (1): Illustrates rate of consultation on oral antithrombotic medications among participants.

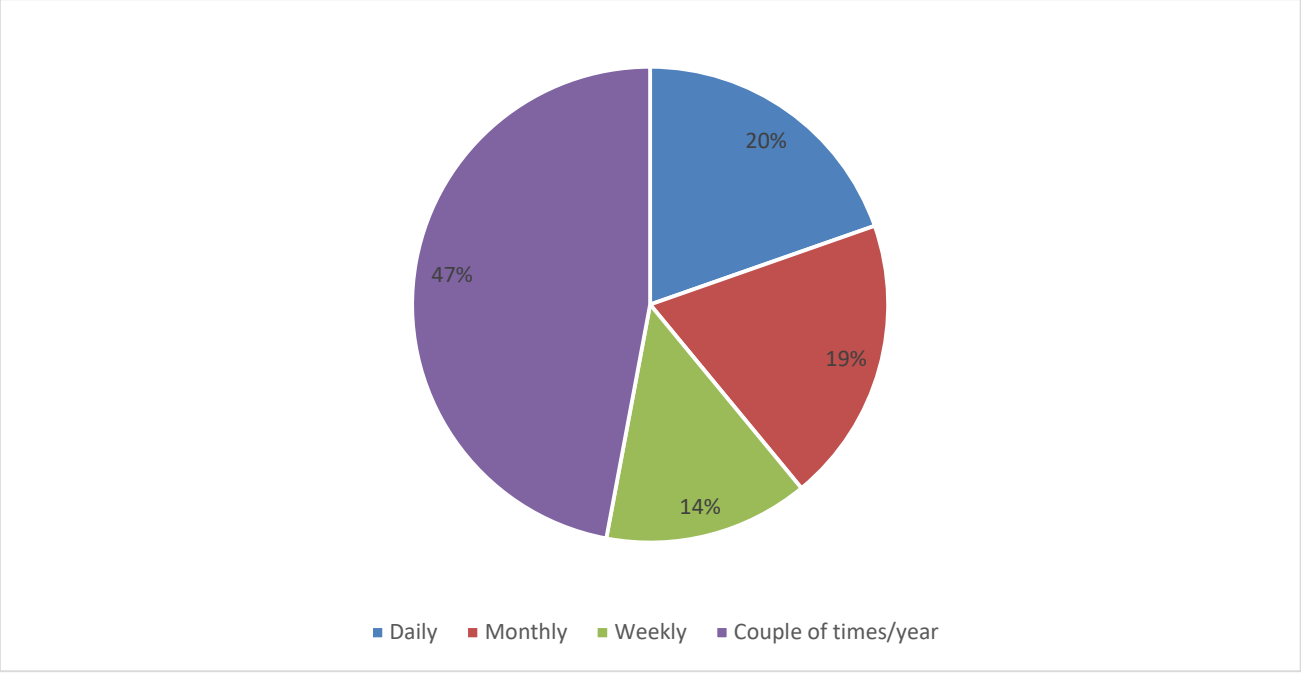

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Table 2 presents valuable data about professionals' knowledge and practices related to the management of patients on anticoagulant therapy, in particular with oral antithrombotic medications (warfarin and clopidogrel). However, reported encounters with patients on these medications were, rather, notable inasmuch as a substantial majority (78.3%) of practitioners surveyed had encountered them, making it clear that there is a great need of awareness and of proper management strategies. Consultations about these patients were somewhat variable and a large part (47.0%) consulted only a few times per year, perhaps signifying a gap between ongoing patient management. This is corroborated by the fact that the majority of practitioners (78.9%) habitually order blood investigations while making the patient workups. In addition, this overwhelming consensus (95.4%) that practice guidelines for the management of dental care in anticoagulated patients exist is a strong call for standard guidelines to improve patient outcomes and reduce risks associated with dental procedures in anticoagulated patients.

Table (2): Parameters related to knowledge in the management of patients undergoing anticoagulant therapy (n=474).

