



How can adherence to asthma medication be enhanced? Triangulation of key asthma stakeholders' perspectives

Sandra Peláez PhD, Simon L. Bacon PhD, Guillaume Lacoste BSc & Kim L. Lavoie PhD

To cite this article: Sandra Peláez PhD, Simon L. Bacon PhD, Guillaume Lacoste BSc & Kim L. Lavoie PhD (2016) How can adherence to asthma medication be enhanced? Triangulation of key asthma stakeholders' perspectives, *Journal of Asthma*, 53:10, 1076-1084, DOI: [10.3109/02770903.2016.1165696](https://doi.org/10.3109/02770903.2016.1165696)

To link to this article: <http://dx.doi.org/10.3109/02770903.2016.1165696>



Accepted author version posted online: 11 May 2016.
Published online: 11 May 2016.



Submit your article to this journal [↗](#)



Article views: 70



View related articles [↗](#)



View Crossmark data [↗](#)

ADHERENCE

How can adherence to asthma medication be enhanced? Triangulation of key asthma stakeholders' perspectives

Sandra Peláez, PhD, Simon L. Bacon, PhD, Guillaume Lacoste, BSc, and Kim L. Lavoie, PhD

Montreal Behavioural Medicine Centre (MBMC), Chronic Disease Research Division, Hôpital du Sacré-Coeur de Montreal, Montréal, Québec, Canada

Abstract

Background and objectives: Adherence to daily asthma controller medication has been shown to be the most effective component of asthma self-management; however, patient's adherence to asthma medication remains poor. This study aimed to understand how patients' long-term asthma controller medication adherence may be improved and facilitated by comparing key asthma stakeholders' perspectives. **Method:** Six focus group interviews including 38 asthma stakeholders ($n = 13$ patients, $n = 13$ pulmonologist physicians, and $n = 12$ allied healthcare professionals) were conducted. Interviews were qualitatively analysed. **Results:** Although similar themes were brought up across different asthma stakeholders, the way in which they were framed differed across stakeholders. The most salient discussion revolved around the content and the moment in which asthma education should be approached to facilitate patients' adherence to asthma medication. **Conclusion:** Asthma medication adherence is a complex process and successful interventions aimed at its improvement would benefit from: (a) making an effort to understand patients' experiences and negotiate the treatment regimen, rather than imposing recommendations; (b) considering treatment as a shared responsibility involving the patient, the healthcare professional(s), and the patients' social networks; and, (c) taking into account different stakeholders' concerns, needs, perspectives, and knowledge.

Keywords

Focus groups, facilitators, intervention, patients, physicians, health care professionals, education

History

Received 13 November 2015

Revised 9 February 2016

Accepted 10 March 2016

Introduction

Asthma is a common airway disease affecting 235 million people worldwide [1]. Although taking daily controller medication has been shown to be the most effective component of asthma self-management [2], adherence remains poor [3, 4] and is associated with poor asthma control [5]. Poorly controlled asthma has both personal (e.g., reduced functional impairment) and socio-economic consequences (e.g., increased expenditures to the public health system) [1, 6–8], making it an important therapeutic target.

Facilitators to long-term controller medication adherence have been previously assessed [9–12]. Examples of facilitators identified in previous research are: greater patient knowledge of medication and disease, patient perception of medication benefits, patient access to personalised and patient-centered healthcare, patient access to a public drug plan, and a good patient-physician relationship [11–15].

To better understand factors influencing asthma self-management, different asthma stakeholders' perspectives (e.g., patients, physicians) using different methodologies (e.g., qualitative, quantitative) have been used [16–19]. These studies

showed that different asthma stakeholders perceive asthma self-management in different ways. For example, Fumagalli and colleagues [20] found that even when physicians and patients were satisfied with medication efficacy—despite shared awareness and concerns about its long-term side effects—physicians continued to prescribe the medication, whereas patients tended to switch medication, skip or change doses, or even stop taking it. This suggests that achieving asthma control should not be seen as solely the patient's responsibility, but as a shared process involving different asthma stakeholders.

In the process of developing clinical interventions to promote patients' adherence to long-term asthma controller medication, understanding the underlying reasons for medication adherence and non-adherence represents is considered an important first step [21]. Although several interventions targeting a variety of asthma populations (e.g., children, adults) and using different approaches (i.e., educational, motivational), designs (e.g., correlational, longitudinal), and implementation strategies (e.g., educational mailing, phone call follow-ups) [22–27] have been developed, the efficacy of these interventions has been inconsistent [28–31]. This may be due to a failure to consider different stakeholders' perspectives, which is an essential component of clinically successful interventions [32, 33].

Although achieving asthma control is highly dependent upon different asthma stakeholders' perspectives, different stakeholders may not necessarily share the same views [34].

Correspondence: Kim L. Lavoie, Montreal Behavioural Medicine Centre (MBMC), Chronic Disease Research Division, Hôpital du Sacré-Coeur de Montreal, 5400, Boul Gouin Ouest, Montréal, Québec H4J 1C5, Canada. E-mail: k-lavoie@crhsc.rtss.qc.ca

Therefore, we aimed to better understand how patients' long-term asthma controller medication adherence may be improved by exploring and comparing key asthma stakeholders' perspectives on facilitators to asthma medication adherence. For this reason, we used focus group interviews, a technique that enhances discussion and exchange among participants and has been widely used in asthma research [37]. Preliminary results from this study were used to develop the Motivational Intervention for Asthma Control Trial (MI-ACT) [35] (ClinicalTrials.gov - Identifier: NCT01132430). This study showed that adherence improved (medium effect size) in the intervention group when compared to the control group, indicating that when stakeholders are consulted prior to designing an intervention, there is the potential to optimise intervention success.

