Differences in Duty Hours and Their Relationship With Academic Parameters Between Preliminary and Categorical General Surgery Residents

Joseph J. Eid, MD, Benjamin Zendejas, MD, Stephanie F. Heller, MD and David R. Farley, MD

Department of Surgery, Mayo Clinic College of Medicine, Rochester, Minnesota

BACKGROUND: There is the perceived notion that nondesignated preliminary general surgery (P-GS) interns are treated differently (i.e., overworked) than their categorical GS (C-GS) counterparts are treated, or in an effort to prove themselves worthy of a categorical position, nondesignated preliminary residents may self-choose to work more. Empirical evidence examining duty-hour differences between P-GS and C-GS residents is lacking.

METHODS: We retrospectively reviewed 4 academic years (July 2009 to June 2013) of our self-entered duty-hour database. Duty hours were averaged over 4-week periods and then averaged annually for each intern. Duty-hour averages and the percentage of conference attendance between P-GS and C-GS interns were compared. Sensitivity analyses were conducted to evaluate the effect of the 2011 duty-hour regulations, attendance to educational activities, seasonal variations in workload, and the Match Day effect.

RESULTS: A total of 70 P-GS and 43 C-GS interns were compared. Duty-hour averages (±standard deviation, range) were 64.4 h/wk (±4.6; 45-70) for the P-GS interns and 64.1 h/wk (±3.9; 57-72) for the C-GS interns, $p = 0.8$. Mean (±standard deviation, range) conference attendance was 61% (±17; 33-89) for the P-GS interns and 66% (±18; 44-85) for the C-GS interns ($p = 0.13$). Duty-hour averages for both the groups positively correlated with conference attendance ($r = 0.27$, $p = <0.001$). The P-GS and the C-GS interns worked on average 4.8 hours more a week after the implementation of the 2011 Accreditation Council of Graduate Medical Education duty-hour regulations when compared with before implementation (66.7 ± 4.1 vs 62 ± 3.1, $p < 0.0001$), with no difference between both the groups. No seasonal variation in duty hours was encountered for either group. For the P-GS interns, no difference in duty hours was observed before or after the Match Day.

CONCLUSIONS: At our institution, the P-GS and the C-GS interns have equivalent duty-hour periods and similar conference attendance. An expected, a positive correlation was observed between duty hours and conference attendance. Average weekly duty hours increased by almost 5 hours after the implementation of the 2011 duty-hour regulations. (J Surg 72:636-640. © 2015 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: duty hours, general surgery residency, ACGME regulations, working hours, preliminary residents

COMPETENCIES: Professionalism, Medical Knowledge, Practice-Based Learning and Improvement

INTRODUCTION

Medical students who pursue general surgery (GS) training in the United States (US) typically enter a GS program in a categorical (C-GS) or a nondesignated preliminary (P-GS) position. A categorical position is characterized by a 5-year agreement with a residency program to obtain surgical training with the goal of becoming board-eligible on completion of the program. Its counterpart, a nondesignated preliminary position, is a temporary 1-year agreement at the postgraduate year 1 or 2 level, which is intended to provide the trainees, who are often international medical graduates,[1] with the opportunity to gain US clinical experience and showcase their attributes with the goal of subsequently being accepted into a categorical position in surgery or some other field. The nature of such preliminary programs has been criticized by some as being discriminatory

For consideration of publication in the *Journal of Surgical Education* Presented as poster presentation at the 2014 Surgical Education Week, Association for Surgical Education, Chicago, IL, April 8 to 12, 2014.

Correspondence: Inquiries to David R. Farley, MD, Department of Surgery, Mayo Clinic, 200 First Street, SW, Rochester, MN 55905; fax: (507) 284-5196; E-mail: farley.david@mayo.edu, scipubs@mayo.edu

  1931-7204/$30.00 http://dx.doi.org/10.1016/j.jsurg.2014.12.005

and unjust, whereas others have highlighted its beneficial effect on the US surgical workforce.[2-12]

During their "yearlong interview," nondesignated preliminary residents are particularly vulnerable to work-related abuses, either imposed on their own (i.e., deciding to work longer hours in an effort to prove themselves worthy) or by their program (i.e., being placed in rotations with less educational value or heavy on duty hours). In the United States, the Accreditation Council of Graduate Medical Education (ACGME) accredits more than 9200 residency programs across all specialties. According to the ACGME 2003 duty-hour regulations, resident work hours should be limited to 80 hours a week, averaged over a 4-week period.[13] In July 2011, the ACGME further limited duty hours to 16 hours daily for interns.[14] Duty-hour logging should document the time spent by residents contributing to patient care, as well as all educational activities conducted by the residency program. Because these regulations make no distinction between P-GS and C-GS interns and GS programs are expected to distribute workload fairly among P-GS and C-GS, one would expect that there be no difference in duty hours worked; however, empirical evidence is lacking.

