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Review

The role of the pharmacy in the management of bronchial asthma
A literature-based evaluation

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ABSTRACT

Objective: Pharmacists play a relevant role in the real-life management of asthma because they are a first-line referral for patients. In fact, the role of pharmacies has been underlined and evidenced also in guidelines. Nonetheless, the true effect of pharmacy-based management of asthma has been assessed in only a few studies. We review the available literature on asthma management in a territorial pharmacy setting.
Data Sources: The literature was searched for the keywords *pharmacy, bronchial asthma, control*, and *management*.
Study Selection: The available studies were subdivided into observational and interventional and described.
Results: Seven observational studies and 14 interventional trials were found, involving approximately 20,000 individuals. Most of those studies were performed in Europe and Australia. A high proportion of patients had poorly controlled asthma in the observational studies. The active involvement of pharmacists, in the interventional trials, consistently led to an improvement of the quality of life, a better inhalation technique, and a reduction of exacerbations.
Conclusion: The literature analysis confirms the relevance of the role of pharmacists in the real-life management of bronchial asthma and underlines the need for a more specific training for those health care professionals.

Introduction

Bronchial asthma is a common chronic respiratory disease; its current prevalence in Western countries ranges from 5% to 15% in the general population.[1] According to the numerous clinical trials performed, the available pharmacologic treatments (bronchodilators, inhaled steroids, leukotriene antagonists) achieve satisfactory control of asthma in most patients.[2] Nonetheless, in real-life, asthma remains only partially controlled or uncontrolled at any step of severity.[3,4] Many factors may account for this fact,[5–8] including the limited time for consultation in the general practitioner (GP) setting and the difficult access to in-hospital follow-up. Actually, most patients undergo no more than 1 visit per year, and spirometry is performed regularly only in a few patients with asthma.[8] Standardized questionnaires represent a practical tool to assess asthma control in every medical setting, but according to a recent Italian survey, the Asthma Control Test (ACT)[9] is routinely used only by 20% of GPs and 42% of specialists because they, surprisingly, consider it time consuming.[8] Although asthma is usually managed by physicians, pharmacists play an important role because they are frequently contacted by the patients for first-line advice or prescription renewal. In particular, adolescents prefer to seek advice in the pharmacies instead of having a long waiting time in the GP's office. In this article, we provide a concise review of the published pharmacy-based studies to better elucidate the active role of pharmacies as coplayers in the management of asthma.

Available Literature

We searched the literature (PubMed) for *bronchial asthma* [AND/OR] *management* [AND/OR] *treatment* [AND/OR] *control* [AND/OR] *pharmacy* [AND/OR/] *pharmacist*. The available studies were subdivided into observational/screening and interventional, as detailed below.

Asthma Control Screening

The assessment of asthma control in the pharmacy setting, without an active intervention in the management of the disease itself, was performed in 7 studies,[10–21] 3 of them[10–12] in the setting of a national campaign (Table 1). Asthma control assessment was

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Table 1
Level of Asthma Control Reported in Studies Performed in a Community Pharmacy Setting

Reference	No. of patients	Country	Questionnaire used	Controlled asthma, %	Uncontrolled asthma, %
Laforest et al[10]	1.559	France	ACT	28	72
Laforest et al[11]	1.048	France	ACT	30	70
Mendes et al[12]	5.551	Portugal	ACT	39	61
Nishiyama and Chrystyn[13]	306	United Kingdom	JMI	50	50
Mehuys et al[14]	166	Belgium	ACT	51	49
Le May et al[15]	354	Australia	PACS	23	77
Lourenco et al[16]	224	Portugal	CARAT	13	87
Armour et al[17]	396	Australia	JMI	21	79
Mehuys et al[18]	201	Belgium	ACT	52	48
Giraud et al[19]	727	France	ACQ	49	51
Armour et al[20]	570	Australia	JMI	23	77
Garcia-Cardenas et al[21]	336	Spain	ACQ	34	66

Abbreviations: ACT, Asthma Control Test; ACQ, Asthma Control Questionnaire; CARAT, Control of Allergic Rhinitis and Asthma Test; JMI, Jones Morbidity Index; PACS, Pharmacy Asthma Control Screening.

mainly based on standardized questionnaires, including the ACT,[9] Asthma Control Questionnaire (ACQ),[22] and Jones Morbidity Index (JMI),[23] the most frequently used. In 2 studies the assessment of pulmonary function test (PFT) was also included.[10,14] Those studies were performed in Europe and Australia and overall involved 12,246 individuals (range, 166–1.555). Only adults with mild to severe asthma were enrolled. The prevalence of controlled asthma ranged from 13% to 54% (Table 1). Of note, in 7 studies, more than 70% of individuals had uncontrolled asthma. The level of asthma control remained unchanged when assessed prospectively 2 years apart in the same populations.[10,11,14,18] In most studies, the population was not stratified according to the severity of asthma; however, in the study by Laforest et al, approximately 3% of patients probably had severe asthma and were repeatedly hospitalized. Failure to self-perceive asthma control was reported in more than 50% of patients, particularly in adults aged 41 to 50 years. When peak expiratory flow (PEF) was measured, forced expiratory volume in 1 second (FEV_1) greater than 80% of predicted was found in 60% of patients.[10]

