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Improving asthma symptoms using asthma action plans

Ryan Daniel Thebo

University of San Diego Hahn School of Nursing and Health Science Betty and Bob Beyster Institute for Nursing Research, Advanced Practice and Simulation, rthebo@san Diego.edu

Michael Terry

University of San Diego Hahn School of Nursing and Health Science Betty and Bob Beyster Institute for Nursing Research, Advanced Practice and Simulation, mjterry@san Diego.edu

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UNIVERSITY OF SAN DIEGO
Hahn School of Nursing and Health Science
Betty and Bob Beyster Institute for
Nursing Research, Advanced Practice and Simulation

DOCTOR OF NURSING PRACTICE PORTFOLIO

by

Ryan Thebo, BSN, PMH-BC, CNRN

A portfolio presented to the
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UNIVERSITY OF SAN DIEGO

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DOCTOR OF NURSING PRACTICE
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Faculty Chair: Michael Terry, DNP, RN, PMHNP, FNP
Seminar Faculty Mary Jo Clark, PhD, RN, PHN
Clinical Mentor: Iyabo Daramola, MD

Final Manuscript

Improving Asthma Symptoms Using Asthma Action Plans

Key words: asthma action plan, symptom-based asthma action plan, written asthma plan,
EPR3 Guidelines, self-management of asthma, symptom-based asthma action plan

April 2015

Abstract

Asthma is a chronic disorder characterized by airflow obstruction, causing chest tightness, wheezing, coughing, and shortness of breath. In California, 7.9% of patients have an asthma diagnosis. The 2007 NHLBI Expert Panel Report 3 recommended using asthma action plans in asthma management (NHLBI, 2007). Patients with asthma were taught to use an AAP to improve asthma control. Overall, 80% of patients improved by at least one EPR3 asthma control category.

Key words: asthma action plan, symptom-based asthma action plan, written asthma plan, EPR3 Guidelines, self-management of asthma, symptom-based asthma action plan

Improving asthma symptoms using asthma action plans

Approximately 8.4% of the U.S. population has asthma. Ineffective asthma self-management can result in emergency room visits, hospitalization, missed work/school days, and premature mortality. In 2009, asthma resulted in approximately 479,300 hospitalizations (Akinbami et al., 2012). The 2007 national cost estimate for asthma was \$56 billion (Centers for Disease Control and Prevention [CDC], 2013). The “Healthy People 2020” objectives identified lack of patient self-management as a serious national health issue and targeted an increase in the use of asthma action plans (AAPs) from 33.4% to 36.8% of office visits by 2020 (U.S. Department of Health and Human Services, 2015).

Asthma in California and San Diego

An estimated 36.4% of California adults with asthma reported missing work or being unable to carry out usual activities due to asthma. In only 40% of visits did California patients receive an AAP; only 30% were advised to make changes in their school, work, or home environments to reduce asthma symptoms; and fewer than 40% of patients used correct inhaler techniques (Millet, Lutzker, & Flattery, 2013). In southern San Diego County, nearly one in seven residents has asthma, higher than state and national asthma prevalence rates (County of San Diego County Health and Human Services Agency, 2012).

Asthma Control in a Primary Care Clinic

This evidence-based project was conducted in a primary care practice employing a physician and two nurse practitioners. The 2007 NHLBI EPR3 guidelines recommend that all patients with asthma be provided an AAP as a standard of care (NHLBI, 2007).

However, AAPs were not being used in the setting.

Project Purpose

The purpose of this project was to increase asthma control by teaching patients how to use an AAP to improve self-management.

Supporting Evidence

The 2007 NHLBI EPR3 Guidelines recommend providing AAPs to all patients with asthma based on “level B evidence”. An AAP significantly improves adherence to ICS medications, asthma control, patient self-management, and quality of life compared to standard care. The AAP should incorporate information about recognizing and handling worsening asthma symptoms on a daily basis, understanding signs of inadequate asthma control, daily treatment, and self-adjustment of medications. For patients with moderate to severe exacerbations, an AAP is particularly recommended based on “level B evidence”. Additionally, symptom-based AAPs and those based on peak expiratory flow monitoring are equally efficacious, based on “level A evidence.” Consequently, it is not the type of AAP that is important, but simply having an AAP in place, that serves to increase patients’ awareness of their asthma symptoms (NHLBI, 2007).

