

The Effect of a Teaching Attending on Medical Students' Labor and Delivery Experience

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Background

Labor and Delivery is consistently rated by medical students as one of the most difficult learning environments [1,2]. Students' perception of a learning environment as unwelcoming can contribute to poor learning outcomes, and has been shown to effect medical students' study habits and academic success [3-6]. In Obstetrics and Gynecology (OBGYN) clerkships, the problem of integration is magnified, as the healthcare team has many members but a less hierarchical organization than other hospital-based clerkships¹. Additionally, as on all clerkships, medical students must navigate how to both learn clinical skills and assist in patient care. A review of evaluations at our institution from 2009-2012 showed students felt excluded from the healthcare team, reported limited contact with faculty, missed assisting in deliveries, and had a fragmented learning experience.

The attitude of faculty influences the learning environment. Physicians and nurses report discomfort with teaching medical students [1,2]. This may stem from a lack of time, inadequate faculty development opportunities, a misapprehension of the level of teaching required, or a desire to protect vulnerable patients from learners [1,2]. A frequent concern is that students do not spend enough time on the labor and delivery floor to learn the management of normal labor and delivery [2]. At our institution, students have didactic sessions, continuity clinics and other obligations which can result in as little as eight 12-hour shifts spent on labor and delivery during a six-week clerkship.

Using the data from previous years' exit surveys as a needs assessment, in 2013 we implemented a program to increase faculty involvement in medical student instruction called Teaching Attending of the Day. Prior to this intervention, no single faculty member on Labor and Delivery was identifiable as an instructor; rather, there existed an informal expectation that all general obstetrician-gynecologists would participate in teaching activities, without a specified role or expected instruction. We hypothesized that by providing faculty development via a structured curriculum and daily identification of one physician responsible for coordination of clinical teaching activities, time spent teaching by physicians would increase. We also hypothesized acceptance of student participation in patient care and familiarity with the Association of Professors of Gynecology and Obstetrics (APGO) Medical Student educational objectives would increase among physicians and Labor and Delivery nurses.

Methods

Medical students at Harvard Medical School complete the third-year clinical clerkship at one of four teaching hospitals. The clerkship at Beth Israel Deaconess Medical Center, an urban, tertiary care medical center with approximately 5000 deliveries a year, consists of 55-60 students per year. During the clerkship, students are assigned to labor

and delivery for 2 weeks, and are expected to take four weekend or overnight 12-hour call shifts. At the start of academic year 2013-2014, we implemented a volunteer teaching position on Labor and Delivery. Following a faculty development seminar, we recruited OBGYN general obstetrician -gynecologists to serve as Teaching Attending of the Day. Volunteers received e-mail instructions at the start of the program and reminder e-mails the night before their scheduled shifts. The Teaching Attending was asked to provide a short didactic session for students based on APGO educational objectives. We designed a teaching curriculum using these objectives, consisting of case studies and suggested topics for didactic sessions, and provided this as a handbook. The Teaching Attending also coordinated bedside teaching, introduced students to nurses and other physicians, and insured students were called for deliveries.

Our primary outcomes were to evaluate if time spent on various teaching activities changed as a result of a dedicated Teaching Attending. A secondary outcome was to assess knowledge of national APGO educational objectives. We assessed our intervention through pre- and post-intervention surveys, which were sent to all general obstetrician -gynecologists and full-time labor and delivery nurses via email. A reminder email was sent to all invited participants 2 weeks later. Surveys were sent out at the start of the academic year prior to implementation of the program, and follow up surveys were sent to physicians and nurses after the first year of the intervention. All general obstetrician- gynecologists and nurses working on labor and delivery during both time periods were eligible to participate in the survey. Intent was to collect data reflecting current practice so we limited participation to the academic year in which the intervention was begun, and surveyed only current third year medical students. Medical students were surveyed at the completion of their OBGYN clerkship during the academic year. Those medical students who completed their rotation prior to the implementation of the program made up the pre-intervention group. Medical students who completed their rotation after the implementation were in the post-intervention group. All responses were collected anonymously through a Redcap survey instrument. We excluded residents and other members of the Labor and Delivery team from our survey as they did not have direct observation of faculty teaching activities, and the survey did not add to the educational mission for residents.

