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Knowledge and Practice of Dentists Regarding Prescribing of Nonsteroidal Anti-inflammatory Drugs (NSAIDs) in Yemen: A Cross-sectional Analysis

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Abstract:
Nonsteroidal anti-inflammatory drugs (NSAIDs) are crucial in dental therapy, as they effectively control pain and inflammation following dental operations. Nevertheless, there is a dearth of study on the understanding of Yemeni dentists regarding the prescription of NSAIDs in their daily practice. This study aimed to address this knowledge gap by evaluating these parameters among dentists from Yemen. A cross-sectional survey was done between February and March 2023, with 123 Yemeni dentists recruited. Information was gathered from dentists working in either the private or public sectors in Aden and Taiz governorates, Yemen. Participants filled out an internet-based questionnaire using Google Forms which consisted of 12-items that evaluated their knowledge of the indications, contraindications, and side effects of NSAIDs in the field of dentistry. The data was examined using SPSS software, specifically version 26. The study recruited 123 participants, the majority were males (56.1%), young individuals (60.9%), with less than five years of professional experience (66.6%), and employed in private clinics (64.2%) with a low number of dental procedures performed on a weekly basis. Based on our results, NSAIDs were often given for dental pain after surgery (97.6%), tooth removal (83.7%), and periodontitis (71.5%). The majority of prescriptions had a duration of 5 to 10 days, accounting for 60.1% of cases. In addition, only 10.6% of dentists disclosed probable adverse effects to their patients. Even among patients who experienced negative effects, almost 50% reported merely gastrointestinal problems. Approximately 71.5% of dentists demonstrated a lack of understanding on the appropriate dosage of NSAIDs for children and pregnant women. This study revealed a concerning deficiency of knowledge among dentists on the appropriate dosage of NSAIDs among pregnant women and children. Although NSAID prescriptions were effective for addressing various types of dental pain, there was a significant deficiency in communicating the potential side effects. These findings emphasize the immediate necessity for educational programs for dental students and practicing dentists might enhance their understanding of evidence-based NSAID therapy.

Keywords: NSAIDs, Knowledge, Practice, Yemen, Dentists

دراسة معرفة أطباء الأسنان حول مضادات الالتهاب غير الاستيروتيدية في اليمن دراسة تحليلية مقطعية

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الملخص:
تُعتبر مضادات الالتهاب غير الاستيروتيدية ركيزة اساسية في طب الأسنان، حيث تُستخدم بشكل فعال في علاج الألم والالتهاب بعد الإجراءات الجراحية. ومع ذلك، تفتقر الأبحاث حول معرفة أطباء الأسنان اليمنيين فيما يتعلق بوصف مضادات الالتهاب غير الاستيروتيدية. تهدف هذه الدراسة إلى معالجة هذه الفجوة من خلال تقييم هذه الجوانب بين أطباء الأسنان اليمنيين.

طريقة البحث: كانت عن دراسة مقطعية شملت 123 طبيب أسنان يمني في الفترة من فبراير إلى مارس 2023م. تم جمع البيانات من أطباء الأسنان الذين يعملون في القطاع الخاص، عيادات خاصة، أو القطاع العام في مدينتي عدن وتعز باليمن، أكمل المشاركون استبيانًا عبر الإنترنت باستخدام استمارات Google. تألف الاستبيان من 12 سؤالًا لتقييم معرفة أطباء الأسنان بكيفية استخدام مضادات الالتهاب غير الاستيروتيدية وموانع استعمالها والآثار الجانبية المترتبة عليها، تم تحليل البيانات باستخدام برنامج SPSS الإصدار 26.

النتائج: من بين المشاركين البالغ عددهم 123، كان 56.1٪ من الذكور، و60.9٪ من الشباب، و66.6٪ لديهم خبرة أقل من خمس سنوات، و64.2٪ يعملون في العيادات الخاصة. تم وصف مضادات الالتهاب غير الاستيروتيدية بشكل متكرر، خاصة لعلاج الألم بعد الجراحة (97.6٪)، وخلع الأسنان (83.7٪)، والتهاب دواعم السن (71.5٪). تراوحت مدة الوصفات الطبية عادةً بين 5 و10 أيام (60.1٪). ومع ذلك، فإن النتيجة المهمة هي أن 10.6٪ فقط من أطباء الأسنان ناقشوا الآثار الجانبية المحتملة مع المرضى. وحتى بين الذين قاموا بذلك، كانت مشاكل الجهاز الهضمي هي التأثير الجانبي الوحيد الذي أقر به أكثر من نصفهم. يفتقر 71.5٪ من أطباء الأسنان إلى المعرفة حول جرعات مضادات الالتهاب غير الاستيروتيدية للأطفال والنساء الحوامل.

