Professional Impact of the DMU Predoctoral OMM Fellowship

Gabriel Berenbeim, OMS IV; Megan Ellis, OMS IV; Kaitlyn Finneran, OMS IV; Isaac Metzler, OMS IV; Drew Lewis, DO, FAAO; Chunfa Jie, PhD

ORIGINAL RESEARCH

Abstract

Context: Predoctoral Osteopathic Manual Medicine Fellowships (pOMMFs) are an additional year of medical training that frequently involve direct patient care, educating medical students, and research. Research has supported that a pOMMF can increase student satisfaction with, and understanding of, Osteopathic Manual Medicine (OMM) curriculum at their respective medical institution. In the interest of identifying programs that improve OMM utilization in practice and promote osteopathic leaders in medicine, pOMMFs might play a significant role. Overall, there is little known research on pOMMFs.

Objective(s): To investigate the impact of the Des Moines University (DMU) pOMMF on the medical and professional careers of its graduates.

Methods: A 26-question survey to be completed online was sent to 88 graduates of the DMU pOMMF who represented graduating classes from 1979 to 2020. The survey contained a combination of Likert scale, yes-no, and free text questions. Statistical analysis included descriptive statistics, Chi-square test of goodness-of-fit, and simultaneous 95% confidence intervals. Free text was qualitatively analyzed for recurrent themes.

Results: Out of 61 respondents, 90.2% of participants reported that the pOMMF significantly improved their ability to teach medical students and residents, along with 77.1% of participants teaching residents/attendings OMM during residency. Of those eligible, 79.2% of alumni held at least one of the following leadership positions: chief resident, clinical preceptor, department chair, medical director. Most participants (83.6%) report providing OMT to their patients, along with 80.7% of respondents attributing the fellowship to significantly improving their ability to incorporate OMT into their medical practice.

Conclusion: The study supports that the DMU pOMMF may create positive downstream effects in the medical careers of its graduates by providing abundant teaching opportunities, encouraging leadership roles, and promoting the utilization of OMT within residency and future practice. Graduates drew from the DMU pOMMF experiences to promote their medical and professional careers. Limitations include potential selection bias and inability to establish causal effect without a control population of non-pOMMF graduates from DMU or other institutions. Further research could corroborate these findings by investigating other pOMMFs and compare responses to non-pOMMF osteopathic medicine graduates.

From Des Moines University College of Osteopathic Medicine in Des Moines, IA.

Disclosures: none reported.

Correspondence address:
Drew D. Lewis, DO, FAAO
Des Moines University
College of Osteopathic Medicine
3200 Grand Avenue, Des Moines, IA 50312
(515) 326-0675
drew.d.lewis@dmu.edu

Submitted for publication May 7, 2021; manuscript accepted for publication August 4, 2021; final revised received January 24, 2022.

Keywords: predoctoral fellowships, osteopathic manual medicine, predoctoral programs, medical school, leadership, teaching, OMM fellowship, OMT

Introduction

Founded by Andrew Taylor Still, MD, DO, osteopathy is one of the most common forms of medicine practiced today.[1] Osteopathy, in part, entails manipulating the patient's tissues with the hands of the physician to help the structure of the body assume optimal function to resolve or amend the patient's medical concerns.

Despite osteopathic medical schools' dedication to providing this unique training, a study[2] in 2003 revealed over 75% of D.O. physicians in Ohio do not provide osteopathic manipulative treatment (OMT) and 2021 Healy et al[3] reported that almost 57% of D.O. physicians nationally do not provide OMT to their patient population. A barrier to providing OMT was identified as having received less than satisfactory OMT training in their clinical years and residency.[3-6] These findings raise concerns for the training of future osteopathic physicians.

After graduating medical school, osteopathic alumni can go on to pursue a wide variety of medical specialties, fellowships, and leadership positions. Post-doctoral fellowships have been shown to have the following benefits at host institutions: positive impact on junior learners through academic curriculum, reputational benefits of hosting a fellowship program, and increased productivity for both academics and clinics.[7] Physicians who complete a post-doctoral fellowship program have been found to acquire the skills necessary to be physician-faculty including educating residents and medical students, providing clinical primary care, and conducting

continued on page 19

continued from page 18

research.[7] Graduates of post-doctoral fellowship programs have also been found to provide higher quality care, obtain higher clinical performance measurements compared to peers, and be recruited for academic positions.[8]

Medical education relies on the presence of teaching hospitals and medical schools staffed with educational leaders to help train future physicians.[9] Post-doctoral medical education fellowship programs have increased in number over the last 20 years as medical standards and practice have changed.[9] Completing an educational fellowship has been shown to impact a graduate's confidence, personal identity, and self-efficacy while teaching, ultimately allowing fellowship graduates to better meet the needs of junior learners.[10] This adaptability and skillset have been shown to support fellowship graduates' professional development, which is often centered around leadership roles in medical education. The presence of educational fellowships benefits medical education and institutions as graduates of these programs become innovative leaders in teaching excellence.[9]

Unlike the effects of post-doctoral and educational fellowships, little research has been done on the outcomes of pre-doctoral fellowships. In the United States, pre-doctoral OMM fellowships (pOMMFs) are offered in 24 of the 34 colleges of osteopathic medicine[11] consisting of an additional year of medical training that frequently involves direct patient care and educating medical students on the utilization of OMM. However, some pOMMFs do not involve direct patient care and are solely teaching focused. The average pOMMF time allocated for teaching was 51% across programs.[11] The majority of pOMMFs select 4 participants per year, with an average fellow to medical student ratio of 1:46.

The Des Moines University (DMU) pOMMF was established in 1977. The authors of this study characterize the DMU pOMM fellows' time as being allocated to approximately 50% teaching, 46% patient care, and 4% research. DMU pOMM fellows gain experience creating and delivering lectures to a medical student population of approximately 440. The organization of OMM labs and examinations require direct collaboration between the fellows and department curriculum committee. Hosting informational presentations regarding osteopathy for matriculating medical students and undergraduate pre-health students is commonly performed throughout the course of their training. Participants of the DMU pOMMF are encouraged to conduct original research projects and case study write-ups. In addition to the previously discussed responsibilities, fellows work alongside physician faculty as they treat patients and demonstrate how to efficiently and effectively utilize OMT in a patient encounter.

A survey study conducted by the Touro University College of Osteopathic Medicine-California (TUCOM-CA) revealed medical students attributed the presence of predoctoral OMM fellows to having higher satisfaction with, and understanding of, the OMM curriculum.[12] It also revealed that students reported a greater likelihood of using OMM in their future clinical practice if the student received OMT from an OMM fellow during their school year. This research sheds light on the benefits that a pOMMF can have on osteopathic medical students and the medical school curriculum; the study did not investigate the impact the fellowship had on its graduates.

The objective of this study was to investigate the impact of the DMU pOMMF on the medical and professional careers of its graduates. Based on the research surrounding post-doctoral and educational fellowships, we hypothesized that completing the DMU pOMMF would positively impact the medical careers of graduates by enhancing teaching skills, leadership skills, research skills, applications for residency, and the use of OMT.

Methods

This was a descriptive survey study. A 26-question survey to be completed online was sent to 88 graduates of the DMU pOMMF who represented graduating classes from 1979 to 2020. A contact list was utilized to send an email explaining the study protocol with an attached survey link.

The survey contained a combination of Likert scale, yes-no, and free text questions. No monetary incentive was offered for participation, and responses were kept anonymous. No personal identifiers were collected. Computer software Qualtrics (version XM, https://www.qualtrics.com) was used to create and distribute the survey.

Descriptive statistics, including frequency, were used to detail results. The Chi-square test of goodness-of-fit was used to assess the equal distributions of different response categories. Simultaneous 95% confidence intervals (CI) for multinomial proportions were created using the function MultinomCI of package DescTools of R platform (version 4.0.3, https://cran.r-project.org/).

