

First, Do No Harm: Unintended Consequences of Skill-Based Training in Global Health

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Abstract

Background: Many medical trainees participate in international clinical rotations in resource-limited settings and they frequently describe pressure to perform outside their scope of clinical practice. Educators must provide trainees with tools to manage dilemmas prior to departure and should also review relevant procedural skills that may be useful. The Northwestern University McGaw Global Health Clinical Scholars program (GHCS), created to provide global health skills across medical disciplines and promote clinical self-awareness, incorporates a skills and ethics simulation curriculum for participating trainees and this study aims to evaluate the impact on trainee self-perceptions.

Methods: Training sessions were held between 2015 and 2017 for trainees participating in the GHCS program. The sessions were: ethics, obstetrics/gynecology/pediatrics, and surgery/anesthesia. Pre- and post- surveys assessed comfort and resources to navigate ethical dilemmas including participant beliefs about benefits versus harms of performing skills potentially outside of their scope and their willingness to perform these skills, if they were the only provider present.

Results: There were 56 responses from 68 trainee session experiences. After the ethics session, participants reported more confidence dealing with issues around scope of practice, professionalism, and harm ($p < 0.05$). After the skills sessions, the majority of participants stated the benefits outweighed harms of performing skills and were more likely to perform all skills if they were the sole provider.

Discussion/Conclusions: Despite having a dedicated ethical simulation reviewing basic ethical frameworks, including scope of practice, skill-based trainings resulted in increased stated willingness of trainees to perform skills outside of their scope of training.

Background

Almost 20% of United States (U.S.) Graduate Medical Education (GME) programs offer some global health experience during training and short-term experiences in global health (STEGH) are available in most disciplines.^{1,2} Often, trainees from high-income countries may be asked to and perform outside of their typical scope of practice during STEGH.³ Although various pre-departure training programs exist⁴, challenges remain in providing trainees with the tools to navigate the ethics and implications of their clinical work and address affronts to personal scope of practice when applied to STEGH.

It is imperative to develop and assess training curricula that encourage trainees to evaluate their own personal scope of clinical skills and leverage ethical frameworks for decision-making to guide future clinical practice during STEGH, because without adequate training, harm may come to trainees, host institutions, and patients.

Many trainees enter GME programs having already participated in STEGH^{5,6} and twenty percent of all U.S. GME programs offer some global health experience,^{1,2} although this varies by specialty.^{1,7,8,9} These

opportunities also vary widely in terms of duration, clinical activities, supervision, and pre-departure training.¹⁰

While the experiential benefits are well-documented for high income country (HIC) participants,^{10,11,12} risks can occur sending unprepared participants to resource-limited settings (RLS).^{13,14,15} These risks involve the participants, the patients they are intending to serve, and the STEGH partnership.¹⁶ Risks include inappropriate or harmful patient care, ineffective resource utilization, and undermining local health infrastructure.^{17,18,19}

In part, these risks arise from a mismatch between the participants' medical knowledge, skills, and behaviors and local expectations of these.^{20,21,22} This is exacerbated by training typical to HICs. Trainees based in HICs often receive highly specialized training and can develop a scope of clinical practice that is narrower than their peers practicing in resource-limited settings (RLS) typically encountered during STEGH. When HIC trainees rotate in these settings, they often report feeling pressure to perform beyond their scope of practice^{3,21,23} or experience difficulties managing care with unfamiliar and often fewer resources.¹³ Trainees must have tools to deal with these pressures unique to STEGH to ensure safety.

