ORIGINAL RESEARCH

Organizational Coordination and Patient Experiences of Specialty Care Integration

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BACKGROUND: Delivering care to patients with complex healthcare needs benefits from coordination among healthcare providers. Greater levels of care coordination have been associated with more favorable patient experiences, cost management, and lower utilization of services. Organizational approaches consider how systems, practices, and relationships influence coordination and associated outcomes.

OBJECTIVE: Examine measures of organizational coordination and their association with patient experiences of care coordination involving specialists.

DESIGN: Cross-sectional surveys of patients and primary care providers (PCPs).

PARTICIPANTS: Final sample included 3183 patients matched to 233 PCPs from the Veterans Health Administration. All patients had a diagnosis of type 2 diabetes mellitus and one of four other conditions: hypertension; congestive heart failure; depression/anxiety; or severe mental illness/posttraumatic stress disorder.

MAIN MEASURES: Patients completed a survey assessing perceptions of coordinated care. We examined ratings on three domains: specialist knowledge management; knowledge integration across settings and time; and knowledge fragmentation across settings and time. We created care coordination measures involving the PCP and three specialty provider types. PCPs provided ratings on relational coordination for specialists, feedback coordination, and team coordination. We aligned patient's specialty services used with corresponding PCP ratings of that specialty.

KEY RESULTS: Patient ratings were significantly lower on specialist knowledge management and knowledge integration when either PCPs did not use feedback coordination ($b = -.20$; $b = -.17$, respectively) or rated feedback coordination lower ($b = -.08$ for both). Teamwork was significantly related to specialist knowledge management ($b = .06$), knowledge integration ($b = .04$); and knowledge

fragmentation ($b = -.04$). Relational coordination was related to coordination between the primary care provider and (i) diabetes specialist ($b = .09$) and (ii) mental health provider ($b = .12$).

CONCLUSIONS: Practices to improve provider coordination within and across primary care and specialty care services may improve patient experiences of care coordination. Improvements in these areas may improve care efficiency and effectiveness.

KEY WORDS: care coordination; Veterans; diabetes; primary care; patient care survey.

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INTRODUCTION

As patient needs become more complex, healthcare increasingly involves multiple providers across different disciplines. Improving patient outcomes for complex patients requires care to be coordinated.¹ Coordinated care has been associated with better patient experiences,² depression management,³ cost management, and lower utilization of services.⁴ Greater use of specialty care, however, may reduce primary care providers' (PCPs) ability to coordinate care effectively.⁵ For this study, we consider the organizational literature on coordination and how it may be applied to understand how patients experience care coordination.

The relation between organizational coordination and patient experiences of coordination is relatively understudied. Organizational coordination considers processes involving synchronization of differentiated work efforts to meet organizational objectives,⁶ (i.e., a process in which individuals who have interdependent roles work together to achieve a common goal). One can focus on perspectives to examine coordination between individuals⁷—the mechanisms through which

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coordination is enacted and the integrating conditions needed to achieve coordination.⁸ Coordination mechanisms can include feedback approaches.⁹ A feedback approach is best suited to address less predictable situations (e.g., treatment of a patient with multiple comorbidities, possibly having contra-indicated treatments). Feedback approaches rely on promoting information exchange to arrive at solutions to address non-standardized situations (e.g., discussion between a PCP and specialist about complex patients). Feedback approaches are associated with lower surgical complication rates, lower amputation rates, and lower mortality.^{10–12} Thus, we hypothesize that greater use of feedback approaches are associated with favorable patient perceptions of coordinated care.

Effective use of feedback coordination requires strong relationships among individuals. Relational coordination, a common measure of relationship-oriented coordination, is comprised of two interacting components, the strength of the relationship between individuals and communication quality.¹³ Relational coordination is most challenging for individuals with different jobs within the same work process (e.g., patient care), especially if they are part of different work units or have different professional backgrounds.⁷ Associations have been found between relational coordination and several healthcare outcomes, including quality of care, well-being, and reduced length of stay.^{14–17} Thus, we hypothesize that higher relational coordination is associated with more favorable patient perceptions of coordinated care.

