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Predictors of Likelihood of Speaking Up about Safety Concerns in Labour and Delivery

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Abstract

Background—Despite widespread emphasis on promoting "assertive communication" by caregivers as essential to patient safety improvement efforts, fairly little is known about when and how clinicians speak up to address safety concerns. In this cross-sectional study we use a new measure of speaking up to begin exploring this issue in maternity care.

Methods—We developed a scenario-based measure of clinician's assessment of potential harm and likelihood of speaking up in response to perceived harm. We embedded this scale in a survey with measures of safety climate, teamwork climate, disruptive behaviour, work stress, and personality traits of bravery and assertiveness. The survey was distributed to all registered nurses and obstetricians practicing in two US Labour & Delivery units.

Results—The response rate was 54% (125 of 230 potential respondents). Respondents were experienced clinicians (13.7 ± 11 years in specialty). Higher perception of harm, respondent role, specialty experience, and site predicted likelihood of speaking up when controlling for bravery and assertiveness. Physicians rated potential harm in common clinical scenarios lower than nurses did (7.5 vs. 8.4 on 2–10 scale; p<0.001). Some participants (12%) indicated they were unlikely to speak up despite perceiving high potential for harm in certain situations.

Discussion—This exploratory study found nurses and physicians differed in their harm ratings, and harm rating was a predictor of speaking up. This may partially explain persistent discrepancies between physicians and nurses in teamwork climate scores. Differing assessments of potential harms inherent in everyday practice may be a target for teamwork intervention in maternity care.

Keywords

Patient Safety; Interdisciplinary Communication; Teamwork; Delivery Room

Clinician silence and ineffective communication can undermine patient safety, [1–3] particularly in the care of mothers and babies. [1, 4] Training for "assertive

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communication," defined as "speaking up and stating concerns with persistence until there is a clear resolution," [2, 5, 6] is presumed to be a critical strategy for improving obstetric safety. However, relatively little is known about clinicians' use of assertive communication to address safety concerns. The extent to which assertive communication is responsive to interventions or reliably improves patient safety, and the specific nature of the relationship between "assertiveness" and "speaking up," remain relatively unexplored. [7–9] Clinical situations calling for speaking up and stating concerns are complex and may have outcomes ranging from immediate recognition and correction of the problem, to lack of resolution resulting in near misses or preventable adverse outcomes.

Studies of safety-related attitudes and behaviours indicate two consistent themes: under-reporting of problems, and discrepancies in assessments of teamwork among individuals who work together. Clinicians across the professional spectrum acknowledge that they recognize safety problems more often than they report them. [10–13] Persistent discrepancies are also observed between nurses and physicians in ratings of teamwork in labour and delivery units [14] and in other hospital settings. [15–17] However, less is known about the roots of reluctance to speak up and the sources of these divergent views of teamwork. [18–20]

Our qualitative work on labour & delivery clinicians' perspectives on patient safety suggests that while these clinicians perceive their level of experience as a primary driver of their ability to speak up to address patient safety concerns, their actions toward speaking up with persistence vary within the same individual across differing situational contexts [12] and may not be directly related to their clinical knowledge. [19] Some of the factors influencing speaking up about safety concerns included hierarchy, administrative support, quality of collegial relationships, fatigue, availability of resources, and other characteristics of the work environment that increase or decrease work stressors. [12, 19] These findings are consistent with other studies conducted across a range of settings with multiple types of providers. [3, 9, 10, 13, 18, 20, 21] To date, research indicates that speaking up about safety concerns is a complex social process influenced by structural, personal, and group factors in the work environment, and that decisions about speaking up or remaining silent are dynamic, highly context specific, and may involve multiple decision points. [9, 10, 12, 18] In this paper we explore factors that may predict whether clinicians speak up in the face of safety concerns, using a new measure.

