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A retrospective evaluation of the effectiveness of a targeted medicines use review service in improving asthma and COPD control provided by community pharmacists in England

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Abstract

Objective Medicines Use Reviews (MUR) may benefit asthma and chronic obstructive pulmonary disease (COPD) control. The present study evaluates the effect of respiratory-targeted MUR-plus (MUR+) services delivered by community pharmacists on disease control.

Methods A retrospective analysis of MUR+ data in the PharmOutcomes database was conducted. All patients receiving respiratory-targeted MUR+ in Milton Keynes were included. Changes in asthma control test (ACT) and COPD assessment test (CAT) scores were analysed.

Key findings A total of 191 asthma and 81 COPD patients received MUR+. Asthma and COPD control improved as shown by the increase in mean ACT [+1.2 (95% CI, 0.6–1.8)] and decrease in mean CAT [−0.2 (95% CI, −1.4 to 1.0)]. Baseline ACT, smoking cessation, absence of change in drug therapy, patient education, healthcare professional referral, device training and baseline ACT score ≤19 were associated with change in ACT, but only smoking cessation was related to CAT change. A multivariable regression model comprising the aforementioned variables explained 19% of the variance in ACT change ($P < 0.001$). Only baseline ACT was associated with ACT change (beta = −0.34, $P < 0.01$). Baseline CAT, absence of change in drug therapy, smoking cessation and baseline CAT score >20 accounted for 12% of the variance in changes in CAT ($P = 0.046$). No variable was significantly associated with CAT change.

Conclusions Respiratory-targeted MUR+ service by community pharmacists was associated with improvements in asthma control among patients with poorer baseline ACT, but not in patients with COPD. Several potentially modifiable factors such as education were associated with changes in control.

Keywords: asthma; chronic obstructive pulmonary disease; community pharmacy; adherence; medicines use review; control

Introduction

Asthma and chronic obstructive pulmonary disease (COPD) are common respiratory diseases, with ~339 million people living with asthma worldwide[1, 2] and 65 million people having moderate to severe COPD.[3] Both of these conditions carry with it a significant burden of disease with an estimated 250 000 asthma deaths,[2] and >3 million deaths from COPD, annually worldwide.[4] In particular, COPD was reported recently as one of the top causes of mortality, and hospital bed days peaked due to COPD exacerbations.[4]

To improve disease control, the United Kingdom (UK) National Review of Asthma Deaths[5] and current National Institute for Health and Care Excellence guidelines on asthma and COPD both recommend regular assessment and monitoring.[6] This should involve regular review of inhaler technique and advising smoking cessation at every opportunity.[6] Medicines adherence – whether patients take their medication as prescribed – is a key part of achieving disease control. Evidence shows that pharmacist-delivered adherence intervention can significantly improve adherence.[7] Community pharmacists are ideally placed to provide these types of interventions, as they are easily accessible to patients, allowing for the provision of ongoing services to meet patients' needs. Additionally, ambulatory patients more frequently visit their community pharmacist than other primary care providers.[8]

The National Health Service (NHS) Community Pharmacy Contractual Framework responded to these identified patients' needs by supporting pharmacists to provide Medicines Use Review (MUR) services as part of Advanced service provision,[9] up until the current community pharmacy contractual framework dated 31 March 2021. The MUR service aims to improve patients' adherence to their prescribed medications and can be delivered by appropriately trained pharmacists. An MUR is a planned face-to-face consultation between a pharmacist and a patient to discuss their medicines. The service establishes the patient's actual use, understanding and experience of taking their medicines; identifies, discusses and resolves poor or ineffective use of medicines; identifies

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side effects and drug interactions that may affect adherence; and improves clinical and cost effectiveness of prescribed medicines.[10] Following the medicines review and discussion, pharmacists can provide patients with healthy living advice including smoking cessation and physical activity. MURs are intended to be conducted annually unless the patient has been recently discharged from hospital with medication changes or if the patient circumstances have changed to justify additional consultations. The results of the MUR and any changes or recommendations can be communicated to the patient's general practitioner (GP) via a feedback form but this was optional.[11] There is no target number of MURs for pharmacies to aim for but no >400 MURs may be provided at each community pharmacy in any one-year period. According to the *Outcomes Strategy for COPD and Asthma NHS Companion* published in 2012, regular MURs provided to patients with asthma or COPD should involve pharmacists assessing disease control.[12] However, quantitative assessments of asthma or COPD control using validated questionnaires[13, 14] that can be reviewed over time to measure changes in disease control are not currently routinely being carried out as part of a standard MUR in England and Wales.[11]