Practice Change

Patients with asthma were seen by the project coordinator. The coordinator identified patients as needing an AAP based on either a prior or new asthma diagnosis at the time of the visit. A pre-selected patient education template was imbedded in the eClinicalWorks system to document the intervention. During visits, patients were asked about daytime symptoms, night time symptoms, and the degree of interference with activity due to asthma. Based on the patient’s responses, the relevant asthma control

category of “well controlled,” “not well controlled,” or “very poorly controlled” was recorded in a log. Other data, such as medication changes, prior medication compliance, and asthma diagnosis (e.g., current, past, none/no symptoms), were also recorded and transferred to a project log for analysis.

The AAP provides written self-management instructions for patients to optimize or adjust asthma control when exacerbations occur. It includes a one-page summary with medications to take in three asthma zones (green, yellow, or red) based on the frequency and severity of symptoms. The green zone represents well-controlled asthma without symptoms during the daytime and at night. The yellow zone constitutes “not well controlled” asthma with a worsening of asthma symptoms and activity impairment. The red zone indicates “very poorly controlled asthma” based on severe symptoms and activity impairment. The patients also received handouts on environmental triggers and inhaler technique (NHLBI, 2007)

All patients received an AAP and were educated on its use. Patients in the “not well controlled” and “very poorly controlled” categories received a phone call 6 to 7 weeks later to assess their asthma control status. Results were recorded in the project log. Patients were also asked if they followed the medication recommendations in the AAP.

Results and Discussion

IRB approval was obtained to disseminate findings using de-identified data. During the project period, 14 patients with asthma received an AAP. Nine of these patients were classified as “well controlled”, and five were either “very poorly controlled” (3) or “not well controlled” (2). Data analysis reflects only these five patients.

Overall, four of the five patients (80%) improved their asthma control by one category (Figure 1). Two patients who were initially “not well controlled” improved to “well controlled” asthma. Two patients initially classified as “very poorly controlled” improved to “not well controlled”. Only one patient did not improve and remained “very poorly controlled,” because she did not follow the AAP and continued to smoke.

The results of this project are congruent with two prior evidence-based projects on AAPs. Both Toro-Linnehan (2013) and Bundy and Murphy (2013) found AAPs to be effective in improving patients’ overall self-management.

Cost-benefit analysis question

A relevant cost-benefit question for the clinic would include: “What is the additional cost for the medical clinic to teach patients to use AAPs measured in dollars (e.g. provider training materials, additional time to pay providers to attend the training sessions, potential EMR additions, increase in annual asthma-related visit costs), compared to the benefits to the regional healthcare system as measured by a mean reduction in ER visits?” No additional costs would be anticipated to train providers to use AAPs, since it is likely to be covered under the current budget. To further save money, a provider training presentation was developed by the study coordinator using the AAP currently incorporated in the EMR. Additionally, the increased numbers of clinic visits would likely be reimbursed by insurance companies to generate new revenue. Thus, no additional expenses are likely to be incurred by similar primary care clinics.

A RCT examined the effectiveness of teaching AAPs to patients with asthma on reducing ER utilization rates. At 6 months, the ER visits were decreased by 4%. At 12 months, there was a 13% reduction in asthma-related ER visits (Walders et al. 2006).

Consequently, a 13% reduction in ER visits would be an expected benefit at the system level.

Limitations

The small number of patients with asthma seen during the project period is a limitation. Similarly, since AAP use was self-reported, it is unknown how closely the patients actually followed the AAP or if they simply followed the medication recommendations from the visit summary. However, the AAP probably assisted patients to fine-tune their medications based on their symptoms. Another limitation could be the patients' memory of their symptoms during the initial assessment as many patients with asthma underestimate the severity of their symptoms (NHLBI, 2007). If this is the case, then the actual effect of the intervention on asthma control may be underreported.

Practice Implications

A few lessons were learned from this evidence-based practice project. Despite the 2007 NHLBI EPR3 recognition of an AAP as a standard of care, setting providers did not directly implement the AAP due, in part to the perceived time involved. However, AAP use only added an estimated 2 to 3 minutes to the visit. Second, more frequent follow-up and re-teaching of the AAP may be necessary for noncompliant patients. Despite these caveats, providers should be educated and encouraged to provide all patients with AAPs.

