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Relationship between Staff Perceptions of Hospital Norms and Hospital-level End-of-life Treatment Intensity

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Abstract

Background—There are wide variations in hospital-level treatment intensity at the end of life that are not entirely explained by structural and market characteristics. Individual hospital microclimates must exist to perpetuate these practice variations.

Objectives—To determine whether a closed-ended survey based upon staff perceptions of informal norms regarding life prolongation, palliation, collaborative decision-making, and patient-doctor familiarity can identify hospital microclimates and to assess whether these norms are related to variation in end-of-life treatment intensity

Design, Participants, and Measurements—Retrospective analysis of hospital discharge data at 11 purposively sampled Pennsylvania hospitals linked to a self-administered survey of 139 administrative and clinical staff clinical staff fielded during site visits in 2004; measurements included year 2000 and 2004 rates of intensive care unit (ICU) admission, mechanical ventilation (MV), and hemodialysis among terminal hospitalizations at each hospital; survey respondent demographics, role, experience, and perceptions of their hospital's context and norms of end-of-life decision making and treatment.

Results—The purposively sampled hospitals exhibited wide variation in rates of ICU admission (38.2 – 84.4%), MV (13.7 – 41.4%), and hemodialysis (0 – 9.2%) among terminal admissions. 139 of 139 administered surveys were returned for a response rate of 100%. For each of 4 factors created from 19 survey items, staff responses varied more between hospitals than within hospitals ($p \leq 0.03$). One factor, patient-doctor familiarity, was inversely correlated with terminal ICU admission ($p < 0.001$) and MV ($p = 0.03$).

Conclusions—The hospital staff survey discriminated differences in microclimates related to norms of treatment intensity at the end of life, but only 1 of 4 factors correlated with objective measures of terminal admission treatment intensity.

Keywords

end of life care; hospital medicine; utilization; physician behavior

There are wide variations in end-of-life treatment intensity across U.S. hospital referral regions, largely attributable to differences in the quantity of medical services provided (i.e., intensity) rather than to the quality of care.¹⁻³ These patterns are aggregations of individual hospital-level variations in end-of-life intensity.⁴ Although measures of end-of-life intensity, such as ICU admission and do-not-resuscitate orders, are associated with hospital characteristics such as location, for-profit status and number of beds, there is considerable residual variation even after adjusting for these structural hospital characteristics. Thus, many believe that individual hospital microclimates must exist to perpetuate observed practice variations. Previous work by Shortell et al. demonstrated that ICU microclimates were measurable⁵ and one aspect of microclimate, caregiver interaction, was associated with improved quality of care and outcomes.⁶

Microclimates are a function of underlying ‘norms’, or “rules, about which there is at least some degree of consensus, that are enforced through social sanctions”.⁷ Although some norms are formal, such as policies or programs created by design and enforced by specialized authorities, many are unwritten and not easily quantified. In this exploratory study we sought to determine whether a closed-ended survey based upon staff perceptions of informal norms regarding life prolongation, palliation, and collaborative decision-making can identify hospital microclimates and then to assess whether these norms are related to variation in end-of-life treatment intensity in 11 Pennsylvania hospitals.

METHODS

Overview

We administered a closed-ended, paper-based survey to 139 staff at 11 Pennsylvania hospitals who were interviewed for hospital case studies designed to better understand organizational determinants of hospital-level variation in treatment intensity at the end of life.

Survey Development

We first conducted focus groups on end-of-life practices with administrators, doctors, nurses, and social workers at community and tertiary hospitals associated with the University of Pittsburgh Medical Center. From these focus groups, we identified 3 factors that we hypothesized affected treatment intensity at the end-of-life: emphasis on the prolongation of life (PROLONG), emphasis on palliative care (PALLIATE), and collaborative decision making at the end of life (COLLABORATE). Specifically, we hypothesized that hospitals with greater end-of-life treatment intensity prioritize life prolongation rather than palliation and have less collaborative decision-making.

