Asthma Action Plans and Patient Satisfaction Among Women With Asthma

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Background: Asthma action plans (AAPs) are a priority recommendation of the National Asthma Education and Prevention Program and have been shown to positively affect health outcomes. Patient satisfaction is an important clinical outcome, yet little is known about its association with receiving an AAP. This study examined the association between having an AAP and behaviors to keep asthma in control and patient satisfaction with care.

Methods: The study design was a cross-sectional analysis of baseline data from a randomized trial evaluating a self-management program among 808 women with asthma. Participants reported demographic information, interactions with clinicians, whether they had an AAP and owned a peak flow meter, self-management behaviors, and symptoms.

Results: The mean age of the participants was 48 ± 13.6 years, 84% ($n = 670$) were satisfied with their asthma care, and 48% ($n = 383$) had a written AAP from their physician. Women not having an AAP were less likely to take asthma medication as prescribed [$\chi^2(1) = 13.68, P < .001$], to initiate a discussion about asthma with their physicians [$\chi^2(1) = 26.35, P < .001$], and to own a peak flow meter [$\chi^2(1) = 77.84, P < .001$]. Adjusting for asthma control, income, and medical specialty, women who did not have an AAP were more likely to report dissatisfaction with their asthma care (OR, 2.07; 95% CI, 1.35–3.17; $P < .001$).

Conclusions: Women without an AAP were less likely to initiate discussions with their physicians, take medications as prescribed, and own a peak flow meter to monitor asthma, all considered important self-management behaviors. They were also less satisfied with their care. Not having an AAP may affect interactions between patient and physician and clinical outcomes.

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Abbreviations: AAP = asthma action plan; NAEPP = National Asthma Education and Prevention Program

Asthma is a prevalent chronic condition that affects 17.5 million adults in the United States, with higher rates among women.¹ For long-term management of asthma, the National Asthma Education and Prevention Program (NAEPP) expert guidelines on the diagnosis and management of asthma recommend that all patients receive an individualized written

asthma action plan (AAP) that details patient daily management (medications and environmental control strategies) and how to recognize and handle worsen-

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ing asthma.² Barriers to asthma guideline adherence are more pronounced among primary care physicians and include low self-efficacy and lack of training, outcome expectation, and time.^{3–5} In 2008, as a national response to barriers in implementing the guidelines,

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the NAEPP prioritized receipt of an AAP to guide self-management efforts among the six recommendations that have sufficient leveraging power to have a positive impact on patient outcomes.⁶

Despite these recommendations, the use of AAPs in clinical practice is frequently lacking, with studies reporting uptake as low as 26% to 46%.⁷⁻⁹ Plans are more commonly used by asthma specialists,¹⁰ although the majority of patients with asthma are seen by primary care physicians.¹¹ Clinician barriers to using written AAPs in general practice and primary care have been associated with poor professional patient communication.¹² Systematic reviews of asthma self-management education have shown that AAPs contribute to improved asthma health outcomes, such as less urgent care use and improved asthma control, with individualized plans demonstrating even stronger associations.^{13,14} Although the evidence suggests that asthma interventions that include AAPs are effective in improving asthma self-management behavior and asthma control, there are currently no controlled studies that demonstrate that AAPs alone are effective in improving disease management-related health outcomes.

Patient satisfaction is an important measure of quality of health care in most systems and for most clinicians.¹⁵ Patient satisfaction is an incentive to physicians to communicate effectively with their patients and provide excellent therapies. When patients are satisfied with the communication and rapport the clinician has established with them, there is a greater likelihood that they will comply with instructions and rate the clinician and health-care organization favorably.¹⁵ A physician incorporating effective communication methods may use common tools to support patient self-management (eg, AAPs, peak flow meters) and encourage patients to generate questions about their asthma by promoting engagement in their care. Among adults with asthma, better partnerships between clinicians and patients have been significantly associated with better asthma control and patient satisfaction.¹⁶ Although patient satisfaction is an important outcome of care for both clinician and patient, little is known about its association with receiving an AAP.

As noted, AAPs are considered an important element of disease management by the NAEPP. However, the relationship of having such plans to other key self-management behaviors is not clear. It is likely that a set of recommended actions for patients is facilitated by AAPs. The need to provide effective support to patients to reduce the significant costs that the health-care system and patients themselves incur from poorly managed asthma increases the importance of understanding the association between AAPs and other aspects of self-management behaviors. This study examined the relationship between having an

AAP and (1) self-management behaviors needed to keep the disease under control and (2) patient satisfaction with asthma care provided by the clinician. It was hypothesized that adults with asthma who did not have an AAP would have lower levels of self-management behavior and report greater dissatisfaction with their asthma care.

