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Original Study

A Retrospective Study on the Influence of Participation at a Student-Run Free Clinic on Medical Specialty Choice

Cynthia Y Tang[1]; George Win[1]; Samantha Unangst, MD[1]; Tricia Haynes, MD, MS[1]; Brittany Pendergraft, MD, MS[1]; Kaystin Weisenberger, MD, MS, MA[1]; Adrienne Ohler, PhD[2]; Natalie Long, MD[3]; Laine Young-Walker, MD[4]

[1]School of Medicine, University of Missouri, Columbia, Missouri, USA
[2]Child Health Research Institute, University of Missouri, Columbia, Missouri, USA
[3]Department of Family and Community Medicine, University of Missouri, Columbia, Missouri, USA
[4]Department of Psychiatry, University of Missouri, Columbia, Missouri, USA

Corresponding Author: Laine Young-Walker; email: youngwalkerl@health.missouri.edu

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Abstract

Background: The MedZou Community Health Clinic at the University of Missouri School of Medicine is a student-run free clinic (SRFC) providing primary care and specialty services to uninsured patients of Missouri. Little is published about the relationship of volunteerism in SRFCs and residency match results. This study evaluated the association of SRFC volunteering on residency placement. We hypothesized that there would be an increased likelihood of medical students matching into specialties correlating with specialty clinics they volunteered with as students.
Methods: We analyzed data on volunteers who graduated from the University of Missouri School of Medicine between 2010-2019 in this retrospective study. Selection criteria included students who permitted publishing their residency match results publicly and actively volunteered for MedZou (at least five volunteer shifts). Odds ratios (OR) were calculated with Fisher exact tests using a confidence interval (CI) of 95% to assess whether volunteering in a specialty clinic was associated with matching in that specialty. Clinics with at least five volunteers during the study period were analyzed (Dermatology, Musculoskeletal [MSK], and Neurology).
Results: Twenty-nine percent of the MedZou volunteers that fit the inclusion criteria volunteered for the Dermatology, MSK, or Neurology Clinic. We found significant associations between those who volunteered in a specialty clinic and those who matched in a related specialty for Dermatology (OR = 4.25, 95% CI = 1.37, 12.13), Musculoskeletal (OR = 3.49, 95% CI = 1.45, 7.98), and Neurology Clinics (OR = 10.89, CI = 1.71, 50.39). Additionally, 51% of MedZou volunteers that fit inclusion criteria volunteered for Primary Care Clinic. These students were also found to have a significant association with matching into a related primary care specialty (OR= 2.01, CI= 1.14, 3.62).
Conclusions: The results of this study indicated that clinical exposure at a SRFC specialty clinic was associated with residency match into related specialties.

Introduction

The MedZou Community Health Clinic is a faculty-sponsored medical clinic that is run by volunteer medical students, residents, and faculty at the University of Missouri (MU) in Columbia, Missouri. MedZou has been successfully operating for over 10 years and has since expanded to 8 different specialty clinics and services. The diversity of specialty clinics offered through MedZou provides a unique opportunity to explore whether volunteering with a specific specialty clinic during medical school has an association with the specialty a student may pursue for residency.

As of 2014, there were 208 reported SRFC sites in the United States.[1] SRFCs provide unique opportunities for medical students to expand their education and training, increase their experience

and exposure to underserved patients, and potentially diversify their medical school classes.[2-5] To date, most studies focus on the association between SRFC involvement and primary care specialty choice, which include Family Medicine, Internal Medicine, and Pediatrics. Overall, studies have reported no association between student involvement and primary care specialty choice.[6-8] The Keeping Neighbors in Good Health through Service clinic of the University of Central Florida and Clinica Esperanza of the University of Tennessee Health Science Center found no association,[6,7] and the Clinica Tepati of University of California Davis is the only published study showing that the majority of their student volunteers (96.5%) entered a primary care specialty.[9]

All published studies agree that medical students who volunteer with SRFCs generally found their involvement to be a valuable educational experience. The associated increase in educational value encompasses a connection to a sense of purpose, improved sense of well-being, more favorable attitudes towards the underserved, and earlier clinical experience.[4,5,10,11] Thus, while the value of volunteering in SRFCs is clear, the association between volunteering in specialty clinics and residency match is unknown. We explore this association in this study.

Methods

Data Collection

This study examined the relationship between medical students at the MU School of Medicine in Columbia, Missouri from the graduating classes of 2010-2019 who actively volunteered in MedZou specialty SRFCs (defined as at least five volunteer shifts) and successfully matched into specialties related to a specialty SRFC they volunteered in.

