

**Could low Safety Attitudes Questionnaire scores be  
indicative of an environment where it may be difficult to get  
new training practices established?**

Sarah Channing<sup>1</sup>, Neil Ryan<sup>1</sup>, Sophie Barnes<sup>2</sup>, Kate Collins<sup>1</sup>, Helen van der Nelson<sup>1</sup>,

Jane Mears<sup>1</sup> & Dimitrios Siassakos<sup>1</sup>

1. North Bristol NHS Foundation Trust, Bristol, UK

2. University of Bristol, Bristol, UK

**Corresponding author contact information:**

Dr Sarah Channing

35 Greville Street, Southville, Bristol, BS3 1EF

Telephone: 07821750860

Email: [sarahchanning1984@gmail.com](mailto:sarahchanning1984@gmail.com)

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## **ABSTRACT**

Simulation-based, multi-professional team training (SBMPTT) is used widely in healthcare, with evidence it can improve clinical outcomes and be associated with a positive safety culture. Our aim was to explore the impact of introducing this type of training to a gynaecological team, using Safety Attitudes Questionnaire (SAQ) scores as the outcome measure in this interrupted time-series study. However, low baseline SAQ scores coincided with difficulty in establishing the training, meaning that at the end of our study period only a small proportion of staff had actually attended a training session. Despite trends towards improvement in scores for safety climate, teamwork climate and job satisfaction, no statistically significant difference was observed. There was however an improved perception of the level of collaboration between nursing staff and doctors after the introduction of training. In this paper we explore a hypothesis that low baseline SAQ scores may highlight that the multiprofessional teams most in need of training work in environments where it is more challenging to implement. There is evidence from other specialties that multiprofessional team training works, now we need to understand how to address the barriers to getting it started. In this paper our authors suggest how the SAQ could be used as a directive tool for improvement; using the detailed analysis of the local safety culture it provides to both inform future training design and also provide management with an objective marker of progress.

## **WHAT THIS PAPER ADDS**

### 1. What is already known on the subject?

- Team training in healthcare settings has been shown to be effective at improving organisational and patient outcomes, including safety culture as measured by the Safety Attitudes Questionnaire (SAQ).
- Simulation-based multi-professional team training is well established and has proven outcomes in obstetrics, whereas there is an unmet need for this type of training in gynaecology.

### 2. What this study adds

- Our comparatively low baseline safety culture scores coincided with challenges in getting training off the ground, meaning we were not able to clearly demonstrate that safety culture on a gynaecology ward can be improved through multi-professional team training.
- This may highlight that the teams most in need of training are working in the very units in which it is difficult to implement and the SAQ results could be used as a directive tool for improvement.

## INTRODUCTION

This study assesses the introduction of simulation-based multiprofessional team training (SBMPTT) to a gynaecology unit in the South West of England using Safety Attitudes Questionnaire (SAQ) scores as an outcome measure.

A recent meta-analysis has shown that the use of team training in healthcare settings is effective at improving all four areas of Kirkpatrick's 'training evaluation criteria'. [1] Namely participants' positive reactions to training, the learning they achieve (of knowledge, skills and abilities), the transfer of that learning to the job and results as measured by organisational or patient outcomes (including safety culture measured by the SAQ). There is also evidence that any learning acquired through team training can impact positively and sequentially on both transfer and results. [2] SBMPTT is already practiced widely within the paired specialty of obstetrics. In England (where training in the management of obstetric emergencies is mandatory for all professionals providing maternity care [3]) the well-established PROMPT (PRactical Obstetric Multi-Professional Training) course is used to provide annual training in most maternity units. Since PROMPT was introduced as a mandatory annual training event for all healthcare professionals working in a busy obstetric tertiary referral centre in the South West of England (the same hospital in which this study took place), there has been strong evidence of improved clinical outcomes. [4-6] SBMPTT is now strongly embedded in this unit and staff attitudes towards safety and teamwork, as measured by the Safety Attitudes Questionnaire (SAQ), [7-8] have been found to be very positive. [9] In the same hospital, SBMPTT has recently been introduced in general surgery and SAQ scores were found to increase for safety and teamwork climate [10] as a result. Evidence that positive SAQ scores correlate with improved patient outcomes [11] was a driver for use of the questionnaire in this study.