All statistical tests were performed using SAS 9.4 (SAS Institute Inc., Cary, NC). All tests were two sided, and P values <0.05 were considered statistically significant. Data are presented as median and interquartile range, or proportion. The medical students who participated in the pre-intervention were not the same as the medical students in the post-intervention group due to the changing rotations. In addition, information identifying participating nurses and physicians was not collected. Therefore, all analyses comparing the pre- and post-intervention were not paired. The primary outcome, time spent teaching, was compared using the Wilcoxon rank-sum test. Other comparisons were made using a Chi-square or Fisher's exact test for categorical variables and Wilcoxon rank-sum tests for continuous variables. This study was approved by the institutional review board at HMS and BIDMC as an educational quality improvement, thus no informed consent was required for participation.

Results

Of the 24 general obstetrician-gynecologists invited to volunteer in the Teaching Attending program, 20 (83.3%) elected to participate. 100% of medical students (n= 6), 83.3% of physicians (20 of 24) and 18.3% (17 of 93) of nurses responded to the pre-intervention survey.

Response rates for the post-intervention survey were 41.2% (21 of 51) for students, 45.8% (11 of 24) for physicians, and 28.9% (26 of 90) for nurses.

Students' estimate of time spent with attending physicians per 12-hour shift on teaching activities increased in the categories of review of written notes, and bedside and didactic teaching, with increases in the median of 5 minutes for review of notes, 5 minutes for bedside teaching, and 5 minutes for didactics (Table 1). Students reported no change in the time spent listening to oral presentations and informal interactions with faculty. Physicians reported an increase in time spent on didactic teaching from a median estimate of 12.5 minutes to 17.5 minutes, and a decrease in time spent on bedside teaching, oral presentations, and informal interactions, with no change in time spent on reviewing written notes. Post- intervention, comparison of physicians' and students' estimates of time spent on teaching activities per 12-hour shift remained significantly different in the areas of reviewing written notes and listening to oral presentations (students' median estimate 12.5 minutes (7.5-12.5) vs. 17.5 minutes (12.5-27.5) $P=0.009$, and 7.5 minutes (7.5-7.5) vs. 12.5 minutes (7.5-17.5) $P=0.003$) (Table 1).

Physicians reported an increase in satisfaction with working with medical students (17 of 20 pre vs. 11 of 11 post [85.0% vs. 100%, $P=0.54$]), although these results were not significant. Student perception of physicians' satisfaction remained unchanged (5 of 6 pre vs. 17 of 21 post [83.3% vs. 81%, $P=1.0$]).

Physician and nursing assessment of students' skill acquisition did not change during the intervention, with similar percentages of physicians and nurses agreeing that students learn management of uncomplicated labors and to deliver a baby. Students' assessment of skill acquisition showed a non-significant decrease: more students agreed prior to our intervention that students learn to manage labor (6 of 6 pre vs. 17 of 21 post [100% pre vs. 81.0% post], $P=1.0$) and deliver a baby (4 of 6 pre vs. 9 of 21 post [66.7% pre vs. 42.9% post], $P=0.72$) (Table 1), although these results were not significant.

Familiarity with APGO educational objectives were similar among physicians and nurses in the two time periods (Table 2). Familiarity with the educational objectives was high among medical students throughout the survey period, with students expressing 100% agreement with educational objectives before and after the intervention (data not shown).

Discussion

Our survey confirms a concerning aspect of medical education: limited contact between attending physicians and medical students

Table 1: Attitudes of students, nurses and physicians before and after teaching attending program.

Survey questions	Pre-intervention	Post-intervention	P
Physicians	(n=20)	(n=11)	
I enjoy working with medical students			0.54
Disagree	0 (0.0)	0 (0.0)	
Neutral	3 (15.0)	0 (0.0)	
Agree	17 (85.0)	11 (100.0)	
Medical students integrate easily into L&D			0.39
Disagree	3 (15.0)	0 (0.0)	
Neutral	13 (65.0)	7 (63.6)	
Agree	4 (20.0)	4 (36.4)	
Medical students are unavailable*			1.0
Disagree	1 (4.2)	1 (9.1)	
Neutral	10 (52.6)	5 (45.5)	
Agree	8 (42.1)	5 (45.5)	