Coordination is an important component of teamwork.¹⁸ Strong inter-member relationships facilitate better information exchange and lead to better care coordination, especially for complex patients.^{19, 20} Providers with team members who conduct pre-work with patients, such as reviewing medications, identifying primary reason for the visit, and reviewing post-session information with patients, can allow providers more time to review history and address current and future needs. Thus, we hypothesize that higher teamwork is associated with more favorable patient perceptions of coordinated care. Our conceptual model is presented in Figure 1.

Recent literature emphasizes patient-centered care and eliciting patient experiences of care as a measure of quality; however, measures have only recently been developed specifically to assess patient experience of the degree to which information is effectively exchanged and coordinated across patient care units or services.²¹ In addition, it is unclear how patient ratings of their personal experiences align with provider perceptions of care coordination. If patient experiences are to be used to evaluate care coordination, it is important to better understand the construct and its antecedents. The objective of this study was to examine how organizational coordination measures, reported by PCPs, were associated with patient experiences of care coordination.

METHODS

The study setting was the Veterans Health Administration (VA). Primary care serves as the “medical home” for most

VA patients to help coordinate care for medical and mental health specialties, including an integrated primary care-mental health program.²² We report on one study aspect from a larger mixed methods study examining patient care and its relation to clinical processes and outcomes.

Data Sources

The study included survey data from PCPs matched to their patients and administrative data.

Patients. Our sample consisted of complex patients who were likely to have a high coordination burden. All patients had a diagnosis of type 2 diabetes mellitus and at least one other comorbidity, either a medical or mental health comorbidity. We chose patients with diabetes because it is a chronic condition that can involve coordination of multiple healthcare professionals within primary care and across specialists. Diabetes is common among the national population; one in ten non-Veterans has diabetes and one in four VA patients has diabetes. VA spends \$1.5 billion annual for treatment.²³ We selected patients based on a conceptual model that characterizes patients by disease domain (physical, mental health) and severity (low, high).²⁴ In this framework, disease domain and severity can lead to greater specialist involvement and greater challenges in coordination.

We used a multi-step process to identify eligible patients. All patients needed at least two outpatient or one inpatient diagnosis for diabetes plus one of four conditions documented from January 1, 2014, to December 31, 2015. We categorized patients into one of four groups with all patients having diabetes plus (a) medical conditions generally managed in primary care (hypertension); (b) medical conditions generally requiring specialty care (congestive heart failure); (c) mental health conditions generally managed in primary care (anxiety or depression); or (d) mental health conditions generally requiring specialty care (schizophrenia, bipolar disorder, schizoaffective disorder, or posttraumatic stress disorder). Conditions were selected so that our sample included a range of patient complexity and associated coordination burden.

Survey Fielding Method

We first selected 29 out of 140 medical centers to reflect relatively high and low performance on the basis of multiple care coordination items using previously collected national program data from the primary care and mental health integration and patient aligned care team surveys completed by a key clinical informant. After identifying sites, we obtained administrative data by provider for patients seen during the most recent 12-month period. Using ICD-9 codes, we classified patients into one of the four categories described above. We selected providers with approximately 100 or more patients in each of the four categories. We sampled approximately three

providers from each hospital-based and three providers from each community-based outpatient clinic. We first surveyed PCPs. We then sent patient surveys only to the patients of providers who responded. For each provider, we randomly selected approximately 15 patients from each of four categories per provider.

