Original Article

Midnight Report: A Novel Faculty-Guided Night Curriculum to Enhance Resident Nighttime Education

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Objectives: A large discrepancy exists in resident educational activities between daytime and nighttime medical rotations. The Accreditation Council for Graduate Medical Education duty-hour regulations led to the increased adoption of the dedicated nighttime rotation called night float. Nighttime education has largely been negatively perceived by night float medical residents. Although there have been attempts to improve nighttime education, none of the initiatives included faculty-guided structured night curriculum. Our objective was to improve resident experience with and perception of nighttime education by implementing a structured, faculty-guided, nighttime educational curriculum.

Methods: This was an assessment of an educational initiative at a single academic medical center, Virginia Commonwealth University Health System. The internal medicine residency program implemented a teaching nocturnist program in 2013 and a novel faculty-guided nighttime teaching curriculum in 2016 called midnight report. We then evaluated resident experience with and perception of nighttime education at our institution using anonymous free-response surveys for the academic year July 2016–June 2017.

Results: Of the 142 eligible residents, 95 (67%) responded to the survey. The majority of the residents (54%–77%) positively perceived their experience of the nighttime educational environment during their night float rotation after implementation of the teaching nocturnist program and midnight report.

Conclusions: Compared with the published literature reporting negative perceptions of the nighttime educational environment by residents at different academic centers, our results showed that the majority of our residents positively perceived the impact of our new faculty-guided nighttime educational curriculum.

Key Words: midnight report, nighttime curriculum, nighttime education, night float, teaching nocturnists

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Night float is defined by the Accreditation Council for Graduate Medical Education (ACGME) as a rotation in which residents "are assigned on-site duty during evening/night shifts, are responsible for admitting or cross-covering patients until morning, and do not have daytime assignments."[1] During the past 10 years, many residency training programs have increasingly used night float rotations in an effort to reduce resident duty hours and fatigue, in accordance with the ACGME work environment requirements. Previous studies have examined the impact of night float rotations on the nighttime educational environment; observations include decreased attendance at teaching conferences, reduced interaction with teaching faculty, and reduced satisfaction with overnight education.[2–5]

In contrast to daytime, nighttime opportunities for structured resident educational opportunities may be limited or scarce. Several authors describe night float–specific educational interventions; however, these interventions tend to be resident led, with unclear sustainability and limited faculty supervision or support,[6,7] or nocturnist led, focusing on clinical supervision and teaching, but without structured curriculum or dedicated teaching time.[8,9] In other academic settings, structured didactic teaching sessions are valuable educational experiences; didactics have been shown to significantly improve examination scores for clinical clerkship students, help expand the fund of knowledge beyond what is learned via direct clinical care, and improve learners' perception of the quality of their education.[10,11] Medical centers developed structured educational activities for daytime learners, including morning reports, noon conferences,

Key Points

- We created a novel, structured, faculty-guided nighttime educational curriculum for the internal medicine residency program at the Virginia Commonwealth University Health System.
- The new curriculum and nighttime educational environment were perceived positively by our residents, contrasting with the overall negative resident perception of nighttime education as shown in the literature.
- This curriculum could be an educational model for other academic healthcare institutions to improve the continuity of resident education across day and night.

and academic half-days.[12,13] There is a general lack of nocturnal structured curricula, negative perceptions of nighttime education by residents, and the desire to enhance nighttime education by both residents and faculty, however.[3–5] In-hospital nighttime teaching faculty members may play an important role in running structured teaching sessions and focused educational experiences. In at least one study, residents favored in-hospital overnight faculty presence, which positively affected both patient care and education on night float rotations.[8]

We implemented a teaching nocturnist role in our academic medical center, Virginia Commonwealth University Health System (VCUHS), and then developed a formal nighttime teaching curriculum that is designed and guided by our teaching nocturnists. Here, we describe our program and program evaluation.

Methods

Settings and Participants

The VCUHS is an 811-bed, academic tertiary-care medical center, located in downtown Richmond. Our internal medicine (IM) residency program trains 145 residents annually; 99 categorical, 20 preliminary, and 26 combined-program trainees (emergency medicine-IM and pediatrics-IM). The program uses a night float structure for nighttime patient care. There is a total of two night teams, each with one resident and two interns, covering a total of eight ward-based teams. All of the residents (with the exception of combined-program trainees) spend at least two 2-week-long blocks per year on night float rotation. Structured handoffs occur at 7:00 PM (day teams to night teams) and 6:00 AM (night teams to day teams). The presentation of new patients admitted overnight to day teams happens slightly later in the morning before day team rounds and are observed by the teaching nocturnists.

Program Description

We implemented the IM teaching nocturnist program at VCUHS in 2013. The responsibilities of a nocturnist include supervising the night float residents during medical emergencies, procedures, patient admissions, handoff observation, coverage of patient services when residents are off-duty, and teaching. Our night float residents work 5 nights per week, Monday through Friday, with the presence of one teaching nocturnist during these night shifts. The teaching responsibilities of the nocturnist include resident education when discussing workup and management of new patient admissions, discussing emerging patient-related clinical questions, and using different educational didactics at the discretion of the nocturnist. None of these activities included a structured curriculum in the early yearly of implementation, however.

