BRIEF REPORTS

Intern Call Structure and Patient Satisfaction

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Our institution has instituted "short-call" and "nightfloat" systems to reduce the number of admissions to the traditional "long-call" housestaff. However, the nightfloat system introduces increased discontinuity to patient care, and interns may spend less time with short-call patients because they are not required to spend the night on-call. Discontinuity and less time spent with patients may result in decreased patient satisfaction. Over a 6-month period, data were collected on 145 consecutive patients admitted to a teaching Veterans Affairs Medical Center with the primary diagnoses of congestive heart failure and chronic obstructive pulmonary disease. We found that patients admitted to either short-call or nightfloat interns were significantly less satisfied with their care than patients admitted to long-call housestaff, controlling for intern gender, patient age, and patient severity of illness ($p = .02$). Residency program directors need to realize that changes in the structure of teaching environment may have an impact on patient satisfaction.

KEY WORDS: **interns; on-call systems; patient satisfaction.**
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Long work hours leading to sleep-deprived housestaff have been perceived to contribute to adverse patient outcomes in teaching hospitals.[1–3] In addition, a greater housestaff workload has been thought to influence the care provided patients.[4–7] Strategies have been implemented at many teaching institutions to reduce housestaff work hours and workload. Our institution has implemented "nightfloat" and "short-call" systems into the traditional call structure, to reduce the number of admissions (and therefore the workload) to the on-call housestaff. However, nightfloat systems increase discontinuity of care for patients, and have sometimes been associated with adverse outcomes for patients.[8–10] Further, interns on short-call may spend less time with their admissions, as they are not required to spend the night on-call. Less time spent communicating with patients has been associated with decreased patient satisfaction.[11,12] Therefore, we hypothesized that patients admitted to short-call or nightfloat housestaff would be less satisfied with their house officer than if admitted to traditional long-call housestaff.

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METHODS

Data were collected from January through June 1995 on patients admitted to a university-affiliated teaching Veterans Affairs Medical Center with the primary admitting diagnoses of congestive heart failure (CHF) or chronic obstructive pulmonary disease (COPD). Patients with these diagnoses were chosen because data were already being collected in an ongoing study of quality of care for patients with these diagnoses. Patients were initially identified from the previous day's admission log in the admitting department, with the diagnosis confirmed by a trained research assistant from the admission orders and therapy instituted. The diagnosis was considered appropriate if the admitting team was treating the patient primarily for CHF (i.e., diuretics, angiotensin-converting enzyme inhibitors, fluid restriction) or COPD (i.e., steroids, bronchodilator therapy). Eligible patients included those who were verbal, not from a nursing home, and not admitted initially to an intensive care unit. Other data collected included patient age, primary intern's gender, and patient severity-of-illness, as measured by admission APACHE III score.[13] Patient length of stay was also noted, as we hypothesized that if patients admitted under the three call structures were truly similar, they would have similar lengths of stay. The satisfaction questionnaire was administered to patients on the day of discharge. Patients were specifically requested to consider satisfaction with their primary intern. We chose to focus on the patient's primary intern because interns admitted and cared for patients under all three call structures, and thus differences in patients' perceptions of interns after controlling for potential confounders might be explained by the call structure experiences. The research assistant administering the questionnaire was blinded to the study's purpose. The satisfaction questionnaire was the 10-item American Board of Internal Medicine recommended satisfaction instrument,[14] using a 5-point Likert-type scale (1 = excellent; 2 = very good, 3 = good, 4 = fair, 5 = poor).

Call Structure

During the study period, housestaff were on-call every fifth night on one of five general medicine inpatient teams.

A team was composed of two interns, one resident, one attending physician, and usually two medical students. Interns were considered to have primary responsibility for all patients, with the resident and attending physician functioning as supervisors. Teams did not admit patients the day after or before a 24-hour call day. On the subsequent 2 days, they would admit up to four patients per team, with short-call responsibility ending at 2:30 PM. Any patient admitted after 10:00 PM was admitted by a nightfloat resident, with subsequent care for that patient assumed by either a short-call or long-call team the next morning, with the nightfloat resident "checking out" to the team assuming responsibility at 8:00 AM. "Cross-coverage" for the nightfloat patients (i.e., if they developed problems between 10 PM and 8 AM after being formally admitted) was provided by the long-call housestaff. There was no nightfloat or short-call system on weekends, with all admissions for 24 hours going to the on-call team.

