Relationship between medical specialty and emergency department rotation performance of postgraduate year 1 residents

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Abstract

Background: Before July 2011, all medical graduates chose their specialties for residency training prior to receiving a 1-month postgraduate year 1 (PGY-1) emergency medicine (EM) training in Taiwan. Therefore, the EM curriculum content may not correlate well with the chosen specialty. Accordingly, the PGY-1 trainees might learn from their EM training differently depending on specialty.

Purpose: This study explored the influence of the specialties of PGY-1 trainees on their performance in the 1-month EM training using workplace assessment tools.

Methods: This retrospective study analyzed the clinical performance of 183 PGY-1 residents who underwent a 1-month EM training program in the emergency department of a teaching hospital. Their performance was assessed using several mini-clinical evaluation exercises (mini-CEXs) and a single monthly global rating. We classified trainees into three groups based on the extent to which the specialty chosen reflected primary care. (Radiology, pathology, nuclear medicine, and anesthesiology reflected little correlation. Obstetrics and gynecology, pediatrics, otolaryngology, ophthalmology, physical medicine and rehabilitation, psychiatry, neurosurgery, neurology, orthopedics, and urology reflected some correlation. Internal medicine, general surgery, EM, and family medicine had high correlation.) We analyzed the variation in the assessment outcomes between groups using Kruskal-Wallis test.

Results: Success in achieving learning outcomes in the emergency department was proportional to the degree of general practice of the specialty chosen. This trend was statistically significant for the mini-CEX domains of medical interviewing (p = 0.028), clinical judgment (p = 0.012), physical examination (p = 0.001), professionalism (p = 0.023), and clinical skills (p = 0.001). Compared to the mini-CEX, the final monthly global rating showed no significant correlation between degree of learning and the trainee specialty.

Conclusion: The success of PGY-1s in achieving learning outcomes after 1-month EM training was correlated with the degree of primary care of the specialty. The structured workplace assessment tool, mini-CEX, provided a more accurate evaluation compared with the single monthly global rating score.

Keywords: clinical competence; educational assessment; emergency departments; emergency medicine; global rating; medical residency; mini-CEX

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1. Introduction

The mini-clinical evaluation exercise (mini-CEX), a structured and reliable tool used to assess clinical performance, was first developed by the American Board of Internal Medicine in the 1970s. Although initially developed only to assess trainees in internal medicine departments, the mini-CEX has since been widely implemented in many other specialty training programs. Its validity, reliability, and feasibility in assessing the clinical performance of residents in various specialties had been well established. The tool works well in the evaluation of many types of examinees: medical students, clerks, interns, residents, or even practicing physicians. In a mini-CEX encounter, the faculty member acts as an evaluator to observe the workplace performance of a trainee. The trainee, either a medical student or a resident, performs a focused history taking, physical examination, or medical counseling with a real patient in the clinical setting. After the encounter, the evaluator completes a structured rating form in multiple domains related to the trainee’s clinical competency. In addition to serving as an evaluation tool, the mini-CEX has an educational component; by providing timely and focused feedback to trainees, it also improves the quality of training.

In Taiwan, since 2003 the 3-month postgraduate year 1 (PGY-1) general medicine training program has consisted of monthly rotations in internal medicine, surgery, and community medicine departments. In 2006, the general medicine training was extended to 6 months. From July 2009 to June 2011, the Taiwan Department of Health required all PGY-1 residents to complete a 1-month training course in the emergency department (ED), which was integrated into the former 6-month program. These PGY-1 residents spend the remaining 6 months of the first year in their own specialty training courses (e.g., neurology or orthopedics). They had already chosen their specialty of residency training prior to graduating from a medical school, and may receive specialty training before or after the general medicine (including ED) training, based on the 1-year course arranged by the departmental program director of the chosen specialty.

No previous study has yet focused on the influence of specialty background on the performance of PGY-1 trainees in the ED. In an era where medical education of the emergency department was highly emphasized, adult learning theory is a crucial factor to be considered in designing emergency medicine (EM) training curriculum. We therefore hypothesize that the chosen specialties of PGY-1 trainees with a holistic approach and their professions or daily practice highly associated with EM learning contents will achieve higher mini-CEX performance score in the 1-month EM training.