In conducting this study, we began with the premise that safety-oriented systems have structures and processes in place supporting a positive safety culture; these may include interdisciplinary practice committees, shared education and decision-making processes, and standardization of at-risk processes. [8, 21, 22] We then hypothesised that:

1. The confluence of a patient's clinical situation (operationalised through clinical scenarios), characteristics present within the speaking and receiving clinicians (bravery and assertiveness; collaboration; disruptive behaviour; stress recognition), and system supports (safety climate; teamwork climate; work stress; site) influences likelihood of speaking up. Specifically,

    a. Clinicians' assessments of the potential for harm regarding the clinical situation influence speaking up.

    b. When clinicians perceive patients could be harmed and system supports intersect positively with caregiver characteristics, clinicians are likely to voice their concerns regarding potentially harmful events.

    c. The likelihood of speaking up is greater in individuals with stronger assertiveness or bravery personality traits.

2. Ineffective or absent processes decrease likelihood of voicing concerns, hampering safety. Specifically,

   a. Speaking up is inhibited by hierarchical power differentials, disruptive behaviours, fatigue, and work stress.

METHODS

Settings/Recruitment

Surveys were distributed to all obstetricians and registered nurses in two moderately sized, US Labour & Delivery units (1800–2800 annual births). Potential respondents received an introductory letter with a nominal incentive ($3) to encourage participation. [23] Participants completed the 20-minute survey anonymously, on paper or online. [23, 24] The University of California, San Francisco and participating hospital Institutional Review Boards approved the study. Participation implied consent.

Instruments

Proposed measures for predictors of speaking up were identified from the literature and operationalised via the scales described below. We combined these scales with clinical scenarios for which respondents could indicate their assessment of potential for harm and likelihood of speaking up. We conducted cognitive interviews using the proposed survey, modified it accordingly, and pre-tested the survey with physicians and nurses from three Labour & Delivery units. [23] In addition to the clinical scenarios and demographic characteristics, the survey included a Disruptive Behaviour Scale developed for this study from Rosenstein and O'Daniel [25, 26]; a modified version of Vidyarthi and colleagues' Work Stress Index in which work stress items were associated with medical resident reports of making medical errors [27]; the Bravery and Assertiveness subscales from the International Personality Item Pool [28]; and the collaboration items and three subscales from the Labour & Delivery version of the Safety Attitudes Questionnaire (SAQ): teamwork climate, safety climate, and stress recognition. [14] The Labour & Delivery SAQ scales are valid and reliable measures with established psychometric properties in healthcare settings. [17, 29] The reported Cronbach alpha coefficient is 0.78 for teamwork climate in Labor & Delivery, [14] and 0.78 for safety climate and 0.68 for stress recognition in a large pooled database. [17] Internal consistency for the bravery and assertiveness scales are reported at 0.75 and 0.84, respectively. [28] Reliability was not reported for the Work Stress Index; Cronbach alphas for our sample are reported under results along with phrasing for selected SAQ and Disruptive Behaviour scale items.

The clinical scenarios were designed to determine the potential for harm clinicians assign to common clinical events, and their perceived likelihood of speaking up to correct these clinical problems (Box 1). Given the data suggesting situational variation in speaking up about safety concerns, [3, 9, 10, 12, 13, 18–20] we aimed to create an aggregate measure that captured responses across varied circumstances. For each scenario, respondents were first presented with a potentially harmful patient care situation. They were asked to rate the potential for harm on a five point Likert-type scale. They then rated their likelihood of speaking up in response to several variations in the context of the clinical situation. A fetal heart rate scenario was adapted from a previous survey on clinical disagreements in obstetrics. [19] We developed the hand hygiene scenario specifically for this study. The responses from the scenarios that dealt with ratings of harm were combined to comprise a "Harm Index" score indicating clinical assessment of potential for harm. The responses to the remaining scenario items were evaluated for inclusion in a composite "Likelihood of Speaking Up Index" score. Items with low item-total correlations were deleted from the analysis. The items deleted included those from a third scenario (dealing with vacuum

assisted birth) that was originally planned for inclusion, but was dropped for psychometric shortcomings. The Cronbach's alpha for the resulting 7-item Likelihood of Speaking Up Index was 0.79; item-total correlations were all 0.34 supporting their inclusion together in a single scale.

