2014

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Abstract

Implementation of the 2003 Accreditation Council for Graduate Medical Education (ACGME) resident duty-hour regulations and access to publicly reported patient satisfaction measures have challenged administrators and clinicians to balance resident's educational experience, patient care quality, and patients' satisfaction and perceptions. A pre-post retrospective study design investigated association between implementation of ACGME regulations and patient satisfaction/perceptions using multinomial logistic regressions. The sample consisted of all surgical inpatients (July 2001 – June 2005), who responded to surveys at an academic medical center. Patients gave lower ratings for physician interactions (patient-physician interaction time, clinical updates, and courtesy) following the implementation of post-duty hour regulations. While the odds of patients rating *"below good"* post-implementation for physician survey questions (i.e., related to time spent, kept informed, and friendliness/ courtesy) were higher (i.e., 1.25 to 1.3) as compared to odds of rating "*very good*", the overall rating of quality care improved post-implementation. This difference could be due to increased interaction of patients with other hospital personnel. To improve patient satisfactions and in turn their perceptions, initiatives such as workload balancing, hand-off protocols, patient communication, and interactive training for care providers are recommended. Finally, residency programs and institutions need to develop strategies for implementation of current and future ACGME duty hour regulations so as to balance patient safety, patient perceptions, and resident well-being.

Keywords

ACGME resident duty hour regulations, patient perceptions, patient satisfaction, physician-patient interactions

Background

Residency programs have been in existence for over one hundred years and little about them has changed.[1] Prolonged duty periods and excessive fatigue are very common in medical residency programs and can lead to serious resident errors. Foresman (2005) reported that 34% and 64% of residents were acutely and chronically sleep deprived, respectively[2]. Residents also admitted to either writing notes (69%) or reviewing medication lists (61%) while dozing. In addition, 41% of residents surveyed cited fatigue as the cause of their most serious error with nearly one-third of fatigue-related errors resulting in patient deaths.[2]

On July 1, 2003 the Accreditation Council for Graduate Medical Education (ACGME) implemented universal resident duty hour regulations, which limits residents to an 80-hour workweek averaged over four weeks and include a 30-hour limit on continuous duty time. The rule also calls for one in seven days free from all patient care responsibilities and in-house call no more than once every three nights, both averaged over four weeks.[3] The revised regulations took effect July 1, 2011 and continued to call for an 80-hour weekly limit, one-day-off-in-seven, and call every third night, but also stipulated that the duty hours are inclusive of all in-house call activities and moonlighting and that periods of duty for first-year residents must not exceed 16 hours in duration. These resident regulations were enacted to protect and improve patient safety and clinical outcomes, resident experience and quality of life, and the resident's educational experience.[4]

Despite the intent to improve resident quality of life and patient care, 35% of general surgery residents in New York indicated that the regulations have negatively impacted the

quality of patient care, while 60% cite a negative impact on continuity of care.[5] In addition, 68% of trauma residents felt that patient care had suffered as a result of the duty hour regulations.[6] Patient information was often lost or failed to be transmitted because of increased resident sign-outs and cross-covering, requiring additional oversight from attending physicians.[6] After the revised 2011 regulations were implemented, surgical interns at 11 university programs reported lower coordination of patient care, reduced continuity with hospitalized patients, and lesser time spent in the operating room.[7] In addition, the majority of the interns believed that the new standards have resulted in either similar or increased resident fatigue. Following the revised 2011 regulation implementation, reviewed literature reported no difference in hours slept, depressive symptoms or well being scores of residents, while residents' concerns of making medical errors has increased by 3.4%.[8]

Patient satisfaction and perceptions are important factors that must be addressed to obtain a comprehensive understanding of the full impact of the resident duty hour regulations. Since 2003, there has been a significant emphasis on public reporting of patients' perceptions of hospital care with the introduction of Hospital Consumer Assessment of Healthcare Providers and Services (HCAHPS)[9], the first national, publicly reported survey of patients about their experience and satisfaction with their care.[10] Patient satisfaction can be thought of as a distillation of perceptions and values[11]; values are the weights patients apply to those occurrences and reflect the degree to which patients consider the specific occurrences to be desirable, expected, or necessary. The measurement of patient satisfaction fulfills four functions, namely understanding patients' experiences of health care, promoting cooperation with treatment, identifying problems in health care, and evaluation of health care.[12]