2. Methods

2.1. Study design and population

This retrospective study analyzed the assessment data of mini-CEX encounters and monthly global ratings of PGY-1 residents in a medical center of northern Taiwan. The study period, study population, and data collection of mini-CEXs are the same as described in our previous study, whose aim was to determine the feasibility, validity, and impact factors of the mini-CEX ratings in the ED setting (and was published in the Journal of Acute Medicine). In addition to monthly global rating scales, we analyzed the same raw data of mini-CEXs. We hereby quoted a part of the description of the study period and population from Chang et al’s study.

All PGY-1 residents who underwent a 1-month training program in the ED between August 2009 and December 2010 were enrolled in our study. Their performances were assessed with the mini-CEX and a final monthly global rating. During the 1-month rotation in EM, the PGY-1 residents underwent 1 week of trauma training conducted by trauma surgeons and 3 weeks of nontrauma training conducted by emergency physicians (EPs). The core contents of the 1-month EM training contained general principles of management of common emergencies and traumatic cases, basic life support and advanced cardiac life support skills, emergency medical services system, emergency and critical transfer, disaster and mass casualty management, ethics issues and medical malpractice in the ED, substance abuse and intoxication, gynecologic and obstetric emergency, and emergency medical sociology.

The clinical competency of each PGY-1 resident was assessed with multiple mini-CEX encounters, on average 3–6. The evaluator was either an EP or a trauma surgeon, depending on the clinical situation. Each PGY-1 resident also had a single clinical tutor to guide him or her throughout the 1-month EM course. The tutor gave the trainee a single overall (global) assessment at the end of the EM training, using a traditional 100-point scale.

The ED faculty received multiple lectures and video-based workshops on rater training prior to the formal implementation of mini-CEX as an assessment tool for the PGY-1 EM training. Therefore, most evaluators were assumed to be competent to perform this workplace assessment of clinical competency using the tool provided.

Based on the degree to which the chosen specialties used a holistic approach (i.e., one that takes into consideration the biological, psychological, and social environment of the patients) and the association between the teaching contents provided in the 1-month EM training course for the PGY1 trainees and their daily practice or experience required and documented in their residency training programs, we classified the PGY-1 trainees into three groups. Group A (radiology, pathology, nuclear medicine, and anesthesiology) includes medical specialties with less of the character of a general physician using a holistic approach skill, and there was a higher disparity between EM teaching contents provided and trainees’ specialty training required. Group C (internal medicine, general surgery, EM, and family medicine) contains specialties whose practice uses a holistic approach such as that of a general physician and lesser disparity between EM teaching contents provided and trainees’ specialty training required. Group B (obstetrics and gynecology, pediatrics,
otolaryngology, ophthalmology, physical medicine and rehabilitation, psychiatry, neurosurgery, neurology, orthopedics, and urology) contains the intermediate generalist character of physician specialties and disparity between EM teaching contents provided and trainees’ specialty training required, which is considered between those specialties defined in Groups A and C.

2.2. Study protocol and measures

This study was a retrospective review of mini-CEXs and global assessments completed by ED faculty members from August 2009 to December 2010. The mini-CEX is composed of seven domains (medical interviewing, physical examination, professionalism, procedural skills, clinical judgment, counseling skills, and organization) using a 9-point rating scale (1 indicating unsatisfactory and 9 indicating superior). Each PGY-1 resident was evaluated with a mini-CEX weekly. At the end of the month, the tutor gave the resident a single overall score for knowledge, skill, and attitude, using a 100-point scale. The protocol was approved by the Hospital Ethics Committee on Human Research, which deemed it free from the requirement of obtaining documented informed consent.

2.3. Data analysis

The performance in ED of PGY-1 residents by specialty was evaluated using both the mini-CEXs and the monthly global rating. The Shapiro–Wilk test was used to test the null hypothesis of normal distribution. The differences in the assessment results in seven individual domains between the three groups were analyzed using Kruskal–Wallis test. Post hoc comparisons were made using Dunn test. We also examined the global rating score between groups. All analyses were performed using SAS statistical software version 9.2 (SAS Institute Inc, Cary, NC, USA). A p value of <0.05 was considered statistically significant.

