



# Impact of Medical Students on Patient Satisfaction of Pregnant Women in Labor and Delivery Triage

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## Abstract

**Objectives** Clinical rotations are an important aspect of undergraduate medical education. However, as patient satisfaction scores receive increasing attention, the impact of medical student participation on patient satisfaction and perception of quality of care is unclear. Previous studies from the Emergency Department and outpatient settings show that medical students do not negatively impact satisfaction scores. The authors sought to examine the effect of medical student involvement on patient satisfaction in the Labor and Delivery Triage setting.

**Methods** The authors conducted a survey study of a convenience sample of pregnant patients seen in and discharged from Labor and Delivery between January 2015 and April 2016. Surveys addressed questions about the overall satisfaction with the care patients received, as well as other outcome measures such as comfort with asking questions, time spent with a physician, and politeness of staff.

**Results** 240 total surveys were collected. After excluding surveys from those that were unsure whether a medical student was involved in their care, 168 surveys were used in the final analysis. Of these, 63.7% of subjects reported being seen by a medical student. There was no significant difference ( $p=0.76$ ) in overall patient satisfaction between groups.

**Conclusions for Practice** Given the lack of a negative impact of medical student involvement on patient satisfaction, medical students should continue to be active members of the healthcare team, including in specialties such as obstetrics and locations such as Labor and Delivery triage with highly sensitive and time-dependent evaluations.

**Keywords** Medical students · Labor and delivery · Quality of care · Patient satisfaction

## Significance

When included in the health care team, medical students have been shown to positively impact the perceptions of quality of care as demonstrated in both the Emergency Department and outpatient obstetrics and gynecology clinics. Similarly, our study demonstrates that medical student involvement did not negatively impact patient experience in the Labor and Delivery Triage setting. Patients feel more comfortable asking questions of their doctors when medical students are involved.

## Objectives

Clinical rotations at teaching hospitals are an integral part of undergraduate medical education as they give students the opportunity to practice clinical skills along with the opportunity to develop empathy and communication skills (Coleman and Murray 2001). Jody Gittel's conceptual framework about relational coordination that emphasizes communication between team members, shared goals and knowledge, along with mutual respect and helpfulness, has shown to improve the patient-perceived quality of care (Bordage 2009). Patients also reported feeling that attending physicians spent more time with them, sharing information and educating them when medical students were present (Esguerra et al. 2014). Evaluating the impact of medical students on patient perception of quality of care is important given the presence of over one thousand teaching hospitals in the United States and the national trend towards

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evaluating patient satisfaction and perceptions of quality of care (“Teaching Hospitals” 2014; Cleary and McNeil 1988).

However, few studies have evaluated the impact of medical students on the patient’s perception of quality of care (Esguerra et al. 2014). Existing literature outside of obstetrics in the fields of emergency medicine and internal medicine demonstrates that medical student involvement in patient care improved patient satisfaction (Kuan and O’Donnell 2007; DeLaney et al. 2013). Prior single-site studies completed in the outpatient obstetrics and gynecology setting have demonstrated that patients are receptive to having medical students participate in their care (Ching et al. 2000; Coppola et al. 2014). Another study conducted across five outpatient specialties reported no significant difference in patient attitudes across these specialties, including obstetrics and gynecology (Passaperuma et al. 2008). However, to our knowledge, the impact of medical students on patient satisfaction in the obstetric population has not been previously evaluated. While obstetric patient satisfaction shares similarities with satisfaction in non-obstetric patients in several regards such as importance of their relationship with the physician, nursing staff, and hospital facilities; several key differences in obstetric patients also exist (Howell and Concato 2004; Zweig et al. 1986). For example, continuity of antenatal versus delivering physician, presence of a birth plan, requirement for an ongoing relationship with medical personnel from antenatal to postpartum care, and need for multiple gynecologic exams.

Given the paucity of data focusing on the impact of medical student involvement on patient satisfaction in the obstetric population, we focused on the Labor and Delivery (L&D) Triage Unit. This unit functions as the intake point for obstetrical patients to inpatient care, much as the emergency department does for the non-pregnant population. Medical students assist resident physicians in triaging patients by obtaining histories and performing non-invasive physical exams such as cardiovascular, respiratory, and abdominal exams. They are often the first member of the health care team to address a patient’s needs after the patient is checked in by the triage nurse. As medical students have been shown to have a positive impact on patient perception of quality of care in the emergency room setting, we hypothesized that they have a similar impact on the pregnant population in L&D Triage.