Methods

Study design, participants, and procedures

We designed a qualitative, multiple-case study [36]. We interviewed a total of 38 asthma stakeholders purposefully selected from a teaching university hospital. We grouped participants into three cases representing different stakeholders (case 1 = 13 patients suffering from asthma; case 2 = 13 physicians who treated patients with asthma, and case 3 = 12 allied healthcare professionals [AHP] providing asthma healthcare). Patients were included if they: had a primary diagnosis of asthma confirmed by chart evidence of a 20% fall in FEV₁ after methacholine challenge and/or bronchodilator reversibility in FEV₁ of $\geq 16\%$ [37], were between 18 and 75 years of age, spoke French or English, and had a prescription for inhaled corticosteroids for at least 12 months.

We conducted 6 focus groups, 2 per group of stakeholders sampled, each of them led by a moderator and attended by a participant observer and a stenographer who recorded and then transcribed verbatim all focus group discussions [38]. The 6 focus groups ranged in length from 100 to 120 minutes and were conducted between February and June 2009. Refreshments were offered to participants during the focus groups.

All participants provided written, informed consent prior to participating, after which they received general information about the study and the focus group procedures. Following this introduction, the different asthma stakeholders discussed: (1) their perspectives concerning medication adherence, (2) barriers and facilitators to medication adherence, and (3) what they considered an ideal intervention to improve medication adherence. Stakeholders' understanding of adherence and barriers to medication adherence were published in a previous article [39]. In the present article, we present the analysis of the data set dealing with facilitators to improve patients' long-term asthma controller medication adherence. The main question was "based on your experience, what facilitates (patient's) adherence to prescribed long-term controller medication?" Examples of other questions used to collect the data analysed in the present paper were: "What helps you [a patient] take medication as prescribed?" and "What should be the goals of an intervention designed to enhance medication adherence?"

Data analysis

The data was analysed following the *thematic network analysis* procedures [40], recommended to explore the understanding of an issue by extracting themes related to a phenomenon. Identified themes were first clustered into *basic themes* (i.e., lowest order premises of evidence), then grouped into *organising themes* (i.e., middle-order themes), and finally into *global themes* (i.e., macro super-ordinate themes) representing the overall analysis.

We first conducted *within-case* analyses by coding data into different basic themes. Then, we related themes by both looking for patterns that connected those themes and re-arranging themes into thematic networks that represented the conductive thread underlying each stakeholders' narrative. As such, we developed a preliminary case-per-case framework. We then conducted *cross-case* analysis to build abstractions based on common and unique patterns across cases [36]. A challenge we faced while comparing and contrasting [41] stakeholders' views was identifying a common language across cases, i.e., similar words referring to shared meanings. To accomplish this, we discussed the essential meaning of each theme portrayed in each preliminary case-per-case framework, we then compared the content coded and the labels we attributed, and finally, for similar themes, we chose an encompassing label that represented the similar themes across cases. These discussions contributed to the final version of each case-per-case framework. We used the computer software MAXQDA (VERBI GmbH, Germany, version 10) to support data analysis.

Results

Participants characteristics

Patients were 52.5 years old (Age range = 20–75; SD = 15.8), 69% were women, and had asthma for an average of 29.8 (SD = 22.3) years. They had a score of 1.25 (M = 0.64) on the Asthma Control Questionnaire (ACQ) [42], denoting poorly controlled asthma. *Physicians* were 44.3 (SD = 9.9) years old, 31% were women, and had been practicing for an average of 14.1 (SD = 10.0) years. *AHP* were 41.5 (SD = 8.6) years old, 83% were women, and had been practicing for an average of 19.9 (SD = 9.0) years as nurses (17%), technicians (33%), inhalotherapists (33%), and pharmacists (17%). All participants spoke French.

Global theme and common organising themes across stakeholders' groups

Participants' discussions were organised around one global theme we named *facilitators to patient's long-term adherence to asthma controller medication*. Table 1 displays the seven common organising themes we identified across stakeholders.

Facilitators to long-term adherence to asthma controller medication per stakeholder group

Patients' perspectives

Asthma is a disease experienced along a continuum. The patients approached facilitators to long-term controller medication adherence by describing their medical condition as

Table 1. Common organisational themes across cases.

Organisational themes, brief description, and example quotations
Lived experience Having lived the consequences of an asthma exacerbation due to not adhering to prescribed asthma medication: <i>“No, you don’t play with your prescription. After having experienced the consequences of not taking the prescribed medication, oh! No, you don’t play with it anymore. You quickly understand that you have to respect your prescription”</i> (a 53 years old, male patient) <i>“Patients who have severe asthma frequently become more adherent because at one point in their lives they played with medication and they suffered the consequences of not having taken it”</i> (an allied health professional) <i>“It’s after having gone through an asthma crisis that you click that you have to take your medication regularly”</i> (a physician)
Acceptance Acceptance of the diagnosis, of having a chronic disease, and the fact that there is an associated long-term treatment: <i>“So you have to accept that you have to take the medication even if you’re doing well and not just as a mere response to your symptoms because asthma is a chronic disease and therefore requires long-term treatment”</i> (a 68 years old, male patient) <i>“For young people, accepting that they have a chronic disease it’s not easy. That means they won’t no longer have a ‘virgin’ file ... But when there’s no acceptance of the disease, the treatment is intermittent”</i> (an allied health professional) <i>“A healthy person that all of a sudden is diagnosed with asthma perceives asthma as a handicap. So at the beginning, this person won’t simply accept the received diagnose. But truth is that without acceptance of the disease there’s no possible treatment”</i> (a physician)
Self-management Behavioural actions and strategies denoting the patient’s acknowledgement of the disease, as well as the ability to carry out the prescribed treatment: <i>“If you leave on holidays, then you have to preview enough medication supplies to prevent any potential inconvenience”</i> (a 31 years old, female patient) <i>“So it’s just knowing that when you train you need to double your dose just because of the efforts you’re doing. Then you come back to the ordinary dose”</i> (an allied health professional) <i>“You say to your [asthma] patients that you want to see them in a year from now, and the majority of them are really happy. They want to be followed up”</i> (a physician)
Patient knowledge Being knowledgeable about both the disease and its treatment: <i>“I never take for granted what I know about asthma. I want to know what’s going to happen to me in a future. That’s why I always pose so many questions”</i> (a 61 years old, female patient) <i>“Patients need to have tips to help them manage their condition properly”</i> (an allied health professional) <i>“If we want them to follow the treatment, then we have to give them all the information so that they are informed”</i> (a physician)
Patient attitude Attitudes and feelings with regard to asthma, and more specifically, its associated treatment: <i>“Taking the medication is part of my daily routine, of my daily habits”</i> (a 62 years old, female patient) <i>“Discipline concerning the treatment relies upon motivation”</i> (an allied health professional) <i>“The responsibility concerning the treatment has to be shared. I agree with my colleague in that medication adherence is an individual choice and requires internal motivation”</i> (a physician)
Patient-physician relationship The patient trusts the physician because of his or her professional background and his or her attitude (e.g., they listen, are gentle, comprehensive, and understanding): <i>“He is very professional, he is a thorough physician; I entirely trust him, imagine that he has been my physician since I’m 12!”</i> (a 31 years old, female patient) <i>“I think that being empathic helps; also being open and non-judgemental”</i> (an allied health professional) <i>“I have to put myself on the patients’ shoes or I will just pick lies from them”</i> (a physician)
Intervention A short term educational and/or motivational treatment to enhance asthma self-management: <i>“Make things enjoyable”</i> (a 61 years old, female patient) <i>“The intervention has to provide the patient both the necessary education and encouragement to carry on with the treatment”</i> (an allied health professional) <i>“Unify all the information so that the patient knows what to do and is reassured”</i> (a physician)