3. Results

3.1. Overview

Over the 17-month period of EM training (from August 2009 to December 2010), 57 faculty members (42 EPs and 15 trauma surgeons) evaluated 183 PGY-1 residents from 18 different specialties, creating a total of 723 mini-CEX encounters during the study period (Table 1). Of these, 591 encounters (86.8%) were rated by EM physicians and 132 (13.2%) were rated by trauma surgeons. The mini-CEX domain of clinical competency most often achieved by PGY-1 trainees in ED was medical interviewing (99.3%), clinical judgment (99.1%), and physical examination (98.5%); the least achieved domain was procedural skills (42.0%) (Table 2).

3.2. Influence of specialty on trainees’ performance evaluated by mini-CEX

The mean score in each domain of mini-CEX was higher for those who had chosen a primary care specialty. This trend was statistically significant for the mini-CEX domains of medical interviewing (p = 0.028), clinical judgment (p = 0.012), physical examination (p = 0.001), professionalism (p = 0.023), and procedural skills (p = 0.001). The trend was not statistically significant for the domains of counseling skills (p = 0.098) and organization/efficiency (p = 0.065) (Table 3). In post hoc analysis, Group C and Group A performed with significant differences in medical interviewing, clinical judgment, physical examination, professionalism, and procedural skills. Group B and Group A performed with significant differences in medical interviewing and physical examination. There were no significant differences in performance between Group B and Group C in post hoc analysis.

Table 1
The distribution of PGY1 residents and relevant mini-CEX encounters in different medical specialty.

<table>
<thead>
<tr>
<th>Examinee specialty</th>
<th>Number of examinees&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Number of mini-CEX tests&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N = 183 (100%)</td>
<td>N = 723 (100%)</td>
</tr>
<tr>
<td>Internal medicine</td>
<td>49 (26.8)</td>
<td>209 (28.9)</td>
</tr>
<tr>
<td>General surgery</td>
<td>29 (15.8)</td>
<td>101 (14.0)</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>17 (9.3)</td>
<td>72 (10.0)</td>
</tr>
<tr>
<td>Emergency medicine</td>
<td>14 (7.7)</td>
<td>51 (7.1)</td>
</tr>
<tr>
<td>Obstetrics and gynecology</td>
<td>11 (6.0)</td>
<td>40 (5.5)</td>
</tr>
<tr>
<td>Physical medicine and rehabilitation</td>
<td>8 (4.4)</td>
<td>31 (4.3)</td>
</tr>
<tr>
<td>Orthopedics</td>
<td>7 (3.8)</td>
<td>28 (3.9)</td>
</tr>
<tr>
<td>Anesthesiology</td>
<td>7 (3.8)</td>
<td>28 (3.9)</td>
</tr>
<tr>
<td>Neurology</td>
<td>6 (3.3)</td>
<td>24 (3.3)</td>
</tr>
<tr>
<td>Radiology</td>
<td>5 (2.7)</td>
<td>23 (3.2)</td>
</tr>
<tr>
<td>Otorhinolaryngology</td>
<td>5 (2.7)</td>
<td>19 (2.6)</td>
</tr>
<tr>
<td>Neurosurgery</td>
<td>5 (2.7)</td>
<td>17 (2.4)</td>
</tr>
<tr>
<td>Ophthalmology</td>
<td>4 (2.2)</td>
<td>17 (2.4)</td>
</tr>
<tr>
<td>Pathology</td>
<td>4 (2.2)</td>
<td>17 (2.4)</td>
</tr>
<tr>
<td>Family medicine</td>
<td>4 (2.2)</td>
<td>16 (2.2)</td>
</tr>
<tr>
<td>Psychiatry</td>
<td>4 (2.2)</td>
<td>14 (1.9)</td>
</tr>
<tr>
<td>Urology</td>
<td>3 (1.6)</td>
<td>12 (1.7)</td>
</tr>
<tr>
<td>Nuclear medicine</td>
<td>1 (0.5)</td>
<td>4 (0.6)</td>
</tr>
</tbody>
</table>

*Mini-CEX = mini-clinical evaluation exercise; PGY1 = postgraduate year 1.*

<sup>a</sup> Data are presented as number (%).

