Association for Surgical Education

Systems-based practice: learning the concepts using a teamwork competition model

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Abstract

BACKGROUND: Systems-based practice (SBP) is a core competency of the Accreditation Council for Graduate Medical Education (ACGME) that must be integrated into residency training. We sought to develop a method to improve resident understanding using a teamwork competition model.

METHODS: The residents were given a pretest to assess their understanding of SBP followed by a didactic lecture. They were then divided into teams to solve a programmatic “problem” in the residency. Each team had to prove that their solution best fulfilled the expectations of SBP. Their solutions were then presented at a departmental conference followed by a post-test to evaluate knowledge.

RESULTS: In the pretest, 33% of the residents understood what SBP meant and only 15% knew the components of SBP. In the post-test, this increased to 85% and 89%, respectively.

CONCLUSIONS: SBP is a competency mandated by the Accreditation Council for Graduate Medical Education in residency training. Using a novel approach, we were able to improve the residents’ understanding of SBP.

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In 1998, the Accreditation Council for Graduate Medical Education (ACGME) began its Outcome Project, which required that US graduate medical education programs develop core curriculums, implement training, and assess competency in 6 domains: patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and systems-based practice (SBP). The objective of attaining these 6 competencies was to create patient-focused physicians who would be able to practice in medicine within current and evolving health care systems. The teaching of patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, and professionalism are easily achieved in a general surgical residency program through direct observation of attending interactions with patients, operating room teaching, didactic lectures, surgical grand rounds, and morbidity and mortality conference. Assessment of these competencies is included in our resident evaluations completed by attending surgeons and ancillary staff.

SBP is defined as “an awareness of and responsiveness to the larger context and system of health care and the ability to call effectively on other resources in the system to provide optimal health care.” As a principle, it permeates every phase of patient care including the outpatient, inpatient, and perioperative arena. However, the teaching and assessment of SBP have been more difficult as it is a
core competency that is not well understood by residents or attending staff. Because this was a difficult topic to give a didactic lecture on, the methodology we chose to employ to teach the concepts was an educational game.

Using educational games has been a valid method for teaching in medicine. A 2010 survey of program directors in family medicine and internal medicine residencies found that 92% favored using games as a teaching tool and that 80% were already using them. Akl et al used a television game format to teach internal medicine residents’ clinical practice guidelines. They identified that gaming was feasible for teaching and that residents enjoyed learning in this format and felt more engaged than in a didactic lecture. Another study by Webb et al used the popular game show Jeopardy! to teach surgical residents about geriatrics. Other active learning techniques such as case-based discussions and problem-based learning were used to teach non-geriatric topics. Comparing the pretest and post-test for the topic of geriatrics, there was a statistically significant increase in retained knowledge as the average score increased from 51.5% to 82.6%. Although there was no difference noted in the delayed post-test scores of geriatrics vs non-geriatric topics, resident satisfaction was noted to be higher with the gaming sessions. Kerfoot and Baker used an online educational game as a means for teaching core topics to urology residents. They found it to be an effective method for teaching and validated their findings by comparing the game scores to resident in-service examination scores. Similar to other studies, resident satisfaction was high. Of the residents who completed the end-of-program survey, 99.6% (667 of 670 respondents) said they would be willing to participate again in a program using the game format.

We chose to use a team-based competition game model as it has previously been successful with our residents. Using surgical jeopardy as a method of teaching “dry” topics had been popular and repeated yearly for basic science topics by resident request. The rationale behind this training exercise was to teach the core concepts of SBP to the residents and to improve their understanding of this competency.

Methods

A mandatory conference is held once a week for the general surgery residents in our program. Residents are excused from conference when they are on vacation, on the surgical service at an affiliated site that is 20 miles away from our primary hospital, or when involved in emergency patient care. Before the start of one of the conferences, the residents in attendance were given a written pretest evaluating their knowledge of the SBP and its components. During the following week, all the residents participated in a didactic lecture on SBP provided on the ACGME Web site. At the completion of the lecture, the residents were divided into teams based on their residency year, and each team was assigned a “task” to solve for the residency program. The tasks were how to improve attending feedback on the floors and in the operating room (post graduate year [PGY]-5 class), how to build an effective journal club (PGY-4 class), how to best integrate medical students into the surgical rotation (PGY-3 class), how to improve simulation training in residency (PGY-2 class), and how to create an effective reading club (PGY-1 class).

