

The role of community pharmacists as oral health advisors in the management of oral effects of asthma medications: an exploratory survey

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Abstract

Objectives: To investigate community pharmacists' attitudes, confidence, practice, knowledge, and barriers towards the management of oral side effects of asthma medications.

Methods: A paper-based questionnaire was developed from previous research, trialled, and validated. Convenience sampling through web search was used to identify pharmacy practices across Cairns, Queensland, Australia. Practices were contacted by email and phone before hand-delivering and collecting questionnaires.

Key findings: Thirty eight community pharmacist responses were descriptively analysed. Community pharmacists surveyed within the Cairns region feel that it is within their role to help manage the side effects of asthma medications. Many feel this is best conveyed during inhaler dispensing and instruction. Current advice is more prompted rather than preventative. Pharmacists routinely advise patients of mouth-rinsing following inhaler use, however the link to preventing side effects is not clearly communicated. Pharmacists are confident in recognizing and managing common side effects such as oral thrush and dry mouth, but fewer are aware of dental decay and gingivitis. Many identify a lack of guidelines as the largest barrier to providing preventive oral health advice.

Conclusions: Cairns community pharmacists already self-perceive their role in the management of oral side effects of asthma medications. Advice given to patients is practical but does not clearly convey the causative associations between asthma medications and their potential oral side effects. Patient education is prompted more by enquiry rather than a preventative approach. The development of standardized practice protocols and integration within undergraduate degrees or continuing education may benefit the community-pharmacist delivered care.

Keywords: community pharmacists; asthma; health promotion; medicines management; adverse drug reactions

Introduction

In 2019, the World Health Organisation estimated globally, 262 million people suffered from asthma [1]. Two main types of medication are used to manage asthma: bronchodilators to relieve the airway constriction (relievers), and corticosteroids to manage underlying airway inflammation (preventers). In Australia, most reliever asthma medicines are available from pharmacies without a prescription, while corticosteroid preventer medicine is prescribed. These asthma medications are associated with several oral side effects that are often clinically seen in dental patients, such as dry mouth, dental caries, gingivitis, dental erosion, and oral thrush [2].

In recent years, the professional scope of the community pharmacist has been evolving from dispensing medicines to an expanded, more patient-centred role. The significant role of providing advice regarding preventive oral health care is often under-recognized, given pharmacists are often one of the most accessible healthcare professionals for the public [3]. For many patients, pharmacists may be the first, or sometimes only contact with a health professional, especially in rural areas where access to oral health services can be limited [4]. Studies have shown that pharmacists are frequently in contact with patients at higher-risk of, or currently suffering-from dental problems,

while seeking non-dental treatments [5, 6]. Due to accessibility and the expansion of their roles, community pharmacists are well-positioned to be the primary point of contact for many patients seeking oral health advice [7].

Alongside traditional drug dispensing, pharmacists are actively involved in the management of chronic diseases such as asthma [8]. The community pharmacy setting is unique as it is also the point of access for a 'hidden' population that seeks self-management of their asthma in the less restricted prescribing environment of Australia [9]. Despite studies showing pharmacist-delivered interventions may improve asthma control [10], concerns about side effects are cited to be a major patient-reported barrier to medication adherence [9, 11]. Improper inhaler technique, overuse of reliever medications, and underuse of preventer medications all potentially contribute to the oral side effects of asthma medicines clinically seen in dental patients [9, 12–14]. Oral thrush can develop from local suppression of the immune system by inhaled corticosteroids [12–14]. Caries and gingivitis may also be associated with the inclusion of fermentable carbohydrates in inhalers, as taste modifiers in inhaler formulations, as well as the reduced salivary flow stemming from prolonged bronchodilator use [12]. Globally, patients

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are accessing pharmacies to obtain the medications required for their asthma management [9]. As such, pharmacists are advantageously placed to perform educational and health promotional roles related to the oral side effects of asthma medications [15].

Literature review suggests pharmacists already self-perceive their role as oral health advisors [5], and through inhaler technique education, can positively influence patients' asthmatic control, medication adherence, and safety [10]. However, no published studies explore whether pharmacists specifically discuss the potential oral health implications of the asthma medications and their link to oral and dental side-effects.