Box 1

Three Clinical Scenarios

	Measure
Scenario 1 A labouring woman was admitted at 8:00 PM with an unremarkable history, no identified risk factors, and a foetal heart rate tracing demonstrating moderate variability with accelerations and no decelerations. Labour has been progressing slowly. It is now 4:00 AM and the foetal heart rate tracing has had minimal to absent variability with late decelerations for the past 30 minutes. Change of position, IV fluids, and oxygen administration have not changed the FHR tracing. The nurse calls the physician and requests a bedside evaluation. The physician states she does not need to come in to evaluate the patient at this time; she will see the patient at 6:30, prior to making her morning rounds.	
Questions (Response Format – 5 point Likert-type scale)	**Measure**
• If no action is taken, how great is the potential for harm in this situation? (Very Low – Very High)	Harm Index
• Assume you are the nurse caring for this patient. How likely are you to insist the physician come to evaluate the patient now? (Very Unlikely-Very Likely)	LSI
• Assume you are not caring for the patient directly but you have become aware of the situation. How likely are you to step in to help the nurse get the physician to see the patient now? (Very Unlikely- Very Likely)	LSI
• Assume the patient's physician is someone who has been rude or condescending to you in the past. How much more or less likely are you to step in? (Much less likely – Much more likely)	LSI
• Assume either you or the original nurse have spoken directly with the physician, who still refuses to come and evaluate the patient. How likely are you to take additional action to resolve the situation? (Very Unlikely-Very Likely)	LSI
Scenario 2 You are talking with a patient in her hospital room when another clinician comes in to start an IV on the patient. The clinician gathers materials from the supply cabinet, sets them up, and is about to start the IV. The clinician has not washed his or her hands, and does not appear to be planning to do so.	
Questions (Response Format – 5 point Likert-type scale)	**Measure**
• Assuming the clinician did not wash his or her hands right before entering the room, how great is the potential for harm in this situation? (Very Low – Very High)	Harm Index
• Assume the other clinician is a nurse. How likely are you to insist that the nurse wash his or her hands? (Very Unlikely – Very Likely)	LSI
• Assume the other clinician is a junior physician. How likely are you to insist the physician wash his or her hands? (Very Unlikely – Very Likely)	LSI
• Assume the other clinician is the Chair of the Anesthesiology department. How likely are you to insist this person wash his or her hands? (Very Unlikely – Very Likely)	LSI

Data Analysis

We explored relationships between variables with descriptive statistics and bivariate analyses, and estimated internal consistency of scales. We conducted item-level evaluation of associations with Likelihood of Speaking Up Index score and Harm Index score using Spearman correlations. We evaluated differences in scale score means between the two sites and between the two roles (physician or nurse) using two-tailed t-tests (significance level $p<0.05$). We used multiple linear regression to model candidate predictors for likelihood of speaking up. For this exploratory study we used forward stepwise selection, controlling for clinical site with $p>0.20$, to determine the optimal model. Hypothesised predictors were

included along with clinical site (1 or 2), professional role (physician or nurse) and years of experience, based on bivariate analyses.

RESULTS

Response rate was 48% in the first unit, 61% in the second unit, and 54% overall; 43% of 77 possible physicians and 53% of 153 possible registered nurses returned surveys (Table 1). Of the 125 respondents in the sample, only 6 were males (all physicians).

While participants at the two sites differed by age, distribution of profession, and report of work stress (mean 27.7 vs 20.7 with 9–45 possible score, p<0.001), there were no significant differences between the two sites on mean SAQ scale scores, Likelihood of Speaking Up or Harm Index scores, or on Assertiveness, Bravery, or Disruptive Behaviour Scales. Scale characteristics are shown in Table 2.

Because of reported differences in perception of teamwork in the literature, we tested differences in mean scores between physicians and nurses (Table 3).

The Likelihood of Speaking Up Index score did not differ by role, but assessment of potential for harm in the scenarios (Harm Index), work stress, teamwork climate, and disruptive behaviour scores were significantly different. Nurses gave higher ratings than physicians for potential harm in the scenarios, and reported higher exposure to disruptive behaviours and lower teamwork climate. Physicians reported higher work stress scores. Significant item-level differences between nurses and physicians on disruptive behaviour, teamwork climate and safety climate items are listed in Table 4.

