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Perspectives of general practitioners about a collaborative asthma care model in primary care

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ABSTRACT

Introduction: Asthma affects 2.7 million people in Australia and is predominantly managed by general practitioners (GPs) within primary care. Despite national focus on this condition, asthma control in the population is suboptimal, with many preventable hospitalizations. In the light of robust evidence supporting the role of pharmacists in the management of chronic diseases including asthma, the Australian Medical Association (AMA) proposed a General Practice Pharmacist (GPP) model in 2015. In this proposal, a non-dispensing pharmacist, co-located within the primary care setting and collaborating with GPs and allied health professionals, can make a positive impact on patients' health and minimize costs due to medication misadventure. The aim of this study was to obtain the views of GPs regarding the GPP model for better management of asthma in a qualitative study.

Methods: Semi-structured interviews were conducted with 23 GPs, audio-recorded, transcribed verbatim, and later analyzed for emergent themes. The GPs support the idea of a GPP as time and task pressures restrict them in adhering to asthma management guidelines.

Results: Support from another health professional in such a pressured environment can positively impact patient's health. Funding, clear role delineation within general practice, training of pharmacists working as GPPs, and effective communication systems were described as the potential catalysts for the success of the model.

Conclusion: Sustainable funding and the willingness of practice owners/managers were described as the barriers. The GPs agreed that pharmacists can make a positive difference in patient's asthma management once the barriers were effectively addressed.

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Introduction

Asthma affects 339 million people across the world and is one of the major contributors to global mortality (1000 deaths per day globally) (1). In Australia, it is listed as a National Health Priority Area (2), affecting approximately 2.7 million Australians and with 389 deaths in the country attributable to the condition in 2018 (3). Despite the availability of effective asthma medications on the Pharmaceutical Benefits Scheme (PBS) (4), asthma management is still suboptimal in Australia (5). Asthma, like any other chronic disease, is managed predominantly by general practitioners (GPs) within the primary care setting and is amongst the top reasons for GP presentations in Australia (6,7). The Australian asthma management guidelines (8) and Global Initiative for Asthma (1) (GINA) both recommend the need to use low dose inhaled corticosteroids (ICS) as first line therapy for managing

asthma symptoms in patients experiencing symptoms more than twice a month; if symptoms remain uncontrolled with this treatment, guidelines recommend stepping up to combination inhalers containing ICSs and Long Acting Beta Agonists (LABAs). In contrary to these well-established stepped approach guidelines, the most commonly prescribed preventer inhalers in Australia are ICS/LABA combinations (9). Further, a majority of patients continue to rely on Short Acting Beta Agonist relivers (SABAs) available in Australian pharmacies without prescription (10,11). Additionally, inadequate patient inhaler use skills result in poor pulmonary drug deposition, compromising therapeutic effect and consequently symptom control (12). Australian data suggest that only 10% of asthma patients can competently use their inhalers (13,14).

As medication supply (over the counter or prescription) occurs mainly in pharmacies and pharmacy

venues are highly accessible given long opening hours and a walk-in service rather than appointment-based care, community pharmacy housed asthma services have been a focus of many trials in Australia. The outcomes of these trials (15,16) clearly illustrate the benefits of community pharmacist-led interventions to the asthma patient, including improved asthma control, medication adherence, sustained self-management skills, and asthma literacy. The aforementioned trials were centered on care delivered by community pharmacists with doctor referrals provided to patients in a linear fashion with little interaction or true “collaboration”. The positive impact of collaborative care by community pharmacists and GPs on asthma patients’ outcomes has been previously reported, particularly improved inhaler use, higher asthma awareness, and decreased emergency department visits (17). Discrete practice locations, lack of shared patient information, funding models, and role boundaries, however, limit GP–pharmacist collaboration in current practice, and innovative models that foster such collaboration are needed.

In the United Kingdom (UK), the National Health Service (NHS) introduced a General Practice Pharmacist (GPP) model as a part of the General Practice Forward View initiative (18–20). These pharmacists are non-dispensing clinical pharmacists working within the primary care setting supporting GPs (20) in all aspects of pharmacotherapeutic decision making. Similarly, the Australian Medical Association (AMA), proposed the Pharmacist In General Practice Initiative Program (PGPIP) in 2015 (21). This proposal stated clear roles for the GPP and highlighted that GPP models likely save costs (every dollar invested in GPP would save \$1.56 to the health system) incurred through medication misuse and over-prescribing leading to a reduction in preventable hospital admissions related to medication misadventures (21).