Parameter		***No.***	***Percent (%)***
In your dental practice, do you see patients taking oral antithrombotic medications like warfarin or clopidogrel?	No	103	21.7
	Yes	371	78.3
If yes; how often do you consult on a patient on oral antithrombotic medications?	Daily	93	19.6
	Monthly	92	19.4
	Weekly	66	13.9
	Couple of times/year	223	47.0
Where have you been practising dentistry? (Multiple answers possible) *	Government hospital	169	35.7
	Private clinic	132	27.8
	University hospital	328	69.2
	Corporate hospital	14	2.9
What are the prescribed Oral Anticoagulant Medications that you are aware of?	Aspirin/clopidogrel	227	47.9
	Heparin	26	5.5
	Warfarin/coumarin	213	44.9
	Others	8	1.7
Do you routinely ask for blood investigations during your overall workup of patients on Oral Anticoagulant Medications?	No	100	21.1
	Yes	374	78.9
If yes; please specify the investigation you recommend. (Multiple answers possible) *	Bleeding time/clotting time	226	47.7
	Complete blood count	102	21.5
	Prothrombin time/Activated partial thromboplastin	314	66.2

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	time/International normalized ratio (INR)		
	Others	75	15.8
Regardless of the patient's Oral Anticoagulant Medications; will you proceed with the dental procedure if the blood tests are within therapeutic limits?	No	81	17.1
	Yes	393	82.9
Prior to extraction; consultation with the patient's physician?	Any medical practitioner	30	6.3
	Colleague	19	4.0
	Not applicable (I do not consult anyone)	34	7.2
	Primary physician of the patient	371	78.3
	Others	20	4.2
For what procedures would you like to stop the Oral Anticoagulant Medications (Multiple Choices Available) *	Endodontic procedures	64	13.5
	Extraction (<three teeth/visit)	269	56.8
	Subgingival scaling	125	26.4
	Surgical procedures (periodontal, implants, impaction, multiple teeth extraction (>three teeth/visit)	397	83.8
	None of the above	47	9.9
What would you do if a non-invasive dental procedure (e.g.; restoration) is required for patients on Oral Anticoagulant Medications?	Deny treatment	43	9.1
	Proceed with the necessary treatment without stopping the drug	299	63.1
	Refer the patient for an opinion prior to the procedure	115	24.3
	Stop the drug on your own and continue with the procedure	17	3.6
What would you do if an invasive dental procedure (procedures where bleeding is likely to be encountered) is required for patients on Oral Anticoagulant Medications?	Deny treatment	61	12.9
	Proceed with the necessary treatment without stopping the drug	47	9.9
	Refer the patient for an opinion prior to the procedure	340	71.7
	Stop the drug on your own and continue with the procedure	26	5.5
Do you think a practice guideline is necessary: Management of dental and	No	22	4.6
	Yes	452	95.4

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oral surgical care for Oral Anticoagulant Medications patients in a Saudi Arabian setting?			
Dental extraction on VKAs (warfarin; acenocoumarol) with INR in the therapeutic range	No I would consult a cardiologist	166	35.0
	Yes	187	39.5
	Yes but with cessation of both drug	42	8.9
	Yes but with cessation of one drug	79	16.7

Results may overlap

As shown in figure (2), The data presented regarding abstinence from aspirin for seven days before extraction is very valuable. 274 (58.1%) of 474 participants declared not to abstain from aspirin, and 155 (32.7%) said they did abstain from it. Among the remaining 111 participants who constitute about 23.4 percent of all respondents, not surprisingly, there is uncertainty as to their aspirin usage in the week prior to extraction.

Figure (2): Illustrates pre-extraction abstinence from aspirin among participants.