We then developed and pre-tested survey items with a convenience sample of physician health services researchers and made revisions based on their feedback. The survey instructed respondents: “When answering these questions, think about the care of patients over the age of 65 with serious chronic illnesses.” The survey also recorded information about respondent demographics, role, and experience.

Three survey items were added after preliminary analysis of field notes from the first 2 hospital case studies. These included 1 item for PROLONG and 1 for COLLABORATE. We also created a new factor, patient-doctor familiarity (FAMILIARITY). This construct emerged independently in both hospitals. Staff felt physicians in the low intensity hospital were “more connected” to their patients because they lived in the same community, whereas staff in the high intensity hospital felt the physicians were disconnected by living in separate suburbs. We conceptualized FAMILIARITY as a potential mechanism of enforcement of

norms of treatment intensity (e.g., accountability to friends and neighbors being different somehow from accountability to patients).

Survey responses to items associated with the 4 factors were measured on a 4-point modified Likert scale (“disagree strongly” to “agree strongly”; or, if related to frequency, “rarely or never” to “always”); we eliminated a neutral option to force opinions on some ethically challenging concepts.

Sample Selection

To identify PA hospitals for case study, we used stratified, non-probability purposive sampling to ensure heterogeneity^{8, 9} in structural characteristics, region, and end-of-life treatment intensity. Specifically, using data from the 2000 Pennsylvania Health Care Cost Containment Council (PHC4) hospital discharge data from all PA non-Federal acute care hospitals (n=183), 2 investigators (DCA, JRL) selected 10 pairs of hospitals matched on city (for Philadelphia and Pittsburgh) or city size by rural urban continuum codes (RUCC), bed size, and teaching status based on residents per bed (major, minor, or no teaching program) but that had disparate rates of terminal ICU admission, mechanical ventilation and hemodialysis. We identified hospital key informants based upon role functions believed by participants in the aforementioned focus groups to have familiarity with end-of-life decision making in the hospital. These informants included the Director of Case Management, Vice President of Patient Care, Director of the Emergency Department, Physician ICU Director, Nurse Manger of the ICU, Director of the Ethics Consult Service or Committee, Chief of Surgery, Director of Palliative Care, Director of Pastoral Care, oncology and ICU social workers, a bedside ICU nurse, and two physicians with the highest admission volume.

Survey Administration

During hospital site visits of 1-2 days’ duration each, one investigator (AEB), blinded to each hospital’s intensity, conducted 50-minute audiotaped semi-structured interviews with each informant followed by the survey described above. We could not always interview/survey informants in each of the key roles (either because they did not exist or were not available). Several hospitals added additional informants at their own discretion. Details of the full case study protocol are available from the authors upon request. For the purposes of the current paper, we restrict our analysis to the findings from the survey.

Analysis

We summarized individual item responses as the proportion of respondents endorsing each Likert scale response. We reverse coded items as necessary to align negatively-worded items. To assess the fit of our hypothesized model (i.e., which individual items measured an aspect of each of the 4 hypothesized factors: PROLONG, PALLIATE, COLLABORATE, and FAMILIARITY), we used principal components analysis with varimax rotation, forcing a 4-factor solution.

We calculated scales for the 4 factors by summing the numeric responses for each item in the factor and dividing by the number of items in the factor. We addressed random item non-response by dropping the item from the factor and dividing by the number of non-missing items and addressed non-random item non-response using regression-based imputation (3 items were missing from the surveys at 2 hospitals (n=30) and 1 item was missing from the surveys at another hospital (n=12), see Technical Appendix).

To test whether staff responses allowed us to discriminate between hospitals, we first assessed whether subjects within hospitals were responding similarly, given the discrepancies in job functions, using a within-group interrater reliability estimate. Assuming

no response bias, interrater reliability ranges from 0 to 1 with 0 implying no agreement and 1 showing perfect agreement¹⁰. Second, we explored whether between-hospital variability was larger than within-hospital variability by testing the ratio of between-hospital variation to within-hospital variation using an F-test⁵.

