

Can access to spirometry in asthma education centres influence the referral rate by primary physicians for education?

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BACKGROUND AND OBJECTIVES: Asthma remains uncontrolled in a large number of asthmatic patients. Recent surveys have shown that a minority of asthmatic patients are referred to asthma educators. The objective of the present study was to assess the influence of increased access to spirometry in asthma education centres (AECs) on the rate of patient referrals to these centres by general practitioners.

METHODS: A one-year, prospective, randomized, multicentric, parallel group study was conducted over two consecutive periods of six months each, with added spirometry being offered in the second six-month period to the experimental group. Ten AECs were enrolled in the project. An advertisement describing the AECs' services was sent by mail to a total of 303 general practitioners at the start of each period, inviting them to refer their patients. Measures of the frequency of medical referrals to the AECs were assessed for each period.

RESULTS: The group of AECs randomly selected for spirometry in the second six-month period received 48 medical referrals during the first period and 32 during the second one, following proposed spirometry. AECs that had not offered spirometry received five referrals during the first period and seven during the second period. One AEC withdrew a few weeks after the study began and others encountered administrative problems, reducing their ability to provide interventions.

CONCLUSIONS: Referral to AECs is not yet integrated into the primary care of asthma and offering more rapid access to spirometry in the AECs does not seem to be a significant incentive for such referrals.

Key Words: *Asthma education; Asthma management; Asthma treatment; Spirometry*

Asthma education is considered to be a major component of asthma management by all consensus guidelines (1-3). Unfortunately, large-scale surveys have shown that asthma control is still achieved only in a minority of asthma patients, and even though mortality and hospitalizations have been declining in Canada in the past decade, the morbidity associated with this disease remains high (4-8).

Among various care gaps observed in asthma management, underutilization of objective measurement of airway obstruction

Est-ce que l'accès à la spirométrie peut influencer sur les taux de renvoi par les médecins de soins primaires vers les centres d'éducation sur l'asthme?

CONTEXTE ET BUT : Dans bien des cas, l'asthme n'est pas maîtrisé. D'après des enquêtes récentes, seul un petit nombre de patients asthmatiques sont dirigés vers des éducateurs spécialisés. La présente étude avait pour but d'évaluer l'effet d'un accès plus grand à la spirométrie sur les taux de renvoi par les omnipraticiens vers des centres d'éducation sur l'asthme (CEA).

MÉTHODE : Il s'agit d'une étude prospective, multicentrique, d'une durée de un an, menée avec hasardisation, en mode parallèle, sur deux périodes consécutives de six mois chacune; le service de spirométrie a été offert au groupe expérimental au cours de la deuxième période de six mois. Dix centres ont participé à l'étude. Une annonce dans laquelle on décrivait les services offerts par les centres a été envoyée par la poste à un total de 303 omnipraticiens au début de chaque période les invitant à y diriger leurs patients. Il y a eu mesure de la fréquence des renvois par les médecins vers les CEA à chacune des périodes.

RÉSULTATS : Le groupe de centres choisis au hasard pour l'offre de services de spirométrie pendant la seconde période de six mois a reçu 48 renvois par des médecins au cours de la première période et 32 au cours de la deuxième, après la réception de l'offre de services de spirométrie. Les centres qui n'offraient pas le service ont reçu 5 renvois au cours de la première période et 7 au cours de la deuxième. Un centre s'est retiré de l'étude au bout de quelques semaines, et les autres ont connu des problèmes administratifs, ce qui a nui à leur capacité de faire les interventions.

CONCLUSIONS : Les renvois vers les CEA ne font pas partie intégrante encore des soins primaires de l'asthme et l'offre d'un accès plus rapide à la spirométrie dans les CEA ne semble pas une mesure incitative suffisamment importante pour augmenter le nombre de renvois.

has been reported, as well as inadequate assessment of overall disease severity or control (7-9). The insufficient use of spirometry may be due to the lack of availability of or delayed access in obtaining it, as well as a lack of integration of these assessments in current practice. There is also a lack of confidence in the test, perhaps due to the fact that there are no randomized, controlled trial data that prove that routine use of spirometry in primary care leads to improved control or outcomes in patients with asthma itself (10-12).