experiencing an acute asthma exacerbation, as well as engaging in regular asthma self-management. The *lived experience* of an asthma exacerbation, i.e., the real experience of physically suffering the consequences of non-adherence to medication, helped the patients realise the importance of taking their medication. For example: “I suffered from neglecting to take my medication, so I learned that I had to take it ... or I’m done. Therefore, I found myself a reason to adhere to medication” (Male, 39 years). Associating the fact that an asthma exacerbation could be related to non-adherence to medication led patients to accept both their diagnosis of asthma and the fact that it is a chronic disease requiring daily treatment. *Acceptance* of the disease represented a second facilitator, as explained by a 62-year-old female patient: “So I tried both taking and not taking the medication, and finally, I decided that enough was enough; I accepted I had asthma and that I had to take the medication for the rest of my life.” Patients referred to a third facilitator: *asthma self-management*. Adherence to long-term controller medication was described as one component of asthma self-management, along with the ability to adjust medication as a result of anticipating asthma symptoms, minimising the perception of side effects, perceiving the benefits of taking medication, perceiving that medication is user-friendly and easy to administer, having strategies and resources to optimise medication adherence, and having medical insurance and/or receiving free samples of medication. Some examples are:

“Of course there are some associated effects to asthma medication, but I decided to take it because I know it’s good for me” (a 39-year-old, male patient)

“There are so many options in terms of medication formats that you can now choose the one that fits you the best” (a 75-year-old, female patient)

The conductive thread of patients’ discussions concerning facilitators to medication adherence revolved around identifying and sharing ideas to face their daily struggle of dealing with asthma. The asthma continuum entailed a learning process facilitated by the *patients’ knowledge* (e.g., disease and treatment-related knowledge) and the *patients’ attitude* (e.g., once the disease is accepted, patients’ willingness to manage it in the best way possible). Each event along this continuum (e.g., an exacerbation), if capitalised upon, could enhance patients’ adherence to medication. Another facilitator to medication adherence identified by patients was having a trust-based *patient-physician relationship*. This relationship had to be nurtured from both sides, with patients showing honesty and respect towards the physician, and with physicians showing empathy and interest towards the patient.

Figure 1 displays the corresponding thematic network analysis of facilitators we created with the organising themes. The conductive thread we identified in the patients’ discussions was highlighted in the figure.

Views on designing an adherence intervention. The patients agreed that participating in a group (vs. individual sessions) educational intervention, including a motivational component, would facilitate medication adherence. Patients also expressed that such an intervention should be delivered at the last stage of the asthma continuum, i.e., after having an exacerbation, because that was the time at which they were ready

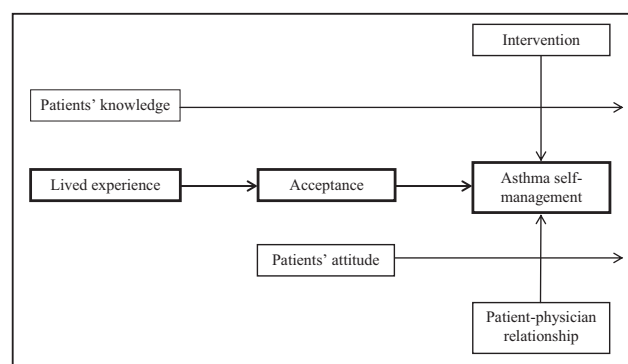


Figure 1. Facilitators to long-term asthma controller medication adherence: the patients’ perspectives.

to engage in appropriate asthma “self-management,” as one patient explained:

When the physician tells you: “Take the medication because it will be good for you,” unless you know what may happen to you, you don’t really pay attention. You start considering seriously what asthma is after suffering an attack ... when you accept that you will have to take it for the rest of your life ... It’s at that point when you want to learn more about your disease (Male, age 53).

Patients agreed that any healthcare professional that was empathetic, caring, and available to respond to their treatment questions could deliver such an intervention, ideally, at an easy-to-access place (e.g., close to home). For example: “Ideally [the intervention] should be delivered by someone you trust, someone with a shared vision ... But if the intervention can be delivered at a place close to home, that’s a bonus!” (Male, age 53).

Physicians’ perspectives

Taking the medication. The physicians’ conversations concerning facilitators to long-term controller medication adherence resulted in a spider-shaped pattern in which all facilitators related to the conductive thread and core idea discussed: “medication taking.” The thematic network analysis displaying physicians’ discussion is presented in Figure 2.

