Journal of HOSPITAL MEDICINE www.journalofhospitalmedicine.com

ORIGINAL RESEARCH

Measuring Patient Experiences on Hospitalist and Teaching Services: Patient Responses to a 30-Day Postdischarge Questionnaire

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BACKGROUND: Data comparing patient experiences between general medicine teaching and nonteaching hospitalist services are lacking.

OBJECTIVE: Evaluate hospitalized patients' experience on general medicine teaching and nonteaching hospitalist services by assessing patients' confidence in their ability to identify their physician(s), understand their roles, and their rating of the coordination and overall care.

METHODS: Retrospective cohort analysis of general medicine teaching and nonteaching hospitalist services from 2007 to 2013 at an academic medical center. Patients were surveyed 30-days after hospital discharge regarding their confidence in their ability to identify their physician(s), understand the role of their physician(s), and their perceptions of coordination and overall care. A 3-level, mixed effects logistic regression was performed to ascertain the association between service type and patient-reported outcomes.

RESULTS: Data from 4591 general medicine teaching and 1811 nonteaching hospitalist service patients demonstrated that those cared for by the hospitalist service were more likely to report being able to identify their physician (50% vs 45%, $P < 0.001$), understand their role (54% vs 50%, $P < 0.001$), and rate greater satisfaction with coordination (68 vs 64%, $P = 0.006$) and overall care (73% vs 67%, $P < 0.001$). In regression models, the hospitalist service was associated with higher ratings in overall care (odds ratio [OR]: 1.33; 95% confidence interval [CI]: 1.15-1.47), even when hospitalists were the attendings on general medicine teaching services (OR: 1.17; 95% CI: 1.01-1.31).

CONCLUSION: Patients on a nonteaching hospitalist service rated their overall care slightly better than patients on a general medicine teaching service. Team structure and complexity may play a role in this difference. *Journal of Hospital Medicine* 2016;11:99–104. © 2015 Society of Hospital Medicine

The hospitalized patient experience has become an area of increased focus for hospitals given the recent coupling of patient satisfaction to reimbursement rates for Medicare patients.[1] Although patient experiences are multifactorial, 1 component is the relationship that hospitalized patients develop with their inpatient physicians. In recognition of the importance of this relationship, several organizations including the Society of Hospital Medicine, Society of General Internal Medicine, American College of Physicians, the American College of Emergency Physicians, and the Accreditation Council for Graduate Medical Education have recommended that patients know and understand who is guiding their care at all times during their hospitalization.[2,3] Unfortunately, previous studies have shown that hospitalized patients often lack the ability to identify[4,5] and understand their course of care.[6,7] This may be due to numerous clinical factors including lack of a prior relationship, rapid pace of clinical care, and the frequent transitions of care found in both hospitalists and general medicine teaching services.[5,8,9] Regardless of the cause, one could hypothesize that patients who are unable to identify or understand the role of their physician may be less informed about their hospitalization, which may lead to further confusion, dissatisfaction, and ultimately a poor experience.

Given the proliferation of nonteaching hospitalist services in teaching hospitals, it is important to understand if patient experiences differ between general medicine teaching and hospitalist services. Several reasons could explain why patient experiences may vary on these services. For example, patients on a hospitalist service will likely interact with a single physician caretaker, which may give a feeling of more personalized care. In contrast, patients on general medicine teaching services are cared for by larger teams of residents under the supervision of an attending physician. Residents are also subjected to duty-hour restrictions, clinic responsibilities, and other educational requirements that may impede the continuity of care

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Additional Supporting Information may be found in the online version of this article.

Received: April 24, 2015; **Revised:** August 21, 2015; **Accepted:** August 26, 2015
2015 Society of Hospital Medicine DOI 10.1002/jhm.2485
Published online in Wiley Online Library (Wileyonlinelibrary.com).

for hospitalized patients.[10–12] Although 1 study has shown that hospitalist-intensive hospitals perform better on patient satisfaction measures,[13] no study to date has compared patient-reported experiences on general medicine teaching and nonteaching hospitalist services. This study aimed to evaluate the hospitalized patient experience on both teaching and nonteaching hospitalist services by assessing several patient-reported measures of their experience, namely their confidence in their ability to identify their physician(s), understand their roles, and their rating of both the coordination and overall care.

