



Students' educational experiences and interaction with residents on night shifts

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SUMMARY

Background: The purpose of this mixed-methods study was to investigate whether increased night shifts for students on paediatric rotations 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 rotations 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. The non-parametric Wilcoxon signed-rank test was used to analyse the quantitative data, and constant comparative thematic analyses, as described by Creswell, were used to analyse the qualitative data.

Results: The results indicated that students' perceived quality of experiences during the night shifts was greater, compared with their day shifts. Students reported having more time to socialise during the night shifts. They further reported that informal ways of learning, such as impromptu teaching and

spontaneous discussions on clinical problems, were more beneficial, and these often occurred in abundance during the night shifts as opposed to the scheduled didactic teaching sessions that occur 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.

[Do] increased nights shifts for students ... [have] any negative impact on their overall quality of educational experiences[?]

Students spent four consecutive night shifts with a different night resident team

INTRODUCTION

Duty-hour restrictions (DHRs) exist in numerous training programmes worldwide.¹ The Accreditation Council for Graduate Medical Education implemented DHR to improve patient safety, education, and the wellbeing of residents.² Consequently, night-shift rotations during residency have increased, and this has contributed to the reduction in residents' teaching activities.² This could affect students' clinical experiences,^{3,4} as students receive substantial training from residents.⁵

At a US medical school, third-year clinical students spend 4 weeks with an in-patient paediatric team with daily hospital rounds and teaching sessions. Prior to 2011, students participated on 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 resident team. Educational leadership was concerned that 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 whether 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 students 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 were scored on a Likert scale (1, poor; 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 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 and transcribed focus group sessions lasted between 40 and 60 minutes, and included between six and 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 teaching that residents, fellows, and faculty members engaged in during night shifts was less than that performed during the day shifts (not significant); 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

Students felt that the quality of residents' teaching during night shifts was higher than that during day shifts

Table 1. Activity and quality differences in day and night shifts

	Day shift Mean (SD)	Night shift Mean (SD)	Z (p values)
Percentage of time spent on teaching by residents, fellows, or faculty members	12.87 (6.93)	12.62 (6.16)	-0.18 (0.855)
Percentage of time spent on socialisation (e.g. eating together)	5.03 (4.54)	11.79 (10.57)	-3.34 (0.001)
Overall quality of experience	3.96 (.79)	4.67 (.57)	-2.99 (0.003)
Quality of experience with direct patient care	3.80 (1.00)	4.33 (.70)	-1.86 (0.062)
Quality of feedback	3.40 (.87)	3.63 (1.01)	-0.92 (0.357)
Quality of direct observation	3.12 (1.17)	3.58 (1.02)	-1.57 (0.116)
Quality of resident teaching	3.64 (.95)	4.36 (.81)	-3.49 (0.001)

The Wilcoxon rank test was performed. Quality questions assessed on Likert scale (1, poor; 5, excellent).

0.48 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 during 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 $d = 0.49$ and $d = 0.43$, respectively, indicating moderate practical significance. It is to be noted that using Bonferroni adjustment, the alpha level was set at 0.007 (0.05/7).

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 the future; (3) team dynamics; and (4) length of night shifts (Figure 1). These themes suggest that increased night shifts did not have a negative impact on students' overall learning experiences. Selected quotes from different focus group students are included.

Education

Students expressed that there was more time at night to obtain full histories and physical examinations on patients, with more 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 from a student 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.

In focus group 2, another student remarked that:

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 the 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 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

Based on student comments, teaching at night is more experiential and directed towards real-life problems

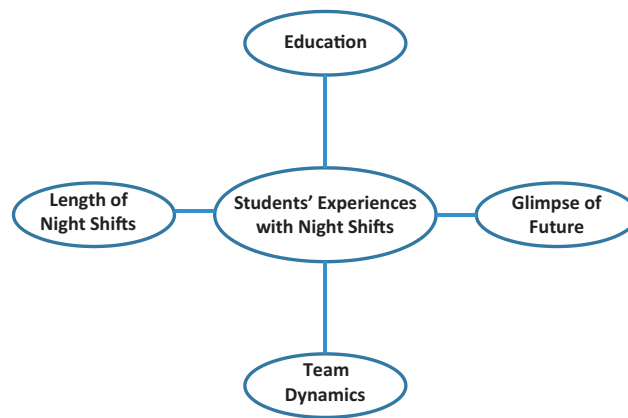


Figure 1. Concept map of students' experiences with night shifts

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, whereas they worked with the night-shift team for just four nights; however, they reported higher perceptions of team cohesiveness during night shifts. For example, in focus group 1 a student stated that:

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 that students had during night shifts. Students reported four consecutive night shifts was not sufficient to reap the entire benefits of working on 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 do not have any negative impact on student learning experiences for paediatric clinical students. Indeed 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 a reduction of residents' working 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 that 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-centred 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. Socialisation could potentially help students to develop stronger relationships that may also contribute to the 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. Furthermore, students gained a better understanding of how the hospital functions differently during the night, particularly of residents' work.

Finally, based on our results, expanding the length of and 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.

The limitations of this study are that data were collected from a single university with a 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 that immediate patient care would be affected by students undertaking night shifts. Further study should be performed 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 night-time learning.

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Students gained a better understanding of how the hospital functions differently during the night

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