BRIEF REPORT

Patient Assessment of Chronic Illness Care (PACIC) and Improved Patient-centered Outcomes for Chronic Conditions

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BACKGROUND: The Patient Assessment of Chronic Illness Care (PACIC) has potential for use as a patient-centered measure of the implementation of the Chronic Care Model (CCM), but there is little research on the relationship between the PACIC and important behavioral and quality measures for patients with chronic conditions.

OBJECTIVE: To examine the relationship between PACIC scores and self-management behaviors, patient rating of their health care, and self-reported quality of life.

DESIGN: Cross-sectional survey with a 61% response rate.

PARTICIPANTS: Included in the survey were 4,108 adults with diabetes, chronic pain, heart failure, asthma, or coronary artery disease in the Kaiser Permanente Medical Care program across 7 regions nationally.

MEASUREMENTS: The PACIC was the main independent variable. Dependent variables included use of self-management resources, self-management behaviors such as regular exercise, self-reported adherence to medications, patient rating of their health care, and quality of life.

RESULTS: PACIC scores were significantly, positively associated with all measures (odds ratio [ORs] ranging from 1.20 to 2.36) with the exception of self-reported medication adherence.

CONCLUSIONS: Use of the PACIC, a practical, patient-level assessment of CCM implementation, could be an important tool for health systems and other stakeholders looking to improve the quality of chronic disease care.

KEY WORDS: chronic disease; survey research; quality assessment.

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INTRODUCTION

The Chronic Care Model (CCM) is a widely accepted framework for delivering care to patients with chronic illnesses.^{1–3} The CCM focuses on optimization of 6 key elements of the health care system: health care organization, delivery system design, clinical information systems, decision-support, self management support, and community resources.^{4–5} Adoption of CCM elements by health care providers has been shown to be associated with improved care for patients with chronic illnesses.⁶ Considering the “quality chasm” between what is known about optimal chronic disease care and what is delivered in practice,^{3,7} further implementation and spread of the CCM has the potential for improving quality of care.²

Assessment of system-level CCM implementation has primarily focused on the perspective of the clinician and the health plan, using tools such as the Assessment of Chronic Illness Care (ACIC).^{5,8} The Patient Assessment of Chronic Illness Care (PACIC) was designed to assess the implementation of the CCM from the patient perspective that focuses on the receipt of patient-centered care and self-management behaviors.⁸ Using a patient-level assessment of health care such as the PACIC is consistent with calls for both practical tools for evaluating chronic care management,⁹ and for quality measurement tools that are patient-centered and focus on patient perspectives.³ Measures such as the PACIC can potentially be used to track delivery of self-management support for patients by health care organizations (now required by the Joint Commission for the Accreditation of Health Care Organizations’ Disease Management Certification program), and to support overall quality improvement efforts.¹⁰

While the PACIC has potential as a tool for quality improvement and for use as a patient-centered quality metric, this potential would be enhanced by demonstrating that PACIC scores are related to other relevant measures of health care quality. Previous work has shown that for patients with diabetes, the PACIC is associated with increased physical activity and receiving appropriate laboratory assessments and self-management counseling.¹ However, there is no work to date that examines the relationship between the PACIC and quality metrics in chronic conditions other than diabetes or that examines the relationship between the PACIC and a broad array of patient self-management behaviors. In addition, there is no work examining the relationship between PACIC scores and patient-centered quality measures such as rating of health care

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and quality of life. The purpose of this paper is to assess the relationship between PACIC scores and the above outcomes for a national sample of adults with chronic conditions in a large, integrated delivery system.

METHODS

Sample. Data were obtained from the Kaiser Permanente (KP) Self-care and Shared Decision-making Survey, which gathered data for chronic conditions quality improvement efforts by the organization. In September 2004, surveys were sent to a random sample of 8,908 KP members selected from 6 chronic condition population registries: (1) asthma, (2) diabetes (DM), (3) heart failure, (4) coronary artery disease (CAD), (5) chronic pain, and (6) both DM and CAD. The sample was selected from 7 of KP's 8 regions (Northern California, Southern California, Colorado, Georgia, Hawaii, Mid-Atlantic States, and Northwest) representing 98% of KP's total membership. A total of 6,673 members in the sample had valid contact information (i.e., had a correct address or telephone number), were reachable, had a verifiable chronic condition, and were current KP members. Four thousand one hundred eight completed the survey for a response rate of 61%. Respondents and nonrespondents did not differ based on age, gender, and chronic condition cohort;¹¹ further information about the survey development and content is available elsewhere.¹¹

