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The Active Patient Role and Asthma Outcomes in an Underserved Rural Community

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Abstract

Purpose—Patient activation, an individual's knowledge, skills, and confidence for managing their own health and health care, can play an important role in the management of chronic conditions. However, few studies have examined patient activation in underserved rural communities. The purpose of this study was to describe patient activation and examine how patient activation is associated with adherence to asthma maintenance medication and disease control in a low-income rural population with asthma.

Methods—We conducted a cross-sectional telephone survey with 98 adults. Patient activation was assessed with the Patient Activation Measure. Adherence to long-term controller (LTC) medications and asthma control were examined using the Morisky Medication Adherence Scale (MMAS) and Asthma Control Test (ACT). Multivariate regression analyses were used to assess the associations between patient activation and 1) adherence to LTC medications and 2) asthma control.

Findings—The majority of participants (50%) were classified in the highest level of patient activation. The least activated participants had lower mean MMAS and ACT scores in comparison to participants who were classified in higher patient activation levels. Multivariate analyses found significant positive associations between patient activation and adherence and asthma control.

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Conclusions—Patient activation may be instrumental in low-income rural patients' use of asthma medication and disease control. Study results inform interventions to help patients use asthma medications appropriately and achieve better asthma control. In addition to increasing access to health care services in rural communities, health care professionals also may develop and implement strategies to positively impact rural patients' involvement in care.

Keywords

asthma; patient activation; rural; self-management; underserved

Asthma is a costly chronic condition that is associated with morbidity, mortality and diminished quality of life.¹⁻⁴ Significant disparities exist in asthma prevalence and control. Individuals with family incomes below the federal poverty level have higher prevalence of asthma than those at or above the poverty level.⁴ Although the prevalence of asthma is similar in metropolitan (7.8%) and nonmetropolitan areas (7.9% to 8.6%), limited data suggest that rural patients receive inferior asthma care.⁵⁻⁷ More specifically, researchers have found that rural patients have more emergency department visits and hospitalizations per 100,000 persons per year than urban patients, which may indicate difficulties with primary care.^{8,9} National guidelines stress the importance of disease control as a key therapeutic goal.¹⁰ However, many patients (20% to 85%) are not well-controlled or very poorly controlled.^{11,12}

Poor adherence to long-term controller (LTC) medications (eg, inhaled corticosteroids, long-acting beta agonists, and leukotriene receptor antagonists) is a contributing factor to diminished asthma control.^{13,14} Up to 80% of patients with asthma have problems adhering to prescribed treatment regimens.¹⁵ Researchers have found that knowledge about asthma, positive attitudes about asthma care, and greater self-efficacy regarding self-management are associated with improved medication use, quality of life and health care utilization, which may be indicative of better asthma control.¹⁶⁻²¹

The 2005 IOM Report, *Quality Through Collaboration: The Future of Rural Health Care*, stresses the importance of rural residents' self-management of chronic conditions (eg, adherence to medication regimens).²² Given the role of medications in controlling asthma, patient activation may be a potential target for improving asthma management among underserved populations. Hibbard and associates conceptualize patient activation as individuals' knowledge, skills, and confidence for managing their own health and health care.¹⁷ They describe 4 levels of patient activation reflecting 1) peoples' beliefs about the importance of the patient role, 2) confidence and knowledge necessary to take action, 3) enacting health behaviors (eg, maintaining lifestyle changes, preventing problems, handling symptoms on one's own), and 4) behavior maintenance even when under stress.¹⁷ Recent literature highlights the importance of patient activation in an effort to improve the quality and safety of care.^{23,24}

Patients with low activation are typically passive recipients of care and do not believe in an active patient role, while those with high activation are proactive participants in the care process and actively engage in healthy behaviors.²⁴ Previous studies have found positive associations between patient activation, self-management behaviors and outcomes. Mosen

and associates found that respondents with higher patient activation were more likely to perform self-management behaviors and report greater adherence to medication regimens as well as higher quality of life.²¹ Hibbard and associates found positive relationships between increases in patient activation and positive changes in medication management behaviors such as asking a physician or pharmacist about medication side effects and how to avoid them.²⁵

Scant research has examined patient activation in disadvantaged and/or rural populations. Lubetkin and associates assessed patient activation in those who received care from inner-city low-income health centers and found more patients were characterized as having low activation in comparison to the general population.²⁶ However, the consequences of poverty likely differ in rural and inner-city populations, as low-income rural individuals report worse perceived health than low-income urban individuals.²⁷ Thus, the objectives of this study conducted in a low-income rural population with asthma were 1) to describe patient activation and 2) to examine how patient activation is associated with adherence to asthma maintenance medication and asthma control.

