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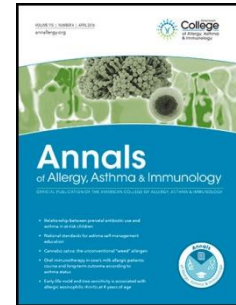
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The Impact of Patient Autonomy on Older Adults with Asthma

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Abbreviations:

ACT: Asthma Control Test; API: Autonomy Preference Index; AQLQ: mini Asthma Quality of Life Questionnaire; BMI: Body Mass Index; COPD: Chronic Obstructive Pulmonary Disease; FEV1: Forced Expiration over 1 second; FVC: Forced Vital Capacity; GDS: Geriatric Depression Scale short form; MI: Michigan; NIH: National Institute of Health

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Abstract: Background: Understanding patient preferences and desire for involvement in making medical decisions is important when managing chronic conditions. Previous studies have utilized the Autonomy Preference Index (API) in younger asthmatic patients to evaluate these preferences.

Objective: To identify factors associated with autonomy, and to determine if autonomy is related to asthma outcomes among older adults.

Methods: 189 older adults (>55 yr) with persistent asthma were included. Preferences for autonomy were assessed using the API, with a higher score indicating higher desire for autonomy. Scores were separated into two domains of 'information seeking' and 'decision making' preferences. The separated scores were correlated with asthma outcomes and demographic variables. To control for confounding factors, a linear regression analysis was performed.

Results: Higher 'decision making' preference scores correlated with female gender ($p=0.007$), higher education level ($p=0.01$), and lower depression scores ($p=0.04$). Regarding outcomes, 'decision making' scores positively correlated with asthma quality of life questionnaire (AQLQ) scores ($p=0.01$). On linear regression analysis, the AQLQ score remained significantly associated with 'decision making' preference scores ($p=0.03$). There was no association with asthma control test scores, spirometry values, and healthcare utilization. 'Information seeking' preference scores correlated with education level ($p=0.03$), but there was no correlation with asthma outcomes.

Conclusion: Older asthmatic adults with a greater desire for involvement in decision making have a higher asthma related quality of life. Future studies with the intention to increase patient autonomy may help establish a causal relationship.

Introduction

Understanding patient preferences and desire for involvement in healthcare is important in managing medical conditions. Studies have found that involving patients in the management of chronic illnesses may lead to better outcomes.^{1,2} Previously conducted research indicates that physicians consistently underestimate the amount of information patients want regarding their medical condition.³ Appreciating patient preferences can be a channel to improved patient care, better patient outcomes, and an enhanced physician patient relationship.

Older adults, in comparison to younger adults, tend to have multiple chronic medical conditions, and therefore understanding their preferences and desires in medical care can be complex and may be different than younger age groups.⁴ It may easily be misperceived that older adults would choose a more paternalistic approach to medicine due to this high level of complexity, but this may not necessarily be true.^{5,6} As the older adult population increases over time in the United States, it will be important to not only understand their preferences but also to determine if these preferences affect outcomes.⁷

Asthma is a chronic, occasionally debilitating, medical condition affecting more than 3 million elderly people in the United States.⁸ Asthma is frequently perceived as a medical condition affecting children and young adults, but the prevalence of asthma in elderly patients is similar to the prevalence of asthma in other age groups.⁹ Asthmatic patients above the age of 55 have a higher number of emergency room visits, hospitalizations and near fatal events compared to those under the age of 55.¹⁰ Previous studies have utilized the Autonomy Preference Index (API) in younger patients with asthma to evaluate and recognize their preferences for involvement in medical care.^{1,11,12} One study of adults with asthma ≥ 18 years of age evaluated factors associated with asthma related hospitalizations and did not find a significant association

with API scores.¹² However these associations have not been studied in older adults with asthma. More importantly, the associations between patient preferences for autonomy and asthma specific outcomes have not been studied in the past decade. The purpose of this study is to assess whether patient preferences for autonomy can impact asthma related outcomes among older adults with persistent asthma.