Conclusion

Lack of self-management of asthma can result in ineffective control. Use of AAPs in this project improved symptom control and should be fostered among providers. For nonadherent patients with very poorly controlled asthma, more frequent follow-up and other behavioral approaches could be employed to improve asthma control.

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Figure 1: Changes in Asthma Control Category Using AAPs

Poster abstracts and Letters of Acceptance

WIN Abstract

Improving asthma symptoms using asthma action plans

Author: Ryan Thebo, RN, BSN, PMH-BC, CNRN

Co-authors: Michael Terry, DNP, PMHNP, FNP, Mary Jo Clark, PhD, RN, PHN

Author affiliations: Hahn School of Nursing and Health Science, University of San Diego, San Diego, California

Statement of the problem: The prevalence of asthma in the U.S. is estimated to be approximately 19 million adults with an estimated 11.8 million missed days of work annually due to asthma-related symptoms. In California, the prevalence of asthma is approximately 7.9%, with one in five adults in this group experiencing poorly controlled asthma. The 2007 NHLBI Expert Panel Report 3 (EPR3) Guidelines recommend providing an asthma action (AAP) to all patients with asthma to promote self-management of asthma; however, only 40% of patients in California have ever received one. Within the southern region of the County of San Diego, nearly one in seven residents have been diagnosed with asthma, which is disproportionately higher than other parts of the county, as well as the state and national prevalence of asthma.

Background and evidence of the problem: In a review of electronic medical records (EMRs) and current practices at a primary care clinic in southern San Diego County, AAPs were not being completed and given to patients with asthma. As a result, patients were not correctly self-managing their asthma symptoms consistent with recommendations from the 2007 NHLBI Guidelines.

PICO question: Does teaching patients with asthma how to use an asthma action plan (AAP) increase their asthma control as measured by before and after categories of asthma control from the EPR3 guidelines?

Evidence-based practice intervention and benchmark: The aim of this project was to increase asthma control by at least one category in 60% of patients with very poorly controlled or not well controlled asthma by teaching patients how to use an AAP to self-manage their asthma symptoms. The EPR 3 Guidelines were chosen due to level B evidence that an AAP be provided to all patients with asthma as a standard of care. Based on 36 RCTs, there is strong evidence to support that an AAP significantly improves self-management of asthma symptoms and patient outcomes compared to the usual standard of care. The project coordinator reviewed key teaching aspects of an AAP consistent with the 2007 EPR 3 guidelines and developed AAPs for all patients seen for asthma in the clinic. Data on asthma symptoms were collected from EMRs before and after the educational intervention and development of the AAP.

Outcomes: The use of AAPs by patients resulted in a significant improvement in asthma symptoms, since 80% of the five patients seen with poorly controlled asthma improved by one asthma control category. Additionally, 40% of these patients achieved very well controlled asthma control. One of the patients with “very poorly controlled” asthma maintained the same control category due to being noncompliant with the plan of care.

Conclusions: The use of AAPs for patient education should be adopted by all providers in the setting as a long-term approach to improving patients’ self-management of asthma. Successful long term adoption of AAPs by providers should include documentation of the AAP in the EMR to ensure continuity of care. Patients who do not improve due to

noncompliance with the AAP should receive further education on asthma management and the AAP and more frequent follow-up.

Improving asthma symptoms using asthma action plans

By: Ryan Thebo, RN, BSN, Michael Terry, DNP, PMHNP, FNP, & Mary Jo Clark, PhD, RN, PHN

Affiliation: Hahn School of Nursing and Health Science, University of San Diego, San Diego, California

Clinical issue/current practice: In California, the prevalence of asthma is approximately 7.9%. The 2007 NHLBI Expert Panel Report 3 (EPR3) Guidelines recommend providing an asthma action (AAP) to all patients with asthma to promote self-management, however; only 40% of asthma patients in California have ever received one. In southern San Diego County, nearly one in seven residents have an asthma diagnosis, which is disproportionately higher than the state of California. In a review of electronic medical records (EMRs) and current practices at a primary care clinic in the region, AAPs were not being completed and given to the patients with asthma. As a result, patients were not self-managing their asthma symptoms consistent with recommendations from the 2007 NHLBI 2007 Guidelines.