MATERIALS AND METHODS

Data

Data used for this analysis came from the baseline assessment of a randomized controlled trial evaluating a self-management program among women with asthma. Details of the self-management program are described elsewhere.¹⁷ The protocol for this study (1997-0500) was approved by the Institutional Review Board at the University of Michigan Medical School.

Sample

Participants in this study were women with asthma aged ≥ 18 years who were given the diagnosis based on NAEPP guidelines by a University of Michigan Health System physician.² Additional study criteria included the presence of active symptoms in the past 12 months, having been an enrolled patient in one of the participating University of Michigan asthma or primary care clinics, no extenuating medical or mental conditions (eg, terminal illness, dementia), and access to a telephone. Procedures on participant recruitment are described elsewhere.¹⁷ Of the 2,336 women who were initially approached for the study, 997 consented to participate. Ultimately, 808 women returned the completed consent forms by mail, providing baseline data, and the present analysis is based on these respondents.

Instruments

The self-reported baseline data were collected prior to randomization through telephone interviews by trained interviewers. We asked participants about their asthma symptoms; whether they received care from a specialty clinic (allergy or pulmonology) or from a primary care physician, were given a written AAP by their physician, owned a peak flow meter, took their medications as prescribed, and initiated discussions about asthma with their physician; and about their satisfaction with care. We also obtained demographic characteristics, including age, education, household income, marital status, and race/ethnicity.

Measures

Patient Satisfaction: The outcome of interest was whether participants were satisfied with their care. We asked participants to rate on a 5-point Likert scale (with 1 meaning not at all satisfied and 5 meaning extremely satisfied) the following question: "In general, how satisfied are you with the clinical/medical care you receive for asthma?"

Asthma Action Plan: In this study, an AAP was defined as a written treatment plan for asthma. To evaluate whether participants had an AAP, we asked them the following question on a binary (yes/no) scale: "Do you have a treatment plan or asthma care plan that you and your doctor worked out together for you to adjust your medication use when symptoms change?"

Asthma Control and Frequency of Asthma Symptoms: Asthma control and frequency of symptoms were assessed based on self-reporting of the presence of daytime and nighttime symptoms in the previous month, which is the recommended assessment period based on the NAEPP guidelines for the diagnosis and management of asthma.² Asthma control levels were calculated by the worst impairment category of daytime or nighttime symptoms. The NAEPP guidelines were used to classify the frequency of symptoms reported by participants into four categories: ≤ 2 d/wk, > 2 d/wk but not daily, daily, and throughout the day. Asthma control was classified into three categories: poorly controlled, not well controlled, or well controlled.²

Owning a Peak Flow Meter: To evaluate whether participants owned a peak flow meter to monitor their asthma symptoms, we asked the following question on a binary (yes/no) scale: "Do you own a peak flow meter?"

Taking Asthma Medication as Prescribed: To evaluate whether participants took their asthma medications as prescribed, we asked the following question: "How often do you take your asthma medications as prescribed by your physician?" Participants were to answer usually, sometimes, or rarely.

Initiating Discussion About Asthma With Their Physician: To evaluate whether participants initiated discussion about their asthma with their physician, we asked the following question: "Would you say that you asked the doctor questions about asthma often, sometimes, rarely, or never?"

Data Analysis

The outcome of interest was patient dissatisfaction. Based on the distribution of responses, we collapsed patient dissatisfaction into a binary variable, with a response of 1, 2, or 3 indicating dissatisfaction with care and a response of 4 or 5 indicating satisfaction with care. Also based on the distribution of responses, we collapsed taking asthma medication as prescribed into a binary response, with usually indicating yes and rarely or sometimes indicating no. Sensitivity analyses confirmed the stability of the results using these cut points. Frequencies were computed for each categorical variable (ie, education, household income, marital status, race/ethnicity, asthma control, frequency of symptoms, medical specialty of asthma care, owning a peak flow meter, taking asthma medications as prescribed, initiating discussion about asthma with physician, having an AAP, patient dissatisfaction), and mean $\pm$ SD was computed for continuous variables (ie, participant age). Student *t* test and χ^2 analyses with Fisher exact test were used to examine differences in demographic and clinical characteristics among participants who had an AAP and those who did not. Multivariate logistic regression analysis was used to examine the association between patient dissatisfaction and having an AAP, while adjusting for asthma control, annual household income, and medical specialty. $P < .05$ was considered significant. SAS, version 9.2 (SAS Institute Inc) statistical software was used for all analyses.

