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Why Does Patient Activation Matter? An Examination of the Relationships Between Patient Activation and Health-Related Outcomes

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BACKGROUND: There is a growing awareness that patients should be more active and effective managers of their health and health care. Recent studies have found patient activation—or having the knowledge, skills, and confidence to manage one's health, to be related to health-related outcomes. These studies have often relied on self-reported outcomes and often have used small samples.

OBJECTIVE: To examine the degree to which patient activation is related to a broad range of patient health and utilization outcomes in a large, insured population.

DESIGN: Cross-sectional study of patients at Fairview Health Services in Minnesota. Data on patient activation and patient outcomes were derived from the electronic health record, abstracted in December 2010.

PATIENTS: A total of 25,047 adult patients were included in the analysis. They all had a primary care visit in the prior six months and completed the patient activation measure as part of an office visit.

MAIN MEASURES: The key independent measure was the Patient Activation Measure. We examined 13 patient outcomes across four areas: prevention, unhealthy behaviors, clinical indicators, and costly utilization.

RESULTS: In multivariate models, patient activation was related to 12 of 13 patient outcomes in the expected direction. For every additional 10 points in patient activation, the predicted probability of having an ED visit, being obese, or smoking was one percentage point lower. The likelihood of having a breast cancer screen or clinical indicators in the normal range (A1c, HDL, and triglycerides) was one percentage point higher.

CONCLUSIONS: This cross sectional study finds that patient activation is strongly related to a broad range of health-related outcomes, which suggests improving activation has great potential. Future work should examine the effectiveness of interventions to support patient activation.

KEY WORDS: patient activation; patient engagement; health care quality.

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INTRODUCTION

Strategies for improving the quality of care in the United States increasingly include a focus on the patient role in managing one's health¹⁻⁴. Because patients play such a large role in determining both the need for care and the outcomes of care, there is a growing awareness that patients should be more active and effective managers of their own health and health care⁵⁻⁷. The widely adopted Chronic Care Model calls for health care system redesign that enables proactive teams of clinicians to interact with “informed, activated patients”—or patients who have the motivation, knowledge, skills, and confidence to make effective decisions to manage their health¹. The significance of patient activation has been recognized in current health care reform efforts. For example, the Center for Medicare and Medicaid Innovation announced that supporting patient activation and engagement will be a factor in scoring applications for the new Pioneer Accountable Care Organizations (ACOs)².

While there is increasing agreement that patient activation and engagement are important for improving quality of care, programs to support patients in these areas are not yet well developed or widely implemented^{8,9}. Nor are such programs being emphasized in current primary care quality improvement efforts¹⁰. The lack of experience in supporting patient activation and engagement has been cited as a potential pitfall as health care organizations seek to improve quality and decrease health care costs as ACOs¹¹.

While programs to enhance patient activation and engagement have been slow to develop, over the last decade the empirical evidence on patient activation has grown substantially. In 2004, Hibbard and colleagues published an article on the development of a valid and reliable measure of patient activation, the Patient Activation Measure or PAM¹². The PAM assesses one's knowledge,

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skills, beliefs, and confidence for managing health and health care—a broader underlying construct than prior related measures such as locus of control, self-efficacy, and readiness to change. At the low end of the PAM scale, people are typically passive recipients of care and do not believe in the need for an active patient role. At the high end of the activation scale, people are proactive about their health and engage in many recommended health behaviors.

Since 2004, there have been a number of cross-sectional studies that have found patient activation (usually measured with the PAM) to be related to healthy behaviors (e.g. physical activity, frequency of eating fruits and vegetables), appropriate use of health care system (e.g. having a regular source of care, not delaying care), consumeristic behaviors (e.g. researching physician qualifications, preparing a list of questions for a doctor visit), chronic care self-management (e.g. eye examinations for people with diabetes, keeping diary of blood pressure readings), and control of chronic illness (e.g. HbA1c control, fewer hospitalizations)^{13,14,16–20}. Many of the studies are limited, however, by reliance upon self-reported health outcomes and use of relatively small samples.

There have also been longitudinal studies that demonstrate that patient activation is predictive of future health outcomes and that activation is a modifiable characteristic^{9,21}. Several recent interventions outside of the primary care setting have been shown to increase patient activation and improve patient outcomes^{22–25}. A review that examined earlier intervention studies training patients to be more proactive during the clinical encounter also found that such interventions improved health outcomes²⁶.

