Evaluation of analgesic prescription patterns among dentists in Jordan

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ABSTRACT

Objective: The aim of this study is to evaluate the analgesic prescription pattern in different clinical situations among dentists in Jordan.

Materials and methods: A questionnaire for this cross-sectional study was distributed to 220 dental practitioners working in four different dental healthcare sectors in Jordan. Of the 220 questionnaires distributed (paper-based and online), 213 were completed. The first part of the questionnaire consisted of multiple choice questions to obtain general information about each participant. In the second part, the participants were asked whether they would prescribe an analgesic for the most commonly encountered dental situations. They were also asked to write their chosen analgesic for each condition they would prescribe for. The collected data were analysed using SPSS® 24.0 (IBM Chicago, IL). Chi square test was used to test the association between level of education, working sector and years of experience with analgesic prescription in different clinical situations and type of analgesic prescribed.

Results: Ibuprofen was found to be the most prescribed analgesic (91.1%), regardless of the clinical diagnosis**,** followed by paracetamol (70.4%), then diclofenac (66.2%) and finally naproxen (40.4%). Variable analgesic prescription patterns were found among dentists in Jordan dealing with different clinical situations.

Conclusion: In Jordan, analgesic prescription patterns vary among dentists dealing with different clinical situations. Dental practitioners should be aware of analgesic interactions and use them in an appropriate way without causing any complications or harmful effects for their patients.

Keywords: analgesics, dental practitioner, prescription pattern, pain.

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Introduction

Orofacial pain is one of the main reasons to seek dental treatment, and the most common reason is dental pain. Dental pain is associated with dental disease or following certain interventional procedures.[1,2] The efficient management of dental pain relies on the “Three Ds” concept: starting with correct diagnosis, followed by performing definitive dental treatment, and finally prescribing the appropriate drugs.[3]

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Analgesics are routinely prescribed by dental practitioners to manage dental pain. Dentists should be aware of the pharmacological characteristics of the analgesics commonly used in dentistry and should choose appropriate analgesics to treat and prevent pain associated with inflammation or surgery.[4]

Paracetamol and non-steroidal anti-inflammatory drugs (NSAIDS) are frequently used to manage dental pain, while opioid analgesics are rarely prescribed.[5-9] Paracetamol has an analgesic and an antipyretic effect, but it has no anti-inflammatory effect[10]. The most important side effect of paracetamol is hepatotoxicity, which occurs at high doses. [11, 12]

Due to their analgesic and anti-inflammatory effects, NSAIDS are widely prescribed in dental practices.[2] NSAIDs have been shown to be more effective at reducing pain than opioid analgesics, and are therefore recommended as the first-line therapy for acute pain management.[13]Unfortunately, NSAIDS have side effects on gastrointestinal, renal, bronchopulmonary and cardiovascular systems.[7]

Many studies examined analgesic prescription patterns among dentists in different countries, Sermet et al reported that Naproxin is the most prescribed analgesic by dentists in Istanbul for cases of dental pain[14]. Frank Halling et al concluded that ibuprofen is the analgesic of choice among dentists in Germany[15]. A cross sectional study held in Guangzhou in China found that dentists mostly prescribe paracetamol for dental pain [16].

There was no consensus on a standardized protocol for analgesic prescription in different dental clinical situations.[17]

We have found no study of analgesic prescription patterns in different dental clinical situations in Jordan. Hence, the aim of this study is to evaluate the analgesic prescription pattern in different clinical situations among dentists in Jordan.

Methods

Prior to commencing the study, ethical approval was obtained from the Human Research Ethics Committee of the Jordanian Royal Medical Services. A questionnaire consisting of two parts was used to collect data for this study. It was distributed to dentists from different sectors in Jordan using paper-based forms and online dental forums and groups. The first part of the questionnaire consisted of multiple choice questions to obtain general information about each participant. Participants were asked to provide their level of education and whether they were general dental practitioners, residents, postgraduate students, or specialists. . Secondly, the participants were asked to specify the health sector in which they practise their profession: a private practice, Royal Medical Services (RMS), the Ministry of Health (MOH), or a university. Finally, the participants were asked how many years of experience they had: less than five years (Group 1), between five and 10 years (Group 2), or more than 10 years (Group 3).

In the second section of the questionnaire, the participants were asked if they would prescribe an analgesic (yes), or if they would not prescribe an analgesic (no) for ten of the most commonly encountered dental diagnoses: gingivitis, periodontitis, pulpitis, localized abscess, diffused abscess, cellulitis, dry socket, dental trauma, extraction, and surgery. If the answer was yes, the participants were asked to write their analgesic of choice for that particular diagnosis in the questionnaire.

