

Patient quality of life in the Mayo Clinic Care Transitions program: a survey study

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Background: Transitional care programs are common interventions aimed at reducing medical complications and associated readmissions for patients recently discharged from the hospital. While organizations strive to reduce readmissions, another important related metric is patient quality of life (QoL).

Aims: To compare the relationship between QoL in patients enrolled in the Mayo Clinic Care Transitions (MCCT) program versus usual care, and to determine if QoL changed in MCCT participants between baseline and 1-year follow-up.

Methods: A baseline survey was mailed to MCCT enrollees in March 2013. Those who completed a baseline survey were sent a follow-up survey 1 year later. A cross-sectional survey of usual care participants was mailed in November 2013. We included in our analysis 199 participants (83 in the MCCT and 116 in usual care) aged over 60 years with multiple comorbidities and receiving primary care. Primary outcomes were self-rated QoL; secondary outcomes included self-reported general, physical, and mental health. Intra- and intergroup comparisons of patients were evaluated using Pearson's chi-squared analysis.

Results: MCCT participants had more comorbidities and higher elder risk assessment scores than those receiving usual care. At baseline, 74% of MCCT participants reported responses of good-to-excellent QoL compared to 64% after 1 year ($P=0.16$). Between MCCT and usual care, there was no significant difference in self-reported QoL ($P=0.21$). Between baseline and follow-up in MCCT patients, and compared to usual care, there were no significant differences in self-reported general, physical, or mental health.

Conclusion: We detected no difference over time in QoL between MCCT patients and those receiving usual care, and a nonsignificant QoL decline in MCCT participants after 1 year. Progression of chronic disease may overwhelm any QoL improvement attributable to the MCCT intervention. The MCCT interventions may blunt expected declines in QoL, producing concordant responses among sicker MCCT patients and healthier usual care participants.

Keywords: elder risk assessment index, geriatrics, hospital discharge, qualitative study, transitional care

Introduction

Older adults are at higher risk of hospitalization and hospital readmission. There has been a recent emphasis on transitional care programs to reduce these readmissions. Transitional care comprises interventions to prevent harm to patients during transition from inpatient hospitalization through discharge to community-based care.^{1,2} This area of research is gaining attention due to a continuing rise in the geriatric patient population in the US.² Transitional care interventions can feature a variety of modalities to enhance the discharge process. These processes can include the designation of a case manager to guide patient access to community resources during and after discharge,

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as well as in-home visits by nursing or other staff to monitor patient reintegration in the out-of-hospital environment.^{2,3} The primary targeted outcomes for these programs have been lower rates of hospital readmission, reflecting continued improvement in the health of the patient as well as reduced cost; however, patient quality of life (QoL) also deserves attention as an outcome.

Meta-analyses examining the effects of transitional care on reducing readmission rates have shown mixed results.^{4,5} A prospective cohort study at our own institution, evaluating a transitional care intervention with case management and home visits for recently discharged elderly individuals, demonstrated reduction in 30-day readmission from 20.1% in a referent group compared to 12.4% in the care transitions group ($P=0.002$).⁶

While metrics such as 30-day hospital readmissions are commonly used to judge the efficacy of transitional care interventions, other measures of personal patient experiences or care delivery aspects concerning efficiency are less common.⁴ Trials of various transitional care interventions have measured QoL as a primary or secondary outcome, with variably positive results.² Several of these studies, however, have only shown modest advantages in QoL for transitional care participants in the short term, with differences either not demonstrated or declining with long-term follow-up.⁷⁻⁹

Some trials have used disease-specific instruments to measure QoL rather than generally applicable questionnaires.^{10,11} The nature of the transitional care intervention is also highly variable, with some programs targeting specific disease groups or broader multimorbidity. Some programs use telephone follow-up, video communication, or personalized exercise plans.^{11,12} The purpose of this study was to longitudinally measure QoL in patients participating in a transitional care intervention involving home visits, and compare them to a cross section of usual-care participants. We used a validated, self-rated questionnaire designed to measure QoL and patient impressions regarding their physical, mental, and social well-being.

Methods

Study design and setting

This was a mailed survey of Mayo Clinic Care Transitions (MCCT) program participants with longitudinal follow-up at 1 year. Patients provided written informed consent for study enrollment; the study was conducted between 2013 and 2014. This study was performed within the Department of Employee and Community Health (ECH) at Mayo Clinic in Rochester, Minnesota. ECH includes four medical

clinics (three in Rochester, MN, and one in Kasson, MN) with two adult primary care workgroups (Family Medicine and Primary Care Internal Medicine). The Mayo Clinic Institutional Review Board approved the study and survey questionnaire.