Medical students spend enough time on L&D to learn to manage an uncomplicated delivery			0.89
Disagree	6 (30.0)	3 (27.3)	
Neutral	5 (25.0)	4 (36.4)	
Agree	9 (45.0)	4 (36.4)	
Medical students gain enough experience during clerkship to deliver a baby safely			1.0
Disagree	10 (50.0)	6 (54.5)	
Neutral	7 (35.0)	3 (27.3)	
Agree	3 (15.0)	2 (18.2)	
Medical Students	(n=6)	(n=21)	
Attendings enjoy working with medical students			1.0
Disagree	0 (0.0)	1 (4.8)	
Neutral	1 (16.7)	3 (14.3)	
Agree	5 (83.3)	17 (81.0)	
Medical students integrate easily into L&D			1.0
Disagree	0 (0.0)	2 (9.5)	
Neutral	2 (33.3)	5 (23.8)	
Agree	4 (66.7)	14 (66.7)	
Medical students are unavailable too often			0.23
Disagree	4 (66.7)	13 (61.9)	
Neutral	2 (33.3)	2 (9.5)	
Agree	0 (0.0)	6 (28.6)	
Medical students spend enough time on L&D to learn to manage an uncomplicated delivery			1.0
Disagree	0 (0.0)	2 (9.5)	
Neutral	0 (0.0)	2 (9.5)	
Agree	6 (100.0)	17 (81.0)	
Medical students gain enough experience during clerkship to deliver a baby safely			0.72
Disagree	1 (16.7)	4 (19.0)	
Neutral	1 (16.7)	8 (38.1)	
Agree	4 (66.7)	9 (42.9)	
Nurses	(n=17)	(n=26)	
I enjoy working with medical students			0.78
Disagree	1 (5.9)	2 (7.7)	
Neutral	4 (23.5)	9 (34.6)	
Agree	12 (70.6)	15 (59.7)	
Medical students integrate easily into L&D			0.32
Disagree	2 (11.8)	7 (26.9)	
Neutral	8 (47.1)	13 (50.0)	
Agree	7 (41.2)	6 (23.1)	
Medical students are unavailable too often			0.84
Disagree	8 (47.1)	15 (59.7)	
Neutral	6 (32.3)	7 (26.9)	
Agree	3 (17.7)	4 (15.4)	
Medical students spend enough time on L&D to learn to manage an uncomplicated delivery			1.0
Disagree	6 (35.3)	8 (30.8)	
Neutral	6 (35.3)	9 (34.6)	
Agree	5 (29.4)	9 (34.6)	
Medical students gain enough experience during clerkship to deliver a baby safely			1.0
Disagree	8 (47.1)	13 (50.0)	
Neutral	6 (35.3)	8 (30.8)	
Agree	3 (17.7)	5 (19.2)	

Data are presented as n (%).

*One person missing a response in the pre-intervention period

Table 2: APGO educational objectives before and after teaching attending program.

Survey questions	Pre-intervention	Post-intervention	P
Physicians	(n=20)	(n=11)	
Medical students should be <i>allowed</i> to:			
Take histories from patients	20 (100.0)	11 (100.0)	1.0
Perform admission physical exams	20 (100.0)	11 (100.0)	1.0
Perform cervical exams on low risk labor patients	15 (75.0)	6 (54.5)	0.42
Observe vaginal delivery	20 (100.0)	11 (100.0)	1.0
Assist in vaginal delivery	20 (100.0)	11 (100.0)	1.0
Deliver the placenta	20 (100.0)	11 (100.0)	1.0
Observe cesarean delivery	20 (100.0)	11 (100.0)	1.0
Assist at cesarean delivery	16 (80.0)	9 (81.2)	1.0
Make postpartum rounds	20 (100.0)	11 (100.0)	1.0
Medical students should be <i>expected</i> to:			
Take history from patients	20 (100.0)	11 (100.0)	1.0
Perform admission physical exams	20 (100.0)	9 (81.8)	0.12
Perform cervical exams on low risk labor patients	6 (30.0)	2 (18.2)	0.68
Observe vaginal delivery	20 (100.0)	11 (100.0)	1.0
Assist in vaginal delivery	18 (90.0)	11 (100.0)	0.53
Deliver the placenta at vaginal delivery	16 (80.0)	9 (81.8)	1.0
Observe cesarean delivery	20 (100.0)	11 (100.0)	1.0
Assist at a cesarean delivery	12 (60.0)	8 (72.7)	0.70
Make postpartum rounds	17 (80.0)	9 (81.8)	1.0
Nurses	(n=17)	(n=26)	
Medical students should be <i>allowed</i> to:			
Take histories from patients	17 (100.0)	26 (100.0)	1.0
Perform admission physical exams	15 (88.2)	26 (100.0)	0.15
Perform cervical exams on low risk labor patients	9 (52.9)	15 (62.5)	0.75
Observe vaginal delivery	17 (100.0)	26 (100.0)	1.0
Assist in vaginal delivery	16 (94.1)	25 (96.2)	1.0
Deliver the placenta	11 (64.7)	19 (76.0)*	0.50
Observe cesarean delivery	17 (100.0)	26 (100.0)	1.0
Assist at cesarean delivery	6 (35.3)	13 (52.0)*	0.35
Make postpartum rounds	11 (68.8)*	21 (87.5)*	0.23
Medical students should be <i>expected</i> to:			
Take history from patients	17 (100.0)	25 (96.2)	1.0
Perform admission physical exams	14 (82.4)	24 (96.0)*	0.29
Perform cervical exams on low risk labor patients	3 (17.6)	8 (32.0)*	0.48
Observe vaginal delivery	17 (100.0)	26 (100.0)	1.0
Assist in vaginal delivery	13 (76.5)	20 (80.0)*	1.0
Deliver the placenta at vaginal delivery	17 (100.0)	26 (100.0)	1.0
Observe cesarean delivery	16 (94.1)	23 (95.8)*	1.0
Assist at a cesarean delivery	5 (29.4)	8 (34.8)*	1.0
Make postpartum rounds	11 (64.7)	17 (77.3)*	0.48