Methods

Subjects included in this study were part of an ongoing randomized controlled trial of asthma self-management for older adults which utilized standard asthma education, complementary techniques, and enhanced patient-physician communication over a 12-month period (ClinicalTrials.gov Identifier: NCT01979055). This study was a cross-sectional analysis on the baseline data acquired prior to intervention. Inclusion criteria included adults ages 55 and older with physician-diagnosed persistent asthma. Persistent asthma was defined by the need to be on a daily controller medication or the use of albuterol on at least 3 days of the week. Exclusion criteria were as follows: any other pulmonary disease including COPD, current tobacco use, and more than 20 pack year smoking history, as this level of previous smoking has been associated with COPD.¹³ The recruitment period lasted from November 2013 through April 2016 from two academic centers in Detroit, MI and Ann Arbor, MI thus providing a diverse socioeconomic population. University of Michigan Institutional Review Board approval was obtained, and written informed consent was given by each subject.

Baseline data and demographic information were collected through patient questionnaires. The demographic information collected included gender, educational level, duration of asthma, race, self-reported comorbidities, and depression. The NIH Asthma Severity score was assessed based on self-reported medication usage (outlined in eTable 1), as has been

previously done.^{14,15} Depression was assessed using the geriatric depression scale short form (GDS).¹⁶ Objective measures of lung function were obtained with pre and post bronchodilator spirometric values. Asthma control was assessed using the asthma control test (ACT)¹⁷ score, and quality of life was measured using the mini asthma quality of life questionnaire (AQLQ).¹⁸ Corticosteroid use was assessed with the number of corticosteroid courses administered in the last year. Asthma exacerbations were assessed by determining the number of hospitalizations, emergency room visits, and unscheduled or urgent physician visits over the prior 12 months.

Patient preferences for autonomy in management of asthma were assessed using the Autonomy Preference Index (API) which was developed and validated by *Ende et al* (shown in eTable 2).¹⁹ The API is a survey with 11 questions that allows physicians to understand the extent to which patients like to be involved in their medical care. The responses for API are made on a 5-point Likert scale with a higher score indicating a greater desire to have autonomy in their management. The API measures patient autonomy on two domains. One is the ‘decision making’ preference domain, and the other is the ‘information seeking’ preference domain. The ‘decision making’ preference domain gauges how involved a patient chooses to be in making decisions in medical care, and the ‘information seeking’ preference domain measures how much knowledge a patient would like to acquire about a medical condition or treatment. As originally developed by *Ende et al*, the two domains were each analyzed separately in this study.¹⁹

Statistical Analysis

After acquiring the baseline information, the scores for the API were separated into the ‘information seeking’ preference scores and ‘decision making’ preference scores. The Kendall’s Tau correlation was calculated to assess the correlation between API scores and the demographic variables. The Kendall’s Tau correlation is based on ranking of the data and is appropriate when

there are ordinal variables. A t-test analysis was performed to confirm the differences in API scores between women and men. Multiple linear regression analyses were then carried out to examine the associations between API scores and outcomes after adjusting for the confounders.

Results

A total of 189 patients were included in this study, and all were able to provide responses to the questionnaires. Details of baseline characteristics are listed in Table 1. Of the 189 participants, 49 (25.9%) were men and 60 (31.8%) were black. The average age was 66, and 46% of the population was diagnosed with asthma after the age of 40. 42.9% of the population was noted to have had an asthma exacerbation in the last year, and 47% of the population had required treatment with oral corticosteroids in the last year. Average BMI was 31.1, falling into the obese range, average NIH severity score was 3.5, and median educational level was 4.0 (4=4-year college).

We next identified factors that were correlated with 'decision-making' preference scores. Demographic variables assessed were gender, age, duration of asthma, race, comorbidities, depression score, education level and NIH severity score. Higher decision making scores were correlated with female gender ($p=0.007$), higher education level ($p=0.01$), and lower depression scores ($p=0.04$). On t-test analysis, women had a higher average API score than men (men = 13.1 versus women = 14.9, $p=0.008$). There was no correlation with age, duration of asthma, race, comorbidities, and asthma severity (Table 2).

'Decision making' scores were then assessed for correlation with asthma related outcomes including number of exacerbations in the past 12 months, corticosteroid use in the past 12 months, spirometry values, ACT scores, and AQLQ scores. 'Decision-making' API sub

scores were found to positively correlate with higher AQLQ scores ($p=0.01$) whereas correlation with spirometry values ($p=0.07$) and ACT score ($p=0.09$) was marginally significant (Table 3).