Pre-departure training varies across institutions and can include online modules, lectures, and case-based simulation sessions that teach clinical content and skills. High-quality pre-departure training, particularly about ethics, should be provided within HIC institutions and should be standard of practice for all global health trainees, as global health work poses unique ethical challenges.¹⁵ Innovative simulation curricula focus on emotional and social needs of the trainees.^{10,24,25} Ethics Simulation in Global Health Training (ESIGHT) is a high-technology simulation training focusing on common dilemmas and how to safely navigate care and avoid patient harm.²⁶

The Northwestern University (NU) McGaw Global Health Clinical Scholars (GHCS) program is a selective interdisciplinary program supporting GME trainees with interest in global health. The program consists of lectures, mentored projects, and on-site rotations at partner institutions. In 2015, an ethics simulation curriculum adapted from ESIGHT was developed to address the unique challenges faced in global health work, including navigating the dilemma of practicing outside scope of training. Concurrently, a skills curriculum was created for trainees reviewing surgical and anesthesia (Surg/Anes) and obstetrics and gynecology (ObG) clinical skills addressing RLS content and challenged individual trainee comfort and understanding of their scope of practice. Here we discuss the content and evaluation of this curriculum.

Methods

Participants

The participants were GME trainees in the GHCS program. Trainees were from any discipline participating in the program. Participation in the simulation series is required for program graduation and not all participants were able to complete the full GHCS program. There were 29 participants in the two ObG

sessions, with survey data available from 24, there were 11 and participants in the single Surg/Anes with survey data available from all participants, and 28 participants in the two Ethics simulations with data from 21. The Surg/Anes session was changed prior to its second iteration and therefore not included in analysis.

Implementation

Ethics Simulation

The ethics curriculum was adapted from ESIGHT and provided as an in-person training for participating faculty and standardized patients.²⁶ We added faculty debriefing training, adapting and added detailed instructions to the debriefing guide, and developing decision-making guidelines to complement the existing ESIGHT curriculum. The McGaw curriculum has three ethics scenarios pertinent to STEGH in RLS.^{26,27} These simulations modeled RLS settings and standardized patients were trained to augment ethical tensions by creating situations in which participants had to make difficult decisions. Facilitated debriefing occurred in small groups led by trained faculty (Table 1).

ObG Skill Session

The ObG session was held twice and reviewed skills determined by global health faculty from the Department of Obstetrics and Gynecology based on a curriculum for fourth year medical students. At each station, an expert taught skills and learners had the opportunity to both practice the skill and reflect on their proficiency with the skill, but were not taught skills to mastery (Table 1).

Surg/Anes Skill Session

The annual Surg/Anes session was held once during this study period and was altered for its second iteration, the results of which are not included here. The content and instructional strategy of skill stations were determined by global health faculty in the Departments of Surgery and Anesthesiology. At each station, an expert taught each skill and learners had the opportunity to both practice the skill and asked to reflect on their proficiency with the skill which was not taught to mastery (Table 1).

Table 1
Simulation and Skill Day Content

Session	Curriculum Content	Setting and Faculty	Debriefing	Performance Evaluation
Ethics Simulation	Adapted from ESIGHT Cases addressed: - Scope of practice - Privacy issues - Voluntary Informed Consent	Setting: - Simulated resource limited setting in a simulation lab Faculty: - Standardized patients - Global Health Educators	Structured small group debriefing on: -Ethical concepts - application of ethical concepts - Decision making Large group debrief on: - Decision making - Overall reflections	n/a

Session	Curriculum Content	Setting and Faculty	Debriefing	Performance Evaluation
Obstetric and Gynecologic Skill Session	<p>Skills:</p> <p><i>First Session</i></p> <ul style="list-style-type: none"> - Management of postpartum hemorrhage - Dilation and curettage - Assessment of the stages of labor - Obstetric Suturing - Episiotomy and laceration repair - Vaginal delivery - Obstetric ultrasound <p><i>Second Session</i></p> <ul style="list-style-type: none"> - Management of postpartum hemorrhage - Basic Suturing - Vaginal delivery - Obstetric Ultrasound - Estimating blood loss - Prolapse management - Preparation for delivery 	<p>Setting:</p> <ul style="list-style-type: none"> - Conference rooms <p>Faculty:</p> <ul style="list-style-type: none"> - Obstetrics and gynecology faculty - Global health educators 	<p>Structured debriefing:</p> <ul style="list-style-type: none"> - At each station there was a case presented that addressed the specific skill and a potential application in resource limited settings - Large group debrief on ethics and decision making 	<p>Checklists provided at skill stations for trainees to complete under the direction of skill station leaders</p>