Physicians were more likely to associate *patient acceptance* of the importance of taking their medication to control asthma as the primary facilitator to adherence and they did not believe patients would be more likely to adhere because of the feared negative consequences of a given *lived experience* (i.e., attack). A physicians did not emphasise the importance of a *patient’s*

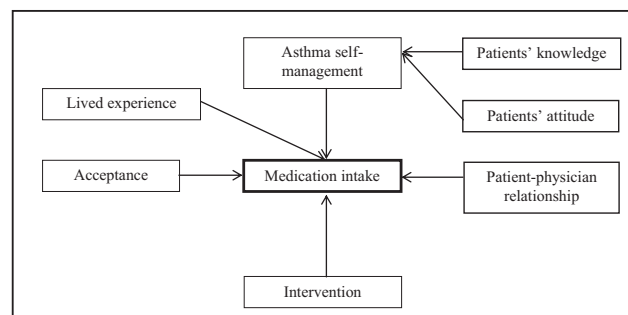


Figure 2. Facilitators to long-term asthma controller medication adherence: the physicians’ perspectives.

attitude (with the exception of motivation), they agreed that *patient's knowledge* was crucial to asthma self-management and medication adherence because an educated patient can make more informed decisions. Physicians insisted that a key component of patients' knowledge was accurate interpretation of symptoms, as noted in the following excerpt:

The truth is that medication intake is highly related to the symptoms the patients have, but as well, to the way they interpret the symptoms. When they're doing well, they tend to say: "I'm ok, I'm healed." The patients usually use the past tense to refer to their symptoms, when we all know asthma is a chronic disease. So the way the patients conceive the disease, i.e., what they know, what they believe, and how they interpret the symptoms, it's a combo that makes the patients either, as I call them, 'stop and go,' so they take the medication if they're having symptoms and they stop when the symptoms are gone ...

In addition, physicians mentioned that the *patient-physician relationship*, ranging from promoting patient empowerment to using directive strategies to indicate what the patient should be doing, were potential contributors of adherence. Finally, physicians believed that patients' ability to identify the beneficial effects of medication and minimise side effects (both components of good *asthma self-management*) were important facilitators of adherence.

Views on designing an adherence intervention. Physicians mentioned that an intervention aimed at facilitating medication adherence should primarily offer the patient *asthma education*. Although they did not offer any clarification concerning how the content should be delivered, physicians explained that a simple message adapted to the patient's needs should be given at each follow-up by all healthcare professionals involved. Although physicians believed they were best placed to deliver such an intervention, they admitted not having the time. They proposed that education should be delivered by asthma educators and reinforced by pharmacists.

Physicians also discussed the idea that adherence could be improved at specific moments over the course of standard treatment:

- Physician 1: The frequency of the follow-up, I always ask myself that question ... Some need a closer follow-up, a weekly phone call, let's say. If they get to adhere at that point, then it's done because they notice the benefits of medication adherence, but if we offer a 3-to-4 month follow-up, we lose them. So we should target the follow-up depending on the patients.
- Physician 2: ...I think there is a critical moment when we can enhance and promote adherence. Once the patient is on the good track, it works, but I think there is a moment when they're ready to listen.
- Physician 3: Thus, a closer follow-up is crucial for those who do not yet manage asthma properly ... But a yearly follow-up is ok for those who are under control.

Allied healthcare professionals' perspectives

The key role of education. AHP described facilitators to long-term controller medication adherence as a complex process in which a *patient's knowledge* was a core component and an intervention specifically designed to enhance it was key to support the patient in achieving asthma self-management. AHP saw themselves as key contributors to this process by offering patients the educational support required to respond to their needs. The conductive thread in these stakeholders' discussions

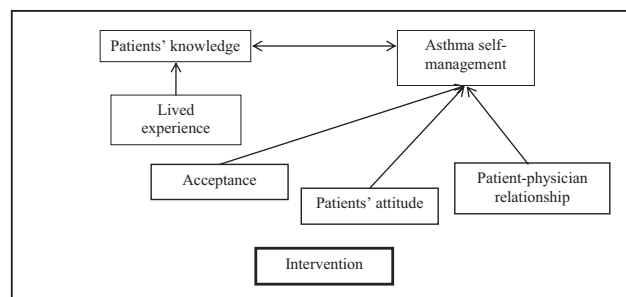


Figure 3. Facilitators to long-term asthma controller medication adherence: the allied healthcare professionals' perspectives.

was the link between asthma education and appropriate asthma self-management. The corresponding thematic network analysis is presented in Figure 3.

For AHP, fears about the *lived experience* of an asthma exacerbation played a crucial role, as stated in the example provided by one AHP: "Fear of undergoing another asthma attack is crucial for medication adherence." The *acceptance* of the disease, the availability of free medication samples, and having health insurance also facilitated adherence in patients who accepted the chronicity of asthma. One AHP said: "Once asthma is accepted, the patient moves to 'self-management,' which basically requires understanding and comprehending the disease." Another facilitator of asthma self-management identified by AHP was the *patient's attitude*, i.e., motivation and discipline. A motivated patient was more prone to perceive the benefits of medication taking, be attentive to the potential onset of symptoms, and be willing to use strategies and resources to properly manage asthma. Similarly, AHP explained that a trust-based *patient-physician relationship* in which the patient, with appropriate physician guidance, was able to become more active and responsible for his or her disease facilitated appropriate *asthma self-management*.

Views on designing an adherence intervention. AHP explained an educational intervention should be delivered along a continuum to support the patients concerning asthma self-management, respond to their evolving needs, and enhance their sense of empowerment, especially in the form of information and organisational strategies (e.g., reminders to take medication). According to AHP, another key element was to ensure patients had access to medication, e.g., providing samples. In addition, AHP strongly believed the intervention should be delivered: face-to-face, for a duration of 45 minutes–2 hours, by an interdisciplinary team of healthcare professionals having available time to discuss various topics with patients and willing to verify patients' inhaler techniques. One conversation follows:

- AHP 1: I would say that the intervention has to have an impact on the patient ... it has to improve the patient's health ... it has to have an overall positive impact that the patient can notice. The patient will be pleased with such an intervention ...
- Moderator: Excellent.
- AHP 2: Yes, effectively, an intervention that is feasible and that allows the patient to see that is doable.
- AHP 3: I would add that the intervention ...the patient has to clearly see that the intervention is part of a process, of a continuum, where all healthcare professionals contribute in a singular way, but at the same time, head into the same direction. So such an intervention cannot be delivered by one health care professional, but by an interdisciplinary team.

