PAINT-2 Study

Procedural Access IN Training (PAINT-2)

A multi-centre observational study to evaluate access to procedures in training for different groups of learners in anaesthesia

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Introduction

A number of recent publications address the under-representation of women in anaesthesia leadership roles,[1-8] research productivity,[8-13] and specialty honour awards.[14 15] Less often discussed are women's experiences during anaesthesia training, and how it may contribute to inequities later in their professional career. Female anaesthesia trainees perceive a higher level of discrimination in the workplace compared to their male peers,[16 17] more gender bias from patients,[17] and are less likely to be described using agentic language in their early training years.[18] In the Procedural Access IN Training (PAINT-1) study, male anaesthesia trainees report performing significantly higher numbers of procedures compared to women, were more likely to perceive themselves as requiring less supervision, more likely to rate themselves at a competency above their actual training level, and felt more prepared for independent specialist practice.[17]

Even with similar procedural case-volumes, the level of autonomy afforded during a procedure may influence confidence, learning curves, and future role identity. A conceptual model for the interaction between bias, confidence and learning hypothesises that the confidence gap and unconscious bias combine to result in decreased levels of autonomy for affected groups of learners.[19] This limits access to hands-on practice and impairs the learning experience, which may lead to under-representation reinforcing the confidence gap.[19] A gender gap, with men receiving higher levels of autonomy than women, has been reported amongst trainees in cardiothoracic surgery,[20] otorhinolaryngology,[21] general surgery,[22 23] and colorectal robotic surgery.[24] There are no studies investigating gender effects on the level of autonomy afforded to anaesthesia trainees in performing procedures.

Aims

We are conducting a multi-centre study to evaluate access to procedures in training for different groups of learners. The PAINT-1 study had previously identified self-reported discrepancies between trainees in the number of procedures performed. This study aims to empirically identify any discrepancies in level of supervision while performing procedures and further quantify this. Potential influencing factors include gender, procedural complexity, type of procedure, level of training, trainee ethnicity, and supervisor seniority.

Study Design

This is a prospective observational multi-centre cohort study. Reporting is based on the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines for reporting observational studies.[25] Large training institutions will be targeted for recruitment, with data collection to occur over two consecutive weeks in each location, though consideration will be given to split weeks to facilitate participation. A local investigator responsible for data collection will be appointed at each site. A system to capture all procedures performed by trainees in the operating theatre, pre-operative area, or procedure/block room, when rostered with named supervisors, will be determined in consultation with the local investigator for each site. Data entry will be facilitated by an online system (i.e. Survey Monkey). The study commencement date at each site should be at least four weeks after the start of a new training rotation.

The supervisor and trainee separately rate the level of supervision provided for each procedure, and the supervisor ranks the complexity of the procedure relative to their overall experience.

Level of autonomy will be rated using a validated four-point scale,[26] modified for this study:

- Learner Watching – supervisor performs the procedure while explaining each step to the learner
- Active Help – learner performs procedure with supervisor actively guiding learner through critical steps
- Passive Help – learner performs critical steps of procedure independently while supervisor passively observes, intervening only if necessary to make an important teaching point or to optimise patient safety
- Learner Independent – learner performs procedure independently without input from supervisor, who may or may not be present. A discussion on technique/plan may have taken place prior to the procedure.

Supervisors will be asked to rate the complexity of the procedure relative to specific patient markers of difficulty (e.g. global assessment of anticipated difficult intubation), and their overall experience with that procedure. This will utilise previously validated three-level scale:[26]

- Least complex (one-third)
- Average complexity (one-third)
- Most complex (one-third)

The Australian and New Zealand College of Anaesthetists levels of training are categorised below. International Medical Graduates with prior anaesthesia training in trainee roles will be identified by the local site investigator and categorised after discussion with the principal investigating team.

- IT (Introductory Trainee, including those in pre-IT rotations e.g. anaesthesia senior house officer)
- BT (Basic Trainee)
- AT (Advanced Trainee)
- PF (Provisional Fellow, we will include those in post-FANZCA fellowship roles)

Procedures to be included in the study are as follows:

- Anticipated difficult airway management (steps/procedures to manage an anticipated difficult airway)
- Neuraxial blocks (i.e. spinals and epidurals)
- Peripheral nerve blocks
- Central venous cannulation (including PICCs)
- Point-of-care ultrasound (e.g. cardiac, lung, gastric)

Exclusion criteria are as follows:

- Procedures that are excluded from data collection, i.e.
    - Routine airway management in patients with no anticipated difficulty
    - Peripheral venous cannulation (except PICCs)
    - Arterial cannulation
    - Off-the-floor procedures (i.e. those in the labour ward or in ED)
    - Procedures performed while on call (i.e. not a named list)
- Solo lists, i.e. no paired supervisor-learner
- After-hours lists, i.e. evenings, nights, weekends
- Lists where supervisors are paired with medical students as the only learner

Provisional fellows may play the role of a learner when rostered with a specialist or may act as a supervisor when working with a junior trainee – this will be discussed with local site supervisors. In addition, some learners may progress through a level of training during the study period. For each procedure, the role and level of training will be based on that at the time of the case.

