Giving Asthma Support to Patients (GASP) program evaluation

Nicholas A Zwar, Iqbal Hasan, Andrew Hayen, Anthony Flynn, Judy Mullan, Elizabeth J Halcomb, Andrew Bonney

Background and objective
The Giving Asthma Support to Patients (GASP) program, developed in New Zealand, guides practice nurses to provide structured asthma care. This study assessed GASP in the context of Australian general practice.

Methods
The study used a pre–post design and was conducted in 19 practices in Western Sydney and Illawarra/Shoalhaven. Patients aged 5–70 years with moderate-to-severe asthma were invited to participate. Of the 289 patients who attended an initial GASP consultation, 153 attended for one or more follow-up visits. Outcomes were exacerbations requiring medical intervention in the previous 12 months, asthma control in the previous four weeks and quality of asthma care at the time of GASP consultation.

Results
There was a decrease in patients having one or more exacerbations (113 [74%] versus 80 [52%], *P* <0.001), and an increase in patients with good asthma control (21 [14%] versus 40 [26%], *P* <0.005). There was no significant change in the quality of asthma care variable.

Discussion
Implementation of the GASP program was associated with improvement in asthma outcomes.

ASTHMA ACCOUNTS FOR 2.4% of the Australian burden of disease affecting 10% of Australians across the lifespan, impacting quality of life and participation in work and school and leisure activities.[1] Despite the significant burden, many people with asthma do not receive evidence-based care.[2,3] There is evidence that regular structured review and support for self-management leads to better asthma outcomes, and this is recommended in both Australian and international guidelines.[3–5] However, initiatives to support the provision of planned care, such as the Asthma 3+ visit plan, have not achieved lasting success.[6] Qualitative work with Australian general practitioners (GPs) found that time and suitable remuneration were barriers for GPs to providing structured review,[7] and GPs indicated support for a nurse or other health professional to take on the task of patient support and education.[7] Most general practices in Australia now employ one or more practice nurses (PN) and PNs play a key role in the care of patients with chronic conditions.[8]

The Giving Asthma Support to Patients (GASP) program was developed by Comprehensive Care Limited, and has been implemented in general practices in New Zealand. The GASP program consists of an educational program for PNs and an online computerised decision support tool that helps to structure asthma assessment and care, including education to patients, in general practice.[7,9,10] This includes recording spirometry results, asthma symptoms, exacerbations, peak flow measurement, asthma triggers, medication adherence, inhaler technique and review of action plans. Based on the information entered, GASP provides suggestions for pharmacological and non-pharmacological interventions according to clinical practice guidelines.[10–12] In a retrospective cohort study evaluating the GASP program in New Zealand, improvements were found in asthma exacerbations, use of oral steroids, use of reliever medication and health service use, including emergency department visits and hospitalisations.[13]

Prior to the commencement of this study, the Asthma Foundation of NSW (now Asthma Australia), in collaboration with Comprehensive Care Limited, adapted the GASP program for the Australian context. This included ensuring recommendations provided via the tool were consistent with the *Australian asthma handbook*.[4] Despite efforts to do so, it was not possible to integrate the GASP tool to function with commonly used electronic medical records software products.

The study aimed to assess whether the use of the GASP program in Australian general practice was associated with improved asthma outcomes. It was hypothesised that patients would experience a reduction in exacerbations requiring medical intervention and improved asthma control. It was also hypothesised that the GASP program would improve the quality of asthma care provided.

Methods

Study design

The study used a pre–post period-of-treatment design. The study was conducted in general practices in Western Sydney and Illawarra/Shoalhaven. To participate, practices needed to employ one or more PNs and have access to a working spirometer, a suitable clinical space for the PN to conduct the intervention and a printer for patient resources.

Participants

Patients were identified by a search of the practice electronic medical records. Eligible patients were those aged between five and 70 years with a recorded diagnosis of asthma who had been prescribed inhaled corticosteroids or a course of oral steroids for asthma in the previous six months or who had been admitted to hospital for their asthma in the previous 12 months. Patients were excluded if they were unable to speak English, had cognitive impairment (as clinically assessed by the PN or GP) or had been diagnosed with chronic obstructive pulmonary disease (COPD) or asthma–COPD Overlap Syndrome. Patients were invited to participate by mail from their general practice, followed by a telephone call (by the PN) two weeks later to non-responders. Potential patients' medical records were tagged so that patients could also be invited to participate if they attended for a consultation.