The effect of respiratory-targeted MUR-based or similar or bespoke pharmacist-led interventions – where pharmacists aim to recruit patients with respiratory conditions for the MUR service and interventions are focussed on the control of asthma or COPD – have been evaluated in different countries.[15–20] The studies have assessed impact on disease control as measured by validated questionnaires, such as the asthma control test (ACT)[13] and COPD assessment test (CAT).[14] ACT scores reflect asthma control over the previous four weeks. The test comprises five questions, each with five-option answers scored from 1 to 5. Total ACT scores range from 5 (poor control of asthma) to 25 (complete control of asthma). An increase in a patient's ACT score represents an improvement in their asthma control.[13] The CAT score assesses control of COPD.[14] There are eight questions each scored by the patient on a scale of 0–5, with a lower CAT score indicative of better-managed COPD. Total CAT scores range from 0 to 40; <10 indicates low impact, 10–20 medium impact, 21–30 high impact and >30 very high impact level of the disease on health status.[21]The ACT and CAT are quick and easy to complete, making them appropriate for use in research and pharmacy practice.

Findings from previous MUR studies have been mixed, in terms of the impact on disease control.[15–20] The efficacy of MUR on asthma control has been evaluated in three studies in Italy, Belgium and Spain. The I-MUR study carried out in Italy in 2015, involving 816 asthma patients, assessed impact of MUR on ACT following patient education.[16] ACT scores were assessed at baseline and every three months. Results showed that those who received the MUR-based intervention had a 20% increase in median ACT scores, if asthma was controlled at baseline, and for those with uncontrolled asthma at baseline, a change from 19 to 20.5.[16] As an ACT <19 indicates uncontrolled asthma, and a score ≥20 indicates controlled, this change was deemed to be a shift in asthma control category. In contrast, the control group who received usual pharmacist care only had a small increase in the median ACT score from 18 to 19. A more recent prospective comparison study of 34 community pharmacies in Italy also reported significant improvement in adherence and ACT.[19] Whether these improvements are translatable to a UK context are unknown. As MURs are not routinely carried out in Italy, the extent of benefit from carrying out the asthma targeted MUR service in addition to a standard MUR may be different for asthma patients in England and Wales, where MURs were more commonly delivered, though data are lacking on the effectiveness and cost-effectiveness of MUR delivery in the UK.

Similar studies have been conducted in Belgium[17] and Spain.[18] A six-month Belgian study in 66 community pharmacies reported improvements in ACT scores but only in a subgroup of patients who had 'insufficiently controlled asthma' (ACT < 20) at baseline.[17] As such, the study did not support the primary outcome measures of effectiveness. Baseline score-based exclusion criteria and the selection of regular customers for the study may have biased study findings. Newly diagnosed patients were also not included, making the results less generalisable to the overall asthma population. In the Spanish study, patients who received the MUR-based intervention, where asthma control and inhaler technique were assessed, had an improvement in asthma control[18] as assessed by the Asthma Control Questionnaire (ACQ). However, improvements in mean ACQ scores were all below the minimum clinically important difference (MCID), which may in part be because the study did not achieve the expected power. Furthermore, only patients who were prescribed Symbicort as a dry powder inhaler were eligible for conclusion, making the findings less generalisable to wider asthma populations. The study also did not account for changes in pharmacotherapy. As there were more patients with uncontrolled asthma in the intervention group, there was potentially more opportunity for improvement in asthma control, compared to the control group.

In terms of impact of MUR on COPD, a multi-centre evaluation of community pharmacy-based COPD support service was carried out in the UK from September 2012 to June 2013.[20] The service involved smoking cessation advice, inhaler use education and assessment of CAT scores. Mean CAT scores improved from 20.81 (baseline) to 19.96 (6 months). However, the evaluation did not have a control group as a comparator, and recruited patients who were motivated which may have led to a positive selection bias. Furthermore, although data were collected over six months, only data collected in the initial 10-week period of the service was evaluated. The ongoing effect of the service long-term thus remains unknown. Research questions remain as to what the impact of a respiratory-targeted MUR+ service is on disease control, and what factors may influence changes in ACT and CAT.