To test whether the measured norms correlated with practice patterns, we calculated a mean hospital value for each of the 4 factors and calculated Spearman correlation coefficients between factor values and three measures of hospital-level treatment intensity at the end of life: rates of terminal ICU admission, mechanical ventilation, and hemodialysis, using 2004 PHC4 data to ensure overlap between the survey and utilization measures.

Human Subjects and Role of the Sponsor

The study was approved by the University of Pittsburgh Institutional Review Board (IRB) and deemed exempt from the requirement for written informed consent. The authors had full independence from the funding agency, the National Institute on Aging, in the design, conduct, analysis, and reporting of the study.

RESULTS

Sample Description

Of 20 eligible sampled hospitals, 13 agreed to participate and 11 site visits were completed (Table 1). Three hospitals were major teaching hospitals in large cities, 2 were major teaching hospitals in small towns, 1 was a minor teaching hospital in a large city, 3 were minor teaching hospitals in medium cities, and two were rural non-teaching hospitals. Due to the purposive nature of the sampling, there was heterogeneity in rates of terminal ICU admission, mechanical ventilation, and hemodialysis within groups of hospital type, except for terminal ICU admission in the two rural hospitals (due to change in that measure from 2000 when the sample was drawn to 2004 when the case studies were conducted). Among the 11 hospitals, ICU admission during the terminal hospitalization ranged from 38.2% to 84.4%, mechanical ventilation from 13.7% to 41.4%, and hemodialysis from 0% to 9.2% (Table 1).

At these 11 hospitals, we administered surveys to 139 staff. All were returned for a response rate of 100%. Over half (59.4%) of the respondents were women and most (95.7%) were non-Hispanic white; most were trained as nurses (44.2%) or physicians (39.1%), 50% were engaged primarily in clinical care, 29% in management or administration, 14.5% in general social work, care coordination, case management or utilization review, and 3.6% provided pastoral care. The mean (SD) number of years in practice was 19.4 (9.6), three-quarters of which had been spent at the current hospital. Among those who had direct patient contact, the mean (SD) number of patient deaths in the last month was 6.0 (7.1).

Perceptions of hospital norms

We report the distribution of Likert-scale responses to each item in Table 2. Most (71.6%) respondents agreed that the default pattern in their hospital is to use all life-sustaining treatments (LSTs) to keep a patient alive, but 78% disagreed that their hospital's most important priority is to prolong a patient's life. Most (82%) felt that family requests for the use of LSTs were more important than staff opinions about futility and that fear of litigation influenced end-of-life treatment decisions (69.6%). A significant minority perceived that patients are usually or always put on life support despite having no chance of surviving the hospitalization (26.2%), of being physically independent (28.7%), or cognitively independent (20.7%). Although most felt that palliative care (79.1%) and advance directives (81.7%) were taken very seriously, many indicated that patients are usually or always

(20.9%) resuscitated in the Emergency Department despite having an advance directive, that DNR orders are usually or always (25.1%) interpreted as “do not give any treatment,” and that patients are rarely or only sometimes (32.6%) allowed to have their life support withdrawn upon request. Most expressed agreement with statements indicating collaborative end-of-life decision making; however, the provision of verbal consultation was uncommon (60%) and many felt that nurses do not feel comfortable giving their opinions to doctors (22.4%), that everyone on the team does not have a voice (23.9%), that doctors don't listen to input from other team members (21%), and that staff do not rely upon pastoral care to communicate with patients and families (60.5%). Finally, about half agreed that patients are cared for by doctors who have known them for years and 61.3% indicated that doctors live in the same community as their patients.