Free-text responses were qualitatively analyzed into major themes. Responses were independently read by four researchers. Major themes were identified by individual researchers and then corroborated among the research team. Themes were included if the frequency of occurrence was greater than 35%. Inclusion criteria was met if a free-text response included a keyword such as "teaching," "leadership," "confidence," or "OMT," and the context of the sentence was equally relevant to the question. Patient care was further defined as participants mentioning the words "medical care," "patient care," or "impact on their patients." A single free-text response could contain more than one major theme.

IRB Approval #2020-30 was obtained from the DMU Research Dept. on September 28, 2020.

Results

Demographics

The participant response rate was 69.3%, with 61 out of 88 completing the online survey. Family Medicine, Physical Medicine and Rehabilitation, and NMM/OMM were the top three most frequent specialties practiced by the participants (Table 1 and Figure 1). The majority of participants reported working in a medical practice that takes place in both inpatient and outpatient settings (45.7%), while 40.7% work in out-patient only, and 13.6% work in an inpatient only setting (Table 2 and Figure 2*).*

continued on page 21

Table 1. *Graduates' field of medicine (n=61). Responses to a multiselect, multiple-choice question.*

Field of Medicine	Frequency	Percent
Family Medicine	22	28.6%
Physical Medicine & Rehabilitation	13	16.9%
NMM/OMM (ONMM)	11	14.3%
Other	8	10.4%
Orthopedics	4	5.2%
OB/GYN	4	5.2%
Pediatrics	4	5.2%
Surgery	3	3.9%
Emergency Medicine	3	3.9%
Internal Medicine	2	2.6%
Anesthesia	2	2.6%
Critical Care	1	1.3%

Figure 1. *Graduates' field of medicine (n=61). Bar graph indicating graduates' field of medicine. PM&R, physical medicine and rehabilitation.*

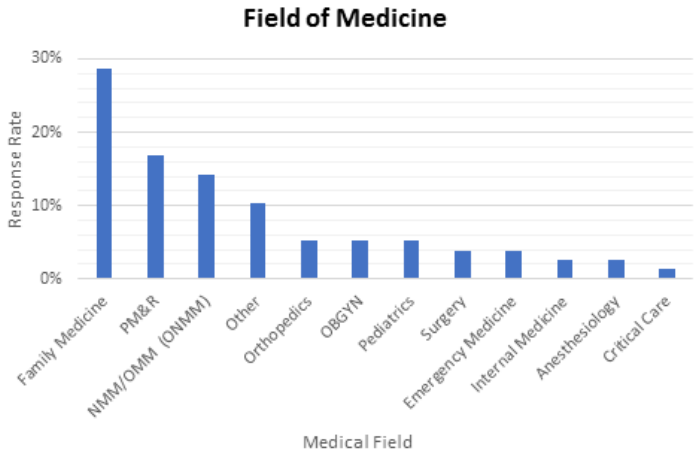
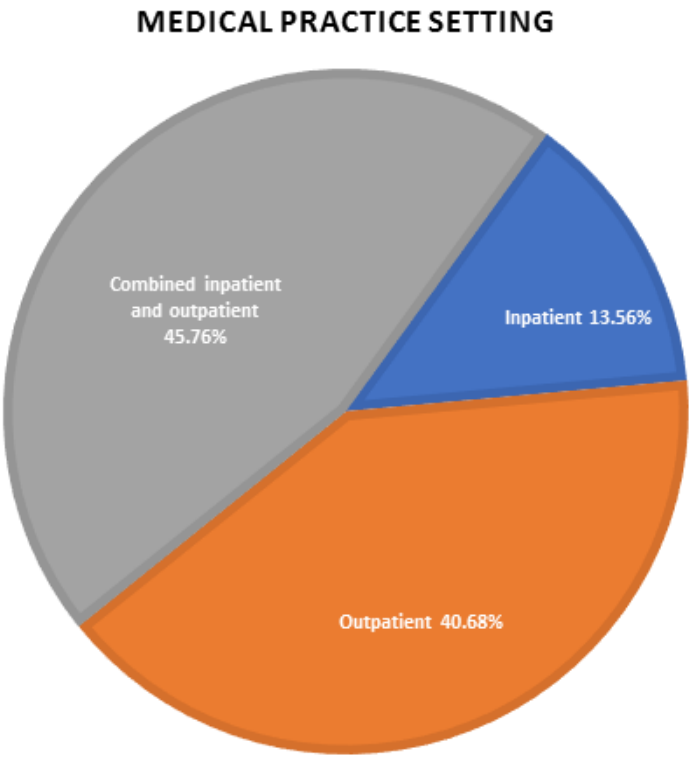


Table 2. *Distribution of graduates' type of medical practice (n=59). Responses to a single-select multiple-choice question.*

Type of Medical Practice Setting	Frequency	Percent
Inpatient	8	13.6%
Outpatient	24	40.7%
Combination of Inpatient and Outpatient	27	45.7%

Figure 2. *Pie Chart of Medical Practice Setting. Showing inpatient vs outpatient practice setting.*



continued from page 19

Teaching

Participants reported that the pOMMF had a significant impact on their perceived comfort giving a lecture (86.9%), comfort leading a workshop (80.3%), teaching medical students or residents (90.2%), and innovating new teaching strategies (52.5%) (Table 3 and Figure 3).

The question "How has the fellowship been used as a springboard for success in your medical career?" was analyzed for common themes. Independent analysis from each researcher led to a consensus that revealed a total of 5 major themes. Analysis showed that 58.3% of free-text responses indicated that teaching experience during the pOMMF was used as a springboard for success in graduates' medical careers, and 47.9% of free-text responses indicated leadership experience as a major theme (Table 4).

Residency

Table 5 and Figure 4 represent responses to survey questions investigating the impact that the DMU pOMMF had on various aspects of graduates' application to residency programs and residency experience. Questions 2 and 5 included the responses

continued on page 23

Table 3. *Responses to the question: To what extent did the OMM Fellowship impact the following teaching skills? (n=61). Four distinct single select multiple-choice questions.*

Teaching Skills	No Improvement		Minimal Improvement		Moderate Improvement		Significant Improvement	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Comfort giving a lecture	0	0%	2	3.3%	6	9.8%	53	86.9%
Comfort leading a workshop	2	3.3%	2	3.3%	8	13.1%	49	80.3%
Teaching medical students or residents	0	0&	0	0	6	9.8%	55	90.2%
Innovating new teaching strategies	3	4.9%	9	14.8%	17	27.9%	32	52.5%

Figure 3. *The pOMMF impact on teaching skills (n=61): Likert scale questions with 95% simultaneous confidence intervals. Goodness of fit chi-square for equal distribution p < 0.001 for teaching skills 1-4.*

