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Performance Outcomes Associated with Medical School Community Service

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Abstract

Background

Providing medical students with community service opportunities during medical school is believed to foster altruism. Little is known whether voluntary community service is associated with students' academic and clinical skill performance. This study examined the relationship between students' volunteer community service hours during medical school and their medical school academic performance, measures of clinical skills, and residency performance.

Method

Subjects were 2001 and 2002 graduates of the institution. Performance measures were: United States Medical Licensing Examination (USMLE) Step 2 score, grade point average, fourth-year clinical skills examination scores, and two types of residency director assessments. Associations between performance measures and community service hour categories were analyzed using descriptive statistics, chi-square, and *t*-tests.

Results

Students in the highest service group

(≥ 18.5 hours) had significantly higher grade point averages, USMLE Step 2 scores, and scores on both residency director assessment when compared to students with no community service hours.

Conclusions

Community service involvement in medical school appears associated with medical school academic and residency performances.

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Medical school admission committees select applicants largely for their academic abilities, but also for their potential to provide humanistic care to individuals and society.^{1,2} Recognizing the Association of American Medical College's (AAMC) Medical Schools Objectives Project³ four core attributes of physicians (altruism, knowledge, skill, and dutifulness), medical schools have begun to foster altruistic tendencies amongst their students through the creation of required/elective service learning elective experiences and/or provision of campus resources to facilitate voluntary community service.^{2,4-5} Formal, curriculum-based service learning opportunities occur within a structured learning environment in which community service is conducted following specific preparation and subsequent reflection upon the experience.⁶ In contrast, voluntary community service does not engage the learner in structured preparation, reflection, and service activity, but simply

provides the participant a venue for helping others.

Community service participation prior to medical school matriculation has been associated with greater participation in community service in medical school^{2,5} and primary care career choice.⁷ However, little research has explored the outcomes associated with community service participation during medical school. Recently, Brush et al.⁸ reported that levels of involvement in a required service learning experience are associated with class rank and election to Alpha Omega Alpha (AOA), but not with performance on Year 2 and Year 3 clinical skills examinations, election to the institution's Gold Humanism in Medicine Honor Society, or specialty choice. Their work provides an important first step in examining the outcomes of community service participation, but does so in the context of a required service learning environment and focuses only on medical school outcomes.

In 1993, the Medical University of South Carolina (MUSC) established a university-based community service office that provides students information about volunteer opportunities in the community. Service learning is not

required in the curriculum. Rather, students are encouraged to participate in community service if they are interested, and the office facilitates their involvement in a wide variety of voluntary community service activities. Students are requested to record their community service activities with the office, and students with the most number of community service hours are recognized each year. To examine whether students who provide more community service hours during medical school are academically stronger, exhibit better clinical skills, and/or are evaluated more positively by residency directors than their peers who provide none or few community service hours, this study examined the relationship between students' volunteer community service hours and their medical school academic performance, measures of clinical skills, and residency performance.

Method

For this study, the following measures were collected for graduates of the 2001 and 2002 classes. The institution's Institutional Review Board approved this study.

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Medical School Academic Performance Measures

Two variables composed the Medical School Academic Performance Measures: The United States Medical Licensing Examination (USMLE) Step 2 Clinical Knowledge (CK) scores and medical school grade point average (GPA). The USMLE Step 2 CK is administered at the institution following the students' completion of the third year of medical school and a passing score is required for graduation. Students' scores on the first attempt of USMLE Step 2 CK were used for this study. The GPA is a student's cumulative four-year grade point average for course work throughout medical school.

