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Nursing Home Medical Staff Organization: Correlates with Quality Indicators

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Abstract

Objectives—Little is known about the relationship between how medical care is organized and delivered in nursing homes. Taking a lead from the acute care arena, we hypothesize that nursing home medical staff organization (NHMSO) is an important predictor of clinical outcomes in the nursing home.

Methods—A total of 202 usable surveys from a two-wave survey process using the Dillman Method were returned from medical directors who were randomly selected from the AMDA membership and were asked to fill out a survey on the structure of medical organization in their primary nursing home practice. Quality measures that are likely to be affected by physician practice patterns were culled from NH Compare and OSCAR data sets and matched to the physician surveys, i.e., long stay residents' prevalence of pain, restraint use, catheter use, pressure ulcers, pneumococcal vaccination, influenza vaccination, presence of advanced directives, prescription of antibiotics, and prevalence of depression.

Results—Using a series of hierarchical multiple regressions, significant R² changes were found when the medical staff organization dimensions were added in the regressions after controlling for nursing home structural characteristics for the following outcomes: pneumococcal vaccination and restraint use. Near significant findings were noted for pain prevalence among long stay residents, catheter use and prevalence of pressure ulcers.

Conclusions—This study is the first to demonstrate a relationship between medical staff organizational dimensions and clinical outcomes in the nursing home setting and as such represents an initial “proof of concept.” NHMSO should be considered as a potentially important mediating or moderating variable in the quality of care equation for nursing homes.

Keywords

Nursing Home; Medical Staff Organization; Physician Practice; Quality Outcomes

Introduction

Nursing homes have evolved significantly over the past two decades. They have come to accommodate an increasingly frail population with an array of both acute and chronic care needs¹. Understandably, the quality of care delivered in United States nursing homes remains a high priority among all the relevant stakeholders, including nursing home residents and their families, state and federal regulators, policy makers, and the full array of professional caregivers employed in nursing homes^{2,3}.

While quality of care has improved over the past few years, in large part as a result of reforms emanating from a series of critical IOM and GAO reports, much remains to be done^{4,5}. Indeed, quality of care in the nursing home has been linked to a number of structural and process variables⁶. While some of these variables are mutable (e.g., nurse staffing ratios) others, such as, nursing home size and proprietary status are relatively fixed. Surprisingly, little is known about the relationship between how medical care is organized and delivered in nursing homes and outcomes, despite governmental and professional organizations' public recognition of the critical role played by physicians in nursing homes and explicit regulatory mandates specific to physicians⁷.

Taking a lead from the acute care arena, we hypothesize that nursing home medical staff organization (NHMSO) is an important predictor of clinical outcomes in the nursing home. The relationship between medical staff organization and quality in acute care hospitals was first described over thirty years ago. In their classic article Roemer and Friedman⁸ defined seven dimensions that could describe medical organization in hospitals: staff composition; appointment process; job commitment of physicians; reporting and coordination systems; number of control committees; documentation and informal interpersonal relationships. Hospitals' performance, as measured by national accreditation, was related to the aspects of the physician's job commitment and the more tightly structured hospital staff organization. Results from Shortell and his colleagues and Flood and Scott^{9,10} further suggest that structured medical staffs have better medical/surgical outcome¹¹. Together these studies suggest that quality of care is related more to how physicians interact as a professional group and the extent of their ties to the institution than the characteristics of the physician. Although not physician specific, nursing home "culture" has recently been linked to the use of feeding tubes and antipsychotics in nursing homes^{12,13}.

Capitalizing on the organizational framework for acute care hospitals, Katz and his colleagues developed and validated an analogous framework and scale to define and measure nursing home medical staff organization¹⁴. The scale's dimensions, along with the specific components that define them are presented in Table 1.

Given the preliminary stage of our inquiry, we sought to demonstrate "proof of concept" by empirically examining whether the overarching medical staff organization construct is associated with clinical outcomes of nursing home residents above and beyond the previously studied nursing home structural characteristics, such as for profit status. Our strategy was to quantify the medical staff organization dimensions using data from a survey of a random national sample of nursing home medical directors and to match and merge it

with the nursing home resident outcome data from the CMS Nursing Home Compare and MDS (minimum data set), both nationally administratively derived data bases. Nursing home structural characteristics were obtained from the MDS and a second national administrative data base, i.e., Online Survey Certification and Reporting System (OSCAR). Hierarchical multiple regression analyses were performed to test whether a model which included the medical staff organizational construct explained significantly more variance in the nursing home resident outcomes than was explained by a model that only included nursing home structural characteristics.