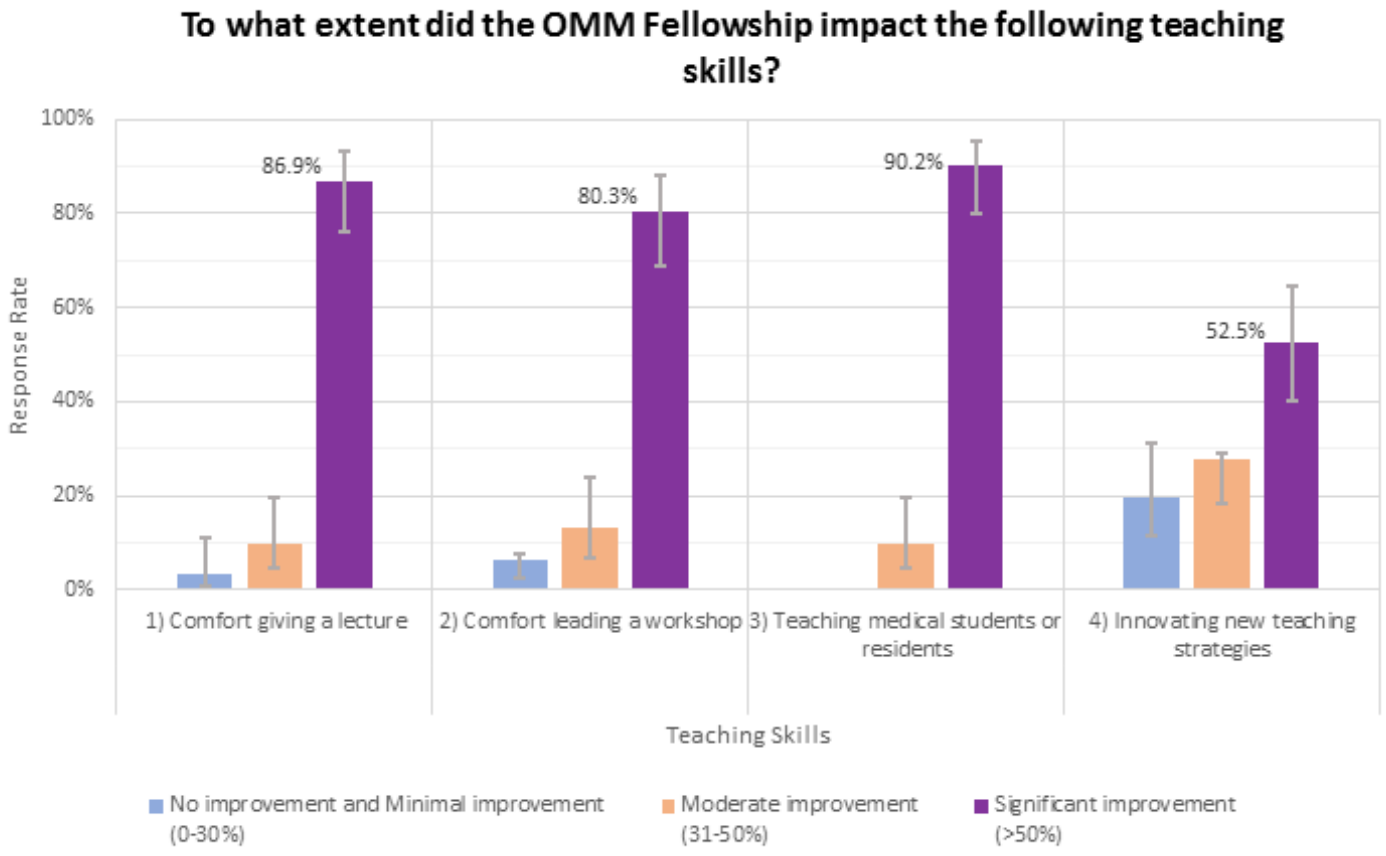


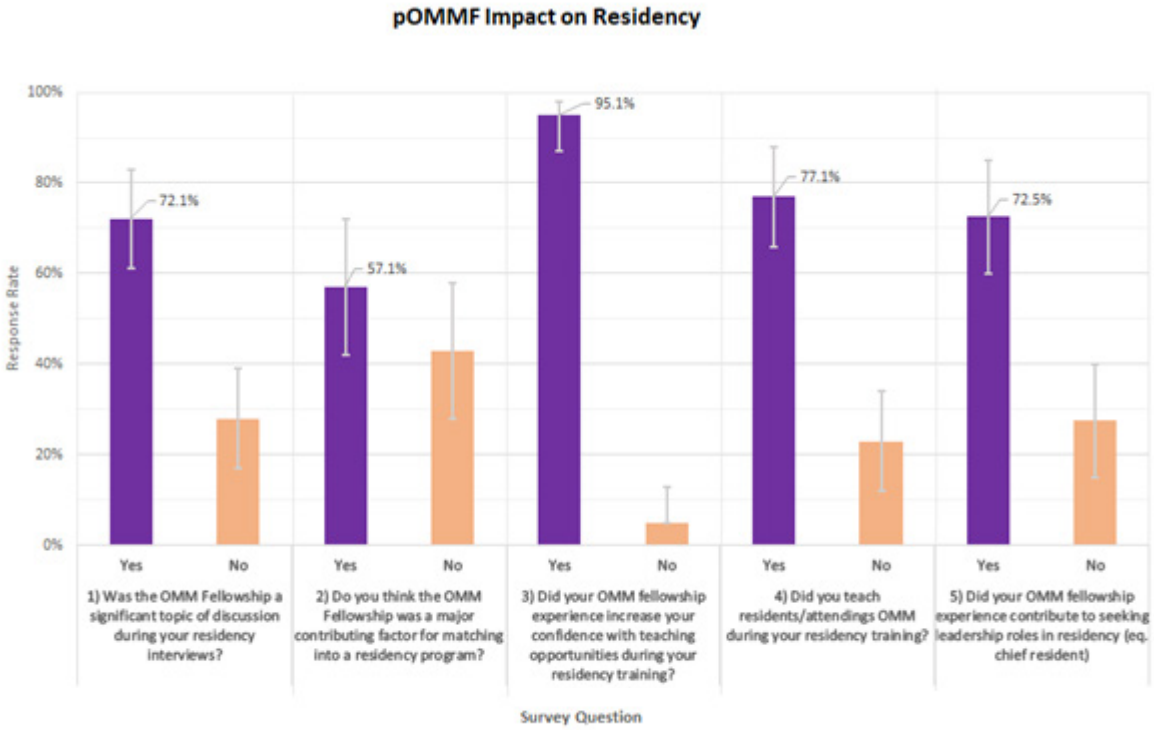
Table 4. *Analysis of free-text responses (n=48) to the question below includes frequency of major themes found in free-text responses. One free-text response could contain more than one theme.*

How has the OMM Fellowship been used as a springboard for success in your medical career?		
Major themes	**Frequency**	**Percent**
Teaching experience	28	58.3%
Leadership experience	23	47.9%
Patient care	20	41.7%
Confidence	19	39.6%
Use and incorporation of OMT	17	35.4%

Table 5. *Residency related questions (n=61), except 2 (n=51) and 5 (n=42). Questions 1, 3, and 4 were distinct yes-no questions. Questions 2 and 5, were yes-maybe-no questions in the survey, but the maybe answers were excluded in our results because such an answer was not deemed a definitive answer to the question.*

Survey Question	Yes		No	
	Frequency	**Percent**	**Frequency**	**Percent**
1. Was the OMM Fellowship a significant topic of discussion during your residency interviews?	44	72.1%	17	27.9%
2. Do you think the OMM Fellowship was a major contributing factor for matching into a residency program?	24	57.1%	18	42.9%
3. Did your OMM fellowship experience increase your confidence with teaching opportunities during your residency training?	58	95.1%	3	4.9%
4. Did you teach residents/attendings OMM during your residency training?	47	77.1%	14	23.0%
5. Did your OMM fellowship experience contribute to seeking leadership roles in residency (eq. chief resident)?	37	72.5%	14	27.5%

Figure 4. *Residency related questions (n=61), except 2 (n=51) and 5 (n=42). Questions 1, 3, and 4 were distinct yes-no questions. Questions 2 and 5, were yes-no-maybe questions in the survey, but the maybe answers were excluded in our results because such an answer was not deemed a definitive answer to the question. 95% simultaneous confidence intervals included. Goodness of fit chi-square for equal distribution p < 0.001 for questions 1-5.*



continued from page 21

of "yes," "no," and "maybe," and participant responses of "maybe" for these questions were excluded because they were not deemed definitive answers.