Measures. The cross-sectional survey included the 20-item PACIC (Appendix). It measures the extent patients report receiving care that is aligned with the CCM within the past 6 months. The PACIC has 5 subscales addressing the following domains: patient activation, delivery system design, goal setting, problem solving, and follow-up/coordination.⁸ Previous work found the PACIC and its subscales to be internally consistent and aligned with its hypothesized factor structure and to have moderate test-retest reliability.⁸

The survey also included 3 sets of measures related to patient self-management behaviors over the past 6 months (use of self-management services, performance of self-management behaviors, medication adherence) and 2 patient-centered outcomes (quality of health care, quality of life). Use of self-management services was assessed with 5 "yes/no" questions asking whether the participant used KP self-management services within the past 6 months, including the KP website, health education classes, "HealthWise Handbook", HealthPhone (prerecorded health education audiotapes), and emotional support groups. We adapted 4 self-management behavioral items from Hibbard et al.¹² and asked patients to rate these using a 4-point Likert scale (1=strongly disagree, 2=disagree, 3=agree, 4=strongly agree): (1) consuming 5 servings of fruits and vegetables, (2) doing tasks needed to manage their chronic condition, (3) following a regular exercise program, and 4) following a regular stress management program. Finally, we used an item adapted from Chesney to assess medication adherence.^{13,14} Participants were asked how many days of medication doses were missed in the past 7 days.

For the 2 patient-centered outcomes, participants were asked to rate the health care and services provided by Kaiser

Permanente (0=worst health care possible, 10=best health care possible) in the prior year, using a Consumer Assessment of Health Plans Survey (CAHPS) item,¹⁵ and to rate their overall quality of life (1=very good, 2=good, 3=neutral, 4=poor, 5=very poor) using an item from the World Health Organization (WHOQOL-BREF).¹⁶ The survey also asked questions regarding age, sex, race/ethnicity, education, and self-reported health.

The KP Northern California Institutional Review Board approved this study. Patients were informed that their survey responses would not be reported to their primary care team or negatively impact their care in any way.

Data analysis. The PACIC was scored by summing participants' responses across all 20 items then dividing by 20, the number of items in the scale. Thus, scores on the PACIC range from 1 to 5 with higher scores indicating patient's perception of greater involvement in self-management and receipt of chronic care counseling.^{1,8} When fewer than 20 questions were answered, the PACIC score represents the mean score of all completed questions. Almost three quarters of respondents ($n=2,917$) respondents completed all 20 PACIC items; 90% ($n=3,697$) completed 17 or more. All 8 dependent variables were dichotomized. The 4 patient self-management behaviors were dichotomized as agreeing versus disagreeing. Use of self-management services in the past 6 months was dichotomized as one or more versus none, and medication adherence as missed one or no medications versus missing two or more in a 7-day period. Patients' ratings of their health care were dichotomized as the best care (9 or 10) versus less than the best (1–8) and their ratings of quality of life as good and very good versus fair, poor, or very poor.

We focused our analyses on the relationship between the PACIC and these 8 dependent variables because the PACIC was specifically designed to measure practices that would impact patient self-management behaviors and patient-centered outcomes.⁸ The PACIC's association with these variables was measured using 8 hierarchical logistic regressions (one for each dependent variable) adjusting for geographic region as a random effect and patient age, gender, race/ethnicity, education, chronic condition cohort, and self-reported health status as fixed effects. All analyses were performed using SAS version 9.1.

RESULTS

Table 1 shows the descriptive characteristics of the sample. Half the sample was male with a mean age of 61.9 years. Most were well educated with 67% having at least some college or technical school beyond high school. The mean PACIC score was 2.7 (SD=1.1). Except for participating in stress management, over 50% agreed they performed self-management behaviors, used self-management resources, and adhered to their medications.

The PACIC was significantly and positively associated with the use of at least one of the self-management services (odds ratio [OR]=1.40, 95%CI=1.30, 1.53), greater engagement in all self-management behaviors (ORs ranged from 1.21 to 1.41), higher rating of health care (OR=2.36, 95%CI=2.18, 2.56), and higher quality of life (OR=1.20, 1.13, 1.27; Table 2). These results are reported as ORs or the increased odds of achieving the outcome for each additional point on the PACIC scale. There was no significant association between the PACIC and adherence to