Provider Survey

The provider survey measured three organizational coordination constructs: relational, feedback, and within-team. The survey also included demographic and practice characteristic items. The *relational coordination* measure included seven items that assessed PCP perceptions of shared goals; shared knowledge; mutual respect; and the frequency, timeliness, accuracy, and problem-solving aspects of communication.²⁵ Providers rated 12 specialty services and clinics including cardiology, mental health, nutrition, and endocrinology on these seven items. Each item was scored using a 5-point Likert-type scale. Cronbach's α values ranged between .86 and .91 among specialties. Because PCPs do not coordinate with every specialty for a particular patient, we created a weighted measure of relational coordination based on the number of patient visits to specialty clinics assessed on the PCP survey over 12 months preceding when surveys were first sent to patients. For example, if a patient had 8 visits to cardiology and 2 visits to endocrinology, then the PCP ratings for cardiology contributed 80% to the weighted relational coordination score, while ratings from endocrinology contributed 20%. We computed this measure for each patient.

We measured *feedback coordination* using ratings on “how helpful have consults, including (including e-consults)” been with a set of specialty clinics and services in caring for patients.¹⁰ PCPs rated each of 12 specialty services, similar to the relational coordination measure. Response options included opt-out options if the service was not available or if the provider did not use the service. Evaluative ratings were on a five-point scale ranging from “not at all helpful” to “extremely helpful.” We created a composite measure with categories for helpful (for those respondents with an average rating of “helpful or extremely helpful”), less helpful (for those respondents with a less than “helpful or extremely helpful” average), and not used.

We measured *within-team coordination* ($k = 5$, $\alpha = .89$) using the average PCP response to a series of questions asking them to rate the “degree of teamwork and cooperation” demonstrated by specific team members (e.g., registered nurse,

PCP, licensed practical nurse). Team members were rated using a five-point response scale from “poor” to “excellent.”

Patient Survey

We recruited patients between April 13, 2016, and September 2, 2016, using up to four mailed invitations.²⁶ Patients could complete the survey by mail or online. We created two versions of the patient survey, one with a small number of questions about patient experiences of cardiac care and the other with parallel questions for mental healthcare. Patients with cardiac comorbidities were sent the cardiac version and patients with mental health comorbidities were sent the mental health version. The patient survey contained items reflecting coordinated care from the Patient Perceptions of Integrated Care (PPIC) survey.^{27–29}

The PPIC focuses on several dimensions of coordination, such as test result communication, transition following hospitalization, and support for self-directed care. We examined three care dimensions that focused on coordination among PCPs and specialists as dependent variables ([Appendix](#)). Dimensions were supported with analysis of the factor structure of the instrument. Items generally consisted of Likert-type response options ranging from “never” (1) to “always” (4). *Knowledge integration* across settings and time ($k = 4$, $\alpha = .81$) consisted of items assessing the extent to which the PCP was well-informed of treatment the patient was receiving from other care providers and teams. *Knowledge fragmentation* across settings and time ($k = 5$, $\alpha = .69$) consisted of items asking whether patients needed to repeat information to providers about their care needs; lower scores were favorable. *Specialist knowledge management* ($k = 4$, $\alpha = .73$) consisted of items asking whether the specialists knew the patient's medical history and test results from other providers. We created alternative scoring measures to reflect condition treated, including *coordination for diabetes care* ($k = 6$, $\alpha = .73$); *coordination for heart specialist care* ($k = 6$, $\alpha = .69$); and *coordination for mental healthcare* ($k = 6$, $\alpha = .73$).

Model Covariates

We included covariates that reflected both patient and provider characteristics. For patients, we included variables for *age*, *sex*, *race*, *ethnicity*, and *marital status*, based on self-reported survey question responses. Using administrative data from the VA Corporate Data Warehouse, we included a count of *VA medical center outpatient visits within 12 months* (e.g., primary care, mental health, surgery), a ratio of selected clinics for

Figure 1 Conceptual model for patient-experienced coordination.

specialty care visits to total primary care/specialty visits, a count of comorbid conditions based on Elixhauser codes,³⁰ and a measure to reflect *diabetes control*, based on whether the patient's average hemoglobin A1C test value for a 12-month period was less than 7%. For providers, we modeled self-reported responses to *VA tenure*. From administrative data, we coded *occupation* as physician, nurse practitioner, or physician assistant. We also accounted for *panel size*, *practice location* (urban or rural), and whether providers practiced in a *hospital or CBOC*.