Aggregate Measures Assessment

Using the regression imputation method we assessed whether subjects within hospitals were responding similarly based upon inter-rater reliability estimates where informants within hospitals are considered the raters (see Technical Appendix, including Tables A2 and A3). Inter-rater reliability by item ranged from a low of 0 (no agreement, for example, for fear of litigation affecting end-of-life treatment decisions at hospitals A and F) to a high of 0.933 (near perfect agreement for the item asking how frequently patients are put on life support despite having no chance of hospital survival in hospital K), with some items having consistently high inter-rater reliability across all hospitals, such as frequency with which patients are put on life support despite having no chance of survival, cognitive, or physical independence. Interrater reliability estimates for the aggregated factors COLLABORATE, PROLONG and PALLIATE were high for every hospital ranging from 0.72 to 0.95. Clearly the informants within hospitals are responding consistently and this is true across all 11 hospitals. For the FAMILIARITY factor, reliability estimates ranged from 0.40 to 0.88 with four of the hospitals having values less than 0.7. This is partly due to the fact that this factor only has two questions, though there may be true inter-rater inconsistency in interpretation of the question or perception of the phenomenon.

The ratio of between-hospital variation to within-hospital variation for each factor score demonstrated significantly higher between- than within-hospital variability with p-values ranging from 0.03 to < 0.001 (Table 3), confirming that responses from informants within each hospital discriminate among hospitals.

Factor correlation with treatment intensity

Among the 11 hospitals, higher FAMILIARITY scores significantly correlated with lower rates of terminal ICU admission ($\rho = -0.85$, $p < 0.001$) and mechanical ventilation ($\rho = -0.66$, $p = 0.03$), but the negative correlation with hemodialysis did not reach statistical significance ($\rho = -0.51$, $p = 0.11$). PROLONG, PALLIATE, and COLLABORATE scores were not significantly correlated with observed measures of end-of-life treatment intensity (Table 4).

DISCUSSION

In this survey of 139 key informant staff at 11 acute care hospitals in Pennsylvania, we found a predominant perception that norms emphasize life-prolonging treatment among critically ill elders with life-limiting chronic conditions. There was a minority, but not insubstantial, perception that advance directives and treatment limitation orders and requests are frequently misconstrued or violated and that decision making is not collaborative. Informant responses varied more between hospitals than within hospitals, suggesting that the survey captured normative organizational differences in our constructs, confirming our first hypothesis. Partially confirming our second hypothesis, 1 of 4 of these constructs correlated

with an objective measure of end-of-life treatment intensity. Specifically, those hospitals in which the doctors taking care of patients have known them for years and live in the same community (so that they may have a better understanding of their patient's preferences and the wherewithal to abide them) had lower rates of terminal ICU admission and mechanical ventilation.

To our knowledge, this is the first study that has tried to use a survey instrument to measure norms of end-of-life treatment in the acute care hospital and to correlate those norms with observed measures of intensity. Our sampling design, which purposively ensured a heterogeneous group of hospitals with respect to both structural characteristics and measures of end-of-life treatment intensity, all within a single state so as to minimize differences in regulatory and financing policy is a strength. Another strength is our reliance upon qualitative methods to identify study constructs and hospital key informants and to enhance our survey after the first 2 case studies.

The study's weaknesses derive, in part, from its exploratory nature; specifically, the small sample size and the non-random item non-response at some hospitals due to addition of items after preliminary analyses from early site visits. To address missingness, though, we systematically assessed each of 5 different approaches and believe that we optimized the integrity of the analysis by using a regression-based imputation. Additionally, we sampled the hospitals based on year 2000 intensity measures available to our study team when we began the hospital case studies. We updated these measures to later-acquired 2004 data to ensure that our intensity measures were from the same year as our survey and found some instability in these measures, particularly for smaller hospitals.

Other limitations are that several items may have measured more than one latent construct. For example, a greater fear of litigation affecting end-of-life care could have grouped positively with emphasis on life prolongation and negatively with emphasis on palliative care, and reliance upon pastoral care could have grouped positively with both collaboration and with emphasis on palliative care. Although we hypothesized that emphasis on life prolongation and emphasis on palliative care would move in opposing directions, these two goals (prolongation and palliation) are not mutually exclusive. Also, we chose to retain hypothesized item-construct relationships rather than base item groupings upon empirical relationships in the data.