PROMPT has been successfully implemented in a number of countries worldwide (and a similar course called ALSO (Advanced Life-Support in Obstetrics) runs in America). In England, no equivalent training course exists for gynaecology despite the Royal College of Obstetricians and Gynaecologists (RCOG) recommending to gynaecology units that “training in the management of emergencies must be given priority”.[12] There is though the potential for life-threatening emergencies that would require management by a multiprofessional team occurring in the gynaecological setting, including include sepsis, collapse, haemorrhage (both post-operatively and during a miscarriage) as well as ruptured ectopic pregnancy. Local successes of SBMPTT in both obstetrics and in general surgery [7-9, 10] alongside mounting evidence that team training in healthcare settings is associated with improved outcomes [2], inspired the development of local gynaecology SBMPTT based on the PROMPT model.

It is of relevance that a team of healthcare professionals in the South West of England originally developed the PROMPT course and one of the authors of this paper (DS) is a senior member of the PROMPT Maternity Foundation. The other authors of this paper work both clinically and academically within the specialty of obstetrics and gynaecology and all have an interest in medical education.

## **METHODS**

This interrupted time-series study took place at a tertiary referral teaching hospital with a catchment area of 400,000 patients. The gynaecology services studied admitted both elective and emergency cases. The majority of elective patients had undergone major grade 3 or 4 surgery (as defined by the National Institute of Health and Care Excellence). [13] Emergency referrals into the service were received from

the early pregnancy clinic, the emergency department, general practitioners and other acute specialties.

Two SBMPTT days were run during the study period in April 2013 and April 2014. Originally up to 4 sessions had been planned with the intention of capturing all clinical staff working regularly on the gynaecology ward. The curriculum was designed in concordance with the authors of the local obstetric SBMPTT course, following several of the key principles of PROMPT:

- multiprofessional participants and trainers
- locally run, using facilities in own unit
- multiprofessional drills, supported by in-house clinical champions
- participant debrief using clinical and teamwork checklists

All doctors, nurses and health care assistants (HCAs) working on the gynaecology ward were invited to attend a training session. The faculty was derived from the local department and comprised of senior gynaecologists and anaesthetists (either with a background in medical education or experience of teaching on the local PROMPT course), senior gynaecology nurses, the PROMPT lead midwife and a medical student. All faculty members were fully briefed verbally on the scenarios in advance of commencing training and had access to written information about running their station. The morning session was aimed at information giving and included a team building exercise, updates on new local guidelines and introduced some key causes of morbidity and mortality in gynaecology (sepsis and haemorrhage). In the afternoon participants were given the opportunity to practice working in teams to manage common gynaecological emergencies. Multi-professional groups of 4-6 learners rotated through 4 “drills” - collapse, post-operative haemorrhage, sepsis and bleeding post-miscarriage. Low-fidelity models were used to aid simulations of these

emergencies in real time in a familiar clinical environment on the gynaecology ward, following the PROMPT model of using local clinical facilities. Each drill had case-specific learning objectives relating to diagnosis, initial emergency management, definitive treatment and medium and long-term patient support. Teamwork and safety climate specific objectives included the longitudinal themes of safe teamworking, multiprofessional values and communication within each drill. Each station lasted thirty minutes including time for a scenario briefing and debrief. Checklists were used to facilitate debrief on clinical aspects of managing the emergency. Facilitators were prompted to provide feedback to participants on the observed communication and teamworking within the scenario.