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The other significant care gap in asthma management, which is the lack of referral to an asthma educator for adequate education about self-management of asthma, has been regularly observed (8,9). However, this was considered to be one of the main ways to reduce asthma-related morbidity and acute health care use (1,11-15).

The Quebec Asthma and COPD Network (QACN) has established a network of more than 100 asthma education centres (AECs) in the province of Quebec. Unfortunately, only a small proportion of asthmatic patients consulting for acute asthma are directed to AECs. Strategies to increase the number of patients referred to these centres have been developed, such as automatic referrals to AECs from emergency departments and various initiatives to support guideline implementation by primary care physicians (16). We herein describe a strategy aimed at offering easy access to spirometry in AECs to determine its impact on the referral rate of asthma patients to AECs. This project was included as part of the third phase of a disease management program carried out under the auspices of the QACN and Towards Excellence in Asthma Management, and supported by Merck Frosst Canada and AstraZeneca Canada (17).

METHODS

Study objectives

The primary objective of the present study was to implement the use of spirometry in AECs and to assess its impact on the rate of patient referrals by primary care physicians. The secondary objective was to evaluate the physicians' level of satisfaction in regard to the use of that service for the care of their asthma patients.

Study design

The Ethics Committee of the Research and Health Technology Assessment of the Hôpital Sacré-Cœur de Montréal, Quebec, approved the research protocol. The confidentiality of information pertaining to enrolled physicians was strictly maintained. This was a one-year, prospective, randomized, multicentric, parallel group study including two consecutive periods of six months each. Ten AECs were involved; five AECs with spirometry were matched individually with five control (no spirometry) centres with similar characteristics and populations. In each pair, an AEC had to offer spirometry in addition to the educational program while the other had to offer only the educational program. Spirometry was randomly assigned to various AECs.

During the first six months of the study (phase I), all physicians were asked to refer patients to an AEC that did not offer spirometry, while during the next six months (phase II), spirometry was offered to a subset of physicians in addition to educational asthma intervention. Asthma interventions in AECs in Quebec are in line with the recommendations of the Canadian Asthma Network for Asthma Care and include a report to the family physician but no routine measurement of peak flows or any objective measurements.

Study population

The study included only general practitioners (GPs). To be included in the study, GPs were required to practice in a targeted private clinic, see a minimum of 20 asthma patients per year and not have access to spirometry in their offices. The most relevant clinics had been identified by the educators in each AEC to ensure a sufficient number of physicians and patients.

The physicians were recruited from 10 regions in the province of Quebec with access to an AEC; these regions were identified as having high asthma-related morbidity according to recently published asthma care gaps (18). Targeted AECs had to meet the accreditation requirements of the QACN and educate a minimum of 50 asthma patients each year. All administrators in charge of the AEC signed an agreement confirming their establishment's collaboration with the research group for the duration of the project.

Physicians were randomly assigned into one of two groups: those who received information from AECs not offering spirometry (control group), and those who received information from AECs offering access to spirometry (experimental group).

Educators' training

All AEC health educators participated in a 3 h workshop on the theoretical and practical aspects of performing spirometry according to the quality standards established by the American Thoracic Society (19) and received relevant written information. They also underwent an evaluation to assess whether the training objectives had been met. The main objectives of the training dealt with quality control in the administration of spirometry, and interpretation and criticisms of the computerized spirometer report.