The majority of DMU pOMMF graduates (72.1%) indicated the fellowship was a significant topic of discussion during their residency interview. Just over half (57.1%) of the respondents perceived that the pOMMF was a major contributing factor for matching into a residency program. Continuing with the topic of residency, 58 individuals reported that the pOMMF increased their confidence with teaching opportunities during their residency training, while only 3 reported that it did not increase their confidence. The majority of graduates (77.1%) reported that they taught OMM to other residents and attendings during their residency training (Table 5 and Figure 4).

Table 6 shows that a majority of participants reported significant improvement in the following six medical skills: performing a pertinent physical examination (73.8%), performing a neurological examination (70.5%), palpation (96.7%), osteopathic manipulative techniques (98.4%), communication with patients (70.5%), and ability to work with patients with chronic pain (62.3%). Most participants chose either moderate (mod) improvement or significant (sig) improvement for the following medical skills: history taking (mod 54.1%; sig 34.4%), communicating imaging and laboratory results (mod 36.1%; sig 32.8%), providing a diagnosis (mod 47.5%; sig 32.8%), and developing a medical plan (mod 46.7%; sig 35.0%).

Leadership

Graduates were asked to indicate leadership positions that they currently hold or have held in the past. Responses to leadership roles were filtered based on participants' eligibility to hold a chief resident position in a 3-year residency program by 2020. A list of four influential leadership positions and their frequency were included in Table 7. A total of 79.2% of respondents reported holding at least one of the four leadership roles (Chief Resident, Clinical Preceptor, Department Chair, Medical Director). Additionally, 54.2% have held at least two of the leadership roles mentioned.

When participants were asked "Do you think completing the OMM fellowship increased the likelihood you sought leadership roles?" the majority of graduates (79.5%) responded yes (Table 8). Graduates attributed the DMU pOMMF to either moderate or significant improvement in the following personal attributes: a lifelong learner (mod 34.4%; sig 54.1%), resiliency (mod 39.3%; sig 45.9%), adaptability (mod 34.4%; sig 55.7%), and confidence in self (mod 27.9%; sig 67.2%) (Table 9 and Figure 5).

Participants attributed the pOMMF to significantly improving the following four leadership skills: working as a team player (60.7%), group communication (60.7%), lead by example (63.9%), and reliability (55.7%). Project planning was reported to have been moderately improved (42.6%) and significantly improved (42.6%) by the pOMMF (Table 10 and Figure 6).

continued on page 25

Table 6. *Responses to the question: To what extent did the OMM Fellowship impact the following medical skills? (n=61), except 8 (n=60). Ten distinct single select multiple-choice questions with 95% simultaneous confidence intervals. Goodness of fit chi-square for equal distribution p < 0.001.*

Medical Skills	No Improvement			Minimal Improvement			Moderate Improvement			Significant Improvement		
	f	%	CI	f	%	CI	f	%	CI	f	%	CI
1. History taking	0			7	11.5%	(3.5-19.5)	33	54.1%	(41.6-66.6)	21	34.4%	(22.5-46.2)
2. Performing a pertinent physical examination	0			3	4.9%	(1.7-13.5)	13	21.3%	(12.9-33.1)	45	73.8%	(61.6-83.2)
3. Performing a neurological examination	0			3	4.9%	(1.7-13.5)	15	24.6%	(15.5-36.7)	43	70.5%	(58.1-80.4)
4. Palpation	0			0			2	3.3%	(0.9-11.2)	59	96.7%	(88.8-99.1)
5. Osteopathic manipulative techniques	0			0			1	1.6%	(0.3-8.7)	60	98.4%	(91.3-99.1)
6. Communicating imaging and laboratory results	2	3.3%	(0.9-11.2)	17	27.9%	(18.2-40.2)	22	36.1%	(25.2-48.6)	20	32.8%	(22.2-45.2)
7. Providing a diagnosis	0			12	19.7%	(9.7-29.6)	29	(47.5)	(35.0-60.1)	20	(32.8)	(21.0-44.6)
8. Developing a medical plan	0			11	18.3%	(10.6-29.9)	28	(46.7)	(34.6-59.1)	21	(35.0)	(24.2-47.6)
9. Communication with patients	0			2	3.3%	(0.9-11.2)	16	(26.2)	(16.8-38.4)	43	(70.5)	(58.1-80.4)
10. Ability to work with patients with chronic pain	0			4	6.6%	(2.6-15.7)	19	(31.2)	(20.9-43.6)	38	(62.3)	(49.7-73.4)

Table 7. *Leadership positions held (n=48). The table represents eligible alumni (n=48) that held the following leadership positions: chief resident, clinical preceptor, department chair, medical director. Responses to leadership roles were filtered based on participant eligibility to be at least a chief resident in a 3-year residency program by 2020.*

	Chief Resident		Clinical Preceptor		Department Chair		Medical Director	
	f	%	f	%	f	%	f	%
Leadership Roles	25	52.1%	26	54.2%	11	22.9%	14	29.2%

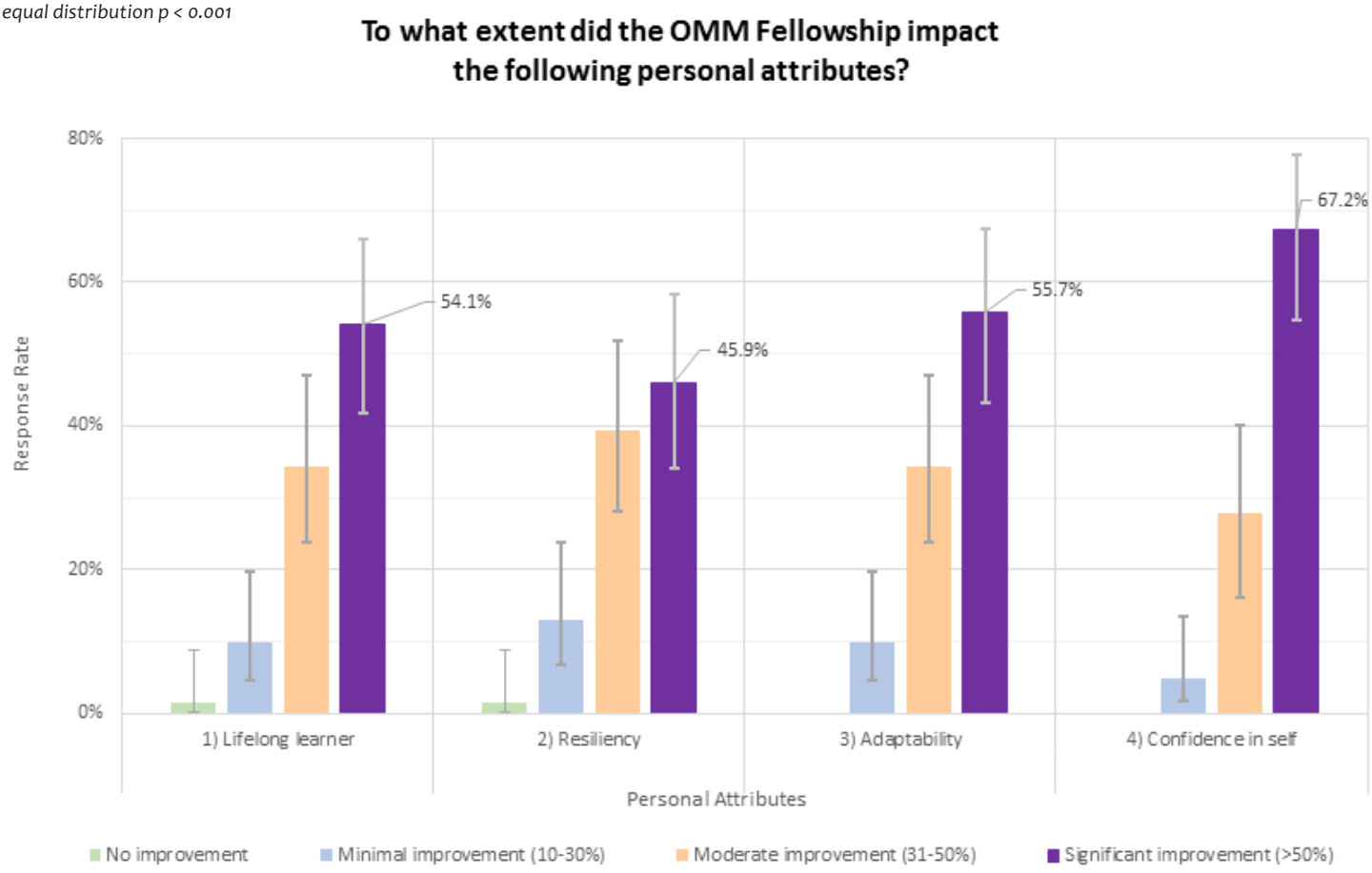
Table 8. *Seeking leadership roles (n=44). Yes-no responses to the survey question. This question was a yes-maybe-no question in the survey with 95% simultaneous confidence intervals. The maybe answers were excluded in our results due to the inability to ascertain why the individual chose maybe over yes or no. Goodness of fit chi-square for equal distribution p < 0.001*