This study provides the most comprehensive empirical examination to date of the relationship between patient activation and health-related outcomes. It takes advantage of a large health system's routine collection of patient activation data during office visits and enables the examination of the relationship between activation and a variety of outcomes derived from the electronic health record (EHR). We hypothesized that higher PAM scores would be related to greater use of preventive care, healthy behaviors, clinical indicators in the normal range, and less costly utilization among patients in this insured population. Determining the importance of patient activation and engagement to health outcomes is a critically important step. Such evidence is a prerequisite to widespread adoption and implementation of strategies for supporting greater activation in patients.

Further, because patient activation is positively related to socio-economic status (SES)¹³, and there is a large literature documenting that SES is a strong predictor of health outcomes^{27,28}, it is important to assess whether patient activation is consistently associated with health outcomes for people of differing SES. Prior studies have found patient activation to be a valid measure in a number of population subgroups (e.g. Latinos, uninsured, older adults with

multiple chronic conditions)^{14–16}. This is the first examination of whether the relationships between patient activation and health-related outcomes differ across SES strata. Thus, the goals of this analysis are to assess the contribution of patient activation to health-related outcomes, as well as examine these relationships within SES groups.

METHODS

This is a cross-sectional study of patients at Fairview Health Services, a large non-for-profit health care system in Minnesota with 35 primary care clinics. In 2009, Fairview Health Services began collecting data on patient activation using the PAM in order to better understand their patients and bolster support of patient engagement. Initially, the PAM was collected in four primary care clinics. In mid-2010, the PAM started to become routinely collected as part of the rooming process in its 31 other primary care clinics.

The study protocol was approved by Human Subjects Committees at the University of Oregon and the University of Minnesota.

Sample

To be included in the analysis, a Fairview patient had to be 18 years of age, had to have had a primary care visit between July and December 2010, and had complete the PAM during an office visit. A total of 25,047 patients were included in the study sample.

The study sample differed slightly in terms of demographic and health characteristics from the 183,051 adult patients who had a visit in the same time frame but did not complete a PAM. Since the PAM was just beginning to be integrated into the rooming process during the study period, those who completed the PAM used more health care services, including prevention, primary care, and emergency visits. They also had more chronic conditions (1.0 versus 0.7), and were more likely to be women (61% versus 56%).

Measures

Independent Variables. Patient activation was measured using the PAM, which consists of 13-items that form an interval level, uni-dimensional, Guttman-like scale with strong psychometric properties^{26,27}. The PAM items are statements on confidence, beliefs, knowledge, and skills about managing one's health, which respondents can answer with degrees of agreement or disagreement (e.g. I know how to prevent problems with my health; I am confident that I can tell a doctor my concerns, even when he or she does not ask). The measure is scored on a theoretical 0–100 scale with most patients falling in the 35–95 point range.

Four levels of activation have been previously identified, reflecting a developmental progression from passive receipt of care toward greater activation.

Dependent Variables. We examined patient outcomes for four areas of health: prevention, unhealthy behaviors, clinical indicators, and costly utilization. We used three HEDIS preventive screening measures (colon cancer screen, cervical cancer screen, and breast cancer screen). The unhealthy behaviors included being a current smoker and having a body mass index ≥ 30 (obese). The clinical indicators we examined were systolic blood pressure, diastolic blood pressure, low-density lipoprotein (LDL), high-density lipoprotein (HDL), serum triglycerides, and hemoglobin A1c (A1c). Measurements were categorized as to whether or not they fell within the normal range based upon national guidelines^{29–31}. Only those who had a test in the prior 12 months were included in these analyses. For HbA1c we further subset the sample to only include those patients who were identified as having diabetes using the Ingenix's episode treatment groups. We used two measures of costly utilization: having an emergency department (ED) visit and being hospitalized in the prior 12 months.

Statistical Analyses

We first conducted descriptive analyses of the total sample, and the sample stratified by tercile of the patients' zip code per capita income, our measure of SES.¹² Then we examined the bivariate relationships between patient activation and the dependent measures. For ease of interpretation we present the patient activation by the four levels, which range from 1 (lowest) to 4 (highest). This analysis was conducted for the whole sample and separately by terciles of income.

Next we developed multivariate regression models for each dependent variable with patient activation as the key independent variable, controlling for potential confounding variables. In these analyses the PAM is modeled continuously, taking advantage of its interval scale property. The potential confounders included patient age, gender, income tercile, and the number of chronic conditions from the following list: asthma, diabetes, hypertension, congestive heart failure, coronary artery disease, hyperlipidemia, and chronic obstructive pulmonary disease. Because the hospital and ED use data were only for utilization within the Fairview system, the multivariate analyses were adjusted to account for utilization outside the system. We used data from one large insurer to calculate, for each clinic, the percent of patients' total hospital-related utilization that occurred outside the Fairview system. A multi-year analysis indicates that these percentages are stable over time.