Analysis

Our goal was to examine relationships between organizational coordination and patient-reported coordination. We first reviewed data for range of values, completeness, and collinearity. We created a “missing” category for demographics. We regressed our three measures of patient perceptions of coordination on the set of patient and provider characteristics. We used a random effects multi-level model with robust standard errors that accounted for patients being clustered within providers. Analysis was completed in SAS 9.2 (Cary, NC).

RESULTS

We received survey responses from 262 PCPs (22% response rate) located across 29 medical centers. We used 233 providers to select patients. We obtained 7157 patient survey responses (47% response rate). Approximately 21% of the respondents indicated that the PCP listed on the survey did not provide care to them within the last 6 months and were subsequently exited from the survey. Because we were focused on select specialty care visits to compute our coordination measures, we included only patients with visits to one of the designated specialists assessed on the PCP survey during the study timeframe ($n = 3183$). The average number of patients responding per provider was 16.35 (SD = 14.18) based on the final regression models.

Descriptive statistics of the patient and provider respondents are presented in Tables 1 and 2 respectively. A majority of patients were between the ages of 65 to 74, male, Caucasian, non-Hispanic, and married or living with someone. Among providers used in the analysis, approximately half worked in VA for more than 5 years and worked in a CBOC setting. Slightly more than two-thirds were physicians and located in an urban area.

Tables 3 and 4 present regression models for the PPIC dimensions of knowledge integration (i.e., PCP knows about care provided by other teams); knowledge fragmentation (i.e., patients need to repeat information); specialist knowledge management (specialists/providers know about test results); and disease-specific coordination models respectively. Feedback coordination (i.e., consultation helpfulness) ratings ranged greatly across services (.49 to .83) with endocrinology and cardiology among the highest rated. Compared to PCPs

Table 1 Descriptive Characteristics of Patients in the Sample (N = 3183)

Measure	Number	Percent
Patient group		
Anxiety or depression	729	22.89
Heart failure	513	16.13
Hypertension	1000	31.42
Severe mental illness or posttraumatic stress disorder	941	29.56
Age		
Less than 55	153	4.8
55 to 64	590	18.5
65 to 74	1700	53.4
75 or more	589	18.5
Not reported	151	4.7
Gender		
Male	2900	91.1
Female	136	4.3
Unknown	147	4.6
Race		
White/Caucasian	2260	71
Black/African American	573	18
Other	140	4.4
Not reported	210	6.6
Ethnicity		
Hispanic	208	6.5
Non-Hispanic	2726	85.6
Missing	249	7.8
Relationship status		
Married/living together	2133	67.0
Not married	970	30.5
Not reported	80	2.5
Hemoglobin A1c levels < 7	1883	53.2
Measure	Mean	SD
VA service visits 12 months	15.78	13.75
Elixhauser condition count	2.33	1.69
Select specialty care visits per total visits	.42	.24

who rated specialty consults as helpful, providers who did not use specialists or have specialists available for consults provided lower ratings on specialist knowledge management ($b = -.15, p = .02$), knowledge integration ($b = -.11, p < .01$), diabetes care coordination ($b = -.23, p < .001$), and mental health coordination ($b = -.26, p = .03$). (Example: providers who reported favorable feedback coordination could be expected to have .26 higher scores for mental health coordination on average holding other variables constant.) Within-team coordination was positively associated with all three PPIC

Table 2 Descriptive Characteristics of Providers in the Study (N = 233)

Measure	Number	Percent
VA experience		
Less than 2 years	51	21.6
2 to 5 years	75	32.2
More than 5 years	107	45.9
Rural practice setting	54	23.2
CBOC practice setting	120	51.5
Occupation		
Physician	164	70.4
Nurse practitioner	57	24.5
Physician assistant	12	5.2
Feedback coordination		
Not reported	32	13.7
More helpful	95	40.7
Not helpful	106	45.5
Measure	Mean	SD
Panel size (per 1000 patients)	1.06	.20
Relational coordination—weighted	3.86	.64
Teamwork	4.11	.85