Intervention

PNs attended three days of training (conducted by staff from Comprehensive Care Limited, New Zealand) covering asthma epidemiology, anatomy and physiology, asthma-centred respiratory assessment (including peak flow measurement and spirometry) and asthma management (including understanding of asthma medications and asthma action plans). There was also time dedicated to GASP tool navigation and skills in setting up and conducting a nurse-led asthma clinic. On completion of the training, PNs were required to complete an asthma assessment and care plan, a reflection on the process and achieve ≥80% mark in a theory test. The PNs were supported in delivering the intervention by a specialist asthma nurse.

The planned GASP package of asthma care delivered to patients was as follows: baseline visit to PN for assessment, education and management plan, one-month follow-up visit, six-month follow-up (visit or telephone) and 12-month follow-up visit. This program supplemented the care provided by the patient's GP, and the GP remained responsible for any changes in medical treatment and approved the content of asthma action plans.

Outcome measures

Data for all quantitative outcomes were based on information entered by the PN into fields in the GASP tool during asthma consultations. De-identified data were extracted and available for analysis. Outcomes covered the areas of measures of exacerbations, measures of asthma control and measures of quality of asthma care.

A composite dichotomous variable for exacerbations over the previous 12 months was derived, which counted as present if the PN entered 'yes' for one or more of the following: one or more hospital admission, one or more unscheduled visits, increase in inhaled medications or one or more courses of oral steroids. This definition is consistent with the American Thoracic Society description, which states that 'in clinical practice, exacerbations are recognized as episodes that are troublesome for patients, and that prompt a need for a change in treatment'.[14] Individual variables making up the composite measure were reported separately.

A composite variable for asthma control was derived; good control meant no daytime symptoms, no nocturnal symptoms and no activity limitations reported in the past four weeks. Individual variables making up the composite measure were reported separately.

A composite variable for the quality of asthma care was derived; good quality meant all of the following were recorded as present: using regular inhaled corticosteroid, correct inhaler technique and high medication adherence. Individual variables making up the composite measure were reported separately. Possession of an asthma action plan was not included as a measure of asthma quality of care, as the fields in the GASP tool only allowed the PNs to record 'updated today' or 'current in last 12 months'.

Sample size

Estimates of effect sizes were based on findings of a study conducted in New Zealand.[13] The sample size for showing a decrease in the proportion of patients reporting an exacerbation requiring medical intervention in the past 12 months from 40% to 25% was 155. The sample size for a reduction of courses of oral steroids in the past 12 months from 35% to 25% was 198.

Analysis

Participants who had one or more follow-up visits were included in the analysis. Where there was more than one follow-up visit, the visit closest to 12 months post baseline was chosen as the follow-up data point for pre–post comparison. A sensitivity analysis was performed; participants who did not have follow-up data were assumed to have had no change in the outcome measures between baseline and 12 months. The analysis for the composite outcomes related to exacerbations, measures of asthma control and quality of asthma care was done using McNemar's test. This test is appropriate for 2 × 2 contingency tables with a dichotomous trait, with paired observations on the same patients.

Ethics approval was received from the University of New South Wales (HC15644) and the University of Wollongong (2017/107).

Results

Practice participation

Forty-three practices were recruited from Western Sydney and Illawarra/Shoalhaven. Of these, 29 practices contributed data to the evaluation. Ten of these 29 practices withdrew from the project and did not collect follow-up data, leaving 19 practices that completed the

project. The most common reasons for practices withdrawing were demands of the project on PN time, PN staff changes, PN personal or health issues, PNs not passing the GASP competency assessment (totalling 16 practices) and changes in practice priorities (8 practices). All 42 PNs who attended the GASP training were registered nurses; 39 were female and 38 successfully completed the training.