	Yes			Clinical Preceptor		
	f	%	CI	f	%	CI
Do you think completing the OMM fellowship increased the likelihood you sought leadership roles?	35	79.5%	(67.6-91.5)	9	20.5%	(8.5-32.4)

Table 9. *Responses to the question: To what extent did the OMM Fellowship impact the following personal attributes? (n=61). Four distinct single select multiple-choice questions.*

Teaching Skills	No Improvement		Minimal Improvement		Moderate Improvement		Significant Improvement	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
1. Lifelong learner	1	1.6%	6	9.8%	21	34.4%	33	54.1%
2. Resiliency	1	1.6%	8	13.1%	24	39.3%	28	45.9%
3. Adaptability	0		6	9.8%	21	34.4%	34	55.7%
4. Confidence in self	0		3	4.9%	17	27.9%	41	67.2%

Figure 5. *Personal attributes (n=61). Four distinct single-select multiple-choice questions with 95% simultaneous confidence intervals. Goodness of fit chi-square for equal distribution p < 0.001*



continued from page 23

Research

Participants perceived that the pOMMF had no improvement on the following research skills: planning research (56.7%), conducting research (55.0%), and publishing research (58.3%) (Table 11 and Figure 7).

OMM Utilization

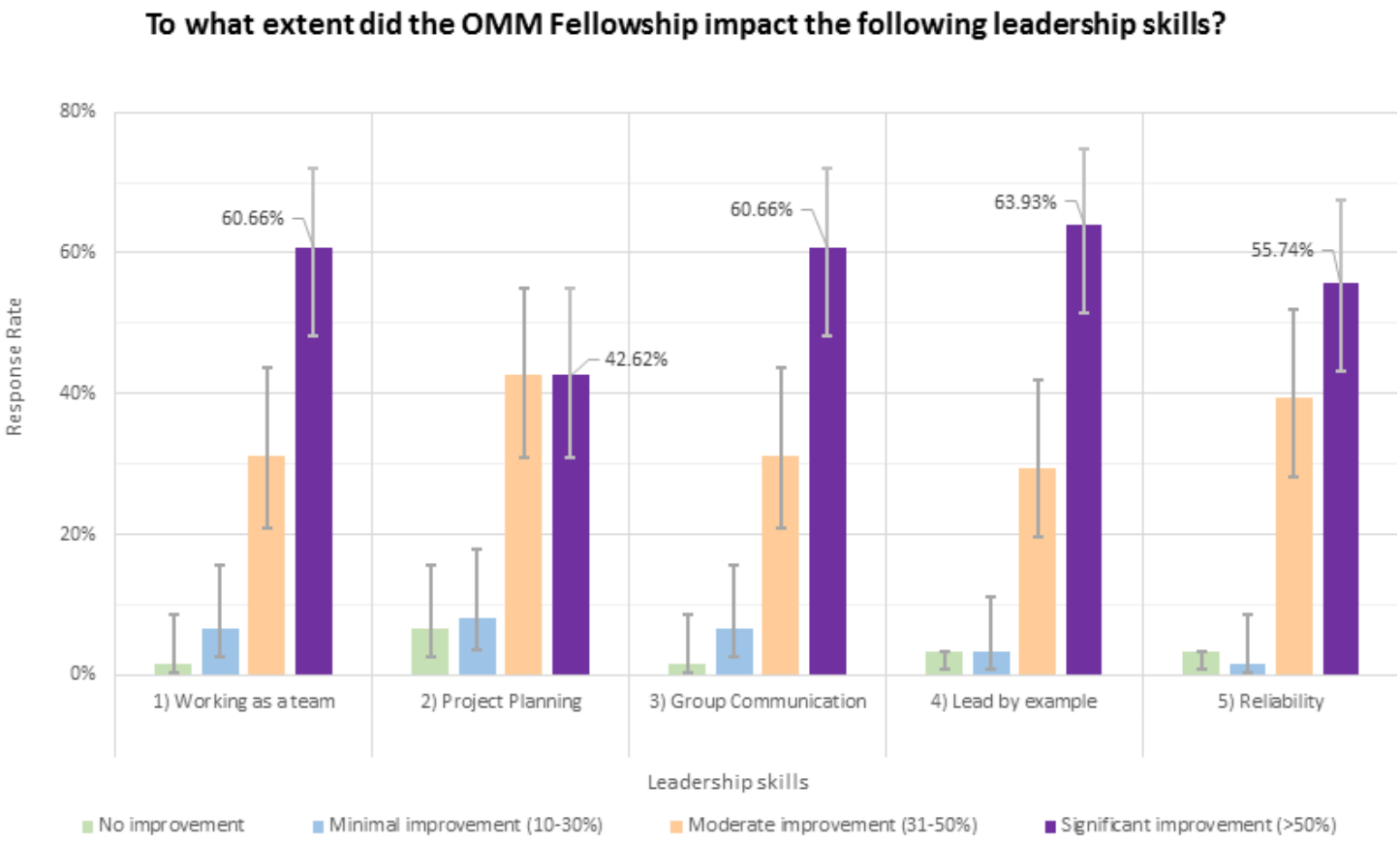
A total of 80.7% of the pOMMF graduates attribute the fellowship to significantly improving their ability to incorporate OMT into their medical practice (Table 12 and Figure 8). A total of 83.6% of graduates report providing at least some OMT to patients in their current practice (Table 13 and Figure 9). A breakdown of the degree to which they provide patients OMT revealed 50.8%

continued on page 26

Table 10. *Responses to the question: To what extent did the OMM Fellowship impact the following leadership skills? (n=61). Five distinct single-select multiple-choice questions.*

Leadership Skills	No Improvement		Minimal Improvement		Moderate Improvement		Significant Improvement	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
1. Working as a team	1	1.6%	4	6.6%	19	31.2%	37	60.7%
2. Project Planning	4	6.6%	5	8.2%	26	42.6%	26	42.6%
3. Group Communication	1	1.6%	4	6.6%	19	31.2%	37	60.7%
4. Lead by example	2	3.3%	2	3.3%	18	29.5%	39	63.9%
5. Reliability	2	3.3%	1	1.6%	24	39.3%	34	55.7%

Figure 6. *Leadership Skills (n=61). Four distinct single-select multiple-choice questions with 95% simultaneous confidence intervals. Goodness of fit chi-square for equal distribution p < 0.001*



continued from page 25

provide 1-25% of their patient population OMT, 16.4% provide 26-50% of their patient population OMT, 4.9% provide 51-75% of their patient population OMT, and 11.5% provide 76-100% of their patient population OMT.

