International Journal of Pharmacy Practice, 2022, **30**, 326–331
https://doi.org/10.1093/ijpp/riac033
Advance access publication 9 May 2022
Research Paper

IJPP International Journal of Pharmacy Practice

OXFORD

Australian community pharmacists' ability to identify the indications for dental prescriptions—a case vignette study

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Abstract

Objectives Pharmacists are known as medicine experts. Dentists can independently prescribe and administer medications related to dental conditions such as antimicrobials, anti-inflammatories and analgesics. However, little is known about pharmacists' knowledge and perceptions of medicines prescribed for dentistry. Therefore, this study aimed to assess community pharmacists' ability to identify the indications for dental prescriptions using hypothetical vignettes.

Methods Australian community pharmacists were invited through email and social media to undertake a web-based questionnaire consisting of nine case vignettes of dental prescriptions and their indicated uses in dental settings and two perception-based questions. The results were provided as a percentage of the correct answers to the case vignettes. In addition, Pearson chi-square tests were performed to examine associations between categorical variables.

Key findings Of the 202 pharmacists who completed the questionnaire, the mean number of correct responses was 5 ± 2 (out of 9). More than three-quarters (78.5%) of pharmacists believed that thorough knowledge of prescriptions for dental ailments was necessary for safe and effective community pharmacy practice. In addition, nearly two-thirds (64.1%) felt confident that they could dispense medicines indicated for dental conditions safely and effectively.

Conclusions The knowledge demonstrated by participants through correct identification of the indications for dental prescription was less than optimal. Professional development courses for pharmacists in dental ailments could prove beneficial.

Keywords: community pharmacists; dentistry; Australia; prescriptions; knowledge

Introduction

The majority of community pharmacists provide oral health consultations up to five times or more on a weekly basis.[1] One survey of 144 community pharmacists reported that 25–90% managed a wide range of oral health presentations,[2] the majority of whom sought further training and education on pharmacotherapeutics in oral health care.[2] Pharmacists are health professionals who not only dispense dental prescriptions[3, 4] but also provide counselling on medicines that could adversely affect overall dental health.[5] In addition, pharmacists have a role in providing over-the-counter medicines and recommending advice to improve oral health.[6] Most medicines prescribed for dental conditions are antibiotics, analgesics and opiates, anti-inflammatories, antifungals, benzodiazepines, anticonvulsants and antiemetics or emergency medicines.[3, 4] After a medicine is prescribed by a dentist (or dental specialist), the pharmacist reviews and dispenses the prescription to ensure the patient receives a safe and efficacious medicine to treat their dental ailments. The interprofessional relationship between pharmacy and dentistry is extremely important to ensure medicine safety.[7]

Medicines can be used prophylactically and therapeutically for oral health conditions. However, these are not always used appropriately. Over one million medicines are prescribed by dentists and dispensed each year in Australia.[8] Research has identified that 16–55% of these prescriptions were potentially inappropriate.[9] The combined Australian Pharmaceutical Benefits Scheme study (pharmacoepidemiology and cost analysis) reported the increasing rate of dispensing and cost of dentist-prescribed antibiotics, opioids, and benzodiazepines between the years 2006 and 2018.[3, 4] This study also showed that there had been an increase in both oxycodone and tramadol prescribing, which were consistent with the increasing trends of opioid use observed internationally.[10] However, it is not only overprescribing or inappropriate prescribing that is of concern but also omitting necessary medicines. For example, for dentists, a naloxone injection is recommended as an adjuvant for opioid analgesia where there is a suspected risk of opiate overdose, especially for

Received: 16 September 2021 Accepted: 25 March 2022

opioid-naive people. However, according to a recent dental pharmacoepidemiology study, very few naloxone injections were dispensed from 1992 to 2018.[11] To emphasise the importance of management of opiate overdose, naloxone nasal spray is now listed on the Pharmaceutical Benefits Scheme (PBS) for dentists.[12, 13]

The need for appropriate dental prescribing has been further highlighted in 2019 by two separate studies (assessing both allopathic and complementary alternative medicines), which demonstrated that pre-registrant dentists have substantial gaps in their knowledge regarding the quality use of medicines.[14, 15] It could be argued that even though dentists have a broad knowledge of dental health, there may be gaps in their existing knowledge on medicines.[9] Medicine knowledge relating to dentistry can also extend to medical professionals. Despite expressing an interest in managing dental conditions, general medical practitioners develop their skills after completing their general practice fellowship.[16] Potential gaps within the medical school curriculum for managing dental conditions have previously been identified.[17, 18]

Although community pharmacists play an essential role as members of an oral healthcare team, it has been suggested that additional training is needed to recognise common oral health presentations and provide recommendations aligned with current best practice guidelines.[19] Furthermore, medication-related problems in dental clinics can occur. These may involve a patient's current medications causing oral health problems or potential complications with dental procedures.[20, 21] Therefore, pharmacist intervention is essential for improving the quality use of medicines for dental conditions.

