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How surgical faculty and residents assess the first year of the Accreditation Council for Graduate Medical Education duty-hour restrictions: results of a multi-institutional study

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Abstract

Background: This study examined how surgical residents and faculty assessed the first year of the Accreditation Council for Graduate Medical Education duty-hour restrictions.

Methods: Questionnaires were administered in 9 general-surgery programs during the summer of 2004; response rates were 63% for faculty and 58% for residents (N = 259). Questions probed patient care, the residency program, quality of life, and overall assessments of the duty-hour restrictions. Results include the means, mean deviations, percentage who agree or strongly agree with the hour restrictions, and significance tests.

Results: Although most support the restrictions, few maintain that they improved surgical training or patient care. Faculty and residents differed ($P \leq .05$) on 16 of 21 items. Every difference shows that residents view the restrictions more favorably than faculty. The sex of the resident shaped the magnitude of the gap for 11 of 21 items.

Conclusions: Few believe that duty-hour restrictions improve patient care or resident training. Residents, especially female residents, view the restrictions more favorably than faculty.

Keywords: Duty hour restrictions; Surgical residents; Surgical faculty

The duty-hour restrictions for resident physicians enacted by the Accreditation Council for Graduate Medical Education (ACGME) on July 1, 2003, sparked controversy and inflamed passions in the medical community [1,2]. This study explored how surgical faculty and residents assessed the ACGME duty-hour restrictions. The study focused on general-surgery residencies because they were among the most time demanding of all residency programs. For example, a 1998–1999 national survey indicated that residents in general surgery averaged 102 hours of work per week in their intern year and 106 in their second year [3]. A reduction to an average of 80 duty hours per week required that programs in general surgery implement significant changes to the work hours and call schedules of residents.

Existing studies provided few insights into how the new rules have been assessed by surgical residents and faculty. One branch of research explored duty-hour restrictions in New York, where restrictions similar to those imposed by the ACGME have been in place for more than a decade [4,5]. Assessments of the first year of the nationwide restrictions, however, may not parallel those observed in New York. Other studies that predated the ACGME restrictions explored how the rules might be assessed by residents and faculty [6–9]. Although helpful, those studies explored anticipated rather than actual experiences with the ACGME restrictions. A final branch of research—to which this study contributes—has just begun to explore assessments of the

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ACGME duty-hour restrictions. This branch considers faculty work hours in a single institution [10], resident and faculty burnout in a single institution [11], resident operative experience [12,13], and resident assessments of the duty-hour restrictions in 4 academic programs in New York [14].

Four attributes of the current study extended previous research. First, it was a multi-institutional and multiregional study and thus was not bound entirely to the traditions and interpretations of faculty and residents in a single program or region of the country. Second, it included different types of residency programs—academic, community, and hybrid programs—and thus permitted an exploration of the hypothesis that assessments of the duty-hour restrictions may differ across types of programs. Third, it probed the views of both faculty and residents and thus facilitated comparisons between the 2 groups and analyses of factors that lead to divergent assessments. And fourth, it explored the views and assessments of surgical faculty and residents after 1 year of actual experience with the ACGME rules.

The study focused on 3 issues. First, how did faculty and residents, overall, assess the duty-hour restrictions? Second, to what extent and for what issues did faculty and resident assessments diverge? And third, what factors, if any, influenced the magnitude of observed gaps in the assessments of faculty and residents?

Methods

The study included faculty and residents from 9 residency programs in general surgery located in 8 states in 3 different time zones. The 9 sites included 5 academic and 4 nonacademic programs (2 community and 2 hybrid programs). On-site coordinators secured approval of the study from their local Institutional Review Board, arranged administration of the questionnaire, addressed questions, gathered completed forms (enclosed in envelopes to ensure confidentiality and anonymity) from a drop box, and returned materials to the lead author. Eligibility, determined by the coordinators, was restricted to residents and faculty in their second or subsequent year (fellows were excluded). That restriction ensured that all participants had an effective baseline experience for at least 1 year before the duty-hour restrictions began. Coordinators distributed the paper survey forms during the summer of 2004. Response rates were 63% for faculty (N = 146) and 58% for residents (N = 113). The 9 programs yielded enough respondents to provide a statistical power of .80 to detect a .35 point difference between faculty and residents—the main planned comparison [15]. Table 1 provides basic information about the sample.