Participants were asked "Please describe how the OMM Fellowship influenced the use of OMT in your practice." The most common major theme analyzed from written responses pertained to confidence in using or providing OMT (42.7%) (Table 14).

Discussion

Teaching

While pOMMFs differ slightly, an emphasis on teaching is central to these programs as the fellows are tasked with teaching OMM to medical students.[11,12] Accordingly, our research supports that pOMMFs improved the graduates' perception of their teaching capabilities, and the data suggests that the teaching experiences played a significantly positive role in molding their professional careers.

continued on page 28

Table 11. *Responses to the question: To what extent did the OMM Fellowship impact the following research skills? (n=60). Three distinct single-select multiple-choice questions.*

Research Skills	No Improvement		Minimal Improvement		Moderate Improvement		Significant Improvement	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Planning research	34	56.7%	14	23.3%	6	10.0%	6	10.0%
Conducting research	33	55.0%	19	31.7%	2	3.3%	6	10.0%
Publishing research	35	58.3%	13	21.7%	6	10.0%	6	10.0%

Figure 7. *pOMMF impact on research skills (n=60). Likert scale questions with 95% simultaneous confidence intervals. Goodness of fit chi-square for equal distribution p < 0.001 for research skills 1-3.*

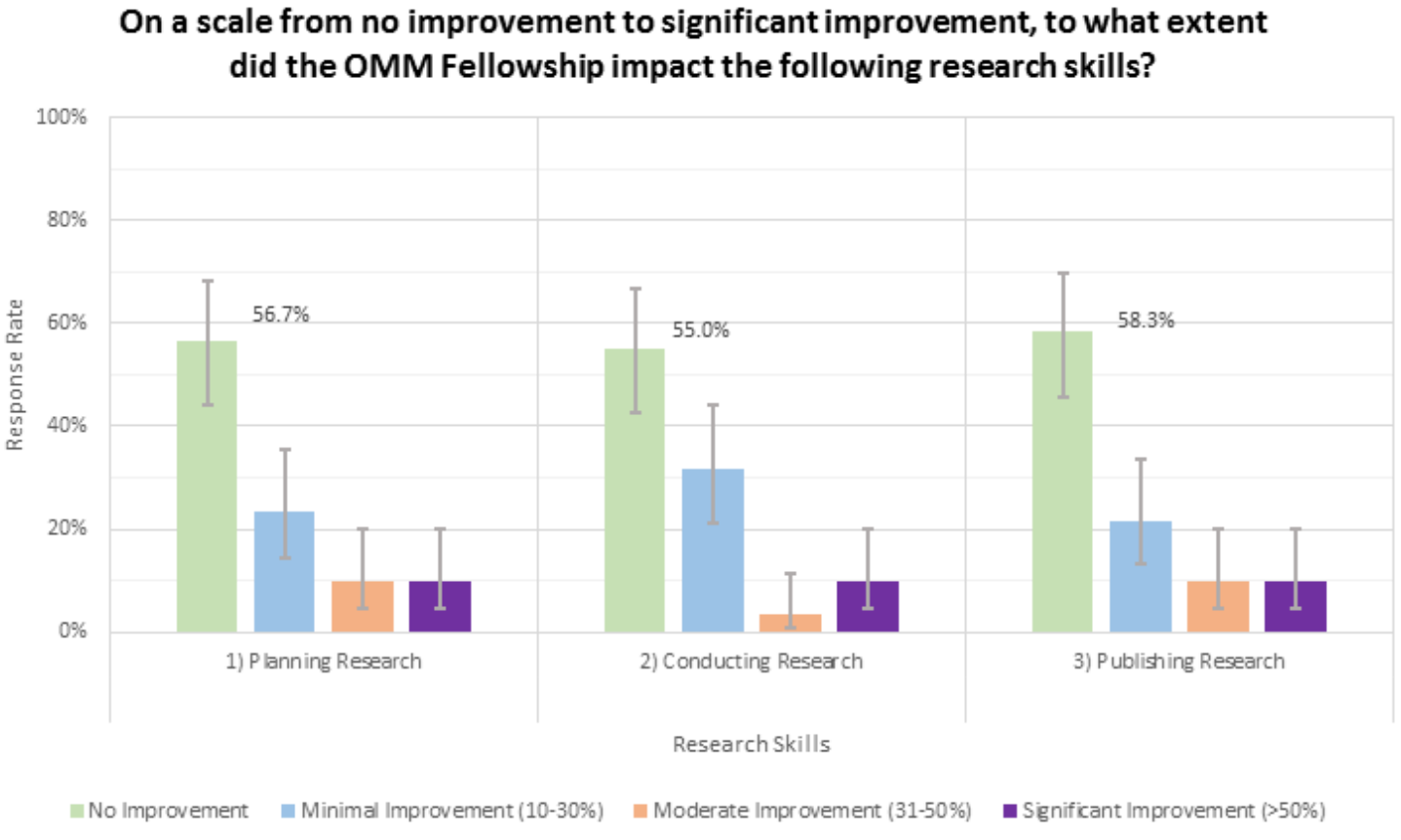


Table 12. *Responses to the question: To what extent did the OMM Fellowship improve your ability to incorporate OMT into your practice? (n=57). Responses to single-select multiple-choice survey question.*

	No Improvement		Minimal Improvement		Moderate Improvement		Significant Improvement	
	Frequency	Percent	Frequency	Percent	Frequency	Percent	Frequency	Percent
Incorporate OMT Into Your Practice	2	3.5%	2	3.5%	7	12.3%	46	80.7%

Figure 8. *Incorporating OMT into practice (n=61). Likert scale question with 95% simultaneous confidence intervals. Goodness of fit chi-square for equal distribution p < 0.001.*

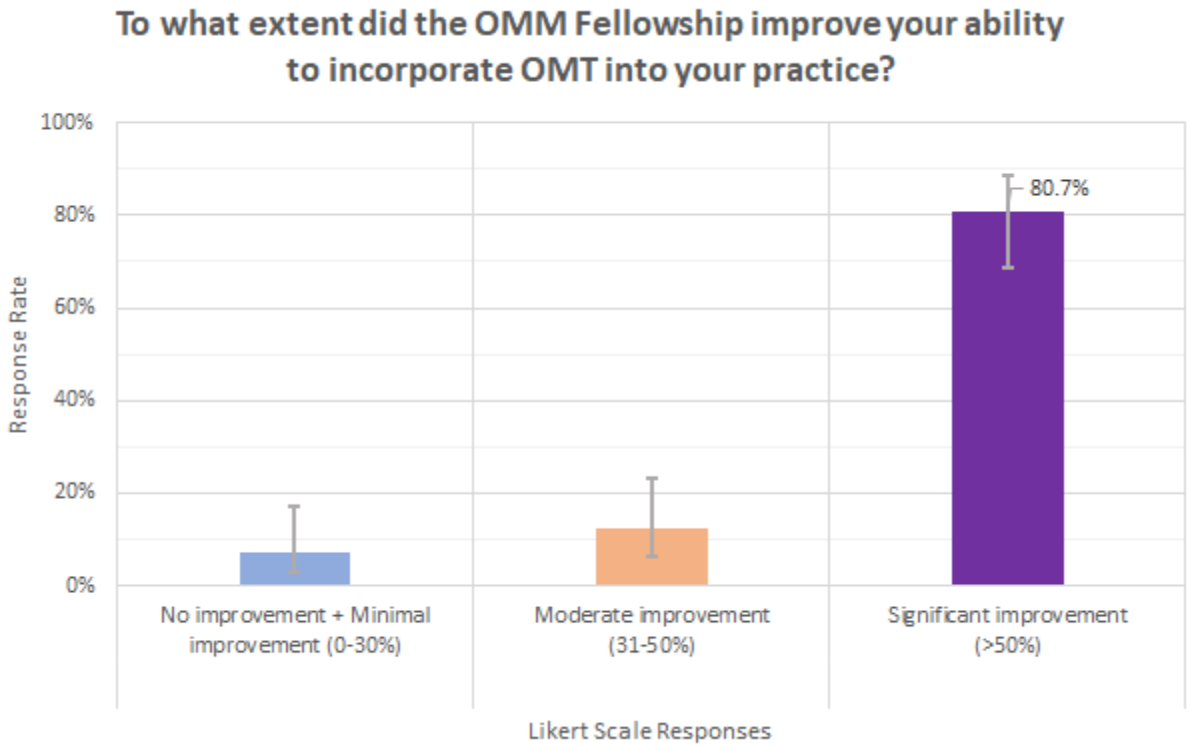


Table 13. *Responses to the question: To what extent did the OMM Fellowship impact the following research skills? (n=60). Three distinct single-select multiple-choice questions.*

