

Title Page

Title

Behavioral Influences on Controller Inhaler Use for Persistent Asthma in a Patient-Centered Medical Home

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Article Synopsis

Barriers to medication adherence are important to identify, particularly in chronic disease management. This study addressed barriers to adherence by utilizing the Theory of Planned

Behavior as a construct to develop a survey that evaluated behavior, attitude and self-efficacy in the context of adherence to asthma medications. The Theory of Planned Behavior has been utilized in other arenas of health care, but has yet to be used for medication adherence. Use of an inhaler was important to patients based upon survey results, but did not correlate with adherence. Future studies that further address patient-specific factors in medication adherence are needed in order to understand patient motivations and behaviors.

Abstract

Title: Behavioral Influences on Controller Inhaler Use for Persistent Asthma in a Patient-Centered Medical Home

Objectives

To examine the behavioral influences and motivation that influence adherence to asthma controller medications.

Methods

A chart review of patients with an asthma diagnosis treated at an academic Family Medicine practice identified 582 English-speaking adults prescribed an asthma medication. Participants were contacted in a randomized order via telephone and asked to complete an investigator-developed survey based upon the Theory of Planned Behavior. Descriptive statistics, chi square and t-tests were used for data analysis.

Results

240 individuals were contacted and 27 individuals consented and completed a survey. Eighteen individuals (67%) were prescribed a controller inhaler in the past year, fourteen of whom picked up their prescription from the pharmacy. Individuals who did not pick up their prescription reported more strongly than those who did that using their inhaler is important ($p=0.01$). No other statistically significant differences were identified.

Conclusion

Use of an inhaler is important to the patient based upon survey results; however, this belief did not correlate with adherence. Future studies that investigate patient-specific motivators would allow practitioners to better target clinical interventions to improve medication adherence in patients with asthma.

Keywords:

Asthma

Motivation
Inhaler
Disease management
Medication adherence
Pharmacists

Manuscript

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Introduction

In 2010, asthma affected 18.7 million adults in the United States and its prevalence has increased by 15% over the past 10 years. Between 2006 and 2010, 50% of adults with asthma had uncontrolled symptoms, resulting in increased hospitalizations, emergency department visits, and missed days of work and school.¹ To decrease the incidence of hospitalizations, treatment guidelines focus on achieving asthma control.

Current treatment guidelines for persistent asthma recommend adherence to daily controller medications. Poor adherence to medications has been identified as a key factor in poor disease management.^{2,3} Barriers to medication adherence in adults with asthma have been found to include: cost of asthma medications, cost to be seen by a primary care doctor or asthma specialist, socioeconomic status, and illness perceptions.⁴⁻⁸ Previous studies have shown that adherence to medications in asthma improves with stronger belief in the necessity of chronic treatment and the patient's perception of disease severity.⁹ Psychosocial influences of a patient's self-efficacy and self-management of asthma have been shown to affect perception of symptoms, general health-related behaviors, and beliefs regarding asthma.⁸ The Theory of Planned Behavior was utilized as a framework in this study to understand how disease perception and beliefs may affect behavior.

The Theory of Planned Behavior, proposed by Icek Ajzen, is a construct comprised of key variables that serve as the foundation for an individual's intention, ultimately resulting in a behavior. Behavioral Beliefs and Attitude Toward Behavior are the variables that link a behavior and expected outcome. Normative Beliefs and Subjective Norms describe the perceived social pressure to engage or not engage in a behavior. Control Beliefs and Perceived Behavioral Control describe an individual's perceived ability to perform a behavior.¹⁰

As adherence to medications is dependent upon picking up prescribed medications from the pharmacy, factors that affect filling prescriptions are of particular importance. Utilizing the Theory of Planned Behavior in the context of asthma management, the psychosocial factors that may influence whether an individual picks up a prescription for asthma are explored in this study.

Objective(s)

The purpose of this study was to examine the behavioral influences, motivation, and self-efficacy that may guide a patient's decision to pick up asthma controller medications from the pharmacy for the treatment of persistent asthma.

Methods

The University of Maryland institutional review board (IRB) approved this study. Patients with an asthma diagnosis treated at one academic Family Medicine practice between 1/1/2013 and 2/28/2014 were identified based upon ICD-9 billing codes. A subsequent chart review was then conducted which identified 582 English-speaking adults aged 18 to 65 years prescribed an asthma medication. Patients were contacted in randomized order via telephone and asked to complete a survey. The investigator attempted to contact patients throughout the duration of the study, from April 2014 through August 2014.