Table 2
Overall mean ratings of each domain of mini-CEX.

<table>
<thead>
<tr>
<th>Domains of mini-CEX</th>
<th>Number of each domain assessed&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Overall mean rating&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical interviewing</td>
<td>717 (99.2)</td>
<td>6.8 (1.0)</td>
</tr>
<tr>
<td>Physical examination</td>
<td>712 (98.5)</td>
<td>6.7 (1.0)</td>
</tr>
<tr>
<td>Clinical skills</td>
<td>313 (43.3)</td>
<td>6.7 (1.1)</td>
</tr>
<tr>
<td>Counseling skills</td>
<td>645 (89.2)</td>
<td>6.6 (1.1)</td>
</tr>
<tr>
<td>Clinical judgment</td>
<td>716 (99.0)</td>
<td>6.8 (1.1)</td>
</tr>
<tr>
<td>Organization/efficiency</td>
<td>696 (96.3)</td>
<td>6.7 (1.1)</td>
</tr>
<tr>
<td>Professionalism</td>
<td>684 (94.6)</td>
<td>6.9 (1.1)</td>
</tr>
</tbody>
</table>

<sup>a</sup> Data presented as number (%).
<sup>b</sup> Data presented as mean (standard deviation).
3.3. Influence of specialty on trainees’ performance evaluated by a monthly global rating score

The mean monthly global score of all PGY-1 residents was 86.5 ± 5.6. Those in Group A scored 85.2 ± 5.8, those in Group B scored 86.3 ± 5.5, and those in Group C scored 86.8 ± 5.6. The difference between groups was not statistically significant even though scores were correlated with the extent of primary care focus of the chosen specialty.

4. Discussion

4.1. Factors influencing the career choices—adult learning theory

From a national survey in the United Kingdom, early career choices for EM are less predictive of career destinations, and those who switched to EM were, notably, doctors who previously favored surgical specialties, hospital physician-led specialties, and anesthetics. According to Lefevre et al., the main motivating factors for medical students’ choice of career included interesting diseases, opportunities for private practice, patient contact, and quality of life. In the study by Kumar and Dhaliwal, personal interest was rated by 80% of senior medical students as important in influencing their career choice, followed by stability (58%), reputation of the specialty (56%), and lifestyle (55%). Although a strong interest in certain highly specialized fields of medicine may influence one’s career choice, many medical students cite job availability for the future as their major concern. As such, adult learning theory noted by Lindeman may be considered highly relevant in interpreting our assessment outcomes. Physicians are motivated to learn as they experience needs and interests that learning will satisfy. These adults have a deep need to be self-directed. It would be logical to assume that physicians with a background in EM, internal medicine, general surgery, or family medicine would be more motivated to learn EM and thus would score higher in tested domains.

Lambert and Goldacre found that the percentage of PGY-1 doctors whose first choice of eventual career was general practice has not changed much in England in recent years. The career of choice is presumably related to a medical graduate’s personality and individuality, and it may not easily be changed. In theory, those who choose general practice as a future career will presumably perform better in skills related to patient contact (e.g., history taking and physical examination) than those who choose a specialty with fewer doctor–patient interactions. As such, the specialties in Group C require the mandated skills in general medicine training as set by the Taiwan Department of Health for all PGY-1 residents. This fact is compatible with our observation that PGY-1 residents in Group C got higher scores in most domains of mini-CEXs as compared to other groups. The variation in performance of the PGY-1 residents in different domains may reflect their individual personality, strengths, and weakness. Therefore, the tutors can enhance the training in certain domains according to the background specialty of the trainee.