RESULTS

Sample

Demographic and clinical characteristics of the 808 participants who completed baseline interviews are provided in Table 1. Within the total sample, the mean age of participants was 48 ± 13.67 years,

16% ($n = 127$) of participants were nonwhite, and 63% ($n = 505$) reported being married. Seventy percent ($n = 563$) reported educational attainment above high school, and 68% ($n = 495$) had an annual household income of $> \$40,000$. Forty percent ($n = 322$) reported symptom frequency of ≤ 2 d/wk, whereas 21% ($n = 172$) reported symptoms > 2 d/wk but not daily, 33% ($n = 269$) had daily symptoms, and 6% ($n = 45$) reported symptom frequency throughout the day. Forty percent ($n = 322$) of the sample reported well-controlled asthma, whereas 46% ($n = 372$) reported not-well-controlled asthma and 14% ($n = 114$) had poorly controlled asthma. Forty-eight percent ($n = 383$) reported having an AAP vs 52% ($n = 410$) who did not have an AAP. Significant differences between participants with an AAP and those without an AAP were found for household income [$\chi^2(3) = 8.37$, $P = .03$], with those at high income levels more likely to have a plan, and medical specialty of asthma care, with those seen by a specialist more likely to have a plan [$\chi^2(1) = 29.70$, $P < .001$].

Self-Management Behaviors, Dissatisfaction With Clinical Care, and Asthma Treatment Plans

Table 2 shows behaviors needed to keep asthma under control and patient dissatisfaction among participants with and without an AAP. Overall, 70% ($n = 568$) of participants reported owning a peak flow meter, 78% ($n = 577$) reported taking their asthma medications as prescribed, and 55% ($n = 439$) initiated discussion about their asthma with their physician. Sixteen percent ($n = 132$) reported dissatisfaction with their asthma care. Significant differences between those who had an AAP and those who did not were found for owning a peak flow meter [$\chi^2(1) = 77.84$, $P < .001$], taking asthma medication as prescribed [$\chi^2(1) = 13.68$, $P < .001$], initiating discussion about asthma with a physician [$\chi^2(1) = 26.35$, $P < .001$], and patient dissatisfaction [$\chi^2(1) = 13.66$, $P < .001$] (Table 2).

Patient Dissatisfaction and Asthma Treatment Plans

Table 3 shows the results of the multivariate logistic regression analysis examining the association between patient dissatisfaction and AAPs while adjusting for asthma control, annual household income, and medical specialty of asthma care. Findings indicate that participants who did not have an AAP were more likely to report dissatisfaction with their asthma care (OR, 2.07; 95% CI, 1.35-3.17; $P < .001$) compared with those who had an AAP. Participants with poorly controlled asthma were also more likely to report dissatisfaction with their asthma care (OR, 2.61; 95% CI, 1.38-4.97; $P < .05$) compared with those with

Table 1—Demographic and Clinical Aspects of Participants With and Without an Asthma Action Plan

Variable	Total Sample (N = 808)	Asthma Action Plan (n = 383)	No Asthma Action Plan (n = 410)	Difference	P Value
Age, y	48.02 ± 13.67	47.95 ± 11.79	48.12 ± 15.23	$t = 0.18$	NS
Education				$\chi^2(4) = 0.27$	NS
Below high school	2 (19)	2 (7)	3 (12)		
High school	28 (225)	25 (97)	30 (124)		
2-y college	20 (163)	21 (79)	20 (80)		
4-y college	28 (226)	28 (107)	28 (114)		
Postgraduate	22 (174)	24 (93)	19 (79)		
Household income				$\chi^2(3) = 8.37$	.03 ^a
< \$20,000	14 (100)	13 (45)	14 (52)		
\$20,001-\$40,000	18 (131)	16 (55)	20 (72)		
\$40,001-\$60,000	20 (145)	17 (61)	23 (82)		
≥ \$60,001	48 (350)	54 (188)	43 (157)		
Married	63 (505)	65 (250)	60 (245)	$\chi^2(1) = 2.43$	NS
Nonwhite race	16 (127)	17 (63)	15 (61)	$\chi^2(1) = 0.27$	NS
Medical specialty of asthma care				$\chi^2(1) = 29.70$	.001 ^b
Asthma specialist	60 (476)	70 (261)	51 (206)		
Primary care	40 (313)	30 (111)	49 (198)		
Frequency of symptoms				$\chi^2(3) = 1.00$	NS
≤ 2 d/wk	40 (322)	40 (153)	40 (162)		
> 2 d/wk but not daily	21 (172)	20 (78)	20 (91)		
Daily	33 (269)	34 (128)	34 (137)		
Throughout the day	6 (45)	6 (24)	6 (20)		
Asthma control				$\chi^2(2) = 2.05$	NS
Well controlled	40 (322)	40 (153)	40 (162)		
Not well controlled	46 (372)	44 (170)	48 (197)		
Poorly controlled	14 (114)	16 (60)	12 (51)		