Community pharmacists are able to manage minor oral health conditions (e.g. oral thrush, dry mouth, mouth ulcers and teething in children)[2] but refer to the dentist where necessary.

While some studies have investigated oral health management in community pharmacies,[1, 2, 19, 22, 23] little research has been done on community pharmacists' knowledge and attitudes regarding prescriptions prescribed by dentists, used in these conditions. Addressing this gap could provide valuable insight into the quality use of dental medicines for researchers, academics, individuals and organisations involved in Australian health workforce planning and policymaking. Therefore, this study aimed to assess community pharmacists' ability to identify the indications for dental prescriptions using hypothetical vignettes.

Methods

Study design and setting

This cross-sectional study consisted of an anonymous online questionnaire, which assessed Australian community pharmacists' knowledge of medicines used in dentistry. It is reported according to the Checklist for Reporting Results of Internet E-Surveys (CHERRIES).[24] All pharmacists in Australia were invited to participate in the survey. As of December 2020, there were 32 393 registered pharmacists in Australia, excluding provisionally registered pharmacists. [25]

Development and pre-testing

The method followed a previously published approach to similar research in a different target population.[14, 15] Both earlier studies utilised an electronic questionnaire consisting of clinically relevant case vignettes and self-reported perception-based questions. The questions were formulated by an interdisciplinary team consisting of registered pharmacists, registered general dentists and dental public health academics, using the Therapeutic Guidelines Version 3.[26] Questions consisted of gender, age, state or territory of residence, practice type, pharmacy qualification level, years of practice, nine case vignettes (multiple-choice questions consisting of two to four options)[26] and two opinion-based questions based on confidence and necessity (sliding scale of 0 to 100) (Supplement 1). Case vignettes were randomised to ensure bias was minimised. No personal identifiers were included. The questionnaires were then imported to Qualtrics XM software (Provo, UT, USA). In addition, five community pharmacists, who were known to the authors, piloted the uploaded questionnaire before administration to ensure the questions were appropriate. The results from the pilot testing were not included in the results.

Case vignettes

The case vignettes were designed to recreate a community pharmacy scenario where the pharmacists were required to have an understanding of the indications of the prescriptions issued by a dentist (Supplement 1). The nine case vignettes encompassed topics, including acute necrotising gingivitis, peri-implantitis, oral lichen planus, minor aphthous ulcers, severe pain analgesia, management of avulsed front teeth, alternative anti-inflammatories, trigeminal neuralgia and antibiotic prophylaxis.

Recruitment process and questionnaire administration

Australian community pharmacists were invited to undertake the survey over 11 weeks between February 2021 and April 2021. The link was distributed to all community pharmacists through relevant social media and non-social media medical groups (direct email, Facebook, LinkedIn and Twitter). Completed questionnaires were sent directly to the researchers via Qualtrics. Participants could not submit until they had answered all the questions. To ensure that pharmacists only undertook the survey once, 'preventing ballot box stuffing' in QualtricsXM software was selected. In addition, the authors manually checked IP addresses to identify potential duplicate entries from the same user.

Data management and statistical analysis

Normally distributed pharmacists' demographics (gender, age, states and territory of residence, practice type, years of experience and pharmacy qualifications) and correct answers to the various questions were reported as counts and percentages as well as mean and standard deviations.

The collected data from Qualtrics were imported into a comma-separated values (CSV) file. To compare outcomes (percent of correct answers) of categorical variables (gender, age, state or territory of residence, practice type, pharmacy qualification level and years of practice), Pearson Chi-square tests were used. SPSS version 27.0 (IBM Company, Chicago, IL, USA) was used, and the statistical significance was set at $P < 0.05$. This was to reduce and mitigate possible risks of the observed difference between variables being due to chance.

Ethics approval

This study was approved by the Human Research Ethics Committee at The University of Western Australia (Approval Number—2020/ET000331).

Results

Demographics

A total of 202 Australian community pharmacists completed the questionnaire (Table 1). The sample primarily consisted of females (n = 152; 75.2%).