Demonstration projects showcase patient and GP acceptability of such models and preliminary evidence of improved clinical outcomes through GP–GPP provided care in Australia (22,23). In these studies, GPs and GPPs were mostly interviewed *post hoc* after a pilot had been implemented rather than engaging with stakeholders *prior to* commencement and through the process in co-designed research approaches. Implementation science theorists however suggest that the first step in the development of most new health service models is to explore the perspective of potential stakeholders likely to participate in the development of the service (24). This

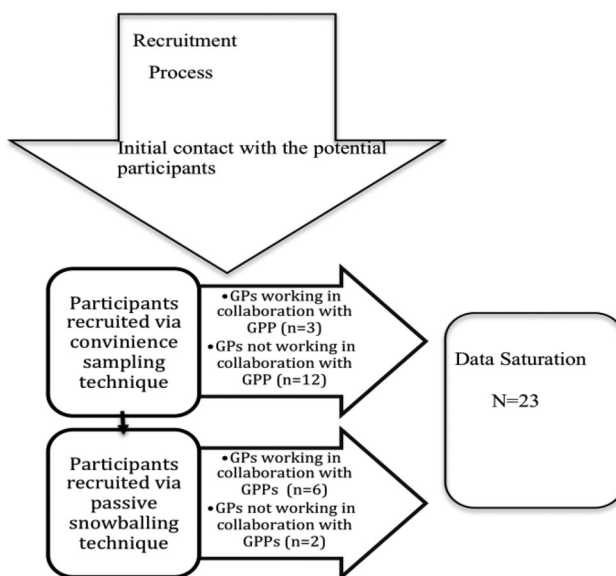


Figure 1. Illustration of recruitment process.

information could lead to the development of pragmatic service models.

The aim of this study, therefore, was to qualitatively elicit GPs’ views and recommendations about models of collaboration in primary care involving the integration of non-dispensing pharmacists within GP practices for the specific purpose of supporting GPs in providing asthma management services.

Method

Study design

The study protocol was approved by the Human Ethics Committee at the University of Sydney (protocol number 2017/582). Qualitative inductive methods were employed to achieve the objective(s) of the study. Given the anticipated uniqueness of the individual perspectives of GPs, in-depth, semi-structured interviews were utilized.

Participants and recruitment

Criteria for inclusion of participants were that participants needed to be GPs who were currently registered with the Australian Health Practitioner Regulation Agency (AHPRA) and were currently working within a primary care setting. The exclusion criteria were GPs not currently practicing or not practicing within primary care.

The participants were recruited *via* convenience sampling followed by a passive snowballing technique (25) as illustrated in Figure 1. The convenience aspect of the sampling involved contacting (email/phone)

GPs known to the research team with interest in asthma management. The participants recruited through this approach were requested, once their participation was complete, to forward research information to other colleagues who would be interested in participation (passive snowballing). The participants recruited *via* passive snowballing provided their contact information to the research team and mentioned their preferred manner of conducting the interview (face-to-face or over the phone). Informed consent was obtained from all participants prior to conduct of the research. It was proposed that the sample size would be determined by data saturation, but nonetheless a goal was to conduct 20–25 interviews as this number has been suggested as usually sufficient to achieve data saturation in qualitative interviews when a group that is relatively homogenous (in our case professionally homogenous) are interviewed on a topic that is not personal (interview topic related to professional practice rather than personal beliefs *per se*) (26).

Data collection

A thematic analysis using the inductive approach was adopted to obtain the insights from GPs working within a primary care setting. Data were obtained through in-depth open-ended interviews. The semi-structured interview guide (Appendix 1) was custom designed for this study and was based on a focused literature view (27) which had explored GP–pharmacist collaboration as well as the cumulative experience of the research team members in qualitative research in primary care. The interview guide contained three main sections. The *first section* comprised of general demographic questions, which allowed the interviewer to ease the participants into the second section of the interview guide. This *second section* was designed to obtain a deep understanding of GP’s current asthma management experience, for example, clinical insights into the management and challenges faced by GP participants when they are managing their patients with asthma and potential roles of other health professionals in asthma management within primary care. The *third and last section* of the interview guide was designed to gather GPs views regarding the AMA proposal (28) of a GPP, specifically for asthma management. The guide comprised broad questions with embedded prompts to be used when required for deeper probing. The interviews were conducted by a researcher who had prior training and experience in qualitative data collection (AQ) and were audio-recorded using an audio recording application on

a laptop. The audio-recorded interviews were later transcribed verbatim for analysis.

Data analysis

The coding of the transcribed data was performed using the NVivo® 11 software (QSR International, Melbourne, Victoria, Australia). The data were analyzed based on the Braun and Clarke (29) framework approach for data analysis. This provides a stepwise systemic approach consisting of six phases including, “familiarization with data”, “generation of initial codes”, “searching for themes”, “reviewing themes”, “defining themes”, and “writing up”. Data from three interviews were independently coded by the first and the last authors to reduce bias, and discussions following this independent coding led to the development of an agreed coding framework. The first author coded the remainder of the data independently. Codes that mapped cohesively to a particular topic were then coalesced into emergent themes following discussions between all research team members. The research approach was adherent to the commonly used CONSolidated criteria for REporting Qualitative research (COREQ) (Appendix 2) (30).