A lack of power may explain the nonsignificant relationships that emerged, or it may mean that these measures, although capturing “something” different about the hospitals, do not capture the norms that mediate higher end-of-life treatment intensity. Indeed, the one construct that was found to be associated with lower end-of-life treatment intensity, FAMILIARITY, may have been confounded by structural variables like hospital size and ICU capacity; factors that were not included in the current analysis. Also, this measure had less precision; interrater reliability estimates for FAMILIARITY were lower than for the other 3 constructs. Finally, the mechanism is not one previously established; indeed, other studies have found that increased length of relationship may increase end-of-life treatment intensity by decreasing willingness to withhold or withdraw life-sustaining treatments.^{11, 12}

The challenge of correlating complex social processes with treatment processes and outcomes was encountered in the sophisticated and well-powered National ICU study. That study included a survey of over 1,700 staff from 42 ICUs from which risk-adjusted mortality and LOS data from over 17,000 patients also were collected, and comprehensive case-study of 9 ICUs with high, medium, and low risk-adjusted mortality. Organizational and management styles were associated with some quality process measures, but not with risk-

adjusted mortality and, based on the case studies, “good” management existed in poor performing ICUs and vice-versa.^{6, 13}

Efforts to examine and document norms of decision making and treatment are potentially valuable because they likely mediate some of the variations in practice in a country where many people die with ICU services even though there is a dominant cultural fear of dying with such aggressive care.¹⁴ Once identified, these norms may be malleable through explicit leadership efforts and implementation of new forms of positive and negative sanctions.^{15, 16} Using survey methods to measure norms facilitates economy of study, compared to the extensive fieldwork used by sociologists and anthropologists.¹⁷⁻²⁰ On the other hand, our understanding of the means by which norms might be changed is not sufficiently enriched using survey methods. Future studies should include mixed qualitative and quantitative methods in larger samples and should extend inquiry to include not just measures of intensity but also of patient and family satisfaction with level of care and involvement in decision making.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

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Table 1

Hospital Sample Characteristics

Characteristic	Median (Range)
Number of staff surveyed	12 (7 – 16)
Number of hospital beds	364 (104 – 720)
Terminal ICU admission rate [†] , %	59.4 (38.2 – 84.4)
Terminal mechanical ventilation rate [†] , %	32.1 (13.7 – 41.4)
Terminal hemodialysis rate [†] , %	5.7 (0 – 9.2)

[†] Calculated from Pennsylvania Health Care Cost Containment Council (PHC4) hospital discharge data and restricted to inpatient decedents \geq age 65.