Prescriptions knowledge for different dental ailments

The mean (and standard deviation) number of correct responses was 5 (±2) out of 9 (Table 2). Of the 202 pharmacists, 54% (n) answered more than half of the questions, and 3.5% (n = 7) answered all questions correctly. The case vignettes where more than half of the pharmacists answered correctly were acute necrotising gingivitis (n = 121; 59.9%), oral lichen planus (n = 104; 51.5%), severe pain analgesia (n = 145; 71.8%), trigeminal neuralgia (n = 193; n = 95.5%) and antibiotic prophylaxis (n = 138; 68.3%). Statistical differences among pharmacists' demographic variables (postgraduate qualifications, age, gender, experience, state and territories of residence) were noted in peri-implantitis, oral lichen planus, minor aphthous ulcers, severe pain analgesia, alternative anti-inflammatories and antibiotic prophylaxis ($P < 0.05$) (Table 2).

Table 1 Demographics of community pharmacists that undertook the questionnaire (n = 202)

	Percentage	Count
Gender		
Male	24.8%	48
Female	75.2%	152
Other	1.0%	2
Age		
20–29 years	41.6%	84
30–39 years	33.2%	67
40–49 years	13.9%	28
50–59 years	7.9%	16
60–69 years	3.5%	7
States and territories		
New South Wales	19.3%	39
Victoria	16.8%	34
Queensland	17.3%	35
South Australia	5.9%	12
Western Australia	32.2%	65
Tasmania	4.0%	8
Australian Capital Territory	3.0%	6
Northern Territory	1.5%	3
Practice type		
Metropolitan	64.9%	131
Regional	33.1%	67
Remote/Very Remote	2.0%	4
Years of experience		
0–4 years	36.1%	73
5–9 years	27.2%	55
10–19 years	21.8%	44
20–29 years	7.4%	15
30–39 years	5.9%	12
>40 years	1.5%	3
Pharmacy qualification level		
Bachelor	66.3%	134
Graduate Certificate/ Graduate Diploma	11.4%	23
Masters	20.8%	42
Doctorate (e.g. PhD, DClinPharm)	1.5%	3

Self-reported perception of prescriptions for different dental ailments

Pharmacists' self-reported perceptions of prescriptions for different dental ailments were generally positive (Supplement 1; Table 3). Nearly two-thirds [mean (±standard deviation): 64 (±25)] felt confident that they could safely and effectively dispense dental prescriptions. In addition, more than three out of four pharmacists [mean (±standard deviation): 79 (±21)] stated a belief that a thorough knowledge of prescription medicines for dental ailments was necessary for safe and effective community pharmacy practice.

Discussion

This study was the first to assess Australian community pharmacists' knowledge on prescriptions used in various dental conditions. The knowledge demonstrated by participants through correct identification of the dental prescription indications was suboptimal. However, pharmacists with postgraduate qualifications or extended clinical experience (>10 years of practice) were more likely to provide correct answers to survey questions.

The small sample size is a limitation to the generalisability of the findings. However, despite only having over 200 participants, the gender distribution was representative of the pharmacist population.[25] Secondly, more Western Australian pharmacists completed the questionnaire. The legislation for pharmacists dispensing medicines differs by states and territories. For example, oxycodone cannot be dispensed in Queensland [Health (Drugs and Poisons) Regulation 1996]. However, the overall aim of this study was to determine whether community pharmacists in Australia had the therapeutics knowledge set out by the Therapeutic Guidelines (Oral and Dental).[26] Therefore, we did not stratify the results based on different states and territories at the sampling stage. Finally, this study did not exclude pharmacists with dual registrations (i.e. participants with pharmacist and dentist registration).

In terms of external validity and generalisability, there were no time restrictions when responding to the questionnaire, and pharmacists could have checked other information sources before responding to the scenarios. The rationale behind the case vignette study was to endeavour to emulate the clinical scenarios community pharmacists would encounter in their everyday setting. However, despite the opportunity for respondents to consult additional references, if necessary, not all answered the questions correctly. The possible reason for this could be the availability of specific dental resources.

Table 2 Clinical knowledge of prescription medications used in dental ailments by community pharmacists (n = 202)