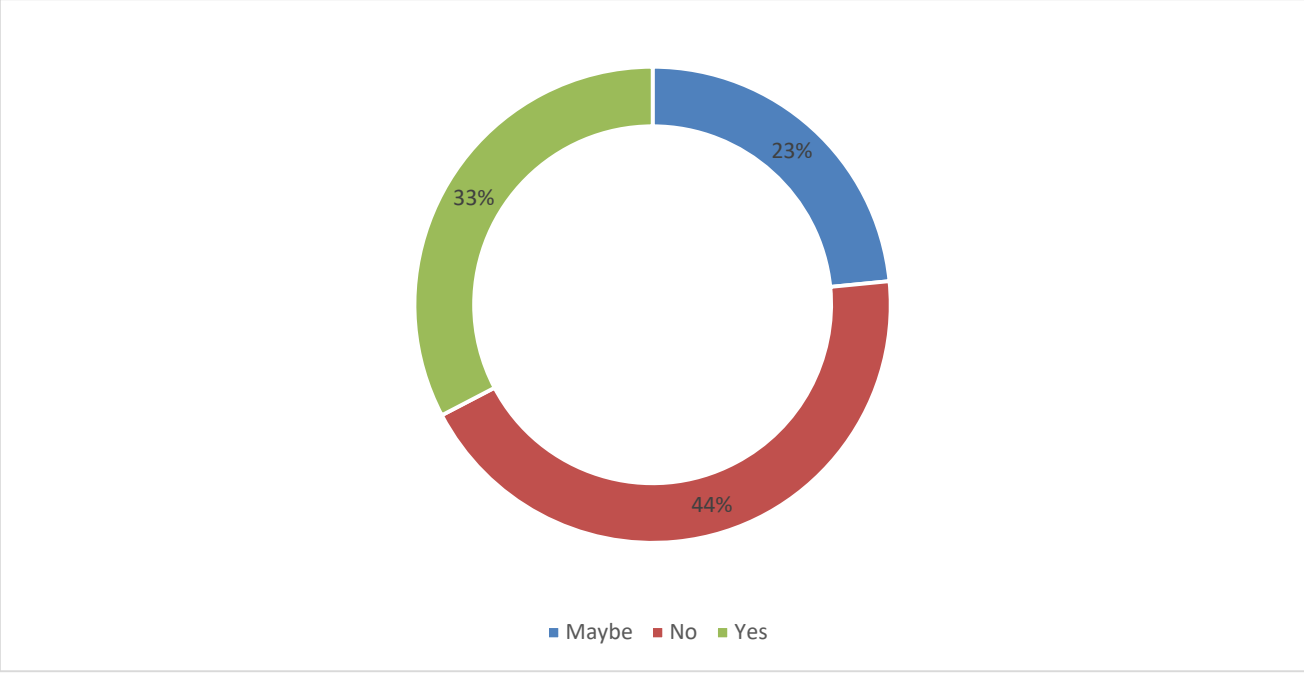

Table 3 shows that 474 participants have access to data on the clinical practices of those managing patients on anticoagulant treatment. A large number of participants, 43.9%, do not require abstinence from aspirin for seven days prior to dental extractions, which concerns the possibility of bleeding during procedures. Notably, the vast majority (79.1%) indicate that a large majority (LMA, 79.1%) considers INR levels relevant to certain medical conditions, or are aware of the importance of monitoring coagulation status. The participants appear to know the heparin antidote, with just 55.5% identifying

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protamine sulfate as the proper antidote, although a worrying 11.2% did not respond. Additionally, the percentages checking for postoperative clot formation ranged from 71.3% who do so routinely to 88.0% who do so sometimes. In terms of the INR dependability timeframe, most participants agreed that almost half (47.3%) indicated a 48-hour window is critical to the safety of patients receiving anticoagulant therapy.

Table (3): participants' clinical practice in the management of patients undergoing anticoagulant therapy (n=474).

Parameter		***No.***	***Percent (%)***
Abstinence from aspirin for seven days prior to extraction?	Maybe	111	23.4
	No	208	43.9
	Yes	155	32.7
INR levels for different medical conditions?	No (Not considered)	99	20.9
	Yes (Considered)	375	79.1
Familiarity with the heparin antidote?	Not mentioned	53	11.2
	Protamine sulfate	263	55.5
	Vitamin K	158	33.3
Postoperative clot formation checked?	No	41	8.6
	Yes	338	71.3
	Sometimes	95	20.0
Time range for dependability of the International normalized ratio esteem before extraction in patients getting vitamin K antagonist?	Till 24 hours	150	31.6
	Till 48 hours	224	47.3
	Till 5 days	64	13.5
	Till 7 days	36	7.6

The authors present data from Table 4 showing levels of the knowledge and awareness regarding management of patients on anticoagulant therapy amongst a sample of 474 people. Most score a moderate knowledge level, amounting to 51.1 percent of participants, indicating a great deal of knowledge, but also an opportunity for additional education and training. In contrast, 30.6% show excellent knowledge while 18.4% have little knowledge at all.