Category	Frequency	Percent
I do not provide OMT in my practice	10	16.4%
I provide OMT to one body region or more to 1-25% of my patients.	31	50.8%
I provide OMT to one body region or more to 26-50% of my patients.	10	16.4%
I provide OMT to one body region or more to 51-75% of my patients.	3	4.9%
I provide OMT to one body region or more to 76-100% of my patients.	7	11.5%

Figure 9. *Extent of using OMT (n=61). Likert-scale question with a goodness of fit chi-square of equal distribution p < 0.001. Starting at "Does NOT provide OMT" and going clockwise 95% CI is [9.2-27.6%], [38.6-62.9%], [9.2-27.6%], [1.7-13.5%], [5.7-21.8%]. Overall, 16.39% do not provide OMT, while 83.61% do provide OMT.*

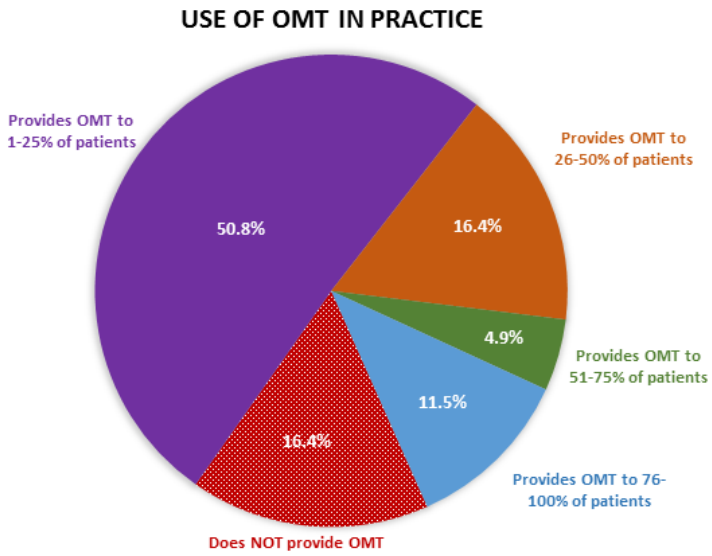


Table 14. *Free-text analysis of responses (n=53) to the below statement. Responses were categorized into a theme if it contained a comment regarding the themes. Graduate responses can contain multiple themes.*

Major Theme	Frequency	Percent
Confidence in the use of OMT	25	47.2%

continued from page 26

Regarding teaching skills, most participants reported that the pOMMF had a significant impact on their perceived comfort giving a lecture (86.9%), comfort leading a workshop (80.3%), and teaching medical students or residents (90.2%) (Table 3 and Figure 3). The data suggests that the pOMMF's emphasis on teaching significantly augmented the graduates' teaching capabilities. These are necessary skills that benefit medical institutions and patients by facilitating the sharing of medical expertise with practicing physicians, medical students, and patients – whether it is related to OMM or not. The participants credit the pOMMF for providing them increased comfort in teaching in a variety of settings, which may have been one of the reasons that they also perceive the fellowship as having increased their confidence with teaching opportunities during residency training (Table 5 and Figure 4). Having osteopathic physicians who are willing to teach OMT to their residency colleagues has been shown to increase the perception of OMT as an efficacious treatment option among MD residents and increases the likelihood that residents would refer a patient for OMT.[13] Thus, the ability to effectively share ideas and knowledge of OMM has allowed the DMU pOMMF graduates to not only strengthen their individual careers, but also to promote osteopathy as a valuable treatment approach to patient care.

Innovating new teaching strategies is a difficult but necessary skill to provide medical institutions contemporary teaching practices and relevant education in an ever-evolving field.[9] Participants report that the fellowship improved their ability to innovate new teaching strategies moderately (27.9%) and significantly (52.5%). There is perhaps an intermittent demand for innovating new teaching strategies. Due to the COVID-19 pandemic, current OMM fellows were obligated to find novel teaching strategies to meet the demands of the medical student learners. A similar demand for innovation may not have been as apparent in prior years, which might explain why only 52.5% of participants felt that the pOMMF significantly improved this skill (Table 3 and Figure 3). Nevertheless, this skillset encourages a culture of visionary thinking that attempts to seek the best outcomes for learners in variable learning conditions.

When asked "How has the fellowship been used as a springboard for success in your medical career?" the most common theme analyzed from written responses related to teaching experience (Table 4). The majority (58.3%) of those who answered the free text response discussed how teaching skills, confidence in teaching, and experience in teaching benefited their careers. Based on the free text response, there is evidence that graduates were able to promote themselves as competent candidates for leadership positions, able to comfortably teach at conferences, better teach their patients, and better teach their MD/DO peers within their medical community.

These two examples of responses from participants elucidate in many ways how the teaching experiences gained in the pOMMF have benefited their respective careers.

"I now feel much more comfortable with teaching in a variety of settings. I felt that I was well prepared to put together a coherent lecture and able to deliver it to a group of high-level learners and experts in the field with confidence. The OMM fellowship also continued my interest in teaching, and I have made it a point to teach medical students during their rotations with us at every available moment."

"The fellowship helped me realize my love for teaching. It also gave me leadership experience. These led to becoming Chief Resident. It motivated me to pursue clinical teaching roles of preceptor, adjunct faculty, and now full-time residency faculty and associate professor. It gave me the confidence to accept speaking opportunities at local and state levels. I am pursuing publications of case studies and prospective research studies in OMT. I have lifelong friendships and professional relationships with the OMM faculty who continue to mentor me in my professional goals. The OMM Fellowship was a life changing experience for which I will always be grateful."

The survey data corroborates our theory that pOMMFs positively influence many aspects of graduate's careers by providing a strong foundation for teaching excellence. It is worth noting that the act of teaching and doctoring are interrelated. Both endeavors require eliciting the learner/patient's needs, stating the teacher/doctor's agenda, use of appropriate testing/diagnostic approaches, ongoing feedback/communication, and evaluation of outcomes.[14] The adage, "see one, do one, teach one" relating to medical procedures accounts for how physicians are expected to be lifelong scholars who are constantly teaching their peers and patients, and thereby enriching their own understanding of the material by educating others.