Results

Data saturation was achieved after the completion of 23 interviews (convenience sample, $n=20$ and passively snowballed sample, $n=3$), Figure 1. The interviews were conducted between June 2018 and April 2019, either face to face ($n=2$) or over the phone ($n=21$), depending on the convenience of the participants. The interview duration ranged between 14 and 45 min. Participants included GPs from the metropolitan Sydney area in the state of New South Wales in Australia, regional New South Wales as well as interstate in metropolitan Melbourne (Victoria).

Most of the participants ($n=13$) had less than 10 years of practice experience. Only a few ($n=4$) mentioned undertaking additional respiratory training. The demographics of the participants are illustrated in Table 1. Five of the participants had been working with a GPP in their practices and their views varied somewhat from the rest of the GPs. The interviews yielded rich, “thick” data that could be coalesced into three major themes and three subthemes as illustrated in Table 2 and outlined below. For the purpose of analyzing data in a de-identified manner, every participant was assigned a code, consisting of the letter “GP” followed by a number. This code, the participant’s gender (M or F) and whether they had

Table 1. Demographics of the participants.

Gender	
Females	n = 13
Males	n = 10
Years of experience	
0–5	12
6–11	2
>11	9
Specialized respiratory training	
Yes	n = 4
No	n = 19
Employment status	
Full-time	n = 21
Part-time	n = 2
Locum	n = 0
Practice involvement with incentives	
Asthma cycle of care (ACC)	n = 9
General practice pharmacist (GPP)	n = 2
ACC & GPP	n = 4
None	n = 8

Table 2. Emergent themes and subthemes.

Themes and subthemes
Challenges in asthma management
Opinion on patient's attitude and asthma literacy
Health care and organizational issues
Perceptions about possible GP-GPP collaborative care models
Practicalities of implementation of an asthma management GPP model
Potential impediments and facilitators

experience of working with a GPP (yGPP) or not (nGPP) are described in square brackets following data (textual quotes from transcribed interviews) that are presented along with description of each theme in the sections below.

Table 3 highlights the clinical roles that these participants suggested that GPPs could have in asthma management in general practice.

Theme 1. Challenges in asthma management

Opinion on patient's attitude and asthma literacy

The participants, regardless of their experience of working with a GPP, mentioned similar negative opinions regarding patients' attitudes and low asthma literacy and suggested these to be the major challenge in treating asthma patients. Participants reported that their patients potentially visit multiple GPs, sometimes the diagnosis and management of asthma are overseen by different GPs in the same or other practice sites leading to fragmented care. Many participants thought overall asthma literacy in their patients was low resulting in a suboptimal level of self-management of asthma. Participants observed that their patients appeared to have a "no symptoms – no worries" attitude; with such patients tending to visit their GPs or using their preventer medication only when they felt they were unwell. Nearly all participants reported that patients

demonstrated a lack of adherence to their preventer medication regimen, overused their reliever medication and often were not competent in using their inhaler.

"Those patients go to multiple different practices, whatever is convenient for them, especially the working patients who may go to a practice near their work and then visit one that is close to home." [GP-019-F-yGPP]

"They (asthma patients) are not taking their medication regularly, but they are using their reliever more often than required, and are not using the preventer." [GP-009-F-yGPP]

"Even after so many years of using XXX (salbutamol inhaler brand), there are patients who don't even know how to use it (aerosol inhaler) properly." [GP-002-M-nGPP]

All participants acknowledged that their provision of written asthma action plans was limited and occurred only in the case of children, especially as Schools/Childcare organizations in NSW mandate parents to provide their child's current asthma action plan, which needs to be updated annually. As such requirements are not pertinent in adult asthma patients, action plan provision was rarely initiated for adult patients.

"The school recommends the parents to get an asthma action plan for the children. However, there are no requests from the adults maybe because they are busy working but when it comes to the childcare or school, they do request asthma action plans?" [GP-022-M-nGPP]

Health care and organizational issues

The participants also reported several organizational and health care system issues that result in asthma management gaps. From an organizational perspective, most participants reported dealing with time and task pressures, which negatively impacted guideline-based care when treating patients with asthma. The practice budget was another organizational factor reported. Participants from smaller practices, in particular, described having staffing issues, for example not affording a practice nurse who could assist in patient asthma management.

Health system issues reported related to medication costs. Participants indicated that medication costs were perhaps a deterrent to purchase of preventer medications, and that this could be an underlying issue in adherence to these medications. One of the participants, [GP-001-M-nGPP] with overseas practice experience, described the provision of free spacers and peak flow meters to asthma patients through the public health system in other countries, which helped alleviate some of the medicine cost burden on families.