To control for potentially confounding variables, a linear regression analysis was performed on the following outcomes: FEV1 pretreatment percent predicted, FEV1/FVC pretreatment percent predicted, ACT score, exacerbation rate, and AQLQ score. Covariates included in the model included gender, age, duration of asthma, race, comorbidities, depression, educational level, and NIH severity score. On linear regression analysis, the 'decision making' preference score remained a significant positive predictor for the AQLQ score ($p=0.03$). Educational level, gender, race, depression score, and NIH severity score were also found to be significant predictors for asthma related quality of life (Table 4). The 'decision making' API score was not found to be a significant predictor for spirometric values, exacerbations, nor ACT score (data not shown).

'Information seeking' preference scores were next analyzed. As shown in eTable 3, when examining demographic variables, 'information seeking' preference scores correlated with education level ($p=0.03$). However, 'information seeking' preference scores did not correlate with any asthma specific outcomes (eTable 4), and no further analysis was done.

Discussion

Patient involvement in decision making has become an essential part of managing chronic medical conditions in today's world. In asthma, interventions often emphasize self-recognition of symptoms and adherence to an asthma action plan. These practices require patient involvement and autonomy, which are not universally the same among patients. Historically, increasing patient involvement in asthma care through education and use of asthma action plans has shown an improvement in asthma related outcomes.^{1,20}

Medicine, in general, has slowly evolved from a primarily paternalistic approach, where physicians make all decisions regarding medical management, into a more shared approach. This change in approaching patient care may be partially explained by the ease of access to medical information which may allow patients to demand more details regarding their care. Additionally, the number of therapeutic options for any given medical condition has dramatically increased making multiple treatment approaches feasible, thereby enabling a physician to seek a patient's preferences before coming to a conclusion.³ These factors, among others, have likely assisted in facilitating the changing role of the patient-physician relationship over time.

In our study of older adults with persistent asthma, higher desire for autonomy as demonstrated by a higher 'decision making' score was associated with better quality of life. In general, quality of life (in reference to a chronic illness) is a subjective measure of how a given medical condition may be inhibiting or interfering with daily activities. Patients were asked about how their asthma made them feel or how bothered they may have been in reference to a multitude of symptoms. Patients with a higher level of autonomy are likely to empower and involve themselves in their medical care, thereby giving them a sense of overall control. Prior studies of asthmatic patients have found a significant association between asthma related quality of life and asthma self-efficacy.²¹ It is possible that autonomous patients have a higher level of self-efficacy in the management of their asthma, thereby providing an explanation for why quality of life and autonomy are associated. Studies with other chronic conditions such as diabetes have demonstrated similar results associating patient autonomy with quality of life.²² Additionally, having a high overall sense of autonomy in medical care has also been associated with having a higher sense of trust and satisfaction with healthcare compared to those who have

lower autonomy scores.²² To our knowledge, this is the first study of elderly patients with asthma that has established a positive correlation between autonomy and quality of life.

Age of the patient population is an important element to consider in this study. Younger age has previously been found to be a factor associated with higher preferences for decision making in asthma care,¹ and earlier analyses evaluating autonomy in asthma were comprised primarily of younger adults. In patients younger than 55 years of age, one study evaluated factors that may be associated with asthma related hospitalizations. Although lower preferences for autonomy were associated with asthma related hospitalizations on the initial univariate analysis, the regression analysis failed to corroborate this association.¹² In younger adults with asthma, a prior study showed no association between degree of autonomy and asthma related quality of life.¹¹ In younger adults therefore, autonomy preferences may not be reflective of any asthma related outcomes, while in the elderly, the utility of autonomy in managing asthma serves as tool to assess quality of life.

Several factors may have a direct impact on a patient's desire to participate in medical decision making in managing asthma. Our study found a significant correlation between higher 'decision making' scores and gender, with women having higher scores than men. The association between gender and higher 'decision making' preferences scores has been shown previously in multiple studies with women consistently showing higher preferences for autonomy.³ Higher 'decision making' scores were also found to correlate with lower depression scores. This association between depression and poor decision making has been made even outside the realm of asthma related care.^{23,24} Socioeconomic status can influence a patient's desire to participate in medical decision making, and in our study, educational level was used as a marker of socio-economic status. Both 'information seeking' preference scores and 'decision

making' preference scores were found to correlate with education level (eTable 3 and Table 2, respectively). An overall higher educational level may encourage patients to seek more information regarding their medical care,^{1,25} which in turn may assist patients in making pertinent decisions in managing their asthma. 'Information seeking' preference scores, contrary to the findings with 'decision making' scores, were not correlated with any asthma related outcomes in our study. The absence of an association between 'information seeking' preference scores and any asthma related outcomes is consistent with prior studies as well.¹¹ Future studies will need to evaluate whether interventions involving treatment of depression and improving healthcare literacy will influence patient autonomy.