Table 3 Regression Model Patient Perceptions of Integrated Care

Variable	Specialist knowledge management		Knowledge integration		Knowledge fragmentation	
	<i>b</i>	<i>se</i>	<i>b</i>	<i>se</i>	<i>b</i>	<i>se</i>
Intercept	3.28***	.22	3.53***	.17	1.43***	.15
VA visits	.00	.00	.00	.00	.00	.00
Elixhauser condition count	.03*	.01	.02	.01	.01	.01
A1c levels below 7	-.12***	.04	-.04	.03	.00	.03
Specialty care visit rate	-.28***	.09	.07	.07	.06	.06
Less than 2 years VA (ref > 5)	-.32***	.04	-.42***	.03	.27***	.03
2 to 5 years VA (ref > 5)	-.47***	.16	-.42***	.13	.29***	.11
Panel size per 1000 patients	.01	.01	-.04**	.04	.00	.01
CBOC	-.01	.04	-.02	.03	-.01	.03
Rural practice setting	-.03	.05	.05	.04	-.10*	.03
Nurse practitioner (ref = MD)	-.08	.05	.00	.04	.00	.03
Physician assistant (ref = MD)	.15	.10	.16	.08	-.01	.07
Feedback: not used (ref = helpful)	-.15*	.06	-.11**	.05	.03	.04
Feedback: not helpful (ref = helpful)	-.05	.04	-.05	.11	.02	.03
Relational coordination	.01	.03	.01	.02	-.01	.02
Teamwork	.05*	.03	.05*	.02	-.04*	.02

Model adjusts for patient age, gender, race, ethnicity, and relationship status

CBOC community-based outpatient setting, *b* unstandardized coefficient, *se* standard error

*Significant at $p < .05$; **significant at $p < .01$; ***significant at $p < .001$

care coordination measures (b ranged from .04 to .06, $p < .05$). Relational coordination was positively associated with diabetes care coordination ($b = .09$, $p < .01$) and mental healthcare coordination ($b = .12$, $p = .03$).

Patients with A1C levels below 7% reported lower ratings on specialist knowledge management ($b = -.12$, $p < .001$) and lower perceptions of diabetes care coordination ($b = -.23$, $p < .001$). Specialty care visit rate was negatively related to specialist knowledge management ($b = -.28$, $p < .001$) and coordination with mental health providers ($b = -.40$, $p < .001$). Panel size was negatively associated with knowledge integration ($b = -.04$, $p < .01$). Providers with five or more years of VA tenure had more favorable PPIC measures as well as disease-specific coordination measures. Patients receiving care in CBOCs reported lower diabetes care

coordination ($b = -.11$, $p = .04$). Patients treated by a nurse practitioner reported lower scores on mental healthcare coordination ($b = -.17$, $p = .04$).

As a sensitivity analysis, we examined using a 24-month period to compute specialty care utilization for weighted coordination measures and specialty care visit rates and found similar support for hypotheses. We also modeled PCPs overall rating of specialist coordination measures regardless of patient utilization, but found results were similar to weighted models.

DISCUSSION

Interest in defining and measuring coordination to improve care has been growing.³¹ Findings support our hypotheses that