Questions centered on the residency program, training, quality of life, patient care, and overall assessments of the duty-hour restrictions. Most questions explicitly asked respondents to compare the present with the past, a comparison prompted by a common question stem: "The shift to the 80-hour workweek . . ." Responses were formatted as 4-point, Likert-style items (strongly agree = 1, agree = 2, disagree = 3, and strongly disagree = 4). Methodologic studies of the merits of neutral [16] and no-opinion categories [17] supported the decision to omit those options.

Results include means and percentages who agreed or strongly agreed. Statistical significance, defined as a P value of .05 or less, was assessed by 2 methods. Two-tailed t tests were used for the analysis of faculty-resident differences in Table 2. Table 3, which compares the means for male residents, female residents, and faculty, draws on ordinary least-squares regression with 2 dummy variables (coded 0 or 1): 1 for female residents and 1 for male residents. The 2-tailed t tests on the coefficients in that analysis show whether the means for female and male residents differ significantly from the mean for faculty. Differences between the means for male and female residents were assessed with an F test from the test procedure in STATA 8

Table 1
Sample characteristics

Variable	Attribute	Resident, N (response rate)	Resident %	Faculty, N (response rate)	Faculty %
Sex	Male	80	71	125	86
	Female	29	26	18	12
	Missing	4	4	3	2
Program site	1	14 (70%)	12	13 (59%)	9
	2	17 (61%)	15	27 (84%)	19
	3	11 (100%)	10	8 (67%)	6
	4	17 (45%)	15	23 (62%)	16
	5	10 (83%)	9	15 (79%)	10
	6	5 (36%)	4	9 (75%)	6
	7	11 (52%)	10	17 (81%)	12
	8	16 (84%)	14	11 (61%)	8
	9	12 (36%)	11	23 (38%)	16
Program type	Academic	55	49	68	47
	Nonacademic	58	51	78	53
Sample totals		113	100	146	100

Table 2
Assessments of the first year of the duty-hour restrictions by surgical residents and faculty

	Item means			Mean difference	Percent in agreement		
	Overall	Resident	Faculty	*P* value	Overall	Resident	Faculty
Residency program and training							
1. DHRs decreased faculty expectations for residents	2.32	2.66	2.05	<.001	61	44	75
2. DHRs improved faculty supervision of residents	2.96	2.82	3.06	.002	17	19	15
3. DHRs enhanced residents' clinical decision making	2.93	2.63	3.17	<.001	19	34	8
4. DHRs reduced resident time on service-oriented tasks	2.64	2.54	2.71	.116	41	45	38
5. DHRs shifted duties from junior to senior residents	2.18	1.93	2.38	<.001	66	78	57
6. DHRs reduced surgical experience	1.96	2.35	1.65	<.001	76	56	92
7. DHRs improved the quality of surgical training	2.89	2.50	3.19	<.001	28	48	12
8. DHRs increased resident satisfaction with the program	2.45	2.38	2.50	.172	53	55	51
Patient care							
9. DHRs increased the number of errors in patient care	2.78	2.96	2.63	.001	32	24	38
10. DHRs improved the quality of care	3.00	2.76	3.18	<.001	19	32	8
11. DHRs decreased the continuity of care	1.83	2.12	1.60	<.001	82	71	90
12. Night float diminished the quality of patient care	2.37	2.56	2.22	.001	53	43	61
13. Adherence to the DHRs is good for patient care	2.79	2.50	3.01	<.001	35	52	21
14. Lack of familiarity, not fatigue, is the major cause of errors	1.80	2.03	1.62	<.001	85	76	92
Quality of life							
15. DHRs increased the stress of the residency program	2.56	2.64	2.50	.194	45	41	48
16. DHRs reduced resident fatigue at the hospital	2.20	2.01	2.35	.003	70	74	68
17. DHRs allowed residents more time with family or leisure	1.75	1.82	1.70	.139	90	84	94
18. Quality of life is less important than one's surgical education	2.10	2.18	2.04	.148	72	72	73
Overall assessments							
19. DHRs are largely a good thing for residents	2.34	2.00	2.60	<.001	60	74	48
20. Adherence to the DHRs is good for residents	2.38	2.20	2.53	.001	59	69	50
21. I support the reduction in duty hours for residents	2.40	2.15	2.59	<.001	57	69	48

