

Research Article

Student-Rated Value of 3rd - Year Surgery Clerkship Activities and Work Hours

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Abstract

Background: Medical education transitions from largely didactic curriculum the first two years to self-directed learning in the clinical clerkship years. A critical component of self-directed learning is bi-directional feedback to the student and the facilitator (in this case, clerkship director) to make adaptations and enhance future learning. These clinical years have proven critical to residents' satisfaction and risk of attrition. Our aim is to evaluate the most and least valued educational aspects of the surgical clerkship, and to explore student perceptions of duty hours.

Materials and methods: A descriptive, correlational electronic survey-based study administered to 3rd and 4th Year medical students.

Results: Of students surveyed 87/356 (24%) students responded. On average, students worked 61.3 hr/wk. A total of 47% felt their hours worked were unfair; the most common reason for this was 'not enough time to study' (28%). Students reported an average of 24.8 hr/wk in the operating room, and 67% thought this was fair. The worst part of the clerkship was most often felt to be "number of hours worked" (39%), and the best part was time participating in surgeries (49%). Students who valued overnight call accounted for 53% of students. The departmental quality and teaching conferences were rated 2.4 (scale 1-5) in terms of educational value.

Conclusion: Time spent in the operating room was the most valued educational aspect; in general, educational conferences were favorably rated, indicating didactic instruction is still valued. Of students, 47% felt working 61 hr/wk is unfair, which may indicate future dissatisfaction during residency.

Keywords: Clerkship; Self-directed learners; Duty hours; Surgical learning

Introduction

Adult learning theories rely heavily on methods that advocate for less learner dependency and increased self-directedness for the adult learner such as in the pedagogical theory "Andragogy" introduced by Malcolm Knowles in 1980 [1,2]. A key aspect of this technique is bidirectional feedback: evaluation of the learner's newfound knowledge is imperative to ensure that learning is happening through activities such as exams. Likewise, there must be frequent and timely direct feedback from the student to the instructor affording the instructor an opportunity to make appropriate adjustments, when necessary, to further assist future learners.

Medical school classes are comprised of adult learners with a minimum of a bachelor's degree of educational experience, which likely have a well-evolved understanding of their learning. Adult learning theories such as andragogy have been discussed and implemented in medical school curriculums across the nation, including student response evaluations [3]. Commonly throughout medical schools, end-of-clerkship surveys follow the completion of core clerkships which allow students to evaluate not only the course

activities but also individual instructors for consideration by clerkship directors for opportunities for adjustments [4,5].

Third-year clinical clerkships serve to develop bedside manner, supply experiential learning of certain medical diagnoses/treatments, expose the student to the daily life of the specialty to aid in career discernment, and prepare them for shelf exams. Clerkships also importantly serve to introduce students to the responsibilities and roles of residents. A previous national mixed-methods analysis performed by Engelhardt et al. [6], found residents attributed a feeling of ill-preparedness from their clinical clerkships when transitioning to residency increased their risk of attrition. Providing students with an opportunity to incorporate their feedback through evaluations into their teaching may allow students to feel more prepared to handle residency and lower attrition rates.

Our primary aim was to evaluate different aspects of the third-year surgical clerkship from the student's perspective of value regarding different educational aspects of the clerkship [7,8]. Our hypothesis is that the overall perception of the clerkship would be significantly different between students who are increasingly removed temporally from the clerkship compared to those who were surveyed directly after their clerkship due to the stressors of exams and final grades.

Materials and Methods

Due to the lack of validated surveys for discerning students' perceptions of clinical clerkships, we constructed a survey of questions relevant to students' experiences during the clerkship and the importance they placed on its distinct educational aspects. Questions regarding overall duty hours, hours spent in the operating room, the best and worst part of the clerkship, treatment by residents and attendings, and value of didactic educational events were administered. Open-response answers were only an option when

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reporting average hours.