METHODS

Study Design

We performed a retrospective cohort analysis at the University of Chicago Medical Center between July 2007 and June 2013. Data were acquired as part of the Hospitalist Project, an ongoing study that is used to evaluate the impact of hospitalists, and now serves as infrastructure to continue research related to hospital care at University of Chicago.[14] Patients were cared for by either the general medicine teaching service or the nonteaching hospitalist service. General medicine teaching services were composed of an attending physician who rotates for 2 weeks at a time, a second- or third-year medicine resident, 1 to 2 medicine interns, and 1 to 2 medical students.[15] The attending physician assigned to the patient's hospitalization was the attending listed on the first day of hospitalization, regardless of the length of hospitalization. Nonteaching hospitalist services consisted of a single hospitalist who worked 7-day shifts, and were assisted by a nurse practitioner/physician's assistant (NPA). The majority of attendings on the hospitalist service were less than 5 years out of residency. Both services admitted 7 days a week, with patients initially admitted to the general medicine teaching service until resident caps were met, after which all subsequent admissions were admitted to the hospitalist service. In addition, the hospitalist service is also responsible for specific patient subpopulations, such as lung and renal transplants, and oncologic patients who have previously established care with our institution.

Data Collection

During a 30-day posthospitalization follow-up questionnaire, patients were surveyed regarding their confidence in their ability to identify and understand the roles of their physician(s) and their perceptions of the overall coordination of care and their overall care, using a 5-point Likert scale (1 = poor understanding to 5 = excellent understanding). Questions related to satisfaction with care and coordination were derived from the Picker-Commonwealth Survey, a previously validated survey meant to evaluate patient-centered care.[16] Patients were also asked to report their race, level of education, comorbid diseases, and whether they had any prior hospitalizations within 1 year. Chart review was performed to obtain patient age, gender, and hospital length of stay (LOS), and calculated Charlson Comorbidity Index (CCI).[17] Patients with missing data or responses to survey questions were excluded from final analysis. The University of Chicago Institutional Review Board approved the study protocol, and all patients provided written consented prior to participation.

Data Analysis

After initial analysis noted that outcomes were skewed, the decision was made to dichotomize the data and use logistic rather than linear regression models. Patient responses to the follow-up phone questionnaire were dichotomized to reflect the top 2 categories ("excellent" and "very good"). Pearson χ^2 analysis was used to assess for any differences in demographic characteristics, disease severity, and measures of patient experience between the 2 services. To assess if service type was associated with differences in our 4 measures of patient experience, we created a 3-level mixed-effects logistic regression using a logit function while controlling for age, gender, race, CCI, LOS, previous hospitalizations within 1 year, level of education, and academic year. These models studied the longitudinal association between teaching service and the 4 outcome measures, while also controlling for the cluster effect of time nested within individual patients who were clustered within physicians. The model included random intercepts at both the patient and physician level and also included a random effect of service (teaching vs nonteaching) at the patient level. A Hausman test was used to determine if these random-effects models improved fit over a fixed-effects model, and the intraclass correlations were compared using likelihood ratio tests to determine the appropriateness of a 3-level versus 2-level model. Data management and χ^2 analyses were performed using Stata version 13.0 (StataCorp, College Station, TX), and mixed-effects regression models were done in SuperMix (Scientific Software International, Skokie, IL).

RESULTS

In total, 14,855 patients were enrolled during their hospitalization with 57% and 61% completing the 30-day follow-up survey on the hospitalist and general medicine teaching service, respectively. In total, 4131 (69%) and 4322 (48%) of the hospitalist and general medicine services, respectively, either did not answer all survey questions, or were missing basic demographic data, and thus were excluded. Data from 4591 patients on the general medicine teaching (52% of those enrolled at hospitalization) and 1811 on the hospitalist service (31% of those enrolled at hospitalization) were used for final analysis (Figure 1).