The Likelihood of Speaking Up score was correlated with scores for bravery and assertiveness (Spearman's rho 0.30 and 0.35, p<0.05), but not overall work stress or disruptive behaviour. Bravery and assertiveness scores were also associated with age (Spearman's rho 0.36 and 0.26, p<0.05) and years experience (Spearman's rho 0.49 and 0.39, p<0.001). Harm Index score was associated with Likelihood of Speaking Up Index score (0.34, p=0.002), but not with any other measures. At the item-level, 12% of physicians and 33% of nurses reported sometimes feeling intimidated by physicians. This was associated with a lower score for likelihood of speaking up (Spearman's rho −0.25, p=0.01). Controlling for site, the exploratory regression model for Likelihood of Speaking Up retained role (physician/nurse), specialty experience, harm index, bravery, and assertiveness. The overall model explained 38% of the variance in likelihood of speaking up (Table 5), with site, role, Harm Index score, and specialty experience making significant contributions.

We designed the hand hygiene scenario (Box 1, Scenario 2) to evaluate differences in likelihood of speaking up by hierarchy status and harm rating, and therefore used it specifically to explore relationships between these variables. Respondents rated their likelihood of speaking up to three types of colleagues with historically differing hierarchy status in hospitals (nurse, junior physician, and Chair of Anaesthesia Department). For this scenario, the item-level association of harm rating with likelihood of speaking up rating was attenuated by the status of the other clinician in the scenario. (Spearman's rho between harm rating and speaking to nurse=0.57, speaking to junior physician=0.46, and speaking to Chair of Anaesthesia=0.39; p<0.001). We noted that while 86% of respondents rated the potential for harm in this scenario from medium to very high, only 36% reported that they were likely to speak up to the Chair of the Anaesthesia Department. To further evaluate relationships between harm rating and speaking up in this scenario, we identified all nurse and physician respondents who indicated potential for harm 'High' to 'Very High' and compared those characterized as the Voice group ('Likely' or 'Very Likely' to speak up, n=33) with those

characterized as the Silence group ('Unlikely' or 'Very Unlikely' to Speak Up to Chair of Anaesthesia, n=15) (Table 6).

The Voice group reported higher quality communication and collaboration with physicians and managers and less exposure to disruptive behaviours than the Silence group.

DISCUSSION

In this exploratory study, we demonstrated positive relationships between clinicians' assessments of role-specific communication quality and their reported likelihood of speaking up about potential harm to patients. We also demonstrate a negative relationship between self-reported exposure to disruptive behaviours and likelihood of speaking up. About one in eight clinicians reported they were unlikely to speak up to an authority figure regarding lack of hand hygiene despite perceiving high potential for harm. Clinicians in this Silence group reported poorer quality collaboration and communication with physicians and managers. Although overall reports of disruptive behaviours were low, the Silence group reported more frequent exposure to rudeness and intimidation, and feeling intimidated by physicians was negatively associated with speaking up. These findings support our hypothesis that the confluence of the patient's clinical situation with other historical, individual, and contextual factors influences likelihood of speaking up. These findings also emphasize that in addition to working to improve communication skills, organizations should direct focused attention to improving collaboration and eliminating disruptive behaviour. [26, 30, 31] Our multivariate model revealed that likelihood of speaking up scores were associated with hospital site and professional role, but that Harm Index scores were the strongest single predictor, accounting for almost as much variance as site and role combined.

