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ORIGINAL ARTICLE

General practitioner-delivered adherence counseling in asthma: feasibility and usefulness of skills, training and support tools

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Abstract

Objective: Poor medication adherence contributes to uncontrolled asthma in primary care. Good doctor-patient communication around adherence increases patients' medication taking but general practitioners (GPs) often feel poorly equipped to provide effective adherence counseling. This study aimed to assess the feasibility and usefulness of adherence counseling training, skills and support tools for GPs. **Methods:** Twenty-five GPs enrolled in a 6-month cluster randomized-controlled trial of adherence interventions for asthma were randomized to an intervention delivering personalized adherence discussions. They received 2 hours training in delivering brief, motivational-interviewing-based adherence counseling and were provided with asthma-specific counseling support tools. At baseline, post-training and study end, GPs rated the training, reported confidence/frequency of using counseling skills and satisfaction with their consultations, and commented on support tools. Patients reported their barriers to adherence and rated their GPs empathy at baseline and at 6-months. **Results:** 96% of GPs rated adherence counseling training as very/extremely useful. At the end of the study (17 ± 4 months) GPs' confidence in using counseling skills increased, as did the frequency they applied the skills and their satisfaction with consultations. GPs were positive about counseling support tools, stating that they were easy to use and facilitated covering more ground within single consultations. Half the GPs expressed some difficulty implementing counseling due to time constraints. Patients reported good GP empathy and no significant change in adherence barriers. **Conclusions:** GPs valued counseling training and support tools. Although implementation was sometimes challenging, GPs reported increased frequency of use and confidence in applying adherence counseling skills, which persisted for 17 months.

Keywords

Communication, medication adherence, motivational interviewing, primary care, satisfaction with consultation

History

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Introduction

Poor adherence with inhaled controller medications for asthma is common and associated with worse quality of life, greater asthma symptoms and increased mortality risk [1,2]. Interventions that increase patient use of controller medications have the potential to greatly reduce symptoms and improve the daily lives of asthma patients.

Horne's necessity-concern Framework model [3], which builds on Leventhal's self-regulatory model of health behavior [4], describes how adherence behavior is determined by a disequilibrium between patients' personal beliefs about the necessity of medication and their concerns about potential adverse effects, in the context of factors such as practical difficulties [5]. Concordant with this framework,

we have identified key barriers specific to asthma patients' adherence with inhaled corticosteroid/long-acting beta agonist (ICS/LABA) therapy [6]. These barriers include beliefs about: experience of and sensitivity to side effects, treatment necessity, perceived duration of asthma and difficulty establishing medication-taking routines.

Research suggests that patient barriers to adherence may be amenable to change by using empathic patient-centered communication strategies, such as motivational interviewing (MI) [7–9] and collaborative goal setting [10]. MI is a communication style for eliciting each patient's unique motivations for behavior change in the interest of their personal health/life goals [11].

The majority of consultations for asthma occur in primary care [12] and while asthma guidelines recommend that general practitioners (GPs) address adherence at every visit [13], doctors may feel challenged to provide effective adherence counseling [14]. For busy GPs, the delivery of brief, structured, patient-centered adherence counseling based

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on motivational interviewing is likely to be more feasible than longer or more complex interventions. Studies investigating training GPs in the delivery of brief MI-based counseling report that GPs find it acceptable and useful for addressing a wide range of health issues including physical activity, problem drinking and smoking cessation [15–18].

Previous studies that have specifically investigated MI-based counseling for promoting asthma medication adherence in adults have shown significant improvements in patients' motivation or readiness to adhere [7,9] and in asthma self-efficacy [19], and indicate the potential for improvements in adherence and asthma control [19]. However, these studies were not carried out in primary care settings, and in two of the three studies, counseling was delivered by psychologists rather than physicians.

In the current study, we aimed to develop and assess the feasibility and usefulness of a training program for promoting the acquisition, and use of adherence counseling skills among GPs caring for patients with asthma in their own practices.

Methods

Recruitment of GPs

Of 1662 GPs sent a letter of invitation from general practice administrative divisions in Greater Sydney, Australia during 2010–2011, 55 GPs (response rate 3.3%) participated in a 6-month cluster randomized-controlled trial of GP-delivered interventions for improving patients' adherence with ICS/LABA therapy and asthma control. This paper reports on GP attitudes about the adherence counseling skills, tools and training delivered to half of the study GPs [20]. Participant GPs described in this paper received either adherence counseling alone or adherence counseling plus access to a website where they could view a graph of their patient's daily ICS/LABA use [20].

