

Effect of Grade Point Average and Enrollment in a Dental Hygiene National Board Review Course on Student Performance on the National Board Examination

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Abstract: Passing the National Board Dental Hygiene Examination is a requirement for licensure in all but one state. There are a number of preparation courses for the examination sponsored by corporations and dental hygiene programs. The purpose of this study was to determine if taking a board review course significantly affected student performance on the board examination. Students from the last six dental hygiene classes at Baylor College of Dentistry (n=168) were divided into two groups depending on whether they took a particular review course. Mean entering college grade point averages (GPA), exiting dental hygiene program GPAs, and National Board scores were compared for the two groups using a t-test for independent samples ($p < 0.05$). No significant differences were found between the two groups for entering GPA and National Board scores. Exiting GPAs, however, were slightly higher for those not taking the course compared to those taking the course. In addition, a strong correlation (0.71, Pearson Correlation) was found between exiting GPA and National Board score. Exiting GPA was found to be a strong predictor of National Board performance. These results do not appear to support this program's participation in an external preparation course as a means of increasing students' performance on the National Board Dental Hygiene Examination.

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Researchers¹⁻⁷ have attempted to determine predictors of successful performance on the National Board Dental Hygiene Examination. Predictors studied have included a variety of grade point averages (GPA) such as high school,¹ entering cumulative,^{1,2} entering science,³ and the grade point average at a certain point within the dental hygiene program^{1,6} or in certain prerequisite courses.¹ Other predictors studied include the American College Test (ACT) scores,^{1,4} the Scholastic Aptitude Test (SAT),² age,¹ marital status,¹ dental assisting experience,⁵ performance on a mock board examination,⁶ and performance in an online nutrition course.⁷

At the University of Maryland, undergraduate (entering) science grade point average was the strongest predictor of performance on the National Dental Hygiene Board Examination when compared to overall GPA, the Dental Hygiene Aptitude Test Sci-

ence Section scores, and the scores received on the twenty-five minute personal interview.³ Other predictors were examined in a later study of three dental hygiene associate degree programs. The programs that participated attempted to determine if any of a number of the students' academic and demographic variables were useful in predicting a passing score on the National Board Dental Hygiene Examination.¹ High school GPA, cumulative college GPA, age, and marital status were not found to be useful predictors. The best predictors of pass or fail on this examination were the dental hygiene GPA and course performance in anatomy, psychology, sociology, and the social studies section of the ACT. ACT scores, however, were found to be a weak predictor of National Board performance in one study conducted at Baylor College of Dentistry.⁴ Although the ACT scores were a mild to moderate predictor of performance in five out of eleven years of the program, it

was not a strong or consistent predictor of performance on the National Board examination. The most recent study, conducted at the Medical College of Georgia, found incoming GPA to be significant in predicting National Board scores.² Incoming math/science GPA and SAT scores were not found to be predictors of performance on the National Board examination.

Although prior dental assisting experience was found to have a positive effect on students' initial clinical performance at the University of Arkansas, no significant differences were found for performance on the National Board.⁵ At Armstrong Atlantic University, final grades for nine dental hygiene courses taken before the administration of a previously released National Board examination used as a mock board had a greater positive influence on National Board Dental Hygiene Examination performance than the mock board.⁶ To explore the impact of computer technology, researchers at Clayton College & State University examined whether there was a difference in performance on National Boards between those students enrolled in an online nutrition course and those who took the course in the traditional format. The online course students did not perform better on the National Board examination than those who took the course on campus.⁷ In this same study, students' age was also not found to be a predictor of examination performance.

One possible method of preparing students for and increasing student performance on the National Board Dental Hygiene Examination is for students to enroll in an external review course. Currently, a wide variety of National Board review courses are marketed and presented to dental hygiene students each year. Because of the considerable expense involved in taking one of these commercially available review courses, students often seek faculty guidance in making the decision to enroll in one of them. Students may benefit from reviewing curricular content from another source. Sometimes students wish to enhance their self-confidence by confirming that they already know the required information. Occasionally, students may uncover an area of weakness in their understanding of a particular subject. One recent study of 118 graduates reported that 98 percent of those taking an external review course found it to be somewhat to most beneficial to them.⁸ It is unclear, however, if this benefit is enough to warrant the cost and time devoted to taking the course.

The purpose of this study was to:

1. Determine if enrolling in a particular review course affected student performance on the National Board compared to the performance of those not taking the course.
2. Forecast if entering grade point average was a predictor of performance on the National Board.
3. Confirm if exiting grade point average (dental hygiene GPA) was a predictor of performance on the National Board.

Materials and Methods

The Caruth School of Dental Hygiene is a baccalaureate program located within Baylor College of Dentistry. The names of the dental hygiene students who enrolled in a particular National Board review course over the previous six years (1998-2003) were obtained from the commercial company conducting the course and from the students ($n=61$). Those students were compared to the students from the same classes who did not take the review course ($n=107$) for differences in entering grade point average, exiting grade point average, and National Board Dental Hygiene Examination scores. Entering grade point average was defined as the cumulative college grade point average before enrollment in the dental hygiene program. Exiting grade point average was defined as the cumulative grade point average at graduation for dental hygiene program courses only. Grade point averages were obtained from the Office of Admissions and Records at Baylor College of Dentistry.

All students took the National Board examination. The students' first-attempt National Board scores, obtained from the American Dental Association, were analyzed. Comparisons were made using t-tests for independent samples. Students were then divided into quartiles according to their exiting grade point average. T-tests were applied to determine if National Board performance was significantly different for students in each quartile who took the review course compared to those who did not take the course. A Pearson Correlation Coefficient was used to determine if a relationship between entering grade point average and National Board performance, and exiting grade point average and National Board performance existed.