"I think a lot of patients do not comply with their medications because they have not been provided with spacers and inhalers like xxxx (Salbutamol Brand) or

Table 3. Potential roles of general practice pharmacists mentioned by the study participants.

Pharmacist roles in asthma management (based on previous research)	Highlighted and supported by a majority (>66%) of participants	Actively highlighted and supported by some GP participants (i.e. <66%)	Not highlighted in the discussion by any participants
Assessing asthma control		✓	
Assessing appropriateness of therapy in the context of asthma control	✓		
• dosing, regimen	✓		
• drug selection	✓		
Measuring lung function (spirometry)		✓	
Checking preventer medication adherence	✓		
Providing adherence support	✓		
Checking inhaler use skills	✓		
Upskilling patients on inhaler use	✓		
Checking for drug interactions of asthma medications and recommending appropriate changes	✓		
Checking for adverse effects of asthma medications and making appropriate recommendations	✓		
Facilitating the step-up and step-down of preventer therapy as needed		✓	
Helping in de-prescribing solo reliever use (whether over the counter or prescription use)	✓		
Exploring patients' asthma triggers and making appropriate recommendations		✓	
Checking asthma action plan ownership status and referring patient to their doctor to obtain one		✓	
Exploring potential comorbid conditions that affect asthma and making therapeutic recommendations for these conditions		✓	
Providing regular follow-up and monitoring to asthma patients	✓		
Educating asthma patients about asthma	✓		
Educating asthma patients about self-management	✓		
Upskilling asthma patients about asthma first aid	✓		
Assisting in patient centered care by goal setting with patients			✓
Answering patients' questions or concerns	✓		
Training practice staff about current and new asthma medications		✓	
Training practice staff about inhaler use			✓

peak flow meters. I remember working in xxxx (name of country), we used to provide patients the spacers and peak flow meters to give them understanding (of their own lung function) and a bit of an education." [GP-001-M-nGPP]

The participants described the existence of an Asthma Cycle of Care (a Practice Incentive for Asthma Management for GPs) (31) in practice. Due to a lack of regular availability of the nurse practitioner and their patient's negative attitudes in terms of attending follow-up visits, the impact of this service was reported to remain insignificant.

"Because of the lack of staffing availability at the moment, we don't have a full-time nurse." [GP-003-M-nGPP]

"The nurse in our practice is trained to do spirometry. If I need lung function tests done for one of my patients and if she is finished for the day, we lost the chance." [GP-015-F-nGPP]

Theme 2. Perceptions about possible GP-GPP collaborative care models

Nearly a fifth of the participants reported working in a primary care setting where a GPP was present as a part of the multidisciplinary team. The views of these

participants toward a collaborative care model for asthma differed to other GP participants in terms of level of trust in the pharmacist's clinical skills and the extent of desirable collaboration (Table 4). These participants already reported a high level of trust in their GPP colleagues, expressed a desire for deeper, immersive collaboration, and had far more pragmatic suggestions on developing and sustaining GPP models. Nonetheless, all participants, in general, expressed a positive attitude toward collaborative care models for asthma.

"I have the experience, having an in-practice pharmacist. It has been extremely valuable in building capacity, improving general practice knowledge (around medications), including patient knowledge, and including patients who will learn to self-manage" [GP-018-F-yGPP]

"The thought of the model [GP-GPP asthma care model] is really good. I would say it's beneficial for both patients and the doctors." [GP-003-M-nGPP]

Theme 3. Practicalities of implementation of an asthma management GPP model

The participants expressed similar opinions when probed about practicalities of installing a GPP, regardless of having or not having had experience working

Table 4. The difference in views of GPs working in different primary care settings.