Recruitment of asthma patients

Eligible participants were: existing patients of enrolled GPs with sub-optimal asthma control (Asthma Control Test ≤ 19) [21], aged 14–65 years; prescribed twice daily ICS/LABA for ≥ 1 month prior to enrolment; no asthma exacerbation in the last month; and not currently participating in an asthma study.

Blinding

In order to avoid selection bias, no information about the study hypotheses or interventions was provided to GPs during recruitment, in accordance with published guidelines [22]. Information about the intervention was revealed to each GP during the training workshop (see below).

Adherence counseling training

General practitioner training workshops were provided at convenient times and locations. Participating GPs received continuing professional development points for attending training and study participation, and a per-patient reimbursement of Australian dollars 100 to cover workshop attendance and study time.

A 2-hour training workshop for GP-delivered personalized adherence discussions was developed by two authors (JMF, LS) based on a literature review of brief counseling training for primary care interventions and their prior experience of delivering brief MI-based adherence counseling and goal-setting training to pharmacists and GPs [10,23].

Part one of the training aimed to reduce GPs' ambivalence and increase motivation around learning and implementing new communication skills. GPs brainstormed the relevance and challenges of behavior change promotion in their clinical practice. Basic concepts of motivational interviewing were introduced, and research evidence of its effectiveness.

In part two, two custom-made videos of primary care consultations around ICS/LABA adherence were played. The first video showed a GP using a didactic advice-giving communication style. The second video showed a patient-centered style based on motivational interviewing in which discrepancy between current behavior and asthma goals was explored. GPs were asked to identify and discuss effective and less effective communication skills in both videos.

In part three, training in classic MI techniques was provided such as "OARS" (asking Open questions, providing encouragement (Affirmation), Reflecting and Summarizing); "PRO-CON" (discussing the pros and cons of current and future health behavior) and "Resisting the righting reflex" (avoiding didactic advice giving and asking instead for the patient's opinions, interest in advice and perceived relevance of any advice given) [11]. Training on health goal setting was also provided, including how to guide patients to identify personalized, clear, achievable goals and develop strategies for putting goals into action [10,23].

In part four, GPs practiced using different MI-based counseling techniques in pairs. Role play was facilitated by semi-scripted prompt cards, and personalized feedback was provided by the trainer.

Top-up telephone training tailored to each GP's needs was offered by the trainer at least monthly throughout the study. The trainer used a semi-structured training guide in which the GP was asked to recall and give an example of key adherence counseling skills (needs assessment), after which tailored feedback and top-up training was provided.

Adherence counseling support tools

The counseling intervention was organized into a 5-stage checklist familiar to Australian GPs called "5As" (Figure 1A) [24], which GPs could use to remind them of the intervention steps. A set of support tools was also provided to facilitate GPs' use of MI-based adherence counseling skills (e.g. Figure 1B; see further tools in the supplementary material). The tools were designed to facilitate a flexible, personalized adherence discussion by GPs in a single, brief consultation. For example, checklist items could be skipped if a patient did not wish to execute a step (it is key to MI philosophy that pursuing a step without the patient's permission or interest is counter-productive), and blank resource sheets (see supplementary material – Appendix 5) were provided to allow discussion of novel adherence barriers or information. Three Sydney-based GPs who were not involved in the subsequent study piloted the adherence

Figure 1. (A) “5A’s” study intervention checklist, (B) Example of counseling support tools: the conversation starter and resource sheet “I don’t take it” which was provided to patients identifying difficulty establishing medication-taking routines as their adherence barrier.

*The counseling support tools also included a patient self-reported asthma attitude questionnaire; an acetate template which was placed on top of the attitude questionnaire to identify the patient’s strongest adherence barrier/s; six “conversation starters” to support GPs use of empathic communication on specific adherence barriers; six resource sheets, which provided information on specific adherence barriers in lay language; and a goals card for supporting GPs and patients to collaboratively set patient-centered asthma goals (see further tools in the supplementary material).

(A)

Ask

- ☐ Ask patient to complete a waiting room questionnaire which includes an assessment of asthma control, ICS/LABA adherence, and ICS/LABA asthma attitudes.

Assess

- ☐ Assess ICS/LABA adherence discussing with the patient acceptingly, to avoid resistance

Advise

- ☐ Use counseling support tools* to empathically discuss patients views on barriers to ICS/LABA adherence
☐ With permission from the patient, provide barrier-specific information based on patient-identified issues

Assist

- ☐ With permission from the patient, assist patient to identify and set personal asthma goals and strategies to reach their goal based on their greatest problem with asthma.