Based on literature, there is a strong association between patient's health status and their patient satisfaction/perceptions.[11] It has been shown that patient satisfaction can be linked to improved compliance with treatment, maintenance of primary care physician, and improved health status.[13] Patients and their families have often reported frustration when their care is juggled among multiple physicians and physician teams [1]. In addition, exhausted interns have a reduced ability to empathize with patients.[14] These findings are important in understanding potential effects of the ACGME duty hour regulations on patient perceptions. A study of adult inpatients in three teaching hospitals demonstrated that nearly one-third were concerned about resident fatigue and frequent care hand-offs.[15] The ACGME duty hour regulations have caused concern among residents and faculty in terms of the potential impact on quality of care, especially care coordination, resident satisfaction and meaningful surveys of residents and faculty.

Typically patient's inpatient experiences and other factors (i.e., age, and gender, among others) shape their perceptions of care which are expressed as responses to the patient satisfaction surveys. Thus, the purpose of this study was to examine if the 2003 ACGME regulations had any effect on surgical patients' perception of their care, measured through patient satisfaction, at a large 672-bed academic medical center (AMC). Surgical patients were selected as the focus of this analysis because the duty hour regulations created a greater change in work hours and coverage patterns for surgical residents than medical residents. In addition, medical residents had more of an established pattern of sharing the care of patients and more limitations on their work hours than surgical residents did at the AMC being studied before the 2003 regulations took effect. The resulting alternate hypothesis was that implementation of the ACGME resident duty hour regulations would decrease the patient satisfaction and in turn perceptions related to physician factors and perceived quality of care.

Methods

A pre-post study design with retrospective review of records that had been collected for other patient engagement purposes was employed. A convenience sampling, consisting of all patients who returned completed patient satisfaction surveys was used to compare pre-implementation (July 1, 2001 through June 30, 2003) and post-implementation (July 1, 2003 through June 30, 2005) patient satisfaction scores for seven different questions from patient surveys administered by Press Ganey Associates. Based on conversations with the administrators, July 1, 2003 through June 30, 2005 was chosen as the post implementation timeframe as it represents not only good compliance to the 2003 ACGME regulations by the surgical residents but also there were no major modifications/changes (e.g., operational workflow and surgical volume) at the surgical units of the study AMC. With no specific interventions in place to expand survey participant population, the type of survey respondents were expected to be similar for the two study timeframes, negating any selection biases. The survey questions included five individual physician-related questions ('time physician spent with you', 'physician concern for questions/worries', 'physician kept you informed', 'friendliness/courtesy of physician', and 'skill of physician'), one aggregate physician-related question and one 'overall rating of care given' question. Though the pre- and post-implementation data consisted of different patients, the two samples were similar in terms of patient mix except for age (Table 1).

The Press Ganey survey – a nationally recognized patient satisfaction measurement service – ask questions about typical experiences of a patient that he or she encounters