Data presented as n (%).

*Missing response

during the Obstetrics and Gynecology clerkship. We found that prior to our intervention, faculty physicians spent as little as 30 minutes engaged in clinical teaching of medical students during a 12-hour shift on Labor and Delivery. The introduction of a designated Teaching Attending of the day on our unit resulted in increased estimates by students of faculty-student interactions, increased faculty enjoyment of working with medical students, and an increase in familiarity with the nationally recognized APGO educational objectives for the third-year clerkship

In a successful learning environment, learners feel comfortable and accepted, there is adequate time and exposure to learning opportunities with practice of technical skills, and there are opportunities for sufficient interaction with educators. A clinical curriculum has been defined as the comprehensive experience of all that a student learns and is exposed

to in the clinical environment, not all of which is or can be controlled by the educators [3]. Establishing a welcoming learning environment as a base for the clinical curriculum is essential, and educators need to insure the quality of the learning environment as much as possible. Students' perceptions of the learning environment are a strong predictor of their success, with perceptions of good teaching leading to more sustained learning [4,5]. Medical students on an Obstetrics and Gynecology clerkship with a more positive perception of their learning environment have been shown to score better on clinical assessments, although not on written exams [5,8]. We found students had a favorable view of the learning environment both before and after our intervention. Physicians' favorable views improved after the intervention, and a greater percentage of physicians reporting enjoyment of teaching. Our findings were different from prior years' exit surveys and may reflect attitudinal changes due to other institutional changes happening

contemporaneously with the start of our study. An improvement on a national level was also noted in the Association of American Medical Colleges (AAMC) survey of graduating medical students during this time, which showed an improvement over the years 2009-2013 in the ratings of OBGYN clerkships, with ratings of “excellent” improving from 38.4% to 41.5% [9]. Our intervention may have benefited from a national increase in OBGYN clerkship ratings.

A PubMed search (using terms “obstetrics and gynecology”, “teaching”, “time” “satisfaction”) revealed few other reports of obstetrician-gynecologists’ satisfaction with teaching medical students on a labor and delivery unit, nor any report of the quantity of time spent on individual teaching activities. Emmons in 1998 reported a yearly average of medical student teaching in an academic OBGYN department of 89 hours, however this was not broken down by division, included general obstetrician-gynecologists and specialists, and did not differentiate between types of teaching activities, while including time spent teaching in surgery [10]. Our study showed substantial differences between physicians’ and students’ estimates of time spent on teaching activities prior to our intervention, with the exception of didactic teaching time. Students’ estimates of time spent on all other teaching activities were less than half the estimates of physicians at the start of our program. Post-intervention, students and physicians agreed on estimates of time spent on didactics and bedside teaching. Students’ estimates of time spent on didactics, review of written notes, and bedside teaching all increased. Physicians’ estimates of time spent on didactics increased, while all other categories decreased. The convergence of time estimates may indicate an actual shift in the time spent, or may indicate a better awareness of teaching activities, particularly among the physicians. Importantly, students’ perception of more time spent on teaching activities suggests the perception of a more welcoming learning environment, particularly since students were asked to evaluate teaching by all attending physicians, not only the Teaching Attending.