Arrange

- ☐ Arrange a follow-up appointment for 4 weeks time.

(B)

I DON’T TAKE IT

“You indicated on the questionnaire that there may be something getting in the way of taking your preventer as prescribed...I’m interested...what sort of things prevent you from taking it?”

DO YOU TAKE YOUR PREVENTER LESS THAN PRESCRIBED?

GP to mark items discussed using the tick boxes below

☐ Establishing a routine for remembering to take your preventer

- One way of remembering to take your inhaler is to link it with something you do every day
- Putting your inhaler in a place where you will see it every day, helps remind you to take it
- You could keep your inhaler next to your toothbrush, your alarm clock or near your car keys.

counseling support tools with their own patients. The tools were favorably received and GPs’ suggestions were incorporated into the final resources.

Study visits

The study requested GPs to deliver adherence counseling, including goal-setting, in the first consultation, and arrange an appointment 4 weeks later or as soon as the patient was available, to follow up the previous discussion and goal progress. If the patient wished, a new adherence barrier and goal could also be discussed.

GP outcomes

GP ratings of adherence counseling training

At the end of the workshop (“post-training”), GPs were asked to rate the usefulness of the training (1 = not at all useful; 5 = extremely useful), and duration of the training (1 = too short; 3 = just right; 5 = too long).

GP attitudes towards counseling skills over the study period

General practitioners completed a questionnaire modified from Broers and colleagues [25] at baseline (start of workshop), post-training (end of workshop) and at the end of the study (17.3 months after receiving training [range: 9–24]). The questionnaire asked GPs to rate their agreement with statements about perceived usefulness of individual adherence counseling techniques (1 = not useful at all; 5 = extremely useful), their confidence in applying skills

(1 = not at all confident; 5 = completely confident) and their frequency of use of counseling techniques (1 = never; 5 = always). The questionnaire [25] was modified (4 questions were removed and 7 added resulting in 20 total items) to customize it for specific MI skills that were included in our training (e.g. OARS, PRO-CON).

GPs’ global rating of adherence counseling techniques at study end

At the end of the study, GPs answered questions on: the usefulness of counseling techniques for their asthma consultations and for their consultations in general [both reported on a 100 mm visual analog scale (VAS)]; their positive and negative comments on counseling support tools (open text); and which, if any, support tool(s) they used with non-study patients. GPs also reported the estimated average duration of their adherence counseling consultations (10 min or less, 11–20, 21–30, or more than 30 min).

GP ratings of satisfaction with their consultations over the study period

A literature review failed to identify a suitable questionnaire for measurement of overall GP satisfaction with consultations, so GPs completed an abridged, 9-item version (Figure 3), of the 20-item Physician Satisfaction with Primary Care Office Visits Questionnaire [26] at post-training and at the end of the study. From each of 4 subscales we selected 2 items plus one global question, and adapted wording specific to a single consultation to relate to consultations overall (e.g. original:

“My time was not well spent in the visit”; was adapted to: “My time is not well spent during consultations”). We retained the original 5-point Likert scale (1 = strongly disagree; 5 = strongly agree) for the resulting 9-item scale. GPs completed the questionnaire post-training and at follow-up.

Patient outcomes

Patient self-reported adherence barriers

Immediately before receiving the GP-delivered adherence counseling and after their 6 months outcome data were collected, patients completed the Asthma Attitude Questionnaire [6] that lists key barriers to adherence with ICS/LABA. Items worded in a negative direction on the scale were reversed before analysis. After reversal the questionnaire was scored on a 5-point Likert scale: 4 = strongly agree (low adherence barriers); 0 = strongly disagree (high adherence barriers). The total score was the mean score of the 10 individual items.

Patient-rated GP empathy

Patients were asked to rate their GP’s empathy on the Consultation and Relational Empathy (CARE) scale [27], by postal questionnaire (provided by the researchers in the initial study pack) within 7 days after receiving the GP-delivered adherence counseling and 6 months later. The CARE total score is from 10 (minimum GP empathy) to 50 (maximum).

Analysis

Demographic data were summarized by frequency distributions. The Friedman test was used to compare differences in GP ratings between three time-points (baseline, post training and study-end), and the Wilcoxon signed rank test for two time-points (e.g. post-training versus study end for GP outcomes; baseline versus 6-months for patient outcomes). Analyses were conducted on both per protocol and intention

to treat population (missing data were imputed using last observation carried forward method) [28]. Due to the number of statistical tests performed, $p < 0.01$ was used to denote statistical significance.