Results

The t-test for independent samples ($p < 0.05$) found no significant difference between the two overall groups (those who took the review course compared to those who did not) for entering grade point average or performance on the National Board examination (Table 1). There was a significant difference, however, between those who took the course compared to those who did not when exiting grade point averages were examined. Those who did not take the review course had a slight but significantly higher ($p < 0.05$) exiting grade point average than those who took the review course.

When students were divided into quartiles according to exiting grade point average, t-tests found no significant difference in National Board performance ($p < 0.05$) within each quartile for those who took the course and for those who did not take the course (Figure 1). In every grade group, however, the average score for students who took the review course was higher. These differences were more pronounced for the top half of the class. As seen in Figure 1, there was a strong correlation (0.71) between exiting grade point average and performance on the National Board examination.

Discussion

In our study, taking a board review course conducted by a commercial company was not found to significantly affect student performance on the National Board compared to those who did not take the course. In addition, entering GPA in our study was not found to be a predictor of National Board performance; this supports the findings of Shannon¹ but conflicts with those of Downey et al.² A strong cor-

relation was found, however, between exiting dental hygiene GPAs and performance on the National Board examination. Although this finding is limited to the dental hygiene students at Baylor College of Dentistry, this result confirms those of Shannon who found that dental hygiene GPA was one of the best predictors of success on the National Board Dental Hygiene Examination.¹

Many variables could affect student performance on the National Board examination and could not be controlled in this study. Students not taking the review course may have studied more hours than students taking the course and therefore performed similarly to those students taking the review course. Non-course students may have used more outside study materials, such as commercially available National Board review books, previously released National Board examinations, and/or the Procter and Gamble website, dentalcare.com, which contains case studies. Also, a student could have taken a different review course of which the faculty were unaware.

Even though taking the external review course did not enhance scores, there may be other positive effects from participating in such a course that this study did not examine. A review course may lessen the stress a student feels before and during the examination by means of the following:

- The review course could confirm what students already know, thereby putting them more at ease.
- Familiarity with the examination format may also lessen students' stress levels.
- Organizational and study skills suggestions presented in the course may also help lessen students' anxiety about their preparedness for the examination.

Conclusions

Exiting grade point average was found to be the strongest predictor of performance on the National Board examination in this study. Overall, students who took the review course did not perform better than those who did not take the course. In addition, there was no significant difference in performance between students who took the review course and those who did not when separated into quartiles according to exiting grade point average. Although not statistically significant, it does appear that when

Table 1. Mean values of all students taking the review course versus those not taking the course (1998-2003)

	Review Course	No Review Course
National Board Scores	84.02 ± 5.191	84.29 ± 5.023
Entering GPA	3.32 ± 0.35	3.38 ± 0.34
Exiting GPA	3.22 ± 0.40	3.36 ± 0.35

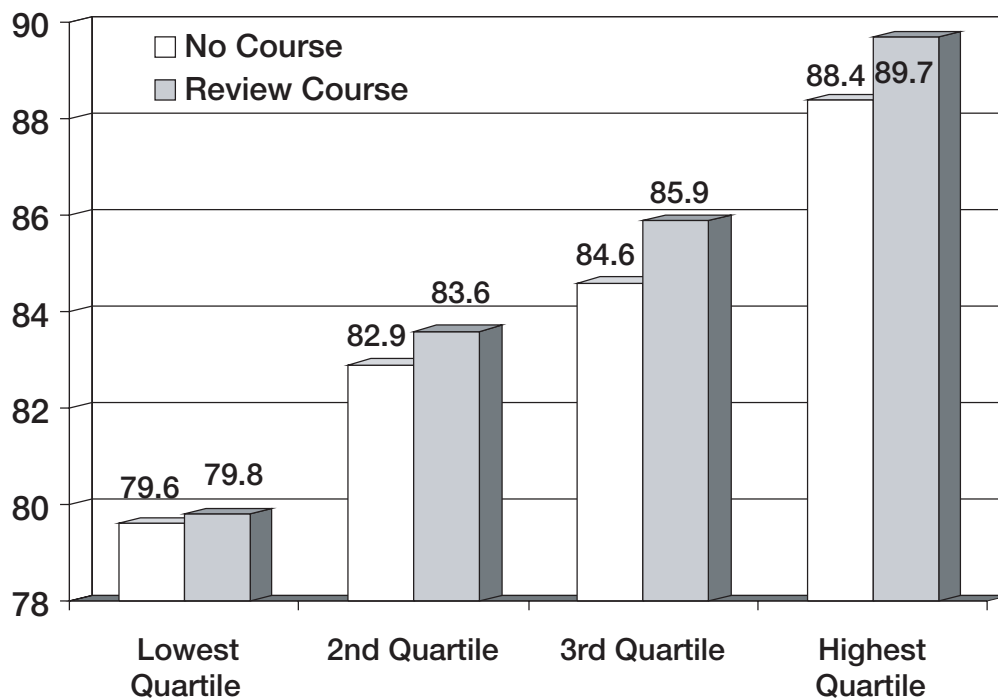


Figure 1. National Board Score by review course and rank in class

students were divided by quartiles, those who took the course did perform better. This improvement in performance, however, was more pronounced in the top half of the class.

From these results, it is questionable whether to recommend an external review course for our students as a means of improving their scores on the National Board Dental Hygiene Examination. Preparation courses, however, may be beneficial by lowering the stress students feel before and during the examination. Future research should focus on establishing credibility for the potential benefits provided by an external review course. In addition, future research efforts should focus on other possible predictors of success on the National Board examination that have not been previously examined. Some of these may include type and level of prerequisite courses for admission, high school rank, performance on a mock National Board examination and standardized tests such as the Scholastic Aptitude Test (SAT), or various state examinations such as the Texas Higher Education Assessment (THEA).

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