This study was deemed exempt from our institutional IRB, (study #23.0280). An invitation explaining the reason for the study and assurance of confidentiality of their responses was accompanied by the survey link and sent *via* email to 342 students who completed their surgical clerkship between 2021-2023 (166-4th-year cohort and 176-3rd-year cohort). The survey was administered *via* online administration through Microsoft Forms to increase the ease of participation. No directly identifying information was collected and responses were kept confidential. Students were asked to identify average duty hours, OR hours, and the sites they were located to categorize their perceptions into helpful groups for analysis. Those who spent both 4-week rotations of their total 8-week clerkship at the same site, their second 4-week rotation data was excluded in data analysis. The email was sent out multiple times on a rolling basis over three months to attempt to increase accrual. Data was exported from Microsoft Forms to Excel for statistical analysis.

Statistical analyses

Data were summarized using counts and percentage for categorical variables and using means and standard deviations for quantitative variables. For analysis of rotation-specific data (questions 1-16), each 4-week rotation that the student did not provide a site when completing the survey was excluded, as well as the exclusions discussed above. Fisher exact tests were used to assess differences in reported fairness by categorical variables, and ANOVA was used for continuous variables. The relationship between continuous and/or ordinal variables was summarized using the Spearman correlation. All statistical analysis was performed using R statistical software, version 4.2.2.8.

Results

Of the 356 students surveyed, 87 students (24%) responded. As each student completed 2 sequential 4-week rotations to complete their 8-week total clerkship, they were given the opportunity to fill out the rotation specific questions (question 1-16) separately for each rotation, particularly if the sites were markedly different (Veterans' Affairs Hospital, Community Hospital, Children's Hospital, Academic Hospital). Of those who responded, 59 provided data for 2 rotations at different sites, while 27 responded for 1 rotation site, yielding a total of 145 clinical rotations evaluated. These 145 clinical rotations were used separately for data points, supplying a maximum N of 145 for the rotation specific data (questions 1-16).

Rotations that averaged 40 dh/wk-49 dh/wk to 80 hour/week-89 duty hour/week (dh/wk) had reported unfairness percentages that increased as the hours increased. The results for the average dh/wk and perception of them are as follows (Table 1): the average dh/wk were 61.3, 3% of rotations averaged 30 dh/wk-39 dh/wk, 10% averaged 40 dh/wk-49 dh/wk, 7.5% averaged 50 dh/wk-59 dh/wk, 23% averaged 60 dh/wk-69 dh/wk, 33% averaged 70 dh/wk-79 dh/wk, and 22% averaged 80 dh/wk-89 dh/wk. Approximately half (53%) of rotations dh/wk were reported as fair and 47% rotations dh/wk were found to be unfair. Those reported as fair averaged 55.8 dh/wk, significantly less than those reported as unfair, 67.4 dh/wk ($p < 0.001$). Rotations that averaged 40 dh/wk-49 dh/wk were the most likely to voted 'fair' (93%), followed by 50 dh/wk-59 dh/wk (91%). Rotations that averaged 80 dh/wk-89 dh/wk were most often reported to be unfair (72%), followed by 70 dh/wk-79 dh/wk (42%). The follow up question 'why was it unfair?' found most often the concern was 'not enough

time to study' (28%), followed by 'took away from wellness' (13%), and other (4%). There was no significant difference in perception of rotation's fairness of dh/wk when compared to length of time from completion of their clerkship ($p = 0.339$).

There was a single student who chose not to report their operating room hours ("OR hours, oh/wk") for their rotations, providing an N of 143. Rotations were reported to have an average of 24.8 oh/wk participating in cases with the breakdown as follows: 11 oh/wk-20 oh/wk (28%), 21 oh/wk-30 oh/wk (21%), and 31 oh/wk-40 oh/wk (23%). Most rotations (67%) were reported to have fair oh/wk, with students scrubbing an average of 25.7 oh/wk. The 33% of rotations which students felt the oh/wk were unfair, the average oh/wk was 23.0. Rotations within the middle range were most likely to be found to have fair; 21 oh/wk-30 oh/wk (93%), followed by those within the lower range reported: 11 oh/wk-20 oh/wk (83%). Rotations within the extremes of the ranges (<10 oh/wk and >41 oh/wk) were most likely to be reported as having unfair oh/wk (32% and 50%, respectively). Rotations with dh/wk reported as fair were more likely to find their oh/wk as fair (78%) than rotations with dh/wk reported as unfair (54%) ($p = 0.004$). No significant differences in perception of fairness of oh/wk was found when compared to length of time from completion of their clerkship. This data is shown in Table 2.