To test whether the observed relationships between patient activation and the health-related outcomes were consistent for those of different SES, we tested for significance of interaction terms between patient activation and income tercile. We used linear probability models with robust standard errors because interaction terms in these models are easily interpretable, unlike for logit and probit models³². Full regression models are presented in online appendix 3. Only when there was a significant interaction term do we present the model with the interaction. Since most models did not include significant interactions, in order to facilitate interpretation we translated the regression findings into predicted probabilities at different levels of PAM scores, while holding covariates at their observed levels. All analyses were adjusted for the clustering of patients by clinicians, used a 2-tail significance tests, and were conducted using Stata 11.

RESULTS

Women made up more than half the sample (61%). The average age of patients was 50, and they had, on average, one chronic condition (Table 1). Patient activation levels for the sample were similar to that found in a recent nationally representative survey¹³. The study sample had slightly greater percent of respondents in the top level of activation compared to national data (46% versus 41%), though fewer in the second highest level (33% versus 37%). The percentages in the two lower levels of activation were very comparable (14% versus 15% for the second to lowest level, and both groups had 7% in the lowest level of activation). The smoking rate among patients (17%) was comparable to the state average³³, while the obesity rate was substantially higher (40% versus 25%)³⁴.

The per capita median income of patients' zip codes was strongly related to patient demographics and to the patient health and utilization outcomes (Table 1). Those living in higher income areas had activation scores approximately two points higher than those residing in low income areas. Consistent with national norms, those in high income areas were substantially less likely to smoke, to be obese, or to use the emergency department. They were also more likely to have clinical indicators in the normal range and to have had cancer screenings.

Table 2 shows patient activation was significantly related in the expected direction to 10 of the 13 patient health and utilization outcomes. Patients with the highest level of activation were 9 percentage points more likely to have systolic blood pressure within the normal range, compared with those in the lowest level of activation (53% versus 44%). The percentage point difference between high and

Table 1. Characteristics of the Sample, by Income Tercile

| | Sample Size | Total | Income Tercile [#] | | | P Value |
|--|-------------|-------------|-----------------------------|--------|------|---------|
| | | | Low | Medium | High | |
| Patient Characteristics | | | | | | |
| Age, mean (SD) | 25,047 | 49.7 (16.4) | 49.6 | 49.9 | 49.6 | 0.42 |
| Female (%) | 25,047 | 60.8 | 61.4 | 60.9 | 60.2 | 0.31 |
| Chronic Conditions, mean (SD) | 25,047 | 1.0 (1.1) | 1.0 | 1.1 | 1.0 | <0.001 |
| Patient Activation, mean (SD) | 25,047 | 66.4 (15.4) | 65.4 | 66.6 | 67.3 | <0.001 |
| Preventive Screening | | | | | | |
| Colon Cancer (%) | 11,952 | 66.1 | 62.4 | 65.4 | 70.5 | <0.001 |
| Cervical Cancer (%) | 10,064 | 80.5 | 79.7 | 79.8 | 82.0 | 0.03 |
| Breast Cancer (%) | 7,792 | 72.1 | 65.8 | 73.3 | 77.2 | <0.001 |
| Unhealthy Behaviors | | | | | | |
| Current Smoker (%) | 25,047 | 16.7 | 23.5 | 15.9 | 10.5 | <0.001 |
| Obese (%) | 25,047 | 40.3 | 45.1 | 40.9 | 34.7 | <0.001 |
| Clinical Indicators (% in normal range) | | | | | | |
| Systolic (%) | 23,812 | 48.7 | 44.6 | 48.0 | 54.0 | <0.001 |
| Diastolic (%) | 23,812 | 75.5 | 75.5 | 75.3 | 75.8 | 0.79 |
| LDL (%) | 12,552 | 73.9 | 72.4 | 75.2 | 74.0 | 0.01 |
| HDL (%) | 12,717 | 57.5 | 54.3 | 57.9 | 60.0 | <0.001 |
| Triglycerides (%) | 12,447 | 65.2 | 61.4 | 66.1 | 67.7 | <0.001 |
| A1c (%) | 3,070 | 60.3 | 56.6 | 62.1 | 63.0 | 0.005 |
| Costly Utilization | | | | | | |
| ED visit (% with 1+ visit) | 25,047 | 17.9 | 23.6 | 17.9 | 12.0 | <0.001 |
| Hospitalization (% with 1+) | 25,047 | 9.0 | 10.2 | 9.3 | 7.6 | <0.001 |

[#]The low, medium, and high income terciles were respectively: \$10,618–\$22,653, \$22,654–\$28,606, and \$28,607–\$69,391

low level activated patients was of a comparable magnitude for emergency department visits and triglycerides levels, greater for some dependent variables (15 points for obesity and 11 points for HDL), and smaller for others (6 points for cervical cancer and current smoking, 5 points for hospitalization and breast cancer screening). Contrary to

expectations, patients with higher activation levels were not more likely to have normal levels of LDL, diastolic blood pressure, or A1c compared to those with lower activation levels (Table 3).