The aim of our study was therefore to evaluate the effect of a 'real-world' respiratory-targeted MUR+ service that was carried out in the Milton Keynes area, the UK over a 2-year period. This evaluation differs from previous studies as it focuses on patients with asthma or COPD, and uses real-world data from all patients eligible for the MUR-based on the ACT and CAT scores recorded as part of routine practice. Specifically, the objectives of the study were to describe the characteristics of patients presenting to Milton Keynes pharmacies for MUR+ service in terms of their disease control; characterise the pharmaceutical care issues identified by pharmacists and the types of interventions provided according to the MUR+ classification system; and evaluate the impact of the MUR+ services on disease control as measured by ACT and CAT scores.

Method

The present study was a retrospective analysis of data collected as part of a respiratory-targeted MUR+ service that was carried out in 37 different community pharmacies within the Milton Keynes area of England. Patients who received both a baseline and a follow-up respiratory-targeted MUR+ service were included for analysis. Participating pharmacies included ASDA pharmacy, Boots and Lloyds Pharmacy.

MUR-accredited pharmacists carried out the respiratory-targeted MUR+ service over a two-year period, with MUR follow-ups scheduled annually. Data were collected using PharmOutcomes. PharmOutcomes is a web-based system used by community pharmacies to collect data from services provided, allowing for the data to be used for subsequent service evaluations.[22] As part of the service, potential patients, that is, patients living with either asthma or COPD, were identified during the dispensing process and were recruited when collecting their medications. Other potential patients were referred to take part in the service by their GP. The pharmacists involved received training on ACT and CAT scoring. Baseline data collected by pharmacists included: patient basic demographic information such as address, gender, age, ethnicity, registered GP practice (though these details were not available for analysis); whether or not the patient was referred to the service by their GP surgery; whether the patient's last GP/nurse review took place more or less than 12 months ago; current diagnosis (asthma or COPD); smoking status; and current medication therapy for their asthma or COPD and other medicines not listed in the patient's medication record. Pharmacists also had access to the patient's previous dispensing history.

As part of this service, patients received an initial MUR+ consultation with a follow-up MUR+ with the pharmacist planned at 12 months or earlier if a significant change in patient circumstances meant an earlier review was deemed necessary, such as hospitalisation.[10] Patients were also offered referral to a smoking cessation service where applicable, and acceptance or refusal of this offer were recorded both during the initial and follow-up MUR+ services. ACT and CAT scores were calculated through online scoring by the MUR+ pharmacist and recorded during both the initial and follow-up MUR+ services.

Pharmacists then identified any medication-related issues experienced by patients using a standardised worksheet (see Supplementary Material). To minimise bias and variation between pharmacists, the worksheet comprised seven standardised questions that explored how the patient was managing their medicines and whether they had any issues with these, including prompts about any concerns with taking or using the medicine, whether they think they are working, any side effects and whether any doses have been missed or changed (see Supplementary Material for full details of the questions asked). Inhaler technique and device cleaning were also assessed by the pharmacist during the MUR consultation – patients were asked to bring their inhalers or spacers in and demonstrate or explain how to use or clean their devices. Any interventions to address identified pharmaceutical issues were recorded. Adherence issues fell into three categories: 'belief', 'device' or 'medicine' related issues. The interventions that were carried out by the pharmacists in response to these issues were tailored to the adherence issue(s) experienced by the individual patient. Interventions fell into one or more of the following three categories: 'Patient education', 'Device training' or 'Referral to an appropriate healthcare professional (HCP)'. Pharmacists indicated this via a tick box on the form. A free-text box was also available for pharmacists to provide more details on the reasons for referral or other issues but these fields were not mandatory.

The above data were extracted from the PharmOutcomes database and analysed using SPSS Version 25. For the purpose of data analysis, any data for patients who failed to attend the follow-up MUR+ were not included since no data were available to allow comparison with baseline scores. For the primary outcome of disease control, this was assessed as continuous variables for ACT and CAT scores. Change scores were assessed using a student's *t*-test. Data normality were assessed in SPSS. A multivariable regression model was used to identify factors influencing changes in asthma or COPD control. In these final models, a P-value <0.05 was considered statistically significant. As a subgroup analysis, a chi-square test was used to evaluate whether referral to a smoking cessation service was different between patients with asthma versus COPD. The lead investigator (AD) had full access to the PharmOutcomes database. No additional data cleaning or linkage was required.