Table 4 Regression Model Patient Perceptions of Integrated Care

Variable	Coordination with diabetes providers		Coordination with heart specialist providers		Coordination with mental health providers	
	<i>b</i>	<i>se</i>	<i>b</i>	<i>se</i>	<i>b</i>	<i>se</i>
Intercept	3.22***	.27	3.28***	.25	3.35***	.40
VA visits	.00	.00	.00	.00	.00	.00
Elixhauser condition count	.03	.02	.03*	.02	.01	.02
A1c levels below 7	-.23***	.05	.00	.05	.00	.06
Specialty care visit rate	-.18	.11	-.19	.11	-.40***	.14
Less than 2 years VA (ref > 5)	-.35***	.05	-.30***	.05	-.29***	.06
2 to 5 years VA (ref > 5)	-.59***	.19	-.50***	.19	-.34	.29
Panel size per 1000 patients	.00	.01	-.02	.01	.00	.02
CBOC	-.11*	.05	.06	.05	-.03	.07
Rural practice setting	.02	.07	-.02	.06	.10	.09
Nurse practitioner (ref = MD)	-.04	.06	.00	.06	-.17*	.08
Physician assistant (ref = MD)	.20	.12	.09	.11	-.21	.19
Feedback: not used (ref = helpful)	-.23***	.08	.03	.07	-.26*	.010
Feedback: not helpful (ref = helpful)	-.05	.05	.00	.05	-.11	.07
Relational coordination	.09**	.04	-.01	.04	.12*	.05
Teamwork	.03	.03	.00	.03	.06	.04

Model adjusts for patient age, gender, race, ethnicity, and relationship status

CBOC community-based outpatient setting, *b* unstandardized coefficient, *se* standard error

*Significant at $p < .05$; **significant at $p < .01$; ***significant at $p < .001$

higher scores on feedback coordination, relational coordination, and teamwork are related to more favorable PPIC and disease-specific coordination perceptions.

Feedback coordination was related to patient perceptions. Methods to improve communication (i.e., a type of feedback coordination) in the electronic health record have shown potential to improve care coordination.³² While the shared electronic medical record in VA provides detailed information, it may not convey information about complex patients or urgent needs in a timely manner due to differences in work habits and preferences among providers. The use of instant messaging can allow for faster responses on relatively simple questions compared to encrypted messages which may require a more detailed review and response.³³ Co-location, up-to-date contact information, protected time for care coordination, and opportunities for providers to meet and develop strong working relationships are other examples of approaches that might support coordination through more detailed and timely communication about complex patients between providers.

Teamwork ratings were associated with all three patient measures of coordination and with diabetes and mental healthcare coordination. The finding highlights the importance of inter-team communication in caring for complex patients. Teamwork has been widely studied as an important indicator of performance in healthcare.³⁴ Team-focused strategies such as structured interdisciplinary rounds,³⁵ training to improve teamwork,³⁶ and simulation³⁷ are associated with improvements in process and delivery of care. Health services research has not given much attention to knowledge management frameworks, which may be especially important to understand in relation to care coordination as they describe how to create, transfer, and apply knowledge in complex organizational settings.³⁸

Relational coordination was associated with diabetes and mental healthcare coordination, but not with the PPIC dimensions. This may indicate the relational coordination measure reflects task-specific behaviors, for each of the disease conditions, better than broader measures of patient coordination. It may suggest improving coordination across specialty clinics may benefit by focusing on condition-specific activities more so than general improvement strategies; this could include service agreements that are used to prescribe responsibilities of both primary care and specialty care in requesting consults.

PCPs with larger panel sizes may have less time to follow and attend to notes from specialist visits, which was reflected in lower patient-experienced knowledge integration. Research has shown panel size to be associated with quality of care.³⁹ This may suggest challenges in knowledge management for coordination as the number of patients a provider cares for increases.

The study has limitations worth noting. First, our study was conducted within VA, a healthcare system with several existing systems and processes established for integrating care. Thus, findings may differ in other contexts. We did not

consider the influence of VA providers and their coordination with community care providers, an area that has become increasingly important due to recent regulatory changes allowing for greater Veteran choice and access to community care. We might find coordination across settings to be even more important in non-integrated systems. We selected patients for surveys based on health condition rather than using clinic stop code visits, which restricted the number of useable responses. The survey response by providers was relatively low, which may limit the variability in the predictors.

Healthcare leaders should review and consider practices for improving coordination within and across primary care and specialty services, such as improving the methods and ease of consults for clinical questions, and within team coordination. With growing complexity of patient populations and greater use of specialty care services, investments in cultivating communication and relationships between primary care and specialty care providers may improve patient experiences of care coordination and, ultimately, the efficiency and effectiveness of care.

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The VA Central Institutional Review Board approved the study.

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