The purpose of this exploratory pilot study was to examine the oral health advisory role of community pharmacists in the provision of oral effects of asthma medications. The following are the aims of the study:

- (1) What are pharmacists' attitudes, practice, and knowledge towards providing oral health advice on the oral effects of asthma?
- (2) How confident are pharmacists in informing patients of the links between asthma, or the use of asthma medications, and oral/dental health, and how frequently do they provide this advice?
- (3) Do pharmacists perceive any barriers or limitations in terms of providing advice on the oral health effects of asthma medications?

Methods

Advice sought from academics of the James Cook University School of Pharmacy was utilized to gauge feasibility, formulate, and reconfigure our study design to best approach our study aims. Consultation with local pharmacy chains and the Pharmacy Guild of Australia served to gauge interest in the topic and estimate the possible response rate that could realistically be achieved within the study's limited time frame and budget. Ethics approval was obtained from the James Cook University Human Research Ethics Committee (approval no. H6607, date 07/06/2016). A written questionnaire was devised with the aim of obtaining qualitative and quantitative data. The layout and questions were developed based on a literature review of similar published studies [5, 16, 17]. The eight-page questionnaire included 25 questions in total, across four sections:

- (1) Section one—Demographics.
- (2) Section two—Pharmacists' attitudes and sources of knowledge.
- (3) Section three—Pharmacists' level of knowledge related to the oral side-effects of asthma medications, and how often they relay this knowledge to patients.
- (4) Section four—Perceived barriers for community pharmacists in providing this oral health advice.

The questionnaire was evaluated for its suitability by experienced advisors, and pilot surveys were trialled on pharmacists and pharmacy assistants to test face validity. This population was then excluded from the final survey. With the feedback received, the questionnaire underwent multiple revisions whereby wording and survey items were modified and reordered to best fit the study objectives, reduce ambiguity, and achieve a logical flow. A copy of the final survey is attached as a [Supplementary Material S1](#).

The questionnaire was deployed in the Cairns region of Queensland, Australia. Recruitment of participants was first conducted by tallying all pharmacy practices with a web presence via Google Maps search. A formal invitation via electronic mail was then sent out to all 33 identified pharmacies present in the region. 22 practices declined participation. A courtesy telephone call was conducted with all 11 consenting pharmacy managers to arrange a convenient time for the pharmacists to complete the questionnaire. Face-to-face deployment of surveys was used to maximize response rates for the smaller regional population. Unmarked envelopes containing the questionnaire and an anonymous consent form, were hand-delivered to the 11 locations during August 2016. Due to differing rostering and opening days, questionnaires were left at the pharmacy for participants to complete in their own time and were retrieved 4 weeks later. A returned response with signed consent was constituted as a recruited participant. In total, 38 pharmacists consented, with 38 completed responses collected by the end of the month.

The data collected was entered into and analysed by using Microsoft Excel 2013 and IBM Statistical Package for Social Sciences (SPSS v23 (SPSS Inc., Chicago, IL, USA)). Questions with short answer fields were transcribed and coded independently by each of the three research members to minimize bias. After combining the results, data checks, theme definitions, and emerging themes were cross-checked by two members. Any disagreements about the emerging themes were resolved through discussion. Frequencies and proportions of each response item were then generated, followed by univariate analysis. Descriptive statistics, in the form of distributions, were generated based on the questionnaire responses and displayed in frequencies and percentages of the total number of respondents. Questionnaire completion rates were excellent, with only one or two failing to answer some questions. For these cases, statistics were calculated relative to the total responses gathered, rather than the total number of respondents.

Results

In total, we collected responses from 38 consenting community pharmacists. Data was gathered and descriptively analysed. Using statistical information obtained from the Pharmacy Guild of Australia and Pharmacy Board of Australia, this represents an approximate response rate of 34.5% from the study region.

Demographics

On average, respondents had 5–10 years of working experience, with 55.3% (21/38) identifying as female. A total of 53.3% (16/38) had professional memberships with the Pharmaceutical Society of Australia (PSA) and the Australasian College of Pharmacy (ACP). 97.4% (37/38) frequently have contact with patients ([Table 1](#)).