الخلاصة: كشفت هذه الدراسة عن نقص مقلق في فهم أطباء الأسنان لاستخدام مضادات الالتهاب غير الاستيروتيدية، خاصة فيما يتعلق بجرعات الأطفال والنساء الحوامل. على الرغم من أن وصفات مضادات الالتهاب غير الاستيروتيدية كانت مناسبة لاحتياجات مختلفة لتسكين الألم، إلا أن التواصل بشأن الآثار الجانبية المحتملة كان يفتقر بشدة. بالإضافة إلى ذلك، يبدو أن الوعي بالآثار الجانبية يقتصر بشكل أساسي على مشاكل الجهاز الهضمي. تؤكد هذه النتائج على الحاجة الملحة لتحسين التدريب والتعليم في هذا المجال. يمكن لجلسات التدريب الرسمية، سواء لطلاب طب الأسنان أو لأطباء الأسنان الممارسين، أن تسهم في تعزيز فهمهم لإدارة مضادات الالتهاب غير الاستيروتيدية بناءً على الأدلة بشكل كبير. ويجب تزويدهم باستراتيجيات فعالة للتواصل مع المرضى حول المخاطر والفوائد المحتملة لهذه الأدوية، مما يمكن أن يساعد في منع المضاعفات غير المرغوب فيها وضمان تقديم رعاية صحية مثالية للمرضى.

الكلمات المفتاحية: مضادات الالتهاب غير الاستيروتيدية، معرفة، تدريب، اليمن، أطباء الأسنان.

Introduction

Nonsteroidal anti-inflammatory drugs (NSAIDs) are widely used in global pharmacotherapy because they provide important advantages in alleviating pain, reducing fever, and combating inflammation [1]. The extensive utilization of these products is evident in a significant market valued at $15.58 billion in 2019 and projected to reach $24.35 billion by 2027 [2].

NSAIDs such as ibuprofen and aspirin are widely available over-the-counter (OTC) in approximately all countries, due to their safety and efficacy [3]. However, many types of NSAIDs are available in the market as an OTC and others available as prescriptions such as diclofenac, mefenamic acid, and naproxen which can be distinguished between them only by the high potential side effects [3].
To ensure the proper safety, and to avoid the potential adverse effects, all NSAIDs prescribers should follow the recommended guidelines [4]. The misuse of NSAIDs can result in majority of side effects e.g. peptic ulcers, GIT bleeding, hepatotoxicity, nephrotoxicity, and in severe overdose cardio toxicity [5, 6]. These adverse issues not only jeopardize individual healthcare professionals but also strain healthcare resources too.
The mechanism of NSAIDs is by blocking cyclooxygenase (COX) enzymes, which prevent the production of prostaglandins which then bloc both inflammation and pain [7]. Nowadays healthcare professionals prefer to prescribe new generation of NSAIDs called selective COX-2 inhibitors (COXIBs) e.g. celecoxib which only bloc only COX-2 enzymes to avoid GI side effects. However, the fact that some COXIBs have been taken off the market because of their role in the risk of the heart which has limited their use [8]. Aside from GI issues, NSAIDs can impact negatively many other organs, e.g. liver, cardiovascular system, kidney, inducing various other adverse effects [9].

Dentists often recommend NSAIDs to alleviate mild to moderate pain, especially after dental operations. This requires careful evaluation of patient-specific characteristics and possible adverse effects [10, 11]. Although there has been much international study on the knowledge and prescribing practices of NSAIDs in the field of dentistry, there are still limitations in certain countries, such as Yemen [12, 13].
Previous published research in some neighboring countries such as Saudia Arabia and Egypt have addressed the potential knowledge deficiencies among dental students, raising concerns about practicing dentists as well [14, 15]. This study aims to evaluate the knowledge and practice of Yemeni dentists regarding the prescribing and practice of NSAID, aiming to improve education and ensure optimal patient care while minimising complications associated with NSAID use.

Methods

Study design and setting

The author used a self-administered survey to enroll licensed dentists practicing in both private and public clinics in two Yemeni cities (Aden and Taiz) from February to March 2023. Only dental practitioners who were currently practicing, gave their consent for this study and did not include participants who were retired or not working in a hospital or clinical setting at the time of the study were included.