Patient participation

In total, 289 patients (mean age: 38.4 years, age range: 6–81 years, 63.3% female) attended an initial (baseline) GASP consultation. The number of participants in each practice at baseline ranged from one to 26 (mean: 10 per practice). Of these, 153 (52.6%) subsequently completed one or more follow-up visits. Details of these 153 patients are shown in Table 1. Of the 136 patients lost to follow up, 26 were from practices that withdrew from the study. The mean number of follow-up visits was 1.9 (range: 1–4). The time interval between baseline and the follow-up assessment visit ranged from 28 to 1001 days (mean: 328 days). The majority (73%) of follow-up visits included in the analysis were between 100 and 500 days.

Outcomes

There were improvements in the composite variables for exacerbations and quality of asthma care. There were also statistically significant improvements observed across a number of individual variables (Table 2).

The asthma action plan field in the GASP tool only provided options for 'updated today' and 'current in the last 12 months'. At baseline, 23% of patients were recorded as having a current asthma action plan, and this increased to 82.4% at follow up.

The findings of the sensitivity analysis where participants (n =136) who did not have follow-up data were assumed to have had no change in the outcome measures between baseline and 12 months were similar to the main analysis, with a significant decrease in exacerbations requiring medical intervention and improvement in asthma control (Appendix 1, available online only).

Table 1. Demographic characteristics of the 153 patients with baseline and ≥1 follow-up visits

Demographic characteristics (n = 153)		Mean (SD)
Age		41.9 (20.3)
		Number (%)
Age groups	≤20 years	40 (26.1%)
	21–40 years	27 (17.8%)
	>40 years	86 (56.2%)
Female		95 (62.1%)
Aboriginal or Torres Strait Islander		2 (1.3%)
Current smoker		17 (11.1%)
Using inhaled corticosteroid daily		138 (90.2%)
Using short-acting beta agonist more than twice a week		85 (55.6%)
Medical conditions	Rhinitis	94 (61.4%)
	Atopic dermatitis	57 (37.3%)
	Gastroesophageal reflux	57 (37.3%)
	Obstructive sleep apnoea	59 (38.6%)

SD, standard deviation

Discussion

The findings were positive, with consistent improvements from baseline to follow up. There was a decrease in the composite variable measuring exacerbations requiring medical intervention in the previous 12 months and an improvement in the measure of asthma control and each of its component variables. The latter indicates a high level of symptom control, which is of clinical significance and likely to be associated with improved disease-related quality of life. A sensitivity analysis found that, even if the conservative assumption is made that people who did not return for follow-up experienced no change in their asthma status, a range of statistically and clinically significant benefits remained present for the group as a whole.

The findings are similar to the New Zealand evaluation of GASP,[13] which found a significant reduction between GASP assessments in the risk of exacerbations, requirement for corticosteroids, bronchodilator reliance, emergency department presentations and hospital admissions. The New Zealand evaluation included a larger number of patients (n = 761) and the mean time between GASP assessments was somewhat shorter (260 days versus 328 days in the current study). The proportion of people reporting an exacerbation in the past 12 months at baseline was higher in the Australian (74%) study compared with the New Zealand study (40%). This difference almost certainly related to the addition in the Australian version of the GASP tool of the field 'increased inhaled medication' in the section that defined exacerbations in the past 12 months.

The two studies in different settings, yielding similar results, provide some evidence that the improvements observed are related to the GASP program. A systematic review of eight trials of computer decision support systems (CDSSs) for asthma concluded that CDSSs for healthcare professionals were ineffective in improving patient care, because the systems were rarely used.[15] The GASP program appears to have overcome this problem through task

redistribution and the development of the role of the PN. However, a substantial number of practices withdrew from the project and the reasons were commonly related to demands of the project on PNs or PN staffing changes.

The GASP program has multiple components, and it is not possible to identify which are the most important elements of the intervention. The substantial improvement in inhaler technique could be a factor.[3,4] It has also been shown that education in self-management, including possession and use of a written asthma action plan, is associated improved asthma control and outcomes.[5,16] The GASP program helps to guide self-management education and provides a written asthma action plan that be completed in the tool and printed and given to the patient.