MedZou operates weekly as a general clinic and has expanded to eight other specialty clinics, including Dermatology, Diabetes, Ophthalmology, Musculoskeletal, Psychiatry, Neurology, Transgender Health Clinic, and Women's Health Clinic. This study focused on the three largest specialty clinics available at MedZou that included over five volunteers during the timeframe included in this analysis for the classes of 2010-2019: Dermatology, Musculoskeletal, and Neurology. Thus, while MedZou offers a variety of specialty services, "Specialty Clinics" in this study is defined as involvement in Dermatology, Musculoskeletal, and Neurology clinics.

Residency Match areas were grouped based on specialty clinic offerings and included Dermatology, Musculoskeletal (Physical Medicine & Rehabilitation, Orthopedic surgery), Neurology (Neurology specialties, Neurosurgery), and Primary Care (Family Medicine, Internal Medicine, and Pediatrics). All other specialties including Psychiatry, Anesthesiology, Emergency Medicine, Obstetrics and Gynecology, Ophthalmology, other surgical specialties not listed, Pathology, and Radiology were grouped into an "Other" category, as these areas are not adequately represented by our available specialty clinics (less than five volunteers or no available specialty clinic). Data regarding volunteers for Psychiatry, Ophthalmology, and Women's Health clinics were not adequate for analysis.

Students may have had leadership positions which included Clinic Director, Clinic Manager, Education Coordinator, Patient Liaison, Volunteer Coordinator, and various Chair positions including Fundraising, Grant Writing, Inventory, Quality Improvement, Research, and Specialty Clinic Chairs among others. Leadership positions typically required students to have more responsibilities such as scheduling, fundraising, and recruitment of volunteers. These leadership positions did not require additional in-clinic responsibilities for those who possessed these roles.

Criteria for Selection

Records of all students who had signed up to volunteer from the class of 2010 to class of 2019 were recorded in Microsoft SharePoint 2019 (Microsoft Corporation, Washington). These records were initially screened for availability of match data, as students have the option to withhold their match data from the public. Eighty-two MedZou volunteers did not have public match data and these students were, therefore, excluded from the study. The average number of volunteer shifts completed by this group of excluded students was 8 (Standard Deviation [SD] = 8.07). However, only 1.81% of this group volunteered for one of the specialty clinics included in this analysis (Table 1). Thus, excluding them is less likely to lead to bias in our final analysis. MedZou

and the MU School of Medicine defines an active MedZou volunteer as a student that volunteers for at least five shifts (regardless of if the clinic is a primary care or specialty clinic) in their tenure as a medical student. Students with fewer than five recorded volunteer shifts were also excluded from analysis (n=337). The average number of volunteer shifts completed by students with fewer than five shifts was 1.71 shifts (SD = 1.43). Of these students, 1.38% participated in one of the specialty clinics included in our analysis, and the large majority matched into Primary Care or "Other" Specialty described in this section (Table 2). Thus, similar to the exclusion of the students without public match data, exclusion of those who volunteered for fewer than five shifts are less likely to lead to bias in our final analysis. A student who participated in at least five volunteer shifts and multiple different specialty clinics were counted as volunteers in multiple specialty clinics. After screening for exclusion criteria, 463 student records were included in analysis (Figure 1). This study has been determined as exempt and approved by the MU Institutional Review Board.

Analysis

Statistics were completed in RStudio Team (2015).[12] Fishers exact tests were used to analyze specialty volunteers matching into respective residencies. The following associations were tested by odds ratios: volunteering with a particular specialty clinic (yes or no) and match in the associated residency specialty (yes or no). We hypothesized that the odds of matching with Dermatology residency increase for those individuals who volunteered in a MedZou Dermatology clinic. Odds ratios were calculated with a 95% confidence interval (CI). A CI excluding the value of 1 was considered significant.