Medical School Clinical Skills Performance Measures

Two variables, a "checklist" score and an "interpersonal" score from the institution's required fourth-year clinical practice exam, composed the Medical School Clinical Skills Performance Measures. For 2001–2002 graduates, the study institution participated as a test site for the National Board of Medical Examiners (NBME) Step 2 Clinical Skills exam prototype. This prototype examination served as the institution's required beginning of fourth-year clinical practice exam (CPX) for those two years, administered in August of the respective fourth years. Each exam consisted of encounters with standardized patients that focused on history, physical examination, and communication skills. Students' interpersonal skills were also assessed. History, physical examination, and communication skills were documented using case-specific checklists. Interpersonal skills were assessed using two instruments: a 7-question Patient Perception Questionnaire and a 6-item Physical Examination Questionnaire. Both were scored on a 5-point scale (1 = poor to 5 = excellent) and were completed by the standardized patient after the encounters. Details of the institution's NBME prototype examination administration and station scoring, including transformation of station scores to a mean of 65 and a standard deviation of 10 to standardize scores across the two examination years, are described elsewhere.⁹ All analyses were conducted using the average interpersonal and checklist scores calculated from the

transformed station scores that were determined for each student.

Residency Performance Measures

The Residency Performance Measures consisted of a quartile ranking and an average of the six items on MUSC's residency director rating questionnaire. MUSC sends a residency director's evaluation questionnaire to each graduate's residency program director approximately 18 months after graduation. This questionnaire asks about the intern's performance in the six core competencies defined by the Accreditation Committee of Graduate Medical Education (ACGME): patient care, medical knowledge, practice-based learning, interpersonal and communication skills, professionalism, and systems-based practice using a 5-point scale (1 = lowest to 5 = highest). An average of these competency items for a student is reported as an "ACGME Competency Score." The questionnaire also asks the residency directors to give a global quartile ranking of the intern's performance compared with other interns (4 = highest quartile, 1 = lowest quartile).

Medical school community service hours

The total number of service hours recorded with the university-based community service office described above was calculated for each subject.

Premedical school GPA

To control for academic performance in medical school, premedical school GPA was gathered for each subject. Premedical GPA was included to adjust for the fact that premedical grades correlate highly with medical school grades. This was done in an effort to better isolate associations between medical school community service and medical school academic performance.

Analyses

The range of students' community service hours during medical school was large (0–697) and highly skewed, and therefore we created a categorical variable for service hours. The median number of total community service hours recorded during medical school among students with at least one hour of service was 18.5 hours. Students were then assigned to groups of "no service hours," "<18.5

hours," and "≥18.5 hours." For each performance measure, we calculated descriptive statistics or mean scores by community service group. Categorical distributions were analyzed using chi-square statistics and mean scores were compared using *t*-tests. To investigate the overall effect of service hour group on each performance measure, analyses of variance were conducted incorporating the premedical school GPA as a control variable.

Results

USMLE Step 2 CK scores and GPAs were available for 263 students. Fourth-year CPX scores (Checklist and Interpersonal) were available for 222 of these students. The response rate for the residency director's evaluation was 64% for the class of 2001 and 75% for the class of 2002; residency director evaluations were available for 169 students. Students with no community service hours were more likely to be male and more likely to be white than students in the group with the greatest community service (≥18.5 hours) (Table 1). There were no significant differences in premedical school GPA between the community service groups. The mean checklist and interpersonal scores from the fourth-year CPX were no different for students in the three community service groups. Students in the highest service group (≥18.5 hours) had significantly higher medical school GPAs, USMLE Step 2 CK scores, residency director ACGME ratings, and residency director quartile rankings when compared to students with no community service hours. Even after controlling for premedical school GPA, there was still a significant association between community service activity and Medical School GPA and USMLE Step 2 CK scores. Although there was not a significant difference between student service groups with respect to residency director ACGME ratings and residency director quartile rankings, there was a trend toward higher residency director ACGME ratings and quartile rankings among the students in the highest service group.