The SAQ (Labour and Delivery version UK) was utilised to generate both quantitative and qualitative outcome data initially in April 2013 then again in July 2014. The SAQ is a validated survey for measuring safety culture within healthcare teams.[7-8] Doctors' rotas and nurse/HCA "off duty" rosters were used to assess those whom had worked on the gynaecology ward for at least 4 weeks and would therefore be eligible to complete the SAQ. The training course faculty, as well as those running this study were excluded. 51 staff were eligible in April 2013 and 50 in July 2014. All eligible staff were contacted via their NHS Trust email (using existing departmental contact lists) and invited to complete the SAQ. In addition staff were sent a paper copy. Researchers (SC & NR) promoted the completion of the SAQ during team meetings. Once anonymously completed, the questionnaires were placed in a sealed box and kept in a locked corridor only accessible by NHS staff working on the ward. In June 2014, a new list of eligible staff (using the same criteria) was created and they were invited to complete the SAQ. Staff did not need to have

completed the SAQ in April 2013 to be eligible and they may not have attended a training day.

The SAQ was adapted to ensure specialty-appropriate language (with the term “midwife” replaced by “nurse” and “labour ward” replaced by “gynaecology ward”). This validated questionnaire[7-8] assessed the safety culture of the ward as a whole by asking the individuals working there questions within six different domains; teamwork climate, safety climate, job satisfaction, stress recognition, perceptions of management, working conditions. The SAQ asks for the respondents’ level of agreement (on a 5-point Likert scale) with 47 positively worded statements, giving a score of 1 to 5 (1=Strongly disagree, 2=Disagree, 3=Neutral, 4= Agree, 5=Strongly agree). In the case of the 10 negatively worded statements, adjusted scores were calculated automatically by a formula in MS Excel (adjusted score = 6 – score). The SAQ also asks staff to rate their level of collaboration and communication with the different members of the multi-professional team (1=very low, 2=low, 3=adequate, 4=high, 5=very high). We planned to exclude all invariant responses from analysis. Demographic data was collected to ensure there were no duplicate responses. Free-text responses to the question “*What are your top 3 recommendations for improving patient safety on the gynaecology ward?*” were transcribed word-for-word and analysed for commonality. All data from the SAQs was stored on a password-protected NHS computer.

Data are expressed as percentages (for proportions of staff) and means (for individual item scores). Percentage scores for the six domains (teamwork climate, safety climate, job satisfaction, stress recognition, perceptions of management, working conditions) were calculated using the average score for items within those domains and applying the formula  $(\text{score} - 1) \times 25$  (thus converting the 5-point Likert

scale to a 100-point scale (1=0, 2=25, 3=50, 4=75, 5=100)). Statistical significance between the two cohorts was investigated using STATA software. The Mann-Whitney U test was utilised for non-parametric data. In order to utilise this method, medians and means were calculated and compared for alignment. Divergence confirmed a non-parametric distribution. Statistical significance was defined as  $p < 0.05$ .

Approval was granted to conduct the study and disseminate results by North Bristol NHS Trust Research and Development, reference number 3345.

## **RESULTS**

### **Who completed the SAQ?**

In April 2013, 82% (n= 42/51) of eligible staff completed the SAQ (25/30 doctors, 12/15 nurses and 5/6 HCAs). In June 2014, 58% (n=30/50) of eligible staff completed the SAQ (18/28 doctors, 7/17 nurses, 4/5 HCAs and 1 with role undeclared). There were no questionnaires with invariant responses. Through analysis of demographic data provided by respondents, no duplicate responses were found. Around a third (n=12) of the respondents in the second cohort had attended a simulation training session.

### **Collaboration and communication scores**

In April 2013, only 36% of doctors felt that the levels of collaboration and communication they experienced with nurses was high or very high. By June 2014 this had reached 71%. Analysis showed this to be a statistically significant improvement (mean ratings = 3.17/5.00 (April 2013) and 4.06/5.00 (June 2014),  $p=0.02$ ). Nurses more consistently rated their collaboration and communication with

doctors as high or very high (mean ratings = 4.50 (April 2013) and 4.00 (June 2014) / 5.00),  $p=0.17$ ) through the study period.