Participants in the MCCT program

The MCCT participants were aged over 60 years and received primary care within ECH. They possessed multiple complex medical problems as defined by an elder risk assessment (ERA) score ≥ 16 . The ERA score is used for risk stratification within the Mayo Clinic to determine eligibility for case management and encompasses the domains of age, comorbid health conditions, and previous hospital utilization. An ERA score of 16 defines the 90th percentile for risk of hospital readmission.¹³ The ERA predicts hospital stays and emergency department visits, as well as mortality and nursing home placement.¹⁴ The ERA is a dynamic score and could have changed between the time of contact and the time of completing the survey.

Study participants were recruited from a registry of patients eligible for the MCCT. Registered nurses (RNs) within ECH identified patients with ERA scores denoting eligibility for the MCCT using Mayo's electronic medical record (EMR). The MCCT's RN case manager provided study coordinators with lists of eligible participants; similar methods were used to locate participants not enrolled in the MCCT. Participants were either enrolled in the MCCT or received usual care during the study as a referent group. Exclusion criteria included discharge to a nursing home, terminal illness, dementia, and hospice care enrollment.

Referent group

Referent patients were those who met the criteria for enrollment in the MCCT but were not enrolled. This may have been a result of the stepwise implementation process of the MCCT, in which clinical sections initiated the program at different times because of incremental implementation. Referent patients were also those who were not enrolled because of a lack of capacity to accommodate the patient with staffing levels. Comorbid health conditions were collected as part of the calculation of the ERA score via abstraction from the EMR.

MCCT program

The MCCT initiated contact with patients while they were still in the hospital. The team included a nurse practitioner, a case manager RN, a primary physician, and a consulting geriatrician. Initial visits included medication review and review

of the hospitalization (with examination of the discharge summary, symptoms persisting following discharge, and upcoming follow-up tests and appointments). This visit also included a functional assessment, assessment of symptoms, and an evaluation of cognitive function. Following an initial visit that established goals of care, case manager RNs communicated with patients weekly and triaged patients with new symptoms, while the nurse practitioner made subsequent home visits or telephone calls as needed. The length of care for patients in the MCCT was no shorter than 30 days and normally lasted 60 days.

Usual care in referent group

Usual care, consisting of a comprehensive review of medications by hospital consulting pharmacists and medication reconciliation by the hospital nursing team at discharge, was provided to all participants in the study. A hospital discharge summary was provided to all patients before discharge from the hospital. The patients' primary care physicians received notification of hospital admissions and discharges, and had access to inpatient records and the discharge summary, via the hospital system's EMR. Patients were able to access follow-up visits with primary care if needed.

Survey and outcomes

The primary method of obtaining information from both groups was through a mailed survey. An initial baseline survey of the MCCT participants was mailed by the Mayo Clinic Survey Research Center on March 4, 2013, with reminders mailed to nonrespondents on April 4, 2013 and May 4, 2013. A survey of the referent group (eligible for MCCT but never enrolled) was mailed in November 2013. For MCCT patients who completed a baseline survey, a second follow-up survey was sent out 1 year later. Follow-up reminder surveys were mailed in March 2014. Survey mailings were staggered over time as patients were enrolled in the intervention.

The primary outcomes were study participants' self-rated QoL as determined by answers to a standard instrument, the PROMIS (Patient-Reported Outcome Measurement Information System) version 1.1. PROMIS is a standardized group of questions that can be used for research or clinical practice and was developed by the National Institute of Health (USA), accessed from the following websites <http://www.nihpromis.org/default#2> and <http://www.promishealth.com/>. The QoL measurements were surveyed within 90 days of enrollment in the program and with longitudinal follow-up at 1 year for participants in the MCCT, with a corresponding cross-sectional sample of usual care participants at the time

of follow-up survey. The responses were categorized as "fair to poor" or "good to excellent" for the question "In general, would you say your quality of life is ..."

Secondary outcomes included self-rated subdomains of health, including overall health in physical and mental domains. These were categorized into "fair to poor" or "good to excellent". Patients were also queried on satisfaction with social activities and relationships and self-rated ability to perform usual roles and activities (including physical activities), as well as self-rated difficulty with emotional problems. These outcomes were again compared between MCCT participants and those undergoing only usual care at follow-up. We also compared MCCT participants at baseline and 1 year following the intervention.