If replicated, our finding that assessment of potential for harm differed by role and that Harm Index score predicts likelihood of speaking up suggests recognition of differences in clinicians' assessments of potential harm to patients may be a new intervention target. The difference between nurses and physicians in baseline assessment of potential for harm may partially explain persistent differences in teamwork climate noted in the literature, and replicated here. One of the fundamental components of teamwork is creating a so called "team mental model" of the situation [32–34]. This occurs when team members develop a shared understanding of the key situational elements that allows shared interpretations, expectations, and causal accounts of the present state, thereby enhancing performance. [32–34] While the absolute potential for harm in a given situation may not be known precisely, differing assessments of this potential by nurses and physicians facing the same clinical situation may represent a previously unidentified challenge to achieving team situation awareness. When the physician and nurse are unaware that they have different views of the degree of potential for harm to the patient, they are unlikely to realize that their perceptions of the clinical implications may differ as well. Unrecognized gaps in understanding of each other's clinical perceptions may contribute to failure to resolve safety concerns. This suggests inter-professional team training [35, 36] may need to explicitly address ways to identify differences among team members in assessments of the potential for harm embedded in clinical situations. While "true" harm potential may never be known unequivocally, further research into clinicians' assessments of potential for harm in everyday practices may prove fruitful for enhancing collaboration among team members. For Labor & Delivery, interpretation of foetal monitoring data may be a particularly important area for exploring differing assessments of potential harm [22].

Limitations

These were the first administrations for this instrument and we took an exploratory approach to data analysis, thus our results should be interpreted as such. The clinical scenarios measured what clinicians think they would do, not what they actually do. Established assertiveness scales do not address speaking up within the context of patient safety. [6, 7] We were unable to find a published "gold standard" for measuring "speaking up" or "assertive communication" in the clinical context, and clinical scenarios have been used successfully in previous studies of clinician behaviours. [37, 38]. While a growing body of literature exists on silence in teams and organizations, the focus of this work is antecedents to speaking up [39] and on leadership qualities that enhance speaking up, [31, 39] rather than on measuring speaking up itself. Respondents' socially undesirable responses (such as a perceived harm situation but unlikely to speak up) suggest that responses were likely valid. However, it is possible that likelihood of speaking up was over-reported due to social desirability bias, and future research should consider strategies to address this. Our study was designed specifically for Labour & Delivery, and included context-specific examples of potential harm. Some situations are more generalizable across healthcare settings than others; for example the hand hygiene scenario may be useful for independent replication in varied settings.

Our combination of multiple scales that included validated and exploratory metrics was an additional limitation given our sample size and response rates. Future research should target higher response rates, additional clinician roles, and larger cohorts of clinical areas to further refine which metrics are most useful in this line of inquiry. The SAQ, for example, was designed to garner clinical area specific norms that are the consensus view of healthcare workers from that site. The differences reported here by clinical role are consistent with previous SAQ research; however, the inclusion of only two L&D units that happened to have similar SAQ scores to each other diminished the utility of the SAQ in the current study. Indeed, understanding the intersection of individual differences (e.g., assertiveness) and work-setting specific norms (e.g., teamwork climate) will be a critical area for further research.

In addition to their similarities to each other, our two participating clinical units may have unique characteristics that are not representative of Labour & Delivery units nationally. For example, in other studies clinicians were generally more likely to agree with the statement, "In this clinical area it is difficult to speak up if I perceive a problem with patient care," than they were in our study. [14] Settings with more problematic communication patterns might demonstrate even more evidence of clinician silence in the face of potential harm. Finally, the sample of only 6 males precluded any analysis by gender or potential interaction between gender and role.

Conclusions

Despite their joint commitment to providing the best possible care, maternity nurses and obstetricians continue to practice in environments where boundaries between disciplines are infrequently crossed, mental models may not be shared, disruptive behaviours have potential to shut down communication, and there is a premium on avoiding conflict both within and across disciplines. The ability of clinicians to speak up about concerns is an essential component of all safety interventions, and the need for fundamental change is urgent. A focus on what is best for the patient rather than on risks clinicians may face when speaking up about potential patient harm is needed to achieve ultra-safe care in everyday clinical practice.

