



Procedural Skills of the Entrustable Professional Activities: Are Graduating US Medical Students Prepared to Perform Procedures in Residency?

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PURPOSE: Competency-based medical education has been successfully instituted in graduate medical education through the development of Milestones. Consequently, the Association of American Medical Colleges implemented the core entrustable professional activities initiative to complement this framework in undergraduate medical education. We sought to determine its efficacy by examining the experiences and confidence of recent medical school graduates with general procedural skills (entrustable professional activities 12).

METHOD: We administered an electronic survey to the MedStar Georgetown University Hospital intern class assessing their experiences with learning and evaluation as well as their confidence with procedural skills training during medical school. Simple linear regression was used to compare respondent confidence and the presence of formal evaluation in medical school.

RESULTS: We received 28 complete responses, resulting in a 33% response rate, whereas most respondents indicated that basic cardiopulmonary resuscitation, bag/mask ventilation, and universal precautions were important to and evaluated by their medical school, this emphasis was not present for venipuncture, intravenous catheter placement, and arterial puncture. Mean summed scores of confidence for each skill indicated a statistically significant effect between confidence and evaluation of universal precaution skills.

CONCLUSIONS: More advanced procedural skills are not considered as important for graduating medical students and are

less likely to be taught and formally evaluated before graduation. Formal evaluation of some procedural skills is associated with increased confidence of the learner. (J Surg Ed 74:589-595. © 2017 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: competency-based medical education, entrustable professional activities, medical education, medical students, undergraduate medical education

COMPETENCIES: Medical Knowledge, Practice-Based Learning and Improvement, Systems-Based Practice

INTRODUCTION

Medical schools are responsible for teaching and assessing knowledge and practical skills while also ensuring students' competency in those skills. Yet, recent literature demonstrates a growing concern that medical students are inadequately prepared for residency training. In fact, many general surgery program directors believe that first year residents (postgraduate year 1 [PGY-1]) are unable to perform basic procedures.¹ The lack of a standardized assessment process further augments institutional differences in procedural training resulting in a large variation in the competency of medical school graduates.

The Association of American Medical Colleges (AAMC) published the Medical Schools Objective Project Report, which introduced a list of routine technical procedures that all fourth year medical students should be able to perform upon graduation from medical school such as lumbar punctures, nasogastric tube insertion, and thoracentesis.^{2,3} Despite these early goals, most programs fell short in preparing students for independent

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performance of these skills.^{2,3} This variation in readiness led both the AAMC and the Accreditation Council for Graduate Medical Education to create standardized assessment practices for trainees.

The AAMC introduced the Core entrustable professional activities (EPA) as a part of the competency-based medical education (CBME) movement initiated by the Accreditation Council for Graduate Medical Education outcome project and milestones.⁴⁻⁷ EPAs are “units of professional practice, defined as tasks or responsibilities, that trainees are entrusted to perform unsupervised once they obtain specific competence” and “should be able to carry out without direct supervision from the first day of residency.”^{4,8,9} Unfortunately, given the abstractness of the EPA language, institutions struggle to embed EPAs within a clinical context for assessment.⁹⁻¹¹ Although EPAs have shown international success, there is little evidence showing implementation and efficacy of the EPAs in US undergraduate medical education.^{10,11}

EPA #12 is intended to ensure competency in general procedures and states that graduating medical students will be able “to provide basic care in basic CPR, bag/mask ventilation, venipuncture, intravascular catheter lines, and arterial puncture” and “to understand the anatomy, physiology, indications and contraindications, risks and benefits, alternatives, and complications” (the subcomponents) of these procedures.⁴ Our goal is to determine its efficacy by examining the experiences and confidence of recent medical school graduates with general procedural skills (EPA 12), hypothesizing that although the introduction of CBME into US graduate medical education has improved competency acquisition, US medical schools have yet to meet the true goals of this initiative.

METHODS

Survey Design

We developed a survey to investigate recent medical school graduates' perceptions of their medical schools' implementation of EPA #12. Specifically, we inquired about medical schools' methods of teaching the EPA's basic procedural skills, the importance of those skills to their medical school, and how confident they felt completing those tasks. Further, we assessed the primary teaching influence for these skills at the medical school institutions.

Using a cross-sectional study design, we developed a survey based on published recommendations of survey design. The survey included 10 fixed-response multiple choice, yes or no, and Likert scale questions. We were unable to use a validated survey because of the unavailability of any tools for measurement of the EPAs. We based our questions on the text of the AAMC EPA#12 in the Curriculum Developers' Guide.⁴ The survey is provided at the following link: <https://files.acrobat.com/a/preview/9b3b05b8-1a37-4742-a68a-ee689ad07616>. We piloted the

survey with a group of residents (PGY-2 or above) from the internal medicine, obstetrics and gynecology, surgical subspecialties, and psychiatry specialties at MedStar Georgetown University Hospital (MGUH) and adjusted the survey based on feedback.

Information regarding the purpose of the study and intended use of responses was provided in an electronic cover letter and at the beginning of the survey link. We defined competency and EPAs according to the aforementioned AAMC definitions. We obtained informed consent from participants in the first question of the survey. To assess the extent of respondents' confidence with the EPA's procedural skills, we used the AAMC's sub-components for each skill, including preparation for procedure, indications/contraindications, risks/benefits, alternatives, complications, mechanical skills, aseptic technique related to the procedure, discussing knowledge about the procedure, and coping with the patient's emotional response to the procedure. The Georgetown University Institutional Review Board approved this study.

Population

We sent the survey electronically to all PGY-1 residents in the class of 2015 to 2016 at MGUH via SurveyMonkey (www.surveymonkey.com). This survey group included all ($N = 84$) interns from internal medicine, pediatrics, psychiatry, pathology, obstetrics and gynecology, and surgery and the surgical subspecialties. Only the responses of participants who completed the survey were included in the study. We distributed the survey 3 times within 1-month period in August of 2015, approximately 1 month following the intern class start date at MGUH. All responses were kept confidential and anonymous.

Data Analysis

Demographics were presented as descriptive statistics. We calculated mean Likert scores for the reported degree of importance of each procedural skill to the medical school of the respondent. Similarly, we calculated the sum of the mean Likert scores for the reported degree of confidence of each procedural skill subcomponent. To determine if medical school requirements regarding the evaluation of the procedural skills affected confidence levels in those skills, we scaled the variables (basic CPR, bag/mask ventilation, universal precautions, venipuncture, intravenous (IV) line insertion, and arterial puncture) from 1 to 5 (1 being “Not very confident”, and 5 being “Very confident”) for the categories: preparation for procedure, indications/contraindications, risks/benefits, alternatives, complications, mechanical skills, aseptic technique, discussing procedural knowledge, and coping with patients' response.

Further, we performed a simple linear regression analysis of these summed scores against medical school requirements

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