## Methods

### Design

This prospective survey study of a convenience sample was performed in the Labor and Delivery (L&D) Triage Unit of a mid-sized, urban, tertiary care, academic referral center. Our

L&D Triage generally evaluates pregnant patients between 18 weeks gestation and 2 weeks postpartum, though exceptions are occasionally made at the discretion of the attending obstetrician in partnership with the attending emergency medicine physician. Institutional Review Board approval was obtained through MetroHealth Medical Center. The cover letter on the survey indicated that completion and return of the survey constituted providing informed consent to participate.

### Recruitment and Participants

A convenience sample of English-speaking pregnant and postpartum patients evaluated and discharged from our L&D Triage unit were recruited at the end of their visit. Patients were approached during all nurse/resident physician shifts including nights and weekends. Patients were informed that their participation was voluntary and anonymous. They were given our survey along with their discharge paperwork at the end of their visit by the nurse or the resident physician. Patients agreeing to participate in the study returned their completed surveys either to their discharging nurse or to the Triage front desk. Patients that were discharged at the end of their visit, were at least 18 years of age, and could read and write in English were included in the study. Exclusion criteria included those patients that were incarcerated or brought in by police and those patients who could not read or write in English. We also excluded those patients admitted to Labor and Delivery from Triage as those patients being emergently admitted (e.g. precipitous deliveries or acute maternal/fetal status) would not be able to complete a survey in Triage before admission. We did so due to concerns of introducing a selection bias by only including patients who were being non-emergently admitted, and concerns about our ability to isolate the experience with students to Triage compared to the rest of their hospital stay.

### Survey Design

The survey included demographic information regarding the age of the patient, gestational age, highest level of education, and race. The remainder of the questions were answered on a 4-point modified Likert scale ranging from “significantly less than expected” to “significantly more than expected” (survey is attached in “Appendix”). While no validated survey instrument exists to our knowledge to study the impact of medical students on patient satisfaction, our survey instrument was modeled after a previous study instrument utilized for a similar study question (Esguerra et al. 2014), albeit in a different clinical location. The survey instrument was written at a 5.3 Flesch–Kincaid reading level—equivalent to that of a fifth grader. It was developed iteratively after

completing 3 pilot interviews with pregnant patients presenting to L&D Triage for evaluation.

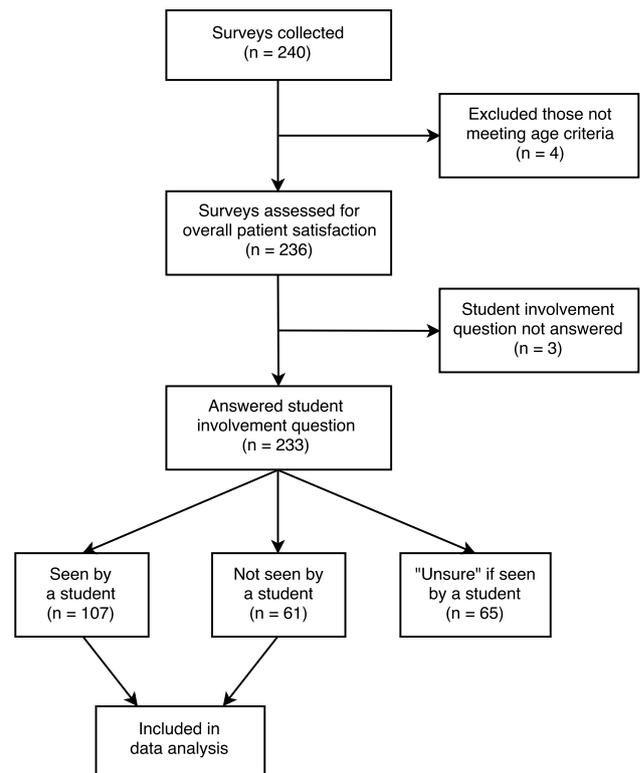
**Statistical Analysis**

Microsoft Excel version 12.3.6 and R Version 3.3. (R Core Team 2002) were used for statistical analyses. A power analysis was not completed due to the lack of a prior validated survey instrument or other studies in the area of interest on which to conduct the analysis. Continuous variables were assessed using the Mann–Whitney U test, and categorical variables were assessed using Chi square or Fischer exact tests where appropriate. A *p* value < 0.05 was considered statistically significant. For multiple comparisons of survey answers across whether the respondent was seen by a student, the Holm–Bonferroni correction was used post hoc to identify differences in proportions.