Views of GPs working in collaboration with GPP	Views of GPs working in usual primary care setting
<i>Level of trust</i>	
"I think the fact that it's screening it means you're using a tool so it means anyone with the appropriate training using a tool can be able to screen." [GP-018-F-yGPP]	"Yes, they can screen (comorbidities) based on the medications taken in the past or any side effects but not based on the symptoms." [GP-006-F-nGPP]
"It could be de-prescribing if that's an option, changing medications to something more suitable if that's an option, education to the patient and why they're taking what they're taking and then making follow-ups appointments in there." [GP-018-F-yGPP]	"I prescribe a medication for a patient and if at all the chemist has some concerns with regards to this, I would be having a doubt regarding to what extent I should go by his opinion." [GP-014-M-nGPP]
"We do regular case conferences between pharmacist, myself and the practice nurse and the medical assistant to see if she (GPP) picks up or we pick up something we can change or we should check." [GP-017-M-yGPP]	"We have at the moment an appointed nurse just for chronic disease. Maybe she would do it but although she is not a pharmacist, maybe doing more of the asthma devices plus we a senior nurse in a treatment room who does the asthma plan checks the spirometry and talks to the patients about it." [GP-015-F-nGPP]
"With our GP community pharmacist, not the dispensing pharmacist, because she's there in our practice, and she also does inhaler technique and discusses a possible action plan with us, as well as all the things that I said our nurse gets involved with as well." [GP-019-F-yGPP]	"I don't know if this is going to be feasible in our practice. We've got the nurses who are doing it." [GP-020-F-nGPP]
"The other thing our pharmacist does is checking, for example, all the asthma COPD patients, we downloaded who they were, we look at the data and when the guidelines changed for COPD where inhaled corticosteroids were now the third line, we went through and thought who could we take off inhaled corticosteroids, who could we put on LAMA, LABA instead. She's been instrumental in some of our data, looking at the data and bringing patients back in, and changing them according to guidelines." [GP-019-F-yGPP]	"Asthma management and pharmacists. I can't think of much but, obviously, quite a number of doctors are not aware of the number of products and the type of products available in the market. I think pharmacists can probably play a role or the doctors can play a role by asking the pharmacists as to what products are available and the brands that are available" [GP-004-M-nGPP]
<i>Level of collaboration</i>	
"We've got a pharmacist at our practice that comes in once a week. He does a medication review. If there are any patients we're worried about, we can send to him either at home visits or if there are any other issues and we're worried about interactions, or just needs education, the patient can come in and see him at the practice as well ... often, if there are any concerns, we'll just give him a call or have a discussion with him and we manage it that way." [GP-012-F-yGPP]	"I always collaborate with the chemist when I find the patient is not getting the message. For example, the patient is on multiple medications, so I put them on the Webster pack. We keep communicating with the chemist. We sometimes also do HMR" [GP-022-M-nGPP]
"All the health professionals including their regular GP and the other allied health people can view the things that have been discussed with the clinical pharmacist and what other suggestions which are being given for the future management." [GP-009-F-yGPP]	"We expect that when the patient takes the script to the pharmacy, the pharmacist shows the technique and check on their inhaler technique as well, but we are not aware if they are actually doing it." [GP-010-F-nGPP]

with a GPP. These practical issues raised included methods of communication (face-to-face case based conferences, access to practice software, written reports), generalizability of the pharmacist role, need for training of the pharmacist, setting up protocols, and logistics (consultation room set up for GPP). Role delegation for GPPs not only centered around medication review and medication education, but also included raising asthma awareness in asthma patients.

"I think the main thing is to have a really close team-based approach to the multidisciplinary team. The nurse, the pharmacist, and the GP working quite cohesively together and face-to-face communication- having time for that is really important." [GP-018-F-yGPP]

"I see a lot of comorbidities in my practice. I think the role of the pharmacist in my practice would be generally looking at the medications and seeing their appropriateness of each therapy, including puffers and asthma medications." [GP-007-F-nGPP]

"If there is no separate room then we can use the treatment room for a short period of time say for 2–3 hours for the pharmacist." [GP-011-M-nGPP]

Potential impediments and facilitators

In addition to pragmatic issues in implementing GPP models within general practice, participants described a few barriers. Funding was reported to be the key barrier. Financial constraints were mentioned even by GP participants who already had GPPs working in their practices. Many participants from Western Sydney suburbs indicated that the local Primary Healthcare network organization (WentWest) (32) had funded a pilot GPP project, however the concern raised was, how practices could keep GPPs on as staff once the funds allocated to the project had been expended. The other aspect of the financial barriers reported related to the need for renovating practice

infrastructure, for example creating a separate room for the GPP.

Finally, several participants highlighted that if the GPP model was implemented in their practice, it would be likely to include a focus on all chronic conditions rather than just on asthma. Competition was another financial angle, given the GP remuneration framework depended on billing per consult, if GPPs took over consultation with patients, this would affect income of individual GPs within a practice.

Differences in professional perspectives also appeared to pose a problem for some of the participants as they felt approach to medication use differed between pharmacists and GPs.

“Barriers would be funding. Who’s going to pay for this person [GPP] to be in our practice? At the moment, in practice, the local primary health network is funding her wages. But a general practice at the moment is squeezed for funding as it is, who’s going to pay for these people [GPP] to be there? These are professionals that deserve a professional wage, they’ve got to be paid by somebody, and usually, it’s down to money.” [GP-019-F-yGPP]

“If there are more consults, the doctors would earn more money. If there are fewer consults, the doctor will earn less money... I think there will always be a lobby against that.” [GP-004-M-nGPP]

“I feel like this can be a conflict in decision making. GP will prescribe a drug and the pharmacist will say ‘No, this drug is not going to work’. Everyone is thinking in a different way.” [GP-006-F-nGPP]

Discussion

This study delivered unique insight into the asthma management challenges faced by Australian GPs working at diverse locations and in differently configured practice set-ups varying from solo GP practices to large GP centers. In view of the aim of the study to explore GP perspectives on collaborating with practice pharmacists (GPPs), results highlighted a fairly positive stance as participants posited how integrating GPPs within their practice could address some of the asthma management challenges. GP participants highlighted various enablers and impediments that would likely be practically encountered when actually setting up GPPs as part of their practices. A rich list of potential ways to tackle the logistics of the GPP–GP asthma care model was also proffered by the participants. The maximally varied sample encompassed GPs who were experienced in working with GPPs as well as those with no such experience. The former appeared more supportive and were able to provide

very concrete directions to enable such models into practice.