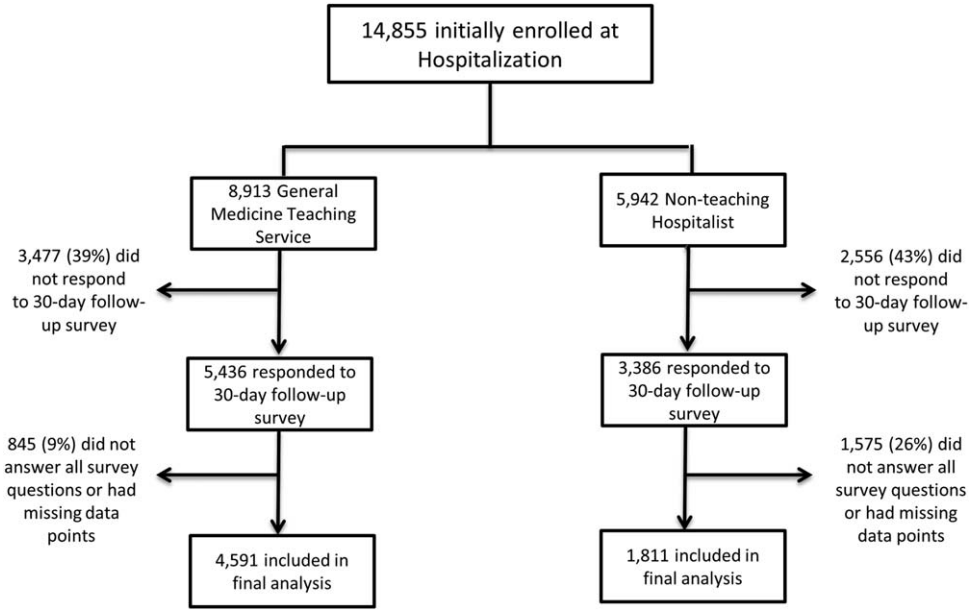

FIG. 1. Study design and exclusion criteria.

Respondents were predominantly female (61% and 56%), African American (75% and 63%), with a mean age of 56.2 (±19.4) and 57.1 (±16.1) years, for the general medicine teaching and hospitalist services, respectively. A majority of patients (71% and 66%) had a CCI of 0 to 3 on both services. There were differences in self-reported comorbidities between the 2 groups, with hospitalist services having a higher prevalence of cancer (20% vs 7%), renal disease (25% vs 18%), and liver disease (23% vs 7%). Patients on the hospitalist service had a longer mean LOS (5.5 vs 4.8 days), a greater percentage of a hospitalization within 1 year (58% vs 52%), and a larger proportion who were admitted in 2011 to 2013 compared to 2007 to 2010 (75% vs 39%), when compared to the general medicine teaching services. Median LOS and interquartile ranges were similar between both groups. Although most baseline demographics were statistically different between the 2 groups (Table 1), these differences were likely clinically insignificant. Compared to those who responded to the follow-up survey, nonresponders were more likely to be African American (73% and 64%, $P < 0.001$) and female (60% and 56%, $P < 0.01$). The nonresponders were more likely to be hospitalized in the past 1 year (62% and 53%, $P < 0.001$) and have a lower CCI (CCI 0–3 [75% and 80%, $P < 0.001$]) compared to responders. Demographics between responders and nonresponders were also statistically different from one another.

Unadjusted results revealed that patients on the hospitalist service were more confident in their abilities to identify their physician(s) (50% vs 45%, $P < 0.001$), perceived greater ability in understanding the role of their physician(s) (54% vs 50%, $P < 0.001$), and reported greater satisfaction with coordination and teamwork (68% vs 64%, $P = 0.006$) and with overall care (73% vs 67%, $P < 0.001$) (Figure 2).

From the mixed-effects regression models it was discovered that admission to the hospitalist service was associated with a higher odds ratio (OR) of reporting overall care as "excellent" or "very good" (OR: 1.33; 95% confidence interval [CI]: 1.15-1.47). There was no difference between services in patients' ability to identify their physician(s) (OR: 0.89; 95% CI: 0.61-1.11), in patients reporting a better understanding of the role of their physician(s) (OR: 1.09; 95% CI: 0.94-1.23), or in their rating of overall coordination and teamwork (OR: 0.71; 95% CI: 0.42-1.89).