Analysis

We compared the baseline responses between the MCCT patients and referent patients for group comparison. For within-group comparison, we compared QoL between MCCT participants at baseline (following hospital discharge) and 1 year later. Statistical comparisons were accomplished by subjecting categorical variables to Pearson's chi-squared test. Equal variance *t*-tests and Wilcoxon rank-sum *t*-tests were used for continuous variables in parametric and nonparametric distributions, respectively. Analysis was performed using SAS version 9.3 (SAS Institute, Inc, Cary, NC, USA).

Results

Recruitment and patient characteristics

Total recruitment for the final analysis was 199 subjects, with 83 in the MCCT completing both surveys and 116 receiving usual care. The team mailed a survey to 467 patients who had enrolled in MCCT; 141 MCCT participants completed the initial survey. Eighty-three completed the 1-year follow-up survey and were included in the analysis. In the referent group, 482 patients matched enrollment criteria but were not enrolled in MCCT; 116 surveys were returned for a 24% response rate. The median age of respondents overall was 82.5 years with an interquartile range of 76–88 years; 53.3% of the patients were female.

The patient characteristics for both groups are noted in Table 1. We found that patients in the MCCT program were older, with a mean age of 82.7 years compared to 78.0 years in the referent group ($P=0.02$). Patients in the MCCT group were in significantly poorer health than usual care participants, with more comorbidities and higher ERA scores. There was no significant difference in the number of previous hospitalizations.

Table 1 Characteristics of study participants

Characteristics	MCCT cases (N=83)	Non-MCCT cases (N=116)	Overall (N=199)	P-value
Age				0.0187 ^a
Number	83	105	188	
Mean (SD)	82.7 (6.3)	78.9 (13.7)	80.6 (11.2)	
Median	83.0	82.0	82.5	
Q1, Q3	79.0, 88.0	73.0, 89.0	76.0, 88.0	
Range	(69.0–100.0)	(21.0–102.0)	(21.0–102.0)	
Sex				0.1332 ^b
Female (%)	39 (47.0)	67 (57.8)	106 (53.3)	
Male (%)	44 (53.0)	49 (42.2)	93 (46.7)	
Number of comorbidities				<0.0001 ^a
Number	80	111	191	
Mean (SD)	13.2 (3.1)	8.0 (4.2)	10.2 (4.6)	
Median	13.0	7.0	10.0	
Q1, Q3	11.0, 15.0	5.0, 11.0	7.0, 14.0	
Range	(6.0–21.0)	(1.0–18.0)	(1.0–21.0)	
ERA score at time of MCCT				<0.0001 ^a
Number	79	114	193	
Mean (SD)	17.8 (3.3)	13.3 (5.4)	15.2 (5.2)	
Median	18.0	14.0	16.0	
Q1, Q3	16.0, 20.0	9.0, 16.0	13.0, 19.0	
Range	(7.0–25.0)	(3.0–30.0)	(3.0–30.0)	
Tier at time of MCCT				<0.0001 ^b
Missing	0	2	2	
–1	0 (0.0%)	3 (2.6%)	3 (1.5%)	
0	0 (0.0%)	3 (2.6%)	3 (1.5%)	
1	1 (1.2%)	22 (19.3%)	23 (11.7%)	
2	7 (8.4%)	41 (36.0%)	48 (24.4%)	
3	21 (25.3%)	25 (21.9%)	46 (23.4%)	
4	54 (65.1%)	20 (17.5%)	74 (37.6%)	
Number of hospitalizations year prior to MCCT				0.8522 ^c
Number	83	116	199	
Mean (SD)	0.8 (1.0)	0.8 (1.4)	0.8 (1.2)	
Median	0.0	0.0	0.0	
Q1, Q3	0.0, 1.0	0.0, 1.0	0.0, 1.0	
Range	(0.0–4.0)	(0.0–8.0)	(0.0–8.0)	
Ever inpatient				0.8938 ^b
No	45 (54.2%)	64 (55.2%)	109 (54.8%)	
Yes	38 (45.8%)	52 (44.8%)	90 (45.2%)	

Notes: ^aEqual variance t-test, ^bchi-square, ^cWilcoxon.

Abbreviations: ERA, elder risk assessment; MCCT, Mayo Clinic Care Transitions; SD, standard deviation.

Primary and secondary outcomes

Comparing MCCT patients at follow-up and usual care patients, there was no significant difference in self-rated QoL (63.9% vs 72.2% “good to excellent”, respectively; $P=0.21$; Table 2). There was also no significant difference in self-rated QoL between MCCT patients at baseline and 1 year following the intervention (74.1% vs 63.9% “good to excellent”, respectively; $P=0.86$; Table 2).