Amongst the key challenges noted by participating GPs were those around patient allocation within practices as well as patient behavior. Participants indicated that diagnosis and management of asthma were often carried out by different GPs, either within the same practice or otherwise. This often resulted in the re-issue of a previously prescribed, possibly inappropriate asthma medication/device. These observations by our GP participants are borne out in larger studies (33–35). An analysis of Medicare¹ claims for GP consults over a 10-year period indicated that only 50% of patients see the same GP, although about 80% at least see a GP in the same practice (33). Clearly, this compromises the continuity of care in chronic conditions such as asthma and is a factor that needs to be addressed. The new electronic health record (My Health Record) recently introduced in Australia may help enhance continuity of care through the shared care platform (36).

The participants’ views about asthma specific roles for pharmacists were quite medication/therapy focused (Table 3). GP participants also highlighted their patients’ low adherence to asthma medications, especially preventers, as well as low inhaler use skills; these are often cited as the key reason for suboptimal control of asthma in the literature (37,38). Many participants also highlighted that their patients rarely requested written asthma action plans, unless it was for a pediatric patient, where state school regulations required individual asthma action plans for students with asthma. In detailing these challenges, GP participants outlined that such issues are addressable by practice pharmacists. Current reviews of Australian GP’s asthma management practices suggest that in addition to patient education related issues, GP care deviates from recommended guidelines, for example in the overuse of longer term high intensity (moderate to high dose inhaled corticosteroid/long acting beta agonist (ICS/LABA) treatments, low patient asthma action plan provision and overestimation of a patient’s symptom control (39). Many of these issues possibly arise from time or task pressures (40,41), which can be addressed by practice support staff, particularly pharmacists whose training focuses on quality use of medications. The need for medication education experts is likely to be called for as global asthma guidelines shift toward recommending that even in mild asthma, low dose preventers are essential and SABA reliever use without preventer cover is unsafe (1).

Generally, integrating a non-dispensing clinical pharmacist into primary care has been shown to have

a positive impact on patient's health and stakeholders have demonstrated eagerness for the implementation of this model (42,43). Only one Australian study tested this specifically for asthma, where in a Canberra based pilot study testing the general feasibility and effectiveness of the GPP–GP model, data were extracted specifically for asthma outcomes (44). Results highlighted that the mean Asthma Control Test (ACTTM) (45) score was significantly improved in 23 patients, between the initial consult and the final visit, that is, from 14.4 ± 5.2 to 19.3 ± 4.7 , $p < 0.0001$ (44). Given cumulative effectiveness data from robust trials investigating effectiveness of pharmacy based-pharmacist-delivered asthma interventions (46), it is of course not surprising that pharmacists can affect the same benefits when working in a different venue. What needs to occur, of course, are pragmatic ways of “transplanting” successful Australian asthma service models used in a community pharmacy setting by a patients' dispensing pharmacist to similar services (16,46) provided by a pharmacist located within and working with a patients' GP.

Toward that end, Ryan et al. (43) described the implementation catalysts of the GPP model and these included pharmacist training, role-clarity to facilitate work as a part of a multidisciplinary team, setting up appointment systems, keeping non-medical staff in the loop, effective communication, and time required to build trust in pharmacist skills (47). These facilitators were consistent with those proposed by participants in our study. The Pharmaceutical Society of Australia (PSA) also recently described essential criteria for a pharmacist to work as GPP (48). The GP participants in our study who were already working in collaboration with GPPs also described similar credentials of their in-practice pharmacists. To boost the pool of pharmacists in GPP models, universities are now starting to offer part-time courses for registered pharmacists to develop additional skills required to fulfill the duties of GPP (49).

Tan et al. (47) in their Pharmacist in Practice Study (PIPS) discussed the need for a private consultation room for the GPP, which is also emphasized by the participating GPs of this study. The need for a private consultation room may call for logistical adjustments within the practice and can be a potential barrier. However, it was suggested by the participants experienced in working in collaboration with an onsite pharmacist, that GPP working part-time, on set days of a week could acquire any room available in their practice, it was a matter of strategic rostering. Rostered days for GPPs may be a way for space management, especially in space-constrained smaller GP practices.