Trial registration and ethics

The full RCT was registered with the Australian and New Zealand Clinical Trials Registry (ACTRN 12610000854033). The trial was approved by the Human Research Ethics Committee of the University of Sydney. All GP and patient participants provided written informed consent.

Results

GP participants

Twenty-five GPs (56% male) attended adherence counseling training (Table 1). Participating GPs were demographically similar to the population of Australian GPs with respect to age and gender [29]. By the end of the study, 5 GPs had dropped out (lack of GP/patient time $n = 2$, too few eligible patients $n = 2$, illness $n = 1$) and 2 were lost to follow up. The 18 continuing GPs were demographically similar to the original 25 trained GPs (Table 1).

Patient participants

A total of 65 patients (mean age 40.7 years $\pm$ SD16.9; 69% female) were enrolled by participating GPs (Table 1). Around one in three (37%) patients spoke a language other than English at home (languages included Arabic, Bengali, Samoan).

GP outcomes

GP training ratings

General practitioners ($n = 25$) rated the adherence counseling training as very/extremely useful (96%), and rated the training

Table 1. Characteristics of GPs trained and completing the study, and patient demographics and baseline characteristics.

GPs	GPs Trained: $N = 25$	GPs Completing Study: $n = 18$
Age in years, mean (range)	50.3 (33–72)	50.6 (35–65)
Female	44%	50%
Years practicing as a GP, mean (range)	20.3 (5–48)	22.2 (5–48)
Non-English language spoken at home	48%	50%
GPs attending any asthma/COPD training events in past 12 months	40%	33%
Practicing in a socially disadvantaged area ^a	56%	50%
Patients	Patients of trained GPs $N = 65$	
Female	69%	
Age, mean $\pm$ SD	40.7 $\pm$ 16.9	
Asthma control test, mean $\pm$ SD ^b	14.3 $\pm$ 4.3	
FEV ₁ % predicted, mean $\pm$ SD	73.6 $\pm$ 18.6	
ICS daily dose at study entry, fluticasone propionate equivalent, mcg ^c	789 $\pm$ 306	
Living in socially disadvantaged area ^a	51%	
Smoking: Current/Past/Never (%)	13/33/54	
Highest education of secondary school or lower	38%	
Non-English language spoken at home	37%	

^aSocial disadvantage at GP practice location (GP) / home address (Patients): “Disadvantaged” Socio-Economic Indices for Area (SEIFA) Quintile ≤ 3 ; “Advantaged” SEIFA Quintile: 4–5 [41].
^bAsthma Control Test (scored worst: 5–best: 25) 19 or less indicates suboptimal control.
^cmcg dose refers to ICS component of ICS/LABA combination inhaler treatment.

duration as just right (76%) or a bit/too long (24%). The 18 continuing GPs received an average of 28 min (range: 0–103 min) top-up counseling training by telephone over the study period; 3 of the 18 GPs received no telephone training.

GP attitudes towards counseling techniques and tools

Twenty-five GPs completed baseline and post-training questionnaires. There were no significant differences in post-training ratings of “usefulness” or “confidence in using” MI techniques between continuing GPs and those lost to follow up/drop out GPs ($n = 7$). Of the 18 continuing GPs, 15 (83%) completed the questionnaire at the end of the study (17.3 months after receiving training [range: 9–24], the range reflecting variable speed of patient recruitment by GPs). GP-rated confidence grew from baseline in the use of 3 out of 4 counseling skills, including “exploring patients’ personal reasons for poor adherence”, with changes sustained at the end of the study (all $p \leq 0.01$; Table 2). GP-reported frequency of use of counseling skills was relatively high at baseline but by the study end, there were significant increases in several skills (Table 2).

At the end of the study, GPs positively rated the usefulness of counseling techniques for their asthma consultations (78.1 ± 14.7 on 100 mm VAS) and for their consultations for other conditions (78.9 ± 15.2). The following proportion of GPs reported using counseling tools with *non-study* patients: motivational interviewing skills (93%), asthma attitude questionnaire (50%) and adherence barrier-specific resource sheets (50%). Fifteen GPs provided open text comments; all GPs wrote positive comments about the support tools including that they were easy to use, they were useful for covering more ground in one consultation, they assisted the GP in encouraging and educating patients regarding preventer use, were beneficial to the GP for learning new techniques, and complemented current practice and philosophy. Half the GPs reported that adherence counseling was time-consuming. GP self-reported consultation length for counseling (≤ 20 min [43%], ≤ 30 min [42%], > 30 min [14%]) appeared longer than average Australian GP consultations (mean: 15.6 min [95% CI: 15.3–15.8]) [12].

