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Effects of Enrollment in a Student-run Free Clinic Elective on Third Year Clerkship Evaluations and Grades

Abstract:
We retrospectively examined the association between enrollment in the student-run free clinic elective and University of California-San Diego (UCSD) medical student performance on third-year clinical rotations between 2012 and 2017. Free clinic participation was examined both as a binary variable and based on the total number of units taken (2, 4, and >4). Student performance was assessed using a standardized evaluation rubric that included the following seven categories for every rotation: medical knowledge (MK), clinical reasoning (CR), data gathering skills (DGS), communication of clinical data and medical information (CCD), interpersonal communication skills and humanistic qualities (ICS), professionalism (PRO), and potential as a resident in the discipline (POT). Evaluation scores were analyzed individually and as a composite score across each rotation discipline as well as chronologically over the school year. We found that enrollment in the free clinic elective had statistically significant associations with third year rotation evaluations and grades, which differed by clerkship. These findings show a novel method to assess the impact of medical school electives, particularly those with clinical exposure.

Background:
Medical education is constantly evolving to better train future physicians in the art of healthcare delivery. That training includes pre-clerkship electives that allow students early exposure to clinical settings, various specialties, and structured environments to learn and practice skills. Dedicated time outside of the core curriculum to pursue these interests is considered one of the major benefits of electives.[1–5] In the same manner as the core curriculum, electives are evaluated and reviewed to determine their impact, mostly through surveys and committee meetings.[2–12] One study at the University of Washington School of Medicine found that implementation of a new pre-clinical curriculum led to a significant improvement in clerkship performance.[13] However, few other studies have examined the impact of a specific teaching intervention, like an elective course, on students' overall clerkship performance.

A particular medical school elective that is gaining nationwide popularity is the student-run free clinic (SRFC).[7,14–16] At UCSD, the student-run free clinic elective immerses students in weekly face-to-face patient interactions, physical exams, presentations to attendings, and note-writing.[16] This experience provides students a pre-clerkship opportunity to work in a clinical environment that has similarities to future third-year rotations. Most studies on student-run free clinics have evaluated the quality of their patient care.[17–23] However, some studies have begun to quantify some of the benefits student-run free clinics confer onto students. They have shown that students gain skills and knowledge of underserved populations, transdisciplinary/interprofessional settings, medical teaching, and systems based learning.[6–8,10–12] One study showed that a majority of students perceived SRFC as a valuable educational experience.[10] This study, like most studies on medical student electives, was conducted using primarily survey-based evaluations and group discussions. Though this has become standard practice in determining the impact of a course, it is intrinsically limited to students' perceptions of knowledge/skills gained. To our knowledge, no

study has yet quantified the impact of a preclinical elective on overall performance in medical school clerkships. We sought to determine if enrollment in the UCSD SRFC elective was associated with student performance evaluations filled out by clerkship preceptors.

Definition:

In this study, we looked at the effect of the UCSD student-run free clinic elective on medical students' performance evaluations during third year. We hypothesized that early exposure to a clinical environment through the free clinic elective better prepares students for their third-year clinical rotations, as reflected by higher scores on rotation evaluations. Medical education plays a vital role to every physician's career, and quantifying the impact an educational component can aid in the formulation of future educational interventions. In this analysis, we examine the UCSD third-year student cohorts over five academic years: 2012-13, 2013-14, 2014-15, 2015-16, and 2016-17.

Methods:

Study design: This retrospective analysis used the results of a 7 category Likert-type grading scale used by UCSD School of Medicine and final course grades to evaluate the association between enrollment in the student-run free clinic elective and medical student academic performance.

Participants: Subjects included third-year medical students enrolled in clinical rotations at UCSD School of Medicine between 2012 and 2017. The primary exposure variable was enrollment in the free clinic elective.

Data Collection: All students who completed clinical rotations between 2012-2017 were included. Students' involvement in the free clinic elective between 2012-2016 was recorded. A third party completed data collection and anonymization so that investigators remained blinded to student identities.

Outcome of interest: The primary outcome was academic performance as measured by the final grade (Pass/Near Honors/Honors) for each core third-year rotation (Medicine, Surgery, Pediatrics, Obstetrics-Gynecology, Neurology, Psychiatry, and Primary Care Core Clerkship). Secondary outcomes included performance on the seven individual metrics that compose the Likert-type grading scale used by UCSD on its OASIS evaluation system: medical knowledge (MK), clinical reasoning (CR), data gathering skills (DGS), communication of clinical data and medical information (CCD), interpersonal communication skills and humanistic qualities (ICS), professionalism (PRO), and potential as a resident in the discipline (POT).

Statistical analyses: Univariate analysis comparing academic performance between students who were or were not enrolled in free clinic was completed using the Mann-Whitney U Test. Multivariate analysis was completed using ordinal logistic regression models. Covariates included total free clinic units, rotation order, and academic year.

Results: A total of 606 students were included in the study. 426 students had enrolled in at least 2 units of the free clinic elective, 118 students did not take the free clinic elective. Each student received a grade of Pass (P), Near Honors (NH), or Honors (H), in each of seven rotations for a total of 4,242 courses analyzed.

	Free Clinic Enrollment	
	No	**Yes**
Pass	693 (55.0%)	1448 (48.5%)
Near Honors	248 (19.7%)	670 (22.5%)
Honors	319 (25.3%)	864 (29.0%)
Total	***1260***	***2982***

In the planned primary analysis, we observed a significantly higher median rank of clinical grades (P, NH, H) for free clinic students relative to non-free clinic students (Mann-Whitney U Test $P<0.001$). Students enrolled in any form of free clinic elective had significantly increased odds of high clerkship grades compared to their non-free clinic counterparts (odds ratio = 1.24, 95% confidence interval 1.11-1.43).

Secondary analysis of individual rotations showed differential effects of free clinic enrollment. In the Pediatrics rotation, free clinic students had higher median scores in the following grading categories: POT, PRO, ICS, CCD, DGS, and MK. The Medicine rotation showed higher median score values in ICS and CCD. The Reproductive Medicine rotation showed higher median score values in ICS and CCD. Surgery, Primary Care, Psychiatry, and Neurology showed no significant difference between the individual category scores of the two groups, though all individually had a significant increase in grades within the rotation alone. A comparison of overall scores in all rotations showed a significantly higher median value in the categories of POT, PRO, ICS, and CCD. Rotation order was analyzed and during their first rotation the free clinic group had a significantly higher median score in PRO.

Discussion: Among UCSD third-year medical students, those who participated in the free clinic elective(s) had increased odds of a high final rotation grade compared to their non-free clinic counterparts. Medical school electives are implemented with the goal of improving student exposure, experience, skill set, and knowledge base. Whether an elective has a measurable impact in these areas can be hard to prove. However, in this study we demonstrated statistically significant differences in clerkship performance between students who took the elective and those who did not. Previous studies relied on pre- and post- surveys to evaluate the effectiveness of electives, which does not necessarily represent actual clinical performance. To our knowledge, our study was the first to examine the impact of a preclinical medical school elective on subsequent clerkship performance.

Our study had some limitations, including the lack of demographic information and other possible confounding variables (e.g. other electives taken, academic performance prior to free clinic elective, varying free clinic positions). Though these variables are important to consider,

they were intentionally excluded to protect anonymity of the students within the study. Additionally, this study was retrospective and conducted at a single institution, which may limit the generalizability of the results.

We believe that going forward, evaluation of clinical performance in medical school after an elective can help determine the impact of an individual course. Future studies can aggregate data from multiple institutions and include demographic information to assess the generalizability of this association.

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