**Results**

Two hundred and forty surveys were collected from January 1, 2015 to April 30, 2016. Four were excluded due to not meeting age eligibility criteria. Fifty-seven (24.2%) surveys were incomplete—missing answers to one or more questions. Three subjects did not answer the medical student involvement question. Among those subjects that did, 107 (45.9%) of subjects reported being seen by a medical student, 61 (26.2%) reported not being seen by a medical student, and 65 (27.9%) were unsure whether or not a medical student had seen them, the latter of which were excluded. Therefore, 168 surveys were included in the analysis (Fig. 1).

Baseline demographics were similar between those subjects seen and not seen by a medical student with the exception of gestational age—those subjects seen by a medical student had a lower median gestational age (32.5 weeks (interquartile range 26–35) compared with 36 weeks (interquartile range 31.5–37); *p* = 0.002) (Table 1). Of note, not all survey respondents answered every demographic question, some likely by choice and others by error—an early format of the survey listed the education and race questions on the other side of the paper, causing those questions to be missed. However, 82% or more of respondents included in the analysis answered each demographic question. Differences in percentage of non-responders did not exist between groups based on medical student involvement (data not shown). The median age and gestational age of the total study population were 25 years and 33 weeks, respectively. African American was the most prevalent race (45.9%), followed by Caucasian (27.3%). The highest level of education reached was high school or lower for the majority of subjects (71.9%). Based on our department’s internal quality data, this sample is representative of our overall patient population served.



**Fig. 1** Flow diagram of survey respondents and inclusion in data analysis

**Table 1** Baseline demographics of respondents

Demographic characteristic	Seen by a medical student		p value
	Yes	No	
Age (years)	25 (22–29)	26 (23–29)	0.976
Gestational age (weeks)	32.5 (26–35)	36 (31.5–37)	0.002
Highest level of education			
Middle school	1/91 (1.1)	2/48 (4.2)	0.274
High school	62/91 (68.1)	34/48 (70.8)	0.743
Technical school	9/91 (9.9)	2/48 (4.2)	0.330
Associate’s degree	12/91 (13.2)	4/48 (8.3)	0.394
Bachelor’s degree	5/91 (5.5)	4/48 (8.3)	0.496
Master’s degree+	2/91 (2.2)	2/48 (4.2)	0.608
Race			
African American	40/92 (43.4)	23/49 (46.9)	0.694
Asian	0/92 (0)	0/49 (0)	
Caucasian	31/92 (33.7)	11/49 (22.5)	0.164
Hispanic	13/92 (14.1)	12/49 (24.5)	0.125
Other	5/92 (5.4)	2/49 (4.1)	1
Mixed race	3/92 (3.3)	1/49 (2.0)	1

Data are median (interquartile range) or n/N (%) unless otherwise specified

Overall, satisfaction with care was high among the total study population. 90.5% rated the staff as slightly or significantly more courteous than expected. 81.7% reported that their wait time to be seen was slightly or significantly less than expected. 74.1% reported that the time spent with the doctor was slightly or significantly more than expected. 98.7% said the explanation of the care they received was understandable. 98.7% also reported that most or all of their questions were answered. 88.5% reported being unafraid to ask questions. Lastly, 92.6% stated that their overall experience in triage was slightly or significantly better than expected.

Among those subjects seen by a medical student ( $n = 107$ ), 72.0% reported that the medical student's impact was very positive, and 16.0% reported the student's impact as somewhat positive. Table 2 compares the subject satisfaction between groups. The only statistically significant difference was that those subjects seen by a medical student were more likely to report being “not at all” afraid to ask questions ( $p = 0.049$ ). We did not identify significant differences in satisfaction with staff courtesy, wait time, time spent with a physician, explanation of care, answering of questions, or overall satisfaction.