The investigator-developed survey was based upon The Theory of Planned Behavior. The survey addressed each key variable within the context of asthma controller medications and management of persistent asthma. Open-ended questions addressed basic demographic information as well as which medication(s) the participant was prescribed for asthma. 5-point Likert-type scale questions addressed Behavioral Beliefs, Attitude Toward Behavior, Normative Beliefs and Subjective Norms. A score of 1 indicated an attitude or behavior that may decrease adherence to asthma medications, and a score of 5 indicated an attitude or behavior that may increase adherence to asthma medications.

Behavioral Beliefs and Attitude Toward Behavior were measured by questions such as “on a scale of 1 to 5, using my controller inhaler will: 1 = worsen my overall health, 3 = not change my overall health, 5 = improve my overall health”.

Normative Beliefs and Subjective Norms were measured by questions such as “on a scale from 1 to 5, how do you feel you are judged by your friends and/or family for using your controller inhaler?: 1 = negatively, 3 = neither positively or negatively, 5 = positively”. Questions in checklist format asked questions such as: “which of the following are true for you? (check all that apply): My family and/or friends know I have asthma; My family and/or friends think it is important to use my asthma inhaler(s); My doctor(s) think it is important to take my asthma inhaler(s) as prescribed; My family and/or friends think it is important to treat asthma”.

Questions in checklist format were employed to address Control Beliefs and Perceived Behavioral Control. Participants were asked to identify potential barriers to picking up medications from the pharmacy, including feeling depression, use of illicit substance(s) and/or alcohol, homelessness, inability to afford the medication, not knowing how to use inhaler(s), lack of transportation to the pharmacy, other illnesses that are more important to the participant than asthma, insurance not covering the medication, taking care of a sick family member and/or friend, feeling fine without using a controller inhaler, and not believing that they have asthma.

Participants completed the survey via telephone, with an investigator who read items aloud and recorded responses. Descriptive statistics, chi square and t-tests were used for data analysis.

Results

A total of 240 individuals were contacted and 27 individuals consented and completed the survey. Basic demographic information is summarized in Table 1. All 27 participants stated they were prescribed an inhaler for asthma. Eighteen individuals (67%) were prescribed a controller inhaler in the past year, fourteen of whom reported they had picked up their prescribed controller inhaler from the pharmacy. Of those who picked up their prescription, nine reported using the controller inhaler every day.

Interestingly, individuals who did not pick up their prescription(s) reported more strongly than those who did pick up their prescription(s) that using their inhaler is important ($p=0.01$). There were no other statistically significant differences between individuals who picked up their prescription and those who did not in Attitude Toward Behavior and Subjective Norms (Table 2).

Regarding Control Beliefs and Perceived Behavioral Control, belief that they do not have asthma, not knowing how to use their inhaler(s), use of illicit substance(s) and/or alcohol, and transportation to the pharmacy were not identified as barriers to picking up prescriptions from the pharmacy. Identified barriers to picking up prescriptions from the pharmacy did not significantly differ between those who did pick up their prescription and those who did not, suggesting that

self-efficacy, in our study, was not a significant factor in the decision to pick up or not pick up a controller inhaler from the pharmacy.

The most frequently prescribed asthma medication among participants was albuterol. Eight individuals reported using only a short-acting asthma inhaler in the past year. Within the group of participants using only a short-acting inhaler, there were no differences when compared to participants using a controller inhaler in belief that they have asthma. Among the participants who reported using only a short-acting inhaler, three reported the reason they did not pick up their prescription for a controller inhaler was because they felt fine without using the controller inhaler.

Table 1. Survey Participant Demographics

Demographics	
	<u>Mean (SD)</u>
Age in years	34.74 (11.40)
Annual income	\$43,555.56 (\$43,371.48) ^a
Gender	
	<u>N (%)</u>
Female	22 (81.5)
Race	
African American	22 (81.5)
Caucasian	4 (14.8)
Asian	1 (3.7)

^aBased on 18 responses: 5 participants reported zero annual income and 9 participants declined to state annual income

Table 2. Comparative Results of Participants Who Did and Did Not Pick Up Prescription