Session	Curriculum Content	Setting and Faculty	Debriefing	Performance Evaluation
Surgery and Anesthesia Skill Session	Skills: - Peripheral vascular access placement - Fluid resuscitation - Sedation medication administration - Bag mask ventilation - Laryngoscopy - Airway device placement - Simple fracture management - Incision and drainage - Suturing	Setting: - Simulation laboratory Faculty: - Surgery and anesthesia faculty - Global health educators	Structured debriefing: - At each station there was a case presented that addressed the specific skill and a potential application in resource limited settings - Large group debrief on ethics and decision making	Checklists provided at skill stations for trainees to complete under the direction of skill station leaders

Universal and Life Saving Skills

As part of Surg/Anes, a session of the Trauma First Responder Course²⁸ for lay people who respond to violence and a training course using Helping Babies Breathe²⁹ curricula was part of ObG to teach basic neonatal resuscitation. Both of these curricula were evaluated using their own standard format, these results are not included in this analysis as both the objectives and evaluations are specific to each course.

Analysis

Participants in each simulation were given a pre-and post-survey. Each survey had a unique numeric identifier to match pre- and post-session responses, but additional identifiers were not collected. Chi-squared and Fisher's Exact tests were performed using IBM SPSSv.25. Two-sided p-value was set as < 0.05. Survey data collected before and after each skill session focused on participant perception of benefit versus harm of performing skills in exigent or emergency circumstances using Likert Scale of agreement. Participants were then asked if they would perform the skill if they were the only available

provider. Collection and analysis of pre- and post-session surveys for analysis was given IRB exemption through NU.

Retrospective Feedback

After the sessions, a survey was administered to global health faculty mentors to generate a local expert consensus as to what skills trainees from all specialties should be expected to have. This survey was conducted to better guide teaching content, was completed electronically, and the consensus results compared to what was being taught.

Results

During the study period, there were two ethics simulations, two ObG/Peds skill days, and one Surg/Anes skill day with participants from across disciplines (Table 2). Most of the participants had at least some prior global health field experience.

Table 2
Participant Type

Resident type	Ethics	Obstetrics and Gynecology / Pediatrics	Surgery and Anesthesia
Anesthesiology	14%	21%	0%
Dermatology	5%	4%	9%
Family Medicine	14%	21%	46%
Internal Medicine	5%	8%	18%
Obstetrics and Gynecology	0%	13%	9%
Pediatrics	5%	21%	0%
Physical Medicine and Rehabilitation (PMR)	0%	13%	18%
Total	21	24	11

Ethics

For the ethics simulation sessions, participants were asked if they were exposed to specific ethical challenges presented in the scenarios. Identification of exposure increased from 84–98% after the training.

Before and after the session, participants were asked if they had a strategy to deal with the ethical issues presented. For each of the issues there was an increase in participant agreement in before and after responses and findings were similar when asked if they had a person with whom to discuss the issue (Fig. 1).

After each training, participants overwhelmingly agreed that the ethical scenarios highlighted dilemmas that could be faced abroad, were useful in preparation for international electives, and were realistic. They also agreed the debriefing was helpful for reflection and understanding the subtleties of ethical issues they may encounter while abroad.

Obstetrics and Gynecology

Survey data was collected before and after each of the skill review sessions to determine trainee perception of the benefits versus harms of performing each skill and help the participant decide whether they would perform skills if they were the only available provider.

Overall, participants stated that the training improved their clinical skills in each of the topics. There was an increase in agreement that the benefits outweighed the harms of performing each skill and that they would be willing to perform the skill as the only provider regardless of trainee scope (Fig. 2).

