

Received Date : 30-Sep-2015

Revised Date : 01-Apr-2016

Accepted Date : 13-Apr-2016

Article type : Original Article

Students' Educational Experiences and Interaction with Residents on Night-Shifts

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Abstract:

Introduction: The purpose of this mixed-methods study was to investigate if increased night-shifts for students on paediatric clinical rotation had any negative impact on their overall quality of educational experiences in light of the implementation of duty hour restrictions.

Methods: Both quantitative and qualitative data were collected from 30 students on paediatric clerkship during the Academic Year 2011-12. Students completed two questionnaires, one in response to their experiences during the day-shifts and another in response to their experiences during the night-shifts. Only 25 cases were retained for the final analyses. Non-parametric test, specifically Wilcoxon Singed Rank Test, was used to analyse the quantitative data and constant comparative thematic analyses as described by Creswell was used to analyse the qualitative data.

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as [doi: 10.1111/tct.12561](https://doi.org/10.1111/tct.12561)

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Results: The results indicated that students' perceived quality of experiences during the night-shifts was greater as compared to their day-shifts. Students reported having more time to socialise during the night-shifts. They further reported informal ways of learning, such as impromptu teaching and spontaneous discussions on clinical problems more beneficial, which often occurred in abundance during the night-shifts as opposed to scheduled didactic teaching sessions during the day-shifts.

Discussion: This study documented many unanticipated benefits of night-shifts. The feeling of cohesiveness of the night team deserves further exploration as this can be linked to better performance outcomes. More consideration should be given to implementing night-shifts as a regular feature of clerkships.

INTRODUCTION

Duty hour restrictions (DHRs) exist in numerous training programmes worldwide¹. The Accreditation Council for Graduate Medical Education² implemented DHR to improve patient safety, education, and residents' well-being. Consequently, night-shift rotations during residency increased. This contributed to the reduction in residents' teaching activities.² This could affect students' clinical experiences³⁻⁴ as students receive substantial training from residents.⁵

At a US medical school, third year clinical students spend 4 weeks with an inpatient paediatric team with daily hospital rounds and teaching sessions. Prior to 2011, students participated in overnight call with their daytime resident team every fourth night. As the residency transitioned to a night-shift system, student schedules were restructured to mimic the residents' experience. Beginning in 2011, students spent four consecutive night-shifts with a different night-time resident team. Educational leadership was concerned the new student schedule would change team dynamics and impact students' overall learning experiences as no sufficient literature existed on the topic. The limited literature available on this topic is contradictory and inconclusive.⁶ Therefore, the purpose of this mixed-method study was to

investigate if implementing night-shifts had any negative impact on student-perceived quality of educational experiences.

METHODS

Both qualitative and quantitative data were collected in 2011. Questionnaires were administered to paediatric clerkship students. Consent was implied based on voluntary participation. The Institutional Review Board granted exempt status.

Quantitative methods

Surveys were administered to 30 students; 25 were retained for final analyses. Five students had missing information and were excluded. Students completed two surveys, one each after a night-shift and after a day-shift. The surveys were collected at the convenience of the research assistant, so the time between surveys varied and surveys were not completed in a particular order. Questions were selected to measure different aspects of educational experiences and assessed using Likert scale 1 (poor) to 5 (excellent). Data were analysed by Wilcoxon Signed Rank Test. We computed descriptive statistics and performed relevant tests using the Statistical Package for the Social Sciences (SPSS) version 22.0.

Qualitative methods

Two moderators conducted four student focus groups using a semi-structured interview protocol to explore students' views on day and night -shifts. The audiotaped, transcribed focus group sessions lasted between 40-60 minutes and included between 6-12 students. All students participated in a focus group. Detailed field notes and analytic memos were completed. Using the constant comparative thematic analyses method,⁷ two authors read each transcript individually and developed a preliminary code list. These preliminary codes and themes were then discussed as a group until consensus was reached.

RESULTS

Quantitative

Table 1 presents the variables relevant to our research question. The amount of teaching residents, fellows, and faculty engaged in during night-shifts was less than during day-shifts (n.s.). However, students engaged in more non-teaching or patient care related activities with their team members during night-shifts at a statistically significant level. An effect size (Cohen's *d*) of .48 was found; this is a medium effect size based on Cohen's criteria.⁸

In terms of students' quality of experience with direct patient care, feedback and direct observation, differences were not statistically significant. However, students felt that the quality of residents' teaching during night-shifts was higher than that of day-shifts. Similarly, students' perceptions of the overall quality of their experiences were higher during night-shifts. Cohen's effect sizes for the two variables were $d=.49$ and $d=.43$, respectively indicating moderate practical significance. It is to be noted that using Bonferroni adjustment, the alpha level was set at .007 (.05/7).