Methods

Respondents

As described in Katz et al (2009) it was reasoned that 200 respondents would yield a sample size that would permit the detection of a moderately sized significant R^2 of .12, $p < .05$ with a power of at least .8 the hierarchical multiple regression analyses described below. Four hundred respondents were selected randomly from the AMDA membership in anticipation of a 50% response rate, which would yield the necessary number of subjects. The inclusion criteria for the respondents were the following: licensed physician and currently serving as a medical director of a freestanding, nonpediatric, licensed nursing home that was able to be matched to the Online Survey Certification and Reporting System (OSCAR) and Minimum Data Set (MDS).

Whereas we initially achieved a 51% response rate ($n=204$), the mailing list contained a number of individuals who did not meet eligibility criteria (e.g., retired, nonphysician, no longer in nursing home practice). Thus, of the 204 respondents, 95 were excluded leaving a total of 109 usable surveys. To reach the goal of 200 surveys, a second sample of 400 randomly selected AMDA members was thus generated. A second mail survey was conducted using the same procedures as the initial survey. There were 233 surveys returned in this second wave for a response rate of 58% with 93 respondents meeting eligibility criteria. Combining the two surveys resulted in a total sample of 202 usable surveys. Duplicate surveys were excluded.

Procedure

The study received approval from the University of Rochester IRB. The Dillman “Total Design Method” was used for the mail surveys²¹. Initially, a crafted cover letter under AMDA letterhead was sent with the survey and a self-addressed stamped return envelope. A thank you/reminder postcard was mailed to all respondents 1 week after the initial mailing. Non-respondents received up to 2 additional follow-up mailings of the survey done over a 3-week period. Responses were mailed back to the University of Rochester where they were entered into an Excel database. A 10% data check was done to ensure its accuracy. The survey instructed respondents to identify the nursing home that was the basis for their answers. The survey instructed the respondents who were medical directors in more than one facility to answer the survey questions based on the facility they consider their primary nursing home.

The respondent medical directors were primarily male (85%) primary care physicians (43% family physicians; 45% internists) who averaged almost 19 years in NH practice. Forty five percent were certified medical directors (CMD) while 39% held a CAQ (certificate of added qualifications) in geriatrics. Most of the respondents were part time medical directors (84%) and derived an average of 24% of their income from NH practice.

As described in Katz et al (2009)¹⁴, comparison of the nursing home characteristics of this sample to all United States nursing homes in the OSCAR database indicates that this sample is representative of United States nursing homes.

The survey data was merged with nursing home characteristics and outcome data obtained from the Online Survey Certification and Reporting (OSCAR) data and from quality data published on the website www.medicare.gov/nhcompare, both from 2006, the calendar year when the surveys data was collected.

Measures

Nursing Home Medical Staff Organization: The dimensions of nursing home medical staff organization were quantified by the scale developed by Katz et al (2009)¹⁴. It is presented in Table 1. The scale consists of 25 items that are subsumed under 6 dimensions: Composition of Staff, Appointment Process, Commitment, Departmentalization, Documentation and Informal Dynamics.

Nursing Home Structural and Staffing Characteristics: The nursing home characteristics obtained from the OSCAR data included 1) the OSCAR acuity index¹⁵ 2) total nursing hours per day per resident 3) ratio of RN to total nursing staff 4) OSCAR total beds in facility 5) OSCAR occupancy rate 6) for profit status and 7) whether facility was part of a chain.