The collected data were analysed using SPSS® 24.0 (IBM Chicago, IL).Chi squared test was used to test for the statistical significance of percentages for the association between level of education, practice sector and years of experience with the analgesic prescription in different clinical situations and type of analgesic prescribed.

Results

A questionnaire for this cross-sectional study was distributed to 220 dental practitioners working in four different dental healthcare sectors in Jordan. Of the 220 questionnaires distributed (paper-based and online), 213 were completed (response rate 96.82%). Of those who participated, 92 (43.2 %) were general dental practitioners. The remaining participants were either residents 29 (13.6%), postgraduate students 11(5.2%), or specialists 81 (38%).

Figure 1 shows that most of the dentists that participated in this study work in the private sector, followed by dentists working at the Jordanian Royal Medical Services, dentists from the Ministry of Health and finally dentists working in universities.

Regarding years of experience, the participating practitioners were distributed into three groups, less than five years 61 (28.64%), five to 10 years 76 (35.68%) and more than 10 years of experience 76 (35.68%).

The results showed that 96.2% of the participating dentists prescribed an analgesic for at least one of the clinical situations. We found that ibuprofen was the most prescribed analgesic by the participating dentists (91.1%) regardless of the clinical situation. Other prescribed analgesics were paracetamol (70.4%), diclofenac (66.2%), naproxen (40.4%), aspirin (1.4%) and only one participant prescribed opioids in one clinical situation (0.46%),

Prescription of analgesics based on the level of education of the participants was also studied. The results show that the highest percentage of prescription was among general practitioners, regardless of the analgesic prescribed or the clinical situation, see **Table I**.

Table II shows the prescription of analgesic based on level of education in the different clinical cases studied.

Chi square test showed that there was no statistical significant association between the level of education and type of analgesic prescribed, $p = .721$. On the other hand, a significant association was found between the level of education and analgesic prescription only in cases of pulpitis, $p < .05$and dental trauma, $p < .05$.

We also found differences in the percentage of analgesic prescriptions according to the healthcare sector in which the participants worked. The results are summarized in **Table III**. Chi square test results showed that there is a significant relationship between the working sector and analgesic prescription regardless the clinical situation, $p = .000$. It was also found that there is association between the health care sector and prescription of ibuprofen, $p =.001$ and paracetamol, $p < .05$ regardless the clinical situation.

In terms of years of experience, the data revealed that ibuprofen was the most prescribed analgesic regardless of the group, whilst the prescription of the other analgesics varied, see **Table IV**.
When the relationship between the clinical situation and the prescribed analgesic was studied, **Table V**, surgery was the clinical situation in which most participants prescribed analgesics (93.0%), followed by dry socket (92.5%), cellulitis (91.5%), and pulpitis (90.1%), whereas few prescribed an analgesic for gingivitis (14.1%). One important point to mention is that aspirin was only prescribed for dry socket, and only one participant prescribed opioids (for dental surgery).

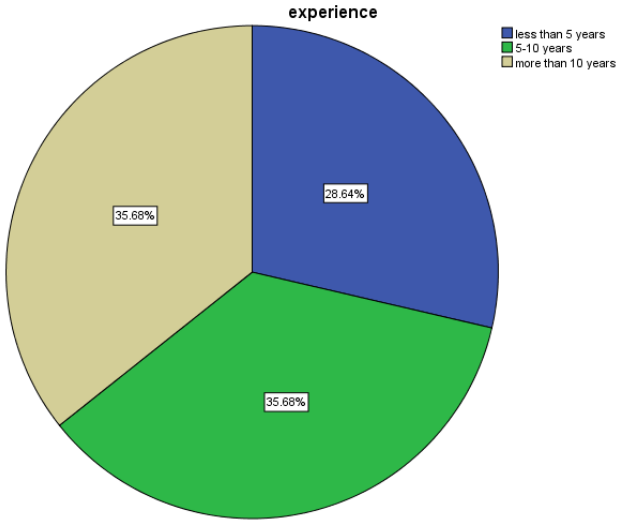

Figure 1

Table I: Prescription of analgesics based on education level

Group	Prescription of Analgesic [1], N (%[2])			
	Diclofenac	Ibuprofen	Paracetamol	Naproxen
General Practitioner	63 (68.5)	81 (88.0)	64 (69.6)	34 (37.0)
Resident	18 (62.1)	27(93.1)	20(69)	11 (37.9)
Postgraduate Student	5.0 (45.5)	9.0 (81.8)	8.0 (72.7)	6.0 (54.5)
Specialist	55(67.9)	77(95.1)	58(71.6)	35(43.2)
Total (%)[3]	141 (66.2)	194 (91.1)	150 (70.4)	86 (40.4)