Interventional Studies

To date, 14 interventional pharmacy-based studies have been published,[18–21,24–33] including 6,526 adults with asthma, with all but 1 performed in Europe and Australia (Table 2). The duration of intervention was 1 to 12 months. Several outcomes directly involved the pharmacists: quality of life, asthma control and severity, PEF measurement, inhalation technique, and awareness of the disease. All the mentioned outcomes were evaluated together in a single study,[33] and asthma control was assessed only in the more recent studies[18,20,21,30–33] after the official guidelines underlined the central role of pharmacies in the management of asthma.[1]

Different interventions were delivered to active groups: posted asthma educational information, indication for seeking GPs advice,[31,32] short training session on inhalation techniqueuntil comprehensive,[18] and organized asthma programs.[21]

According to the available results, pharmacy involvement overall led to an improvement of quality of life,[18,21,25,28–30] better asthma control,[18–21,30,31] and reduction in asthma severity.[18–21,26–29] An improvement in the inhalation technique was also observed.[18–21,28,30] Higher PEF values after intervention were reported in 4 of 6 studies.[24,25,27,28] In 1 study,[28] FEV_1 remained unchanged, although PEF increased.[28]

Most studies documented an improvement in the knowledge of the disease,[20,24,27,29,33] which persisted after the interventional phase.[20,33] Two studies assessed also the socioeconomic effect of pharmacy intervention[27,28] and found a significant reduction in the expenditure for medications and insurance claims.

Critical Evaluation

The above described studies, performed in the pharmacy setting, confirm the overall unsatisfactory control of asthma, as already known in the medical setting and cross-sectional studies. To overcome this long-standing problem, some innovative approaches to asthma management have been recently suggested, including the proactive role of various health care professionals, other than physicians. In this perspective, the involvement of pharmacists could represent a step forward in the future of asthma management. Given their knowledge, skills, and expertise, pharmacists could play an important role in supporting the screening of the general population, in identifying at risk patients and referring them to their GP at earlier stages of the disease, and possibly in actively following up patients. The successful involvement of pharmacies has been already documented for other chronic diseases, such as diabetes, hypertension, and dyslipidemia.[34,35] Furthermore, the easy and regular accessibility of pharmacies over the territory remains an essential aspect in most geographic areas. For example, in Australia, where health care facilities are widely dispersed, this approach is considered advantageous, and in fact, many studies were performed in that country. The positive results so far reported and summarized in the present review confirm the positive effect of pharmacy-based interventions on clinical aspects, quality of life, and economic outcomes.

Assessment of Asthma Control

Patients referred to pharmacies are usually able to correctly report their symptoms irrespective of the questionnaire used.[34] This finding confirms that the ACT, ACQ, and JMI are suitable tools in a pharmacy setting, as previously reported in medical settings.[36,37]

The structural bases of questionnaires (ACT, ACQ, and JMI) are equivalent because all include questions on asthma-induced limitations due to breathlessness, sleep and daily activities impairment, and use of rescue medications. The ACT scores patients from 0 to 25, whereas the JMI classifies patients into 3 levels of morbidity (low, medium, high). The ACQ (designed for clinical trials) is slightly more complex because it has separate questions on wheezing and severity of symptoms and requires a lung function assessment. However, independently of the questionnaire used, all studies detected a poor asthma control in approximately 50% of the patients evaluated. In some studies,[18,32,33] the screening questionnaires were mailed to patients but the response rate was low (15%). Therefore, on-site assessment in the pharmacy would be a more suitable opportunity for screening programs. In some studies, PEF measurement was the primary instrument, whereas FEV_1 was regularly evaluated only in 2 studies.[20–28] A regular inclusion of spirometry in the pharmacy setting was recently promoted on the basis of encouraging preliminary results.[38,39] However, whereas the PEF can be measured and correctly interpreted by a trained pharmacist, the evaluation of the lung function needs a robust expertise and a careful quality evaluation of the maneuvers and instruments.[40]

Educational Interventions

Education remains the major unmet need in asthma management, and this can be successfully improved by an appropriate involvement of the pharmacists. Several educational interventions were applied in the studies published so far, from a training on the inhalation technique to printed or mailed information to personalized programs. Most of the reported interventional protocols provided a baseline educational session through individual or