In 2016, we established the "midnight report" as a structured teaching curriculum for night float residents. The report was initially held once weekly, on Wednesdays at midnight. Shortly after implementation and positive verbal feedback from the residents, it was expanded to twice weekly, on Wednesdays and Fridays at midnight. This midnight timing was selected to decrease disruption to workflow, allowing residents to receive handoffs, complete early evening admissions work, and have enough time for early morning admissions and clinical activities. The timing is occasionally moved to accommodate workflow. The midnight report is a 45-minute session that involves the teaching nocturnist, all night interns and residents, and any fourth-year medical students on night float rotations.

The midnight report is structured to mirror the classic morning report. The session includes a resident-led case presentation with evidence-based teaching focused on differential diagnosis, diagnostic workup, or management. At the beginning of the week, the two night float teams are instructed to select a patient from their admissions encounters. The teams inform the teaching nocturnists of their case selections the night before their presentation. The admitting intern presents the patient's history and relevant clinical findings, while the senior resident guides the discussion. The senior residents are instructed to focus their discussion on one area, such as differential diagnosis, diagnostic workup, or management, and to highlight any relevant clinical guidelines or evidence-based literature. The senior residents prepare for the session before the presentation. The teaching nocturnist ensures that the discussion is streamlined and focused on high-yield clinical areas related to the case; provides support to the senior resident during the discussion; and helps answer clinical questions asked by the residents, interns, or students. The teaching nocturnist also helps to summarize the take-home points for each case. During the conference time, the two senior residents typically cover the interns' pagers to triage any urgent or emergent pages received during the report. In coordination with the hospital admitting personnel, new admissions are deferred until after this 45-minute conference time.

Program Evaluation

We assessed resident perceptions of the educational value of night float rotation and midnight report in the academic year July 2016–June 2017, as part of a larger end-of-year internal medicine residency anonymous annual program survey. The survey is distributed in the spring of each year to all trainees using REDCap electronic data capture tools hosted at VCUHS.[14,15]

The survey included eight Likert-scale response items that focused on residents' nighttime educational experience after implementing the teaching nocturnist program and midnight report. Six of the survey items focused on the nighttime educational environment and asked the residents how positively or negatively they felt about those items (Fig. 1). The remaining two items focused directly on residents' educational experience with the midnight report by asking them to what extent they agreed with those two items (Fig. 2). The survey questions included items that were similar to previously published surveys assessing nighttime educational interventions for residents.[5,6] This survey

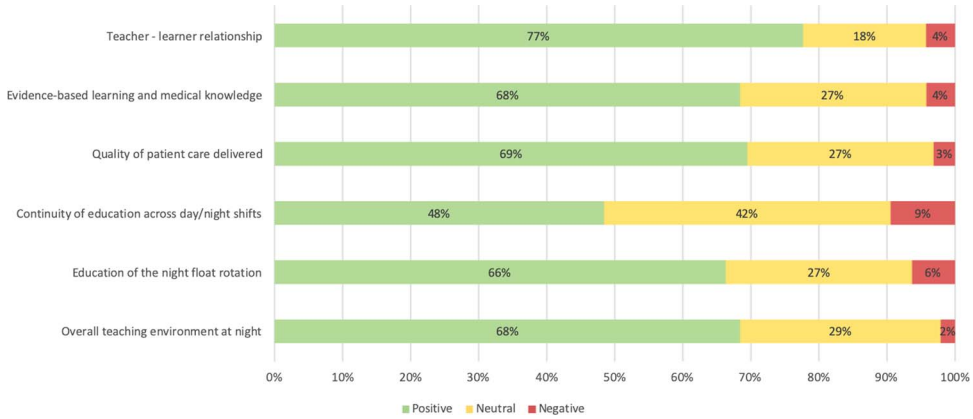

Fig. 1. **Resident perception of the nighttime education after implementing the teaching nocturnist program and midnight report. "Positive" results include "positive" and "very positive." "Negative" results include "negative" and "very negative."**

was part of our larger annual program assessment and improvement process. We report aggregated existing data from this anonymous survey. Our institution does not require institutional review board approval for these efforts. We report descriptive statistics and results from one-way analysis of variance for differences in postgraduate year (PGY) levels, using SPSS version 25.0 (IBM SPSS Statistics, Armonk, NY).

Results

We distributed the survey to 142 residents (59 PGY1, 37 PGY2, 38 PGY3, 6 PGY4, 2 PGY5). Ninety-five residents (67%) responded (35 PGY1, 28 PGY2, 32 PGY3–5). The survey results showed that the majority (68%) of the residents surveyed perceived the educational environment of night float rotation positively, whereas 29% were neutral. Residents valued the teacher–learner relationship between residents and academic nocturnists the most (77%). Sixty-eight percent of the residents believed that they were gaining evidence-based learning and education; 69% of the residents believed that the quality of patient care delivered was improved. Only 48% of the residents positively perceived continuity of education across day and night, whereas 42% were neutral and 9% viewed it negatively. Moreover, 54% of the residents reported that they enjoyed participating in midnight report, whereas 26% were neutral. The results are highlighted in Figures 1 and 2. There was no statistically significant difference in perception based on the PGY levels (*P* value ranged from 0.107 to 0.548), except for the survey item "I enjoyed participating in midnight report," for which the "agree" results favored PGY2 and PGY3–5 ($P = 0.023$).