Surgery and Anesthesia

For all of the skills, the post-test showed an increase in agreement of the benefits outweighing the harm, and when asked if the trainee would be willing to perform skills if they were the only provider, there was an increase after the training (Fig. 2).

Simulation Skills Review: Generating a Local Consensus

After reviewing the preliminary results of the trainings, a survey was performed to better understand which skills institutional global health experts felt all trainees should have as part of their scope of practice. Respondents were from the leadership of GHCS (Table 3). The skills that were reviewed, but retrospectively not felt to be part of general global health trainee scope of practice, were: dilation and curettage, obstetric suturing, episiotomy and laceration repair, obstetric ultrasound, prolapse management, and laryngoscopy.

Table 3

Institutional Expert Consensus – Which skills should be a part of global health trainee scope of practice?

Skill	Part of Expected Trainee Scope of Practice (% agreement)	Majority of Experts Agree – Skill should be part of general global health trainee scope of practice
Post-partum Hemorrhage	100%	Yes
Dilation and Curettage	0%	No
Assessment of the Stages of Labor	75%	Yes
Obstetric Suturing	0%	No
Episiotomy and Laceration Repair	25%	No
Vaginal Delivery	100%	Yes
Obstetric Ultrasound	25%	No
Estimating Blood Loss	100%%	Yes
Preparation for Labor	100%	Yes
Prolapse Management	25%	No
Peripheral IV placement	100%	Yes
Fluid Resuscitation	75%	Yes
Sedation/Drawing up Medications	87.5%%	Yes
Bag Mask Ventilation	100%	Yes
Laryngoscopy	0%	No
Airway Management	67%	Yes
Fracture Management	100%	Yes
Suturing	100%	Yes

Skill	Part of Expected Trainee Scope of Practice (% agreement)	Majority of Experts Agree – Skill should be part of general global health trainee scope of practice
Incision and Drainage	100%	Yes

Discussion

Participation in STEGH is common in almost all US GME programs, and thoughtful and targeted pre-departure training is important. One specific challenge of pre-departure training is to address the mismatch between US/Host scope of practice and expectations, as well as to give trainees tools to assess and act within their scope of practice and not beyond.

We found that exposure to procedural skills during single review sessions increased trainee reported willingness to perform them, regardless of scope of practice. These trainees also had an ethics case specifically dedicated to scope of practice which did not mitigate this effect. This may reflect trainee expectations of “see one-do one-teach one” which has been largely replaced by mastery learning,³⁰ or may represent trainee willingness to showcase confidence in skill performance. This may also reflect trainee desire to do something rather than nothing when engaged with RLS populations which harkens back to the concept of medical mission work.

In accordance with the principles of patient safety, we assert that STEGH should not be used as an opportunity for trainees to perform beyond their usual scope of practice, which they otherwise might, due to differences in supervision, accountability, or external pressures. Patients encountered during STEGH generally do not have a social contract to contribute to HIC provider training and there exists a fluid balance between beneficence and non-maleficence with respect to social justice and patient autonomy.

This illuminates one challenge in pre-departure training for STEGH; given the mismatch between HIC training and RLS realities, is there a unique set of skills which physician trainees should have prior to their STEGH work? If there is a universal skill set, then trainees must be competent in them prior to work in RLS. Unfortunately, there is no well-defined set of skills established for such trainees, though some have been suggested.³¹ This raises the question: within a GME program designed for ethical practice in global health settings, *are we asking them to perform beyond their scope of practice in a global health setting?* This outcome is diametrically opposed to the goals of a thoughtful and ethically sound pre-departure training program. While some of the skills we covered in these reviews were within specific trainee scope, some skills were unequivocally outside their practice scope. We believe these findings underline a physician’s desire to act even when insufficiently trained or lacking knowledge. These findings tell a cautionary narrative about teaching skills infrequently used or not taught to mastery and imbuing inappropriate confidence in trainees to perform beyond their scope of practice, in a setting with different resources, rules, and regulations.