Development of trust in the non-dispensing pharmacist integrated into general practice can be a slow process (43) and an initial barrier. This is also described by a few of the participants of this study already working in collaboration with GPPs. Effective communication and patient/practice gains over some time were able to dissolve issues of trust (43) as described by GPP experienced participants. In implementation toolkits that can be developed for GP organizations setting up GPPs, perhaps pharmacy organizations can provide key examples, case studies and endorsements by other GPs who trust and appreciate the role of a GPP, thus building subjective norms that influence attitudes and behavior change (e.g. based on the Social Cognitive Theory/SCT) (50). In a theory-enriched drive to enhance uptake of this new model of practice, an implementation science approach would be helpful. Finch et al. (51), for example, describe the Normalization Process Theory and instruments based on this theory that practices can use to self-assess readiness for adopting GPPs and develop processes toward implementation (52).

Finally, as in most innovative ideas in health care, remuneration is a key barrier in the implementation of the GPP model (53,54) and our participants consistently brought this up as an issue. A few of the participants of this study suggested the involvement of the Medicare Benefits Scheme (MBS) (55) for sustainable means of remuneration. In the UK, the NHS granted £38,000 to every primary care network to recruit a clinical pharmacist from July 2019 (56). The NHS remains determined to continue to support the clinical pharmacist's program by reimbursing approximately 70% of the cost of recruiting a GPP in general practices during 2019–20 (57). There is enough evidence (16,42–47,57,58) to support the role of clinical pharmacists within primary care. There is a need for involvement of the government for sustainable funding by setting up an item code under MBS for the clinical services provided by GPP. Indeed, other researchers (58,59) exploring quality improvement in general practice have reported that GPs feel supported and can better enact evidence-based care when practice incentives payments for allied staff such as practice nurses are provided; funding for practice pharmacists should be urged and rallied for.

Limitations and strengths

This study, like any research is not without limitations. This project showcased the opinions of the GPs on integrating a clinical pharmacist into primary care

setting. However there is need to obtain viewpoints of other stakeholders such as practice managers and nurses, actively involved in the running of primary care practices, in order to achieve a feasibility of colocation and collaboration.

Whilst it may be felt that patient attitude problems reported in this study have also been reported previously, hence are not novel, the currency of some of these issues is noteworthy, given much investment has been made to address GPs care of asthma patients in Australia *via* practice incentives and support for practice nurses. The strength of the study besides stakeholder engagement, is the expressed need by GPs for further help in asthma management particularly around therapeutic decision making. These findings provide a strong rationale for investment in GPP–GP models, especially models with a focus on asthma in addition to other general medication expertise roles for GPPs. A robust qualitative approach was followed and lends trustworthiness to study results.

Conclusion

GP participants in the study believed that integrating a non-dispensing clinical pharmacist in primary care can potentially improve the adherence to up-to-date asthma guidelines and deliver a broad range of asthma services in the light of evidence-based asthma management strategies. The GPP may not only support GPs by performing asthma medication review but also delivering asthma education to their patients. The willingness of stakeholders, trust in pharmacist skills, and logistic barriers can be resolved over time. Funding is seemingly the only key barrier where government intervention may be required to make the model work.

Note

1. Medicare is a program by Australian Government Department of Human Services and provides Australian some health services at low to no cost.

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Author contribution

The initial literature review was conducted by AQ. The interview guide was established by AQ under the

supervision of BS. All the interviews were conducted by and analyzed by AQ. The coauthors (BS and CA) peer reviewed and approved the final version of the manuscript.

Declaration of interest

There is no conflict of interest to declare.

Data availability

The data supporting the results of this study can be provided from the corresponding author upon reasonable request.

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Appendix 1. Semi-structured interview guide for general practitioners

Interviewee Code: _____

First I would just like to confirm some demographic details about you.

Date of interview: _____

Venue of the interview: _____

Main job type (primary care, hospital, community centers, locum) _____

Size of the surgery/medical center (no. of patients/ no. of staff) _____

No. of years in practice as a GP _____

No. of years of specialized asthma/COPD training IF ANY _____

Note to Interviewer: Ensure there are no identifiable markers about interviewee/their practice listed in the above details

NEXT, I would like to ask about you day to day experience with asthma patients.

Q1. From your experience, please describe the type of asthma presentations in your everyday practice
Prompts

- Number of asthma patients per day/week
- Type of asthma – mostly acute/chronic/intermittent/ seasonal/allergic. induced/exercise induced
- Type of patients – age, gender
- Un-controlled asthma as a primary reason for the patient's presentation in the GP practice

Q2. For what reason do asthma patients generally visit you?
Prompts

- Troublesome symptoms
- Asthma exacerbations
- Recent hospitalization
- Repeat prescriptions
- For regular review

Q3. How do you generally assess asthma control in your patients?
Prompts

- Questionnaires
- Lung function test
- Peak flow meter
- Clinical symptoms/clinical history

Q4. What are some of the difficulties/challenges you feel you face in treating those with asthma?