Data sampling

In order to sample data, the researcher recruited dentists with valid email addresses who had agreed to participate using Google Forms. For calculating minimum sample size, Raosoft online software was used taking into account 5% margin of error, 95% confidence interval, estimated population size of 500 dentists and expected response rate of 40%. This approach was aimed at ensuring diverse representativeness as well as optimizing response potential. At the end, there were 123 participants.

Data Collection Procedure

The paper-based questionnaire was distributed either face to face or via internet depending on participant's working environments where they would receive either link through email or whatsapp application. All dentists whether on line or. From February to March 2023, every dentist had been requested to give their feedback on the internet as well as through papers given at their clinics during the operating time. The writer asked all his respondents to return the forms in three weeks after they were filled. To ensure maximum response rates, the researcher sent reminders to non-respondents after two weeks. It takes about 15-20 minutes to complete the survey. This is an anonymous electronic survey conducted through Google Forms. Accompanied with the link of the survey was a consent form that explicitly explained the objectives of the study and ensured confidentiality. The questions are divided into two parts. The first part inquired simple demographic data about the dentist like; age, sex, years in service and location of practice clinics. The second section investigates knowledge and comprehension levels amongst practitioners regarding NSAIDs using multiple-choice questions only. Questions probed their understanding for correct use of NSAIDs such as situations where they are suitable, proper dosage, potential harmful effects and interactions any other medication.

Ethical Approval

All subjects signed the informed consent document before their participation in the study. The research followed ethical principles and Helsinki Declaration. Ethics approval number MEC No (MEC /AD017) was granted by University of Science and Technology – Aden – Yemen).

Data Analysis

The collected data undergoes a comprehensive analysis process using SPSS version 26. We used descriptive statistics to summarise the demographic information. We reported the proportion of correct answers to each question in the knowledge section. We also examined attitudes using frequency analysis and measures of central tendency.

Development and Validation

The study utilised a validated 12-item questionnaire originally developed and verified in a Qatari study [17] to assess dentists' knowledge, practices, and perspectives on NSAID use. We modified and translated this item into Arabic, resulting in a final version that included two sections:

1. **Demographics**

- Gender
- Age
- Location
- Years of professional experience

2. **Knowledge of NSAID Adverse Effects**

This section assessed dentists' understanding of the potential adverse effects of NSAID use. It also examined the current practices of dentists when prescribing NSAIDs, including

- Frequency of NSAID prescriptions
- Indications for an NSAID prescription
- The patient's experience with NSAID side effects

Data Analysis

Frequency of NSAID prescriptions

1. How many dental procedures do you perform each week that typically require NSAID prescriptions? The responses ranged from approximately five procedures to more than five.

Duration of NSAID Prescriptions

2. For what average duration (in days) do you typically prescribe NSAIDs following dental procedures?

NSAID Selection for Pain Intensity

3a. For mild dental pain, which NSAIDs do you most commonly prescribe? (Select all that apply.)

- a) Ibuprofen b) Ketoprofen c) Aspirin d) Diclofenac e) Paracetamol f) Ketorolac g) Piroxicam, Meloxicam

3b. For moderate dental pain, which NSAIDs do you most commonly prescribe? (Select all that apply)

- a) Ibuprofen b) Ketoprofen c) Aspirin d) Diclofenac e) Paracetamol f) Ketorolac g) Piroxicam, Meloxicam

3c. For severe dental pain, which NSAIDs do you most commonly prescribe? (Select all that apply)

- a) Ibuprofen + Ketoprofen b) Aspirin c) Tramadol d) Diclofenac + Tramadol e) Paracetamol +Tramadol f) Naproxen g) Piroxicam, Meloxicam + Tramadol

Comparison with Overall Prescribing Patterns

4. Considering all dental procedures, which NSAIDs have you prescribed most frequently during the past year? (Select all that apply)
    - a) Ibuprofen b) Ketoprofen c) Aspirin d) Diclofenac e) Paracetamol f) Ketorolac g) Piroxicam, Meloxicam

Formulation Preference

5. Do you typically prescribe NSAIDs in oral, topical, or intravenous formulations? (Select one)
    - a) Oral
    - b) Topical
    - c) Intravenous

Switching NSAIDs for Side Effects

6. Do you ever switch patients from one NSAID to another due to side effects? (Yes/No)
    - If so, how often does it happen? (Select one)
        - i) Rarely
        - ii) Occasionally
        - iii) Frequently