during a hospital stay, such as admission, meals, tests, treatments, and discharge.[16] The instrument consists of a few demographic questions and twenty-nine service issue questions that ask the patient to rate various aspects of the visit on a five point Likert-type scale.[17] The survey questions have widely be used for patient satisfaction/perceptions related research.[16,18] The surveys were mailed out within five days of discharge and each patient was surveyed no more than once every three months. The patient satisfaction scores for the five physician-related questions and one 'overall rating of care' question were grouped into three categories: (1) *very poor, poor, and fair* (original score range of 1 to 3; henceforth referred as *"below good"*), (2) *"good"*(original score range of 4), and (3) *"very good"*(original score range of 5). For institutes the difference between receiving *"good"* versus *"very good"* rating can affect their relative peer-to-peer patient experience/perception rankings and also associated value based purchasing compensation. In addition, the response distributions for patient satisfaction questions are typically expected to be skewed to the right side with the majority of response occurring between *"good"* and *"very good"* with very few at or below the fair categories. Thus to differentiate between excellent, acceptable, and below expectations patient satisfaction, this three category grouping scheme was adopted. Similarly, an overall satisfaction with physician scale score was calculated by summing the five individual physician satisfaction-related scores and then collapsing scores into three categories: (1) *very poor, poor and fair* (original score range of 5 to 15; hence forth referred as *"below good"*), (2) *"good"*(original score range of 16 to 20), and (3) *"very good"*(original score range of 21 to 25).

The moderating variables included patients' age (i.e., 18-40; 41-64; 65-89), gender (i.e., male/female), and self-reported rating of health post patient discharge (very poor, poor, and fair (hence forth referred as *"below good"*); *"good"*; and *"very good"*). The intervening variables, which were resident level of training, type of residency program, and number of residents per program, were not considered due to the inability to obtain accurate measurements. The analysis was conducted using SPSS (version 16) statistical software and included descriptive statistics, chi-square tests, and multiple multinomial logistic regressions. For multinomial logistic regressions, levels *"below good"* and *"good"* were compared with the *"very good"* group. The study AMC Institutional Review Board granted exempt approval for this study.

Results

A total sample size of 7,487 (pre-implementation n = 4,031 and post-implementation n = 3,456) patients were examined over the course of the four years (Table 1). About 25% of patients reported *"very good"* health both

pre- and post-implementation periods. The majority of the patients were females (>56%) while the older patients (age group 64 through 89) constituted 33.1% and 37.1% during pre- and post-implementation of duty hour regulations, respectively.

Based on the chi-square test, statistical significance was observed for the following patient satisfaction questions: (1) 'time physician spent with you', (2) 'physician kept you informed' and (3) 'overall rating of care given' (Table 1) following implementation of the duty hour regulations. During post-implementation, patients' ratings of 'time physician spent with you' and 'physician kept you informed' as *"below good"* increased by 2.47% and 1.76%, respectively, indicating a higher degree of dissatisfaction after implementation of the duty hour regulations. Patient perception of 'overall rating of care' shifted from *"good"* to either *"below good"* (by 0.81%) or *"very good"* (by 1.95%) during post-implementation. The other four physician-related patient satisfaction questions were not statistically significant (p>0.05) between pre- and post-ACGME implementation of duty hour restriction. The chi-square tests were significant for both age and health status across six of the seven patient satisfaction questions (Table 2). Sixty percent of the older patients were very satisfied with 'time physician spent with you' compared to 44.64 % of younger patients. Similarly, 11.6% of the younger patients (n=1,129) were not satisfied (i.e., *"below good"*) with how 'physician kept you informed' compared to 7.65% of the older patients. Three to four percent more males felt very satisfied as compared to females for the 'time physician spent with you' and 'physician kept you informed' questions, which were statistically significant (p<0.05).

The multinomial logistic regressions provided similar results to the chi-square results after controlling for age, gender, and health status. Post implementation of ACGME regulations, the odds of a patient rating *"below good"* increased (i.e., between 25% to 30% higher odds) as compared to the odds of a patient rating of *"very good"* for the following physician patient satisfaction questions: (1) 'time physician spent with you'(OR = 1.26, 95%CI (1.1 < OR < 1.44), p < 0.001), (2) 'physician kept you informed' (OR = 1.25; 95%CI (1.07 < OR < 1.47) , p=0.005), and (3) 'friendliness/courtesy of physician' (OR = 1.3; 95% CI (1.05 < OR < 1.6) , p=0.016) (Table 3 and Figure 1). During post-implementation of the ACGME resident duty hour regulations, the odds of rating the 'overall rating of care' as *"good"* was reduced by 11% as compared to odds of providing a rating of *"very good"*(OR = 0.89; 95%CI (0.8 < OR < 0.99) , p=0.037) (Table 3 and Figure 1). The odds of younger patients rating all the seven patient satisfaction related questions *"below good"* ranged from 1.79 to 3.08 (p<0.00001) times higher post implementation of ACGME regulations as compared to the odds of rating