Data are presented as mean ± SD or % (No.) unless otherwise indicated. NS = not significant.

^a $P < .05$.

^b $P < .001$.

well-controlled asthma when adjusting for receipt of an AAP, annual household income, and medical specialty of asthma care. Based on the distribution of responses, sensitivity analyses confirmed the stability of the results with the collapsing of patient dissatisfaction with care and taking medication as prescribed.

DISCUSSION

In the present study of women with asthma, we found that just < 50% of participants did not have an

AAP, and those who did were more likely to be seen by an asthma specialist. This finding is consistent with other work and national data showing the low use of AAPs in general clinical practice.^{7-10,18} Participants who did not have an AAP were more likely to report dissatisfaction with their asthma care compared with those who did have a plan. Although other work has shown that shared decision-making and participatory approaches between the clinician and patient have been associated with possession of an AAP, improved asthma outcomes, and patient satisfaction,^{19,20} the present study is unique and the first to our knowledge to

Table 2—Behaviors Needed to Keep Asthma Under Control and Patient Dissatisfaction Among Participants With and Without an Asthma Action Plan

Variable	Total Sample (N = 808)	Asthma Action Plan (n = 383)	No Asthma Action Plan (n = 410)	Difference	P Value
Own peak flow meter, yes	70 (568)	85 (326)	57 (232)	$\chi^2(1) = 77.84$	.001 ^a
Taking asthma medication as prescribed, yes	78 (577)	84 (286)	73 (283)	$\chi^2(1) = 13.68$	.001 ^a
Initiating discussion about asthma with physician, yes	55 (439)	64 (244)	46 (187)	$\chi^2(1) = 26.35$	.001 ^a
Patient dissatisfaction, yes	16 (132)	11 (43)	21 (85)	$\chi^2(1) = 13.66$	.001 ^a

Data are presented as % (No.) unless otherwise indicated.

^a $P < .001$.

Table 3—ORs Examining Relationship Between Patient Dissatisfaction and Not Having an Asthma Action Plan, Adjusted for Asthma Control, Annual Household Income, and Specialty

Variable	Patient Dissatisfaction	
	OR (95% CI)	P Value
No asthma action plan	2.07 (1.35-3.17)	< .001 ^a
Medical specialty of asthma care		.26
Specialist	0.78 (0.514-1.20)	
Primary care	Reference	
Asthma control		
Well controlled	Reference	...
Not very well controlled	2.23 (1.39-3.59)	.125
Poorly controlled	2.61 (1.38-4.97)	< .05 ^b
Annual household income		
< \$20,000	Reference	...
\$20,001-\$40,000	1.16 (0.58-2.32)	.58
\$40,001-\$60,000	0.97 (0.48-1.95)	.73
≥ \$60,001	1.04 (0.56-1.93)	.98

^aP < .001.

^bP < .01.

explore associations between AAPs and patient dissatisfaction with care.