There are some limitations in this study. While a significant association was found between 'decision making' preference scores and asthma related quality of life, our study is a cross sectional analysis and therefore does not establish a true causal association. Additionally, the analyses were performed on baseline data acquired in a single visit, and this data therefore does not account for any intrinsic fluctuation. Our patient population was also limited to the Midwestern region of the United States.

Despite these limitations, this is the first study that has shown that older adults with persistent asthma who have increased preferences for autonomy in decision making have a higher asthma related quality of life. Factors that were found to correlate with higher 'decision making' scores include female gender, lower depression scores, and higher educational levels. Longitudinal studies conducted in the future with the intention to increase patient autonomy may help establish a causal relationship between autonomy and quality of life in asthma.

References

1. Adams R, Smith B, Ruffin R. Patient preferences for autonomy in decision making in asthma management. *Thorax*. 2001;56(2):126-132.
2. Guadagnoli E, Ward P. Patient participation in decision-making. *Soc Sci Med*. 1998;47(3):329-339.
3. Say R, Murtagh M, Thomson R. Patients' preference for involvement in medical decision making: a narrative review. *Patient Educ Couns*. 2006;60(2):102-114.
4. Kogan AC, Wilber K, Mosqueda L. Person-Centered Care for Older Adults with Chronic Conditions and Functional Impairment: A Systematic Literature Review. *J Am Geriatr Soc*. 2016;64(1).
5. Rogers WA, Mitzner TL. Envisioning the future for older adults: Autonomy, health, well-being, and social connectedness with technology support. *Futures*. 2017;87:133-139.
6. Benbassat J, Pilpel D, Tidhar M. Patients' preferences for participation in clinical decision making: a review of published surveys. *Behav Med*. 1998;24(2):81-88.
7. Vincent GK, Velkoff VA. *The next four decades: The older population in the United States: 2010 to 2050*. US Department of Commerce, Economics and Statistics Administration, US Census Bureau; 2010.
8. Most recent asthma data. 2016. Centers for Disease Control Prevention. URL: https://www.cdc.gov/asthma/most_recent_data.htm [accessed 2017-01-20][WebCite Cache ID 6nfOcBt5G].
9. Gillman A, Douglass JA. Asthma in the elderly. *Asia Pac Allergy*. 2012;2(2):101.
10. Tsai C-L, Lee W-Y, Hanania NA, Camargo CA. Age-related differences in clinical outcomes for acute asthma in the United States, 2006-2008. *J Allergy Clin Immunol*. 2012;129(5):1252-1258. e1251.
11. Gibson PG, Talbot PI, Toneguzzi RC, Group TPM. Self-management, autonomy, and quality of life in asthma. *Chest*. 1995;107(4):1003-1008.
12. Adams RJ, Smith BJ, Ruffin RE. Factors associated with hospital admissions and repeat emergency department visits for adults with asthma. *Thorax*. 2000;55(7):566-573.
13. Straus SE, McAlister FA, Sackett DL, Deeks JJ. The accuracy of patient history, wheezing, and laryngeal measurements in diagnosing obstructive airway disease. *Jama*. 2000;283(14):1853-1857.
14. Expert Panel Report 3 (EPR-3): Guidelines for the Diagnosis and Management of Asthma-Summary Report 2007. *J Allergy Clin Immunol*. 2007;120(5 Suppl):S94.
15. Baptist AP, Hao W, Karamched KR, Kaur B, Carpenter L, Song PX. Distinct Asthma Phenotypes among Older Adults with Asthma. *J Allergy Clin Immunol Pract*. 2017.
16. Almeida OP, Almeida SA. Short versions of the geriatric depression scale: a study of their validity for the diagnosis of a major depressive episode according to ICD-10 and DSM-IV. *Int J Geriatr Psychiatry*. 1999;14(10):858-865.
17. Schatz M, Sorkness CA, Li JT, et al. Asthma Control Test: reliability, validity, and responsiveness in patients not previously followed by asthma specialists. *J Allergy Clin Immunol*. 2006;117(3):549-556.
18. Juniper E, Guyatt G, Cox F, Ferrie P, King D. Development and validation of the mini asthma quality of life questionnaire. *Eur Respir J*. 1999;14(1):32-38.
19. Ende J, Kazis L, Ash A, Moskowitz MA. Measuring patients' desire for autonomy. *J Gen Intern Med*. 1989;4(1):23-30.