Analysis

Focused contrast (long-call vs short-call or nightfloat) analyses of variance were initially performed to examine differences in potential subgroups according to patient age, patient severity of illness, intern gender, length of stay, and satisfaction. Further analysis was with multivariable regression, assessing the association of call structure (nightfloat vs short-call vs long-call) with patient satisfaction, controlling for intern gender, patient severity-of-illness, and patient age. For linear regression analyses, the mean satisfaction score was considered a continuous variable. In logistic regression analyses, satisfaction was dichotomized as receiving excellent ratings on all items versus not receiving excellent ratings on all items. Because the results led to the same conclusions, only those for linear regression will be presented here.

RESULTS

Of the 156 eligible patients, 9 died during their hospitalization. Of the 147 remaining patients, 145 (98%) completed the questionnaire regarding 44 different interns, with 87 patients having the primary diagnosis of COPD and 58 having CHF. All were male, with an average age of 68.6 (±7.2) years, and a mean admission APACHE score of 31.8 (±10.2). Eight patients were represented twice in the study because they had multiple admissions. For the 44 interns, 12 were women, 35 were internal medicine (or medicine/pediatrics) housestaff, and 33 were U.S. medical graduates.

Table 1 presents the mean patient age, APACHE III score, and percentage of women interns for patients admitted under the three call structures, with no significant differences noted for these covariates. The lengths of stay were also similar for patients in the three call structures. However, significant differences were noted for the mean patient satisfaction ratings, ($F_{1,143} = 4.59$; $p = .03$) and the percentage of patients who indicated all 10 ratings of the intern were excellent ($F_{1,143} = 5.20$; $p = .02$), with patients admitted to long call interns significantly more satisfied. In the multiple regression analysis, controlling for resident gender, APACHE score, and patient age, the type of call system a patient was admitted to remained a significant predictor of patient satisfaction ($F_{1,141} = 5.61$; $p = .02$). Younger patient age was associated with less satisfaction, with no other variable achieving statistical significance ($F_{1,141} = 4.07$; $p = .05$).

DISCUSSION

Our results suggest that both short-call and nightfloat call structures are associated with decreased patient satisfaction compared with the traditional long-call structures, at least for patients with CHF and COPD. Other studies have suggested that patients who were admitted to or cared for by nightfloat or "cross-cover" housestaff may be more likely to have a medical complication,[8,10] and may have more tests ordered for them.[9] Our study extends the literature in this field, suggesting that patient satisfaction is another outcome which may be affected by strategies to reduce housestaff workload or work hours.

Table 1. Characteristics and Satisfaction of Patients Admitted in Three Different Call Structure Systems

	Call Structure			
	Long-Call	Short-Call	Nightfloat	*p* Value
Characteristics				
Number of patients	71	52	22	
Mean patient age, years (±SD)	68.9 ± 6.8	68.7 ± 7.8	67.5 ± 7.4	.49
Mean APACHE III score (±SD)	31.7 ± 9.2	30.1 ± 9.2	35.2 ± 12.9	.57
Intern gender, % female	28	25	27	.82
Mean length of stay, days (±SD)	5.5 ± 3.3	5.6 ± 3.5	5.9 ± 3.8	.88
Outcomes				
Mean satisfaction score (±SD; 1 = all excellent)	1.4 ± 0.7*	1.8 ± 1.0	1.8 ± 1.1	.03
All excellent, %	46*	29	30	.02

