The Effects of an Educational Intervention for “At-risk” Residents to Improve Their Scores on the In-training Exam

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Background and Objectives: The American Board of Family Practice (ABFP) In-training Exam (ITE) is one of the tools used to evaluate both a resident’s progress through residency and the program itself. Investigators have examined the ITE’s validity and reliability and predictors of resident performance, but no published studies have reported the effects of initiatives to improve residents’ performance on the ITE. This study examines the impact of an educational intervention on low-scoring residents’ ITE composite scores. Methods: Second-year residents at a university-based program were divided into two groups. The intervention group, who took the educational intervention, all had PGY-1 scores < 400 on their composite score. The control group was comprised of residents scoring > 400 on their composite score as PGY-1s. The educational intervention involved intensive group and independent study. Results: In the first year of the study, there was an increase in the average composite score of 75 points in the intervention group compared to the control group. In the second year, there was an increase of 72.5 points, but these differences were not significant. Conclusions: These composite score changes are not significant, and although this educational intervention may have improved confidence among low-scoring residents, it did not clearly improve their scores on the ITE.

The American Board of Family Practice (ABFP) In-training Exam (ITE) is one of the tools used to assess the academic performance of residency programs and to measure an individual resident’s progress through residency training. The ITE permits programs to provide residents with feedback to help address deficiencies and provides programs with data to help evaluate the effectiveness of the curriculum. All but one of the family practice residency programs in the United States participate in the ITE, which had its inception back in the 1970s.1,2

In 1990, Leigh3 reported on the ability of the ABFP ITE to predict subsequent performance on the ABFP Certification Examination and found that the ITE composite score and the majority of the part scores of the ITE were independently predictive of performance on the certification exam. More recently, however, Replogle4 reported that the part scores on the ITE lacked sufficient reliability to be interpreted per individual resident, whereas the composite score of the ITE had sufficient reliability to be used as part of a formal and comprehensive evaluation system.

Mastagh5 also recently addressed the issue of the ITE as a predictor of performance on the ABFP Certification Examination. She pointed out that if a resident scores below 400 on the composite score of the ITE as a PGY-1 and PGY-2, the resident will pass the Certification Examination on the first attempt only 64% of the time. In the case of a resident who scores below 400 on the composite score in all 3 years, the resident will pass the Certification Examination on the first attempt only 44% of the time. The average pass rate on the exam is about 95%. This knowledge can help us identify residents “at risk” for poor performance on the Certification Examination.

Despite this evidence, controversy remains about the reliability of the ITE and whether “teaching to the exam” will help residents on the ITE and subsequently the ABFP Certification Examination. There are no
published reports in the literature, however, examining interventions or initiatives to improve residents’ scores on the ABFP ITE. This study, therefore, determined whether an educational intervention given to low-scoring residents at one residency program could significantly increase their ITE scores.

Methods

Setting
The study was set in a university-based family practice residency program in Galveston, Tex. The Institutional Review Board reviewed and approved the study.

The residents in the program have been similar over the past 5 years with respect to age at entry, marital status, gender, ethnicity, and place of medical school graduation. The residents, on average, enter our program at about 32 years of age (range 24–52), are married (52%), male (51%), and the ethnic breakdown is approximately 47% Caucasian, 26% Asian, 16% African American, and 11% Hispanic. More than 70% are graduates of US medical schools.

Sample
The intervention group was second-year residents during academic years 2000–2001 and 2001–2002 who had first-year ITE composite scores < 400 and who participated in the educational intervention (n=8). The control group was second-year residents who had first-year resident ITE composite scores above 400 and did not take the educational intervention during the same period (n=6).

The Educational Intervention
The intervention for these second-year residents began 6 weeks before and concluded 2 weeks prior to the ITE, for a total of 4 weeks (the ITE is held on the first Friday in November). The intervention was led by a single physician faculty. It was compulsory for those residents with a PGY-1 composite score of < 400 and was in lieu of an elective month later in their residency. This elective month was set aside for the involved residents when the overall rotation schedule for the residents was prepared prior to the start of the residents’ PGY-2. During the intervention, the residents continued their continuity clinics 3 half days per week and attended their longitudinal and formal didactic sessions for 2 half days per week.

The educational intervention encompassed the remaining 5 half days per week as classroom time. The course objectives were discussed in the beginning, and examination techniques were taught to and practiced by the group. The residents then took a sample ITE test from a prior year under examination conditions. The faculty evaluated their answers and helped residents identify their learning needs. Difficult or tricky exam questions were discussed in the group format.

Commonly occurring examination topics were assigned to individual residents for them to prepare and present briefly to the group. This was followed by practice on questions from the chosen topic, and residents were referred to recommended readings as appropriate to remedy deficiencies. This process was repeated until the group completed the previous 5 years’ worth of old ITEs.