Qualitative analysis

Four themes emerged based on the review of the detailed field notes, analytic memos, and focus group interviews: (1) Education; (2) Glimpse of Future; (3) Team Dynamics; and (4) Length of Night-Shifts (Figure 1: Concept Map). These themes suggest that increased night-shifts did not have negative impact on students' overall learning experiences. Selected quotes from different focus group students are included.

Education

Students expressed there was more time at night to obtain full History and Physical Exams on patients with greater amounts of teaching and feedback on those admissions. Less structured night-shifts allowed for more impromptu teaching, consisting of short, spontaneous discussions on a clinical problem. The theme of education came through when one of the students mentioned in focus group 1,

“The most teaching I got was when I came back from getting a history from [a patient] and [residents] asked me for my differential, had me flush out why or why not, had me think of what tests we would do. So, instead of them telling me what the plan was going to be, we made it together and I thought that was the best teaching that I got on nights, and something I definitely didn't get during the day.”

Another student remarked in focus group 2,

“I've always learned better on patients that I've taken care of as opposed to a didactic session. So I didn't get any lectures at night, but I felt like I got teaching.”

Glimpse of Future

Students appreciated opportunities to learn about residents' night-time work. This gave them a glimpse of possible personal schedules and physical demands in their future career. Students noted differences in how the hospital functions during the two shifts and the inherent changes in lifestyle. This theme was summarised by a student who said in focus group 3,

“There are a lot of kinds of learning. There is learning how to diagnose and treat stuff, but there is also just learning about the lifestyle that we are all about to go into, and...how that changes your schedule, your life, the physical demands on you, what it's like to think when you're tired and still have to make decisions and stuff like that. How the hospital runs at night is different from how it runs during the day, so I think there are a lot of things that are, maybe not tested on an exam or something, but you kind of pick up without thinking about it.”

Team Dynamics

Students worked with the same day-shift residents for most of the month, while they worked with the night-shift team for just four nights. However, they reported higher perceptions of team cohesiveness during night-shifts. For example, one student stated in focus group 1,

“I felt like it was a more cohesive unit, more communication amongst people . . . I felt more of a team member while I was there at night than I ever did during days.”

Length of Night-Shift

A common theme that emerged throughout the focus group interviews was the enriching educational experiences students had during night-shifts. Students reported four consecutive night-shifts was not sufficient to reap the entire benefits of night-shift. For example, one student remarked in focus group 1,

“...I think it would be really nice to have a week of nights and just admit a ton of patients and learn a lot and then go back to days.”

DISCUSSION

The findings of this study, based on both quantitative and qualitative data, suggest that increased night-shifts of paediatric clinical students do not have any negative impact on student learning experiences. Contrarily, students feel that their overall experiences during night-shifts

are more enriching. This study validates previous findings^{3&6} bringing further empirical evidence to the advantages of night-shift learning experiences. In fact, despite reduction of residents' work hours and less structured teaching during night-shifts, students have many opportunities to learn through informal ways.

This study makes three practical contributions. First, students feel they learn better when teaching is impromptu. Based on student comments, teaching at night is more experiential and directed towards real life problems which is more consistent with adult learning theory. In such scenarios, discussions are naturally interactive with automatic feedback, contrary to what may occur in scheduled didactic teaching sessions during daytime hours. The findings of this study suggest, not surprisingly, that students learn better when student-centered instructional techniques are used.

Second, the quantitative data reveal that students find more time for socialisation (e.g., eating together) during night-shifts and perceive their night-shift teams to be more cohesive. Socialisations could potentially help students develop built relationships which may also contribute to perception of better teaching. A strong sense of team has been shown to have many positive effects, including better performance outcomes.⁹ Therefore, concerted efforts should be made to create platforms for students to have meaningful socialisation during both shifts without compromising clinical duties as it has the potential to contribute to students' overall well-being and learning experiences. Further, students gained a better understanding of how the hospital functions differently during the night, particularly residents' work.

Finally, based on our results, expanding the length of night-shifts and/or instilling night-shifts as a regular feature of clerkships should be given serious consideration. As a result of these findings, the night team experience has continued as a required aspect of our paediatric rotation since 2011.

Limitations of this study are that data were collected from a single university with small sample size. However, the findings are consistent with other similar studies and effect sizes of those statistically significant results have moderate practical significance. As students do not provide unsupervised medical care, it is unlikely immediate patient care would be impacted by student night-shifts. Further study should be done to explore the best educational experiences to prepare students for future patient care responsibilities and additional factors that contribute to the higher quality experience of nighttime learning.