A second area of interest at the start of our intervention was the level of familiarity with APGO educational objectives among nurses and physicians. For teachers to be effective they must be familiar with the goals and objectives set forth for learners. We demonstrated a high degree of familiarity with most APGO educational objectives, with the exception of procedures, including cervical exams and assisting at deliveries. We showed non-significant increased awareness of these educational objectives after intervention among nurses. For the skill of assisting at vaginal delivery, in our pre-intervention survey, only 90.0% of physicians and 76.5% of nurses felt this to be an expectation of medical students. These percentages increased non-significantly to 100% among the physicians and 80.0% among the nurses after our program. Our intervention was not successful in increasing expectations among faculty or nurses for students performing intra-partum cervical exams; we found that after one year, 37.5% of nurses and 45.5% of physicians did not agree students should perform these exams. This finding suggests the need for more faculty development; APGO recognizes cervical exams to be “essential to effective labor management” and recommends students be given this opportunity [7].

A critical aspect of the clinical curriculum on Labor and Delivery involves nurses, who may limit students’ access to patients during labor in efforts to provide a woman with privacy or a more intimate birthing experience. The majority of nurses reported enjoyment in working with medical students, and only a minority felt students do not integrate easily into the unit before our intervention. This agrees with prior work done by Capstick and Harley, who reported 87% of labor and delivery nurses agreeing that “supporting” medical students is part of their job [2]. They reported 89% of labor and delivery nurses at their institution in agreement that medical students should assist at normal vaginal deliveries, and 55% agreeing students should perform vaginal exams to assess labor progress. They note that “an obvious deficiency of our

program is a lack of clear objectives for students that everyone involved supports”. In our experience, introduction of a Teaching Attending was associated with improvement in nurses’ agreement with the educational objectives.

Labor and delivery nurses represent an under-utilized resource of knowledge and experience in obstetrical undergraduate medical education. Inviting nurses to become more formally involved in medical student education may further improve the learning environment. A program of labor and delivery nurses as medical student preceptors was reported by Skoll, et al, and demonstrated a marked improvement in medical students’ perception of the labor and delivery unit as a learning environment. In their report, multi-disciplinary faculty development contributed to a better understanding among nursing staff as to the learning goals and objectives of medical students in obstetrics. Exclusion of nurses from our faculty development seminar and from our teaching structure may have limited the effectiveness of our intervention. We plan to incorporate nurses into our teaching team.

Limitations of our study include a poor response rate, particularly in the post-intervention survey of physicians. The nature of the intervention was such that students who completed the clerkship prior to the intervention served as the pre-intervention group, and students completing the clerkship after the intervention were labeled the post-intervention group. Of necessity, surveys of students occurred at the conclusion of the clerkship to capture students’ recent experiences and do not reflect an entire year of the intervention to the same degree as the surveys of attending physicians and nurses. Our study also did not include an objective record of time spent teaching, except for scheduled didactic sessions. The survey was also limited by an inability to determine if the same individuals participated in the pre- and post- surveys of physicians and nurses. This is most likely to affect the nurses’ sample to the greatest extent, as personnel changes occurred over the course of the study. Changes in personnel may have influenced the learning environment in ways we could not measure. A small increase in the number of general obstetrician -gynecologists did not change the number of physicians present on labor and delivery at any given time, and we believe this effect is less likely to explain our findings than the identification of a daily Teaching Attending and the increased expectations for teaching.

Providing motivation for faculty members to participate in teaching is a concern in most academic departments. Our Teaching Attending program was entirely voluntary and its success was dependent on several factors: daily reminder emails to participating physicians with suggestions for didactic topics; easy availability of a handbook containing APGO educational objectives and cases; reminders of departmental and medical school requirements for teaching activity; and our clerkship director and coordinator, who acted as “champions” for the intervention with personal contact and encouragement of participants. These actions helped to set expectations for teaching and change the culture of our unit to a more welcoming environment for students.

The introduction of a designated Teaching Attending of the Day on our Labor and Delivery unit resulted in increased estimates by students of faculty-student interactions, faculty enjoyment of working with medical students, and familiarity with the nationally recognized APGO educational objectives for the third-year clerkship. This program resulted in a positive change in the culture of learning on Labor and Delivery among both physicians and nurses. We plan to continue this program, and expand to include nurses in a multi-disciplinary teaching team.

Previous Presentation

Presented at the Association of Professors of Gynecology and Obstetrics/Council on Resident Education in Obstetrics and Gynecology: CREOG & APGO Annual Meeting

“Power Up: Keeping the Energy in Education”

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