In analyses that examined the bivariate relationships separately by income tercile, we found that the magnitude and direction of the observed relationships were similar across patient income terciles for all the outcomes except for the cancer screening outcomes (not shown). The PAM was consistently related to cancer screenings for low income tercile patients. For medium income tercile patients, the PAM was only related to cervical cancer screening, while for high income tercile patients the PAM was only related to colon cancer screening.

With the exception of diastolic blood pressure, in the multivariate models patient activation was related in the anticipated direction to all the dependent variables (online appendix 2). This includes A1c and LDL, which were not related in the hypothesized direction in the bivariate results. For the 10 outcomes with no significant interaction terms, we translated the regression findings into predicted probabilities at different levels of PAM scores. The predicted probability of having normal HDL levels was 54% if all patients had PAM scores of 50, and it was 10 percentage points higher (64%) if PAM scores were all 100. The range in predicted probabilities based on changing PAM scores from 50 to 100 was wider for obesity (17 points), while it was narrower for the other dependent variables. For LDL and colon cancer screening, we found significant interaction terms, which were of very small magnitudes. In both cases the PAM was

Table 2. Preventive Screening Utilization, Health Behavior and Health Outcomes by Patient Activation Level

| | Patient Activation Level [#] | | | | P Value |
|---|---------------------------------------|-----------|-----------|---------------------|---------|
| | Level 1 (lowest) % | Level 2 % | Level 3 % | Level 4 (highest) % | |
| Preventive Screening | | | | | |
| Colon Cancer | 64.0 | 64.1 | 66.0 | 67.4 | 0.03 |
| Cervical Cancer | 75.9 | 79.2 | 79.6 | 81.6 | 0.003 |
| Breast Cancer | 68.4 | 70.6 | 70.7 | 73.6 | 0.01 |
| Unhealthy Behaviors | | | | | |
| Current Smoker | 20.3 | 19.8 | 17.5 | 14.6 | <0.001 |
| Obese | 50.2 | 47.8 | 42.0 | 35.2 | <0.001 |
| Clinical Indicators (normal range) | | | | | |
| Systolic | 44.2 | 42.6 | 45.9 | 53.4 | <0.001 |
| Diastolic | 77.1 | 74.8 | 74.4 | 76.3 | 0.007 |
| LDL | 76.6 | 75.0 | 74.9 | 72.1 | 0.001 |
| HDL | 49.7 | 55.4 | 56.4 | 60.7 | <0.001 |
| Triglycerides | 60.1 | 62.0 | 63.7 | 68.5 | <0.001 |
| A1c | 63.2 | 56.7 | 60.3 | 61.2 | 0.21 |
| Costly Utilization (1 or more visit) | | | | | |
| ED visit | 24.1 | 20.4 | 17.9 | 16.0 | <0.001 |
| Hospitalization | 13.1 | 10.6 | 9.2 | 7.8 | <0.001 |

[#]Level 1 of patient activation (scores 0–47.0) indicates that an individual may not yet believe the patient role is important, level 2 (scores 47.1–55.1) indicates a patient lacks confidence and knowledge to take action, level 3 (scores 55.2–67.0) indicates a patient is beginning to engage in recommended health behaviors, and level 4 (scores 67.1–100) indicates a patient is proactive about health and engages in many recommended health behaviors

Table 3. Predicted Probabilities for Dependent Variables Significantly Related to Patient Activation, Based Upon Different Levels of Patient Activation