- 297 20. Gibson PG, Powell H, Wilson A, et al. Self-management education and regular
298 practitioner review for adults with asthma. *Cochrane Database Syst Rev*. 2002.
- 299 21. Lavoie KL, Bouchard A, Joseph M, Campbell TS, Favreau H, Bacon SL. Association of
300 asthma self-efficacy to asthma control and quality of life. *Ann Behav Med*.
301 2008;36(1):100-106.
- 302 22. Lee Y-Y, Lin JL. Do patient autonomy preferences matter? Linking patient-centered care
303 to patient-physician relationships and health outcomes. *Soc Sci Med*. 2010;71(10):1811-
304 1818.
- 305 23. Sinuff T, Dodek P, You JJ, et al. Improving end-of-life communication and decision
306 making: the development of a conceptual framework and quality indicators. *J Pain*
307 *Symptom Manage*. 2015;49(6):1070-1080.
- 308 24. Frieri M, O'Connor M, Nassef M. Asthma, stress, and depression in women. *Allergy*
309 *Asthma Proc*. 2015;36(4):256-261.
- 310 25. Thompson SC, Pitts JS, Schwankovsky L. Preferences for involvement in medical
311 decision-making: situational and demographic influences. *Patient Educ Couns*.
312 1993;22(3):133-140.

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316 Table 1: Baseline Demographic Information

	Total Cohort
Number of subjects	189
Male gender, n (%)	49 (25.9%)
Age of enrollment, years	66.0 (7.3)
Asthma diagnosis after 40 years, n (%)	87 (46.0%)
Asthma duration in years, median (IQR)	27.0 (38.0)
Education Level ¹ , median (IQR)	4.0 (2.0)
Race, White, n (%)	123 (65.1%)
Black, n (%)	60 (31.8%)
Other, n (%)	6 (3.2%)
Comorbidities ² , median (IQR)	1.0 (1.0)
Tobacco Pack Years, median (IQR)	0.0 (1.3)
Body mass index (BMI)	31.1 (7.2)
Depression, n (%)	45 (23.8%)
NIH severity score ³	3.5 (1.2)
Asthma Exacerbations in past year, n (%)	81 (42.9%)
Hospitalization, n (%)	20 (10.6%)
Emergency visit, n (%)	32 (16.9%)
Unscheduled visit, n (%)	63 (33.7%)
Oral corticosteroid use in past year, n (%)	87 (47.0%)
FEV1/FVC ratio, pre-treatment %	93.4 (13.6)
FEV1/FVC ratio, post-treatment %	95.6 (15.3)
FEV1 Pre-treatment % Predicted	70.5 (20.6)
FEV1 Post-treatment % Predicted	75.5 (19.2)
FVC Pre-treatment % Predicted	74.8 (17.6)
FVC Post-treatment % Predicted	77.9 (15.6)
Asthma Control Test	17.6 (4.6)
Asthma Quality of Life	5.1 (1.2)

317 All data presented as mean (SD) unless otherwise noted. Data not normally distributed presented as median (IQR)

318 FEV1: Forced Expiratory Volume in 1 second, FVC: Forced Vital Capacity, NIH: National Institute of Health,

319 ¹Educational Level: 1=below high school, 2=high school, 3=2-y college, 4=4-y college, 5=postgraduate.

320 ² Comorbidities are based on counts of heart disease, high blood pressure, stroke or cancer
321 ³ NIH Severity Score on a scale of 1 to 6 with 6 representing most severe

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Table 2: 'Decision making' Score Correlation with Demographic Variables

Demographic Variable	Correlation Coefficient	p-value
Female Gender	0.17	0.007
Education Level	0.15	0.01
Depression	-0.12	0.04
Age	-0.02	0.70
Duration of asthma	-0.0002	0.99
Black	-0.05	0.43
Comorbidities	-0.08	0.16
NIH Severity Score	-0.02	0.75
NIH: National Institute of Health		

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Table 3: 'Decision making' Score Correlation with Asthma Related Outcomes