GPs’ satisfaction with their consultations over the study period

Compared to post-training, GPs were more satisfied at the end of the study. They reported improvements in several aspects of their consultations ($p < 0.05$; Figure 2), including that they felt “more effective in influencing their patients’ behavior”, but only one comparison reached statistical significance ($p < 0.01$).

Patient outcomes

Patient-reported adherence barriers

General practitioners returned the baseline asthma attitude questionnaires for 75% of enrolled patients (49/65). Of these patients, 32 (65%) completed the questionnaire again 6 months later. Patients were enrolled, and baseline patient questionnaires completed, an average of 3.9 months (range:

0.1–16.4) after their GP received training (range reflects speed of patient recruitment by individual GP). There was no change in the total score of the asthma attitude questionnaire, with the 6-month (6 M) score showing no significant change in adherence barriers from baseline (BL: 2.67 ± 0.51 , 6 M: 2.78 ± 0.49 ; ITT analysis 6 M ($n = 49$) 2.61 ± 0.53 ; $p = 0.26$). Based on item 8 of the asthma attitude questionnaire (“I try to take my asthma medications exactly as prescribed”), patients self-reported a positive attitude toward medication adherence at baseline, with 71% (35/49) answering “agree” or “strongly agree”. The mean score for item 8 was similar at baseline and 6-months (ITT analysis ($n = 49$) BL: 2.8 versus 6 M: 2.7, $p = 0.31$; Wilcoxon test).

Patient ratings of GP empathy

Thirty-seven patients completed the CARE questionnaire at baseline (16 ± 12 days after delivery of the MI intervention by their GP), and 32 patients at 6-months. Patient-rated GP empathy was high at baseline (44.3 ± 8.2) and was similar at 6-months (44.2 ± 9.9 ; ITT analysis 6 M 43.7 ± 10.0 ; $p = 0.51$).

Discussion

Training and tools for brief MI-based adherence counseling were well-received by GPs in this study, both immediately after training and 17 months later. GPs reported increased *confidence* in using adherence counseling skills, including “exploring the patient’s personal reasons for poor adherence” and “motivating patients to use their medication as prescribed”. They positively rated the counseling support tools, and used them with both study and non-study patients. GPs’ satisfaction with many aspects of their consultations increased, including “getting enough detail about psychosocial aspects of patient’s problems” and “time well spent during consultations”. However, seven GPs dropped out of the study and half the GPs reported that counseling was difficult to implement due to time constraints.

Acquisition and implementation of counseling skills can be a major challenge for health professionals [30]. Our adherence counseling intervention required GPs to grasp new communication concepts, practice new skills and navigate support tools. Some GPs may have felt overwhelmed; indeed one stated that “GPs may be reluctant to put time into the learning process”. In other studies, a commonly cited reason for GPs to decline counseling training is the concern that it may not be feasible within routine consultations [25]. These feasibility concerns may limit the implementation of GP-delivered adherence counseling in primary care; indeed it may be that the demands (or perceived demands) of implementing the adherence counseling intervention contributed to the drop-out rate (7/25 GPs) in our study. Repeated MI training is also thought to be more effective than brief one-off training [31]. However, our GPs had difficulty in finding time to attend a single workshop, suggesting that additional sessions would not have been feasible. Top-up telephone training was made available to GPs throughout the study period, and all but 3 of the 18 GPs participated; its effectiveness relative to face-to-face training alone is unknown. In other settings, brief MI-based counseling has been successfully delivered by peer educators, lay counselors [32], nurses [8], pharmacists

Table 2. GP ratings of different counseling techniques relating to medication adherence.