Patient enquiries

In a typical day or week, the four most frequent oral-related complaints encountered were toothache (89.5%, 34/38), mouth ulcers (81.6%, 31/38), oral thrush (57.9%, 23/38), and dry mouth (47.4%, 18/38). In total 97.4% (37/38) reported daily-weekly encounters with patients seeking oral pain relief (79.0%, 30/38 daily, 18.4%, 7/38 weekly). Patients most frequently requested advice related to oral health product

Table 1. Characteristics of community pharmacist respondents.

Characteristics	Pharmacists (n=38)
Gender	
Female	55.3% (21)
Male	44.7% (17)
Other post-graduate qualifications	
Yes	13.2% (5)
No	86.8% (33)
Type of pharmacy currently working in	
Privately owned	42.1% (16)
Pharmacy chain	65.8% (25)
Other	0.0% (0)
Community pharmacists that commonly have contact with patients	
Yes	97.4% (37)
No	2.6% (1)
Professional pharmacy memberships	
Pharmaceutical Society of Australia (PSA)	53.3% (16)
The Pharmacy Guild of Australia	26.7% (8)
The Society of Hospital Pharmacists of Australia (SHPA)	3.3% (1)
Australian Association of Consultant Pharmacy (AACP)	16.7% (5)
The Australasian College of Pharmacy (ACP)	53.5% (16)
Professional Pharmacists Australia (formerly APESMA)	0.0% (0)
Other (AICD AIM)	3.3% (1)
None	26.7% (8)
Role in community pharmacy	
Owner	10.5% (4)
Manager or Pharmacist in charge	31.6% (12)
Pharmacist	60.5% (23)
Years working as a registered pharmacist (n=37)	
Mean	9.5541
Median	6.0000
Mode	5.00
Range	44.50
Minimum	0.50

For Professional pharmacy memberships, total percentages may exceed 100%, indicating that respondents may be registered to more than one membership.

Listed Post Graduate Qualifications: Nutrition Graduate Certificate, Graduate Diploma in Hospital Pharmacy, Bachelor of Pharmacy, Graduate certificate in Applied Pharmacy Practice, Diabetes education, AACP Consultant Pharmacist.

recommendation and oral thrush management (57.9%, 22/38 weekly for both). Asthma-related general and oral side effects enquiries were encountered less often, with pharmacists reporting this more frequently within a fortnightly-monthly period (52.6%, 20/38 general side effects and 50.1%, 19/38 oral side effects).

Pharmacist attitudes and confidence

A total of 89.2% (33/37) of respondents felt it was in their role to deliver oral health advice. Almost all respondents identified their role included providing oral health advice related to pain relief (89.5%, 34/38), dental referral (86.8%,

33/38), oral hygiene (86.8%, 33/38), and oral health product recommendation (84.2%, 32/38); 63.2% (24/38) felt confident in identifying oral health conditions, 76.3% (29/38) felt confident in recommending and giving advice about oral health products; and 94.7% (36/38) were confident in providing advice on the oral side effects of asthma medications, whilst 92.1% (35/38) report providing this advice routinely. In total 83.8% (31/37) believe that further education in oral health effects of asthma medications would be of benefit to their practice as a pharmacist (Table 2); 97.3% (36/38) preferred this information to be conveyed during their undergraduate degree, and 86.5% (32/38) through continuing professional development.

Knowledge

The main source of knowledge for pharmacists within the last 12 months was from continuing professional development (72.2%, 26/38), followed by pharmacy professional association journals and industry pamphlets or posters (both 36.84%, 14/38). Surveyed pharmacists were asked to identify as many oral and dental health effects associated with asthma medications as they could. A total of 97.4% (37/38) identified oral thrush and 94.7% (36/38) dry mouth. Fewer identified sore throat (39.5%, 15/38), dental decay (34.2%, 13/38), gum disease (13.2%, 5/38), mouth ulcers (13.2%, 5/38), taste alterations (10.5%, 4/38) and immunosuppression (7.9%, 3/38) (Fig. 1).