Discussion

The widespread implementation of night float rotations, in response to the ACGME work environment requirements and a concern for resident well-being has led to reduced resident satisfaction with overnight education and the desire to enhance it.[3–5] Important barriers to an effective education program at night include lack of nighttime faculty member availability, lack of clear expectations around nighttime teaching, provider fatigue, and demands of clinical task completion.[4] We restructured our night float rotation to address some of these challenges. The changes included introducing dedicated

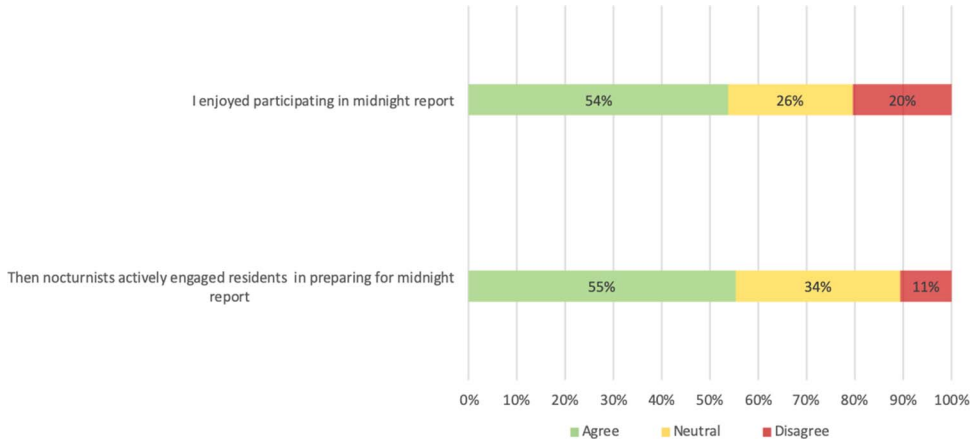

Fig. 2. **Resident perception of the faculty-guided midnight report. "Agree" results include "agree" and "strongly agree." "Disagree" results include "disagree" and "strongly disagree."**

academic faculty nocturnists to provide clinical oversight and guidance, structuring expectations for teaching and observation and evaluation, and implementation of midnight report. Investigators have suggested that residents express great interest in dedicated nighttime teaching with case-based didactics,[4] and that patient care and education were better with the presence of in-hospital overnight attending.[8] It also has been suggested that developing skilled nighttime educators will lead to unique educational opportunities.[16] We believe that our innovative nighttime educational program addresses these issues.

Our night curriculum resulted in an overall favorable nighttime educational experience from our residents' perspectives. The teacher–learner relationship was the most favorable aspect of our night float rotation. Another area of strength included favorable resident perceptions of nighttime evidence-based learning. We believe that this is likely due to the implementation of structured midnight report curriculum, creating an educational environment that is familiar to residents because of the similarity to morning report.

Continuity of education across day and night shifts showed the least positive response, likely because of the continuing large discrepancy between educational activities during the daytime compared with the nighttime. A little more than half of the residents who responded agreed that they enjoyed midnight report, and this was more favored by PGY2 and PGY3–5. After further examining residents' feedback on midnight report, comments showed that residents felt an element of anxiety during the midnight report, particularly regarding finishing clinical tasks and working on upcoming admissions, which likely negatively affected their enjoyment of the educational session. The statistically significant difference in the responses to this item between PGY1 and PGY2–5 residents could be related to PGY1 interns feeling more of the time pressure because of the nature of their clinical responsibilities such as entering patient care orders and writing up admission notes. Night float rotations can be particularly busy in the setting of reduced nighttime resident staffing, especially in large academic medical centers such as VCUHS. To address this issue, further future efforts and resources may be required.

Another challenge encountered is triaging pages during the midnight report session. This was addressed by requiring that the senior residents triage pages received during the conference with guidance from the teaching nocturnist. Moreover, implementing midnight report required coordinating with hospital admission triage staff, so that admissions are seen after the midnight report session.

There are several limitations to our nighttime educational program and its assessment. This curriculum was implemented in a single academic tertiary-care center involving IM and combined IM program residents, and this may not be reflective of all specialties or settings. Another limitation is the resident response rate to the survey being at 67%; however, our response rate is higher than survey response rates for nighttime teaching initiatives reported by similar academic centers.[6] We also did not conduct a full assessment of resident perceptions of the night float rotation before implementing our curriculum, although our overall program evaluations of the night float experience have improved since the implementation of this curriculum.

Conclusions

In summary, implementing a teaching nocturnist program and structured didactics enhanced the resident nighttime educational environment at our hospital. The educational values of the curriculum were positively perceived by the majority of our residents. The midnight report can be an educational model for other hospitals and institutions, to enhance continuity of resident education across day and night.

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