Study period

The study was planned for two phases of six months each. An advertising campaign on the role of the AECs, intended for the GPs of the targeted clinics, was conducted a few days before the official beginning of each phase. The advertisement was sent by mail at the beginning of the study and after six months to all GPs in both groups. The advertisement included information about the services offered by their AEC, as well as schedules and reference modality. In phase I, both physician groups received information on AEC educational interventions (spirometry was not offered). At the six-month mark (phase II), GPs in the experimental group received an official spirometry service offer available from their AEC. The number of medical referrals to the AECs by these targeted GPs was calculated at the end of each phase.

Analysis

The primary variable was the number of medical referrals to the AECs for each phase, before and after access to spirometry for the experimental group, and for each six-month period in the control group without access to spirometry. The secondary variable was the level of satisfaction of the targeted GPs in both groups, which was assessed via a questionnaire regarding the services offered at the AECs.

The same questionnaire was sent to the GPs at the end of each phase to assess their level of satisfaction regarding the services offered by the AECs. The GPs whose patients had not received any educational sessions at the AECs were not sent this questionnaire.

RESULTS

Spirometry training

Thirteen health educators (100%) attended the workshop on spirometry and completed, before the start of phase II, a theoretical and practical test including multiple-choice questions; the average score on these tests was 79%. The practical part of the test was to carry out three detailed identifications on three different adults (one normal subject and two patients). Each participant had to produce a printout of at least two accurate curves, read the computerized spirometer report and comment

on whether the printed curves were in keeping with the report. They also commented on the quality of the curves according to American Thoracic Society standards.

Referrals to AECs

The advertisement informing the GPs of the nearest AEC offering services for their asthmatic patients was sent to 303 GPs. Health educators had to record data on the number of medical referrals to the AECs following this advertisement. After the AECs were randomly assigned to groups with and without spirometry, 183 GPs were linked to the first group (with spirometry for the second period of the study) and 120 to the control group. During phase I, a total of 53 medical referrals was reported (Table 1). For the AECs offering spirometry in addition to education during phase II, there were 48 medical referrals during phase I versus 32 during phase II. For the AECs that did not offer spirometry during phase II, this number went from five (phase I) to seven (phase II). One AEC in the group without spirometry withdrew a few weeks after the study had begun.

GPs' satisfaction level

For phase I (with no spirometry), 15 of 15 GPs responded to the questionnaire that was sent to them. For phase II, out of the 15 GPs who received questionnaires, only 9 responded: six from the experimental group with access to spirometry and three from the control group.

When the importance of measuring spirometry in addition to providing asthma education intervention was assessed with regard to the incentive to refer patients to the AECs, 80% (12 of 15) of GPs who completed the questionnaire during phase I allotted the highest score for this item compared with four of six (67%) GPs who had access to spirometry during phase II (Table 2). The questionnaire revealed that access to spirometry was not really an incentive for increasing referral to AECs for education, because 60% (nine of 15) of the GPs checked the highest score during phase I, compared with 50% (three of six) during phase II, regardless of the group.

DISCUSSION

To improve asthma management and decrease asthma-related morbidity, primary care physicians need to better implement key recommendations of current asthma guidelines, particularly in regard to education and objective measures of airway caliber (1,2). We hypothesized that a potential barrier to inadequate asthma management in primary care was poor access to spirometry and that physicians were not using this assessment tool due to difficulties in accessing this test. We hypothesized that primary care physicians would be more inclined to refer a patient to an AEC if spirometry was offered in addition to the current asthma education program. However, the study did not confirm this hypothesis, and showed that there was an overall lack of interest in referring patients for asthma education, regardless of whether spirometry was offered. Indeed, of the more than 300 physicians in current practice to whom the advertisement describing the AEC's activities was sent, only a small number referred patients, regardless of the services offered. This is in keeping with recent surveys showing persistent care gaps in asthma management (8-10,16).