Clinical leaders must ensure that clinicians are supported when raising concerns, regardless of whether their concerns prove entirely evidence-based. Team training programs such as TeamSTEPPS [36] can help, but these efforts must go beyond teaching SBAR (Situation, Background, Assessment, Recommendation) [2,5] to new physicians and nurses. Clinical scenarios offered in team training sessions should explore differences in assessment of harm among team members and resolution of these differences as a critical aspect of promoting professional communication that enhances patient safety. [34] Leaders and bedside clinicians all have an obligation to model habits of inquiry and engagement in difficult conversations. [10, 30] Several authors have noted the interplay between psychological factors and historically "desirable" behaviours in suppressing organizational learning [40] and in perpetuating and masking unsafe practices. [13, 40] Structural mechanisms for ongoing collaborative communication between disciplines are needed to support system-level safety improvement. Further research is needed to fully characterize predictors of speaking up in the face of potential patient harm. Research is also needed on clinicians' assessments of potential for harm in everyday obstetric practices, and on effective interventions for creating a norm of shared dialogue about goals and plans for patient care.

Acknowledgments

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Table 1

Demographic Characteristics of Respondents, by Hospital Site

	Site 1	Site 2	
	Mean (SD) n=65	Mean (SD) n=60	p-value[*] (95% CI)
Age (Years)	38 (10.7)	46 (11.8)	<0.01 (−12.2, −3.7)
Years Specialty Experience	11 (10.8)	17 (10.5)	<0.01 (−10.0, −2.1)
Years at Hospital	8 (8.9)	12 (10.1)	0.03 (−7.6, −0.49)
	Site 1	Site 2	
	N (%)	N (%)	p-value
Professional Role			
Registered Nurse	31 (48%)	48 (80%)	0.001[§]
Obstetrician	24 (37%)	9 (15%)	
missing	10 (15%)	3 (5%)	
Gender			
Female	55 (85%)	53 (88%)	0.30[‡]
Male	2 (3%)	4 (7%)	
Missing	8 (12%)	3 (5%)	
Work status			
Full time (80–100%)	47 (72%)	39 (65%)	0.06[§]
Part time (<80%)	10 (15%)	19 (32%)	
Missing	8 (12%)	2 (3%)	
Ethnicity			
Hispanic	3 (4%)	4 (7%)	0.10[‡]
Black (non Hispanic)	2 (3%)	4 (7%)	
White (non Hispanic)	36 (55%)	44 (73%)	
Asian Pacific Islander	12 (18%)	4 (7%)	
Multi-Ethnic	2 (3%)	0	
Other	0	1 (1%)	
Missing	10 (15%)	3 (5%)	

[*] Two sample t-test

[§] Chi-square test

[‡] Fisher's exact test

Table 2

Scale Score Range & Internal Consistency Reliability

Scale	Number of items	Possible Score	Cronbach alpha
SAQ Teamwork Climate	6	6–30	0.64
SAQ Safety Climate	7	7–35	0.78
Disruptive Behaviour	11	11–55	0.83
Harm Index	2	2–10	--
Likelihood of Speaking Up Index	7	7–35	0.79
Work Stress Index	9	9–45	0.87
SAQ Stress Recognition	6	6–30	0.80
IPIP Bravery Scale	10	10–50	0.79
IPIP Assertiveness Scale	10	10–50	0.80

SAQ=Safety Attitudes Questionnaire; IPIP=International Personality Item Pool.

Table 3

Scale Means by Professional Role

	Physicians Mean (SD)	Nurses Mean (SD)	p-value
Likelihood of Speaking Up Index	26.5 (4.7)	26.7 (4.5)	0.82
Harm Index	7.5 (1.4)	8.4 (0.9)	< 0.001
Work Stress Index	27.1 (6.3)	22.9 (5.0)	< 0.001
Disruptive Behaviour Scale	20.8 (4.7)	23.7 (4.0)	0.002
IPIP Bravery Scale	35.7 (5.3)	36.4 (5.7)	0.56
IPIP Assertiveness Scale	36.1 (4.8)	35.9 (5.1)	0.85
SAQ Teamwork Climate	25.8 (3.3)	24.6 (2.9)	0.046
SAQ Safety Climate	28.3 (5.4)	29.0 (3.7)	0.42
SAQ Stress Recognition	20.5 (4.8)	21.5 (4.5)	0.52