There were 6 rotations reported to have not taken overnight call providing an N of 139 for the analysis of overnight call helpfulness. Approximately half (53%) of rotation's overnight calls were found to be helpful in 'considering the specialty as a career' for students. Comparing this to perception of dh/wk, rotations with dh/wk voted as unfair were less likely to vote overnight calls as helpful (52%) than those with reported fair dh/wk (62%), as depicted in Figure 1. When compared to perception of oh/wk fairness, no significant trends were found ($p = 1.00$), nor were significant differences found when comparing length of time from neither completion of the clerkship, nor perception of overnight call as helpful or not ($p = 0.107$).

The best and worst parts of the clerkship questions were asked once from the students for their 8-week total clerkship ($n = 87$). Students ranked 'hours worked' as the worst part of the clerkship (39%), followed by: 'treatment by residents' (29%), 'lack of clear expectations' (18%), 'treatment by attendings' (8%), and 'other' (6%). Students ranked 'scrubbing surgeries' as the best part of the clerkship (49%), followed by inclusion by residents (22%), 'other' (15%), and 'inclusion by attending' (14%) (Figure 2 A,B). When compared to the length of time from completion of their clerkship, no significant differences were found ($p = 0.103$).

Students were asked Likert scoring questions once ($n = 87$). These questions addressed the educational value of didactic lectures during "protected educational time." The average was 2.6 out of 5 with 5 being the highest rating (SD=1.0) overall. When looking specifically at value and enjoyment of Grand Rounds, the average score was 2.4 (1.1); Quality Improvement conference was valued at an average of 2.7 (1.3); and Resident Educational conference was rated 2.6 (1.2). We found no association between the average Likert score and the length of time since completion of their clerkship (Spearman $\rho = -0.18$, $p = 0.103$).

Discussion

Published literature on medical education has been increasing over the last decade with approximately 42% of available studies originating within the last 6 years [9]. There is increased awareness that adult learners should be participating in self-directed learning

Table 1: Perception of Duty Hours.

Were Duty Hours Fair?	n Total	Median Number of Hours		Interquartile Range		p-value <0.001
Average Hours	145	65		55-70		
Participants Voted Fair	77	60		45-68		
Participants Voted Unfair	68	70		62-75		
Why Were Duty Hours Unfair?	Voted Reason	n Votes		% Votes		
	No time to study	40		28%		
	Took away from	19		13%		
	Other	6		4%		
Breakdown of Duty Hours Voted unfair	n Total	n Voted		% Voted		p-value <0.001
		Fair	Unfair	Fair	Unfair	
30-39 Hours	5	1	4	20%	80%	
40-49 Hours	15	1	14	7%	93%	
50-59 Hours	11	1	10	9%	91%	
60-69 Hours	34	14	20	41%	59%	
70-79 Hours	48	18	20	58%	42%	
80-89 Hours	32	23	9	72%	28%	
Length of Time Past Completion of clerkship	n Total	n Voted		% Voted		p-value 0.339
		Fair	Unfair	Fair	Unfair	
Just Finished	19	11	8	58%	42%	
2-6 Months	43	23	20	53%	47%	
7-12 Months	52	23	29	44%	56%	
More than a Year	31	20	11	65%	35%	
Correlation of fairness of OR hours to time past		Spearman p-value		0.12		0.15

Table 2: Perception of Operating Room (OR) Hours.

Were OR Hours Fair?	n Total	Median Number of Hours		Interquartile Range		p-value 0.146
Average Hours	143	25		14 - 36		
Participants Voted Fair	96	25		20 - 35		
Participants Voted Unfair	47	15		Aug-40		
Why Were Duty Hours Unfair?	Voted Reason	n Voted		% Votes		
	Not Enough Experience	22		15%		
	Took Away from Study Time	14		10%		
	Took Away from Wellness	4		3%		
	Other	7		5%		
Breakdown of OR Hours Voted Unfair	n Total	n Voted		% Voted		p-value <0.001
		Fair	vs. Unfair	Fair	Unfair	
10 or Fewer Hours	28	21	9	32%	68%	
11-20 Hours	41	7	34	83%	17%	
21-30 Hours	30	2	28	93%	7%	
31-40 Hours	34	14	20	59%	41%	
41 or More Hours	10	5	5	50%	50%	
Length of Time Past Completion of Clerkship	n Total	n Voted		% Voted		p-value 0.867
		Fair	Unfair	Fair	Unfair	
Just Finished	19	12	7	63%	37%	
2-6 Months	43	28	15	65%	35%	
7-12 Months	51	34	17	67%	33%	
More than a Year	30	22	8	73%	27%	
Correlation of Fairness of OR Hours to Time Past		spearman p-value		0.12		0.15