Table 1. Specialty clinic distribution of students without match results (n = 16 students)

Specialty Clinic Volunteer	n	Percent of All MedZou Volunteers*
Dermatology Team Volunteer	8	0.91
Musculoskeletal Team Volunteer	2	0.68
Neurology Team Volunteer	2	0.23
Total Specialty Clinic Volunteers†	16	1.81

**All MedZou Volunteers: N = 882*
†Students may volunteer for more than 1 specialty clinic.

Table 2. Residency match and specialty clinic distribution of students with less than 5 volunteer shifts (n = 337 Students)

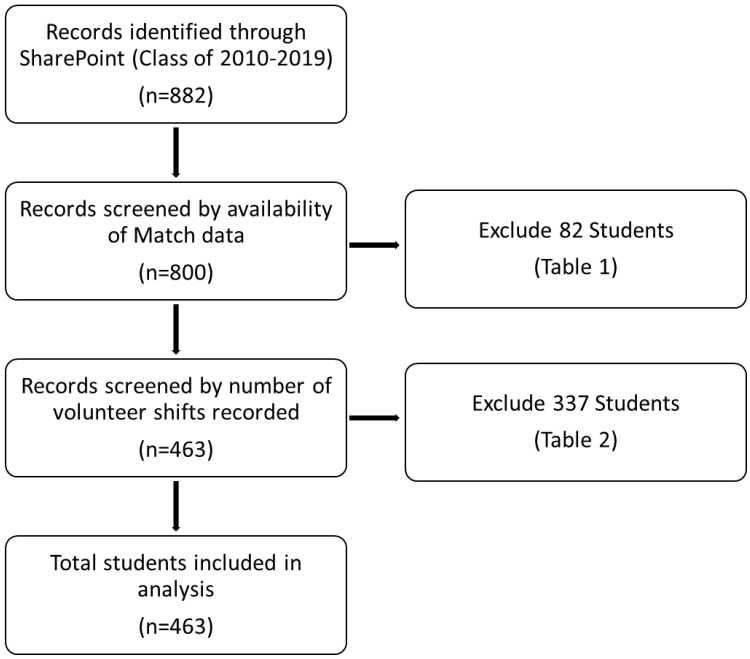
Characteristic	n	Percent of MedZou Volunteers*
Residency Match		
Primary Care	160	20.00
Neurology	6	0.75
Musculoskeletal	21	2.63
Dermatology	7	0.88
Other	143	17.88
Total	337	42.13
Specialty Clinic Volunteer		
Dermatology Team	2	0.25
Musculoskeletal Team	4	0.50
Neurology Team	4	0.50
Total Specialty Clinic Volunteers†	11	1.38

**All MedZou Volunteers: N = 880 (After exclusion of students who chose not to report match results)*
†Students may volunteer for more than 1 specialty clinic.

Results

Of the 463 student records analyzed for this study, 121 students (26.00%) held a leadership position. The average number of volunteer shifts completed by volunteers was 12.20 shifts (SD = 7.84). Table 3 shows the distribution of students matching into the specialties analyzed in this study, as well as the number of students volunteering for each specialty clinic. The number of volunteers involved in the remaining specialty clinics were three for Psychiatry (matched into Neurology, Psychiatry, and Dermatology), one for Ophthalmology (matched into Ophthalmology), and three for Women's Health (matched into Psychiatry, Medicine-Pediatrics, and Internal Medicine). Due to their low sample sizes, they were not included in the analyses. Table 4

Figure 1. Flow diagram of student selection



demonstrates the match rates into each specialty by volunteers for the respective specialty clinic.

We found that the majority (51.19%) of students who volunteered with MedZou matched into a Primary Care specialty. Of the students who volunteered with MedZou, we found a significant association between the students who volunteered with the Dermatology (OR = 4.25, 95% CI = 1.37, 12.13), Musculoskeletal (OR = 3.49, 95% CI = 1.45, 7.98), and Neurology Clinics (OR = 10.89, CI = 1.71, 50.39) and those who matched in the corresponding specialties (Dermatology, PM&R or Orthopedic Surgery, and Neurology or Neurological Surgery, respectively) (Table 4). We also found a significant association between those who volunteered with primary care-related activities (defined above) and those who matched into a primary care-related specialty (OR = 2.01, 95% CI = 1.14, 3.62). In addition to analyzing our primary objectives, we also analyzed whether students who held leadership positions at MedZou matched with a particular specialty area for residency and found no association (OR = 1.18, 95% CI = 0.79, 1.78). Additionally, we found that of the student volunteers with match data in the Dermatology, Musculoskeletal, and Neurology clinics, the Neurology clinic (15/15 = 100.00%) had the highest percentage of students who were active (participating in at least five shifts) as volunteers, followed by Dermatology (57/59 = 96.60%) and Musculoskeletal (63/67 = 94.00%).

Due to their low sample sizes, they were not included in the analyses. Table 4 demonstrates the match rates into each specialty by volunteers for the respective specialty clinic.

Discussion

Summary

Specialty clinics as part of SRFCs are a valuable resource to both the community and to medical trainees. This study is the first to show an association between volunteering for specialty clinics and subsequent pursuit of these specialties for residency.