Outcome	Correlation Coefficient	p-value
AQLQ	0.13	0.01
ACT score	0.09	0.09
Hospitalizations/ER visits/Unscheduled Visits	-0.02	0.70
Steroid Use	-0.03	0.65
FVC Pretreatment % predicted	0.04	0.40
FEV1 Pretreatment % predicted	0.09	0.08
FEV1/FVC Pretreatment % predicted	0.09	0.07
FVC Post treatment % predicted	0.01	0.87
FEV1 Post treatment % predicted	0.03	0.52
FEV1/FVC Post treatment % predicted	0.04	0.40

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ACT: Asthma Control Test
AQLQ: mini Asthma Quality of Life Questionnaire
ER: Emergency Room
FEV1: Forced Expiratory Volume in 1 second
FVC: Forced Vital Capacity

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334 Table 4: Linear Regression Analysis with AQLQ Score as Outcome

Variable	Parameter Estimate	Standard Error	p-value
'Decision Making' score	0.04	0.02	0.03
Female Gender	-0.46	0.18	0.01
Age	0.0005	0.01	0.96
Duration of Asthma	0.0001	0.004	0.97
Black	-0.97	0.19	<0.01
Comorbidities	-0.10	0.11	0.34
Education Level	0.14	0.07	0.05
Depression Score	-0.85	0.43	0.05
NIH Severity Score	-0.16	0.064	0.02

335 AQLQ: mini Asthma Quality of Life Questionnaire

336 NIH: National Institute of Health

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eTable 1: NIH Asthma Severity Score

Severity	Asthma Medication
1	SABA
2	Low Dose ICS or Cromolyn or Montelukast
3	Medium Dose ICS
4	Medium Dose ICS AND LABA or Montelukast
5	High Dose ICS AND LABA or Montelukast
6	High Dose ICS AND LABA or Montelukast AND Oral Systemic Glucocorticoids

ICS: inhaled corticosteroid, LABA: Long acting beta agonist, NIH: National Institute of Health, SABA: Short acting beta agonist,

eTable 2: Autonomy Preference Index

'Decision Making' Preference Domain

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Important medical decisions about your asthma should be made by your physician, not you.	1	2	3	4	5
You should go along with your physician's advice even if you disagree with it.	1	2	3	4	5
When hospitalized for asthma, you should not be making decisions about your own care.	1	2	3	4	5
You should feel free to make decisions about everyday problems with your asthma.	1	2	3	4	5
If you were sick, as your asthma became worse you would want your physicians to take greater control.	1	2	3	4	5

'Information-Seeking' Preference Domain

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
As you become sicker, you should be told more and more about your asthma.	1	2	3	4	5
You should understand what is happening inside your body as a result of asthma.	1	2	3	4	5
You should be given information about your asthma only when you ask.	1	2	3	4	5
It is important for you to know all the side effects of your asthma medication.	1	2	3	4	5
Information about asthma is as important as treatment.	1	2	3	4	5
When there is more than one method to treat asthma, you should be told about each one.	1	2	3	4	5

eTable 3: 'Information seeking' Scores Correlation with Demographic Variables

Demographic Variable	Correlation Coefficient	p-value
Education Level	0.13	0.03
Female Gender	0.09	0.16
Age	-0.04	0.49
Duration of asthma	-0.008	0.88
Black	-0.03	0.67
Comorbidities	-0.06	0.33
Depression	0.03	0.64
NIH Severity Score	0.002	0.97

NIH: National Institute of Health

eTable 4: 'Information seeking' Scores Correlation with Outcomes

Outcome	Correlation Coefficient	p-value
Hospitalizations/ER visits/Unscheduled Visits	-0.01	0.81
Steroid Use	-0.01	0.84
FVC Pretreatment % predicted	-0.01	0.87
FEV1 Pretreatment % predicted	-0.04	0.47
FEV1/FVC Pretreatment % predicted	-0.07	0.19
FVC Posttreatment % predicted	-0.01	0.90
FEV1 Posttreatment % predicted	-0.03	0.53
FEV1/FVC Posttreatment % predicted	-0.09	0.09
ACT score	-0.006	0.90
AQLQ	0.007	0.90

ACT: Asthma Control Test, AQLQ: mini Asthma Quality of Life Questionnaire, ER: Emergency Room, FEV1: Forced Expiratory Volume in 1 second, FVC: Forced Vital Capacity