We found that behaviors needed to guide self-management strategies (eg, owning a peak flow meter, taking medications as prescribed, discussing asthma with a clinician) were significantly lower among participants who did not have an AAP. These findings are consistent with other studies that have shown that AAPs often are rated favorably by patients in enhancing their ability to self-manage their asthma.^{13,21,22} This relationship may be explained by a third factor: patient-provider communication. Participants who did not have an AAP may have experienced clinical encounters where patient education and active engagement are lacking, and thus, self-management behaviors are not fostered. Additionally, the utility of an AAP may be magnified in patients who have multiple chronic conditions. Because of a growing population that is managing multiple chronic conditions, AAPs may aid in clarifying the important aspects of the asthma therapeutic regimen. Others have shown that among adults with asthma, increasing numbers of comorbid conditions are associated with greater difficulty in following treatment recommendations.²³

Consistent with other work, the present findings also showed that a higher percentage of individuals with lower income did not have an AAP. In a study exploring self-management practices among low-income urban adults with acute asthma exacerbations, it was found that no participants used a peak flow meter or received an AAP.²⁴ Low socioeconomic status has been shown to increase susceptibility to contextual risk factors that give rise to difficulties with asthma self-management,²⁵ which in turn, perpetuate

greater asthma disparities with respect to prevalence, morbidity, and worse asthma outcomes.²⁶

Although the present study showed that having an AAP at baseline is positively associated with several self-management steps and patient satisfaction, the findings did not show significant associations with asthma control or symptom frequency at baseline. Asthma control was not an intended outcome in this study, and exploration of it was limited. Several reasons may explain the lack of association of AAPs with outcomes. Only a few self-management steps were measured in this research, although many more may lead to improved asthma control. Further, although inclusion criteria indicated the presence of active symptoms over the past 12 months, the study sample predominantly reported mild symptom frequency. This milder level of symptoms is possibly a result of the time frame for assessment. Although these findings suggest that AAPs alone may not improve asthma control, they also suggest that patients are satisfied about receiving an AAP from their physician not just because their symptoms were milder or less frequent. Patient satisfaction is an important outcome for patients, and may at times be independent of actual health status.

There are several limitations in this study that should be noted. Because of the cross-sectional nature of the analysis, we cannot determine whether having an AAP produced satisfaction with care or whether those who were more satisfied with their care were more likely to obtain action plans. Design limitations in this study do not allow for the conclusion that using AAPs alone will result in improved self-management and patient satisfaction. However, the association between the two conditions is highly significant. This study was a secondary data analysis, and there may be limitations in reliably measuring the variables of interest. Additionally, because the data were self-reported and patients tend to overreport compliance, this outcome may not be fully accurate and should be interpreted with caution. Future studies may consider objective measurements for assessing medication compliance. Self-reporting bias may also be apparent in other measures within this study; therefore, future studies may consider reviewing medical records to confirm that patients have an AAP, their level of asthma control and frequency of symptoms, and the accuracy of reports of medications prescribed. Finally, the study sample comprised women seen in one health system and represented a predominantly white and well-educated group. Therefore, these findings may not be generalizable to all adults with asthma or those seen in other practice settings. Notwithstanding these limitations, the present exploratory work shows significant associations between AAPs and self-management behaviors and patient satisfaction. Future work can

build on these findings through the use of objective measurements, more psychometric testing of the measures, longitudinal analyses, and assessments in heterogeneous populations.

Given the low frequency of providing AAPs by clinicians despite priority clinical guideline recommendations and the relationship of such plans to satisfaction and other key self-management behaviors, efforts to increase their provision are needed. AAPs are recommended for all patients with persistent asthma; however, given the demands of clinical practice, it seems especially important to target efforts toward increased use of written AAPs among groups most at risk for poor outcomes, including those with a low income and multiple comorbidities. An AAP may serve as a catalyst for communication between a physician and patient. Physicians who provide plans to their patients may strengthen the clinician-patient relationship, which in turn, may enhance self-management efforts and reduce the burden of asthma on individual patients and society.

CONCLUSIONS

In this study, fewer than one-half of women with asthma were given an AAP by their physician. Women without an AAP were less likely to initiate discussions with their physician, own a peak flow meter to monitor their asthma, and use their medications as prescribed, all considered important self-management behaviors. Women without an AAP were also less satisfied with their asthma care. Not having an AAP may affect relationships between patient and clinician, which may in turn affect clinical outcomes.

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Ms Patel: contributed to the study concept and design, analysis and interpretation of the data, and drafting and revision of the manuscript.

Dr Valerio: contributed to the interpretation of the data and critical revision of the manuscript.

Dr Sanders: contributed statistical expertise and to the interpretation of the data and critical revision of the manuscript.

Ms Thomas: contributed to the critical revision of the manuscript.

Dr Clark: contributed statistical expertise; to providing access to the data source; and to the study concept and design, interpretation of the data, and critical revision of the manuscript.

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