The 21 items ranged from strongly agree = 1 to strongly disagree = 4.
DHRs = duty-hour restrictions.

(Stata Corporation, College Station, TX) [18]. The test procedure examines whether a model that constrains male and female residents to have the same mean deviation from faculty fits, as well as a model that allows them to differ. In Table 3, pairs of mean deviations that differ significantly are indicated by bold typeface.

Results

Table 2 presents overall results and results separately for faculty and residents. The overall results indicate that few believe that the duty-hour restrictions have improved surgical training or the quality and continuity of patient care. For example, 19% believed that the restrictions enhanced residents' ability to make clinical decisions (item 3) and 28% maintained that surgical training was improved by the restrictions (item 7). With respect to patient care, 19% suggested that the duty-hour restrictions improved the quality of care (item 10) whereas 82% maintained that they decreased the continuity of care (item 11). Not surprisingly, fully 90% agreed that the restrictions allowed residents to spend more time with their family or leisure activities (item 17). The overall assessment section of Table 2 (items 19–21) indicates that nearly 60% of faculty and residents support the duty-hour restrictions and believe that they are good for residents.

Our overall results mask an important pattern: fully 16 of 21 items showed statistically significant differences in the views of faculty and residents. In all cases in which significant differences were evident, residents were more favorable or optimistic than faculty about the restrictions. For example, although few residents and faculty believed that the restrictions enhanced residents' ability to make clinical decisions (item 3), the percentage for residents was more than 4 times larger than that for faculty (34% vs. 8%). Similarly, residents were substantially more likely than faculty to believe that the restrictions improved surgical training (48% vs. 12%; item 7) and were good for patient care (52% vs. 21%; item 13) and residents (74% vs. 48%; item 19).

The final line of inquiry examined factors that might shape the magnitude of the gap between residents and faculty. This line of inquiry unfolded in 3 stages. In the first stage, 3 faculty attributes were considered: age (split at 48 years, the median age in the sample), the percentage of time allocated to clinical activities (split at 80%, which left 45% of faculty in the low group and 55% in the high group), and sex. In the second stage, the possibility that the gap between residents and faculty might differ in academic and nonacademic programs was examined. The third analysis explored whether differences in the sex of the residents shaped the gap between resident and faculty assessments of the restrictions.

Table 3
Resident sex and assessments of the first year of the duty-hour restrictions by surgical residents and faculty