When incorporating any skill review or training into a pre-departure global health training, it is crucial to consider the implications of training content and transparency about learning goals. As a result of the findings, the skill-centered sessions were revised to emphasize first responder and life-saving skills such as bag-mask ventilation and management of post-partum hemorrhage. Rather than skill review, trainees were given checklists to evaluate competency in each skill and we added detailed and targeted ethics vignettes outlining the tensions around each skill station. Notably, at the end of all the skills sessions a large group debriefing around decision making, determining local precedent, and identifying local experts with appropriate knowledge to advise trainees on the best course of action, was added. These modifications were made after critical reflection on the GHCS curricular goals, and each change and its unintended consequence was discussed openly with trainees.

Limitations

While there was a local consensus developed on basic global health clinical skills, this list does not include input from any STEGH hosting institution. Additionally, the results of this study are based on trainee self-reporting, not behaviors, and the reports are based on hypothetical skill performance which may not be congruent. Additionally, this cohort of participants are part of a selective group interested in careers in global health who may be more inclined to be interested in global health ethics, whereas the general graduate medical trainee who participates in STEGH may be more or less likely to report increased willingness to perform beyond their scope of practice.

Conclusion

Skill-based pre-departure assessment and training for global health trainees in the GHCS program, resulted in an increase, regardless of the specialties' scope of practice, in their confidence to perform certain skills as the only provider and in their belief, that the benefits outweighed the harm of performing these skills. While it is important to arm GME trainees with necessary procedural and social-emotional skills prior to their work in RLS, it is critical for pre-departure training to be mindful of the unintended harms of skills-based training and to continue to reinforce ethical practice of skills taught both for relevance and appropriateness of trainee scope of practice. In light of these findings from our curriculum evaluation, it was clear that we needed to change our intervention to align with our goals. As such, using educational design research strategies,³² we have transitioned our curriculum to be simulation based and are currently piloting it with promising preliminary results.

Abbreviations

ESIGHT (Ethics Simulation in Global Health Training), GHCS (Global Health Clinical Scholars), GME (Graduate Medical Education), HIC (High Income Countries), NU (Northwestern University), ObG (Obstetrics and Gynecology), RLS (Resource Limited Settings), STEGH (Short Term Experiences in Global Health), Surg/Anes (Surgery and Anesthesia), U.S. (United States)

Declarations

Ethics Approval and Consent to Participate:

This study has been granted ethics exemption through the Institutional Review Board (IRB), of Northwestern University. Need for consent was waived by the Northwestern University IRB.

Consent for Publication:

Not applicable

Availability of Data and Material:

The dataset generated and analyzed during the current study is not publicly available due confidentiality and its use for educational improvement under IRB exemption but may be available from the corresponding author on reasonable request.

Research materials available upon request to CF

Competing Interests:

The authors declare no conflict of interest

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Authors' Contributions:

This manuscript and data analyses were primarily completed by author CF with content development and review by authors JM, SG, FP, MS, MM, and ADP. All authors have read and approved of submission of this manuscript