### Scores by SAQ domain

Table 1 displays the pre-and post-training SAQ scores by domain and allows for comparison with studies that have used the SAQ to assess the impact of training; and also with SAQ scores from the obstetric unit in the same hospital where SBMPTT is strongly embedded. During the study period there was a trend towards improvement in scores for questions relating to safety climate ( $p=0.19$ ), teamwork climate ( $p=0.4$ ) and job satisfaction ( $p=0.1$ ), none of which reached statistical significance. Therefore the introduction of SBMPTT failed to significantly improve SAQ scores in this setting.

**Table 1. SAQ scores - Comparison with other studies.[7, 8, 10, 14]**

	Baseline scores - this study (SD)	Post-training - this study (SD)	p=	Pre-training - SaFE study	Post-training - SaFE study	Embedded training - LW NBT	Pre-training - surgical wards, NBT (van der Nelson <i>et al.</i> 2013)	Post-training - surgical wards, NBT (van der Nelson <i>et al.</i> 2013)	Pre-training - Paediatric ED, USA	Post-training - Paediatric ED, USA
Teamwork climate	59.9 (14.45)	62.2 (13.68)	0.4	72.5	71.9	76.1	72.8	82.5	69.2	73.1
Safety climate	62.4 (13.91)	66.5 (12.93)	0.19	69.3	74	74	67	77.8	73.2	78.6
Job satisfaction	57.7 (18.10)	63.4 (18.10)	0.1	65.5	65.1	71.9				
Stress recognition	69.4 (11.41)	67.5 (11.29)	0.8	70.8	70.9	65				
Perceptions of management	43.8 (15.93)	44.4 (12.83)	0.5	47.5	49.2	47				
Working conditions	53.2 (16.59)	53.6 (19.24)	0.9	59.9	62.2	62.6				

## Scores by clinical role and SAQ domain

The demographic data and scores for the different domains of SAQ by clinical role are shown in Table 2. Splitting the data in this way demonstrates that the trend towards improvement in scores for safety climate can be mostly accounted for by the ratings of nurses and HCAs. Conversely, any trend towards improvement in the score for teamwork climate was mostly due to higher ratings from doctors.

**Table 2. Scores for domains of SAQ by clinical role**

	Doctors		Nurses		HCAs	
	Apr-13	Jun-14	Apr-13	Jun-14	Apr-13	Jun-14
Number eligible for study	30	28	15	17	6	5
Number responding (%)	25 (83)	18 (64)	12 (80)	7 (41)	5 (83)	4 (80)
Number working in both April and June		10		13		4
Number that attended training	n/a	7	n/a	3	n/a	2
Mean age (lowest-highest)	33.17 (26-60)	31.33 (27-54)	40 (23-53)	30.60 (24-37)	41.25 (26-54)	34.33 (28-45)
Years specialty experience (min-max)	6.42 (0-31)	5.5 (1-30)	12.5 (5-23)	6.44 (1-12)	7.5 (6-9)	
Teamwork climate score	60.85	65.45	57.56	58.93	61.46	55.21
Safety climate score	64.43	65.18	56.93	67.35	65.89	71.43
Job satisfaction score	59.79	65.56	51.83	53.57	60.25	64.58
Stress recognition score	70.05	67.01	68.23	75.00	67.50	60.94
Perceptions of management score	47.92	48.96	34.9	34.82	45.00	37.5
Working conditions score	58.85	58.33	42.71	44.64	51.25	47.92

## Responses to individual SAQ questions

When responses to individual questions were examined it was noted that throughout the study period there was a perception amongst staff that high levels of

workload were common on the gynaecology ward (mean scores = 4.60 (April 2013) and 4.57 (June 2014) / 5.00). Staff disagreed that staffing levels were sufficient for the number of patients (mean scores = 1.69 (April 2013) and 1.97 (June 2014) / 5.00). When asked if morale was high in the clinical area, staff generally disagreed (mean scores = 2.14 (April 2013) and 2.48 (June 2014) / 5.00). Staff agreed that they were less effective when fatigued (mean scores = 4.10 (April 2013) and 4.17 (June 2014) / 5.00) and believed that their performance was affected by the high workload (mean scores = 4.12 (April 2013) and 3.93 (June 2014) / 5.00).