Discussion

Patients, physicians, and AHP discussed facilitators to patients' adherence to long-term asthma controller medication. Although similar themes were identified across groups, the discussions revealed different views depending on the stakeholders' perspectives. For *patients*, the core idea discussed was the daily struggle of living with asthma. Patients explained that having an asthma exacerbation due to poor adherence contributed to both disease acceptance and engaging in appropriate asthma self-management that included medication adherence. *Physicians* explained that since the primary goal of treatment is to achieve and maintain asthma control, the patient should take the medication as prescribed. Finally, *AHP* stated that asthma education played a key role in facilitating medication adherence and they saw themselves as major contributors to this process.

A unique finding of this study is that it unveiled how different asthma stakeholders may hold different perspectives concerning asthma education and motivation towards asthma treatment. While AHP endorsed developing educational interventions aimed at supporting the patient along a continuum of care, physicians recognised its importance, but did not emphasise it; and both AHP and physicians, acknowledged but did not highlight, the importance of motivational variables. Instead, patients explained that they were most receptive of receiving formal asthma education after having lived the experience of an asthma attack and having accepted their disease, and agreed that their attitude was crucial for dealing with the struggles of dealing with asthma-related issues. Thus, for patients, asthma education and motivation (i.e., commitment, positive attitude, self-discipline) were key components of medication adherence. In this vein, it can be speculated that two of the facilitators identified by patients, namely 'minimising the perception of side effects' and 'perceiving the benefits of taking medication' may result from a patient's positive attitude.

All participants recognised the importance of asthma education around adherence [24, 43, 44]. However, previous research shows asthma education in conjunction with an updated diagnosis of asthma severity and symptom control may contribute to medication adherence, but are far from being the solution, as knowledge alone is insufficient for sustained behaviour change [15, 45]. As noted by patients, it is probably the combination of having suffered an asthma exacerbation, receiving asthma education, and being motivated to seek treatment that makes a significant difference concerning medication adherence.

The fact that patients, physicians and AHP perceive clinical encounters differently has been reported in the literature [20, 39, 46, 47]. This suggests that there is a shared social construction and transformation of knowledge across groups [48]. As such, for the physicians, who are the prescribers, taking the medication was a core element, whereas for AHP, asthma education, which is their main responsibility, was what they perceived to be key. Finally, patients, who are those who actually suffer from and have to manage the disease, experienced asthma along a continuum in which their needs might change depending on the moment. Patients' approach to medication adherence was similarly described by the Common-Sense Model [49, 50] in which three stages of coping with a disease were identified: interpretation of disease-related

information; coping with disease; and assessing the strategies implemented to cope with the disease. Although the first stage described in this model is consistent with the impact that the lived experience of an asthma exacerbation has on patients (as reported in this study), the present study contributed to a more meticulous description of the processes the patients go through before they appropriately manage their disease (i.e., what takes place before adhering to medication).

Parts of the organising themes that we identified across groups have been reported in previous studies [11–15]. For example, the relationship between asthma self-management, medication adherence, and patient acceptance of their disease was described nearly 20 years ago [51]. Concerning the role of the patient-physician relationship, Fainzang [52] found that patients who adhered to medication were both those who took medication without questioning the authority of the physician and those who discussed their concerns towards medication with their physicians. Patients in this study agreed that a patient-physician relationship required engagement from both the patient and the physician.

There are some clinical implications related to our findings. First, these findings suggest that when we take intervention stakeholders' perspectives into account at the time of developing an intervention, it may contribute to design changes that may help optimise patients' responses to the intervention. This indicates that it might be helpful to try to understand the patients' experiences [53] towards treatment from an anthropological perspective, a professional attitude that has been shown to be helpful for the treatment of adherence of other diseases [52, 54], instead of 'imposing' adherence. For example, under a shared decision-making model [55], previous research has demonstrated that physicians and patients negotiations concerning treatment regimens that accommodated patient goals and preferences resulted in significantly better controller adherence and long-acting beta-agonist adherence; higher cumulative controller dose; and quantitatively, but not significantly, better outcomes on all clinical measures [56]. Second, achieving asthma control should not be viewed as solely a patient-related responsibility; but instead, as a responsibility shared by all those involved in their care including healthcare professionals.

As noted by patients when discussing their perspectives on the design of a potential medication adherence intervention, agreement among health care professionals is key to successful patient treatment. In line with previous evidence, AHP and physicians might benefit from counselling training aimed at enhancing patients' adherence to medication [57]. Also, medication adherence may be facilitated by aspects affecting the interaction between patient and physician (e.g., the implementation of a patient-centered therapeutic approach) and factors concerning available medical resources and provided services (e.g., access to health care professionals, asthma education and prescription renewal) [15]. Third, our findings support the idea that any healthcare professional trusted by the patient and knowledgeable in the field could deliver the intervention [58]. Fourth, data from this study concerning patient-related motivational variables were used to inform a subsequent intervention. The results of this study indicated the impact of the intervention on patients was positive (e.g., higher percentage of refills and improvement in asthma control and

asthma self-efficacy) [35]. This suggests that overall, asthma interventions will be more successful if they are tailored according to patients and health care professionals needs, concerns, perspectives, and inputs [57, 59, 60].

This study has some limitations. Data collection was based on two focus group interview sessions in each stakeholder group. While focus groups have been extensively used in health research [61], some participants may have responded in a socially desirable way or may have been prone to contribute more to the discussion. Similarly, due to the qualitative nature of the study, data represent participants' subjective opinions. To minimise these potential limitations, we sampled different sexes and ages across groups, elicited responses from all participants, and encouraged sharing views openly and honestly. Also, we did not necessarily achieve saturation (which was not a specific goal of the study); however, our analysis revealed that the data we presented achieved redundancy and consistency [62], but it prevented us from generalising our conclusions across different sex and age groups. A final limitation is that although carefully selected, all stakeholders were recruited from a single urban teaching university hospital, so data may not be generalizable.