Discussion

Medical school admission committees attempt to select applicants with humanistic and altruistic tendencies, and medical schools frequently offer

Table 1

Demographic Percentages and Mean Scores (\pm Standard Deviation) for Students with No Community Service Hours, Less than the Median (1–18.4 Hours), and Greater than the Median (18.5 or More Hours)

	None	1–18.4 hours	≥ 18.5 hours	<i>p</i> Value (ANOVA)
Sample number (%)	105 (40%)	79 (30%)	79 (30%)	
Gender (% male) [†]	66.7%	57.0%	43.0%	
Race (% white) [†]	83.8%	72.2%	68.4%	
Premedical school GPA	3.40 \pm 0.34	3.44 \pm 0.39	3.43 \pm 0.35	
CS [‡] checklist score	64.8 \pm 4.86	63.9 \pm 5.50	65.9 \pm 4.87	0.1002
CS [‡] interpersonal score	65.0 \pm 5.64	64.2 \pm 5.16	65.3 \pm 4.98	0.4941
Medical school GPA	3.30 \pm 0.36	*3.39 \pm 0.32	*3.44 \pm 0.30	0.0104
USMLE-2 Clinical Knowledge	204.4 \pm 21.45	209.0 \pm 23.47	*215.5 \pm 21.6	0.0086
ACGME Competency Score [‡]	3.84 \pm 0.81	4.01 \pm 0.74	*4.08 \pm 0.73	0.3052
Quartile ranking [§]	2.98 \pm 1.01	3.24 \pm 0.91	*3.35 \pm 0.89	0.1747

ANOVA test adjusts for premedical school GPA.

* Significantly different from students with no community service hours (*t*-test, *p* < 0.05).

[†] Significant χ^2 distribution (*p* < 0.05).

[‡] ACGME Competency Score is the average of six categories in which residency directors rated the graduates in their programs (on a scale of 1-5).

[§] Quartile ranking is the quartile placement that these directors gave the graduates (4 is highest).

required/elective service learning experiences or other campus opportunities to facilitate students' participation in voluntary community service. Results from our study indicate that community service involvement during medical school is associated with overall medical school academic performance and residency performance. It does not appear to be associated directly with clinical skill performance during medical school.

Brush et al.⁸ examined students' levels of involvement in a required service learning context with students' academic performance, clinical skill performance, and specialty choice. Our results build upon those of Brush et al.⁸ in that we examined students' participation in community service as strictly volunteer activity, and not within a required service learning context. Additionally, we examined how levels of community service participation in medical school may be related to internship performance. Our results differ slightly from Brush et al.⁸ with respect to medical school performance in that we found that higher levels of community service involvement were associated with higher levels of academic achievement during medical school. Both studies found that increasing levels of community service are associated with higher class rank (GPA). However, Brush et al.⁸ found that students who were high participators in

service learning were overrepresented in the middle quartiles of class rank, concluding that these students made a choice to make service a priority and balance service learning activities with moderate, not exceptional, academic success. Our study found that students with higher levels of community service performed better in several important measures of academic success, including class rank (GPA), measure of clinical knowledge (USMLE Step 2 CK scores), and residency director ratings. One major difference between the two studies is that participation in community service at the study institution is a voluntary activity, not occurring within a required course. This situation results in a quasi-experimental design that should serve to magnify differences between students choosing or not choosing to perform community service.¹⁰

In our study, students with community service participation tended to have stronger academic performance than students with no community service involvement. While premedical GPA was not significantly different between students in the community service hour groups (none, <18.5 hours, >18.5 hours), when premedical GPA was controlled for, those students with more community service hours in medical school had a higher medical school GPA and USMLE Step 2 CK score. Thus, levels of involvement in community service

found amongst our students may likely be affected by academic abilities during medical school. Students who are stronger academically may find they have more time to provide community service and still maintain their academic success; students who are struggling academically may realize they need to devote time to their academics to succeed and not spend time engaged in community service activities.