In a study of family practitioners (11), 20 physicians reported that 68% of patients seen for an 'asthma visit' had never undergone spirometric testing and 55% had never had a

TABLE 1
Counted frequencies of medical referrals to asthma education centres (AECs)*†

	Phase I referrals (n)	Phase II referrals (n)	Referral differences‡	Number of GPs who received advertisement
AECs with spirometry				
1	8	1	-7	8
2	20	14	-6	47
3	7	12	+5	21
4	6	2	-4	51
5	7	3	-4	56
Total	48	32	-16	183
AECs without spirometry§				
6	0	0	0	17
7	3	4	+1	26
8	0	2	+2	25
9	2	1	-1	52
Total	5	7	+2	120
Grand total	53	39	-	303

*Only referrals from general practitioners (GPs) who had received advertising were counted; †For the purpose of the present study, only patients 18 years of age and older were counted as referrals; ‡Phase 2 - phase 1; §One clinic withdrew a few weeks after the study began

peak flow measurement, although a spirometer or peak flow meter was available in 72% of the practices. While easy access to spirometry was necessary for primary care physicians to routinely obtain lung function testing, it was not sufficient. In a logistic regression analysis, O'Dowd et al (20) showed that the factors most strongly associated with reported spirometry use among primary care physicians were owning a spirometer, agreeing that the data were necessary for accurate diagnosis, and believing that they were trained to perform and interpret the test.

However, a recent study (21) demonstrated that despite being provided with equipment and training, primary care physicians used the test neither frequently nor accurately. Our study suggests that improving accessibility to spirometry is not likely to increase the use of pulmonary function testing in asthma.

Physicians must therefore be instructed about the test's usefulness and its interpretation, and further objective evidence of its value may need to be provided. In addition, they must be given the resources to conduct the test and receive assistance in the interpretation of the results (22). In the present study, physicians received an invitation by mail to refer their patients to the AEC, and then they were informed six months later, once again by mail, of the spirometry service offered at their AEC. We know that passive dissemination of information is not effective in changing health care service delivery and outcomes; to have an impact on physician practice, other methods are required, such as interactive workshops, small group sessions or individualized tutorials (22).

Another reason for low referral to AECs may be that the GPs had to send the medical referral directly by fax to the AEC, allowing the health educators to count it. We cannot exclude the possibility that many referrals may have been lost, therefore affecting the count. This would have been the case had a patient been given a referral and forgotten to contact the AEC regarding this matter. A previous study by Robichaud et al (16)

TABLE 2
Compiled questionnaire data on general practitioner (GP) satisfaction level with asthma education centres (AECs)

Questions†	Phase I answers* (Both groups of GPs, n=15), %					Phase II answers* (GPs without spirometry, n=3), %					Phase II answers* (GPs with spirometry, n=6), %				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
• General satisfaction regarding the teaching reports			6.7	53.3	40				100				16.7	83	
• In the teaching reports, are care assessments for your patients relevant?			6.7	26.7	66.7				50	50			16.7	83	
• Satisfaction regarding the content presentation of the teaching reports.			13.3	53.3	33.3			50	50				33.3	33.3	33.3
• Has teaching at the AEC contributed to improving asthma control?			7.1	42.8	50				100				50	50	
• Post-teaching, patients more motivated to cleanse their environment?			15.4	69.2	15.4				100				66.7	33.3	
• Has teaching contributed to improving compliance with taking medication?			14.3	57.1	28.6				50	50			33.3	66.7	
• Has teaching contributed to better technique for the use of inhalators?			7.1	28.6	64.3				50	50				100	
• Post-teaching, are patients more capable of recognizing signs and symptoms and applying action plan?			15.4	54	30.8				50	50			50	50	
• Satisfaction on frequency and types of follow-ups by AEC			15.4	30.8	54				100				50	50	
• Are services offered by an AEC sufficient in terms of geographical access?			6.7	66.7	26.7					100			66.7	33.3	
• Are services offered by an AEC sufficient in terms of working hours?	7.7	7.7	23.1	54	7.7				100				83.3	16.7	
• Are services offered by an AEC sufficient re availability of health educators?			6.7	80	13.3				50	50			66.7	33.3	
• Are FEVs important for you in terms of follow-up of asthmatics?			26.7	73.3					50	50			16.7	50	33.3
• Level of importance granted to measuring FEVs at the AEC			20	80					50	50			16.7	16.7	66.7
• Would spirometry at the AEC incite you to refer more to the AEC	6.7		33.3	60					50	50			16.7	33.3	50
• Do patients visiting the AEC help you reach consensus criteria on control?			46.7	53.3					50	50			33.3	66.7	
• Does measurement of PEFR at office help you reach the control criteria?			26.7	46.7	26.7				50	50			66.7	16.7	16.7
• Does measurement of FEVs at AEC better help you reach the control criteria?	6.7	6.7	40	46.7					50	50			33	50	16.7
• Do patients visiting an AEC make you more likely to prescribe an action plan?	6.7	6.7	53.3	33.3					50	50			66.7	33.3	
• In general, has the AEC met your expectations?	7.1		43	50					100				33.3	66.7	