Practice

In total 92.1% (35/38) of respondents reported already providing patients with information on the oral side effects of asthma medications. Upon picking up their medications, 68.4% (26/38) routinely advise asthmatic patients on mouth rinsing, 39.5% (15/38) educate about inhaler technique, and 36.8% (14/38) focus on general asthma management such as frequency, dosage, timing, and mechanisms. Fewer discussed side effects (31.6%, 12/38), spacer use (23.7%, 9/38), and dentist referral (10.5%, 4/38) (Fig. 2).

When asthmatic patients present with an oral health condition or query, 78.9% (30/38) provided advice for proper inhaler technique “always” or “most of the time”, and 89.5% (34/38) advised oral thrush management “always” and “most of the time”. 81.6% (31/38) discussed potential oral and dental effects of asthma medications either “always” or “most of the time”, with 73.0% (27/38) discussing prevention of such effects “always” or “most of the time”. In terms of referral of the patient to their general medical practitioner, responses ranged from 18.4% (7/38) for “most of the time”, 60.5% (23/38) for “sometimes” and 15.8% (6/38) for “hardly ever”. Similarly, referrals to a dentist ranged from 21.1% (8/38) for “most of the time”, 50% (19/38) for “sometimes” and 18.4% (7/38) for “hardly ever”.

Typical products recommended to relieve the oral and dental asthmatic medication side-effects were dry mouth relief (50.0%, 19/38), antifungals (39.5%, 15/38), and mouthwashes (23.7%, 9/38).

Information about the oral and dental side-effects of asthmatic medications was thought to be best delivered at the time when pharmacists deliver the prescription to patients, or when they educate patients on the use of their inhalers (73.7%, 28/38, and 84.2%, 32/38, respectively). Over half of the respondents suggested that delivery during a doctor or dental appointment was also appropriate (50.0%, 19/38,

Table 2. Pharmacist confidence and attitudes.

	Strongly agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
Confidence					
I feel confident in recommending and giving advice about oral health products (<i>n</i> = 38)	10.5% (4)	65.8% (25)	23.70% (9)	0.0% (0)	0.0% (0)
I feel confident in identifying oral health conditions (<i>n</i> = 38)	7.9% (3)	55.3% (21)	23.70% (9)	13.2% (5)	0.0% (0)
I feel it is within my role to deliver oral health advice (<i>n</i> = 37)	18.9% (7)	70.3% (26)	10.8% (4)	0.0% (0)	0.0% (0)
I feel it is within my role to provide preventive oral health advice and promote good oral health (<i>n</i> = 38)	34.2% (13)	55.3% (21)	10.5% (4)	0.0% (0)	0.0% (0)
Oral Health Advisor is within my role as a pharmacist (<i>n</i> = 38)	29.0% (11)	34.2% (13)	29.0% (11)	7.9% (3)	0.0% (0)
Attitudes					
I routinely provide patients with information on the oral side effects of asthma medications. (<i>n</i> = 38)	44.7% (17)	47.4% (18)	0.0% (0)	7.9% (3)	0.0% (0)
I feel confident in giving advice to asthma patients on the oral side effects of asthma medications. (<i>n</i> = 38)	50.0% (19)	44.7% (17)	2.6% (1)	2.6% (1)	0.0% (0)
I believe further education in oral health effects of asthma medications is of benefit to my practice as a pharmacist. (<i>n</i> =37)	29.7% (11)	54.1% (20)	13.5% (5)	0.0% (0)	2.7% (1)
In your opinion, what type of general oral health advice is within the role of a pharmacist to provide?					
	Pharmacists (<i>n</i> =38)				
Pain relief	89.5% (34)				
Dental Referral	86.8% (33)				
Oral hygiene	86.8% (33)				
Product Recommendation	84.2% (32)				
Other Health Advice	7.9% (3)				
	Medication side effects		5.27% (2)		
	Doctor referral		2.63% (1)		