As this project falls under the definition of a service evaluation, according to UK NHS Research Ethics Committees, formal ethical approval was not required. For MUR delivery, it was not a contractual requirement that written consent was obtained from patients before the provision of MURs. Instead, verbal consent could be obtained and a record of that made in the pharmacy's clinical record for the service.

Results

The PharmOutcomes database comprised 1152 patients who received the baseline MUR+ service. Of these, only 23.6% of patients attended the follow-up MUR+ service, comprising 191 patients with asthma and 81 with COPD. There were no patients with both asthma and COPD. The mean (±SD) time elapsed between patients receiving a baseline and follow-up MUR+ was 142 days (±76 days). The mean age of the asthma cohort was 51 years (±15 years) while the COPD cohort was 66 years (±10 years).

Baseline disease control

Mean (±SD) baseline ACT scores were 17.5 (±5.2) indicating uncontrolled asthma. Mean (±SD) baseline CAT scores were 19.2 (±8.6) indicating medium impact of COPD on health status. In the subgroup analysis, of the asthma patients who were smokers, 50% (25/50) received referral to a smoking cessation service as part of the pharmacist intervention, compared to only 29% (8/28) of patients with COPD who were smokers, though this difference between groups was not statistically significant (P = 0.46). Baseline disease control was significantly worse in patients with asthma who were smokers with a mean (±SD) ACT of 14.8 (±5.4) compared to those who were non-smokers with a mean score of 18.4 (±4.8; P < 0.01). Comparatively, the CAT scores were similar between smokers and non-smokers in those with COPD [mean (±SD) CAT 18.1 (±7.6) smokers vs. 19.7 (±9.0) non-smokers, P = 0.43]. In terms of patients who had received GP/nurse review in the last 12 months, there was no significant difference in baseline disease control between patients who had or had not received a review in the preceding 12 months for the asthma cohort [ACT 17.4 (±5.2) review ≤12

months ago vs. ACT 17.4 (±5.3) review >12months ago, P = 0.96] nor the COPD cohort [CAT 19.6 (±8.0) review ≤12 months ago vs. CAT 17.1 (±10.5) > 12 months ago, P = 0.31].

Issues identified and interventions provided

Adherence issues fell in to three categories – belief, devices or medicines. In the 'belief' category included denial of the presence of the respiratory condition, concern about the quantity of medication to be taken, misunderstanding regarding the treatment or the condition itself and fear of side effects. Adherence issues regarding 'devices' included dexterity problems experienced by patients, and incorrect inhaler technique or incorrect cleaning of spacers. In terms of the 'medicine' specific adherence issues, frequency of dosing, problems taking several different medicines, experienced side effects, forgetfulness and cost of prescription charges were included under this category. Prescription charges were raised as an issue as most working-age adults have to pay prescription charges in England as exemptions do not usually apply for asthma or COPD medicines. The most common adherence issue identified related to 'device', with 53% (101/191) patients with asthma reporting device-related adherence issues and 61% (49/81) patients with COPD (Table 1). 'Patient education' was the most common pharmacist-delivered intervention (Table 2); 71% (136/191) patients with asthma received this intervention, as did 74% (60/81) patients with COPD.

Effect of MUR+ on disease control

Overall, patients with asthma who received the MUR+ service showed significant improvements in their ACT scores. The mean ACT score for the 191 asthma patients improved by +1.2 (95% CI, 0.6–1.8) points (P < 0.01) to a mean (±SD) of 18.8 (±5.2). On the other hand, no significant improvement in the overall mean CAT score was observed between baseline and follow-up MUR+ services for the 81 COPD patients – the overall mean CAT score only changed by –0.2 (95% CI, –1.4 to 1.0) points (P= 0.77). There was no significant difference observed in outcomes by follow-up time for either asthma or COPD patients.

A multivariable model including baseline ACT score, baseline smoking status, smoking cessation, absence of change in drug therapy, patient education, HCP referral, device training and baseline ACT score ≤19 as variables gave an R-squared value of 0.19 (adjusted R-squared = 0.15) – meaning that 15% of the variance in the difference in ACT score could be explained by these factors in the model (P < 0.001). A model which included baseline CAT score, absence of change in drug therapy, smoking cessation and baseline CAT score >20 as variables related to difference in CAT score had a R-squared value of 0.12 (adjusted R-squared = 0.07) – meaning that 7% of the variance in the difference in CAT could be explained by the model (P = 0.046).