Table 1. Descriptive and bivariate statistics for ACGME implementation of duty hour regulations

Patient satisfaction questions	ACGME implementation of duty hour regulations		Significance (p)
	Pre (n= 4031)	**Post (n=3456)**	
Time physician spent with you, n (%)			**0.0073***
Below good	548 (13.59%)	555 (16.06%)	
Good	1296 (32.15%)	1047 (30.3%)	
Very good	2187 (54.25%)	1854 (53.65%)	
Physician concern questions/worries, n (%)			0.2690
Below good	313 (7.76%)	304 (8.8%)	
Good	1096 (27.19%)	926 (26.79%)	
Very good	2622 (65.05%)	2226 (64.41%)	
Physician kept you informed, n (%)			**0.0360***
Below good	356 (8.83%)	366 (10.59%)	
Good	1073 (26.62%)	895 (25.90%)	
Very good	2602 (64.55%)	2195 (63.51%)	
Friendliness/courtesy of physician, n (%)			0.1204
Below good	181 (4.49%)	191 (5.53%)	
Good	946 (23.47%)	801 (23.18%)	
Very good	2904 (72.04%)	2464 (71.3%)	
Skill of physician, n (%)			0.2403
Below good	60 (1.49%)	65 (1.88%)	
Good	641 (15.9%)	517 (14.96%)	
Very good	3330 (82.61%)	2874 (83.16%)	
All physician questions, n (%)			0.2512
Below good	132 (3.27%)	138 (3.99%)	
Good	789 (19.57%)	671 (19.42%)	
Very good	3110 (77.15%)	2647 (76.59%)	
Overall rating of care given, n (%)			**0.0122***
Below good	197 (4.89%)	197 (5.70%)	
Good	1110 (27.54%)	856 (24.77%)	
Very good	2724 (67.58%)	2403 (69.53%)	
Sex, male, n (%)	1716 (42.57%)	1520 (43.98%)	0.2190
Age group (years) n (%)			**<0.001***
18-40	680 (16.87%)	449 (12.99%)	
41-64	2017 (50.04%)	1725 (49.91%)	
65-89	1334 (33.09%)	1282 (37.09%)	
Health status n (%)			0.5990
Below good	1035 (25.68%)	881 (25.49%)	
Good	1950 (48.38%)	1643 (47.54%)	
Very good	1046 (25.95%)	932 (26.97%)	