All respondents were asked to give their top 3 recommendations for improving patient safety on the gynaecology ward. Overall, 69% of respondents suggested more staff and 30% suggested improvements in teamworking (namely communication or better MDT working). During the study period there was a large increase in the number of staff advocating increased input of more senior medical staff on the ward (10% April 2013 and 46% July 2014). Other suggestions included having better stocking of equipment and less bureaucracy and form filling.

## **DISCUSSION**

### **What does this study show?**

During the study, there was a statistically significant improvement in how doctors' perception of their level of communication and collaboration with nurses. This was also reflected in this group's contribution to the trend towards improvement in the teamwork climate score after implementation of training. Doctors' scores for individual statements pertaining to working relationships with nursing staff, such as *"Nurses input is well received in this clinical area"*, *"The doctors and nurses here work together as a well-coordinated team"* and *"Disagreements here are resolved*

*appropriately (i.e. not who is right but what is best for the patient)*”, were particularly improved. It was disappointing that only 12/50 staff in the second cohort had attended a training session as this makes the finding of improved collaboration and communication between doctors and nurses difficult to attribute to SBMPTT directly. However, this may indicate the power of SBMPTT in establishing a set of values and ways of working applicable the local clinical setting. Newcomers to the environment may observe the behaviours and attitudes of more established staff and choose to apply these principles to their own practice (Albert Bandura’s “Social Learning Theory” [15]). The knowledge and practice gained through SBMPTT by those that did attend training may have diffused to those that did not, and in doing so could have contributed to a cultural change on the ward. This cannot be proven through the methodology deployed in our study, however it does provide a theoretical basis to the observed increased perception of doctor/nurse collaboration.

### **Study strengths and weaknesses**

This study set out to assess the impact of introducing SBMPTT to a gynaecology ward, with the hypothesis that SAQ scores (primarily targeting teamwork climate) would improve after training. Unfortunately this was not proven by this study. When considering the possible reasons for this, it is notable that during this study the implementation of training was impeded by practicable considerations. The initial plan was for up to 4 training days to be held. This proved unworkable due to clinical commitments of the relevant staff and workforce planning issues; ultimately it was only possible to hold 2 training days and consequently only 12/50 staff in the second cohort of respondents actually attended training.

The study had a small sample size, potentially leading to an underpowered study unable to detect statistical significance. However, sufficient powering was limited by the practicalities of actual staff numbers; that is there was only a finite number of staff that could be recruited.

One of the strengths of the study was the high response rate in April 2013 (82%), facilitated by a local champion (SC) working in the hospital and distributing questionnaires at meetings and staff handovers. A relative weakness is the lower response rate in June 2014 (58%), a possible source of selection bias.

### **Low baseline scores**

When considering the baseline SAQ scores on the gynaecology ward in this study, it may be of significance that scores for teamwork and safety climate were much lower than were found in other studies where introduction of training did significantly improve SAQ scores in these domains[10, 16]. Could it be that the comparatively high baseline SAQ scores seen in these two studies contributed to the success of the interventions? SAQ scores as low as our baseline have been reported in the literature[17], but there are currently no other published studies where a team training intervention with the aim of improving safety culture has been applied to a unit with baseline SAQ scores as low as found in our study for comparison. It is clear that a unit's underlying safety culture is influenced by a complex set of interacting factors. Studies in several countries have found safety culture to be a highly localised concept; with scores for all domains of the SAQ varying significantly between units within institutions.[8, 18-10] It therefore is not unexpected to have found differences in scores between our gynaecology ward and the adjoining obstetric unit. We hypothesise that the problems to which SBMPTT seeks to redress (reflected in low