In a separate post hoc analysis, those subjects (27.9% of patients surveyed) who responded “unsure” to the question of whether they were seen by a medical student were included and analyzed as a third group. Those subjects seen by a medical student, not seen by a student, and who were unsure did not differ in terms of patient age, race, or highest level of education completed (all  $p$  values  $> 0.1$ ). However, gestational age did differ between the three groups with those reporting not seeing students having a higher median gestational age than those reporting being seen by students or unsure ( $p = 0.003$ ).

Several satisfaction ratings regarding the answering of questions during the triage visits significantly differed when compared across these three groups. The percentages of subjects responding that all of their questions were answered differed between those who reported not seeing a student and those unsure ( $p = 0.013$ ) and those who reported seeing a student versus those unsure ( $p = 0.01$ ), with those unsure if they saw a student being less likely to report all their questions had been answered. Those who were unsure if they saw a medical student were more likely to respond they “didn't ask most” to the question about fear of answering questions ( $p = 0.04$ ). We did not identify significant differences in satisfaction with staff courtesy, wait time, time spent with a physician, explanation of care, or overall satisfaction between the three groups.

**Table 2** Patient satisfaction and quality of care ratings by those subjects seen and not seen by a medical student

Survey item	Seen by a medical student				p value
	Yes		No		
	No.	%	No.	%	
<b>Staff courtesy</b>					
Significantly less than expected	8/106	7.5	4/60	6.7	1.0
Slightly less than expected	1/106	0.9	3/60	5.0	0.135
Slightly more than expected	22/106	20.8	17/60	28.3	0.269
Significantly more than expected	75/106	70.8	36/60	60.0	0.157
<b>Wait time</b>					
Significantly less than expected	64/107	59.8	33/60	55.0	0.545
Slightly less than expected	27/107	25.2	16/60	26.7	0.839
Slightly more than expected	10/107	9.3	5/60	8.3	0.826
Significantly more than expected	6/107	5.6	6/60	10.0	0.292
<b>Time spent with doctor</b>					
Significantly less than expected	12/107	11.2	2/60	3.3	0.089
Slightly less than expected	17/107	15.9	11/60	18.3	0.685
Slightly more than expected	49/107	45.8	31/60	51.7	0.466
Significantly more than expected	29/107	27.1	16/60	26.7	0.951
<b>Explanation of care</b>					
Understood most	100/107	93.5	55/59	93.2	1
Understood some	6/107	5.6	4/59	6.8	0.745
Didn't understand some	0/107	0	0/59	0	
Didn't understand most	1/107	0.9	0/59	0	1
<b>Answering of questions</b>					
All answered	102/107	95.3	58/60	96.7	1
Most answered	5/107	4.7	1/60	1.7	0.421
Some not answered	0/107	0	1/60	1.7	0.359
Most not answered	0/107	0	0/60	0	
<b>Afraid to ask questions</b>					
Not at all	102/107	95.3	53/61	86.9	0.049
Asked some	5/107	4.7	6/61	9.8	0.123
Didn't ask most	0/107	0	0/61	0	
Didn't ask any	0/107	0	2/61	3.3	0.130
<b>Overall experience</b>					
Significantly worse	4/107	3.7	2/59	3.4	1
Slightly worse	3/107	2.8	3/59	5.1	0.667
Slightly better	28/107	26.2	17/59	28.8	0.714
Significantly better	72/107	67.3	37/59	62.7	0.552

Data are n/N or % unless otherwise specified

## Conclusions for Practice

To our knowledge, this study is the first to assess the impact of medical student involvement on the perception of quality

of care in the obstetric population. Although medical students did not improve patients' perception of the quality of care, as noted in the Emergency Room, their involvement did not negatively impact the perception of quality of care among pregnant and postpartum patients (Kuan and O'Donnell 2007). With Press Ganey scores becoming increasingly important in reporting and reimbursement structures, physicians may be reluctant to allow student participation in care. Teaching hospitals tend to have relatively lower satisfaction scores than other types of hospitals (Passaperuma et al. 2008), however our study provides reassurance that medical students do not negatively impact satisfaction in the acute care setting in the obstetric population. Further, this finding is consistent with Gittrel's theory that relational coordination improves patient-focused care (Bordage 2009). Medical education, and thus the strength of the future medical workforce, depends on adequate training for medical students. This study demonstrates that hospitals and medical schools can fulfill their mission of high quality medical education without sacrificing patient satisfaction or perception of quality of care.