[1] Used in at least one of the clinical situations under investigation.
[2]Valid Percentage.
[3]N = 213

Table II: Analgesic prescription based on education level of the dentist in different clinical situations

Education Level	Analgesic use in clinical situations N (%)–									
	Gingivitis	Periodontitis	Pulpitis*	Localized abscess	Diffused abscess	Cellulitis	Dry socket	Dental trauma*	Extraction	Surgery
General Practitioner	15 (16.3)	30 (32.6)	83 (90.2)	71 (77.2)	73 (79.3)	81 (88.9)	85 (92.3)	77 (83.7)	71 (77.2)	85 (92.4)
Resident	1.0 (3.4)	6.0 (20.7)	26 (89.7)	16 (55.2)	23 (79.3)	28 (96.6)	27 (93.1)	28 (96.6)	25 (86.2)	27 (93.1)
Post Graduate Student	0.0 (0.0)	2 (18.2)	7 (63.6)	8 (72.7)	7 (63.6)	9 (81.8)	10 (90.9)	8 (72.7)	9 (81.8)	10 (90.9)
Specialist	14 (17.3)	26 (32.1)	76 (93.8)	51 (63.0)	72 (88.9)	77 (95.1)	75 (92.6)	76 (93.8)	66 (81.5)	76 (93.8)

- $p < .05$

Table III: Prescription of analgesic based on working sector

Sector	Prescription of Analgesic[1], N (%[2])				
	Any analgesic*	Diclofenac	Ibuprofen*	Paracetamol*	Naproxen
Private Sector	105 (100)	78 (74.3)	101 (96.2)	73 69.5)	42 (40.0)
Ministry of Health	22 (95.7)	14 (60.9)	20 (87.0)	21 (91.3)	14 (60.9)
Royal Medical Services	72 (96.0)	45 (60.0)	67 (89.3)	52 (69.3)	28 (37.3)
University Hospital	6 (60.0)	4.0 (40.0)	6.0 (60.0)	4.0 (40.0)	2.0 (20.0)
Total (%) [3]	205 (96.2)	141 (66.2)	194 (91.1)	150 (70.4)	86 (40.4)

[1] Used in at least one of the clinical situations under investigation.
[2] Valid Percentage.
[3] N = 213
* $p < .05$

Table IV: Prescription of analgesics based on years of experience

Experience	Prescription of Analgesic[1], N (%[2])				
	Any analgesic	Diclofenac	Ibuprofen	Paracetamol	Naproxen
Less than five years	57 (93.4)	39 (63.9)	52 (85.2)	42 (68.9)	23 (37.7)
Five to 10 years	73 (96.1)	48 (63.2)	69 (90.8)	45 (59.2)	23 (30.0)
More than 10 years	75 (98.7)	54 (71.1)	73 (96.1)	63 (82.9)	40 (52.6)

[1] Used in at least one of the clinical situations under investigation.

Table V: Use of analgesics in different clinical situations

Clinical Situation	N (%)[2]	Analgesic, N (%)[1]					
		Diclofenac	Ibuprofen	Paracetamol	Naproxen	Aspirin	Opioids
Gingivitis	30 (14.1)	2 (0.90)	7(3.30)	26(12.2)	2 (0.90)	0 (0)	0 (0)
Periodontitis	64(30.0)	8(3.80)	26(12.2)	37(17.4)	8(3.80)	0 (0)	0 (0)
Pulpitis	192(90.1)	50(23.5)	147(69.0)	66(31.0)	47(22.1)	0 (0)	0 (0)
Localized Abscess	146(77.0)	37(17.4)	105(49.3)	52(24.4)	19(8.9)	0 (0)	0 (0)
Diffused Abscess	175(82.2)	66(31.0)	123(57.7)	47(22.1)	34(16.0)	0 (0)	0 (0)
Cellulites	195(91.5)	82(38.5)	130(61.0)	49(23.0)	41(19.2)	0 (0)	0 (0)
Dry Socket	197(92.5)	81(38.0)	129 (60.6)	48(22.5)	4621.6)	5 (2.3)	0 (0)
Dental Trauma	189(88.7)	54(25.4)	128(60.1)	80(37.5)	27(12.7)	0 (0)	0 (0)
Extraction	171(80.3)	46(21.6)	110(51.6)	72(33.8)	28(13.1)	0 (0)	0 (0)
Surgery	198(93.0)	99(46.5)	129(60.6)	52(24.4)	45(21.1)	0 (0)	1 (0.47)

[1] Valid percentage is shown; the participant may choose more than one analgesic for the same clinical case.
[2] Use of analgesic regardless of what the participant prescribes for that particular case.