Examination techniques continued to be emphasized during the 4 weeks, and time was allotted for private study on subject areas identified for each resident as needing further attention. Out of the 20 half days of the intervention (80 hours), 5 half days (20 hours) were set aside entirely for private study.

Data Collection and Analysis
Residents’ standarized composite scores were obtained from the ITE test results sent by the ABFP to the program director. This composite score is a weighted average of the standard scores for the exam in each of the eight major subject areas. The range of scoring is from 200–800, with a mean score of 500 for the exam and a standard deviation (SD) of 100. Second-year residents who were part of the intervention were identified, and change in their composite score from the first year was calculated individually and then as a group. This was also done for the control group. The two mean changes in composite scores for the groups were analyzed by $t$ test to see if there was a significant difference between the two groups. Demographic data on the residents was analyzed using chi-square.

Results
Both groups had similar demographic characteristics. The only difference was that the intervention group in 2001 was composed of significantly more single residents ($P=.01$.)

Although the residents who received the intervention in both years of the study improved their scores more than the residents who did not, the changes were not statistically significant. These results are summarized in Table 1. In the 2000 intervention group, the mean change in the composite score was 140 (range 60–230) compared to 65 (range 60–70) in the control group. This difference was not statistically significant ($P=.2257$). In the 2001 intervention group, the mean change in the composite score was 90 (range 40–150) and in the control group was 17.5 (range -30–80), also a nonsignificant difference ($P=.0851$).

Figure 1 shows the changes in average composite score for the resident class affected by the educational intervention in 2000, and Figure 2 shows the same data for the resident class in 2001. Although the intervention group achieved a higher average composite score increase on the ITE compared to the control group after the intervention, this difference was not statistically significant.
Residents in the intervention group increased their scores more than those in the control groups in our study, but the increase was not statistically significant. Many family practice residency programs attempt to help residents who perform poorly on standardized exams and, in particular, those whose ITE scores suggest that they may have difficulty passing the ABFP Certification Examination. Although the number of poorly performing residents at most programs is few, the problem of dealing with such residents nonetheless affects many programs. Further, failure to pass the Certification Examination will create financial problems for residents after graduation because of the inability of these residents to be included on health plan rosters if they are not board certified.

In our residency program, the intervention described in this article has been a major step to address this issue. The educational intervention was fairly time intensive for involved faculty and residents. Although it did not result in a significant change in residents’ ITE scores, we still feel it was a justified use of time because there were other less-tangible benefits. For example, it was our observation that it improved the residents’ morale, confidence, and enthusiasm for further

**Table 1**

Results in the Intervention Versus Control Groups

<table>
<thead>
<tr>
<th>Residents in intervention group in 2000 (n=4)</th>
<th>Average Change in Composite Score From Previous Year</th>
<th>Difference in Score Between the Intervention and Control Groups</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residents in control group in 2000 (n=2)</td>
<td>140</td>
<td>+75</td>
<td>.2257</td>
</tr>
<tr>
<td>Residents in intervention group in 2001 (n=4)</td>
<td>90</td>
<td>+72.5</td>
<td>.0851</td>
</tr>
<tr>
<td>Residents in control group in 2001 (n=4)</td>
<td>17.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 1**

Changes in Average Composite Score for the Intervention and Control Groups in 2000

**Figure 2**

Changes in Average Composite Score for the Intervention and Control Groups in 2001
academic endeavors. Further, it is possible that these less-tangible benefits may translate into improved performance on the ABFP Certification Examination.

Limitations
There are some limitations to this study. First, our sample size was small, and we may not have had sufficient statistical power to detect small but significant differences in scores. Second, the control group for this study was not truly comparable to the intervention group. Third, the results at our university-based program may not be generalizable to other programs. Fourth, regression to the mean could also explain the change in composite scores. This possibility is supported by data from 4 years prior to this intervention. We examined average composite score changes from PGY-1 to PGY-2. Our low-scoring residents (< 400 as the composite score in PGY-1) were compared to the rest of the residency class (those with a composite score > 400 in PGY-1). Low-scoring PGY-1s (scores 325–345) improved their score an average of 108.75 by the PGY-2 (range 55–210), whereas the higher scoring PGY-1s (scores 460–492) improved their score by a smaller amount, 71 (range 33–105). This suggests that the improvement in scores for low-scoring residents occurred regardless of our educational intervention and is in line with the national average improvement in scores between PGY-1 and PGY-2.

Conclusions
These residents in our intervention group are the ones identified by Mastagh’ of being “at risk” for not passing the Certification Examination at their first attempt. Our educational intervention, however, did not clearly improve these residents’ scores on the ITE, though it may have been successful in raising the morale and the confidence of these “at-risk” residents. We plan to follow our intervention and control groups to monitor their performance on subsequent ITE and ABFP Certification Examinations. Before dismissing the potential benefits of this intervention, it could be beneficial to replicate it with a larger sample size and to repeat it in different settings.

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References