	Did Not Pick Up Prescription (N=5)	Picked Up Prescription (N=22)	P- Value
Mean Scores on Likert Scale			
Attitude Toward the Behavior			
How using controller inhaler will improve breathing	4.20	4.55	0.532
How using controller inhaler will affect risk of asthma attack	4.20	4.41	0.704
Using controller inhaler will decrease risk of being hospitalized or dying	4.60	4.41	0.711
Controller inhaler effect on overall health	3.80	4.23	0.458
Subjective Norm			
Pressure by family and friends to use asthma medication(s)	3.80	3.91	0.853
Judged for using controller inhaler	3.00	3.64	0.212
Importance of using controller inhaler	5.00	4.10	0.010*
Using controller inhaler will improve overall health	3.80	3.91	0.458
Pressured by friends and/or family to use controller inhaler	3.80	3.91	0.853

*Significant at the 0.05 level

Mean values from Likert Scale questions. A score of 1 indicated attitudes and/or beliefs that may decrease medication adherence and a score of 5 indicated attitudes and/or beliefs that may increase medication adherence.

Discussion

The Theory of Planned Behavior has served as a model to explore motivation, behaviors and attitudes across diverse arenas of health care such as predicting medication adherence in post-transplant patients, cervical cancer screening, and self-medication of over-the-counter medications.¹¹⁻¹³ The Theory of Planned Behavior has even previously been utilized to evaluate prescriber intentions and patterns in order to assess their adherence to asthma treatment guidelines.¹⁴ In this study, the Theory of Planned Behavior served as a tool to explore behaviors and attitudes toward asthma in order to begin to understand how they impact the decision to use or not use a controller medication. Participants overall reported higher scores for Attitude Toward Behavior, moderate scores for Subjective Norms, with the exception of the importance of using a controller inhaler, and low scores were not reported for the key variables assessed.

Patient behaviors and attitudes are undoubtedly important to take into consideration when health care providers develop patient-specific asthma care plans and results of this study reveal key factors that warrant attention. For example, the belief that using a controller inhaler may help reduce negative clinical outcomes, such as hospitalization and mortality, was not found to influence an individual's decision to pick up or not pick up a controller inhaler. This result indicates a potential lack of patient education in disease state management. All participants acknowledged having asthma yet a gap exists between recognizing having the disease and knowing which treatments have been shown to have the most benefit. Patient education remains an important element of asthma management, as reinforced by findings of this study. Absence of symptoms is often perceived as absence of asthma and may suggest why of the individuals who picked up their prescription for a controller inhaler, only half reported that they used their controller inhaler every day as directed by their prescriber despite scores on Likert scale questions indicating attitudes and behaviors that may increase medication adherence.¹⁵

Although provider prescribing patterns were not specifically addressed in this study, an interesting finding was that the most frequently prescribed asthma medication observed in this study was albuterol, a short-acting 'rescue' inhaler. Moreover, patients were included in this study based upon a diagnosis of 'persistent asthma', yet some participants reported that they were not prescribed a controller inhaler. Prescribing patterns such as these have been evaluated in previous studies in order to investigate the potential outcomes of overuse of short-acting agents and under-prescribing of controller medications, such as inhaled corticosteroids. Our study did not assess whether short acting asthma medications were over-prescribed, however, our findings do reveal the importance of addressing prescribing patterns. Over-prescribing of rescue medications in asthma has contributed to noncompliance to current treatment guidelines, lack of patient education on proper asthma medication use, and poor patient follow-up.^{16,17} Further research into how prescribing patterns may or may not influence a patient's behavior or attitude towards asthma may reveal more opportunities for pharmacists to deliver provider education about a more evidence-based approach to asthma management.

Limitations

The small sample size limits statistically significant and generalizable outcomes. Calling participants by telephone restricted survey administration to certain times of day and many participants may not answer incoming telephone calls from an unknown phone number.

Comment [f1]: Sue - in your screen for eligible patients, did you include patients that had a controller on their EMR med list, or did you also include patients that had albuterol only?

Conclusion

Use of an inhaler is important to the patient based upon survey results, however, this belief was not shown to correlate with actually picking up the prescription, indicating other elements of patient motivation and beliefs exist that need further exploration. Results of this study reveal that interventions targeting patient-specific barriers to adherence may prove to be more effective in improving medication adherence than emphasizing the importance of inhaler use alone. The importance of characterizing the psychosocial factors influencing a patient's decision to pick up medications warrants future studies that investigate how patient-specific motivators and barriers can be targeted by practitioners to improve medication adherence in patients with asthma.

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