**By focused contrast analysis of variance.*

Our study has several limitations. First, this study is of one institution, was only of male patients, and was only of patients with two diagnoses. Future studies would need to investigate effects on satisfaction for a wider array of patient diseases, and for patients of both genders. Second, patient satisfaction often reflects satisfaction with the "system," or in a teaching institution, the team of doctors. Although our instrument specifically refers to the patient's primary physician, we cannot be sure that patients were not responding to these more global "system" influences. However, patients admitted to nightfloat or short-call care were less satisfied, whether one considers them admitted to an intern or a team of doctors. Further, short-call and nightfloat patients were equally dissatisfied, which suggest it was not simply a function of nighttime personnel. Third, selection bias could be operating in unmeasured ways to influence patient assignment to interns in the various call structures, although there was no difference in patients admitted in the three call structures in terms of measured qualities of severity of illness, age, resident gender, or length of stay. Fourth, reproducible evaluations of satisfaction with a particular house officer generally require up to 20 evaluations with our particular instrument,[15] and we averaged 3.3 per house officer. However, for the purpose of this study, we were concerned with the ratings a group of housestaff received depending on when their patient was admitted, rather than satisfaction with individual housestaff. Fifth, our outcome of patient satisfaction with one intern is a relatively narrow outcome. Whether call structure is associated with other adverse (or improved) outcomes such as overall patient satisfaction, morbidity, mortality, and costs is beyond the scope of our study and is an area of future research. Sixth, our study cannot definitely answer why certain call structures were associated with decreased satisfaction. Aspects of the call structure that could plausibly influence patient satisfaction include discontinuity (nightfloat) and less time with the patient (short-call), but these were not quantified in this study.

Nevertheless, despite these limitations, we conclude that patients with CHF and COPD admitted to traditional long-call housestaff are more satisfied with their intern than those admitted to nightfloat or short-call housestaff. Although reform of residency work hours would seem essential for the well-being of housestaff, and probably for the care of their patients, residency program directors must realize that changes in the teaching environment or in the call structure may not have a positive impact on patient satisfaction and other outcomes. If our findings are replicated on a larger scale in more comprehensive studies, then this would suggest that to reduce housestaff workload or work hours, teaching hospitals may need to consider strategies other than nightfloat or short-call systems.

REFERENCES

1. McCall TB. The impact of long work hours on resident physicians. N Engl J Med. 1988;318:775–8.
2. Green MJ. What (if anything) is wrong with residency overwork? Ann Intern Med. 1995;123:512–7.
3. Asch DA, Parker RM. The Libby Zion case: one step forward or two steps backward? N Engl J Med. 1988;318:771–5.
4. Davidoff F, Nolan JP, and the Editorial Policy Committee of the American College of Physicians. Working conditions and supervision for residents in internal medicine programs: recommendations. Ann Intern Med. 1989;110:647–53.
5. Hillson SD, Dowd B, Rich EC, Luxenberg MG. Call nights and patient care: effects on inpatients at one teaching hospital. J Gen Intern Med. 1992;7:405–10.
6. Griffith CH, Rich EC, Wilson JF. Housestaff's knowledge of their patients social histories. Acad Med. 1995;70:64–6.
7. Meltzer DO, Hiltz F, Bates B. Effects of houseofficer workload on length of stay in traditional and managed care medical services. J Gen Intern Med. 1996;11S:81.
8. Laine C, Goldman L, Soukup JR, Hagen JG. The impact of a regulation restricting medical housestaff hours on the quality of patient care. JAMA. 1993;269:374–8.
9. Lofgren RP, Gottlieb DJ, Wilkins RA, Rich EC. Post-call transfer of resident responsibility: effects on patient care. J Gen Intern Med. 1990;5:501–5.
10. Peterson LA, Brennan TA, O'Neill AC, Cook EF, Lee TH. Does housestaff discontinuity of care increase the risk for preventable adverse events? Ann Intern Med. 1994;121:868–72.
11. Hall JA, Roter DL, Katz NR. Meta-analysis of correlates of provider behavior in medical encounters. Med Care. 1988;26:657–75.
12. Smith CK, Polis E, Hadac RR. Characteristics of the initial medicine interview associated with patient satisfaction and understanding. J Fam Pract. 1981;12:283–8.
13. Knaus WA, Wagner DP, Dryer EA, et al. The Apache III Prognostic System. Risk prediction of hospital mortality for critically ill hospitalized adults. Chest. 1991;100:1619–36.
14. PSQ Project Co-investigators. Final Report on the Patient Satisfaction Questionnaire Project. Washington, DC: American Board of Internal Medicine; 1989:2e-1.
15. Tamblyn R, Benoraya S, Snell C, McLeod PJ, Schnarch B, Abrahamowicz M. The feasibility and value of using patient satisfaction ratings to evaluate internal medicine residents. J Gen Intern Med. 1994;9:146–52.