There were also no significant differences in secondary outcomes of subsets of QoL (Table 2). Overall, self-rated health was not rated differently between MCCT and usual care patients ($P=0.41$) or longitudinally, at baseline and

at 1 year in MCCT patients ($P=0.89$), nor were physical health (between group $P=0.83$ and within group $P=0.84$) or mental health (between group of $P=0.62$ and within group of $P=0.86$). There were also no significant differences between MCCT patients and usual care patients, or MCCT patients longitudinally, with regards to social satisfaction ($P=0.20$ and $P=0.65$), ability to carry out usual activities ($P=0.05$ and $P=0.31$), and ability to carry out every day physical activities ($P=0.14$ and $P=0.37$). MCCT patients were not significantly more or less likely to be bothered by emotional problems compared to usual care patients or to themselves longitudinally ($P=0.13$ and $P=0.41$; Table 2).

Table 2 Comparisons of quality of life survey responses from study participants

Questions on self-rated health	MCCT cases at baseline (N=83)	MCCT cases at follow-up (N=83)	Non-MCCT cases (N=116)	P-value (baseline vs follow-up)	P-value (follow-up vs control)
1. In general, would you say your health is:				0.8689	0.4096
Missing	4	0	1		
Good to excellent	41 (51.9%)	42 (50.6%)	65 (56.5%)		
Fair to poor	38 (48.1%)	41 (49.4%)	50 (43.5%)		
2. In general, would you say your quality of life is:				0.1575	0.2130
Missing	2	0	1		
Good to excellent	60 (74.1%)	53 (63.9%)	83 (72.2%)		
Fair to poor	21 (25.9%)	30 (36.1%)	32 (27.8%)		
3. In general, how would you rate your physical health?				0.8357	0.8278
Missing	4	1	3		
Good to excellent	35 (44.3%)	35 (42.7%)	50 (44.2%)		
Fair to poor	44 (55.7%)	47 (57.3%)	63 (55.8%)		
4. In general, how would you rate your mental health, including your mood and ability to think?				0.8629	0.6217
Missing	1	1	1		
Good to excellent	59 (72.0%)	58 (70.7%)	85 (73.9%)		
Fair to poor	23 (28.0%)	24 (29.3%)	30 (26.1%)		
5. In general, how would you rate your satisfaction with your social activities and relationships?				0.6503	0.2047
Missing	1	0	1		
Good to excellent	58 (70.7%)	56 (67.5%)	87 (75.7%)		
Fair to poor	24 (29.3%)	27 (32.5%)	28 (24.3%)		
6. In general, please rate how well you carry out your usual activities and roles.				0.3090	0.0497
Missing	1	2	1		
Good to excellent	50 (61.0%)	43 (53.1%)	77 (67.0%)		
Fair to poor	32 (39.0%)	38 (46.9%)	38 (33.0%)		
7. Extent able to carry out everyday physical activities				0.3722	0.6653
Missing	1	3	2		
Mostly to completely	24 (29.3%)	22 (27.5%)	37 (32.5%)		
A little to moderately	53 (64.6%)	48 (60.0%)	61 (53.5%)		
Not at all	5 (6.1%)	10 (12.5%)	16 (14.0%)		
8. Bothered by emotional problems				0.4139	0.1350
Missing	6	5	12		
Rarely to never	40 (51.9%)	38 (48.7%)	54 (51.9%)		
Sometimes	26 (33.8%)	33 (42.3%)	32 (30.8%)		
Often to always	11 (14.3%)	7 (9.0%)	18 (17.3%)		
9. Rate your fatigue on average				0.4638	0.8593
Missing	6	6	12		
None	1 (1.3%)	3 (3.9%)	4 (3.8%)		
Mild to moderate	64 (83.1%)	59 (76.6%)	83 (79.8%)		
Severe to very severe	12 (15.6%)	15 (19.5%)	17 (16.3%)		
10. Rate your pain on average				0.8976	0.5472
Missing	8	6	13		
0 – no pain	8 (10.7%)	8 (10.4%)	11 (10.7%)		
1	10 (13.3%)	6 (7.8%)	15 (14.6%)		
2	15 (20.0%)	13 (16.9%)	6 (5.8%)		
3	11 (14.7%)	12 (15.6%)	15 (14.6%)		
4	7 (9.3%)	12 (15.6%)	14 (13.6%)		
5	8 (10.7%)	13 (16.9%)	18 (17.5%)		
6	6 (8.0%)	5 (6.5%)	9 (8.7%)		
7	5 (6.7%)	4 (5.2%)	9 (8.7%)		
8	3 (4.0%)	3 (3.9%)	4 (3.9%)		
9	0 (0%)	0 (0%)	1 (1.0%)		
10–Worst imaginable pain	2 (2.7%)	1 (1.3%)	1 (1.0%)		

Abbreviation: MCCT, Mayo Clinic Care Transitions.