Clinical Outcome Indicators: There has been considerable research focused on the different dimensions of health care quality¹⁶⁻¹⁹. While many argue about which dimensions of quality are the most salient, there is agreement that quality is multi-dimensional. Indeed, empirical work based on the MDS as well as other sources of patient level data have consistently found that there are multiple dimensions and that facilities that perform well in one domain of quality don't necessarily perform well in all^{16,19}. Thus, it is important to examine the relationship of medical staff models with a variety of quality measures. We chose measures that are theoretically likely to be affected by physician practice patterns. While it was understood that performance on most of these measures was not dependent on a sole discipline, in the end we chose items that were more "physician centric". In other words, physician performance was thought to be more directly linked to the outcome whether through the need to write a specific order or craft a diagnostic approach to a given problem. The selected measures also reflected a finite time frame wherein physician action would result in a given change. In particular, we used quality indicators from NH compare which measured long stay residents' prevalence of pain, restraint and catheter use, and from OSCAR which measured pressure ulcer and depression prevalence, pneumococcal and influenza vaccination rates, presence of advanced directives, and prescription of antibiotics.

Results

A series of multiple regressions were performed on the quality indicators as the dependent measures. First, a model was constructed consisting of the nursing home structural and staffing characteristics noted above and the adjusted R-square was noted. Then a second model was constructed adding the nursing home medical staff dimensions, as the predictor variables to the first model, and the adjusted R-square was noted. For the first three dimensions (staff composition, appointment process and documentation) the individual items that defined the dimension were entered individually. For the remaining dimensions, the scale subscores, computed by averaging the individual items in the dimension were entered into the regression. For example, under physician interdisciplinary involvement, a mean score was computed that averaged together the answers from the three items comprising the subscale, and the average was then entered into the regression equation. A change in adjusted R^2 was then calculated to determine whether the second model, which included both nursing home medical staff organization dimensions and the nursing home structural characteristics, significantly explained more variance in the quality indicators than the first model, indicating that there was a unique contribution of the medical staff organization dimensions.

Among the nine quality indicators, significant R^2 changes ($p < .05$) were found for restraint use and pneumococcal vaccination rates while near significant R^2 change ($p < .10$) was found for prevalence of pain, pressure ulcers, and catheter use. The results are presented in Table 2. As can be seen in Table 2, medical staff organization, as a whole, was significantly associated with quality outcomes above and beyond nursing home structural characteristics, i.e., after controlling for the nursing home structural characteristics variables, as hypothesized. No relationship was found between NHMSO and prevalence of advance directives, depression, influenza vaccination, and antibiotic use.

Discussion

This study is the first to demonstrate a relationship between medical staff organizational dimensions and clinical outcomes in the nursing home setting and as such represents an initial “proof of concept.” Extending logic applied to acute care hospitals several decades earlier, NHMSO should be considered as a potentially important mediating or moderating variable in the quality of care equation for nursing homes.

The NHMSO framework described in the present study might reasonably be considered as a “black box.” It is not known which specific facets of the nursing home medical staff organization are the most potent predictors of care outcomes. The inconsistent relationship between the NHMSO domains, as seen in the non-uniformity of the beta weights, speaks to the small sample size and the limited sensitivity of the outcome measures⁶. These relationships also demonstrate that the links between medical staff characteristics and quality is complex, similar to the relationships between single quality measures and overall quality¹⁶. Studies employing a much larger number of subjects as well as more physician centric quality measures (i.e. process based) will be necessary before arriving at any further definitive conclusions²⁰. Recent reports demonstrating a relationship between nurse and

certified nursing assistant hours per resident day and adherence to standardized medical treatment guidelines suggest new approaches to studying the impact of the medical staff on outcomes of care in the nursing home²².

For investigators accustomed to examining quality based on large administrative data sets, the NHMSO tool presents new challenges. As a self reported survey it requires considerably more time to complete and is predicated on individual medical director input. If, however, an institution's "culture" and the nature of relationships between professionals is essential in understanding the decision making process that ultimately drives care, then NHMSO-like tools will be invaluable and necessary in understanding the underpinnings of quality.