In fact, our study demonstrates that patients felt more comfortable asking questions of their doctors when medical students were involved in their care. This increased bidirectional communication may actually be associated with improved health outcomes, though additional study is necessary to assess fully (Ha et al. 2010).

Our reported satisfaction rates mirror the percentages reported in other fields of medicine, consistent with the current body of literature that medical students do not negatively impact patient satisfaction (Scheffer et al. 2010; Bernard et al. 2015). The study was conducted at a busy tertiary-care, urban center and exclusively studied the obstetric population. Although the degree of medical student involvement may vary from center to center, the results of our study can be generalized to any center where medical students are obtaining histories and performing non-invasive physical exams. The weaknesses of the study include that we did not have a systematic sample and that no validated survey instrument existed to utilize for data collection or sample size calculation. Our survey instrument, however, was modeled after a previously reported survey (Esguerra et al. 2014) and developed in an iterative fashion, consistent with well-described techniques for survey methodology (Groves et al. 2004). Other weaknesses are the observational nature and potential for response bias as patients that were unhappy with their care may have been less likely to stay longer to complete a survey.

Given the anonymous nature of our survey, it was not possible to correlate with the medical record to see if a patient had been seen by a medical student. Yet, in a study of patient perception and satisfaction, the patient's perception of being seen by a learner, rather than whether they actually were

seen by a student and/or resident, is most relevant. However, this study points to the need to better clarify roles and responsibilities of the medical team to patients at academic hospitals with various stages of learners. We were also unable to analyze whether the nature of the presenting medical complaint impacted patient satisfaction. While it would be helpful to know if certain populations of patients view medical student involvement differently, our study answers the initial question regarding general involvement in the obstetric L&D Triage environment and sets the stage for future study. Finally, satisfaction with staff in Triage could also have impacted overall satisfaction. However, it is not possible to isolate the medical student's role in an environment where team-based care is provided.

Possible areas for future research include the impact of medical students on the obstetric population in different settings (i.e. the ambulatory setting and inpatient labor and delivery setting) to account for the varying level of involvement of medical students and patient acuity based on setting. Also research regarding the extent of medical student participation and the impact on patient perception is necessary. Further research also needs to be done in order to qualitatively assess satisfaction in patients both evaluated and not evaluated by medical students. Our study adds data from the obstetric population to the current literature that medical student involvement does not negatively impact patient satisfaction or perceptions of quality of care, including in sensitive and time-dependent evaluations such as occur in the obstetric population in Labor and Delivery Triage.

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## Compliance with Ethical Standards

**Conflict of interest** All authors declare that they have no competing interest.

## Appendix

### Patient Satisfaction Survey

We would like to know how you felt about your visit today. The following survey is anonymous and optional. We appreciate your feedback and answers to this survey are confidential and will not affect the care provided to you at this, or subsequent visits.

1. Was our staff polite and courteous to you?  
 Significantly less than expected  Slightly less than expected  Slightly more than expected  Significantly more than expected
2. How long did you have to wait to be seen?  
 Significantly less than expected  Slightly less than expected  Slightly more than expected  Significantly more than expected
3. How much time did your doctor spend with you?  
 Significantly less than expected  Slightly less than expected  Slightly more than expected  Significantly more than expected
4. Did we explain your care in an understandable manner?  
 I understood most things  I understood some things  I didn't understand some things  I did not understand most things
5. Did we answer all your questions?  
 All were answered  Most were answered  Some were not answered  Most were not answered
6. Did you feel afraid to ask questions about your care?  
 Not at all, I was able to ask freely  I asked some questions  I didn't ask most questions  I did not ask any questions
7. Did a medical student see you?  
 Yes  No  I am not sure
8. Did student participation in your care have any impact on your experience?  
 Very positive  Somewhat positive  Somewhat negative  Very negative  Unsure
9. How do you feel about your overall experience at this visit?  
 Significantly worse than expected  Slightly worse than expected  Slightly better than expected  Significantly better than expected

### Demographic Questions

1. How old are you? \_\_\_\_\_ years old
2. How far along in your pregnancy are you? \_\_\_\_\_ weeks
3. What is the highest level of education you received?
4. What race do you identify with?

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