as opposed to didactic lecture-based learning. However, the process of the medical educational curriculum is less frequently presented from the student's perspective [10]. One of the well-defined principles of adult theories is that the student's perspective of their learning experience should not only be readily sought, but also, consistently reported for quality improvement [1,2].

The most concerning finding of our study is the perceived fairness of duty hours - this was a significant factor impacting the students' experience on the clerkship. Many students voted them as the "worst part" of the rotation (39%) and "unfair" (47%), despite the majority (78%) not going over an 80-hour work week. Furthermore, the expectation of following the ACGME 80-hour workweek restrictions is routinely explained to students at the beginning of the clerkship [11].

The third-year clinical clerkships offer an opportunity for students to experience a glimpse of what residency life entails. Due to the average 85.8-hour work week of surgical residents, decreasing duty hours to alleviate their concerns would greatly alter their perception of a career in surgery and may contribute to the attrition rates of general surgery residents [6,12].

Others have reported literature on the effect of hours worked and general surgery lifestyle. Khoushhal et al. [13] performed a meta-analysis of attrition in surgical residents, finding an attrition rate of 17% vs. 14% before and after the 80-hour workweek restriction, respectively, which was not statistically significant. Furthermore, their most common reported case of attrition was reported to be the uncontrollable lifestyle of a general surgery resident. Their study

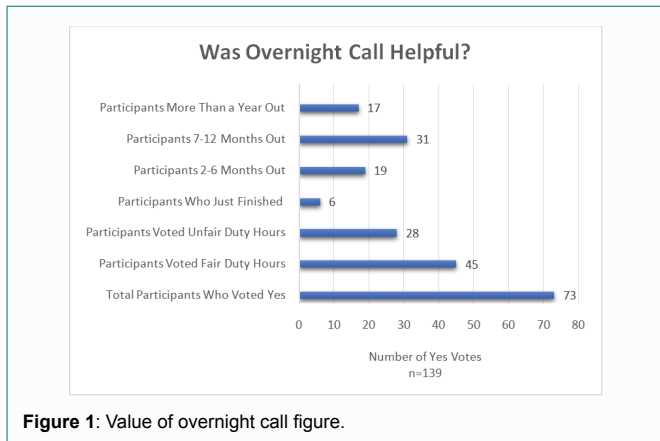


Figure 1: Value of overnight call figure.

found residents who felt their medical school experience was not representative of residency were more dissatisfied. Adjusting students' expectations of their future as general surgery residents could vastly prevent attrition and burnout as they gain a complete understanding of what training will entail [13].

The student's operating room experience proved critical as the students highly valued it, voting it the best part of their clerkships. In fact, those who deemed the oh/wk as "unfair" most often answered the question 'why was it unfair?' as they desired more time. This time also provides a critical opportunity to engage students further as their attention may be heightened as they consider it the best part of the clerkship. A previous study has shown that when asked, faculty believed they had not made a strong effort to instruct medical students during their case and less than half of students and residents believed attendings do a good job at educating medical students [14]. Medical student participation is frequently passive; and instead of having a quiet, observing, "manual retractor", attendings and residents should actively engage the students in their explanation of the surgery and seize this rare opportunity to make an impact in the student's learning [15].

Overnight calls are required on this clerkship with many goals, including furthering the student's grasp of the expectations of a surgical resident for career discernment, as well as the rare emergent cases and unique problems that arise with minimal supervision [7]. Overnight calls may be considered inherently unfavorable due to the long hours and less oversight by residents and attendings. Conversely, it may give the student an opportunity to better help with patient evaluations at their own pace where the environment is quieter. We were pleased

to find that many students did perceive overnight calls to be helpful for career discernment, further substantiating the clerkship's goal of requiring this of students. This importance of overnight calls has also been reported in a previously published analysis implying overnight calls may contribute to improved preparedness, lower attrition, and lower rates of burnout in surgery residency [6].