Two-sided t-test, α=0.05

Table 4

Selected Item Level Differences, by Professional Role

	Physicians Mean(95%CI)	Nurses Mean(95%CI)	p-value
Disruptive Behaviours			
Describe how frequently the following occur in your clinical area:			
Scale = Never(1) to Very Often (5)			
Clinicians or staff talk about others rather than with others	2.8 (2.56, 3.02)	3.3 (3.16, 3.52)	<0.01
Physicians are rude	2.3 (2.12, 2.49)	2.8 (2.62, 2.91)	<0.001
Clinicians or staff yell at or verbally attack others	1.6 (1.37, 1.84)	2.0 (1.86, 2.16)	<0.01
Clinicians or staff insult others	1.7 (1.51, 1.95)	2.1 (1.92, 2.23)	0.01
Clinicians or staff humiliate others	1.5 (1.27, 1.70)	1.8 (1.67, 1.96)	0.01
I feel intimidated by some of the physicians	1.7 (1.42, 1.91)	2.1 (1.92, 2.25)	0.01
Teamwork & Safety Climate			
Please answer the following with respect to your clinical area:			
Scale = Disagree Strongly (1) to Agree Strongly (5)			
Nurse input is well received here	4.4 (4.16, 4.63)	4.0 (3.90, 4.22)	0.02
Disagreements are resolved appropriately (i.e. what is best for the patient)	4.2 (3.92, 4.50)	3.7 (3.53, 3.93)	0.01
The physicians and nurses here work together as a well-coordinated team	4.4 (4.06, 4.69)	3.9 (3.73, 4.10)	0.01
I am frequently unable to express disagreement with staff physicians	1.8 (1.46, 2.12)	2.5 (2.30, 2.77)	<0.01
I know the proper channels to direct questions regarding patient safety	4.2 (3.83, 4.47)	4.6 (4.45, 4.74)	0.01
I am encouraged to report safety concerns	3.9 (3.54, 4.28)	4.4 (4.27, 4.60)	<0.01

Table 5

Exploratory Regression Model for Likelihood of Speaking Up

Likelihood of Speaking up Index	Coefficient	Std. Error	t	p-value	95% Confidence Intervals
Site (1 or 2)	−2.42	0.89	−2.71	0.01	−4.20, −0.64
IPIP Assertiveness	0.19	0.11	1.75	0.09	−0.03, 0.39
Harm Index	1.76	0.39	4.47	<0.001	0.97, 2.54
Years Experience	0.12	0.05	2.46	0.02	0.02, 0.22
Role (physician/nurse)	−2.77	1.02	−2.70	0.01	−4.81, −0.73
IPIP Bravery	0.14	0.11	1.36	0.18	−0.07, 0.35
constant	3.87	4.53	0.85	0.40	−5.17, 12.92

F(6,69) = 8.68, p<0.001; Adjusted R-squared = 0.38

Table 6

Item level difference by Silence and Voice Groups

	Silence Group Mean(95%CI)	Voice group Mean(95%CI)	p-value
Collaboration			
Describe the quality of communication and collaboration you have experienced			
Scale = Very Low (1) to Very High (5)			
Collaboration with Obstetricians	3.5 (3.00, 3.93)	4.1 (3.75, 4.43)	0.033
Collaboration with Paediatricians	3.3 (2.79, 3.87)	4.0 (3.70, 4.24)	0.019
Collaboration with Anaesthesiologists	3.4 (2.78, 4.02)	4.2 (3.91, 4.39)	0.006
Collaboration with Nurse Managers	3.3 (2.79, 3.87)	3.9 (3.60, 4.22)	0.048
Collaboration with Registered Nurses	4.4 (4.05, 4.75)	4.5 (4.27, 4.70)	ns
Disruptive Behaviour			
Describe how frequently the following occur in your clinical area			
Scale = Never (1) to Very Often (5)			
Physicians are rude	2.9 (2.60, 3.26)	2.3 (2.20, 2.71)	0.028
I feel intimidated by some of the MDs	2.5 (2.12, 2.94)	1.8 (1.53, 2.05)	0.002
I feel intimidated by the manager(s)	1.8 (1.37, 2.23)	1.4 (1.20, 1.59)	0.044