Some may question whether medical directors have the necessary insights in contrast to other nursing home leaders. The perception of nursing home physicians as "missing in action" and not professionally committed can now be contrasted to the facts²³. The respondents of the study describe practicing in the nursing home setting on average for almost two decades with the nursing home comprising up to one-quarter of their total practice income. Indeed, in many instances the medical director carries much greater seniority than their administrators and directors of nursing, where turnover remains a major problem

Several limitations of our study are noteworthy. Since the medical director subjects were randomly selected from among AMDA members it is impossible to determine whether the results generalize to non-AMDA medical directors. Contemporary surveys of medical directors, however, would indicate that AMDA members not only represent the majority of nursing homes in the United States but also mirror the training and commitment to non-AMD A physicians^{14,24}. While the relationship between NHMSO and Medicare derived quality measures was found to be significant, these measures are also clearly influenced by other professionals and systems of care. Testing new, more physician-centered measures (i.e., preventable hospitalizations) may make for an even more compelling case.

Conclusions

The NHMSO tool now sets the stage for several new lines of inquiry. Demonstrating the relationship between specific dimensions of NHMSO and clinical outcomes, when further validated, will likely inform future policy (i.e., encouraging closed medical staffs).

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Table 1
Nursing Home Medical Staff Organization Dimensions

Dimension 1: Composition of Staff

- how many attendings provide care
- do physician extenders see residents ^a
- extent of “closed staff model”^b

Appointment Process

- formal process for granting attending privileges^c
- does nursing home have a written contract with physicians^c
- does the nursing home employ physicians directly^c
- detail of bylaws^d

Documentation

Formal Review Process to evaluate physicians^c

Commitment:

Physician cohesion^h

- collegial relationships among the physicians^e
- decision-making process is consensus building^e
- great deal of organizational loyalty^e
- identifiable practice style which we all try to adhere^e

Leadership Turnover/Capability

- administrator turnover in the last five years
- director of nursing turnover in the last five years

Departmentalization:

Physician Supervision

- leadership style as involves checking up on physician^e
- quality of each physician's work is monitored closely^e

Physician Autonomy

- physician has greater freedom to act independently^e
- emphasis on physician individuality^e

Physician Interdisciplinary Involvement

- physician is primary nursing home representative for families^e
- physicians are expected to attend care plan meetings^e
- physicians are expected to assume the leadership role in team meetings^e

Informal Dynamics: Interpersonal Relationships

- quality of your relationship between medical director and administrator^f

- quality of your relationship between medical director and the director of nursing^f
- relationship between physicians and licensed nurses^{f,g}
- medical staff gets no respect in the nursing facility^{e,g}

Notes

^a Do nurse practitioners or physician assistants see residents in the facility

^b percent of residents whose attending is not a community based practitioners

^c measured by yes=1; no=0

^d measured on a 5 point scale anchored by not at all=0 somewhat=1 moderately=2 quite a bit=3 very=4

^e measured on a 5 point scale anchored by strongly disagree=1 disagree=2 neutral=3 agree=4 strongly agree=5

^f measured on a 5 point scale anchored by poor=1 fair=2 good=3 very good=4 excellent=5

^g reversed scored

^h subscore is computed by averaging the individual items

Table 2
Hierarchical Multiple Regression Analyses of Study Outcomes with NHMSO Dimensions as Predictors Controlling for Nursing Home Structural Variables