4.2. Comparison of rating scales in different mini-CEX domains between specialties of the PGY-1 residents

Our study showed that, in the ED setting, PGY-1 trainees with backgrounds in internal medicine, general surgery, EM, or family medicine perform better than those in other specialties in most domains of mini-CEXs, such as medical interviewing, physical examination, procedural skills, clinical judgment, and professionalism in the 1-month EM learning. For trainees with specialties related to primary care (Group C), in the clinical setting, these competencies are closely linked to the daily practice of their profession. Although the trend was similar, the difference between groups was not statistically significant in counseling skills and organization/efficiency. A possible explanation for this homogeneity is the unique teaching context and module in the ED. Patient safety is stressed during the teaching and learning process, and all PGY-1 trainees are instructed in advance and are not allowed to make decisions of disposition during ED visits. Even though all PGY-1 trainees were assigned adequate patient encounters with different acuity and severity levels to achieve the learning goal of EM training, they were supervised by on-site clinical teachers at all times. As most of the trainees were not familiar with the medical resources utilization, system arrangement, and interprofessional collaboration of the teaching environment of the ED, it is difficult for them to provide timely and efficient health care in the ED. It is also difficult for residents in the ED to perform professionally with good clinical reasoning in explaining the rationale for treatment, obtaining patient consent, or conducting counseling regarding management in the 1-month EM training course.
These conditions may explain why the domains of counseling skills and organization or efficiency did not differ significantly between PGY-1 trainees of different specialties, regardless of their individual motivation or previous training.

4.3. Comparison of the mini-CEX ratings and the global rating scores

PGY-1 residents who planned to practice primary care did better than the two other groups according to many domains of the mini-CEX. The global rating assessment showed a nonsignificant difference between groups. The main considerations for the global rating scale were the ability of PGY-1 residents to handle a medical emergency, skill in basic trauma management, the doctor–patient interaction, attitude in the workplace, and sense of responsibility. The global assessment of the PGY-1 is done by the rater based on the recalled observation of the trainee in the clinical setting at the end of the 1-month training. As expected, the mini-CEX was a more reliable workplace assessment tool. Its superiority lies not only in its structured dimensions in accordance with the clinical competency of ED residents, but also in its completion by raters at the moment of direct observation.

4.4. Contribution and application

Our study results addressed the fact that the ED rotation performance of PGY-1 residents with specialties whose practice uses a holistic approach such as that of a general physician and lesser disparity between EM teaching contents provided and trainees’ specialty training required will be assessed as superior using mini-CEXs as compared to others, which might be rational in accordance with the concept of adult learning theory. We also found that the structured mini-CEXs outperformed the single global rating score as a tool to evaluate the clinical EM competency of PGY-1 residents. The PGY1 training program has been extended to 1 year after July 2011. All PGY1 residents are required to complete a 1-month ED rotation prior to being accepted for specialty training. Future studies for analyzing the association between the trainees’ ED rotation performance outcome and their future specialty chosen is indicated.

4.5. Limitations

Our study had several limitations. First, the sample size of this single-center study is too small to establish strong evidence for a conclusion. Second, not all mini-CEX records were computerized during the period of study (some were written on paper). The ED setting, with its limited time and stressful environment, made it difficult for the ED faculty to fill in these evaluation forms without some error. Therefore, some of the information may have been left out owing to a lack of computerized, “missing-proof” mechanism. Third, although we tried to analyze the influence of background specialty on performance in each domain of PGY-1 residents, performance may have been affected by the length of exposure to the material in each resident’s specialty field prior to the 1-month EM training program. Fourth, the assessment bias that could arise from preconceived preferences on performance of different background specialties should be avoided in the study design. As this is a retrospective data review, we could not make sure that the faculties (evaluators) were unaware of trainee specialty. However, the clinical competency of each PGY-1 resident was assessed with multiple mini-CEX encounters, on average 3–6. Therefore, the assessment bias might be limited. Finally, as mentioned by Chang et al, the seniority and background specialty of ED faculty have some influence on the mini-CEX ratings. PGY-1 residents who were rated by a senior supervisor tended to get lower scores. Other potential influencing factors include the varying complexity of the clinical setting during the mini-CEX encounter and the Hawthorne effect. The influence of such factors should be taken into account when interpreting the data.

5. Conclusion

Workplace assessment using the mini-CEX indicates that the background specialty training of PGY-1 residents may influence their performance in EM learning. In our study, the structured mini-CEX outperformed the single global rating score as a tool to evaluate the clinical EM competency of PGY-1 residents. Future research on a larger scale, of longer duration, and with more complete data collection, is warranted.

Conflicts of interest

There were no conflicts of interest related to this study.

References