	Baseline <i>n</i> = 25	Post-training <i>n</i> = 25	Study end <i>n</i> = 15	<i>p</i> Value ^a	Study end <i>n</i> = 25 (ITT)	<i>p</i> Value (ITT) ^b
USEFULNESS: How useful are these techniques for increasing your asthma patients' medication adherence? (1 = Not useful at all; 5 = Extremely useful)						
Asking the patient whether they have taken their medication regularly since the last consultation.	3.67 (0.97)	3.88 (1.01)	3.53 (0.92)	0.704	3.80 (0.87)	0.694
Stressing the importance of the medication for disease control	4.22 (0.73)	3.96 (0.98)	3.60 (0.99)	0.139	3.92 (0.91)	0.131
Exploring the patient's personal reasons for poor adherence	4.06 (0.24)	4.60 (0.58)	4.27 (0.70)	0.002	4.36 (0.64)	0.003
Confronting the patient with negative consequences of poor adherence	3.17 (0.99)	2.48 (1.09)	2.87 (1.25)	0.023	2.92 (1.08)	0.005
Summarizing the patient's personal pros and cons of medication-taking	3.72 (1.07)	4.52 (0.59)	4.00 (0.66)	0.001	4.12 (0.67)	0.001
Asking the patient to rate the importance of medication-taking	3.83 (1.10)	4.52 (0.51)	3.80 (1.08)	0.012	4.04 (0.94)	0.005
CONFIDENCE: With respect to your asthma patients, how confident are you with: (1 = Not at all confident; 5 = Completely confident)						
Getting the patient talking about medication-taking?	3.83 (0.51)	4.20 (0.50)	4.07 (0.46)	0.143	4.24 (0.52)	0.002
Exploring the patient's personal reasons for poor adherence?	3.61 (0.61)	4.24 (0.52)	4.13 (0.52)	0.007	4.24 (0.52)	<0.001
Giving advice without being coercive?	3.56 (0.51)	4.16 (0.55)	3.93 (0.59)	0.005	4.00 (0.58)	0.002
Motivating patients to use their medications as prescribed?	3.67 (0.59)	4.08 (0.57)	4.00 (0.54)	0.156	4.08 (0.49)	0.159
FREQUENCY: How often do you use the techniques below for discussing asthma patients' medication adherence? (1 = never; 5 = always)						
Ask for the patient's agreement to talk about medication adherence?	3.17 (1.10)	–	3.47 (0.92)	0.144	3.52 (0.82)	0.219
Use open-ended questions to explore the patient's reasons for current medication-taking behavior?	3.67 (0.59)	–	3.87 (0.52)	0.059	4.00 (0.50)	0.052
Use empathic listening skills?	3.94 (0.64)	–	4.20 (0.56)	0.157	4.24 (0.52)	0.033
Summarize patient's current medication-taking behavior highlighting pros & cons?	3.39 (0.85)	–	3.60 (0.83)	0.096	3.84 (0.75)	0.032
Use affirmation/encouraging statements?	3.78 (0.43)	–	4.07 (0.46)	0.059	4.16 (0.47)	0.035
Use 0–10 rating scales?	2.56 (1.10)	–	3.60 (0.63)	0.002	3.60 (0.71)	0.001
Ask if the patient is interested in information?	3.11 (0.83)	–	3.67 (0.62)	0.021	3.84 (0.62)	0.002
Invite the patient to assess personal relevance of information?	2.59 (1.06)	–	3.47 (0.83)	0.002	3.76 (0.83)	<0.001
Acknowledge the patient's freedom of choice?	3.67 (0.84)	–	4.00 (0.76)	0.194	4.16 (0.69)	0.048
Invite the patient to nominate most important disease-related problems?	3.39 (1.04)	–	3.47 (0.83)	0.257	3.68 (0.90)	0.052

p < 0.01 denotes statistical significance (indicated in bold text).

^a *p* Value for difference in “usefulness” and “confidence” ratings across three time points: baseline, post-training and study end (Friedman test for related samples), *p* value for difference in “frequency” ratings between baseline and follow-up (Wilcoxon test).

^b *p* Value from analysis of ITT population; for the ITT analysis missing data were imputed using last observation carried forward method.