Prescribing for Special Populations

7. For pregnant women requiring dental procedures, which NSAID (if any) do you typically prescribe?
    - a) Ibuprofen b) Ketoprofen c) Aspirin d) Diclofenac e) Paracetamol f) Ketorolac g) Piroxicam, Meloxicam
    - h) None
8. For paediatric patients requiring dental procedures, which NSAID (if any) do you typically prescribe?
    - a) Ibuprofen b) Ketoprofen c) Aspirin d) Diclofenac e) Paracetamol f) Ketorolac g) Piroxicam, Meloxicam
    - h) None

Confirmation of Adverse Effects

9. Have any of your patients reported experiencing adverse effects as a result of NSAID treatment? (Yes/No)
10. Based on clinical practice, what are the most frequent side effects associated with NSAID use?

a) GIT b) Ringing in the ears c) indigestion d) Dizziness e) high blood pressure f) headache g) salt and fluid retention

Results

A total of 123 Yemeni dentists participated in the study. The majority were adults under 30 years old (75, 60.9%), with females slightly outnumbering males (54 females, 43.9% vs. 69 males, 56.1%). Most dentists worked in private settings (64.2%) and had less than 5 years of experience (66.6%).

Table 1. Demographic Distribution of Participants (n = 123)**.**

Variables		N (%)
Age group	≤ 30 years	75 (60.9%)
	≥ 30 years	48 (39.1%)
Gender	Female	69 (56.1%)
	Male	54 (43.9%)
Year of Practice	≤ 5 years	82 (66.6%)
	≥ 5 years	41 (33.3%)
Working Area	Private	44 (35.8%)
	Public	79 (64.2%)

NSAID Prescribing Practices and Knowledge Deficits:

Patient Education:

- The majority of dentists, 82/123 (66.6%), reported performing less than five dental procedures per week.
- Most of the dentists, 75/123 (60.1%), reported prescribing NSAIDs for 5–10 days.
- The most common reasons for prescribing NSAIDs were post-surgical pain (120/123, 97.6%), tooth extraction (103/123, 83.7%), and periodontitis (88/123, 71.5%).

Prescribing Patterns:

- Ibuprofen 99/123 (80.5%), diclofenac 42/123 (30.1%), and paracetamol 40/123 (32.5%) were the most frequently prescribed medications.
- Among patients with mild pain, ibuprofen was the most commonly prescribed NSAID (99/123, 80.5%), followed by paracetamol (52/123, 42.2%). For moderate pain, ibuprofen remained the most frequent NSAID prescription (55/123, 44.7%), followed by diclofenac (42/123, 30.1%). In cases of severe pain, the most commonly prescribed medications were the combination of tramadol and paracetamol (36/123, 29.3%) and tramadol alone (35/123, 28.4%).
- The most common NSAID formulations prescribed were oral 120/123 (97.6%), followed by intravenous 3/123 (2.4%), and no one 0/123 (0%) declared using topical forms.

Indications for NSAID Use:

- Common reasons for prescribing NSAIDs included tooth extraction, implant surgery, pain management, periodontitis, and dental infections.

Knowledge Gaps:

- A significant portion of dentists reported that 35/123 (28.5%) were aware of the correct dose for children and pregnant women.
- Interestingly, the group that informed patients about NSAIDs, 22 out of 35 (62.9%), demonstrated lower knowledge regarding the following:
    - Specific side effects
    - Maximum daily doses for adults and children

Knowledge Highlights:

- Only 13/123 (10.6%) of the participants informed dentists about NSAIDs' side effects.
- Slightly more than half (7/13) (53.9%) of participants correctly identified the gastrointestinal side effects of NSAIDs.

Experience and Switching Practices:

- Fifty-three dentists (43.1%) reported switching NSAID prescriptions due to adverse effects within the past two years.

Table 2: Knowledge and Practice regarding NSAIDs among dentists (n = 123).