Table 1. Sample Characteristics, n=4,108

Characteristic	Percent
Demographic	
Male	50
Mean age (SD), years	61.9 (14.7)
Race/ethnicity	
White	64
African-American	13
Hispanic	9
Asian-American	9
Other race	5
Educational Attainment	
Less than high school	11
High school graduate	22
Some college/tech school	39
College grad or higher	28
Chronic condition cohorts	
Asthma	14
Chronic pain	17
Coronary artery disease	17
Diabetes	16
Heart failure	17
Both diabetes and CAD	19
Geographical location	
California regions	67
Non-California regions	33
Overall self-reported health (percent reporting very good or excellent)	23
Patient Assessment of Chronic Illness Care (PACIC), mean (SD) (range 1=lowest, 5=highest)	2.7 (1.1)
Self-management variables	
Utilization of self-management services (1 or more)	57
Medication adherence (missed 1 or no days in past 7)	90
Eats 5 or more servings of fruits/vegetables daily (strongly agree/agree)	51
Performs required self-management tasks (strongly agree/agree)	76
Exercises regularly (strongly agree/agree)	58
Participates in stress management (strongly agree/agree)	40
Patient-centered outcomes	
Rating of health care (rating it as best, 9 or 10)	51
Self-reported quality of life (percent reporting very good or good)	64

medications (OR=1.06, 95%CI=0.98, 1.15). These relationships were similar for patients within each disease cohort in subgroup analyses (data not shown).

DISCUSSION

This study found that patients' assessment of the implementation of the CCM as measured by the PACIC was independently associated with improved self-management behaviors and patient-centered outcomes for an adult population with chronic conditions. Previous work has shown a relationship between the PACIC and increased exercise in patients with diabetes.¹ This study extends that relationship to a wider array of self-management measures across a variety of chronic conditions. Furthermore, these analyses are the first to demonstrate a relationship between higher PACIC scores and increased patient ratings of their health care and higher quality of life, suggesting that patients who rate their health plans as having greater implementation of the CCM may be happier with,

and benefit more from, the care for their chronic conditions. We did not see an association between the PACIC and self-reported measure of adherence to medications. It is possible that because over 90% of patients reported adherence in a 7-day period, there was not enough variation to detect a relationship. Future work should examine the relationship between the PACIC and more sensitive measures of adherence, such as those calculated from pharmacy records.^{17,18}

This study had several limitations. First, we cannot determine causality from this survey's cross-sectional study design. For example, whereas higher PACIC scores are associated with greater use of self-management services, it is not clear whether greater implementation of the CCM enables patients to engage in more self-management behaviors or whether the process of engaging in self-management activities makes patients see their health plan as more strongly adhering to CCM principles. The link between the PACIC and these behavioral and outcome measures, however, strengthens the case for the PACIC's use as a patient-focused quality metric.

Second, this study was set in a large group model integrated delivery system. It is possible that results are not generalizable to patients with chronic conditions in other systems, as large medical groups may deliver care that is more adherent to CCM principles than other health care organizations.¹⁹ The KP population, however, is representative of the demographics and educational attainment levels of the larger regions it serves.²⁰

The PACIC is a practical, patient-level assessment of implementation of the CCM. It may be an important tool for health systems and other stakeholders to use in assessing and improving the quality of chronic disease care. Further research should examine the longitudinal relationship between the PACIC and such measures and examine the relationship between the PACIC and clinically important intermediate outcomes such as blood pressure. Such information will be useful to national quality oversight organizations such as the National Committee on Quality Assurance (NCQA) and other stakeholders interested in identifying "patient-centered" quality of care measures.

Table 2. Hierarchical Logistic Regression Results: Independent Association of PACIC with Process and Outcome Measures

Process and care quality measures	Odds ratio (95%CI)
Utilization of self-management services: use of 1 or more versus none	1.40 (1.30, 1.53)
Eats 5 or more servings of fruits/vegetables daily: 'strongly agree'/'agree' versus 'disagree'/'strongly disagree'	1.21 (1.14, 1.28)
Performs required self-management tasks: 'strongly agree'/'agree' versus 'disagree'/'strongly disagree'	1.41 (1.31, 1.53)
Exercises regularly: 'strongly agree'/'agree' versus 'disagree'/'strongly disagree'	1.23 (1.16, 1.31)
Participates in stress management: 'strongly agree'/'agree' versus 'disagree'/'strongly disagree'	1.39 (1.31, 1.48)
Medication adherence: missed 1 or fewer medications in past 7 days (vs 2 or more)	1.06 (0.98, 1.15)
Rating of health care: score of ≥ 9 vs ≤ 8	2.36 (2.18, 2.56)
Self-reported quality of life: 'very good'/'good' versus 'fair'/'poor'/'very poor'	1.20 (1.13, 1.27)

Models adjusted for age, gender, race/ethnicity, educational status, chronic condition, self-reported health as fixed effects, and regional geographic location as a random effect.

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Conflict of Interest: None disclosed.

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