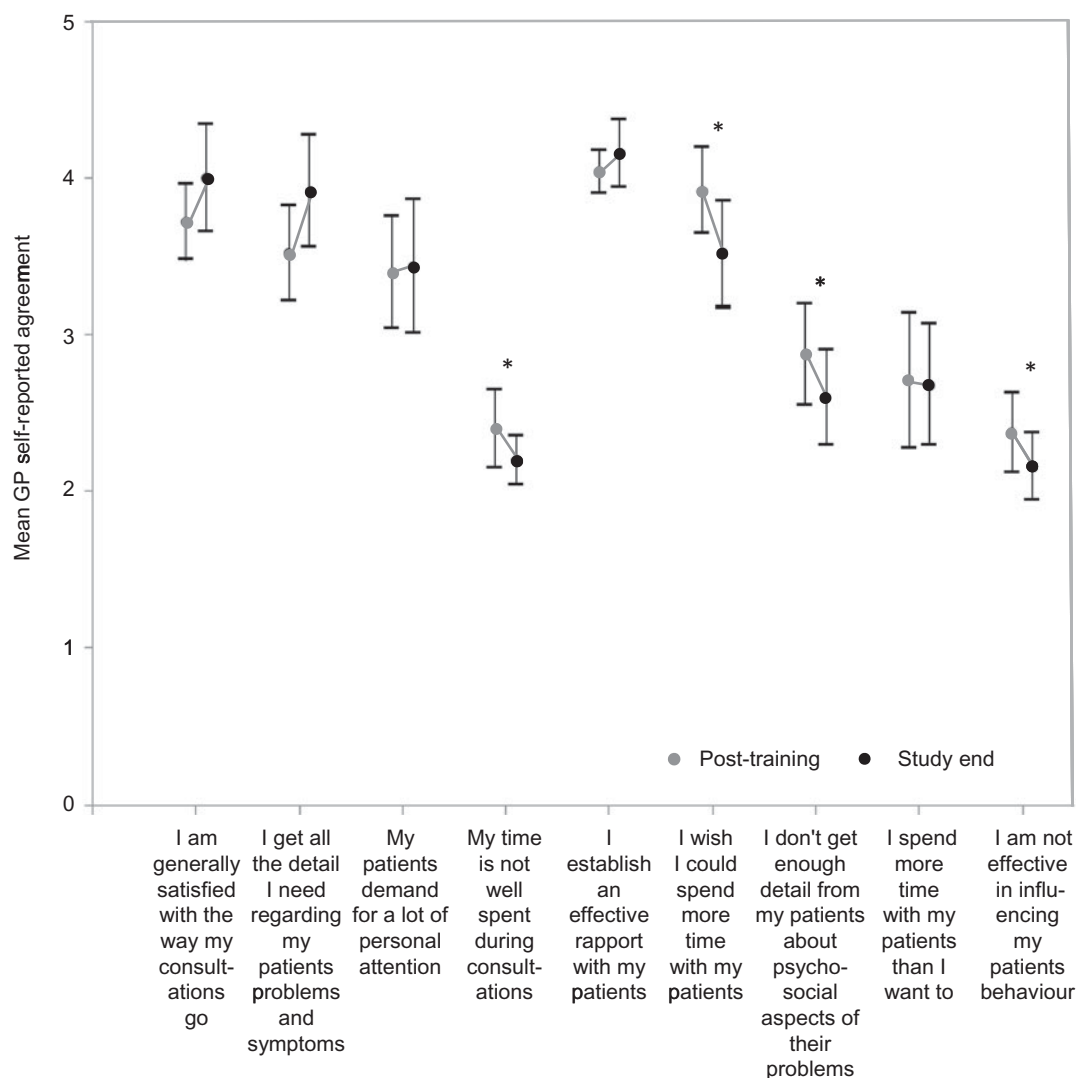


Figure 2. GP ratings of overall satisfaction with their consultations over the study period. * $p < 0.05$ Wilcoxon test for comparison between post-training and study end ITT analysis. Only one comparison reached statistical significance ($p < 0.01$): I wish I could spend more time with my patients. The satisfaction questionnaire was scored: 1 = strongly disagree; 5 = strongly agree. Error bars represent 95% CI.

[33] and psychologists, which could be possible alternative ways of providing brief adherence counseling for time-pressured general practices.

Despite time constraints, 93% of GPs reported at study end that they had used MI skills and support tools with *non-study patients*, suggesting that the majority of GPs were willing to engage in ongoing practice of adherence counseling. GPs also reported increased frequency in using adherence counseling skills over the course of the study. Few GPs made negative comments about the counseling intervention, and all reported positive remarks such as “beneficial personally in learning some new techniques”. It may be that GPs with different levels of interest in counseling and different levels of time pressure may respond differently to the challenge of learning and implementing new skills.

Health professional communication trainees often report “falling back into old habits” [30]. Our tools were structured to provide support and prompts to GPs as they worked their way through an empathic and personalized discussion with an asthma patient about adherence barriers. While one of the GPs described the counseling tools as “too paint by numbers

for me”, other GPs described them as “useful for identifying the adherence issues” and “allowing the consultation to cover more ground”. We built flexibility into the tools to allow discussion of adherence barriers not included in the questionnaire, goal-setting was not restricted to health and adherence [11], and GPs were trained to encourage patients to set a “do-able” goal initially, which could be adapted over time.

The predominantly positive GP ratings of counseling training and skills in this study are similar to a recent pilot study of GP training for provision of brief MI-based adherence counseling in asthma in The Netherlands [18,25]. In comparison, our training of GPs was shorter (2 h versus 9 h) and GP drop-out rate was higher (28% versus 12%). Like the Dutch study [25], our intervention embodied “behavior change counseling” because it aimed to build motivation for change around the unique goals of the patient, required active patient participation and utilized key MI skills. However, to increase the representativeness of our results for real-world primary care, our GPs were unaware that they would be trained in adherence counseling skills until part-way through

the workshop. We sought and obtained ethics approval for this approach, which is in accordance with published guidelines about blinding of non-pharmacological interventions and ethics for adherence studies [22]. Considering our recruitment approach, the response to training and use of MI counseling skills in daily practice by these GPs was especially positive.