Table (4): Shows knowledge and awareness in the management of patients undergoing anticoagulant therapy score results.

	Frequency	**Percent**
High level of knowledge	145	30.6

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Moderate knowledge level	242	51.1
Low knowledge level	87	18.4
Total	474	100.0

Table (5) shows that knowledge in the management of patients undergoing anticoagulant therapy has statistically significant relation to age (P value=0.0001), occupation (P value=0.003), duration of dentistry practice (P value=0.001). It also shows statistically insignificant relation to gender.

Table (5): Relation between knowledge in the management of patients undergoing anticoagulant therapy and sociodemographic characteristics.

Parameters		***Knowledge level***		***Total (N=474)***	***P value****
		High level of knowledge	**Moderate or low knowledge**		
Gender	Female	57	142	199	0.434
		39.3%	43.2%	42.0%	
	Male	88	187	275	
		60.7%	56.8%	58.0%	
Age	23 or less	20	100	120	0.0001
		13.8%	30.4%	25.3%	
	24 to 25	50	120	170	
		34.5%	36.5%	35.9%	
	26 to 27	28	42	70	
		19.3%	12.8%	14.8%	
	28 or more	47	67	114	
		32.4%	20.4%	24.1%	
Region of residence	Northern Region	12	78	90	0.0001
		8.3%	23.7%	19.0%	
	South Region	12	22	34	
		8.3%	6.7%	7.2%	
	Central Region	67	107	174	
		46.2%	32.5%	36.7%	
	Eastern Region	4	24	28	
		2.8%	7.3%	5.9%	
	Western Region	50	98	148	
		34.5%	29.8%	31.2%	
Occupation	1st year in Dental College	0	8	8	0.003
		0.0%	2.4%	1.7%	

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	2nd year in Dental College	0	16	16	
		0.0%	4.9%	3.4%	
	3rd year in Dental College	8	9	17	
		5.5%	2.7%	3.6%	
	4th year in Dental College	12	40	52	
		8.3%	12.2%	11.0%	
	5th year in Dental College	4	25	29	
		2.8%	7.6%	6.1%	
	General Practitioner	66	131	197	
		45.5%	39.8%	41.6%	
	Intern	30	67	97	
		20.7%	20.4%	20.5%	
	Resident	21	28	49	
		14.5%	8.5%	10.3%	
	Specialist	4	5	9	
		2.8%	1.5%	1.9%	
How long have you been practicing Dentistry?	1-2 years	58	135	193	0.001
		40.0%	41.0%	40.7%	
	3-5 years	54	148	202	
		37.2%	45.0%	42.6%	
	6-10 years	33	36	69	
		22.8%	10.9%	14.6%	
	More than 15 years	0	10	10	
		0.0%	3.0%	2.1%	

P value was considered significant if ≤ 0.05.

Discussion:

The purpose of the present study was to determine the knowledge and awareness of dental students, intern dentists and practicing dentists in Saudi Arabia regarding patients undergoing oral anticoagulant therapy and particularly the management of dental procedures such as tooth extractions. As anticoagulant therapy continues to increase in prevalence, so too do the risks to patients of bleeding during dental procedures and dental professionals need to have sufficient knowledge regarding ways to prevent or mitigate this bleeding. This study reveals important information about current state of knowledge in dental practitioners and identifies the gaps in their knowledge where further training and education is needed.

In our study, there we found 51.1% of participants exhibited moderate knowledge to managing patients on anticoagulant therapy and 30.6% showed excellent knowledge. This is consistent with previous work by Alabdulkarim and Ramalingam, who found that dental students knew of such risks, but were not suitably informed regarding the management of it [14]. As Curto et al. had also pointed out, dental

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students should be better prepared to manage dental patients on anticoagulants using improved educational frameworks [15]. Our study findings reinforce the need for greater education in the dental curricula on these knowledge and confidence gaps.