Discussion

Local anaesthetics, antibiotics, and analgesics are the drugs most commonly used in dentistry. However, the prescription pattern of these drugs differs from one country to another.[18, 19] The benefits of these drugs are countered by side effects that may cause serious complications for the patient.[20, 21]Dentists should be aware of the pharmacological characteristics of the commonly analgesics used in dentistry and should choose appropriate analgesics to treat and prevent pain associated with inflammation or surgery. [22]

In this study we focused on the analgesic prescription patterns among dentists from different sectors in Jordan. We also studied their prescription pattern in different clinical situations. We found that ibuprofen was the most prescribed analgesic regardless of the clinical situation. This

result is consistent with a systematic review study done by Sepehri G et al 2018.[23]However, in some studies, paracetamol, diclofenac or naproxen were the most prescribed analgesics.[14, 17, 24]It is clear that the analgesic prescription pattern differs from country to country.[14,15,16]

When the relationship between the type of analgesic and the years of experience was studied, ibuprofen was the most commonly prescribed analgesic among the different years-of-experience groups; however, the results were variable for the second and third most prescribed analgesic.

There is no clear explanation in the literature as to why ibuprofen is the most prescribed analgesic among dentists; its superiority over other NSAIDS has not yet been proved.[22]Lero et al reported improved patient's satisfaction was associated with some analgesics (liposomal bupivacaine, ibuprofen, dexamethasone and lomoxicam) compared to placebo, [25] also Pereria found that the single use of ibuprofen was found to be significantly superior in reducing pain after unit implant surgery compared to placebo.[26]Moreover, like other NSAIDS, ibuprofen has many serious side effects on the gastrointestinal, cardiovascular and renal systems.[20, 21]

Although gingivitis is usually a painless condition,[27] 16.3% of the general practitioners prescribed analgesics (see **Table V**), while only 5.5% of the residents, post graduates, and specialists, prescribed analgesics. This indicates that level of education can affect the decision of the practitioner. The percentages of prescribing an analgesic for the remaining cases were consistent with the general guidelines.

It is worth mentioning that some clinical situations can affect the type of prescribed analgesic, as shown in **Table V**, aspirin was only prescribed for dry socket.

Conclusion

Variable analgesic prescription patterns are found among dentists in Jordan dealing with different clinical situations and it's prescribed unnecessarily in some cases. Dental practitioners should be aware of analgesic interactions and use analgesics in an appropriate way without causing any complications or harmful effects for their patients.

More studies in this field are recommended to develop dental pain control guidelines in order to rationalize the use of analgesics.

Conflict of Interest

The authors declare that the study was directed in the absence of any financial or commercial associations that could be interpreted as a potential conflict of interest.