Each team had to prove that their proposal best fulfilled the 6 expectations of SBP within the framework of the program. These expectations were (1) working effectively in various health care delivery systems and systems relevant to their clinical specialty: the residents had to demonstrate that their proposal could be implemented at the university hospital, the county hospital, and the community hospital comprising the program; (2) co-ordinating patient care within the health care system relevant to their clinical specialty: the residents were asked to identify how their proposal improved patient care co-ordination and how it could be demonstrated at the 3 different hospitals; (3) incorporating considerations of cost awareness and risk-benefit analysis in patient and/or population-based care as appropriate: each proposal had to be considered cost effective and achievable at any of their rotation sites; (4) advocate for quality patient care and optimal patient care systems: the residents were asked to identify how their proposal would improve patient care and quality of care; (5) work in interprofessional teams to enhance patient safety and improve patient care quality: the proposal had to involve other professional caregivers; and (6) participate in identifying system errors and implementing potential systems solutions: the residents were asked to consider possible failures for their proposal and to identify potential solutions for each failure. The individual teams were given 6 weeks to develop a plan. Each team selected 2 representatives to present their idea at a departmental conference where attending faculty surgeons provided critique and selected the best resident team proposal.

Faculty members individually scored the teams on a scale of 1 (least successful) to 5 (most successful) according to how well their proposal addressed each of the 6 components of SBP. Each proposal was also scored on a scale of 1 to 5 for best idea. The highest score each team could receive from an attending was 35.

Eight weeks after the didactic lecture on SBP, the residents at weekly conference were given a written post-test on SBP.

Results

Our general surgery program has 40 categorical residents and 18 preliminary residents. There were 27 residents who participated in both the pretest and post-test. Residents who were not able to participate in both the pre-test and post-test were excluded from the analysis. In the pretest, 9 of 27 (33%) residents felt they had a good understanding of
SBP and 4 of 27 (15%) knew the components of SBP. In the post-test, 23 of the 27 (85%) residents stated that they had a good understanding and 24 of 27 (89%) knew the correct components of SBP (Table 1).

As a secondary gain, the proposals for the residency program “tasks” were innovative and engendered friendly competition between the classes as to who would have the best overall plan. The residents also acknowledged that they practiced SBP in their everyday work as a physician, but this exercise further clarified what SBP actually meant. From the faculty perspective, 2 of the 5 proposed plans were feasible and innovative, and they supported their implementation.

The plan felt to be the most innovative and patient care oriented was the PGY-4 class and their proposal for journal club. Our journal club has been challenged by a paucity of both faculty and resident participation. With the exception of the residents assigned to present the article and the attending assigned to moderate, there was little motivation for the individual residents to read and prepare for journal club. In the past, we had held journal club at a restaurant to entice participation but with limited success. This approach began to fail with resident work hour restrictions and the requirement for time off between shifts. We had also tried using mandatory quizzes to enforce the journal club, but there was little consequence for failed quizzes.

In our program, there are 8 general surgical services. The premise of the new journal club would be that the chief resident from each service (with attending advisement) would be responsible for choosing the articles for journal club for their individual service. Articles would be selected based on current patients on the service. This would incorporate patient care into the journal club and would enhance engagement of the residents. Residents rotating on nongeneral surgery services were included by assigning them to specific general surgery services for the purpose of journal club. Journal club would then take place once a month during a mandatory second hour of conference. An attending from each service would be responsible for reviewing the article with the team. Because the journal club was conducted during mandatory conference time, and because they were smaller groups run by an attending and chief resident, participation would improve. This new journal club has been implemented for the current academic year. We plan to develop an objective measurement of acquired knowledge from journal club as it directly relates to patient care.