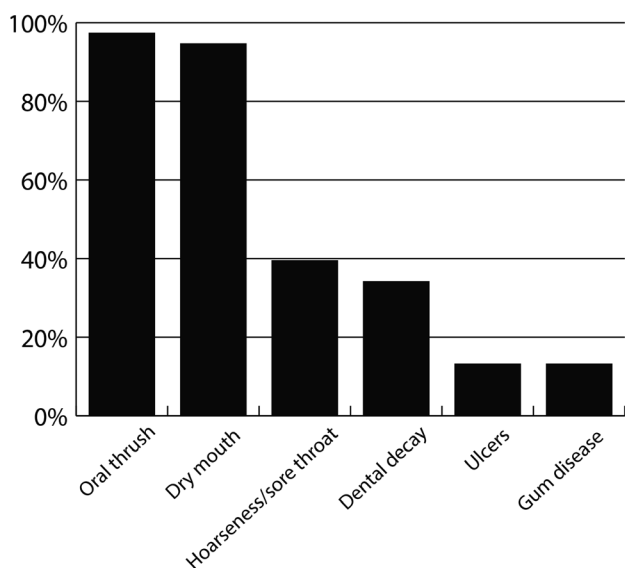


Figure 1. Pharmacist knowledge of oral side effects from asthma medications (*n* = 38).

and 60.5%, 23/38, respectively). The best mode of delivery was identified to be given in person by the pharmacist or dentist (97.4%, 37/38 and 92.1%, 35/38, respectively), followed by printed material (68.4%, 26/38) and web-based resources (21.1%, 8/38) (Table 3).

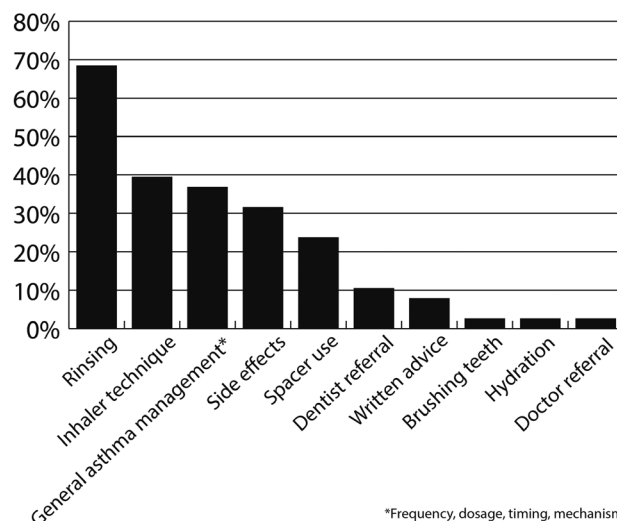


Figure 2. Treatment and advice given to asthmatic patients upon medication pick-up (*n* = 38).

Barriers

In total 63.8% (23/36) cited that a lack of standardized protocol was the largest barrier to providing oral health advice on asthma medications. Other barriers such as a lack of readily available information to provide to patients, professional contact with the local dentist, time, knowledge/training, saw a more mixed response, with similar numbers for and against.

A few respondents also identified that the wide periods between medication refills (2.8%, 1/36), patient motivations, interest, and compliance (5.6%, 2/36) may also limit their opportunity to give such advice (Fig. 3).

Discussion

Community pharmacists surveyed within the Cairns region feel that it is within their role to help manage the side effects of asthma medications. Many feel this is best conveyed during inhaler dispensing and instruction. Current advice is more prompted rather than preventative. Pharmacists routinely advise patients of mouth-rinsing following inhaler use, however the link to preventing side effects is not clearly communicated. Pharmacists are confident in recognizing and managing common side effects such as oral thrush and dry mouth, but fewer are aware of dental decay and gingivitis. Many identify a lack of guidelines as the largest barrier to providing preventive oral health advice.

Strengths and limitations of research

This study's limitations are largely due to small sample size and sampling methodology. Due to limited resources and time, the study was restricted to the regional city of Cairns, Queensland, Australia. Because the study took place

Table 3. Information delivery for oral health advice on asthma medications.