A subgroup analysis was performed on the 25% of hospitalist attendings in the general medicine teaching service comparing this cohort to the hospitalist services, and it was found that patients perceived better overall care on the hospitalist service (OR: 1.17; 95% CI: 1.01- 1.31) than on the general medicine service (Table 2). All other domains in the subgroup analysis were not statistically significant. Finally, an ordinal logistic regression was performed for each of these outcomes, but it did not show any major differences compared to the logistic regression of dichotomous outcomes.

DISCUSSION

This study is the first to directly compare measures of patient experience on hospitalist and general medicine teaching services in a large, multiyear comparison across multiple domains. In adjusted analysis, we found that patients on nonteaching hospitalist services rated their overall care better than those on general medicine teaching services, whereas no differences in patients' ability to identify their physician(s),

TABLE 1. Patient Characteristics

Variable	General Medicine Teaching	Nonteaching Hospitalist	*P* Value
Total (n)	4,591	1,811	<0.001
Attending classification, hospitalist, n (%)	1,147 (25)	1,811 (100)	
Response rate, %	61	57	<0.01
Age, y, mean ± SD	56.2 ±19.4	57.1 ± 16.1	<0.01
Gender, n (%)			<0.01
Male	1,796 (39)	805 (44)	
Female	2,795 (61)	1,004 (56)	
Race, n (%)			<0.01
African American	3,440 (75)	1,092 (63)	
White	900 (20)	571 (32)	
Asian/Pacific	38 (1)	17 (1)	
Other	20 (1)	10 (1)	
Unknown	134 (3)	52 (3)	
Charlson Comorbidity Index, n (%)			<0.001
0	1,635 (36)	532 (29)	
1–2	1,590 (35)	675 (37)	
3–9	1,366 (30)	602 (33)	
Self-reported comorbidities			
Anemia/sickle cell disease	1,201 (26)	408 (23)	0.003
Asthma/COPD	1,251 (28)	432 (24)	0.006
Cancer*	300 (7)	371 (20)	<0.001
Depression	1,035 (23)	411 (23)	0.887
Diabetes	1,381 (30)	584 (32)	0.087
Gastrointestinal	1,140 (25)	485 (27)	0.104
Cardiac	1,336 (29)	520 (29)	0.770
Hypertension	2,566 (56)	1,042 (58)	0.222
HIV/AIDS	151 (3)	40 (2)	0.022
Kidney disease	828 (18)	459 (25)	<0.001
Liver disease	313 (7)	417 (23)	<0.001
Stroke	543 (12)	201 (11)	0.417
Education level			0.066
High school	2,248 (49)	832 (46)	
Junior college/college	1,878 (41)	781 (43)	
Postgraduate	388 (8)	173 (10)	
Don't know	77 (2)	23 (1)	
Academic year, n (%)			<0.001
July 2007 – June 2008	938 (20)	90 (5)	
July 2008 – June 2009	702 (15)	148 (8)	
July 2009 – June 2010	576(13)	85 (5)	
July 2010 – June 2011	602 (13)	138 (8)	
July 2011 – June 2012	769 (17)	574 (32)	
July 2012 – June 2013	1,004 (22)	774 (43)	
Length of stay, d, mean ± SD	4.8 ± 7.3	5.5 ± 6.4	<0.01
Prior hospitalization (within 1 year), yes, n (%)	2,379 (52)	1,039 (58)	<0.01

NOTE: Abbreviations: AIDS, acquired immune deficiency syndrome; COPD, chronic obstructive pulmonary disease; HIV, human immunodeficiency virus; SD, standard deviation. *Cancer diagnosis within previous 3 years.

understand their role in their care, or rating of coordination of care were found. Although the magnitude of the differences in rating of overall care may appear small, it remains noteworthy because of the recent focus on patient experience at the reimbursement level, where small differences in performance can lead to large changes in payment. Because of the observational design of this study, it is important to consider mechanisms that could account for our findings.