Overall, these findings suggest benefit for medical schools to continue supporting SRFCs that already have specialty clinics or are considering expanding to offer specialty services. Specialty clinics are an opportunity for medical students to gain exposure and experience in their specialties of interest, which may have some in-

Table 3. Residency match and specialty clinic distribution

Characteristic	n	Percent of MedZou Volunteers*
Residency Match		
Primary Care	237	51.19
Neurology	13	2.81
Musculoskeletal	32	6.91
Dermatology	19	4.10
Other	162	34.99
Total	463	100.00
Specialty Clinic Volunteer		
Dermatology	57	12.31
Musculoskeletal	63	13.61
Neurology	15	3.24
Total Specialty Clinic Volunteers†	135	29.16

**All MedZou Volunteers: N = 882*
†*Students may volunteer for more than 1 specialty clinic.*

Table 4. Specialty clinic volunteers matching into respective fields

Specialty	Odds Ratio	95% Confidence Interval	P-value*
Dermatology	4.25	1.37-12.13	0.0061
Musculoskeletal	3.49	1.45-7.98	0.0026
Neurology	10.89	1.71-50.39	0.0063
Primary Care	2.01	1.14-3.62	0.01

**P<0.05 is considered statistically significant*

fluence in career choice. Exposure to underserved patients in SRFCs early in a student's medical training not only grants additional training opportunities for students, but also potentially influences attitudes and behaviors of medical students throughout their training.[13] Most students who volunteer with specialty clinics at MedZou do so during their pre-clinical years, providing them with an opportunity to gain exposure and experience in different specialties. This experience may have influenced student interests in the specialty they chose.

Limitations

The findings of this study must be viewed in light of possible limitations. As the medical students who participate at MedZou voluntarily share their chosen residency programs, the data presented in this study is subject to a reporting bias, as well as underreporting. Additionally, because MedZou has evolved and expanded since its inception, there may be inconsistencies in the method of data collection and reporting. This is especially relevant to the Ophthalmology Clinic as it has been around since 2012. The number of volunteer records was not sufficient to perform analyses for Women's Health, Ophthalmology, and Psychiatry clinics. We also recognize that the clinic has a high volunteer turnover rate due to the nature of medical training and the sample size of individuals who met inclusion and exclusion criteria were limited. Individuals who were active volunteers and participated in different specialty clinic shifts, regardless of number of specialty clinic shifts, were counted as volunteers of multiple specialty clinics and served as a limitation in our sample.

Furthermore, we recognize that many Family Medicine, Internal Medicine, and Pediatrics residents go on to specialize in various fields, and this is not captured in our analysis. As this study only analyzed medical students who attended MU School of Medicine, a medical school in Columbia, Missouri, a medical school in which 40% of the class matches into a primary care specialty, this is a limitation to this study. Conclusions regarding the increased likelihood of Dermatology student volunteers with match data being active volunteers could potentially be due to higher student satisfaction of the experiences at MedZou Dermatology clinic, as this clinic allows for students to assist in more procedures such as skin biopsies and removal of foreign bodies compared to other MedZou clinics. Additionally, the Neurology Clinic volunteers had a smaller sample size (n = 15) compared to Musculoskeletal (n = 63) and Dermatology Clinic volunteers (n = 57) with match data, so this could potentially contribute to the reduced likelihood of Neurology student volunteers becoming active volunteers. Finally, because this is a retrospective study, we are unable to draw conclusions of causation. However, the positive as- sociations

drawn from our results illustrate the value of participation at and provision of specialty clinics in SRFCs, regardless of whether participation confirms or inspires specialty interests.

Future studies

Future prospective cohort studies will focus on whether participation in specialty clinics has an influence on career choice. To better address the limitations of exclusively analyzing medical students from our institution, analysis of specialty clinic volunteers from different medical schools and their match results would be beneficial in providing further insight in the external validity of this study. To better address limitations regarding the variability of specialty clinic volunteering experiences between volunteers in different specialty clinics, we will collect student feedback by surveying their initial specialty interests prior to volunteering for MedZou, as well as their experiences as a volunteer in specialty clinics, which may provide more clarity on the relationship between specialty clinic volunteering and matching into similar specialties.

In summary, this retrospective study demonstrates that clinical exposure at a SRFC specialty clinic was associated with residency match into related specialties. The results from this study will help inform decisions regarding the value of adding specialty clinics for existing SRFCs.

Disclosures

The authors have no conflicts of interest to disclose.

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