Items	Option 1	Option 2	Option 3	Option 4
1. How many dental procedures do you perform each week that typically require NSAID prescriptions? (Select one)	≤ 5 procedures 82 (66.6%)	≥ 5 procedures 41 (32.6%)		
2. For what reason you prescribe NSAIDs? (Select all that apply)	Tooth extraction 103 (83.7%)	Implant surgery 90 (73.1%)	Pain management 120 (97.6%)	
	Periodontitis 88 (71.5%)	Dental infections 65 (52.4%)	Post-surgical pain 120 (97.6%)	
3. For what average duration (in days) do you typically prescribe NSAIDs following dental procedures? (Select one)	5 days 35 (28.5%)	5-10 days 75 (60.1%)	≥ 10 days 13 (10.4%)	
4a. For mild dental pain, which NSAIDs do you most commonly prescribe? (Select all that apply)	a) Ibuprofen 99 (80.5%)	b) Ketoprofen 35 (28.5%)	c) Aspirin 10 (8.1%)	d) Diclofenac 29 (23.5%)
	e)Paracetamol 52 (42.2%)	f) Naproxen 6 (4.9%)	g) Piroxicam, Meloxicam 10 (8.1%)	
4b. For moderate dental pain, which NSAIDs do you most commonly prescribe? (Select all that apply)	a) Ibuprofen 55 (44.7%)	b) Ketoprofen 15 (12.2%)	c) Aspirin 10 (8.1%)	d) Diclofenac 42 (30.1%)
	e) Paracetamol 40 (32.5%)	f) Naproxen 15 (12.2%)	g) Piroxicam, Meloxicam 17 (13.8%)	
4c. For severe dental pain, which NSAIDs do you most commonly prescribe? (Select all that apply) (Select all that apply)	a) Ibuprofen + Ketoprofen 28 (22.7%)	b) Tramadol 35 (28.4%)	c) Aspirin 8 (6.5%)	d) Diclofenac + Tramadol 10 (8.1%)
	e) Tramadol + Paracetamol 36 (29.3%)	f) Naproxen 18 (14.6%)	g) Piroxicam, Meloxicam + Tramadol 3 (2.4%)	
5. Considering all dental procedures, which NSAIDs have you prescribed most frequently during the past year? (Select all that apply)	a) Ibuprofen 88 (71.5%)	b) Ketoprofen 65 (52.8%)	c) Aspirin 52 (42.2%)	d) Diclofenac 72 (58.5%)
	e)Paracetamol 101(82.1%)	f) Naproxen 43 (34.9%)	g) Piroxicam, Meloxicam 32 (26%)	
6. Do you typically prescribe NSAIDs in oral, topical, or intravenous formulations? (Select one)	a) Oral 120 (97.6%)	b) Topical 0 (0%)	c) Intravenous 3 (2.4%)	
7. Do you ever switch patients from one NSAID to another due to side effects?	a) Yes 53 (43.1%)	b) No 70 (56.9%)		
○ **If yes, how often does this occur? (Select one)**	i) Rarely 60 (48.8%)	ii) Occasionally 35 (28.5%)	iii) Frequently 28 (22.8%)	
8. For pregnant women requiring dental procedures, which NSAID (if any) do you	a) Ibuprofen 55 (44.7%)	b) Ketoprofen	c) Aspirin 36	d) Diclofenac

typically prescribe? (Select all that apply)		28 (22.7%)	(29.3%)	32 (26%)
	e)Paracetamol 30 (24.4%)	f) Naproxen 22 (17.9%)	g) Piroxicam, Meloxicam 12 (9.8%)	
9. For pediatrics requiring dental procedures, which NSAID (if any) do you typically prescribe? (Select all that apply)	a) Ibuprofen 52 (42.3%)	b) Ketoprofen 10 (8.1%)	c) Aspirin 0 (0%)	d) Diclofenac 18 (14.6%)
	e)Paracetamol 88 (71.5%)	f) Naproxen 22 17.9%)	g) Piroxicam, Meloxicam 9 (7.3%)	
10. Have any of your patients reported experiencing adverse effects associated with NSAID treatment? (Select one)	a) Yes 13 (10.6%)	b) No 110 (89.4%)		
11. Based on clinical practice, what are the most frequent side effects associated with NSAID use? (Select all that apply)	a) GIT 7/13 (53.9%)	b) Dizziness 2/13 (15.3%)	c) indigestion 5/13 (38.7%)	d) Ringing in the ears 1/13 (7.6%)
	e) high blood pressure 0 (0%)	f) Headache 5 /13 (15.3%)	g) salt & water retention 0 (0%)	
12. Are you aware about the side effects, mechanism of action, indications for use, and maximum daily doses of NSAIDs for pregnant women and children?	a) Yes 35 (28.5%)	b) No 88 (71.5%)		
13. Do you inform your patients about the side effects for NSAIDs and how to avoid them?	a) Yes 22/ 35 (62.9%)	b) No 13/35 (37.1%)		

Discussion

The results of this setting highlighted a good understanding that dentist practically used and prescribed NSAIDs more effectively in dental care after dental surgery few times weekly. Our data confirms Finsen et al. [18], who found that dentists provide less weekly treatments. This implies a transition to specialization or part-time dentistry. This trend may be influenced by financial concerns, career stage, or work-life balance. As orthodontics and oral surgery become more prevalent, dentists who specialize in these fields may perform less conventional dental procedures.