Comments

The 6 core competencies were jointly identified by the ACGME and the American Board of Medical Specialties as essential in creating physicians who could provide quality care to patients. The teaching of these core competencies and subsequent assessment of residents’ knowledge of these competencies is delegated to individual programs.

SBP is defined with the following statement: “Residents must demonstrate an awareness of and responsiveness to the larger context and system of healthcare, as well as the ability to call effectively on other resources in the system to provide optimal health care.” For many general surgical programs, the focus is to create individual surgeons who are technically proficient and competent in making good clinical decisions. As part of training, many general surgical programs rotate residents to different institutions to provide exposure to the variety of practice settings that exist: academic, private, and government based. In theory, these varied settings would allow residents to experience a broad range of practice and to appreciate the resources that are present at different locations and to refine their understanding of how different systems function.

However, the actual didactic teaching of the fundamentals of SBP and then assessment of competence can be difficult. A variety of methods have been used to teach SBP to surgical residents. Some efforts have included provision of a nonclinical rotation for resident participation in quality projects and sentinel events. Establishment of resident led performance improvement projects8 and use of Web-based didactic curriculums.9 All our residents have access to the Surgical Council on Resident Education Web site. However, there has been little self-directed interest in the SBP modules. This project began with a pretest to assess the actual knowledge of SBP of our residents, and by self-report, the residents felt a deficit in their understanding of this competency.

We chose to use perceived challenges in the residency program to empower the residents in effecting change. Overall, there was significant excitement and interest in the project from the residents and each group took team photos. The different PGY years collectively met and created proposals based on the principles surrounding SBP. Each team created power point presentations to directly address each of the components of SBP and to demonstrate how their proposal would be effective (Fig. 1).

After the competition, the residents were able to give concrete examples of SBP in their daily practice (Table 2).

Before this project, pertinent discussions of SBP, such as

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<thead>
<tr>
<th>Table 1</th>
<th>Results of the pretest and post-test</th>
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<tr>
<td>Questions</td>
<td>Pretest</td>
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<tr>
<td>What is the meaning of SBP?</td>
<td>9/27 (33%)</td>
</tr>
<tr>
<td>What are the expectations of the ACGME in regards to SBP?</td>
<td>7/27 (26%)</td>
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<tr>
<td>What are the components of SBP?</td>
<td>4/27 (15%)</td>
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<td>What are the goals of SBP?</td>
<td>12/27 (44%)</td>
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<tr>
<td>Do you use SBP in your everyday work as a physician</td>
<td>13/27 (48%)</td>
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ACGME = Accreditation Council for Graduate Medical Education; SBP = systems-based practice.
the financial implications of patient length of stay, cost effectiveness of different diagnostic tests, and differences between the hospital systems, most often occurred during case conferences. There has since been a shift with such discussions now occurring actual patient rounds and presentations.

Another example of resident comprehension of SBP occurred at a post-project morbidity and mortality conference. A case was presented where the resident had opened the wrong mesh for a ventral hernia repair. The resident then presented the costs of different meshes, the direct costs of that case, and what the hospital was expected to be reimbursed. It was identified that this had likely happened in other cases and never previously presented as a patient morbidity to be discussed. However, with new knowledge of a larger system and accountability, this was now a true morbidity and mortality case.

There are limitations to this exercise. The pre- and post-test scores were based on self-reported assessments rather than on objective testing; hence, the validity may be questioned. An additional weakness may be the lack of evaluation of the attending faculty as to their understanding of the SBP competency. Although this report is primarily descriptive, we feel it nonetheless presents a potentially valuable strategy for integrating knowledge of a difficult competency into resident surgical training and practice.

This project was enthusiastically received by our residents. Future projects will include having the residents specifically identify how they use SBP in the patients they follow, application of the fundamentals of SBP during each case presented at an educational conference, and creation of resident team-based quality improvement projects that will promote patient care.

Conclusions

SBP is a core component in the development of a competent general surgeon in our complex and evolving health care environment. A team competition model in residency can teach the fundamental concepts of this competency toward the goal of developing surgeons who are better enabled to provide optimal quality care.

References