The resident-student connection is a critical aspect of the clerkship for students and clearly has a significant impact on students' experiences of clerkship as many students voted it the "worst part" of the clerkship (29%). The comradery of a team that shares the same tasks and goals is not to be taken lightly. Positive interactions between medical students and residents can be as simple as the appropriate demeanor, tone and dialogue, and respect [16]. Encouraging residents to embrace this professional relationship and reminding them of the importance they too placed on this connection when they were students could correlate to a higher quality of perception of the clerkship for both students and residents.

We felt assessing changes of perception overtime would have been an interesting angle to investigate but our cohort did not have enough responses from participants farther out from the clerkship to reliably analyze this correlation. Of the data we did receive, the perception of the clerkship did not change as over time from their completion of the clerkship. While this limitation exists because of insufficient power in this specific regard, we felt our data was still important to report.

Our study is not without limitations; as this is a self-administered survey, sampling bias will always be a factor; while our response rate was 24%, (which is similar to other medical survey response rates reported), and it is well known that most of the survey takers are those that are at the extremes of satisfaction [17-19]. Typically, those who are dissatisfied will use this opportunity to air their grievances, which may have contributed to the high rate of students who felt the hours were unfair. Recall bias is another possible limitation given we asked any student who completed their clerkship in the past two years to participate. Duty hours were self-reported, and this may have been more inaccurate as the student became further removed from the clerkship. Another aspect to consider for sampling bias is that perhaps the results would have been changed if we captured responses from residents, which likely would have altered perceptions of operating time and hours worked.

Another potential limitation of our study is our lack of measurable curricular outcomes of these perceptions. Further investigation is needed into whether students with differing perceptions scored

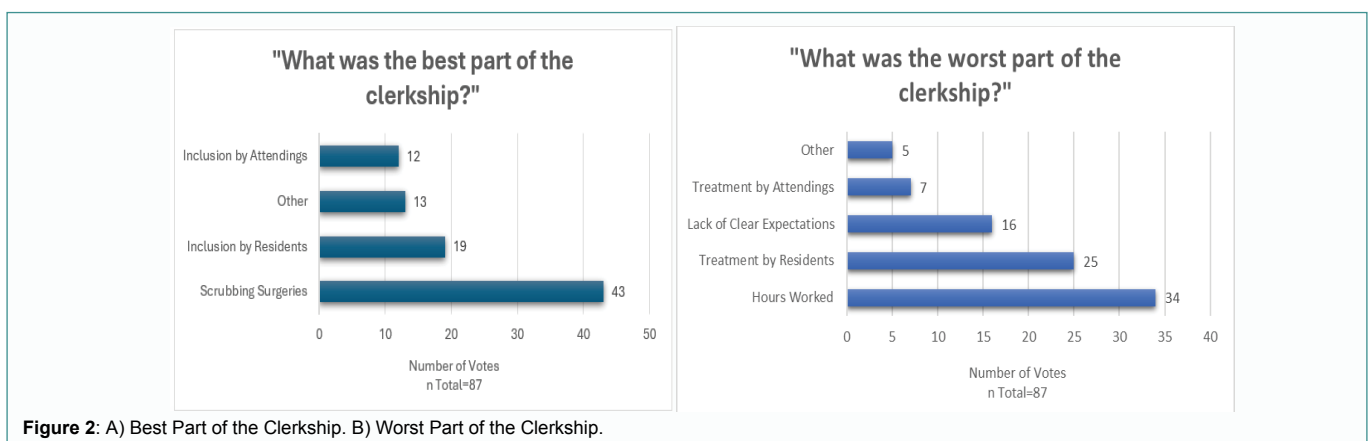


Figure 2: A) Best Part of the Clerkship. B) Worst Part of the Clerkship.

significantly differently on their exams or not, such as those who felt their hours were fair vs. unfair. Without this information, considered changes could have unintended consequences in this area warranting further research on these aspects should be performed before using this data to make significant changes to the clerkship structure.