Our data indicated that most of the dentists prefer to prescribe NSAIDs for about 5-10 days. This finding aligns with the recommendation of the guideline in the treatment of pain following dental surgery [19]. According to the guideline the recommendation proved that one week is a suitable duration for removing the pain and decrease side effects too. The prevalence of ibuprofen as the most often prescribed NSAID validates the patterns identified in other studies. The widespread availability and proven effectiveness of this treatment in controlling oral pain are probable factors contributing to its popularity (e.g., Myers et al., [20]; American oral Association, [21]). Nonetheless, the excessive dependence on oral formulations needs more investigation into the potential benefits of other formulations, depending on the unique clinical circumstance. Intravenous nonsteroidal anti-inflammatory medicines (NSAIDs) may offer hastened pain relief for severe cases or those suffering trouble swallowing; however, topical NSAIDs applied directly to the affected location may lessen systemic side effects for localized pain or inflammation.

The findings of this study showed that dentists utilised NSAIDs to treat mild to moderate pain. These findings are consistent with earlier published research (Myers et al. [20] and the American Dental Association [21]), which indicated the use of NSAIDs depending on the level of pain. Ibuprofen reigns supreme for mild and moderate pain, followed by paracetamol and diclofenac. When pain grows more severe, the use of tramadol and paracetamol together, or tramadol alone, becomes more noticeable, in line with the findings of Ali et al. [22] for severe pain after surgery. But there are differences with studies by Pipalia et al. [23], who say that diclofenac might work just as well as ibuprofen for moderate pain, which could be because of differences in cost or location. Ibuprofen's prevalence is most likely due to its ease of use over the counter and documented effectiveness. Lower diclofenac use may indicate concerns about adverse effects or physician choice. The great incidence of tramadol for severe pain underlines its efficacy, but its dependency risk warrants care.

We discovered a substantial knowledge gap in NSAID dose for children and pregnant women. A large percentage of dentists (71.5%) lacked understanding in this field. This is consistent with studies by Pandey et al. [24] and Hoxha et al. [17], who found a lack of knowledge of NSAID usage in pregnant women. Targeted

educational interventions are required to ensure safe and effective dosage for these patient groups. Paediatric dosage requires careful consideration of age, weight, and unique health concerns, whilst pregnancy considerations include possible dangers to the growing baby.
The discovery that dentists who briefed patients about NSAIDs knew less about particular side effects and maximum dosages shows a possible gap between awareness and depth of knowledge. This supports the results of Hoxha et al. [17]. Dentists may be aware of the need of patient education, but often lack detailed understanding of side effects and dose guidelines. Training in excellent communication skills for sharing possible side effects with patients in a clear and simple way is essential.
Only a meagre 10.6% of participants disclosed the adverse effects of NSAIDs to their dentists, and a little 50% accurately identified gastrointestinal issues. This underscores the need of improving communication in two specific domains: the dialogue between dentists and patients, and the educational materials provided to patients. Dentists should prioritise the discussion of potential adverse effects with patients, ensuring that they understand the risks and are equipped to handle them. Providing patients with concise and instructive pamphlets or online resources on NSAIDs and their negative consequences might enhance their ability to make informed decisions about their prescriptions.

Within the last two years, more than half of dentists have reported changing their NSAID prescriptions due to adverse consequences. This result was lower than in earlier research [25], which showed that 37% of dentists switched NSAIDs owing to therapeutic effectiveness or probable adverse effects. This disparity suggests possible problems with underestimating of side effects or treatment measures. Dentists may be unaware of the possible adverse effects of NSAIDs, or they may fail to accurately analyse their patients' risk factors. Further information on techniques to control NSAID side effects, such as taking the lowest effective dosage or evaluating other drugs, may be useful.