Table 2. Bivariate chi square test results

| Patient satisfaction questions		Gender		Age			Health status		
		Male (n=3236)	Female (n=4251)	18-40 (n=1129)	41-64 (n=3742)	65-89 (n=2616)	Below good (n=476)	Good (n=1440)	Very good (n=5571)
Time physician spent with you	Below good	433 (13.38%)	670 (15.76%)	247 (21.88%)	575 (15.37%)	281 (10.74%)	80 (16.81%)	232 (16.11%)	791 (14.2%)
	Good	981 (30.32%)	1362 (32.04%)	378 (33.48%)	1187 (31.72%)	778 (29.74%)	149 (31.3%)	455 (31.6%)	1739 (31.22%)
	Very good	1822 (56.3%)	2219 (52.2%)	504 (44.64%)	1980 (52.91%)	1557 (59.52%)	247 (51.89%)	753 (52.29%)	3041 (54.59%)
Physician concern questions/ worries	Below good	254 (7.85%)	363 (8.54%)	123 (10.89%)	328 (8.77%)	166 (6.35%)	46 (9.66%)	130 (9.03%)	441 (7.92%)
	Good	843 (26.05%)	1179 (27.73%)	346 (30.65%)	977 (26.11%)	699 (26.72%)	141 (29.62%)	420 (29.17%)	1461 (26.23%)
	Very good	2139 (66.1%)	2709 (63.73%)	660 (58.46%)	2437 (65.13%)	1751 (66.93%)	289 (60.71%)	890 (61.81%)	3669 (65.86%)
Physician kept you informed	Below good	306 (9.46%)	416 (9.79%)	131 (11.6%)	391 (10.45%)	200 (7.65%)	53 (11.13%)	148 (10.28%)	521 (9.35%)
	Good	802 (24.78%)	1166 (27.43%)	335 (29.67%)	958 (25.6%)	675 (25.8%)	137 (28.78%)	416 (28.89%)	1415 (25.4%)
	Very good	2128 (65.76%)	2669 (62.79%)	663 (58.72%)	2393 (63.95%)	1741 (66.55%)	286 (60.08%)	876 (60.83%)	3635 (65.25%)
Friendliness/ courtesy of physician	Below good	164 (5.07%)	208 (4.89%)	83 (7.35%)	194 (5.18%)	95 (3.63%)	33 (6.93%)	78 (5.42%)	261 (4.68%)
	Good	717 (22.16%)	1030 (24.23%)	297 (26.31%)	869 (23.22%)	581 (22.21%)	121 (25.42%)	374 (25.97%)	1252 (22.47%)
	Very good	2355 (72.78%)	3013 (70.88%)	749 (66.34%)	2679 (71.59%)	1940 (74.16%)	322 (67.65%)	988 (68.61%)	4058 (72.84%)
Skill of physician	Below good	54 (1.67%)	71 (1.67%)	33 (2.92%)	63 (1.68%)	29 (1.11%)	15 (3.15%)	34 (2.36%)	76 (1.36%)
	Good	467 (14.43%)	691 (16.25%)	220 (19.49%)	531 (14.19%)	407 (15.56%)	93 (19.54%)	271 (18.82%)	794 (14.25%)
	Very good	2715 (83.9%)	3489 (82.07%)	876 (77.59%)	3148 (84.13%)	2180 (83.33%)	368 (77.31%)	1135 (78.82%)	4701 (84.38%)
All physician questions	Below good	116 (3.58%)	154 (3.62%)	62 (5.49%)	134 (3.58%)	74 (2.83%)	28 (5.88%)	52 (3.61%)	190 (3.41%)
	Good	592 (18.29%)	868 (20.42%)	275 (24.36%)	718 (19.19%)	467 (17.85%)	96 (20.17%)	336 (23.33%)	1028 (18.45%)
	Very good	2528 (78.12%)	3229 (75.96%)	792 (70.15%)	2890 (77.23%)	2075 (79.32%)	352 (73.95%)	1052 (73.06%)	4353 (78.14%)
Overall rating of care given	Below good	153 (4.73%)	241 (5.67%)	90 (7.97%)	207 (5.53%)	97 (3.71%)	29 (6.09%)	93 (6.46%)	272 (4.88%)
	Good	850 (26.27%)	1116 (26.25%)	356 (31.53%)	984 (26.3%)	626 (23.93%)	155 (32.56%)	454 (31.53%)	1357 (24.36%)
	Very good	2233 (69%)	2894 (68.08%)	683 (60.5%)	2551 (68.17%)	1893 (72.36%)	292 (61.34%)	893 (62.01%)	3942 (70.76%)

Note: Significance at P <0.05. Areas highlighted in grey represent statistically significant relationship between corresponding variables.