METHODS

Population

We conducted a cross-sectional telephone survey in a low-income rural population. Patients with asthma who received their medications from the Family Health Center of Marshfield Inc. (FHC), a Federally Qualified Health Center, 340B mail-order pharmacy, were invited to participate. During this study, the FHC service area included an 11-county region in north central Wisconsin and comprised 254 municipalities, 78% of which were populated by less than 1000 people. The FHC is based in Wood County, which has been designated as a non-metro county by the Office of Rural Health Policy (Health Resources and Services Administration).²⁸ The FHC targets all individuals living at or below 200% of the federal poverty level who experience barriers to health and dental care. The majority of the service area population (86%) resides in communities that have been designated by the federal government as medically underserved areas and/or a medical, dental, or mental health professional shortage area. This study was approved by the Marshfield Clinic Research Foundation Institutional Review Board and the Health Sciences Institutional Review Board at the University of Wisconsin-Madison.

Enrollment criteria included age ≥ 19 years, English-speaking, receipt of ≥ 1 asthma medication(s) dispensed in the 6-month period ending June 31, 2009, and a diagnosis of asthma. Potential participants were identified by reviewing electronic health records. A total of 576 individuals met the enrollment criteria; 25% were randomly selected to be targeted for the recruitment effort with the intention of enrolling 100 participants. Research assistants mailed letters to prospective participants to introduce the study. Approximately 5 days after the mailing, research assistants contacted prospective participants to determine their willingness to participate in the study. If an individual was interested, the research assistant obtained oral consent and conducted the telephone survey. Prospective participants were contacted until approximately 100 individuals agreed to participate. The telephone surveys were conducted from January to March 2010.

Variables

The Patient Activation Measure (PAM) short form was used to measure patient activation.²⁹ The PAM contains 13 items, rated on a Guttman-like scale. PAM scores can range from 0 to 100, with higher scores indicating greater patient activation.^{29,30} PAM scores were categorized into 4 standard levels: Level 1 (scores 0–47.0) indicates that an individual may not believe that the patient role is important; Level 2 (scores 47.1–55.1) indicates that an individual may lack confidence and knowledge to take action; Level 3 (scores 55.2–67.0) indicates that an individual is beginning to take action; and Level 4 (scores 67.1–100) indicates an individual may have difficulty maintaining behaviors over time.²⁴ Respondents with PAM scores of 0 or 100 were removed from the dataset due to validity concerns.^{17,29}

Adherence to LTC medications was assessed with the Morisky Medication Adherence Scale© (MMAS).^{31,32} The MMAS is a reliable and valid measure that contains 8 items, with a range of 0 to 8.³¹ A score of 0 is reflective of the lowest adherence and 8 indicates highest adherence. MMAS scores also were dichotomized, as recommended, to represent low adherers (MMAS < 6) and medium/high adherers (MMAS ≥ 6).³¹ The Asthma Control Test (ACT) was used to measure participants' control of asthma.³³ The ACT measures the level of impairment due to asthma over the past 30 days and consists of 5 items measured on a 5-point scale. ACT scores can range from 5 (not controlled) to 25 (completely controlled). An ACT score ≥ 19 is indicative of well-controlled asthma.³⁴ Previous research has found the ACT to have good scale reliability and validity, and low patient burden and risk.³⁵ Survey items also assessed demographic characteristics (age, gender, race, and education), current use of asthma controller medications, and smoking status.

Analysis

Descriptive statistics were used to characterize participants, patient activation, medication adherence, and asthma control. Bivariate analyses and multivariate regression analyses were used to assess the associations between patient activation and 1) adherence to LTC medications and 2) asthma control. Separate analyses were conducted using the patient activation score as a categorical and continuous variable. Multivariate models were adjusted for age, race, gender, education, number of controller medications, and smoking status. We estimated model standard errors and 95% confidence intervals (CIs) using a bias-corrected bootstrapping approach due to the small sample size and potential impact of violating distributional assumptions across the outcomes (adherence and asthma control).^{36,37} Analyses were conducted with STATA version 11.0 (StataCorp LP, College Station, Texas).³⁸

RESULTS

A total of 98 adults participated in the telephone survey (78% response rate). Five participants were removed from the data due to PAM scores of 100; no participant had a PAM score of 0. The average age of respondents was 43.8 years old (Standard Deviation [SD]=15.5) and the majority were female (75%) and white (92%). Table 1 presents information about the characteristics of the participants. The mean PAM score was 65.6 (SD=12.3). The majority of participants (47%) were classified in level 4 of activation (most

activated). Approximately 76% of respondents (n=71) were currently using LTC medications, 63% of those were classified as low adherers. The mean ACT score was 17.4 (SD=4.3) and approximately 30% of respondents had well-controlled asthma (ACT score 19).