	Overall mean faculty	Resident mean deviations		Percent in agreement		
				Faculty overall	Residents	
		Men	Women		Men	Women
Residency program and training						
1. DHRs decreased faculty expectations for residents	2.06	**.48***	**.90***	75	50	28
2. DHRs improved faculty supervision of residents	3.06	−.21*	−.31*	15	17	21
3. DHRs enhanced residents' clinical decision making	3.16	**−.44***	**−.71***	8	27	45
4. DHRs reduced resident time on service-oriented tasks	2.70	−.10	−.19	38	44	41
5. DHRs shifted duties from junior to senior residents	2.38	−.50*	−.35*	57	79	75
6. DHRs reduced surgical experience	1.65	.69*	.77	92	56	55
7. DHRs improved the quality of surgical training	3.19	**−.60***	**−.88***	12	42	62
8. DHRs increased resident satisfaction with the program	2.50	**.01**	**−.40***	51	47	72
Patient care						
9. DHRs increased the number of errors in patient care	2.62	.32*	.45*	38	24	21
10. DHRs improved the quality of care	3.18	**−.30***	**−.69***	8	24	52
11. DHRs decreased the continuity of care	1.58	**.42***	**.94***	90	77	48
12. Night float diminished the quality of patient care	2.21	**.24***	**.72***	61	44	32
13. Adherence to the DHRs is good for patient care	3.01	**−.39***	**−.84***	21	47	66
14. Lack of familiarity, not fatigue, is the major cause of errors	1.62	**.31***	**.62***	92	80	69
Quality of life						
15. DHRs increased the stress of the residency program	2.50	.13	.09	48	39	48
16. DHRs reduced resident fatigue at the hospital	2.35	−.31*	−.42*	68	74	72
17. DHRs allowed residents more time with family or leisure	1.70	.20*	−.01	94	80	93
18. Quality of life is less important than one's surgical education	2.04	.12	.14	73	72	75
Overall assessments						
19. DHRs are largely a good thing for residents	2.60	**−.45***	**−.95***	48	68	90
20. Adherence to the DHRs is good for residents	2.54	−.25*	−.57*	50	63	86
21. I support the reduction in duty hours for residents	2.59	**−.35***	**−.70***	48	62	86

The 21 items ranged from strongly agree = 1 to strongly disagree = 4. Mean deviations represent the difference between resident and faculty means. Pairs of mean deviations in bold typeface are significantly different ($P \leq .05$). Minor differences in faculty means and percent in agreement across Tables 2 and 3 stem from the elimination in Table 3 of cases in which the sex of the respondent was unknown.

* Statistical significance ($P \leq .05$) relative to the overall faculty mean.

DHRs = duty-hour restrictions.

Analyses conducted for the first 2 stages uncovered few differences of any magnitude or significance. Comparisons between younger and older faculty yielded 3 statistically significant differences (items 1, 9, and 13, as listed in Table 2); all suggested that the views of older faculty aligned more closely with residents than was the case for younger faculty. Results for faculty clinical involvement produced 4 significant differences (items 5, 9, 15, and 21); those differences showed no consistent pattern. Comparisons between male and female faculty members, driven partly by small numbers of women, failed to produce a single significant difference. Likewise, the resident-faculty gap was substantially the same in academic and nonacademic programs. Only item 9 indicated that the resident-faculty gap varied across these 2 contexts (it was larger in academic programs).

Table 3 shows that the views of male and female residents diverged substantially and significantly on 11 of the 21 items. In virtually every case in which male and female residents differed, the results showed that women held more positive or optimistic views than their male counterparts. The 11 items that differed for male and female residents had an average gap in agreement of nearly 21 percentage points. For example, female residents were notably less likely than male residents (28% vs. 50%) to agree that the restrictions decreased the expectations and standards faculty have for residents (item 1) and were more likely to agree (45% vs. 27%) that their clinical decision making was enhanced by the restrictions (item 3). Differences between male and female residents held for most items regarding patient care and overall assessments but none of the quality-of-life items in Table 3. Female residents associated fewer patient-care problems with the restrictions than their male counterparts. The 3 items (19–21) that provided overall assessments of the restrictions showed that agreement among female residents runs 22 to 24 percentage points higher than their male peers.

Comments and Limitations

The results suggest 3 notable themes. The first theme involves a large divergence in the assessments of the duty-hour restrictions offered by faculty and residents. It is no surprise that residents would experience improvements to their quality of life after the duty-hour restrictions. It is understandable that residents would factor those quality-of-

life gains into their overall assessments of the restrictions and thus show themselves to be more accepting of the rules than faculty. But it was not expected that faculty and residents would differ so often and so strongly. Faculty and residents, for example, differed by 31 to 36 percentage points, respectively, when asked if the restrictions resulted in lower faculty expectations and standards for residents or if they have improved surgical training. This evidence established a large and pervasive gap between resident and faculty assessments of the restrictions.