| PAM Level | Preventive Screening | | Healthy Behavior-Related Measures | | Costly Utilization (1 or More Visit) | | Clinical Indicators (Normal Range) | | | |
|-----------|----------------------|---------------|-----------------------------------|-------|--------------------------------------|-----------------|------------------------------------|------|------|------|
| | Cervical Cancer | Breast Cancer | Current Smoker | Obese | ER visit | Hospitalization | Systolic | HDL | Tri | A1c |
| 50 | 0.8 | 0.7 | 0.19 | 0.46 | 0.2 | 0.1 | 0.47 | 0.54 | 0.63 | 0.59 |
| 60 | 0.8 | 0.72 | 0.18 | 0.43 | 0.19 | 0.1 | 0.48 | 0.56 | 0.64 | 0.6 |
| 70 | 0.81 | 0.73 | 0.16 | 0.39 | 0.18 | 0.09 | 0.49 | 0.58 | 0.66 | 0.61 |
| 80 | 0.82 | 0.74 | 0.15 | 0.36 | 0.16 | 0.09 | 0.49 | 0.6 | 0.67 | 0.63 |
| 90 | 0.83 | 0.75 | 0.13 | 0.32 | 0.15 | 0.08 | 0.5 | 0.62 | 0.69 | 0.64 |
| 100 | 0.83 | 0.76 | 0.12 | 0.29 | 0.14 | 0.08 | 0.51 | 0.64 | 0.7 | 0.65 |

The predicted probabilities are computed based upon full regression models presented in online appendix 2

positively related to the dependent variable, but the relationship was slightly weaker for one income tercile group (low income for LDL and medium income for colon cancer screening).

DISCUSSION

The study expands the existing evidence base on the relationships between activation and health-related outcomes. Using cross sectional data from an EHR, we found that more activated people were more likely to have received preventive care, less likely to smoke or have a high BMI, and had better clinical indicators. They were also less likely to have been hospitalized or have used the ED. We further examined whether the relationships were consistent across income terciles. We found no evidence of interactive effects for 10 of the 12 outcomes. We did observe a small magnitude interaction, suggesting a weaker relationship between PAM and colon cancer screening for medium income patients and a weaker relationship between PAM and LDL for low income patients.

The findings highlight the potential role that patient activation can play in improving quality and health outcomes. As health systems and providers seek to survive and thrive in the new payment environment, it will be important to identify effective ways to support patients so that they may be more effective partners in the care process. Supporting activation among low SES patients may be a particularly promising approach, since there is so much room for improving activation and health-related outcomes for this group.

To date, the empirical evidence on interventions supporting patient activation is not yet well developed. While this has likely limited the adoption of such programs, there is evidence now emerging about effective interventions that have increased patient activation and improved health outcomes. These successful interventions have employed one of two strategies:

A Focus on Skill Development, Problem Solving, and/or Peer Support

The Stanford Chronic Disease Self-Management Program (CDSMP) is a good example of an intervention that utilizes these elements. Increases in activation among participants have been achieved and sustained for up to 12 months post participation in the CDSMP³⁶. Other interventions have focused specifically on skills development and have shown that training patients in how to ask questions and giving them support to do so, increases their participation in their own care, and increases their activation levels^{22,24–26}.

A Focus on Tailoring Support to the Individual's Level of Activation

These programs seek to tailor support to the individual's level of activation, encouraging small achievable steps for the low activated, and focusing on more difficult behaviors and the challenge of maintaining behaviors for those at higher levels of activation. In a study conducted within a disease management program, patient call centers were randomized to either tailor their coaching to the individual's level of activation or to do "usual coaching". The findings showed that the tailored coaching group had significantly improved activation scores, improved adherence and clinical indicators, and reduced hospitalization and ED use, as compared to the usual coached group, over a 6-month study²³.

While there is not yet evidence on tailored support within the clinical setting, other evidence suggests that primary care providers likely play an important role in increasing patient activation. For example, there is evidence from cross-sectional studies that provider behaviors can support patient activation. Patients who report that their provider helped them in very concrete and specific ways, such as helped them to learn to monitor their condition, set goals, and/or set up and exercise program, were more activated than patients who said their provider did not help them in

these ways^{36,37}. While not formally evaluated, some patient-centered medical homes are measuring their patients' activation levels, and using it as a "vital sign" to help them tailor patient care plans to the patient's ability to follow through on those plans. It is a way to be patient-centered, and to meet the patient where they are.

While this study broadens the empirical research on patient activation, the relationships observed in this cross-sectional study need to be examined longitudinally to better understand the time ordering of events. The present study is also limited by the fact that the study population is not representative of the larger population from which it was drawn, as it includes only patients who were seen in the clinics and who completed the PAM in the early months of the PAM collection roll-out. Also, we measured patient SES using a zip code level measure rather than a measure specific to patients' SES. Studies are needed that address the limitations of the current investigation and provide further insight into how best to support patients to be more effective participants in their care.

With the coming health care reforms, delivery systems and providers will need to be able to produce better outcomes with fewer resources. Patients represent a largely untapped resource that if tapped, may have payoffs that accrue not only to delivery systems, but to the patients themselves and more broadly to the nation.

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