Table 3. Multinomial logistic regression - pre and post implementation of ACGME duty hour regulations

Patient satisfaction scores	Variables	Time physician spent with you	Physician concern questions/ worries	Physician kept you informed	Friendliness/ courtesy of physician	Skill of physician	All physician questions	Overall rating of care given
Below good	Implementation Status- Post	1.26* (1.1 - 1.44)	1.18 (1 - 1.4)	1.25* (1.07 - 1.47)	1.3* (1.05 - 1.6)	1.32 (0.93 - 1.89)	1.28 (1 - 1.63)	1.18 (0.96 - 1.45)
Age	18-40	2.76* (2.26 - 3.38)	2.02* (1.57 - 2.6)	1.79* (1.41 - 2.28)	2.44* (1.79 - 3.34)	3.08* (1.84 - 5.15)	2.32* (1.63 - 3.31)	2.63* (1.94 - 3.57)
	41-64	1.61* (1.37 - 1.88)	1.43* (1.17 - 1.74)	1.44* (1.2 - 1.73)	1.52* (1.18 - 1.96)	1.52 (0.97 - 2.37)	1.32 (0.99 - 1.77)	1.57* (1.23 - 2.02)
Gener	Gender - male	0.88 (0.77 - 1.01)	0.96 (0.81 - 1.14)	0.99 (0.84 - 1.16)	1.12 (0.9 - 1.39)	1.11 (0.77 - 1.6)	1.06 (0.82 - 1.36)	0.92 (0.74 - 1.14)
	Below good	1.49* (1.24 - 1.8)	1.5* (1.19 - 1.9)	1.48* (1.19 - 1.84)	1.66* (1.24 - 2.24)	2.5* (1.53 - 4.1)	1.55* (1.1 - 2.18)	1.79* (1.35 - 2.38)
Health Status	Good	1.4* (1.18 - 1.65)	1.34* (1.08 - 1.65)	1.37* (1.13 - 1.67)	1.41* (1.08 - 1.85)	1.36 (0.83 - 2.21)	1.28 (0.94 - 1.75)	1.31* (1.01 - 1.7)
Good	Implementation Status- Post	0.97 (0.88 - 1.08)	1.01 (0.91 - 1.12)	1.01 (0.9 - 1.12)	1.02 (0.91 - 1.13)	0.95 (0.84 - 1.08)	1.02 (0.91 - 1.15)	0.89* (0.8 - 0.99)
Age	18-40	1.5* (1.28 - 1.77)	1.33* (1.13 - 1.56)	1.31* (1.11 - 1.54)	1.34* (1.13 - 1.58)	1.36* (1.13 - 1.63)	1.56* (1.31 - 1.86)	1.63* (1.39 - 1.91)
	41-64	1.2* (1.07 - 1.34)	1 (0.89 - 1.13)	1.03 (0.91 - 1.16)	1.08 (0.96 - 1.22)	0.9 (0.78 - 1.03)	1.1 (0.97 - 1.25)	1.17* (1.04 - 1.32)
Gener	Gender – male	0.92 (0.83 - 1.02)	0.93 (0.84 - 1.04)	0.89* (0.8 - 0.99)	0.92 (0.82 - 1.03)	0.89 (0.78 - 1.02)	0.92 (0.81 - 1.03)	1.05 (0.94 - 1.17)
	Below good	1.33* (1.15 - 1.53)	1.53* (1.32 - 1.78)	1.69* (1.46 - 1.97)	1.63* (1.4 - 1.91)	2.16* (1.79 - 2.6)	1.76* (1.49 - 2.08)	1.98* (1.71 - 2.3)
Health Status	Good	1.42* (1.25 - 1.61)	1.45* (1.27 - 1.65)	1.62* (1.42 - 1.85)	1.53* (1.34 - 1.76)	1.78* (1.5 - 2.11)	1.55* (1.34 - 1.8)	1.52* (1.32 - 1.73)

Note: Significance at P <0.05. Reference categories: Patient satisfaction scores - Very good, Age - 65-89, Gender - Female, Health status - Very good. Values in cell are Odds ratios with significance and confidence intervals for the odds ratios.