Accounting for baseline smoking status, smoking cessation, absence of change in drug therapy, patient education, HCP referral and device training in the model, baseline ACT score showed a significant relationship with the change in ACT

Table 1 Adherence issues experienced (n = 272 patients)

Adherence issue category	Asthma	COPD		Type of adherence issue			Asthma	COPD
	No. (%)	No. (%)	Number of adherence issues	Belief	Device	Medicine	No. (%)	No. (%)
Belief	32 (17)	25 (31)	1	✓			11 (6)	7 (9)
			2	✓	✓		12 (6)	11 (14)
			2	✓		✓	6 (3)	3 (4)
			3	✓	✓	✓	3 (2)	4 (5)
Device	101 (53)	49 (61)	1		✓		73 (38)	31 (38)
			2		✓	✓	13 (7)	3 (4)
Medicine	39 (20)	14 (17)	1			✓	17 (9)	4 (5)
None recorded	56 (29)	18 (22)	0	None recorded			56 (29)	18 (22)

Table 2 Interventions provided by pharmacists

Intervention category	Asthma	COPD		Type of intervention provided			Asthma	COPD
	No. (%)	No. (%)	Number of interventions provided	Patient education	Device training	Health professional referral	No. (%)	No. (%)
Patient education	136 (71)	60 (74)	1	✓			38 (20)	17 (21)
			2	✓	✓		89 (47)	38 (47)
			2	✓		✓	4 (2)	1 (1)
			3	✓	✓	✓	5 (3)	4 (5)
Device training	127 (67)	57 (70)	1		✓		30 (16)	15 (19)
			2		✓	✓	3 (2)	0 (0)
HCP referral	14 (7)	5 (6)	1			✓	2 (1)	0 (0)
None recorded	20 (11)	6 (7)	0	None recorded			20 (11)	6 (7)

scores (beta = −0.34, $P < 0.01$). Comparatively, none of the factors showed a significant relationship in the model for the COPD cohort.

Discussion

The present study is a real-world evaluation of a respiratory-targeted MUR+ service in Milton Keyes in the UK. The study used validated measures of both asthma and COPD control to assess the impact of the MUR+ service following pharmacist-delivered interventions. Significant improvements in disease control were observed in asthma patients, particularly in patients with poorer baseline ACT scores, but not in patients with COPD.

This service evaluation suggests that a community pharmacist-delivered respiratory-targeted MUR+ service can have an impact on disease control in patients with asthma. The findings did not see an effect of the MUR+ on COPD though the small sample size may have prevented the detection of an effect. Further studies are needed to identify the factors in the service delivery that support greater improvements in disease control.

Following the different categories of pharmacists' interventions, significant improvements in mean ACT scores were seen, except for when HCP referral was provided as an intervention. In terms of the three categories of interventions carried out by the pharmacist – device training, patient education and referral to an appropriate HCP – the greatest significant improvement [+1.4 (95% CI, 0.7–2.1)] in mean ACT scores was observed following device training, indicating this category of intervention provided the greatest contribution towards the improvement of asthma control amongst patients. Similar trends were observed in a Spanish study where improvement in inhaler technique by 56.2% was accompanied by improvement in asthma control.[18] However, in a Belgian study where inhaler technique improved by 40% in the intervention arm (compared to 20% in the control group), mean ACT scores only improved in patients with a baseline ACT score of <20.[17] No improvement in mean ACT score above the baseline was seen in the control group either.[17]

The greatest improvement [+2.4 (95% CI, 1.6–3.2)] in mean ACT scores was observed in patients with a mean baseline ACT score ≤19. An ACT score below 19 signifies uncontrolled asthma, indicating that the MUR+ service had a greater impact on the asthma control of this subgroup of patients – that is, those who had poorer disease control had the greatest benefits. This is similar to the Belgian study, where a significant change in ACT scores was observed for those patients with an original ACT score <20, though no change in overall ACT scores was reported in that study.[17]

When the variables baseline ACT score, smoking status, smoking cessation, absence of change in drug therapy, patient education, HCP referral, device training and baseline ACT score ≤19 were entered into a multivariable regression model, only poorer baseline ACT score showed a significant relationship with a change in ACT score in the model (beta = −0.34, $P < 0.01$). This suggests that if the MUR+ service were to be offered to a select group of patients only, most benefit in terms of improvement in disease control would be gained from offering it to patients based on their baseline ACT score. It also indicates that device training as well as adherence alone is not a predictor of asthma control, though data on device type were not recorded as part of this evaluation. As different devices require different technique and training, future evaluation could explore device type as a variable to see if it influences adherence and disease control in patients receiving MUR services.