In the present study, there was no significant change in patient-reported barriers to medication adherence at six months from baseline. Three previous studies of MI-based counseling for promoting asthma medication adherence showed improvements in patients' motivation or readiness to adhere [7,9] and asthma self-efficacy [19], but these were not measured in the present study. Adherence rates and clinical outcomes were not statistically significantly improved by MI-based counseling in the three previous studies nor in ours (in the full RCT, asthma control and daily controller medication use were not significantly different in patients receiving adherence counseling compared to patients receiving usual care) [20]. The use of motivational and problem solving approaches in a broader asthma self-management intervention, delivered by primary care asthma nurses, has however shown improved parent-reported preventer use by children [34]. In studies of antiretroviral therapy for HIV, changes in adherence have been shown. With up to 5 sessions (30–45 min) of counseling, delivered by nurses who received 24 h of training in MI, there was a significant increase in the proportion of doses taken on schedule and a trend toward increased adherence rates [8].

To improve adherence in primary care, provision of longer GP training and delivery of a greater number of counseling sessions by GPs may be needed, in contrast to the 1.5–2.5 h of MI training and brief one-off counseling delivered by GPs that is sufficient to improve clinical outcomes for physical activity [15], problem drinking [16] and smoking [17]. Cost is an important barrier to adherence [35] and although this was not addressed in this study, given that half of the GPs in this study practiced in low-income catchment areas, patients' financial constraints may have reduced the outcome of effective counseling interventions.

Limitations of our analysis include that results were based on self-report of GPs' counseling practices and may have been biased towards favorable outcomes. Video evidence is considered the gold standard measure of acquisition of counseling skills, but may be limited by poor doctor and/or patient participation and avoidance of sensitive discussions [36]. Further, some questionnaire measures were not validated and may have lacked sensitivity to change over time. Although the low response rate of GPs enrolling into the study (3.3%) was consistent with Australian primary care-based studies [37,38], the GPs who enrolled in this study may have been biased toward those with an interest in asthma or in research participation. Small patient numbers, particularly at follow up, meant that the study was likely underpowered to detect statistically significant change in patient attitudes. Patient attitude- and behavior-change are important elements in feasibility evaluation and we therefore recommend ongoing research into GP-led adherence counseling.

Strengths of the study include that the counseling training and tools were founded on well-described principles of MI and collaborative goal-setting theory, the training was brief, was successfully applied in real-life primary care settings, and was positively rated by GPs, who considered the adherence counseling support tools provided were easy to use and useful. Patient-reports of GP empathy were high and sustained throughout the study and this is an important result given that poor communication with health providers is seen as a crucial barrier to management of asthma by patients [39]. Patient participants were socially and culturally diverse, with one-third speaking a language other than English at home, a rate similar to the Greater Sydney average [40]. These factors suggest that our training model might be adapted and applied effectively in management of other chronic diseases or life-style issues, such as exercise and weight loss in community health care settings.

Conclusions

This first study of training and tools to support brief GP-delivered adherence counseling in real-world primary care was well-received by GPs who considered it feasible, useful and effective for changing their approach to communicating about adherence with controller asthma treatment in primary care. However, some GPs experienced difficulty applying counseling in their practice, which suggests some limits on feasibility. Implementation barriers for GPs, and the potential use of this model of adherence counseling training and support by other health care professionals or lay educators, could be addressed in future primary care studies.

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Declaration of interest

Dr Foster has provided independent continuing medical education for GlaxoSmithKline, Pharmaceutical Society of Australia and AstraZeneca and has participated in an advisory board for Vertex Pharmaceuticals. Dr Smith has provided independent continuing medical education for Pharmaceutical Society of Australia. A/Prof. Reddel has participated in advisory boards and/or data monitoring and safety boards for AstraZeneca, GlaxoSmithKline, Merck and Novartis, has received consultancy fees and/or provided independent continuing medical education for Mundipharma, GlaxoSmithKline, AstraZeneca and Novartis, and has received unrestricted research grants from AstraZeneca and GlaxoSmithKline. Prof. Usherwood and Prof. Sawyer have no potential conflicts of interest to report with respect to this

article. The authors alone are responsible for the content and writing of the paper.

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Supplementary material available online