Table 2 presents adherence and asthma control scores by categorical patient activation levels. Participants who were in the patient activation level 1 (least activated) had the lowest mean MMAS (4.0, SD=1.7) and ACT (14.3, SD=3.6) scores in comparison to participants who were classified in higher patient activation levels. No participants in patient activation level 1 were medium/high adherers or well-controlled asthmatics. Participants in patient activation level 4 (most activated) had lower adherence mean scores in comparison to participants in patient activation level 2, and lower asthma control mean scores in comparison to participants in patient activation levels 2 and 3.

Multivariate regression analyses using the categorical levels of activation as independent variables found significant positive associations between patient activation and adherence and asthma control (see Table 3). Results indicated that participants in patient activation level 2 had greater adherence to LTC medications than participants at level 1 or the lowest activation level ($\beta = 2.25$, 95% CI: 0.52 to 4.39). Findings also showed that participants in both patient activation level 2 ($\beta = 4.65$, 95% CI: 0.38 to 9.45) and level 3 ($\beta = 4.40$, 95% CI: 1.30 to 8.13) had better asthma control than participants in the lowest patient activation level. However, analyses using the continuous patient activation score as an independent variable found no significant associations between patient activation and adherence and asthma control.

DISCUSSION

Patient activation in this sample of low-income rural patients with asthma was similar to previous studies, with the majority of respondents indicating high levels of patient activation. In addition, patient activation was positively associated with medication adherence and asthma control. However, results also suggest that individuals at the higher patient activation levels may have self-management issues that warrant intervention.

In this study, the majority of respondents were in the highest activation group and the smallest proportion of respondents was in the lowest activation group. Findings from a national survey and a study conducted in urban health center settings also found the highest proportion of respondents in the top level of activation as well as the lowest proportions of respondents in the lowest level of activation.^{23,26} However, the proportion of respondents classified in the lowest activation level in our study of low-income rural patients with asthma (8%) was approximately half of the proportion of those classified in the lowest activation level in the study conducted in urban health center settings (14%).²⁶ This difference across populations may be reflective of racial/ethnic differences in patient activation as previous research has documented lower activation among minority populations in comparison to whites.³⁹

Findings also provide evidence to support the positive associations between patient activation, self-management behaviors, and health status, consistent with prior studies. Mosen and associates found that patients with high patient activation were more likely to perform self-management behaviors such as medication adherence and report high quality-of-life and functional status scores.²¹ In the current study, participants who reported greater patient activation (levels 2, 3, and 4) also reported greater adherence to LTC medications and better asthma control in comparison to those who were least activated (level 1). Study results also showed similarities across participants in patient activation levels 2, 3, and 4 in adherence and asthma control. Thus, for low-income rural residents, making the leap to an “active role” by moving beyond patient activation level 1 and embracing a self-concept or identity of activation may be influential on their health.⁴⁰

Contrary to previous research, study results failed to support a positive relationship between the continuous measure of patient activation and outcomes of interest (adherence and asthma control). The most activated participants (level 4) in this study did not report the greatest adherence and the best asthma control (Tables 2 and 3). One plausible explanation for these findings is that individuals in patient activation level 4 may have a sense of overconfidence which could detrimentally impact asthma decision-making, self-management and outcomes.⁴¹ Another explanation for these findings stems from previous research which suggests that underlying patient characteristics differ across levels of patient activation, which impacts health care behaviors and outcomes.¹⁷ For example, individuals who have reached patient activation level 4 have made most of the necessary self-management behavior changes, but may have difficulty maintaining behaviors over time or during times of stress.⁴² In addition to the challenges of maintaining appropriate asthma self-management strategies over time, participants in this study also may face situations such as seasonal variations, drought, allergen exposure, or hazardous work environments that can hinder their self-management of asthma.^{17,23} Health care professionals in rural communities such as pharmacists can support patients’ involvement in their health care in such stressful situations by assessing patient-specific barriers and adapting care and management strategies to help patients address individual needs.^{43–45}

Future research should further examine the concept of patient activation and its influence on health care in rural communities. For example, researchers may focus on low-income rural asthma patients who are in the lowest patient activation level to discern underlying factors that may contribute to poor adherence to medication and asthma control. In addition, future asthma care interventions targeted toward low-income rural asthmatics may incorporate patient activation building strategies in an effort to improve self-management behaviors. For example, Deen and associates designed a patient activation intervention to improve patients’ skills to ask questions of their doctors and promote an active role in decision-making.⁴⁶ Hibbard and associates developed an intervention that tailored self-management coaching to patients’ activation level and found increases in adherence to regimens and reductions in health care utilization.⁴² Implementing such strategies in rural health care settings may support patient-centered care and improve outcomes, especially as patients assume a more active role in their care (ie, moving beyond level 1). Alternatively, the overarching idea of patient activation consists of underlying concepts such as attitudes about roles in health care, confidence and resiliency.¹⁷ Implementing interventions that focus on coping skills,

performance accomplishments, vicarious experiences, verbal persuasion, and self-appraisal in an effort to positively affect such underlying concepts could be vital to strengthening patient activation.^{47,48}