Despite the findings showing significant improvements in mean ACT scores, all have values below the MCID of 3.[23] The MCID is defined as the smallest change in score in the ACT that represents a clinically significant change – in this case, a change of 3 points or more signals a clinically important change in asthma control. These findings are in agreement with the changes in overall ACT scores observed in a Belgian study, which did not reach the MCID[17] though findings from the Italian study did reach clinical significance.[24] These differences may be due to the way the MUR was delivered as the I-MUR was a bespoke intervention with pharmacists specifically trained to identify pharmaceutical care issues in a systematic, structured way with frequent monitoring.[15, 16] Although referral to an appropriate HCP did not show a significant improvement in ACT scores, the number of patients referred was only 14 in the asthma group. A larger sample size may have shown significant results. Also, the pharmacists only recorded whether or not a referral was made, and not whether or not the patient actually attended a consultation with the HCP, so any change in ACT scores cannot be attributed to actual referral attendance. Pharmacists also did not provide details of the reasons for referrals, and referral to pulmonary rehabilitation, vaccination status and self-management were not included but could be applicable to this population particularly for COPD patients. Future MUR evaluations would benefit from capturing data on the reasons for the referrals and referrals for other services such as pulmonary rehabilitation.

In terms of COPD control, the only significant improvement in mean CAT scores was observed in patients who quit smoking between baseline and follow-up MUR+ services [−2.2 (95% CI, −4.0 to 0.4)]. However, this corresponds to a very small sample size of five patients, and the results require further confirmation in future research. This change in mean CAT score relates to a 17.9% decrease in the number of smokers. Likewise, another England-based study previously reported a decrease in the number of smokers by 4.1%, which corresponded to an improvement in mean CAT score by 0.85 points.[20] Both studies involved 30–40% COPD patients who were originally smokers.

Of the three categories of pharmacist-delivered interventions provided – device training, patient education and referral to an appropriate HCP – had the greatest improvement, although not significant, [−2.2 (95% CI, −7.4 to 3.0)] in mean CAT scores was observed following referral to an appropriate HCP. Again, this change in mean CAT score relates to a very small sample size of five patients. Overall, it was found that the greatest improvement, although not significant, [−2.5 (95% CI, −5.5 to 0.5)] in mean CAT scores was observed following a change in drug therapy, likely due to optimising pharmacotherapy. The categories that were used to classify the pharmacist interventions were, however, not standardised as per the literature[25] as this was simplified for service delivery, so comparisons with other studies are limited.

Multivariable regression of baseline CAT score, absence of change in drug therapy, smoking cessation and baseline CAT score >20 showed that none of the variables included in the model had a significant relationship with a change in CAT score. Additionally, as the parameters analysed did not seem

to explain the change in CAT scores, there may have been another variable that was not accounted for in the model that is leading to the change in CAT scores. Analysis of the correlation between these variables in future studies would benefit from a larger sample size of patients with COPD. The MCID in CAT scores is 2,[26] and all three (smoking cessation, change in drug therapy and referral to a HCP) resulted in changes in mean CAT scores greater than the MCID. However, a key limitation of this service evaluation was the number of COPD patients involved, which impacted the significance of the results. In a multi-site COPD study previously carried out, it was found that the percentage of smokers reduced by 4.1% (compared to 17.9% in the present study), however, that study was larger with 137 patients living with COPD.[20]

Although no significant difference in rates of referral to a smoking cessation service between patients with asthma and COPD was observed (P = 0.46), the difference between the number of patients with asthma and COPD who were originally smokers may account for why a significant difference was not seen.

A CAT score >20 is indicative of 'high' or 'very high' impact level COPD[21]; the patients' COPD prevents them completing most/all tasks without getting breathless, and sleep disturbances are very common. Amongst the 25 patients who had a mean baseline CAT score >20, the improvement in mean CAT score was 7.5 times greater compared to the mean overall change in CAT scores for the 81 COPD patients, suggesting that the interventions had a much greater impact on the improvement of COPD control in this subgroup. However, this improvement in CAT score was still below the MCID of 2, which is in agreement with another study that found changes in CAT scores that were not clinically important.[20]

This 'real-world' respiratory-targeted MUR+ service assessed disease control in both asthma and COPD patients using validated questionnaires. Also, data gathered during the provision of this service detailed the specific interventions provided by the pharmacists involved, as opposed to the assumption that a protocol for a standard service was followed. This allowed for a thorough analysis of potential predictors of respiratory disease control, however, data on exacerbation rates were not collected which could be the subject of a future evaluation. As patients who did not return for a follow-up MUR+ could not be included in the study, as no data were available for comparison of scores, this creates a bias as this group who did not return for follow-up is likely to be the group with the poorest adherence or disease control. However, this retrospective evaluation provides a foundation for future prospective studies.