Pharmacist-reported best time to deliver oral health advice on asthma medications	Pharmacists (n=38)
When pharmacists educate patients on inhaler use	84.2% (32)
When pharmacists deliver asthma medication prescriptions	73.7% (28)
During a dental appointment	60.5% (23)
During a doctor's appointment	50.0% (19)
Other (When patients come in for their repeats)	2.6% (1)
Pharmacist-reported best mode to deliver oral health advice on asthma medications	
In person by the pharmacist	97.4% (37)
In person by the dentist	92.1% (35)
Printed materials (i.e. pamphlets, leaflets)	68.4% (26)
Web-based resources	21.1% (8)
Other	0.0% (0)

in a specific target area (regional Queensland), the results may not be representative of other areas in Australia. The total number of community pharmacists practising within this region is unknown. For this study, the number of professionals and an anticipated sample size were estimated based on information from the Pharmacy Guild of Australia (number of community pharmacies) and the Pharmacy Board of Australia (total number of national registered pharmacists).

Because no public register with contact details was available, convenience sampling was used. Other authors have also encountered similar issues citing that the lack of a public pharmacist register made sampling a limitation [5, 16, 17]. The modest number of responses in this study potentially reflects a low topic interest or a limitation of the sampling methodology. Other studies suggest it may be resultant of time barriers to complete surveys [5, 16, 17]. Given the response rate of this exploratory study, results should be interpreted and considered as hypothesis-generating only.

Survey terminology predominantly referred to 'dentists', rather than 'dental practitioners', in which respondents may interpret to be restrictive to a smaller portion of the dental workforce.

Survey data was collected in 2016, which may affect the conclusions' relevance in the current context. However, even with an updated literature review at the time of publishing, a scarcity of relevant studies and national surveys remains, especially those with a focus on the expanding scope of regional and rural Australian community pharmacists. As such, our authors still perceive value in presenting findings not previously reported in the current literature.

Strengths of the research were attributed to survey design. The survey was adapted from an Australian-piloted study, which was previously based on prior published studies evaluating the role of community pharmacies in oral health care [5]. This was then adapted and reviewed by an interdisciplinary group consisting of James Cook University professors and students with varying pharmacy and dental backgrounds to ensure quality and flow of the survey.

Main findings

The findings from this study show that the surveyed Cairns community pharmacists have a positive attitude toward promoting good oral health and view providing general or preventative oral health advice as part of their role. The 89.2% (33/37) of respondents in our study is similar to findings in

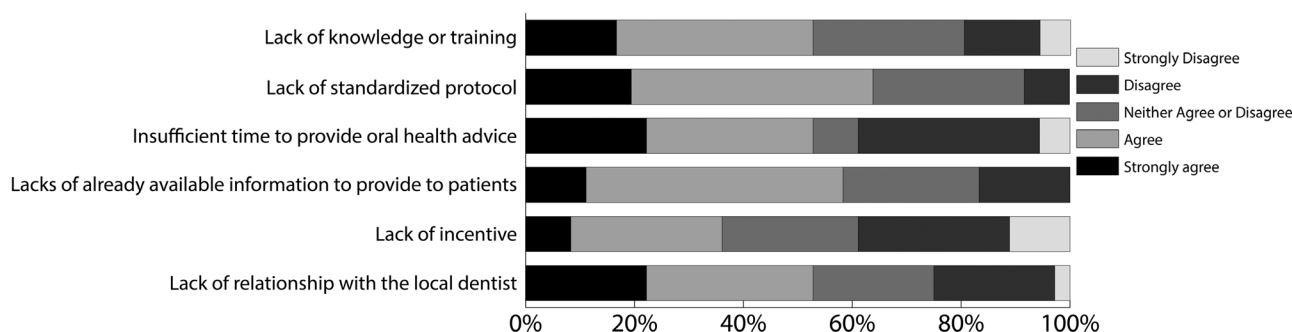


Figure 3. Pharmacist-identified barriers to providing oral health advice on asthma medications (n = 36).

past studies conducted by Freeman *et al.*, Mann *et al.*, and Taing *et al.*, whereby 94.1%, 99.4%, and 93% of community pharmacists are willing to take on the role of providing oral healthcare advice to patients [5, 18, 19]. Many perceive this role to include advising patients on pain relief, oral hygiene, product recommendations, and dental referrals whenever appropriate. Pharmacists were open to expanding their knowledge, with a majority agreeing that further education on the oral effects of asthma medications would benefit their practice. Further training was suggested to be best delivered either during their undergraduate training or through online continuing education.