In order to minimise the impact of the Hawthorne effect, information provided to participants will not state gender comparison as a study aim. The study will be framed as a prospective observational study of procedures performed by trainees and associated levels of supervision.

Statistical analysis

Statistical analysis will be advised by biostatistician Dr Alana Cavadino, a study co-investigator. Potential variables contributing to the level of autonomy will be explored using chi-square analysis and multivariate models with logistic regression. Apart from gender, other potential variables include supervisor seniority, type of procedure, complexity of procedure as perceived by supervisor, learner level of training, and learner ethnicity.

Previous studies investigated levels of autonomy amongst trainees in the surgical specialties, and it is not known if the observed differences are prevalent amongst anaesthesia trainees due to possible workplace culture differences. Sample sizes for the closest comparably designed studies were 596 and 908 cases,[20 23] with other studies retrospectively analysing large case log volumes. Adopting the higher number as part of a conservative approach, plus a 10% contingency, results in a sample size of 998.8 procedures. Therefore, we have set a minimum target sample size of 1,000 procedures.

Authorship Plan: Sidhu N, Pearce G, Cavadino A, Gormack S, on behalf of the PAINT-2 Study Group. The planned authorship may be extended or altered according to a majority vote of the Principal Investigators on the basis of extensive participation. All local site investigators and/or trial coordinators will be named in an appendix to the main paper with centres listed alphabetically. All investigators listed in the authorship appendix will be considered an author and may list the manuscript on their curricula vitae. As authors, they will be required on contribute to the manuscript review. Study collaborators should be aware that it is against the policy of some journals to include research collaboration groups in the list of authors.

Timeline

We anticipate that participating sites will implement the study in a two-week period convenient to them between March and October 2022, with the aim to submit results for publication by the end of 2022.

Retention of records

All documents associated with the study will be archived for 7 years following the completion of the study, or longer in accordance with local ethics committee requirements. Records will be stored in a secure location in the Department of Anaesthesia and Perioperative Medicine, North Shore Hospital, Auckland on a password-protected USB drive.

Ethics Consideration

The study has been granted Locality Authorisation by Waitematā District Health Board (Ref: RM14908). A full ethics submission has been submitted to the Health and Disability Ethics Committee (HDEC). Information will be shared with all sites as approvals are confirmed.