This study has limitations that warrant mentioning. First, study data are based upon information from patients who use the FHC 340B mail-order pharmacy. Patients who fail to fill their medication and those who do not use a mail-order pharmacy may exhibit different characteristics compared to patients who use mail-order. Next, the sample size may have limited our ability to detect some associations; however, we did find several expected significant associations. Future research using larger samples should be conducted to confirm study results. Third, the method used to assess medication adherence was based upon self-report. Although the MMAS has been well validated, data from other sources such as pharmacy claims may provide more insight into actual occurrences. In addition, the survey did not assess alternative factors such as depression, anxiety and extreme poverty which may have influenced the relationships between patient activation, medication adherence, and asthma control.^{49,50} Finally, this study lacked ethnic and racial diversity in the sample of participants. Ethnic and racial disparities in asthma care have been well-documented. Future studies examining patient activation in rural patients with asthma should strive to include ethnically and racially diverse participants as previous research suggests that increasing activation may potentially narrow gaps in health disparities.^{39,51}

Findings from this study suggest that greater patient activation may be instrumental in bolstering low-income rural patients' use of asthma medication and disease control. Furthermore, this study supports recommendations from the 2005 IOM Report, *Quality Through Collaboration: The Future of Rural Health Care*, regarding the important role rural residents have in the ongoing management of chronic conditions.²² In addition to increasing access to health care services in rural communities, health care professionals also may develop and implement strategies to increase patient activation in an effort to engage rural patients in beneficial health-related activities and improve health.

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Table 1

Participant Characteristics (N=93)

Variables	Mean (SD) or N (%)
Age	43.8 (15.5)
Gender	
Male	23 (24.7%)
Female	70 (75.3%)
Race	
White	86 (92.5%)
Other	7 (7.5%)
Education	
Less than high school degree	16 (17.2%)
High school degree only	37 (39.8%)
Some college	40 (43.0%)
Number of asthma controller medications	0.99 (0.90)
Current Smoker	
Yes	28 (30.1%)
Patient Activation (PAM)	65.6 (12.3)
Patient Activation Levels	
Level 1 (least activated)	7 (7.5%)
Level 2	11 (11.8%)
Level 3	31 (33.3%)
Level 4 (most activated)	44 (47.3%)
Adherence to LTC medication (MMAS) ^a	5.4 (1.9)
Low adherence to LTC medication ^a	45 (63.4%)
Asthma Control Test (ACT)	17.4 (4.3)
Well-controlled asthma	28 (30.1%)

^a71 participants (76%) were currently using long-term controller (LTC) asthma medication.

Table 2

Patient Activation Levels, Adherence, and Asthma Control

Patient Activation	Adherence (N=71)			Asthma Control (N=93)		
	n	Mean MMAS scores	Medium/High (% yes)	n	Mean ACT scores	Well-controlled (% yes)
Level 1 (least activated)	6	4.0 (SD=1.7)	0%	7	14.3 (SD=3.6)	0%
Level 2	7	6.3 (SD=1.7)	43%	11	18.4 (SD=4.7)	36%
Level 3	22	5.3 (SD=1.8)	32%	31	18.5 (SD=4.1)	45%
Level 4 (most activated)	36	5.5 (SD=2.0)	44%	44	16.9 (SD=4.3)	23%

Notes: MMAS - Morisky Medication Adherence Scale, ACT - Asthma Control Test

Table 3
Multivariate Regression Results Showing Associations Between Patient Activation Levels and Adherence and Asthma Control

Variables	Adherence			Asthma Control		
	Coefficient	SE	BC 95% C.I.	Coefficient	SE	BC 95% C.I.
Patient Activation						
Level 1 (reference group)	NA	NA	NA	NA	NA	NA
Level 2	2.25	0.92	(0.52 to 4.39)	4.65	2.33	(0.38 to 9.45)
Level 3	1.30	0.78	(−0.11 to 3.07)	4.40	1.72	(1.30 to 8.13)
Level 4	1.40	0.80	(−0.15 to 3.11)	2.86	1.76	(−0.10 to 7.06)

Notes: SE – Standard Error, BC 95% C.I. – Bias Corrected 95% Confidence Interval. Patient activation was defined as a categorical independent variable with Level 1 as the reference group in each multivariate regression model. Each model was adjusted for age, race, gender, education, number of asthma controller medications and smoking status. Bold text indicates statistical significance.