The first are the structural differences between the 2 services. Our subgroup analysis comparing patients rating of overall care on a general medicine service with a hospitalist attending to a pure hospitalist

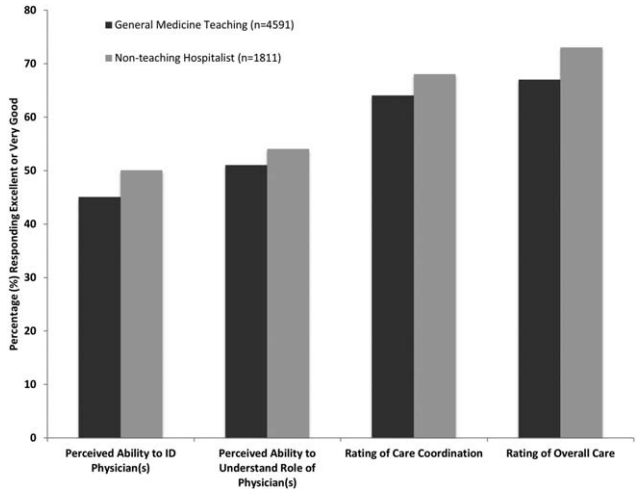

FIG. 2. Unadjusted patient-experience responses. Abbreviations: ID, identify.

cohort found a significant difference between the groups, indicating that the structural differences between the 2 groups may be a significant contributor to patient satisfaction ratings. Under the care of a hospitalist service, a patient would only interact with a single physician on a daily basis, possibly leading to a more meaningful relationship and improved communication between patient and provider. Alternatively, while on a general medicine teaching service, patients would likely interact with multiple physicians, as a result making their confidence in their ability to identify and perception at understanding physicians' roles more challenging.[18] This dilemma is further compounded by duty hour restrictions, which have subsequently led to increased fragmentation in housestaff scheduling. The patient experience on the general

TABLE 2. Three-Level Mixed Effects Logistic Regression.

Domains in Patient Experience*	Odds Ratio (95% CI)	*P* Value
"How would you rate your ability to identify the physicians and trainees on your general medicine team during the hospitalization?"		
Model 1	0.89 (0.61–1.11)	0.32
Model 2	0.98 (0.67–1.22)	0.86
"How would you rate your understanding of the roles of the physicians and trainees on your general medicine team?"		
Model 1	1.09 (0.94–1.23)	0.25
Model 2	1.19 (0.98–1.36)	0.08
"How would you rate the overall coordination and teamwork among the doctors and nurses who care for you during your hospital stay?"		
Model 1	0.71 (0.42–1.89)	0.18
Model 2	0.82 (0.65–1.20)	0.23
"Overall, how would you rate the care you received at the hospital?"		
Model 1	1.33 (1.15–1.47)	0.001
Model 2	1.17 (1.01–1.31)	0.04

NOTE: Adjusted for age, gender, race, length of stay, Charlson Comorbidity Index, academic year, and prior hospitalizations within 1 year. General medicine teaching service is the reference group for calculated odds ratio. **Abbreviations:** CI = confidence interval. *Patient answers consisted of: Excellent, Very Good, Good, Fair, or Poor. Model 1: General medicine teaching service compared to nonteaching hospitalist service. Model 2: Hospitalist attendings on general medicine teaching service compared to nonteaching hospitalist service.

medicine teaching service may be further complicated by recent data that show residents spend a minority of time in direct patient care,[19,20] which could additionally contribute to patients' inability to understand who their physicians are and to the decreased satisfaction with their care. This combination of structural complexity, duty hour reform, and reduced direct patient interaction would likely decrease the chance a patient will interact with the same resident on a consistent basis,[5,21] thus making the ability to truly understand who their caretakers are, and the role they play, more difficult.

Another contributing factor could be the use of NPAs on our hospitalist service. Given that these providers often see the patient on a more continual basis, hospitalized patients' exposure to a single, continuous caretaker may be a factor in our findings.[22] Furthermore, with studies showing that hospitalists also spend a small fraction of their day in direct patient care,[23–25] the use of NPAs may allow our hospitalists to spend greater amounts of time with their patients, thus improving patients' rating of their overall care and influencing their perceived ability to understand their physician's role.