Although the Brush et al.⁸ study and the present one found that students with higher involvement in community service had higher performance in some measures, both studies failed to show that students' participation in community service is related to objective measures of clinical skills, including interpersonal skills. We grant this appears counterintuitive, expecting that students inclined to greater community service would also demonstrate better interpersonal skills. Perhaps the measures of interpersonal skills assessed in clinical skills examinations are very constrained (focused), missing the correlation between community service and overall clinical performance as measured (in the present study) by GPA, (which includes small group participation grades in the preclinical years and clinical evaluations by residents and attendings in third year clerkships), and residency director ratings. Importantly, our results indicate that students' involvement with community service is related to their internship performances, as rated by residency directors in terms of both ACGME competencies and overall performance in comparison to their peers. It may be that community service involvement fosters aspects of professional development, such as altruism, dutifulness, and awareness of systems-based practice issues, that are carried forward into residency and enhances the graduates' overall internship abilities.

This study has several limitations. The study institution may be unique in that it provides students with support for community service activities through the presence of a campus community service office. Students have easy access to learn about community service opportunities and students are able to record their hours of participation in these activities on an ongoing basis. That students self-report their community service hours to

the institution's community service office is another study limitation. Some students may have engaged in more community service than they reported. However, the community service office stresses the advantages for students to provide accurate records in that the office presents awards based upon number of service hours performed and provides assistance with documentation for scholarship and residency application purposes. Additionally, the opportunity for students to record participation in community service on an ongoing basis and by number of hours served per each activity at a central office provides a setting where they are likely to be accurate with their service records. The study used existing office records that were not devised for research purposes, nor did it rely on subject recall of activity that could be inaccurate or biased. Furthermore, community service participation did not occur in a service learning context, and thus represents community service involvement in the spirit of volunteerism and not within the subtext of a required rotation.

The study results have notable implications for the medical school selection process. In previous research completed at this institution, we demonstrated that premedical school community service correlated with

community service hours completed during medical school.⁵ However, that study left the unanswered question of whether premedical school community service hours were a narrow predictor of medical school performance (i.e., future community service) or whether premedical school community service could serve as an important measure of noncognitive traits that also predicted better academic performance. Taken together, our previous study along with this one demonstrate that premedical school community service should receive emphasis in the selection process because it is associated with community service participation during medical school, and community service during medical school is associated with better medical school and residency performance.

In summary, medical students at this institution who performed greater numbers of community service hours during medical school were also more likely to have better medical school and residency academic performance as measured by medical school class rank (GPA), USMLE Step 2 CK scores, and residency director ratings.

References

- 1 McCurdy L, Good LD, Inui TS, et al. Fulfilling the social contract between medical

schools and the public. *Acad Med.* 1997;72:1063-70.

- 2 Elam CL, Stratton TD, Wiggs JS, et al. Gauging interest in community service: a retrospective review of admission files. *Acad Med.* 2002;77:S23-S25.
- 3 The Medical Objectives Writing Group. Report I of the Medical School Objectives Project. *Acad Med.* 1999;74:8-13.
- 4 Barzansky B, Etzel SI. Educational programs at US medical schools, 2002-2003. *JAMA.* 2003;289:1190-96.
- 5 Blue AV, Basco WT, Geesey ME, et al. How does pre-admission community service involvement compare with community service during medical school? *Teach Learn Med.* 2005;17:316-21.
- 6 Seifer SD. Service-learning: Community-campus partnerships for health professions education. *Acad Med.* 1998;73:273-7.
- 7 Owen JA, Gregory MS, Connors AF Jr. Can medical school admission committee members predict which applicants will choose primary care careers? *Acad Med.* 2002;77:344-9.
- 8 Brush DR, Markert RJ, Lazarus CJ. The relationship between service learning and medical student academic and professional outcomes. *Teach Learn Med.* 2006;18:9-13.
- 9 Taylor ML, Blue AV, Mainous AG III, Geesey ME, Basco WT. The relationship between the National Board of Medical Examiners' prototype of the Step 2 Clinical Skills exam and interns' performance. *Acad Med.* 2005;80:496-501.
- 10 Cook TD, Campbell DT. *Quasi-Experimentations: Design and Analysis Issues for Field Settings.* Boston: Houghton Mifflin, 1979.