Available evidence: The EPR 3 Guidelines were chosen due to level B evidence that an AAP be provided to all patients with asthma as a standard of care. Based on 36 RCTs, there is strong evidence to support that an AAP significantly improves self-management of asthma symptoms and patient outcomes compared to the usual standard of care.

EBP question: Does teaching patients to use AAPs improve patients' asthma symptoms compared to current practice?

Intervention: The aim of this project was to increase asthma control by at least one category in 60% of patients with very poorly controlled or not well controlled asthma. The project coordinator reviewed key teaching aspects of an AAP consistent with the 2007 EPR 3 guidelines and developed AAPs for all patients seen for asthma in the clinic. Data on asthma symptoms were collected from EMRs before and after the educational intervention and development of the AAP.

Outcomes measured: 80% of the five patients seen with poorly controlled asthma improved by one asthma control category. 1 in 5 patients did not improve due to noncompliance with the plan of care.

Conclusion/results: The use of AAPs for patient education should be adopted by all providers in the setting as a long-term approach to improving patients' asthma symptoms.

Improving asthma symptoms using asthma action plans

Author: Ryan Thebo, RN, BSN, PMH-BC, CNRN

Co-authors: Michael Terry, DNP, PMHNP, FNP, Mary Jo Clark, PhD, RN, PHN

Author affiliations: Hahn School of Nursing and Health Science, University of San Diego, San Diego, California

Statement of the problem: The prevalence of asthma in the U.S. is estimated to be approximately 19 million adults with an estimated 11.8 million missed days of work annually due to asthma-related symptoms. In California, the prevalence of asthma is approximately 7.9%, with one in five adults in this group experiencing poorly controlled asthma. The 2007 NHLBI Expert Panel Report 3 (EPR3) Guidelines recommend providing an asthma action (AAP) to all patients with asthma to promote self-management of asthma; however, only 40% of patients in California have ever received one. Within the southern region of the County of San Diego, nearly one in seven residents have been diagnosed with asthma, which is disproportionately higher than other parts of the county, as well as the state and national prevalence of asthma.

Background and evidence of the problem: In a review of electronic medical records (EMRs) and current practices at a primary care clinic in southern San Diego County, AAPs were not being completed and given to patients with asthma. As a result, patients were not correctly self-managing their asthma symptoms consistent with recommendations from the 2007 NHLBI Guidelines.

PICO question: Does teaching patients with asthma how to use an asthma action plan (AAP) increase their asthma control as measured by before and after categories of asthma control from the EPR3 guidelines?

Evidence-based practice intervention and benchmark: The aim of this project was to increase asthma control by at least one category in 60% of patients with very poorly controlled or not well controlled asthma by teaching patients how to use an AAP to self-manage their asthma symptoms. The EPR 3 Guidelines were chosen due to level B evidence that an AAP be provided to all patients with asthma as a standard of care. Based on 36 RCTs, there is strong evidence to support that an AAP significantly improves self-management of asthma symptoms and patient outcomes compared to the usual standard of care. The project coordinator reviewed key teaching aspects of an AAP consistent with the 2007 EPR 3 guidelines and developed AAPs for all patients seen for asthma in the clinic. Data on asthma symptoms were collected from EMRs before and after the educational intervention and development of the AAP.

Outcomes: The use of AAPs by patients resulted in a significant improvement in asthma symptoms, since 80% of the five patients seen with poorly controlled asthma improved by one asthma control category. Additionally, 40% of these patients achieved very well controlled asthma control. One of the patients with “very poorly controlled” asthma maintained the same control category due to being noncompliant with the plan of care.

Conclusions: The use of AAPs for patient education should be adopted by all providers in the setting as a long-term approach to improving patients’ self-management of asthma. Successful long term adoption of AAPs by providers should include documentation of the AAP in the EMR to ensure continuity of care. Patients who do not improve due to

noncompliance with the AAP should receive further education on asthma management and the AAP and more frequent follow-up.