Despite these limitations, this is the first study to inform and triangulate the perspectives of patients, physicians, and AHP. Thus, this study is the first to inform the characteristics of a potential patient-based intervention that accounts for the perspectives of both the users and the professionals. Future research should extend this evidence by sampling other people in the patients' social environment, such as partners and family members. Concerning intervention delivery, it would be interesting to explore views on different teaching strategies (e.g., mini-group discussions) and approaches (e.g., inquiry learning).

Conclusion

Although approached differently, similar facilitators to medication adherence were discussed across different groups of asthma stakeholders. The fact that medication adherence was viewed differently by patients, physicians, and AHPs suggests that the design of effective interventions to enhance patients' adherence to long-term asthma controller medication has to consider the needs of all stakeholders involved. By enabling the expression of participants' voices, we concluded that successful asthma interventions not only need to be well intended, but also need to consider: (a) patients' experiences and negotiate the treatment regimen, rather than imposing recommendations; (b) treatment as a shared responsibility involving the patient, the healthcare professionals, and patients' social networks; (c) different stakeholders' concerns, needs, perspectives, and knowledge. In sum, successful interventions aiming at improving patients' medication adherence need to be designed from a multi-level perspective that addresses the complexity of the phenomenon.

Acknowledgements

This work was presented at the Young Investigators (YI) Forum supported by the Canadian Institutes of Health Research (CIHR) held in June 2012, in Montreal, Quebec, Canada. SP,

KLL, GL, and SLB participated in the conception and design of the study. GL coordinated the study including scheduling the interviews, booking the facilities, getting the refreshments, and coordinating the reception of transcriptions of audiotaped interviews. SP and GL contributed to the development of the interview guide, conducted the focus group interviews, and analysed the data. SP led the interpretation of data and drafted the manuscript. KLL, GL, and SLB provided feedback on data analysis and interpretation. All authors read and approved the final manuscript. KLL conceived the protocol, obtained funding, oversaw the study, and therefore assumes the overall responsibility.

Declaration of interest

The authors declare that they have no conflicts of interests. The authors alone are responsible for the content and writing of the article.

Funding

This work was supported by an investigator-initiated grant from GlaxoSmithKline (KLL) and New Investigators Awards from the Canadian Institute of Health Research (CIHR) and the Fonds de la Recherche du Quebec - Santé (FRQS) (KLL, SLB).

References

1. World Health Organization. Fact sheet 307: Asthma [Internet]. 2011 [cited Jul. 3rd, 2012]. Available from: <http://www.who.int/mediacentre/factsheets/fs307/en/>.
2. Masoli M, Fabian D, Holt S, Beasley R, Global Initiative for Asthma (GINA) Program. Global Burden of Asthma 2014 June 2nd, 2014. Available from: http://www.ginasthma.org/local/uploads/files/GINABurdenReport_1.pdf [last accessed 12 June 2015].
3. Sumino K, Cabana MD. Medication adherence in asthma patients. *Curr Opin Pulm Med* 2013;19:49–53.
4. Partridge MR, van der Molen T, Myrseth SE, Busse WW. Attitudes and actions of asthma patients on regular maintenance therapy: The INSPIRE study. *BMC Pulm Med* 2006;6:13. doi: 10.1186/1471-2466-6-13.
5. Williams LK, Pladevall M, Xi H, Peterson EL, Joseph C, Lafata JE, et al. Relationship between adherence to inhaled corticosteroids and poor outcomes among adults with asthma. *J Allergy Clin Immun* 2004;114:1288–1293.
6. Kamble S, Sharma M. Incremental direct expenditure of treating asthma in the United States. *J Asthma* 2009;46:73–80.
7. DeFrances CJ, Lucas CA, Buie VC, Golosinskiy A. 2006 National Hospital Discharge Survey. National health statistics reports. Hyattsville, MD: National Center for Health Statistics, 2008.
8. Cherry DK, Hing E, Woodwell DA, Rechtsteiner EA. National Ambulatory Medical Care Survey 2006 Summary. National Health Statistics Reports. Hyattsville, MD: National Center for Health Statistics, 2008.
9. Shen J, Oraka E. Complementary and alternative medicine (CAM) use among children with current asthma. *Prev Med* 2012;54:27–31. doi: 10.1016/j.ypmed.2011.10.007.
10. Jiang H, Han J, Zhu Z, Xu W, Zheng J, Zhu Y. Patient compliance with assessing and monitoring of asthma. *J Asthma* 2009;46:1027–1031. doi: 10.3109/02770900903229685.
11. Stingone JA, Claudio L. Components of recommended asthma care and the use of long-term control medication among urban children with asthma. *Med Care* 2009;47:940–947. doi: 10.1097/MLR.0b013e318199300c.
12. Souza-Machado A, Santos PM, Cruz AA. Adherence to treatment in severe asthma: Predicting factors in a program for asthma control in Brazil. *World Allergy Organ J* 2010;3:48–52. doi: 10.1097/WOX.0b013e3181d25e8e.