Another limitation of the present study was that co-morbidities/existing medical conditions of the patients were not accounted for, and these could potentially have skewed the ACT and CAT scores. As this was a retrospective study, causality cannot be inferred, as there may also have been other factors that were not considered. In addition, as the pharmacist delivering the service was also responsible for entering the data into PharmOutcomes, this presents as another potential source of bias in the results. For example, disease control scores were calculated by the MUR+ pharmacist themselves, which could have biased the results since they self-scored the effect of the intervention as part of service delivery. Recall bias may also have contributed towards no significant differences being observed in baseline ACT and CAT scores between patients who had and had not attended a GP/nurse review within the last 12 months.

Although the abovementioned changes in ACT and CAT scores measured following various interventions were not 'clinically important', neither the ACT nor the CAT test directly measure correctness of inhaler technique, nor do they account for adherence to all prescribed medication. Adherence was also assessed based on patient self-report of any issues with missing doses, but dispensing records were not evaluated. Future studies and MUR services should additionally assess for adherence using objective measures such as a count of inhalers supplied, and improvements in inhaler technique and adherence following pharmacist-delivered interventions. It remains unanswered whether inhaler technique and adherence to medication actually improved as a result of these pharmacist-delivered interventions. This would then allow for clarity as to why ACT and CAT scores did not show larger improvements (perhaps above the respective MCIDs) as a result of the interventions provided.

Worldwide, 20–35% of people with asthma smoke cigarettes,[27] and 23–45% of COPD sufferers in England in 2005 were found to be smokers too.[28] These figures indicate that the percentages of patients who were originally smokers with asthma (26.2%) or COPD (34.6%) in the present study, is representative of the general population. However, as no control group analysis was carried out, it is not possible to determine how many of the patients who quit smoking would have quit regardless of whether they had received the interventions or not, or would have quit as a result of the 'usual care' provided to them in a community pharmacy setting. Future studies could incorporate control group analysis to determine the benefit (in terms of smoking cessation rates) of providing a respiratory-targeted MUR+ service such as this one, above that of a standard MUR.

As the present study only involved community pharmacies in the Milton Keynes area, the results may not be generalisable on a national level. Other limitations include the length of the study. For the evaluation of this service, data on only one follow-up MUR+ service was evaluated per patient. As MUR services are recommended yearly, future studies over a longer time period to evaluate a greater number of follow-ups are warranted to determine the long-term sustainability of any improvements in asthma/COPD control.

Conclusion

The present study evaluated the effect of a respiratory-targeted MUR+ on validated measures of asthma and COPD control – ACT and CAT scores respectively. The findings suggest that a respiratory-targeted MUR+ service can provide significant benefit in improving asthma control in patients with poorer baseline asthma control, but not in patients with COPD. However, future studies should include a larger sample size of COPD patients to confirm these findings. Overall improvements in asthma control, although significant, were below the MCID of 3. This indicates that improvements in asthma control were not large enough to be considered clinically important. Future studies would benefit from using larger samples, adopting a prospective study design and incorporating a control group to confirm these findings.

Supplementary Material

Supplementary data are available at Journal of Pharmaceutical Health Services Research online.

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Author Contributions

AD – data collection, analysis, interpretation and write up.
ZA – study design, data collection, interpretation and write up.
AC – study design, data analysis, interpretation and write up.

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Conflict of Interest

ZA was the supervisor for AD and point of contact for the dataset. AC was a research fellow with the Asthma UK Centre of Applied Research (AUKCAR) and is now supported by a senior research fellowship from the Auckland Medical Research Foundation. AC is also on the board of Asthma New Zealand. There are no other relevant conflicts of interest.

Data Availability

The data underlying this article were from PharmOutcomes, https://pharmoutcomes.org/pharmoutcomes/help/home?about provided by Pharmaceutical Services Negotiating Committee UK. The derived data generated in this research will be shared on reasonable request to the lead author.

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