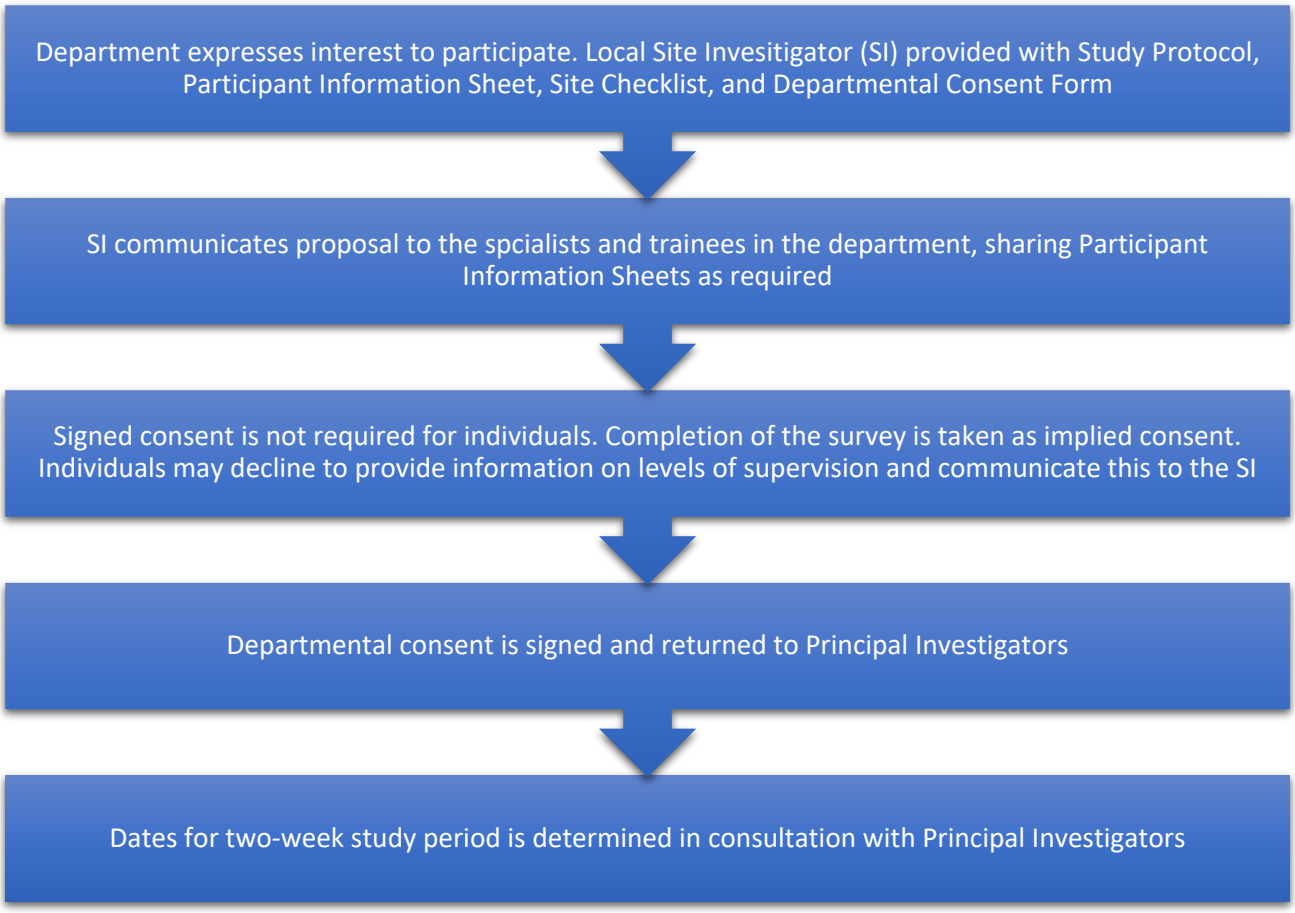
Confidentiality

All individual personal information and dates is kept confidential. The Lead Investigator (NS) is the only individual with access to raw survey results. The IP address collection function is disabled in the survey settings. Survey respondents are required to list their names and date of interaction – this is to enable matching of supervisor/learner responses for analysis and to monitor compliance. The local Site Investigator (SI) will not have access to responses apart from any instances where they assist in completing the survey on behalf of participants. The SI will be provided with feedback on survey completion in order to monitor compliance. Participant names will be anonymised during statistical analysis. Data will not be attributed to individual hospital sites in the final multi-centre analysis.

Participating sites

The study will be based at the Department of Anaesthesia and Perioperative Medicine, North Shore Hospital (Waitemata District Health Board), Auckland, New Zealand. Study sites are hospital departments accredited for training by the Australian and New Zealand College of Anaesthetists.

Multiple expressions of interest have been indicated and the study investigators will engage with these sites and continue to identity other potential study sites. The process for enrolment is outlined below.



Staff Requirements

Trainees and specialists will be required to:

- Complete a short (1-2 min) survey each following any lists with a named supervisor and learner where specific procedures are performed during the study period.
- The final demographic information question is required only when an individual completes the survey for the first time
- If the survey is not completed, the trainee or consultant will receive a reminder in the form of an email or text message, followed by a phone call.

In order to prepare for the intervention, specialists and learners will be provided with an information sheet outlining study details, definitions for level of supervision and procedure complexity, and FAQs.

Departmental Requirements

Participating institutions will be required to nominate a Site Investigator (SI) for the study. Larger departments may nominate up to two individuals for this role. The SI will be responsible for the following:

- Maintain communication with Principal Investigators during the study period, as required.
- Electronically distribute Participant Information Sheets to all specialists and trainees in their department.
- Identify lists with a named supervisor and learner where procedures may be performed.
- Distribute survey links to identified participants daily during the study period.
- Review number of eligible supervision encounters and monitor response rate to the survey.
- Provide reminders to study participants via email or phone call to complete surveys, if required.

Possible Benefits and Risks

Benefits:

- Being involved in a pioneering study on supervision in Anaesthesia.
- Identifying how we can improve the supervision process during training.

Risks:

- No obvious risks to learning, supervision, or patient care were identified in the feasibility study.

Feasibility study

A one-week feasibility study conducted at North Shore Hospital to test reporting systems and identify issues with compliance. Changes were made to the initial protocol to address issues that were identified.

Funding

Primary investigators, study sites and local investigators will not receive any monetary incentives. The study is funded by the internal resource of the Department of Anaesthesia and Perioperative Medicine, North Shore Hospital (Waitematā District Health Board).

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