STTI Letter of Acceptance

Improving asthma symptoms using asthma action plans

Ryan Thebo, BSN, PMH-BC, CNRN, DNP Student
Project Chair: Michael Terry, DNP, RN, PMHNP, FNP

CLINICAL ISSUE

- The U.S. prevalence of asthma is approximately 19 million with 11.8 million missed days of work annually due to asthma-related symptoms (Albarran et al., 2012)
- Prevalence of asthma in California is approximately 7.9%, with one in five adults experiencing poorly controlled asthma (Tallit et al., 2013)
- 2007 NHLBI Expert Panel Report 3 (EPR3) Guidelines recommend that patients with asthma be given every patient with asthma to encourage self-management
- Only 40% of patients in California have ever received an AAP (NHLBI, 2007)
- About one in seven residents in the southern region of the County of San Diego have been diagnosed with asthma (County of San Diego & DHHS, 2013)
- At a medical clinic in this region, AAPs were not being completed and given to patients with asthma

EBP QUESTION

- Does teaching patients with asthma how to use an asthma action plan (AAP) increase their asthma control as measured by before and after categories of asthma control from the EPR3 guidelines?

AVAILABLE EVIDENCE

- 2007 NHLBI guidelines recommend providing an AAP to all patients with asthma that takes into account: daily management, recognition of symptoms, self-adjustment of medications based on symptoms, and self-management of asthma (evidence level B) (NHLBI, 2007)
- AAP is particularly recommended for patients with moderate or severe persistent asthma (evidence B) (NHLBI, 2007)
- Using a written AAP appears to be more effective than other forms of asthma self-management (NHLBI, 2007)
- AAP significantly improves adherence to ICS medications, quality of care (evidence B) (NHLBI, 2007)
- AAP provides patients with the skills needed to control asthma and enhance outcomes (evidence A) (NHLBI, 2007)
- Patient self-management of asthma is equally effective when based on symptoms or peak expiratory flow (evidence level A) (NHLBI, 2007)

INTERVENTION

- Initial data collection:**
 - Patients with asthma were seen by the study coordinator
 - Patients with asthma were asked questions from the EPR3 guidelines on asthma control
 - An asthma control category was then assigned to patients as either well controlled, not well controlled, or very poorly controlled
 - Next, patients with asthma received an AAP from the coordinator reviewed EMRs and contacted patients by telephone for evidence of improvement in asthma control
 - Patients also received a handout from the EPR3 guidelines on inhaler technique and environmental triggers to improve self-management
 - Patients were encouraged to bring the AAP to their next visit to be reviewed
- Second data collection:**
 - Study coordinator received a phone call 6-7 weeks later assessing their change in EPR3 asthma control category

OUTCOMES MEASURED

- Evaluation question:** Did the asthma control category in patients with very poorly controlled or not well controlled asthma increase by at least 1 category in at least 60% of these patients?
- Patients with asthma were seen by study coordinator and an asthma control category was determined
- Following patient education on the AAP, the study coordinator reviewed EMRs and contacted patients by telephone for evidence of improvement in asthma control category

RESULTS

- Initial data collection:**
 - 14 pre-scheduled patients with asthma were seen by the study coordinator and received an AAP
 - 9 of these patients were well controlled
 - The other 5 of these patients were either very poorly controlled (3) or not well controlled (2)
- Second data collection:**
 - 80% of patients with "not well controlled" or "very poorly controlled" asthma improved by one category
 - 40% of these patients achieved good asthma control
 - 1 of the 5 patients with "very poorly controlled" asthma maintained the same control category due to being noncompliant with the plan of care.

CONCLUSION/IMPLICATIONS

- The use of AAPs by patients resulted in a significant improvement in asthma symptoms
- The use of AAPs for patient education should be adopted by all providers in the setting as a long-term approach to improving patients' self-management of asthma
- Providers should adopt an AAP as a long-term standard of care for all patients with asthma
- Providers play an important role in educating patients on self-management of their asthma
- Successful long-term adoption of AAPs by providers should include documentation of the AAP in the EMR to ensure continuity of care
- Patients who do not improve should receive further education on asthma management and the AAP and more frequent follow-up
- Additional strategies may need to be used for patients who are noncompliant with the AAP