Nearly all respondents believed patient education regarding the oral side-effects of asthma medications is best delivered through pharmacists when dispensing asthma medications and instructing patients on inhaler use. Even though nearly all respondents report that they already provide this information, less are putting this into practice. From the results of our study, it appears that this discussion is reported to occur more when these asthmatic patients attend for an oral health condition or query, as compared with when they pick up their medications. This may indicate that patient education regarding the oral effects of asthma medications is prompted more by patient enquiry rather than a preventative approach.

Pharmacists tended to prioritize discussions about rinsing, inhaler technique and asthma management when patients pick up their medications. This is in line with reports in the literature suggesting that current pharmacist-given patient education is predominantly aimed at improving asthma control, with little to no mention of the potential oral side-effects [20–27]. Rinsing still stands to be a benefit in reducing the oral amount of deposited inhaled corticosteroids, thereby lowering the risk of local adverse effects [28]. Despite this sound advice, it appears that the causative associations between medication and oral side-effects are not being clearly communicated to patients. This is particularly concerning, as a UK-wide study by Cooper *et al.* [29] suggests the prevalence of side effects is underestimated by clinicians when compared with actual patient reports.

When asked to identify the side effects associated with asthma medications, almost all pharmacists were able to correctly identify oral thrush and dry mouth, but fewer pharmacists correctly identified dental decay and gum disease. This suggests that pharmacists are less likely to associate these oral problems as medication-related side-effects. Additionally, when asked about the oral health products normally recommended to relieve local side-effects of asthmatic medications, appropriate recommendations of dry mouth products and antifungals was given. Fewer pharmacists recommended products aimed at preventing reoccurrence, such as mouthwash, toothpaste, and toothbrushes. Cairns community pharmacists were confident in their ability to identify and manage oral thrush and dry mouth as side effects of asthma medications, but management was more of a symptomatic nature and less preventative.

Respondents identified a lack of protocols in providing preventive advice as one of the largest barriers to promoting good oral health. This is a point of difference compared with previous studies, which predominately cite a lack of knowledge, time, and finances. Past studies also identify many other potential barriers to providing advice, including the lack of readily available information to provide to patients, lack

of relationship with the local dentists, lack of liaison with other primary care team members, lack of space, lack of remuneration, lack of personal interest, lack of state funding and lack of training [6, 11, 16, 18]. When asked about these previously cited barriers, our respondents were much more polarising or neutral, suggesting there may be other barriers at play, or that barriers may differ depending on the country or locality.

Policy, practice, and research implications

In the most recent 2015–2024 Australian National Oral Health Plan, emphasis is made on building partnerships that make oral health a focus for other health and allied services [30]. Even since 2015, in a statement on oral health jointly published by the Australian Dental Association and Pharmaceutical Society of Australia, joint collaboration between dentists and pharmacists is emphasized to ensure patients receive the right advice on medications potentially affecting oral health [27]. Although our findings suggest most pharmacists believe providing oral health information is within their scope of practice, it seems few take a proactive upstream approach to informing patients of associated side-effects from asthma medications. This highlights that although pharmacists are recognized for their important role in oral health promotion, the need for further support, guidance, and funding is required to realize this in practice. Further research is required to identify how this knowledge is best delivered to pharmacists. We hope future research may be able to build upon both this under-researched topic and population.

Conclusions

Cairns community pharmacists already self-perceive their role in the management of oral side effects of asthma medications. Advice given to patients is practical but does not clearly convey the causative associations between asthma medications and their potential oral side effects. Patient education is prompted more by enquiry rather than a preventative approach. The development of standardized practice protocols and an integration within undergraduate degrees or continuing education may benefit community–pharmacist delivered care.

Supplementary data

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

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Author contributions

A.H., I.L., and M.D. contributed evenly to all aspects of the research conducted. A.N. and F.C. kindly supervised the process and reviewed the final manuscript.

Conflicts of interest

The authors declare they have no conflicts of interest.

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Data access

All authors have complete and ongoing digital access to the tabulated study data.

Data availability

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

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