Discussion

Our longitudinal survey of 83 patients enrolled in our transitional care program following hospitalization did not demonstrate a significant change in self-rated QoL at 1 year follow-up using the standardized PROMIS questions. Among studies that do find transitional care interventions affect QoL, observed improvements often do not persist over long stretches of time. One multicenter study looking at a patient population similar to ours (patients aged over 65 years and recently discharged from the hospital) and examining an intervention featuring a “Post-Acute Care Coordinator” followed patients for 6 months, but only observed improved QoL scores in the intervention group compared to a control at 1 month after discharge.⁷

In populations with specific illnesses, such as heart failure, one also observes mixed results. A randomized trial, providing transitional care to Veterans Affairs patients with congestive heart failure in the form of telephone or videophone follow-up, found improvements in QoL after 1 year for both of those interventions following discharge, along with usual care.¹¹ That study, however, found no distinct advantage attributable to either of the telemedicine follow-up interventions. Those findings of improved QoL may reflect the improvement in heart failure symptoms in congestive heart failure patients following hospital discharge regardless of intervention or usual care. In contrast, a different randomized trial looking at Veterans Affairs patients with a wider range of pathology (including diabetes mellitus and chronic obstructive pulmonary disease) found no improvement in overall QoL scores when the patients were randomized to a transitional care intervention.¹⁵ That population may be more reflective of our diverse group of older adults.

Short-term improvements in QoL as a result of transitional care may still be an expected and verifiable advantage to transitional care interventions. A trial in seniors following hospitalization for heart failure with a home visit transitional care intervention demonstrated improvement in participants’ overall QoL compared to standard of care up to 12 weeks after discharge, with loss of the distinction at later follow-up.⁸ The majority of patients in each group rated their overall QoL as “good to excellent”, and the ability to fulfill their normal activities and roles was “good to excellent” in a majority of participants throughout the study. The findings are encouraging given the association between hospitalization in the elderly and subsequent disability and functional decline.¹⁶

A less intuitive explanation of our findings becomes apparent when interpreting the demographic characteristics of our sample. There were differences in age and comorbid

status between the MCCT group and the referent group, and the survey results were different for the different groups. Table 1 reveals that MCCT participants had higher numbers of comorbidities and higher ERA scores, which are significant in both the statistical and clinical sense. While not resulting in a net increase or more positive survey responses, the MCCT may have played a role in slowing or mitigating declines in health status or have provided sicker patients with a degree of resilience that allowed them to retain a QoL similar to their healthier peers after hospital discharge.

Our study has limitations that restrict drawing further conclusions. Our sample size was somewhat low, particularly in the intervention group, with fewer than 100 participants responding to both surveys, limiting statistical power to distinguish group differences in outcomes. These low numbers likely reflect the size of the program as well as response rates in frail, older adults. However, this information does provide some insight into the QoL in this population. Longitudinal data were also not obtained for the usual care group, preventing comparison of their outcomes at both baseline and 1-year follow-up, as was done with the intervention group. More frequent surveys over a year’s time could possibly detect earlier effects of transitional care interventions on QoL. There are risks of recall bias given the length of time between survey and program participation. Finally, the participation bias may favor the highest functioning patients responding to surveys more consistently than those who are more seriously ill. The considerable frequency of missing responses suggests that an interview format with an operator coding standardized responses would provide more valid results.

Conclusion

Participants enrolled in the MCCT did not demonstrate a significant decline in self-rated QoL or health status at 1-year follow-up. They did not exhibit significant differences in these responses when compared to a referent group receiving usual care at discharge. These results suggest the possible utility of the MCCT for slowing or blunting the effect of expected declines in elderly patients with multiple comorbidities after hospital discharge. Further studies with larger sample sizes, intermittent longitudinal follow-up for both MCCT participants and those receiving usual care, and more objective approaches to measuring QoL would further clarify these issues.

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Disclosure

Paul Takahashi serves on a medical board for Axial Exchange. The authors report no other conflicts of interest in this work.

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