REFERENCES

- See handout provided

GRAPH/TABLE

Before and after improvement in asthma control

Patients on baseline visit with poorly controlled asthma

Improving asthma symptoms using asthma action plans

Ryan Thebo, BSN, PMH-BC, CNRN, DNP Student

Project Chair: Michael Terry, DNP, RN, MMHNP, FNP

Seminar Faculty: Mary Jo Clark, PhD, RN, PHN

Purpose of project

- To increase the patients asthma control by teaching patients how to use an asthma action plan (AAP)

Practice innovation

- **Initial data collection:**
- Patients with asthma were seen by the study coordinator and asked questions from the EPR3 guidelines on asthma control
- An asthma control category was then assigned to patients as either well controlled, not well controlled, or very poorly controlled from the EPR3 guidelines
- Next, patients with asthma received an AAP from the EMR and were educated on self-management aspects recommended in the EPR3 guidelines
- Patients also received handouts from the EPR3 guidelines on inhaler technique and environmental triggers to improve self-management
- Patients were encouraged to bring the AAP to their next visit to be reviewed
- **Second data collection:**
- Patients with very poorly controlled and not well controlled asthma received a phone call 6-7 weeks later assessing their change in EPR3 asthma control category

Evaluation question

- Did the asthma control category in patients with very poorly controlled or not well controlled asthma increase by at least 1 category in at least 60% of these patients?

Results

- **Initial data collection:**
- 14 pre-scheduled patients with asthma were seen by the study coordinator and received an AAP
- 9 of these patients were well controlled
- The other 5 of these patients were either very poorly controlled (3) or not well controlled (2)
- **Second data collection:**
- 80% of these 5 patients with “not well controlled” or “very poorly controlled” asthma improved by one category
- 40% of these patients achieved good asthma control
- 1 of the 5 patients with “very poorly controlled” asthma maintained the same control category due to being noncompliant with the plan of care.

Before and after improvement in asthma control

Cost-benefit analysis

- “What is the additional cost for the medical clinic to teach patients to use AAPs measured in dollars (e.g. provider training materials, additional time to pay providers to attend the training sessions, potential EMR additions, increase in annual asthma-related visit costs), compared to the benefits to the regional healthcare system as measured by a mean reduction in ER visits?”

Cost-benefit analysis (continued)

- To save money a provider training presentation was developed by the study coordinator using the AAP currently in the EMR
- Increased numbers of clinic visits would likely be reimbursed by insurance companies to generate new revenue
- RCT examined the effectiveness of teaching AAPs to patients with asthma on reducing ER utilization rates and found 13% reduction in asthma-related ER visits at 12 months

Conclusions/implications for clinical practice

- The use of AAPs by patients resulted in a significant improvement in asthma symptoms
- The results are consistent with the 2007 NHLBI guidelines which included that an AAP significantly improves adherence to ICS medications, quality of life, and asthma control when compared to standard care (evidence B) (NHLBI, 2007)
- An AAP provides patients with the skills needed to control asthma and enhance outcomes (evidence A) (NHLBI, 2007)
- AAP most likely helps to hone in on their symptoms and fine-tune their medications based on their asthma symptoms (NHLBI, 2007)
- Providers play an important role in educating patients on self-management of their asthma

Conclusions/implications for clinical practice (continued)

- Successful long term adoption of AAPs by providers should include documentation of the AAP in the EMR to ensure continuity of care
- Documentation of the AAP was done through an education template which added little time to the visit
- Having the AAP integrated into the EMR also saved time
- Patients who do not improve should receive further education on asthma management and the AAP and more frequent follow-up
- Additional strategies may need to be used for patients who are noncompliant with the AAP
- The use of AAPs for patient education should be adopted by all providers in the setting as a long-term approach to improving patients' self-management of asthma

Conclusions/implications for clinical practice (continued)

- Many patients living with chronic asthma appear to underestimate the severity of their symptoms (NHLBI, 2007)
- If this is the case, then the actual effect of the intervention on asthma control may be underreported.
- Patients who do not improve should receive further education on asthma management and the AAP and more frequent follow-up
- Additional strategies may need to be used for patients who are noncompliant with the AAP
- The use of AAPs for patient education should be adopted by all providers in the setting as a long-term approach to improving patients' self-management of asthma

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