13. Burgess S, Sly P, Devadason S. Adherence with preventive medication in childhood asthma. *Pulm Med* 2011;Article ID 973849. doi: [10.1155/2011/973849](https://doi.org/10.1155/2011/973849).
14. Ducharme FM, Zemek RL, Chalut D, McGillivray D, Noya FJ, Resendes S, et al. Written action plan in pediatric emergency room improves asthma prescribing, adherence, and control. *Am J Respir Crit Care Med* 2011;183:195–203. doi: [10.1164/rccm.201001-0115OC](https://doi.org/10.1164/rccm.201001-0115OC).
15. Peláez S, Lamontagne AJ, Collin J, Gauthier A, Grad RM, Blais L, et al. patients' perspective of barriers and facilitators to taking long-term controller medication for asthma: a novel taxonomy. *BMC Pulm Med* 2015;15:42. doi: [10.1186/s12890-015-0044-9](https://doi.org/10.1186/s12890-015-0044-9).
16. Alicea-Alvarez N, Swanson-Biearman B, Kelsen SG. A review of barriers to effective asthma management in Puerto Ricans: cultural, healthcare system and pharmacogenomic issues. *J Asthma* 2014;51:97–105. doi: [10.3109/02770903.2013.845205](https://doi.org/10.3109/02770903.2013.845205).
17. Blaakman SW, Cohen A, Fagnano M, Halterman JS. Asthma medication adherence among urban teens: A qualitative analysis of barriers, facilitators and experiences with school-based care. *J Asthma* 2014;51:522–529. doi: [10.3109/02770903.2014.885041](https://doi.org/10.3109/02770903.2014.885041).
18. Chong JJ, Davidsson A, Moles R, Saini B. What affects asthma medicine use in Children? Australian asthma educators' perspectives. *J Asthma* 2009;46:437–444.
19. Gamble J, Fitzsimons D, Lynes D, Heaney LG. Difficult asthma: People's perspectives on taking corticosteroid therapy. *J Clin Nurs* 2007;16:59–67.
20. Fumagalli F, Baena-Cagnani R, Compalati E, Biraio F, Canonica GW, Baena-Cagnani CE. GAPP Italy: A survey on asthma on Italian physicians and patients. *Eur Ann Allergy Clin Immunol* 2010;42:146–154.
21. Bacon SL, Lavoie KL, Ninot G, Czajkowski SM, Freedland K, Michie S, et al. An international perspective on improving the quality and potential of behavioural clinical trials. *Curr Cardiovasc Risk Repts* 2015;9:427.
22. Steurer-Stey C, Storch M, Benz S, Hobi B, Steffen-Bürgi B, Steurer J, et al. Motivational training improves self-efficacy but not short-term adherence with asthma self-management: a randomized controlled trial. *Prim Health Care Res Dev* 2014;16:32–41. doi: [10.1017/S1463423613000480](https://doi.org/10.1017/S1463423613000480).
23. Park J, Jackson J, Skinner E, Ranghell K, Saiers J, Cherney B. Impact of an adherence intervention program on medication adherence barriers, asthma control, and productivity/daily activities in patients with asthma. *J Asthma* 2010;47:1072–1077. doi: [10.3109/02770903.2010.485660](https://doi.org/10.3109/02770903.2010.485660).
24. Shegog R, Bartholomew LK, Parcel GS, Sockrider MM, Mâsse L, Abramson SL. Impact of a computer-assisted education program on factors related to asthma self-management behavior. *J Am Med Inform Assoc* 2001;8:49–61.
25. Guénette L, Breton M, Grégoire J, Jobin M, Bolduc Y, Boulet L, et al. Effectiveness of an asthma integrated care program on asthma control and adherence to inhaled corticosteroids. *J Asthma* 2014;52:638–645. doi: [10.3109/02770903.2014.999084](https://doi.org/10.3109/02770903.2014.999084).
26. Ellis DA, King P, Naar-King S, Lam P, Cunningham PB, Secord E. Effects of family treatment on parenting beliefs among caregivers of youth with poorly controlled asthma. *J Dev Behav Pediatr* 2014;35:486–493. doi: [10.1097/DBP.0000000000000093](https://doi.org/10.1097/DBP.0000000000000093).
27. Halterman JS, Riekert K, Bayer A, Fagnano M, Tremblay P, Blaakman SW, et al. A pilot study to enhance preventive asthma care among urban adolescents with asthma. *J Asthma* 2011;48:523–530. doi: [10.3109/02770903.2011.576741](https://doi.org/10.3109/02770903.2011.576741).
28. Yorke J, Fleming SL, Shulldham C. Psychological interventions for adults with asthma. *Cochrane Database Syst Rev* 2006; 1. doi: [10.1002/14651858.CD002982.pub3](https://doi.org/10.1002/14651858.CD002982.pub3).
29. Welsh EJ, Hasan M, Li P. Home-based educational interventions for children with asthma. *Cochrane Database Syst Rev* 2011;10. doi: [10.1002/14651858.CD008469.pub2](https://doi.org/10.1002/14651858.CD008469.pub2).
30. Tapp S, Lasserson TJ, Rowe BH. Education interventions for adults who attend the emergency room for acute asthma. *Cochrane Database Syst Rev* 2007;3. doi: [10.1002/14651858.CD003000.pub2](https://doi.org/10.1002/14651858.CD003000.pub2).
31. Wolf F, Guevara JP, Grum CM, Clark NM, Cates CJ. Educational interventions for asthma in children. *Cochrane Database Syst Rev* 2003;1. doi: [10.1002/14651858.CD000326](https://doi.org/10.1002/14651858.CD000326).
32. Rycroft-Malone J, Harvey G, Seers K, Kitson A, McCormack B, Titchen A. An exploration of the factors that influence the implementation of evidence into practice. *J Clin Nurs* 2004;13:913–924.
33. Straus SE, Tetroe J, Graham ID, editors. Knowledge Translation in Health Care. Moving From Evidence to Practice. Chichester, UK/Hoboken, NJ: Wiley-Blackwell; 2009.
34. Canino G, McQuaid EL, Rand CS. Addressing asthma health disparities: A multilevel challenge. *J Allergy Clin Immunol* 2009;123:1209–1219. doi: [10.1016/j.jaci.2009.02.043](https://doi.org/10.1016/j.jaci.2009.02.043).
35. Lavoie KL, Moullec G, Lemiere C, Blais L, Labrecque M, Beauchesne MF, et al. Efficacy of brief motivational interviewing to improve adherence to inhaled corticosteroids among adult asthmatics: Results from a randomized controlled pilot feasibility trial. *Patient Prefer Adher* 2014;8:1555–1569. doi: [10.2147/PPA.S66966](https://doi.org/10.2147/PPA.S66966).
36. Stake RE. Multiple Case Study Analysis. New York: The Guilford Press; 2006.
37. American Thoracic Society. Standardization of Spirometry, 1994 Update. *Am J Respir Crit Care Med* 1995;152:1107–36. PubMed PMID: 7663792.
38. Liamputtong P. Focus Group Methodology: Principle and Practice. Los Angeles, CA: Sage; 2011.
39. Peláez S, Bacon SL, Aulls MW, Lacoste W, Lavoie KL. Similarities and discrepancies between asthma health care professionals' and patients' views on medication adherence. *Can Respir J* 2014;21:221–226.
40. Attride-Stirling J. Thematic networks: An analytic tool for qualitative research. *Qualit Res* 2001;1:385–405.
41. Glaser BG. The constant comparative method of qualitative analysis. *Soc Prob* 1965;12:436–445.
42. Juniper EF, O'Byrne PM, Guyatt GH, Ferrie PJ, King DR. Development and validation of a questionnaire to measure asthma control. *Eur Respir Rev* 1999;14:902–907.
43. Boulet LP, Boulay ME, Gauthier G, Battisti L, Chabot V, Beauchesne MF, et al. Benefits of an asthma education program provided at primary care sites on asthma outcomes. *Respir Med* 2015;109:813–820. doi: [10.1016/j.rmed.2015.05.002](https://doi.org/10.1016/j.rmed.2015.05.002).
44. Janson SL, McGrath KW, Covington JK, Cheng SC, Boushey HA. Individualized asthma self-management improves medication adherence and markers of asthma control. *J Allergy Clin Immunol* 2009;123:840–846. doi: [10.1016/j.jaci.2009.01.053](https://doi.org/10.1016/j.jaci.2009.01.053).
45. Bender BG, Long A, Parasuraman B, Tran ZV. Factors influencing patient decisions about the use of asthma controller medication. *Ann Allergy Asthma Immunol* 2007;98:322–328.
46. Street RLJ, Haidet P. How well do doctors know their patients? Factors affecting physician understanding of patients' health beliefs. *J Gen Intern Med* 2011;26:21–27.
47. Mowrer JL, Tapp H, Ludden T, Kuhn L, Taylor Y, Courtlandt C, et al. Patients' and providers' perceptions of asthma and asthma care: A qualitative study. *J Asthma* 2015; 52:949–956. doi: [10.3109/02770903.2015.1010731](https://doi.org/10.3109/02770903.2015.1010731).
48. Gergen KJ. Relational Being: Beyond Self and Community. New York: Oxford University Press; 2009.
49. Leventhal H, Brissette I, Leventhal E. The Common-Sense Model of self-regulation of health and illness. In: Cameron LD, Leventhal H, editors. The Self-regulation of Health and Illness Behaviour. Abingdon, UK: Routledge; 2003: 42–65.
50. Leventhal H, Meyer D, Nerenz D. Illness cognition: Using common sense to understand treatment adherence and affect cognition interactions. *Cogn Ther Res* 1992;16:143–163.
51. Adams S, Pill R, Jones A. Medication, chronic illness and identity: The perspective of people with asthma. *Soc Sci Med* 1997;45:189–201.
52. Fainzang S. La relation médecin-patient. Un conflit de valeurs. *Revue des Maladies Respiratoires* 2008;32:37–39. doi: [RMR-04-2005-22-2-C3-0761-8425-101019-200504084](https://doi.org/10.1016/S0761-8425-101019-200504084).
53. Cordier JF. The expert patient: Towards a novel definition. *Eur Respir Rev* 2014;44:853–857. doi: [10.1183/09031936.00027414](https://doi.org/10.1183/09031936.00027414).
54. Falzer PR, Leventhal HL, Peters E, Fried TR, Kerns R, Michalski M, et al. The practitioner proposes a treatment change and the patient declines: What to do next? *Pain Pract* 2013;13:215–226. doi: [10.1111/j.1533-2500.2012.00573.x](https://doi.org/10.1111/j.1533-2500.2012.00573.x).
55. Upton J, Fletcher M, Madoc-Sutton H, Sheikh A, Caress AL, Walker S. Shared decision making or paternalism in nursing consultations? A qualitative study of primary care asthma nurses views on sharing decisions with patients regarding inhaler device selection. *Health Expect* 2011;14:374–382. doi: [10.1111/j.1369-7625.2010.00653.x](https://doi.org/10.1111/j.1369-7625.2010.00653.x).