SAQ scores) might be the very barrier to its' implementation. Indeed, further interrogation of our baseline SAQ data reveals comparatively low scores in the domains of 'perceptions of management' and 'working conditions' and 'job satisfaction'. Deeper analysis of responses to questions within these domains demonstrated an overwhelming perception of a heavy workload and insufficient staffing of respondents. Indeed in this study, staff most frequently suggested that the way to improve safety on the ward was "more staff". Similarly negative perceptions of workload and staffing were found on our adjoined obstetric unit,[9] but interestingly job satisfaction remained high. The research team in that study hypothesised that the positive attitudes towards teamwork within the unit may have helped to counteract concerns about workload and staffing. Could universally low starting scores and poor morale indicate that a department will be difficult to motivate and engage in an improvement initiative?

The relatively high SAQ scores in the adjoined obstetric unit suggest that a strongly embedded team training programme may contribute to a positive safety culture.[9] The key now is to understand the barriers to establishing a sustainable training programme in gynaecology and to break this vicious cycle.

### **Moving forward**

i. Using SAQ data to inform initiatives aimed at improving patient safety[21-22].

The baseline SAQ could be used to inform learning objectives and design of the training day. We have already noted that scores for teamwork climate were much lower than in the adjoined obstetric unit [9] (59.9 compared to 76.1). Within this domain, the lowest scoring item was "*the doctors, nurses and HCAs here work together as a co-ordinated team*"; therefore, specific teamwork skills training could

be introduced into the programme. Another suggestion is that the morning timetable could contain a “brainstorming” session, canvassing ideas from participants as to how teamworking could be improved on the ward. This may help to shift the focus of staff from poor staffing levels towards ways that they could personally contribute to improved safety on the ward. Engaging attendees in this way would help to make them stakeholders in the process of improving local safety culture. This is an example of how sharing of SAQ results could be used to empower and motivate a department towards self-improvement by handing some of the responsibility for achieving it to the staff on the shop floor.

ii) An objective and validated way to measure improvement

Successful implementation of a sustainable training programme will also require clear organisational level support.[23-24] This must include financial support to ensure that roster gaps are filled so that staff can have study leave to attend the training. For this to happen, the organisation must be able to see some tangible reward for the support of the training. The SAQ could be used to monitor improvement and provide managers with an outcome measure of the success of the training programme. This type of application of the SAQ, with goals being set for departmental-level score improvement, has been used successfully in a hospital in the US[25] and another study has shown that improving SAQ scores can be associated with decreasing levels of patient harm and mortality rates.[26] This provides weight to the suggested practice of using the SAQ as a marker of progress.

## **CONCLUSION**

In conclusion, this study has not been able to clearly demonstrate that safety culture on a gynaecology ward can be improved through multi-professional team

training. However our results still have value, as our baseline safety culture scores were very low, and there was a trend towards improved scores for teamwork climate, safety climate and job satisfaction. Our comparatively low baseline safety culture scores coincided with challenges in getting training off the ground. This may highlight that the teams most in need of training are working in the very units in which it is difficult to implement. There is evidence that multi-professional team training works and there is an unmet need in gynaecology, but we now need to understand how to address the barriers to initiating training and how to enable departments (staff and management) to strive towards an improved safety culture and ultimately better patient outcomes. Using the SAQ as a directive tool for improvement, by using the data it provides to inform future training design and also providing management with an objective marker of progress, may be the way forward.

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#### **DECLARATION OF CONFLICTING INTERESTS**

Dimitrios Siassakos is a member of the PROMPT Maternity Foundation. He has no financial interest from this association.

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