Conclusion

Our data suggests students may have a very difficult transition from 4th year student to surgical intern given their viewpoint on duty hours during their required surgical clerkship. This may also be a contributing factor to higher attrition rates in general surgery resident training. Our data suggest students' perceptions of duty hours may need to be mitigated to support increased satisfaction in their clerkship and smoother transition into residency. We found that operative experience, overnight calls, and respect/integration by the residents remain important when considered from the perspective of the student. Lastly, students were mostly affected by their ability to have protected study time, placing high priority on their shelf exam performance, but this does not seem to significantly distort their perception of the clerkship over time. Future directions may be exploring these perceptions in current resident trainees to assess how perceptions of the clerkship may change in hindsight with their new roles and responsibilities.

References

- Knowles MS. *The Modern Practice of Adult Education*. Chicago: Follett Publishing Company; 1980.
- LINCS. TEAL Center Fact Sheet No. 11: Adult Learning Theories. LINCS. Adult Education and Literacy. U.S. Department of Education.
- Hartzell JD. Adult learning theory in medical education. *Am J Med*. 2007;120(11):e11.
- Berk RA. Survey of 12 Strategies to Measure Teaching Effectiveness. *Int J Teach Learn High Edu*. 2005;17(1):48-62.
- Centra JA. Reflective Faculty Evaluation: Enhancing Teaching and Determining Faculty Effectiveness. *The Jossey-Bass Higher and Adult Education Series*. *J High Edu*. 1995;66(2):235-37.
- Engelhardt KE, Bilimoria KY, Johnson JK, Hewitt DB, Ellis RJ, Hu YY, et al. A National Mixed-Methods Evaluation of Preparedness for General Surgery Residency and the Association with Resident Burnout. *JAMA Surg*. 2020;155(9):851-9.
- Gilbert DT, Lieberman MD, Morewedge CK, Wilson TD. The peculiar longevity of things not so bad. *Psychol Sci*. 2004;15(1):14-9.
- R Core Team. *The R project for Statistical Computing*. Vienna, Austria; 2022.
- U.S. National Library of Medicine. Medical+Education - search results - PubMed. National Center for Biotechnology Information.
- U.S. National Library of Medicine. Medical+Education+from+students+perspective - search results - PubMed. National Center for Biotechnology Information.
- ACGME. Summary of proposed changes to ACGME Common Program Requirements Section VI.
- Warner BW, Hamilton FN, Brunck BS, Bower RH, Bell RH Jr. Study of surgical resident working hours and time utilization. *J Surg Res*. 1990;48(6):606-10.
- Khoushhal Z, Hussain MA, Greco E, Mamdani M, Verma S, Rotstein O, et al. Prevalence and Causes of Attrition Among Surgical Residents: A Systematic Review and Meta-analysis. *JAMA Surg*. 2017;152(3):265-72.
- De SK, Henke PK, Ailawadi G, Dimick JB, Colletti LM. Attending, house officer, and medical student perceptions about teaching in the third-year medical school general surgery clerkship. *J Am Coll Surg*. 2004;199(6):932-42.
- O'Neill R, Shapiro M, Merchant A. The Role of the Operating Room in Medical Student Education: Differing Perspectives of Learners and Educators. *J Surg Educ*. 2018;75(1):14-28.
- Jung S, Greenberg J, O'Rourke AP, Minter RM, Foley E, Voils CI. Comparison of the Perspectives of Medical Students and Residents on the Surgery Learning Environment. *J Surg Res*. 2021;258:187-94.
- Rogers F, Horst M, To T, Rogers A, Edavettal M, Wu D, et al. Factors associated with patient satisfaction scores for physician care in trauma patients. *J Trauma Acute Care Surg*. 2013;75(1):110-4; discussion 114-5.
- Tyser AR, Abtahi AM, McFadden M, Presson AP. Evidence of non-response bias in the Press-Ganey patient satisfaction survey. *BMC Health Serv Res*. 2016;16(a):350.
- Chughtai M, Patel NK, Gwam CU, Khlopas A, Bonutti PM, Delanois RE, et al. Do Press Ganey Scores Correlate with Total Knee Arthroplasty-Specific Outcome Questionnaires in Postsurgical Patients? *J Arthroplasty*. 2017;32(9S):S109-12.