References

1. Temple, J. Resident duty hours and the globe: Where are we now? *BMC Medical Education*. 2014; 14: 1-5.
2. Accreditation Council for Graduate Medical Education. Common Program Requirements http://www.acgme.org/acwebsite/home/Common_Program_Requirements_07012011.pdf Downloaded October 6, 2011.
3. Kogan JR, Pinto-Powell R, Brown LA, Hemmer P, Bellini LM, Peltier D. The impact of resident duty hours reform on the internal medicine core clerkship: Results from the clerkship directors in internal medicine survey. *Acad Med* 2006; 81:1038-1044.
4. Goitein L, Shanafelt TD, Wipf JE, Slatore CG, Back AL. The effects of work-hour limitations on resident well-being, patient care and education in an internal medicine residency program. *Arch Intern Med*. 2005;165(22):2601-6.
5. 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;199:932-42.
6. Talib N, Toy S, Moore K, Quaintance J, Knapp J, Sharma V. Can incorporating inpatient overnight work hours into a pediatric clerkship improve the clerkship experiences for students? *Acad Med* 2013; 88: 376-381.
7. Creswell, J. Research design: Qualitative, quantitative, and mixed method approaches (2nd ed.). 2005. Thousand Oaks, CA: Sage.
8. Cohen JW. Statistical power analysis for the behavioral sciences (2nd ed). 1988. Hillsdale, NJ: Lawrence Erlbaum Associates.
9. Thompson, BM, Haidet P, Borgers NJ, Carchedi LR, Roman BJB, Townsend MH, Butler AP, Swanson DB, Anderson MP, Levine RE. Team cohesiveness, team size, and team performance in team-based learning teams. *Med Educ* 2015(4); 49: 379-385.

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Funding: None.

Conflict of interest: None.

Acknowledgements: None.

Ethical approval: The University of Michigan Institutional Review Board deemed this study exempt from full review.

The participants knew the data was being collected for publication and gave their consent. They were provided information about the study and told that participation was voluntary. They did not receive any incentives for participation.

Table 1.
Activity and Quality Differences in Day and Night-Shifts

	Day-Shift: Mean (Std. Deviation)	Night-Shift: Mean (Std. Deviation)	Z (p values)
Per cent of time spent on teaching by residents, fellow, or faculty members	12.87 (6.93)	12.62 (6.16)	-0.18 (.855)
Percent of time spent on socialisation (e.g. eating together)	5.03 (4.54)	11.79 (10.57)	-3.34 (.001)
Overall quality of experience	3.96 (.79)	4.67 (.57)	-2.99 (.003)
Quality of experience with direct patient care	3.80 (1.00)	4.33 (.70)	-1.86 (.062)
Quality of feedback	3.40 (.87)	3.63 (1.01)	-0.92 (.357)
Quality of direct observation	3.12 (1.17)	3.58 (1.02)	-1.57 (.116)

Quality of resident teaching	3.64 (.95)	4.36 (.81)	-3.49 (.001)
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Note. Wilcoxon Rank Test was performed.

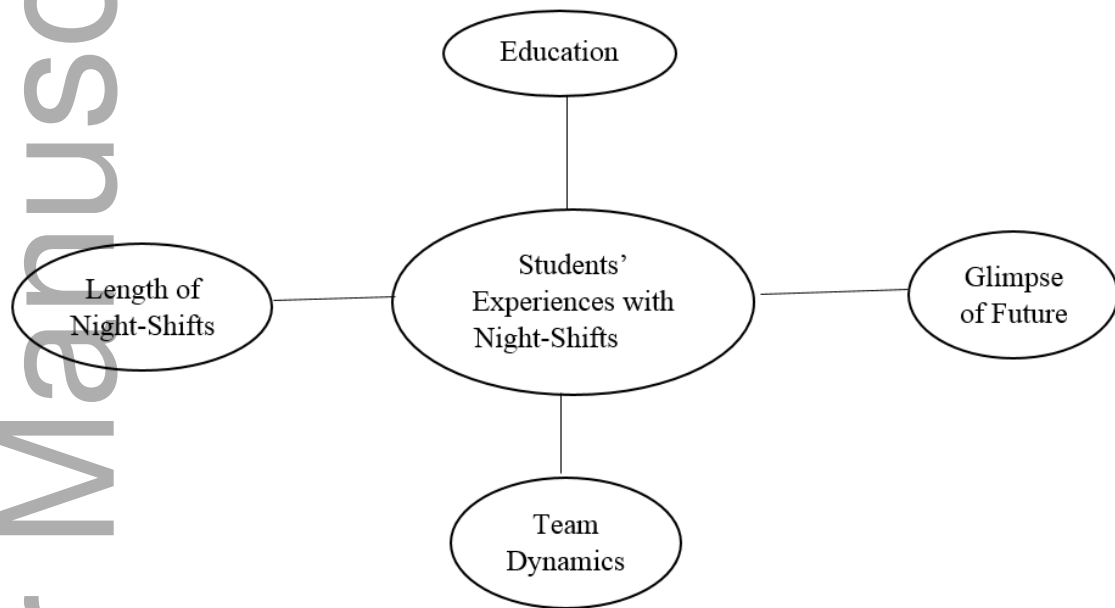


Figure 1. Concept map of students' experiences with night-shifts.