Conclusion
This research revealed that dentists, although informing patients about NSAIDs, lacked awareness of particular adverse effects and proper dose for susceptible groups. The study also revealed poor patient communication about possible side effects. These results need a multifaceted approach, including focused teaching programmes for dentists on safe dosage and communication skills, as well as the creation of simple patient information materials. Future studies should investigate the impact of low operation volume, analyse prescription patterns based on dental specialisation or patient demographics, and explore dentist-patient communication about the detrimental effects of NSAIDs. To enhance patient care and results, it is crucial to rectify these deficiencies in understanding and address communication challenges associated with the use of dental NSAIDs. In order to comprehensively comprehend the use of NSAIDs in various healthcare settings and their impact on public health, it is essential for future study to investigate the knowledge and behaviours of other healthcare professionals.

Limitations and Future Research
Enhancing this study might be possible by obtaining information on the distinct areas of expertise of the dentists involved and their distribution based on the type of practice they are associated with (private practice or clinic). Subsequent studies could investigate the factors contributing to the low number of procedures performed and further analyze the differences in the prescription patterns of NSAIDs based on the dentist's specialization or the demographic characteristics of the patients. Moreover, doing research to explore the precise factors that contribute to dentists' decision not to disclose adverse effects to patients, together with the kind of the information conveyed, would be highly beneficial. In addition, the limited sample size of 123 participants restricts the capacity to generalize the findings. Future research might investigate these patterns' sources and the cost-effectiveness of analgesics for specific pain conditions.

Recommendation
Future research could involve conducting in-depth interviews with dentists to examine the rationale behind their prescription patterns and identify potential barriers to obtaining optimal usage of NSAIDs. Moreover, conducting a study on patient outcomes associated with the administration of NSAID drugs in dental facilities in Yemen may provide valuable insights into the effectiveness and safety of current methods.

Disclaimer
The article has not been previously presented or published, and is not part of a thesis project.

Conflict of Interest
There are no financial, personal, or professional conflicts of interest to declare.