A second theme emerged from the analysis of factors that might influence the magnitude of the gap between faculty and resident assessments. Faculty attributes (ie, age, clinical involvement, and sex) did not shape the extent of the faculty-resident gap consistently or significantly. Nor did program type assume an important role. Sex of the resident, however, emerged as a strong factor. The descriptive statistics for the study showed what everyone knows about surgery: numerically it is dominated by men and is in a state of transition. Previous research suggested that the culture of surgery and surgical residency programs are rife with masculine themes, which may make surgical residencies more hospitable to men than to women [19,20]. It is possible that women view the restrictions differently because they are, in some respects, more nearly outsiders than insiders. A policy that reduces hours and call schedules may reduce somewhat the masculine imagery of the residency; that loss is almost surely less salient for female than for male residents. Given that women are the main providers or parties responsible for arranging childcare and domestic labor in most American families [21,22], a change in program policies that helps residents balance work and family is likely to be viewed more favorably by women than by men.

These large gaps between the sexes may be consequential. The percentages, as is the case for all but 1 of the 11 items that differed by sex, line up with faculty on one end, female residents on the other, and male residents in the middle. For example, consider the matter of whether the restrictions decreased the standards and expectations faculty have for residents. In this case the percentage in agreement decreased from 75% among faculty to 50% for male residents, down to a low of 25% for female residents. Equally large differences emerged with respect to whether the duty-hour restrictions decreased the continuity of care (90% to 77% to 48%, respectively) or improved the overall quality of surgical training (12% to 42% to 62%, respectively). Differences of that magnitude, which indicated fundamentally different perceptions of the duty-hour restrictions, may perpetuate, create, or intensify tensions between faculty and female residents. Because the study did not measure such tensions explicitly, this is a speculative argument that deserves additional research attention.

A third theme involves important and consistent overall patterns in the data. It comes as no surprise that many believe that the restrictions have reduced resident fatigue and have permitted residents to spend more time with their families or participating in leisure activities. Those pieces of relatively optimistic news, however, are surrounded by strong evidence of concern. For example, a minority of both residents and faculty believe that the duty-hour restrictions enhanced residents' clinical decision making or improved the quality of surgical training or patient care. Strong majorities believe that the restrictions decreased the continuity of care and that a lack of familiarity—not fatigue—is the major cause of errors in patient care. Rules that aimed to lessen fatigue and thereby improve the quality of patient care may have succeeded at the former while failing at the latter because familiarity with patients has been reduced. It thus is important to emphasize that the attention given to differences between various groups should not obscure one of the central findings of the study: substantial percentages of residents and faculty maintain that the duty-hour restrictions have deleterious consequences for training and patient care.

Although the study's design was multi-institutional and included both faculty and residents, it nonetheless had limitations, 3 of which are noted here. First, the study rested entirely on subjective assessments of the restrictions. Although those assessments are not to be discounted, they are not the same as objective measurements. For example, the study did not address objectively the work ethic or quality of care delivered by residents, male or female. Second, a few subgroup sample sizes—female faculty and, to a lesser extent, residents and faculty broken out by program type—were relatively small. Those subgroup sample sizes limited the ability to detect statistically significant differences. A larger sample would have been advantageous for that line of analysis.

A third limitation was the inability to gather accurate information on the postgraduate year of residents. Differences between junior and senior residents, found to be important in previous studies, were not explored [4,5,7]. Because of delays at some centers in obtaining investigational review approval, data collection continued after July 1, 2004. Because the question about postgraduate year did not specifically reference the academic year 2003–2004, the academic year that residents used in their responses could not be verified. A change to the questionnaire and subsequent second review by 7 site-specific Institutional Review Boards was not feasible. Although mitigation of this discrepancy may have made little practical difference because of small subgroup sample sizes, this analysis may have provided some insight into the differences in residents by sex if the sex distribution varied across postgraduate years. It is possible that failure to control for postgraduate year may have amplified observed differences between the sexes.

Despite those and other limitations, the study provided an informative examination of how surgical residents and faculty viewed and assessed the first year of the ACGME duty-hour restrictions in 9 residency programs located in different regions of the country. Assessments and analyses of

this sort are essential if we are to understand the consequences of the duty-hour restrictions for faculty and residents.

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