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Figures

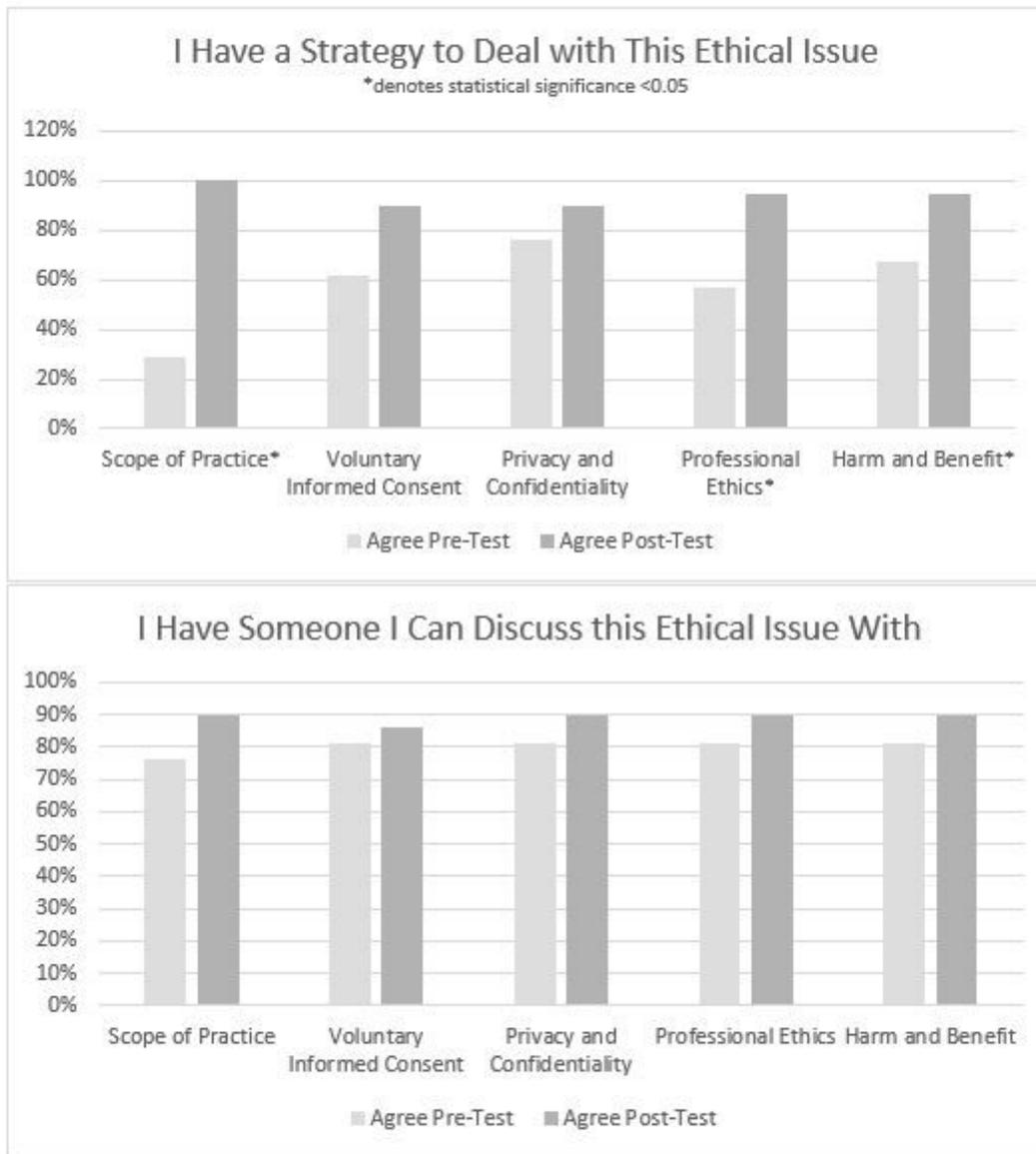


Figure 1

Ethics Simulation Pre and Post Test Evaluation

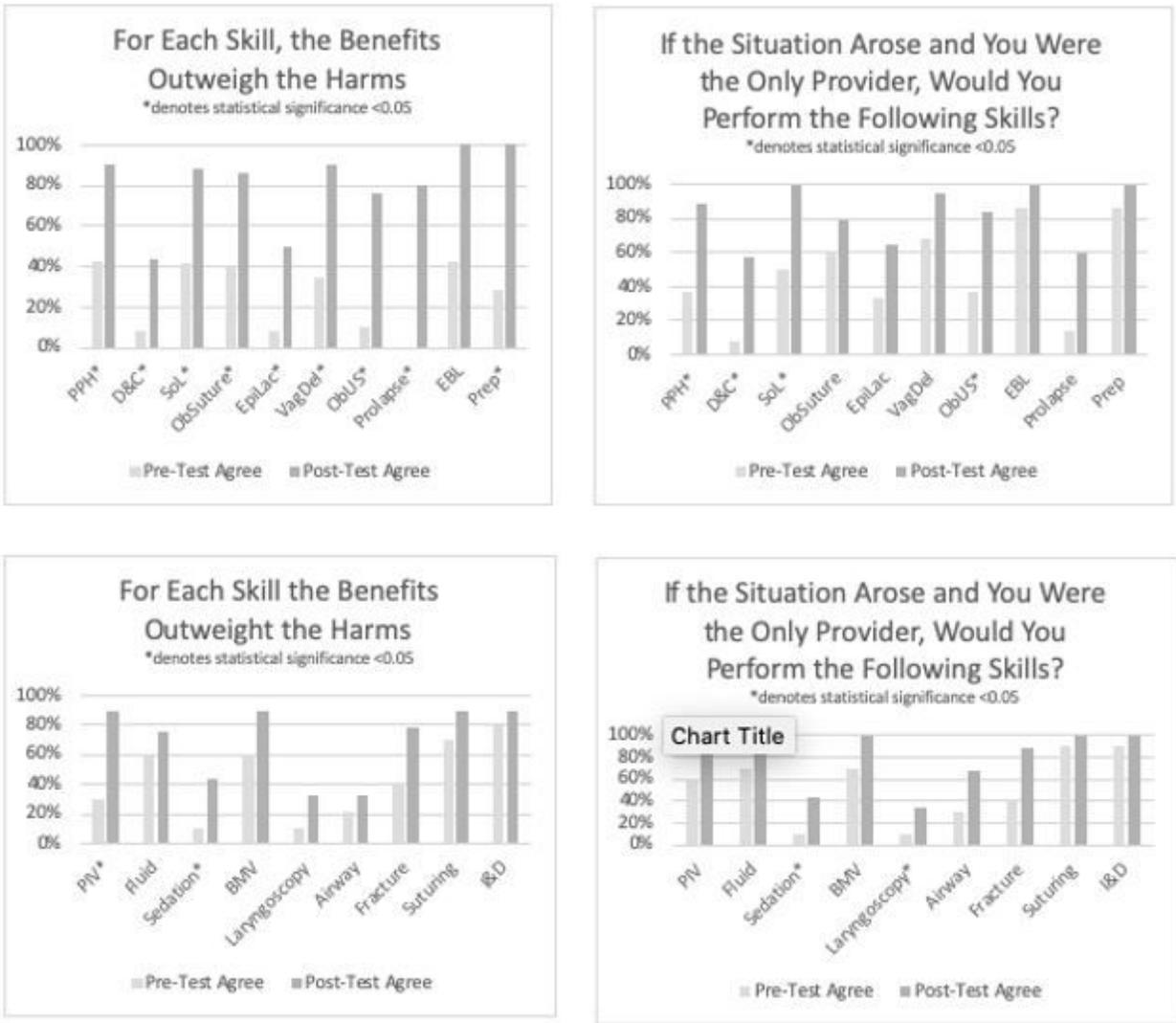


Figure 2

Skill Survey Results Figure Abbreviations: PPH (post-partum hemorrhage), D&C (dilation and curettage), Sol (assessment of the stages of labor), ObSuture (obstetric suturing), EpiLac (episiotomy and laceration repair), VagDel (vaginal delivery), ObUS (obstetric ultrasound), Prolapse (prolapse management), EBL (estimating blood loss), Prep (preparation for delivery), PIV (peripheral vascular access placement), Fluid (fluid resuscitation), Sedation (sedation medication administration), BMV (bag mask ventilation), Airway (airway management), Fracture (fracture management), I&D (incision and drainage)

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