Limitations and direction for future research

The major limitation is the pre–post design and the lack of a control group. It is possible that the improvements in asthma control and quality of care observed are due to simply having a planned asthma consultation, rather than being specifically related to the GASP program. It is also possible they are due to some other factor. However, we note the consistency of the changes observed and the similarity to the findings of the previous evaluation.[13] Further limitations are the fact that the outcomes are patient reported and are not validated measures. However, the composite variable for asthma control is made up of three variables (nocturnal symptoms, daytime symptoms, activity limitations) that are almost identical to the Royal College of Physicians three-question (RCP3Q) patient-reported outcome measure for asthma. In a study by Pinnock et al.,[17] an RCP3Q score of zero (analogous to good asthma control in our study) indicated good control (score <1) on the widely used and validated Asthma Control Questionnaire.[18] There is a need to explore the acceptability of GASP to patients, nurses and GPs, and qualitative work on these questions conducted as part of the evaluation will be reported separately. There is also a need to explore funding mechanisms to overcome the barriers of time and suitable remuneration that impede PN-led, as well as GP-led, chronic disease programs.[7,9] Funding opportunities could be through changes to the Practice Nurse Incentive Program or the quality improvement incentive. As well as funding, consideration is needed of educational pathways and professional support of the PN role.

Table 2. Outcomes of measures of asthma exacerbations over the preceding 12 months, asthma control over the previous four weeks and quality of asthma care at the time of the visit

Outcome	Baseline n (%)	Follow-up n (%)	McNemar's test (*P* value)
Exacerbations in preceding 12 months composite			
Yes	113 (73.9)	80 (52.3)	
No	40 (26.1)	73 (47.7)	<0.001
Individual variables			
Hospital admissions	11 (7.2)	6 (3.9)	<0.24
Unscheduled visits	84 (54.9)	60 (39.2)	<0.002
Increased use of inhaled medications	63 (41.2)	61 (39.9)	<0.89
>1 courses of oral steroids	71 (46.4)	43 (28.1)	<0.001
Good asthma control in preceding four weeks composite			
Yes	21 (13.7)	40 (26.1)	
No	132 (86.3)	113 (73.9)	<0.005
Individual variables			
Daytime symptoms	120 (78.4)	98 (64.1)	<0.003
Nocturnal symptoms	93 (60.8)	58 (37.9)	<0.001
Activity limitations	71 (46.4)	52 (34.2)	<0.01
Good quality asthma care at time of GASP consultation composite*			
Yes	5 (3.3)	3 (2.0)	
No	130 (90.8)	144 (94.1)	Not significant
Individual variables			
Not using regular inhaled steroid	15 (9.8)	10 (6.5)	<0.33
Incorrect inhaler technique	53 (34.6)	10 (6.5)	<0.001
Not highly adherent to medication*	69 (45.1)	54 (35.3)	<0.03

**Missing data for nine patients for the variable 'not highly adherent to medication'*
GASP, Giving Asthma Support to Patients

Conclusions

The PN upskilling and use of GASP was associated with improved asthma outcomes. The program should be considered for broad implementation, accompanied by further evaluation.

Authors

Nicholas A Zwar MBBS, MPH, PhD, FRACGP, Adjunct Professor, School of Population Health, University of New South Wales, Sydney, NSW; Executive Dean, Faculty of Health Sciences and Medicine, Bond University, Gold Coast, Qld

Iqbal Hasan MBBS, MPH, Senior Research Officer, Primary and Integrated Care Unit (PaICU), South Western Sydney Local Health District, NSW Health, Sydney, NSW

Andrew Hayen BA (Hons), MBiostat, PhD, Professor of Biostatistics, School of Public Health, University of Technology, Sydney, NSW

Anthony Flynn MSocSc, PGDipCritCare, BN, Senior Manager, Research and Evaluation, Asthma Australia, Chatswood, NSW

Judy Mullan PhD, FSHPA, BA, BPharm, Academic Director Research, Graduate School of Medicine, Faculty of Science, Medicine and Health, University of Wollongong, Wollongong, NSW

Elizabeth J Halcomb RN, BN (Hons), PhD, FACN, Professor of Primary Health Care Nursing, University of Wollongong and Illawarra Health & Medical Research Institute, Wollongong, NSW

Andrew Bonney MBBS, MFM (Clin), PhD, FRACGP, Roberta Williams Chair of General Practice, Graduate School of Medicine, University of Wollongong, Wollongong, NSW; Illawarra Health and Medical Research Institute, Wollongong, NSW

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Correspondence to:
nzwar@bond.edu.au

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correspondence **ajgp@racgp.org.au**