References

1. Lipton JA, Ship JA, Larach-Robinson D. Estimated prevalence and distribution of reported orofacial pain in the United States. J Am Dent Assoc. 1993;124(10):115-21.
2. Krasniqi S, Daci A. Analgesics use in dentistry. In: Malonado C, editor. Pain relief- from analgesics to alternative therapies. Croatia: InTech; 2017.
3. Sung-Jin Kim, Jeong Taeg Seo.Selection of analgesics for the management of acute and postoperative dental pain: a mini-review. J Periodontal Implant Sci. 2020 Apr; 50(2): 68–73.
4. Cohen S, Hargreaves K. Pathwaysof the pulp. 9th ed: Elsevier; 2006.
5. Becker DE, Phero JC. Drug therapy in dental practice: nonopioid and opioid analgesics. Anesth Prog. 2005;52(4):140-9.
6. Becker DE. Pain management: Part 1: Managing acute and postoperative dental pain. Anesth Prog. 2010;57(2):67-78; quiz 9-80.
7. Nguyen AM, Graham DY, Gage T, Griffiths GR. Nonsteroidal anti-inflammatory drug use in dentistry: gastrointestinal implications. Gen Dent. 1999;47(6):590-6; quiz 7-8.
8. Ong CK, Lirk P, Tan CH, Seymour RA. An evidence-based update on nonsteroidal anti-inflammatory drugs. Clin Med Res. 2007;5(1):19-34.
9. Ong KS, Seymour RA. Maximizing the safety of nonsteroidal anti-inflammatory drug use for postoperative dental pain: an evidence-based approach. Anesth Prog. 2003;50(2):62-74.
10. Breivik EK, Barkvoll P, Skovlund E. Combining diclofenac with acetaminophen or acetaminophen-codeine after oral surgery: a randomized, double-blind single-dose study. Clin Pharmacol Ther. 1999;66(6):625-35.
11. Waring WS, Robinson OD, Stephen AF, Dow MA, Pettie JM. Does the patient history predict hepatotoxicity after acute paracetamol overdose? QJM. 2008;101(2):121-5.
12. Jackson CH, MacDonald NC, Cornett JW. Acetaminophen: a practical pharmacologic overview. Can Med Assoc J. 1984;131(1):25-32, 7.
13. ADA (2020). Oral analgesics for acute dental pain. Availableat: https://www.ada.org/en/member-center/oral-health-topics/oral-analgesics-for-acute-dental-pain (Accessed November 18, 2020).
14. Şermet S, Akgün MA, Atamer-Şimşek Ş. Analgesic prescription pattern in themanagement of dental pain amongdentists in İstanbul. Marmara Pharmaceutical Journal. 2012;16:41-7.
15. Halling F, Heymann P, Ziebart T, Neff A. Analgesic prescribing patterns of dental practitioners in Germany. J Craniomaxillofac Surg. 2018;46(10):1731-6.
16. Yu J, Nie EM, Jiang R, Zhang CY, Li X. Analgesic and Antibiotic Prescription Pattern among Dentists in Guangzhou: A Cross-Sectional Study. Pain Res Manag. 2020;2020:6636575.
17. Al-Maslamani MJ, Sedegi FA, Moule AJ. Prescription pattern of antibiotic and analgesicin endodontic treatment in Kuwaiti population: a self-administered survey. Saudi Endod J. 2014;4:128-34.
18. Jayadev M, Karunakar P, Vishwanath B, Chinmayi SS, Siddhartha P, Chaitanya B. 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):ZC10-4.
19. Tanwir F, Marrone G, Tariq A, Lundborg CS. Diagnosis and prescribing pattern of antibiotics and painkillers among dentists. Oral Health Prev Dent. 2015;13(1):75-83.
20. Sostres C, Gargallo CJ, Arroyo MT, Lanas A. Adverse effects of non-steroidal anti-inflammatory drugs (NSAIDs, aspirin and coxibs) on upper gastrointestinal tract. Best Pract Res Clin Gastroenterol. 2010;24(2):121-32.
21. Trelle S, Reichenbach S, Wandel S, Hildebrand P, Tschannen B, Villiger PM, et al. Cardiovascular safety of non-steroidal anti-inflammatory drugs: network meta-analysis. BMJ. 2011;342:c7086.
22. Kim S.J., and Seo, J.T.. Selection of analgesics for the management of acute and postoperative dental pain: a mini review. J. Periodontal Implant Sci. (2020);50(2):68-73
23. Sepehri G, Sepehri S, Parizi MT, Deghani MR. Dentists' Prescription Patterns of Non-Steroidal Anti-inflammatory Drugs and Antibiotics: A Systematic Review. J Clin Diagn Res. 2018;12(3):4-9.
24. Azodo CC, Umoh AO. Analgesics prescription in Nigerian dental healthcare services. Nigerian Journal of Basic and Clinical Sciences. 2013;10(2):86-90.
25. Lero, P.T. , Mulherin, D.R., Jensen, O., Berry, T., Hassan, D., Samuel, J.R., et al.. A prospective, randomized, open-label study comparing an opiod-sparing postsurgical pain management protocol with and

without liposomal bupivacaine for full arch implant surgery. Int. J. Oral Maxillofac. Implants. 2018;33(5):1155-1164.
26. Pereira, G.M., Cota, L.O., Lima, R.P., and Costa, F. O.. Effect of preemptive analgesia with ibuprofen in the control of postoperative pain in dental implant surgeries: a randomized, triple blind controlled clinical trial. J. Clin. Exp. Dent. 2020;12(1):e71-e78.
27. Trombelli L, Farina R, Silva CO, Tatakis DN. Plaque-induced gingivitis: Case definition and diagnostic considerations. J Clin Periodontol. 2018;45 Suppl 20:S44-S67.