In an effort to better understand the relationship between preliminary and categorical residents at our institution, we sought to examine duty-hour differences and how these related to educational activities and assessment metrics.

METHODS

With approval from our Institutional Review Board, we retrospectively reviewed all self-entered duty-hour log sheets by nondesignated P-GS and C-GS interns for the academic years July 2009 to June 2013. Duty-hour log sheets were in the format of a single Microsoft Excel document that contained data for every 4-week duty-hour period. The documents were stored online in a password-protected departmental server. Duty-hour compliance is monitored and enforced at least weekly by one of our education program coordinators, and residents receive an automatically generated daily e-mail with a link to the duty-hour log sheet as a reminder and encouragement for daily entering of duty hours. We excluded interns who withdrew from the program during the first quarter of the academic year, as well as designated preliminary surgery (urology and oral maxillofacial) interns, and interns from other surgical specialties (orthopedics and ear, nose, and throat) rotating through a GS service.

Our primary aim was to compare the yearly duty-hour averages of nondesignated P-GS and C-GS interns. We averaged weekly duty hours for each 4-week duty-hour period, and then averaged all the 4-week duty-hour averages to obtain a yearly duty-hour average. As secondary aims, the mean duty hours were compared across similar rotations between both the groups. The effect on duty-hour differences before and after the implementation of the 2011 duty-hour regulations was assessed along with the effect of the National Residency Match Program (NRMP) day in mid-March. Given our program's geographical location, we anticipated seasonal variations in workload based on lower patient volumes typically seen in the winter months; hence, we also sought to examine how these potential seasonal variations in workload influenced duty-hour differences between P-GS and C-GS interns. The correlation of duty hours between groups with yearly educational conference attendance percentage and the American Board of Surgery In-Training Examination (ABSITE) scores was evaluated. Educational conferences included our weekly Monday morning Morbidity and Mortality review, Monday evening Surgery Grand Rounds, and Friday morning Simulation Center activities; these total 6 hours per week. Magnetic badge-swiping documented attendance to educational conferences and is monitored by one of our education coordinators.

We elected not to perform a power calculation, as this cohort represents all eligible residents in the period under study, which in turn represents the academic years for which we have available electronic records of duty-hour tracking in a consistent fashion. Data are presented as mean (standard deviation), median (range [R]), or counts (percentage) as appropriate and were analyzed according to the gaussian distribution (predominantly nonparametric), with Wilcoxon rank sum test and chi-square test for continuous and categorical variables, respectively. All hypothesis testing was 2-sided, with a $p < 0.05$ considered statistically significant. JMP statistical software (JMP, Version 9, SAS Institute Inc., Cary, NC) was used to analyze our data.

RESULTS

During the 4 academic years of July 2009 to June 2013, 116 GS interns were eligible for inclusion in this study. We excluded 3 P-GS interns (left the program early), leaving 70 nondesignated P-GS and 43 C-GS interns. Yearly duty-hour averages (mean $\pm$ standard deviation [R]) for P-GS and C-GS interns were similar (64.4 ± 4.6 [45.1-69.9] vs 64.1 ± 3.9 [57.3-72.1], $p = 0.8$). Of the 17 possible intern rotations, 7 are common among P-GS and C-GS interns (hospital surgical service [chief service], trauma/GS [acute care surgery], critical care [surgical intensive care unit], hepatopancreatobiliary surgery, endocrine surgery, plastic surgery, and vascular surgery). Among these similar interns rotations, there was no difference in mean duty hours per week (65.4 ± 13.9 [59.2-70.8] vs 64.9 ± 14.9 [59.5-73.1], $p = 0.39$). Likewise, there was no duty-hour difference between the P-GS and the C-GS interns for rotations that were mentor based ($n = 7$; a faculty and a senior resident with a junior resident, or a faculty and a junior resident) vs