Figure 1. Multivariate results for physician patient satisfaction questions and ACGME duty hour regulations.
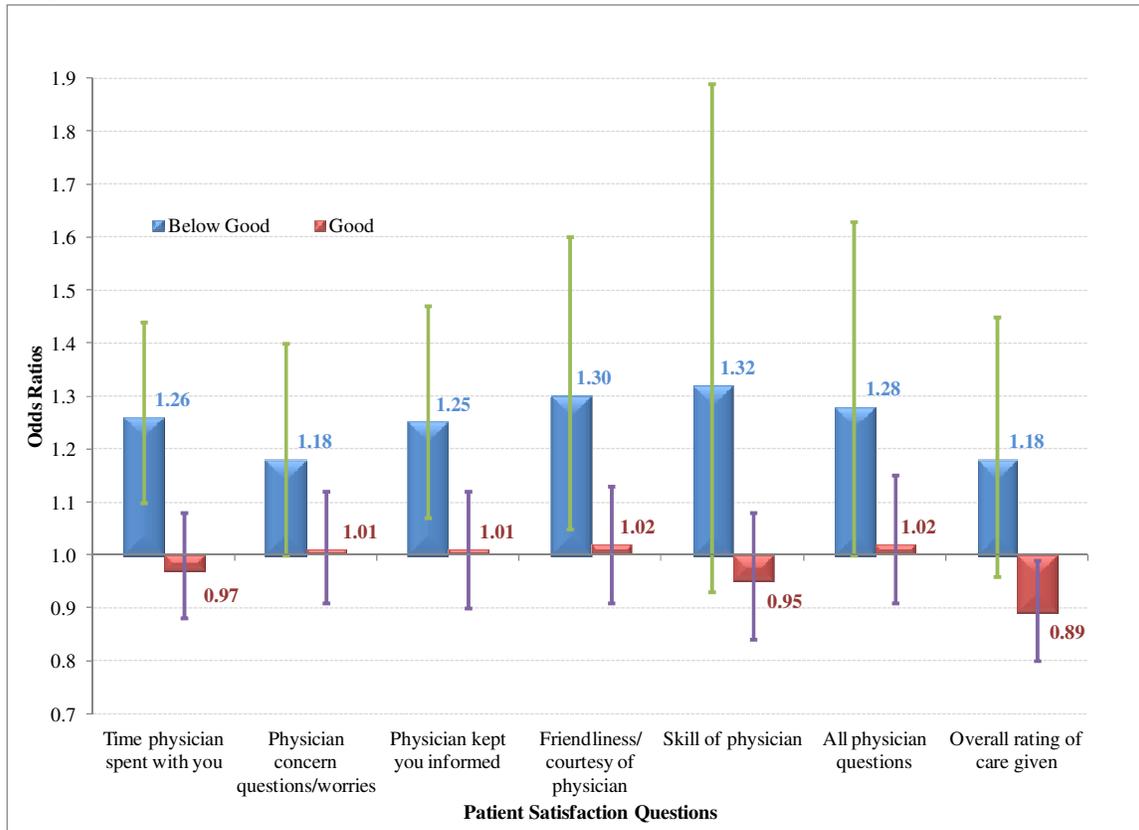
Note: Reference groups: Implementation status – Pre for ACGME duty hour regulations and very good for physician patient satisfaction responses.

them "*very good*". Similarly healthy patients (self-rating of *good*) had the odds of rating all the seven patient satisfaction questions as *"good"* were 1.42 to 1.78 (p<0.00001) higher as compared to the odds of rating these questions as "*very good*".

Discussion

The results of the study indicate that after implementation of the ACGME regulations, there was an increase in the proportion of patients not satisfied (rating of "*below good*") with the care provided by physicians in relation to 'time physician spent with you'(i.e., patient-physician interaction time), 'physician kept you informed' (i.e., clinical updates) and 'friendliness/courtesy of physician' questions, while the 'overall rating of care given' at the AMC improved after controlling for age, gender, and health status. Similar to other observations in the literature[11, 13], in our study patient's health status was one of the main contributors towards patient satisfaction/ perceptions. Younger patient aged 18-40 years (15% of the sample) were less satisfied. Younger patients typically tend to expect a quick and high quality service that includes not only clinical care and outcomes but also quality patient experiences.