Case vignettes	Correct answer		Pearson Chi-square
	Percentage	Count	
Acute necrotising gingivitis	59.9%	121	
Peri-implantitis	13.9%	28	Pharmacists with greater than a Master's qualification answered better (P = 0.028)
Oral lichen planus	51.5%	104	Pharmacists with greater than a graduate certificate qualification answered better (P= 0.000)
Minor aphthous ulcers	49.5%	100	Pharmacists aged 30–39, 50–59 and 60–69 years answered better (P = 0.004) Pharmacists with 5–9 years and greater than 20 years of experience answered better (P = 0.004)
Severe pain analgesia	71.8%	145	Pharmacists aged greater than 40 years answered better (P = 0.015)
Management of avulsed front tooth	26.7%	54	
Alternative anti-inflammatories	34.7%	70	Male pharmacists answered better (P = 0.000) Pharmacists with 5–9 years, 20–29 years and greater than 40 years of experience answered better (P = 0.025)
Trigeminal neuralgia	95.5%	193	
Antibiotic prophylaxis	68.3%	138	Pharmacists with greater than 10 years of experience answered better (P = 0.046) Pharmacists in Queensland, Western Australia, Australian Capital Territory and Tasmania answered better (P = 0.016)

Table 3 Self-reported perceptions of prescription medications used in dental ailments by community pharmacists (n = 202)

Perspectives	Mean% (±standard deviation)[1]
Confidence	64% (±25)
Necessity	79% (±21)

[1]Range: 0 (Disagree) to 100 (Agree).

The use of case vignettes showed potential knowledge gaps in prescriptions for different dental conditions (e.g. peri-implantitis, minor aphthous ulcers, management of avulsed front tooth and alternative anti-inflammatories). Assessing knowledge on certain dental conditions was deemed appropriate as pharmacists dispense medicines associated with them. There were certain aspects that the pharmacists did not perform as well as they should have. For example, the global prevalence of peri-implantitis (range: 1.1–85.0%),[27] aphthous ulcers (20%)[28] and dental trauma (4.5%) all indicate that these are not uncommon dental conditions.[29] If any issues arose, the pharmacist is the most accessible healthcare professionals for any clarifications or counselling. It is important to note that the length of clinical experience appears to improve the community pharmacist's knowledge of dental prescriptions.[30] It is particularly crucial, as there was a cost and dispensing rate increase in Australia in levels of population-adjusted dentist-prescribed antibiotics, opioids and benzodiazepines since 2006.[3, 4]

Nearly two-thirds self-reported that they felt confident that they could safely and effectively dispense dental prescriptions. Furthermore, three out of four pharmacists believed that knowledge of dental prescriptions was necessary for community pharmacy practice. However, interestingly, according to a recently published study, 84% (542 out of 644 community pharmacists) reported having no access to oral health education resources,[22] and only 1% (8 out of 644 community pharmacists) reported having accessed therapeutic guidelines.[22] This highlights the importance of further additional training and educational materials.

Future studies that include a larger sample of community pharmacists across a range of Australian states and territories are now to provide more generalisable findings. An alternative approach to assess pharmacists' knowledge and practice would be to undertake a simulated patient study (i.e. mystery shopper).[31] The existing literature suggests a potential demand for additional training [22, 32, 33] This may be a future research avenue to explore: whether community pharmacists may be interested in getting in-depth knowledge about pharmacological management (prescription and even over the counter) of dental ailments.

Pharmacists need to understand dental ailments and their management to ensure medicines safety.[34] Pharmacists play a pivotal role in providing dentists with evidence-based guidelines on medicines and advising them on potential adverse effects and interactions.[34, 35] The interprofessional relationship between the two professions could be bidirectional. Our study creates a foundation for future research to investigate the knowledge and attitudes of dental prescriptions dispensed by community pharmacists. On a broader level, obtaining insight from pharmacists may be beneficial in determining whether professional development courses in dental conditions and associated medicine indications may be justified.

Conclusion

Responses to the vignettes indicate pharmacists' knowledge about dental conditions is suboptimal. There were knowledge gaps for various dental conditions such as dental implant infection, aphthous ulcers, dental trauma and anti-inflammatory choices. However, most pharmacists believed that possessing foundational knowledge regarding prescriptions for dental ailments was necessary. Determining the specific knowledge gaps related to prescriptions for dental medicines

may provide potential avenues for further research and professional development for community pharmacists in Australia.

Supplementary Material

Supplementary data are available at *International Journal of Pharmacy Practice* online.

Acknowledgement

The authors would like to acknowledge Dr Payne for his assistance in the proofreading of this manuscript.

Author Contributions

J.S.P., A.T.P., M.T. and E.K. designed and directed the project; J.S.P., A.T.P. and K.N.W. conducted the study; J.S.P. analysed the data; J.S.P., A.T.P., K.N.W., M.T. and E.K. wrote the article. All the authors approved the final manuscript for publication.

Funding

A.T.P. is supported by an NHMRC Early Career Fellowship (1156892).

Conflict of Interest

The authors declare no potential conflicts of interest with respect to this research, authorship and/or publication of this article.

Data Availability

The data underlying this article will be shared on reasonable request to the corresponding author.

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