56. Wilson SR, Strub P, Buist AS, Knowles SB, Lavori PW, Lapidus J, et al. Shared treatment decision making improves adherence and outcomes in poorly controlled asthma. *Am J Respir Crit Care Med* 2010;181:566–577. doi: [10.1164/rccm.200906-0907OC](https://doi.org/10.1164/rccm.200906-0907OC).
57. Foster JM, Smith L, Usherwood T, Sawyer SM, Reddel HK. General practitioner-delivered adherence counseling in asthma: feasibility and usefulness of skills, training and support tools. *J Asthma Allergy* 2016;53:311–320. doi: [10.3109/02770903.2015.1091473](https://doi.org/10.3109/02770903.2015.1091473).
58. Newell K. Concordance with asthma medication: the nurse's role. *Nurs Stand* 2006;20:31–33.
59. Clark NM, Griffiths C, Keteyian SR, Partridge MR. Educational and behavioral interventions for asthma: who achieves which outcomes? A systematic review. *J Asthma Allergy* 2010;3:187–197. doi: [10.2147/JAA.S14772](https://doi.org/10.2147/JAA.S14772).
60. Griffiths F, Borkan J, Byrne D, Crabtree BF, Dowrick C, Gunn J, et al. Developing evidence for how to tailor medical interventions for the individual patient. *Qual Health Res* 2010;20:1629–1641. doi: [10.1177/1049732310377453](https://doi.org/10.1177/1049732310377453).
61. Morgan DL. Reconsidering the role of interaction in analyzing and reporting focus groups. *Qual Health Res* 2010;20:718–722. doi: [10.1177/1049732310364627](https://doi.org/10.1177/1049732310364627).
62. Bowen GA. Naturalistic inquiry and the saturation concept: A research note. *Qual Res* 2008;8:137–152. doi: [10.1177/1468794107085301](https://doi.org/10.1177/1468794107085301).