Though the Press Ganey physician-related satisfaction questions are structured to capture information about the patient's main or attending physician, patients are likely unable to distinguish among the team of physicians (i.e., attending physicians, residents, consulting physicians, and medical students). Thus, the satisfaction ratings are likely based on collective patient experiences and perceptions of care with all these providers. With the ACGME regulations, the residents have restricted work schedules while the patient census/surgical volume remained unchanged at the AMC. This resulted in additional workload that was shared by the attending physician and other hospital staff. As a consequence of additional work, attending physicians may have reduced their time spent with patients. In addition, the residents may have been trying to adjust to the standards and could have been struggling to see the same number of patients in a shorter time period. This increased time pressure could result in only essential communication with limited or no opportunity for patient questions. This could be perceived by the patients as being unfriendly/ non-courteous as well as feeling less informed about their treatment plans. The involvement of hospital staff in patient care, especially nurses, along with a positive clinical outcome of the

patients' hospital stay, may have resulted in improvement of 'overall rating of care'.

Resident-patient communication and interaction guidelines and training should be investigated to improve patient satisfaction and perceptions of care. One approach to improve patient satisfaction/ perceptions of care is to reassign non-educational tasks from residents to other appropriate hospital personnel, including hospitalists, advanced practice nurses, physician assistants, laboratory personnel, and social worker, and/or other allied health professionals. Another option for improving patient perception of time spent with their physicians is to improve the quality of conversations between patients and physicians or the specific verbal and nonverbal approaches and "scripts" used, especially for younger patients. Patients provide clues about the personal aspects of their lives or emotions more than 50% of the time during patient/physician conversations.[19] Moreover, visits where physicians missed detecting an important aspect of the patient's life during their conversations tended to be longer than visits where physicians picked up on these clues and acted on them. A nonjudgmental and more counseling-oriented approach by physicians during their conversations with patients has been found to be effective at getting positive results from patients.[20] In addition to the words that physicians use to communicate with patients, the tone of voice has been shown to have an impact on patient satisfaction.[21] Thus, communication effectiveness training for physicians could improve the quality of the conversations that they have with their patients and thus improve patients' perception of the time spent with them as well as more effective, rewarding interactions for physicians. In addition, the training should also include interaction and communication with younger patients, who tend to be less satisfied and expect prompt service and timely updates. Institutions may also consider implementing systems to help streamline some common processes. For example, a web-based tracking system can aid in the reporting of residency duty hours to ensure compliance with ACGME regulations and help formalize sign-out protocols to improve transitions of care between residents.

With recent proliferation of nontraditional mechanism of feedback such as social media (e.g., Facebook and Twitter), our study results (even though the study timeframe was July 2001 to June 2005) become further relevant. As more real-time avenues for communicating patient experiences become available, we expect higher instances of reporting, which may amplify patient dissatisfaction related to physician interactions as well as overall care provided. Thus, healthcare organizations need to develop additional proactive strategies to manage patient perceptions.

The generalization of the study results will require shifting from single site to multi-site and multi discipline studies

that includes operational metrics such as surgical volumes and patient length of stay, duty hour compliance measures (documented versus observed duty hours) and provider satisfaction measures. In addition, qualitative interviews should document changes in nursing and other clinical providers' roles, operational challenges including hand-offs and potential workarounds, and provider attitudes post ACGME resident duty hour regulations. Finally, for a more granular understanding the impact of ACGME duty hour regulations on patient satisfaction, separate patient satisfaction questions for physicians and residents should be investigated.

Conclusion

The study found significant association between current ACGME duty hour regulations and reduced patient satisfaction and perceptions of care as related to physicians (i.e., patients' views of the amount and quality of time their physicians spend with them). Residency programs and institutions need to develop strategies for implementation of current and future ACGME duty hour regulations so as to balance patient safety, patient perceptions, and resident well-being. As duty hour regulations and value base purchasing continue to evolve, patient satisfaction/ perceptions of care must be included in ongoing assessments of the success of the regulations in improving medical care.

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