Prompts

- Patient's lack of awareness of the condition (asthma)
- Patient fear of using inhaled steroids/meds
- Patient lack of adherence to their preventer medication
- Improper inhaler technique leading to suboptimal control of symptoms
- Lack of review visits
- Continued exposure to triggers (smoking)

Q5. How often do your patients request an asthma action plan?

Q6. In your opinion what other health professionals can play a role in improving asthma outcomes in primary care
Prompt

- Practice nurses/community pharmacists/others

NEXT, I would like to ask your opinion of pharmacist's roles in asthma

Q7. Have you collaborated with pharmacists regarding a patient's health/medications previously?

Prompt

- If yes, go to Q8
- If no, are there any reasons for not collaborating? Go to question 10

Q8. What sort of collaboration have you undertaken with pharmacists to achieve optimal outcomes for patients with asthma (or patients with other lung health conditions)?

Prompts

- *Have not collaborated with any pharmacist – GO TO QUESTION 10*
OR
- *Have collaborated – if this is the case then explore further:*
 - Medication choices and doses
 - Checking out for and managing any side effects
 - Offering patients asthma education
 - Measuring lung function
 - Screening for poor asthma control

Q9. How have these collaborative services worked?

Prompts

- Type of collaboration
- Communication channels

Q10. In your opinion, what sort of collaboration between doctors and pharmacists regarding asthma management would you think will be beneficial in the FUTURE? And how would it happen?

FINALLY, I would like to ask about your opinion of a particular collaborative care model for asthma.

In 2015, the Australian Medical Association's (AMA, 2015) provided the Government with a proposal entitled "General Practice Pharmacists-Improving Patient Care" to make non-dispensing pharmacists a key part of the future general practice health care team. This proposal is based on an analysis that this model would save the health system costs related to medication safety and enhance effective use of medications.

Q11. How do you feel this would work in your practice?

Prompts

- Benefits
- Barriers

Q12. And specifically in terms of asthma health?

Prompts

- Benefits
- Barriers
- Mechanisms

Q13. Looking specifically at the issue of suboptimal control of asthma, specifically what roles would you perceive a specialized trained asthma pharmacist performing within a general practice environment?

Prompts

- Screening asthma patient-lung function test
- Screening patients for other co morbid illness – rhinitis/ GORD/anxiety
- Medication review
- Increase patient's awareness of asthma and importance of adherence to ICS
- Demonstration of correct inhaler technique
- Lifestyle management, for example, smoking cessation programs

Q14. Now I would like you to consider the scenario that there is funding support from the Government to trial this model. If your practice were to opt for a trial of such a model- focused on lung health (and asthma specifically), how would you envisage it working (or what are some of the protocols/infrastructure issues you may have to address)?

Prompts

- Room set up, training, staff-pharmacist meeting, appointment system for pharmacist.
- Workflow, for example, direction of referral, role for pharmacist, information sharing (prescription software-specific section for pharmacist notes)

- Outcomes: what markers of success would your practice look for? For example numbers of patients reviewed, medication issues identified, patient outcome

Would you like to add anything further on this topic?

Appendix 2. Consolidated criteria for Reporting Qualitative research (COREQ)-check list

Domain 1: Research team and reflexivity

Personal characteristics

- | | |
|--|---|
| 1. Interviewer/facilitator | ✓ |
| 2. Credentials | ✓ |
| 3. Occupation | ✓ |
| 4. Gender | ✓ |
| 5. Experience and training | ✓ |
| Relationship with participants | |
| 6. Relationship established | ✓ |
| 7. Participants knowledge of the interviewer | ✓ |
| 8. Interviewer characteristics | ✓ |

Domain 2: Study design

Theoretical frame work

- | | |
|--|---|
| 9. Methodological orientation and theory | ✓ |
| Participant selection | |
| 10. Sampling | ✓ |
| 11. Method of approach | ✓ |
| 12. Sample size | ✓ |
| 13. Non-participation | ✓ |
| Setting | |
| 14. Setting of data collection | ✓ |
| 15. Presence of non-participants | ✓ |
| 16. Description of sample | ✓ |
| Data collection | |
| 17. Interview guide | ✓ |
| 18. Repeat interview | ✓ |
| 19. Audio/visual recording | ✓ |
| 20. Field notes | ✓ |
| 21. Duration | ✓ |
| 22. Data saturation | ✓ |
| 23. Transcripts returned | ✓ |

Domain 3: Analysis and findings

Data analysis

- | | |
|---------------------------------|---|
| 24. Number of data coders | ✓ |
| 25. Description of coding tree | ✓ |
| 26. Derivation of themes | ✓ |
| 27. Software | ✓ |
| 28. Participant checking | ✓ |
| Reporting | |
| 29. Quotations presented | ✓ |
| 30. Data and finding consistent | ✓ |
| 31. Clarity of major themes | ✓ |
| 32. Clarity of minor themes | ✓ |