But here's a notable finding from our research: 58.1 percent of respondents didn't follow the advice to discontinue aspirin 7 days before dental extractions. This is important, as it puts up the risk for greater bleeding problems during procedures. This is in accordance with Manfredini et al's findings that it is not adhering to a certain approach in the management of anticoagulation during dental extractions can cause complications [16]. Moreover, our findings revealed that whilst 79.1% of our participants understood the relevance of monitoring INR levels, only 55.5% of our participants were correct in their interpretation of protamine sulphate as the antidote to heparin, thus closing a gap in understanding that could lead to patient safety risks. The lack of understanding is equivalent with the study of Ibdah el al who found a large group of dentists not aware of the recent guidelines for treatment of patients on anticoagulants [17].

Additionally, the study had shown that 78.9 percent of respondents conducted routine blood investigations when ordering patients workups, an encouraging finding that patients of patients on anticoagulant therapy are being aware of the need of careful monitoring of patients. Nevertheless, as is true for 47.3% of respondents, they believe a 48 hour window is required to develop INR as 'reliable.' Of particular concern are that the literature suggests that INR should be measured on the day of the procedure in order to achieve values within the therapeutic range [18]. Our findings contrast with the current guidelines and underscore the requirement for targeted educational efforts to enhance the ability of dental professionals to perform anticoagulation management in accordance with recommended practices.

Moreover, the study identified a significant relationship between knowledge levels and factors such as age, occupation, and duration of dental practice, while no significant relationship was found concerning gender. This finding is consistent with previous studies that have reported variations in knowledge and attitudes towards anticoagulation management based on professional experience and educational background [19]. For instance, the research conducted by Foo et al. in Western Australia found that general dentists exhibited varying levels of knowledge regarding the management of patients on anticoagulant therapy, emphasizing the need for ongoing education tailored to different levels of experience [19]. Our findings suggest that educational interventions should be stratified based on the professional experience of dental practitioners to maximize their effectiveness.

While our study provides valuable insights into the knowledge and practices of dental professionals regarding anticoagulant therapy, it is not without limitations. The cross-sectional design of the study limits the ability to draw causal inferences regarding the relationship between knowledge and practice. Additionally, the reliance on self-reported data may introduce bias, as participants may overestimate their knowledge and adherence to guidelines. Furthermore, the study's sample was drawn from specific regions in Saudi Arabia, which may limit the generalizability of the findings to the broader population of dental practitioners in the country.

Furthermore, knowledge levels were found to be significantly related to such factors as age, occupation, and dental practice time, but not to gender. Previous research had reported the variations in knowledge

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and attitude regarding the management of anticoagulation among professionals with different background and experience [19], consistent with the finding. For example, in Western Australia, Foo et al. demonstrated that general dentists had different levels of knowledge about managing patients on anticoagulant therapy and this necessary requires an ongoing dental education that is tailored to different levels of experience.[19] Our results suggest that educational interventions are most effective when stratified by professional experience of the dental practitioners.

Our study offers important insights into the understanding and practice of dental professionals regarding anticoagulant therapy, however, as with any such study, there are limitations. The cross-sectional design of the study does not allow us to make causal inferences about the effect of knowledge on practice. Additionally, dependence on self-reported data may introduce a bias due to the participants overreporting the knowledge and adherence to guidelines. Additionally, a small sample of the study was limited to selected regions in the kingdom of Saudi Arabia that may not represent the nursing population of dental practitioners in Saudi Arabia.

Conclusion:

This study's findings show that there are wide gaps in knowledge and awareness among the dental students and practitioners of these patient's management on the anticoagulant therapy. The results support the call for improved, more sophisticated educational frameworks in dental curricula to prepare future practitioners more effectively to manage anticoagulated patients. Filling these gaps will enhance patient safety and outcomes during dental procedures which will continue to enhance the quality of care to patients on anticoagulant therapy.

Acknowledgement:

Special thanks to the Deanship of Scientific Research (DSR) and the Faculty of Dentistry at King Abdulaziz University, Jeddah, for supporting this project.

Ethical approval

An informed consent was obtained from each participant after explaining the study in full and clarifying that participation is voluntary. Data collected were securely saved and used for research purposes only.

Funding

There was no external funding for this study.

Conflict of interests

The authors declare no conflict of interest.

Informed consent:

Written informed consent was acquired from each individual study participant.

ISSN:1624-1940
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Data and materials availability

All data associated with this study are present in the paper.

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