*Choice of answers (1=low satisfaction, 5=high satisfaction); †Questions have been abbreviated for inclusion in the table. FEV Forced expiratory volume; PEFR Peak expiratory flow rate

showed that even in an optimum situation in which the patient is directly referred to the AEC and is then contacted by the educator, only approximately 50% will end up receiving education. In that study, 1104 patients were referred to an AEC directly by fax from the emergency room; 106 patients (15%) could not be contacted, 114 patients (16.1%) refused the intervention, 488 patients (68.9%) made appointments and 346 patients (48.9%, or 72.8% of scheduled patients) honoured their appointments.

Another possible explanation for our results is that we selected AECs based on their location in regions with high asthma-related morbidity (15) and not on their other characteristics, such as current performance or organizational profile. The reasons behind the high morbidity observed in these regions may have created a barrier to referral. The small number of GPs in these regions, their heavy workload and their duties may have had a negative impact on their enrolment and referral rate. The scarcity of asthma educators and the financial and organizational problems encountered by the institutions in which the AECs are located may have had an impact on the results.

Due to the small number of preselected AECs, a two-by-two matching process was completed to make them comparable in phase I (without spirometry). It was based on different criteria, such as the asthmatic population size or the comparability of

the cities or regions of the AECs. Even with this matching, the two groups did not appear to be comparable: one received 48 referrals and the other only five during phase I. This difference is mainly due to one outstanding and dynamic AEC that had 20 referrals and differed significantly from the others.

CONCLUSIONS

The present study shows that the low rate of referral to AECs was not improved by offering additional spirometry at the AECs and that the underutilization of airway caliber measurement does not necessarily seem to be due only to the inaccessibility of this test. To increase the use of spirometry in the follow-up and diagnosis of patients with asthma, primary care physicians have to understand its importance and interpretation.

The offering of spirometry in AECs may, despite the results obtained, be useful for asthma educators to better assess the baseline control and to provide physicians with a better evaluation of the current status of asthma control in referred patients. This could be useful for the follow-up and adjustment of therapy, and to increase the link among physicians, educators and patients. With positive results, this study would have created an incentive for the QACN to generalize the use of spirometry throughout its AECs, with the goal of reducing asthma-related morbidity and improving asthma care. Further studies should be conducted to determine how

referral to AECs could be improved and how objective measurement of airway obstruction could be promoted. Innovative strategies and improved communication should be developed.

Enrolled AECs may go on offering spirometry, knowing that the centres have acquired this equipment and that the health educators have developed expertise in using it. Positive results would have made the QACN generalize the usage of spirometry throughout Quebec's AECs with the goal of decreasing

morbidity. The present study did not show that such a service would increase the quality of asthma follow-up. A post-study follow-up would help to determine whether long-term access to spirometry may have an impact on referral rate.

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