Table 2

Staff Perceptions of Hospital Practice Norms

Factors and Items	'strongly disagree' or 'rarely/never' (1) n/N (%)	'disagree' or 'sometimes' (2) n/N (%)	'agree' or 'usually' (3) n/N (%)	'strongly agree' or 'always' (4) n/N (%)
<i>Emphasis on prolongation of life (PROLONG)</i>				
The default pattern is to use all life sustaining treatments to keep a patient alive.	14/137 (10.2)	25/137 (18.2)	56/137 (40.9)	42/137 (30.7)
The most important priority is to prolong a patient's life.	52/127 (40.9)	47/127 (37.0)	23/127 (18.1)	5/127 (3.9)
Family requests for the use of life-sustaining treatments are more important than staff opinions about futility.	5/139 (3.6)	20/139 (14.4)	53/139 (38.1)	61/139 (43.9)
Patients are put on life support when they have no chance of surviving the hospitalization .	12/137 (8.8)	89/137 (65.0)	31/137 (22.6)	5/137 (3.6)
Patients are put on life support when they have no chance of physical independence.	10/136 (7.3)	87/136 (64.0)	34/136 (25.0)	5/136 (3.7)
Patients are put on life support when they have no chance of cognitive independence.	20/135 (14.8)	87/135 (64.4)	22/135 (16.3)	6/135 (4.4)
Patients are resuscitated in the emergency department despite having an advance directive.	20/105 (19.0)	63/105 (60.0)	18/105 (17.1)	4/105 (3.8)
<i>Emphasis on palliative care (PALLIATE).</i>				
Fear of litigation influences end-of-life treatment decisions.	19/138 (13.8)	23/138 (16.7)	59/138 (42.8)	37/138 (26.8)
Palliative care is taken very seriously.	8/139 (5.8)	21/139 (15.1)	56/139 (40.3)	54/139 (38.8)
Advance directives are taken very seriously.	7/137 (5.1)	18/137 (13.1)	54/137 (39.4)	58/137 (42.3)
"Do not resuscitate" orders are interpreted as "do not give any treatment."	48/138 (34.8)	54/138 (39.1)	13/138 (9.4)	23/138 (16.7)
Patients are allowed to have their life support withdrawn upon their or their surrogate's request.	14/138 (10.1)	31/138 (22.5)	60/138 (43.5)	33/138 (23.9)
<i>Collaborative decision making (COLLABORATE)</i>				
Consultants provide assessments to colleagues verbally as well as in chart notes.	21/135 (15.6)	60/135 (44.4)	47/135 (34.8)	7/135 (5.2)
Nurses feel comfortable giving their opinions to doctors about end-of-life treatment decisions.	9/138 (6.5)	22/138 (15.9)	53/138 (38.4)	54/138 (39.1)
Everyone on the team has a voice in end-of-life treatment decisions.	7/138 (5.1)	26/138 (18.8)	73/138 (52.9)	32/138 (23.2)
Doctors do not listen to input from other team members.	52/138 (37.7)	57/138 (41.3)	22/138 (15.9)	7/138 (5.1)
Staff relies on pastoral care to communicate with patients/families about end-of-life decision making.	29/109 (26.6)	37/109 (33.9)	34/109 (31.2)	9/109 (8.3)
<i>Patient doctor familiarity (FAMILIARITY)</i>				
Doctors caring for hospitalized patients have known them for years.	22/138 (15.9)	44/138 (31.9)	46/138 (33.3)	26/138 (18.8)
Doctors live in the same community as their patients and sometimes run into them at the grocery store.	26/106 (24.5)	15/106 (14.2)	35/106 (33.0)	30/106 (28.3)

Table 3
Comparison of Between-Hospital and Within-Hospital Variation in Factor Scores

Factor	Between Hospitals				Within Hospitals			
	Sum of Squares [A]	Degrees of Freedom [B]	Mean Square [C] = [A]/[B]	Sum of Squares [D]	Degrees of Freedom [E]	Mean Square [F] = [D]/[E]	F Statistic [C]/[F]	p-value
PROLONG	6.54	10	0.65	22.26	128	0.17	3.76	0.00
PALLIATE	13.00	10	1.30	24.44	128	0.19	6.81	0.00
COLLABORATE	5.05	10	0.51	31.79	128	0.25	2.03	0.03
FAMILIARITY	53.00	10	5.30	49.18	127	0.39	13.69	0.00

Table 4
Correlation between Factor Scores and Terminal Admission Intensity Measures

Factor	Terminal Admission Intensity Measure					
	ICU		Mechanical Ventilation		Hemodialysis	
	Rho	p-value	Rho	p-value	Rho	p-value
PROLONG	0.39	0.23	0.25	0.45	0.45	0.17
PALLIATE	-0.24	0.48	-0.08	0.81	-0.44	0.18
COLLABORATE	0.35	0.28	0.12	0.73	-0.02	0.96
FAMILIARITY	-0.85	0.00	-0.66	0.03	-0.51	0.11