References

1. Mullan J, Weston KMBA, Burns P, Mullan J, Rudd R. Consumer knowledge about over-the-counter NSAIDs: they don't know what they don't know. Aust New Zealand J Public Health. 2017;41(2):210.
2. Fortune Business Insights. NSAIDs Market to Reach USD 24.35 Billion by 2027; Surging Research on Selective Cyclooxygenase-2 Inhibitors to Boost Growth. 2020. https://www.globenewswire.com/news-release/2020/05/28/2040374/0/en/NSAIDs-Market-to-Reach-USD-24-35-Billion-by-2027-Surging-Research-on-Selective-Cyclooxygenase-2-Inhibitors-to-Boost-Growth-Fortune-Business-Insights.html#:~:text=Filings%20Media%20Partners-,NSAIDs%20Market%20to%20Reach%20USD%2024.35%20Billion%20by%202027%3B%20Surging,Growth%3A%20Fortune%20Business%20Insights%E2%84%A2. Accessed 13 Oct 2020.
3. Negm AA, Furst DE. Nonsteroidal anti-inflammatory drugs, disease-modifying antirheumatic drugs, nonopioid analgesics, & drugs used in Gout. In: Katzung BG, editor. Basic and Clinical Pharmacology. 14th ed. New York: McGraw-Hill; 2017.
4. Mazzarino M, Braganò MC, Donati F, de la Torre X, Botrè F. Effects of propyphenazone and other non-steroidal anti-inflammatory agents on the synthetic and endogenous androgenic anabolic steroids urinary excretion and/or instrumental detection. Anal Chim Acta. 2010;657(1):60–8.
5. Davis A, Robson J. The dangers of NSAIDs: look both ways. Br J Gen Pract. 2016;66(645):172–3.
6. Wazaify M, Hughes CM, McElnay JC. The implementation of a harm minimisation model for the identification and treatment of over-the-counter drug misuse and abuse in community pharmacies in Northern Ireland. Patient Educ Couns. 2006;64(1–3):136–41.
7. Gunaydin C, Bilge SS. Effects of Nonsteroidal Anti-Inflammatory Drugs at the Molecular Level. Eurasian J Med. 2018 Jun;50(2):116-121.
8. Borer JS, Simon LS. Cardiovascular and gastrointestinal effects of COX-2 inhibitors and NSAIDs: achieving a balance. Arthritis Res Ther. 2005;7 Suppl 4(Suppl 4):S14-22.
9. Bindu S, Mazumder S, Bandyopadhyay U. Non-steroidal anti-inflammatory drugs (NSAIDs) and organ damage: A current perspective. Biochem Pharmacol. 2020 Oct;180:114147.
10. Goodman LS. Goodman & Gilman's Pharmacological Basis of Therapeutics. McGraw-Hill, New York, NY, 2018. Guzmán-Álvarez R, Medeiros M, Lagunes LR, CamposSepúlveda AE. Knowledge of drug prescription in dentistry students. Drug Healthc Patient Saf, 2012; 4:55.
11. Kim SJ, Seo JT. Selection of analgesics for the management of acute and postoperative dental pain: a mini-review. J Periodontal Implant Sci. 2020 Mar 19;50(2):68-73.
12. Segura Egea JJ, Martín González J, Jiménez Sánchez MDC, Crespo Gallardo I, Saúco Márquez JJ, Velasco Ortega E. Knowledge and pattern of antibiotic and non narcotic analgesic prescription for pulpal and periapical pathologies-A survey among dentists. J Clin Diagn Res, 2014; 8(7):ZC10
13. Datta R, Grewal Y, Batth JS, Singh A. A survey of analgesic and anti-inflammatory drug prescription for oral implant surgery. Plast Aesthet Res, 2015; 2:51–5.
14. Alharbi AO, Almjayishi SA, Aldarwish RI, Almeshari MA, Aljumydi MT, Faraj RM. Knowledge About and the Use of Oral Nonsteroidal Anti-inflammatory Drugs Among Patients With Rheumatic Disorders in Saudi Arabia: A Cross-Sectional Study. Cureus. 2023 Nov 8;15(11):e48500.
15. Al-Wesabi, M. A., Al-Sanaani, S., & Al-Hajjawi, S. A. (2017). Drug Prescription Knowledge and Practices among Dental Students and Interns Enrolled in Selected Yemeni Universities. Yemen Journal of Medical Sciences, 11(1), 15-23. [1]
16. Bresalier RS, Sandler RS, Quan H, Bolognese JA, Oxenius B, Horgan K, Konstam MA. Adenomatous polyp prevention on vioxx trial I. Cardiovascular events associated with rofecoxib in a colorectal adenoma chemoprevention trial. N Engl J Med, 2015; 352(11):1092–102.
17. Hoxha, M., Malaj, V., Spahiu, E., & Spahiu, M. (2020). Dentists knowledge about over the counter-NSAIDs: an emerging need for NSAID-Avoidance Education. Journal of Applied Pharmaceutical Science, 10(1), 070-076.
18. Finsen, L., Christensen, H., & Bakke, M. (1998). Musculoskeletal disorders among dentists and variation in dental work. Applied ergonomics, 29(2), 119-125.
19. Şermet, S., Akgün, M. A., & Şimşek, Ş. (2012). Analgesic prescription pattern in the management of dental pain among dentists in İstanbul. Marmara Pharmaceutical Journal, 16(1), 41-47.
20. Myers, A., Gelotte, C., Zuckerman, A., Zimmerman, B., Shenoy, A., Qi, D., & Cooper, S. A. (2024). Analgesic onset and efficacy of a fast-acting formulation of acetaminophen in a postoperative dental impaction pain model. Current Medical Research and Opinion, 40(2), 267–277.
21. American Dental Association [ADA]. (2023).Retrieved from https://www.ada.org/
22. Ali S, Sofi K, Dar AQ. Comparison of Intravenous Infusion of Tramadol Alone with Combination of Tramadol and Paracetamol for Postoperative Pain after Major Abdominal Surgery in Children. Anesth Essays Res. 2017 Apr-Jun;11(2):472-476.

23. Pipalia, P. R., Annegeri, R. G., Juturu, T., & Mehta, R. (2016). Control of odontogenic pain by diclofenac and meloxicam mucoadhesive patches: A randomized, double-blinded, placebo-controlled, preliminary study. Journal of Indian Academy of Oral Medicine and Radiology, 28(3), 229-235.
24. PragyaPandey, A. P. T., Bharti, R., Jha, P., Singh, D., & Kudva, S. (2021). Knowledge of Pregnant Women in Regards to Oral Health of the Expected Child. Indian Journal of Forensic Medicine & Toxicology, 15(2), 559.
25. Dionne, R. A., Gordon, S. M., & Moore, P. A. (2016). Prescribing opioid analgesics for acute dental pain: time to change clinical practices in response to evidence and misperceptions. Compend Contin Educ Dent, 37(6), 372-378.