Model	Predictor Variables	Outcome Variables				
		Pain (long stay) <i>Beta</i> (<i>s.e.</i>)	Restraints (long stay) <i>Beta</i> (<i>s.e.</i>)	Pneumo-vaccine <i>Beta</i>	Pressure Ulcers <i>Beta</i>	Catheter <i>Beta</i> (<i>s.e.</i>)
1	Case mix (acuity index)	.31 (.20)	1.21 (.36)	.22 (1.77)	.61 (.22)	.36 (.22)
	Total nursing hours per day/resident	.85 (.44)	-.03 (.77)	-3.32 (3.90)	.58 (.49)	.18 (.48)
	Percentage of nursing staff that are RN	-.22 (1.41)	-3.45 (2.46)	12.29 (12.64)	-1.45 (1.59)	2.37 (1.56)
	Total Beds	.01 (.01)	-.01 (.01)	-.01 (.03)	.01 (.01)	-.01 (.01)
	For profit status	1.18 (.60)	2.46 (1.60)	-5.71 (5.44)	.46 (.68)	.06 (.67)
	If facility part of a chain	.15 (.57)	-.52 (1.00)	-9.85 (5.13)	.66 (.64)	1.25 (.63)
	Occupancy rate	-6.15 (2.40)	-9.11 (4.23)	24.28 (19.53)	.51 (2.45)	.18 (2.65)
	R² Model 1	.10	.16	.05	.09	.06
2	Case mix (acuity index)	.35 (.21)	1.30 (.37)	1.08 (1.83)	.60 (.23)	.27 (.24)
	Total nursing hours per day/resident	1.26 (.47)	.15 (.80)	-3.44 (4.03)	.48 (.51)	.01 (.51)
	Percentage of nursing staff that are RN	-1.01 (1.47)	-3.29 (2.53)	2.78 (13.08)	-1.44 (1.66)	2.03 (1.61)
	Total beds	.01 (.01)	.01 (.01)	-.01 (.03)	.01 (.01)	-.01 (.01)
	For profit status	1.40 (.61)	1.64 (1.06)	-1.90 (5.42)	-.01 (.69)	-.13 (.68)
	If facility part of a chain	.68 (.59)	-.29 (1.02)	-10.93 (5.24)	1.18 (.67)	1.30 (.65)
	Occupancy rate	-5.53 (2.45)	-6.84 (4.24)	20.66 (19.74)	1.56 (2.51)	-.61 (2.70)
	How many attending physicians provide care (composition of staff)	-.01 (.02)	-.03 (.04)	-.01 (.21)	-.04 (.03)	-.02 (.03)
	Do physician extenders see residents (composition of staff)	-.24 (.58)	.75 (1.01)	7.39 (5.03)	-.01 (.64)	1.11 (.64)
	Extent of "closed staff model" (composition of staff)	-.11 (.72)	1.11 (1.24)	20.31 (6.39)	-.96 (.81)	.35 (.80)
	Formal process for granting attending privileges (appointment process)	-.52 (.59)	-2.40 (1.02)	-6.16 (5.26)	1.13 (.67)	.48 (.65)
	Does nursing home have a written contract with physicians (appointment process)	-.82 (.80)	-1.35 (1.38)	6.75 (7.04)	-1.05 (.89)	-1.24 (.88)
	Does the nursing home employ physicians directly (appointment process)	-.98 (.99)	2.09 (1.72)	3.43 (8.20)	.76 (1.04)	3.56 (1.09)
	Detail of bylaws (appointment process)	-.33 (.26)	-.23 (.44)	1.70 (2.30)	-.71 (.29)	-.32 (.28)
	Physician cohesion scale (commitment)	.81 (1.83)	-5.81 (3.18)	5.35 (16.55)	-1.56 (2.10)	1.67 (2.02)
	Leadership turnover scale commitment)	-3.68 (2.09)	1.44 (3.61)	-21.03 (18.54)	-.35 (2.36)	-3.22 (2.30)

Model	Predictor Variables	Outcome Variables				
		Pain (long stay)	Restraints (long stay)	Pneumo-vaccine	Pressure Ulcers	Catheter
		<i>Beta (s.e.)</i>	<i>Beta (s.e.)</i>	<i>Beta</i>	<i>Beta</i>	<i>Beta (s.e.)</i>
	Physician supervision scale (departmentalization)	1.16 (1.36)	-.94 (2.35)	.90 (12.13)	.59 (1.54)	.27 (1.49)
	Physician autonomy scale (departmentalization)	3.79 (1.35)	-.36 (2.33)	-4.77 (11.99)	.24 (1.52)	.66 (1.49)
	Physician interdisciplinary involvement scale (departmentalization)	-1.47 (1.29)	4.06 (2.23)	-21.95 (11.41)	3.24 (1.45)	-2.67 (1.42)
	Formal review process (documentation)	.34 (.68)	-1.45 (1.18)	7.81 (6.06)	.82 (.77)	.71 (.75)
	Interpersonal relationships scale (informal dynamics)	1.57 (1.73)	3.50 (2.99)	13.76 (15.51)	-.23 (1.97)	-.19 (1.91)
	Constant	-2.18 (3.90)	-2.21 (6.74)	31.35 (33.10)	-2.67 (4.21)	3.33 (4.29)
	R² Model 2	.21	.28	.19	.20	.17
	R² Change	.11+	.12*	.13*	.11+	.14+