Although there was no difference between general medicine teaching and hospitalist services with respect to patient understanding of their roles, our data suggest that both groups would benefit from interventions to target this area. Focused attempts at improving patient's ability to identify and explain the roles of their inpatient physician(s) have been performed. For example, previous studies have attempted to improve a patient's ability to identify their physician through physician facecards[8,9] or the use of other simple interventions (ie, bedside whiteboards).[4,26] Results from such interventions are mixed, as they have demonstrated the capacity to improve patients' ability to identify who their physician is, whereas few have shown any appreciable improvement in patient satisfaction.[26]

Although our findings suggest that structural differences in team composition may be a possible explanation, it is also important to consider how the quality of care a patient receives affects their experience. For instance, hospitalists have been shown to produce moderate improvements in patient-centered outcomes such as 30-day readmission[27] and hospital length of stay[14,28–31] when compared to other care providers, which in turn could be reflected in the patient's perception of their overall care. In a large national study of acute care hospitals using the Hospital Consumer Assessment of Healthcare Providers and Systems survey, Chen and colleagues found that for most measures of patient satisfaction, hospitals with greater use of hospitalist care were associated with better patient-centered care.[13] These outcomes were in part driven by patient-centered domains such as discharge planning, pain control, and medication management. It is possible that patients are sensitive to the improved outcomes that are associated with hospitalist services, and reflect this in their measures of patient satisfaction.

Last, because this is an observational study and not a randomized trial, it is possible that the clinical differences in the patients cared for by these services could have led to our findings. Although the clinical significance of the differences in patient demographics were small, patients seen on the hospitalist service were more likely to be older white males, with a slightly longer LOS, greater comorbidities, and more hospitalizations in the previous year than those seen on the general medicine teaching service. Additionally, our hospitalist service frequently cares for highly specific subpopulations (ie, liver and renal transplant patients, and oncology patients), which could have influenced our results. For example, transplant patients who may be very grateful for their "second chance," are preferentially admitted to the hospitalist service, which could have biased our results in favor of hospitalists.[32] Unfortunately, we were unable to control for all such factors.

Although we hope that multivariable analysis can adjust for many of these differences, we are not able to account for possible unmeasured confounders such as time of day of admission, health literacy, personality differences, physician turnover, or nursing and other ancillary care that could contribute to these findings. In addition to its observational study design, our study has several other limitations. First, our study was performed at a single institution, thus limiting its generalizability. Second, as a retrospective study based on observational data, no definitive conclusions regarding causality can be made. Third, although our response rate was low, it is comparable to other studies that have examined underserved populations.[33,34] Fourth, because our survey was performed 30 days after hospitalization, this may impart imprecision on our outcomes measures. Finally, we were not able to mitigate selection bias through imputation for missing data .

All together, given the small absolute differences between the groups in patients' ratings of their overall care compared to large differences in possible confounders, these findings call for further exploration into the significance and possible mechanisms of these outcomes. Our study raises the potential possibility that the structural component of a care team may play a role in overall patient satisfaction. If this is the case, future studies of team structure could help inform how best to optimize this component for the patient experience. On the other hand, if process differences are to explain our findings, it is important to distill the types of processes hospitalists are using to improve the patient experience and potentially export this to resident services.

Finally, if similar results were found in other institutions, these findings could have implications on how hospitals respond to new payment models that are linked to patient-experience measures. For example, the Hospital Value-Based Purchasing Program currently links the Centers for Medicare and Medicaid Services payments to a set of quality measures that consist of (1) clinical processes of care (70%) and (2) the patient experience (30%).[1] Given this linkage, any small changes in the domain of patient satisfaction could have large payment implications on a national level.

CONCLUSION

In summary, in this large-scale multiyear study, patients cared for by a nonteaching hospitalist service reported greater satisfaction with their overall care than patients cared for by a general medicine teaching service. This difference could be mediated by the structural differences between these 2 services. As hospitals seek to optimize patient experiences in an era where reimbursement models are now being linked to patient-experience measures, future work should focus on further understanding the mechanisms for these findings.

Disclosures: Financial support for this work was provided by the Robert Wood Johnson Investigator Program (RWJF Grant ID 63910 PI Meltzer), a Midcareer Career Development Award from the National Institute of Aging (1 K24 AG031326-01, PI Meltzer), and a Clinical and Translational Science Award (NIH/NCATS 2UL1TR000430-08, PI Solway, Meltzer Core Leader). The authors report no conflicts of interest.

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