Residency

Matching into a desired residency program can be one of the most challenging and monumental processes of medical school. Residency applicants are ultimately selected by programs based on a multitude of factors: board scores, letters of recommendation, performance during clinical rotations, research experience, clinical skills, leadership qualities, etc.[15] One goal of this study was to understand how the pOMMF at DMU may or may not have played a role in the residency match process. The results suggest that graduates attribute the DMU pOMMF to having some influence over matching into the graduates' desired residency, but it is difficult to assess the extent of that influence. While the majority of graduates reported that the pOMMF was a major topic of discussion during interviews (72.1%), just over half (57.1%) of the respondents perceived that the pOMMF was a major contributing factor to matching into a residency program (Table 5 and Figure 4). This discrepancy may be explained by the fact that many residents do not learn exactly why a residency program ranked them higher than another applicant. Thus, it would be difficult for any graduate to conclude the pOMMF was one of the top reasons they were chosen by a program. Examples of how respondents explained the impact of the pOMMF on residency are seen below:

"The OMM Fellowship is so teaching heavy that a large part of my application focused on my teaching/presentation and leadership experiences. These were desirable experiences that helped me to stand out for a lot of programs. I was also largely drawn to programs that encouraged peer-to-peer teaching or that offered a residents-as-teachers curriculum."

"Residency program directors overall were incredibly interested by the amount of research and teaching completed during the fellowship year, both of which were seen as significant strengths...In addition, they were more apt to discuss their options for being involved in med-ed as a resident due to the teaching background... Finally, the amount of practice we get presenting, answering questions as a fellow certainly increased my confidence and interview skills during the application progress."

continued on page 29

continued from page 28

The examples above highlight how graduates perceived the fellowship as providing them with teaching and leadership experiences that were of interest to residency program directors. Although the fellowship may not have been the singular cause of a graduate matching into residency, it likely bolstered their applications and success during interviews by providing them multiple examples of teaching and leadership experiences to discuss with program directors.

In addition to matching into residency, we investigated the impact of the pOMMF on the graduates' residency experiences and leadership involvement. A major component of the DMU pOMMF is participating in direct patient care. The OMM fellows are consistently gathering patient histories, performing various physical exams, communicating the treatment plan to patients, and writing assessments and plans. Given the extensive clinical experience combined with significant teaching opportunities, we hypothesized that the graduates would report improved confidence in patient care and therefore positively impact their ability to thrive as a physician in residency. Over 70% of respondents reported that the fellowship significantly improved their communication skills with patients, ability to perform a pertinent physical exam, and ability to perform a neurologic exam (Table 6). It is possible that the perceived improvement in clinical skills not only impacted their clinical performance on rotations during the residency application cycle, but also could have improved their preparedness for the first year of residency.

In addition to improved clinical skills, over 70% of respondents reported that the pOMMF made them more confident in seeking leadership and teaching roles in residency, with over 75% reporting they taught OMM principles to their colleagues (Table 5 and Figure 4). In a cross-sectional study of a pediatric residency program, OMM educational sessions were found to have a significant impact on the osteopathic and allopathic residents' understanding of OMT and the belief that OMT is an efficacious treatment strategy. The OMM education sessions were conducted by osteopathic residency program directors and osteopathic residents.[13] An example of how one DMU pOMMF graduate shared their OMM knowledge and skills with others during residency is below:

"Allopathic programs recognized the value of the additional skills in caring for musculoskeletal concerns. As a family medicine resident in Michigan, my training hospital was very supportive and very interested in incorporating our osteopathic philosophy and skills into our patient care and education. I took over inpatient consults for OMT after a previous OMM fellow graduated. I developed 3 different curricula to teach Osteopathic Principles and Practice to med students, general rotating interns, and family medicine residents monthly, and I was also able to start an outpatient OMT clinic that is still in place today. I would not have had those opportunities without my OMM fellowship."

Through taking on leadership roles and teaching OMM principles at residency programs, the DMU pOMMF graduates are acting as ambassadors for osteopathy by passing on the significance and benefits of incorporating OMT into conventional medical care. The results of this survey suggest the DMU pOMMF is not only leaving the graduates with teaching experience, but also has the potential to shape their entire medical careers through advancement of clinical skills and the confidence to become teachers and leaders for their colleagues.

Leadership

Research on strong leaders often analyzes characteristics such as intelligence, self-efficacy, credibility, communication, and personality types.[16] The survey found that graduates perceived the DMU pOMMF as providing significant improvement in the following leadership skills: working as a team (60.7%), project planning (42.6%), group communication (60.7%), lead by example (63.9%), and reliability (55.7%) (Table 10 and Figure 6). In addition to these leadership skills, graduates of the pOMMF can be seen self-identifying as leaders through their free-text responses as seen in the example below:

"I can't begin to explain how the OMM Fellowship has influenced the physician I am today. The leadership opportunities of the fellowship gave me the confidence to pursue a chief resident role and significantly impact the administrative level of my residency program. I created an OMM lecture series for my co-residents to educate them about OMM. My comfort in public speaking during lectures and labs gave me the confidence in my Grand Rounds presentations during residency as well as becoming a vocal advocate for Opioid Use Disorder in my community."

Furthermore, the participants attributed the pOMMF to significantly improving the following personal attributes: lifelong learner, resiliency, adaptability and confidence in self (Table 9 and Figure 5). Physicians need to endorse the responsibility of lifelong learning to provide the gold standards of patient care and ensure that organizations are constantly committed to improving the quality of healthcare provision.[17] Adaptability enhances leadership because it allows physicians to encounter challenges and develop a solution from a novel perspective. Resiliency is essential to this profession because as learners we make mistakes. It is a physician's resiliency that allows them to face up to failure and find ways to carry on more wisely and compassionately because of it.[18] A physician who has confidence in self is better equipped to make critical decisions under pressure and follow their aspirations. The results of this survey suggest the DMU pOMMF promotes the qualities and attributes necessary for becoming successful leaders in their future careers.

A descriptive study of primary care physicians found that successful physician-faculty, who are responsible for leading residents and medical students through their medical education, are often graduates of a fellowship and are more likely to hold senior academic rankings.[7] Correspondingly, this survey found the majority of DMU pOMMF graduates report holding at least one of the following major medical professional leadership roles: chief resident, clinical preceptor, department chair, medical director (Table 7). Furthermore, when participants were asked "Do you think completing the OMM fellowship increased the likelihood you sought leadership roles?" the majority of graduates (79.5%) responded "yes" (Table 8). As seen in the free-text response examples provided, pOMMF graduates reported the extra year of training improved their leadership skills and ability to successfully hold medical leadership positions. It is remarkable to discover that 52.1% of those that completed the pOMMF at DMU held the role of Chief Resident (Table 7). These results support the theory that the pOMMF at DMU is positively impacting the professional careers of graduates as they sought out and held leadership positions.

continued on page 30

continued from page 29

Research

Post-doctoral fellowships can be categorized into 3 distinct taxonomies based on the focus of the program: individualized, clinical, and research.[19] DMU's pOMMF would most closely fall in the clinical fellowship category due to the fellows' role in direct patient care and teaching medical students. The apparent lack of improvement as it pertains to research skills may be attributed to the fellowship's historic emphasis on teaching.

When graduates were asked how the DMU pOMMF impacted their research skills, the majority reported minimal to no improvement in their ability to plan research (80.0%), conduct research (86.67%), or publish research (80.0%) (Table 11 and Figure 7). The responsibilities of DMU OMM fellows has changed since its start in 1977, with a more recent emphasis on conducting research beginning in 2017. Of the time allotted to fellow responsibilities from pOMMF programs in the United States, on average only 6% of the fellows' time was dedicated to research.[11] This may help explain the alumni's perceived lack of research skill development.

Conducting osteopathic research to demonstrate the benefits of OMM may help preserve the philosophy and skillset of osteopathy. With the new emphasis on conducting research during the DMU pOMMF, it remains unseen how future pOMMF graduates will contribute to osteopathic research. The scope of this study should be expanded to investigate how other pOMMF programs have influenced the research skills of their graduates.

Utilization of OMT

The frequency by which osteopathic physicians use OMT has been a major concern to the osteopathic profession as it has continued to decline for decades. Based on a survey of osteopathic physicians nationally by Healy et al,[3] 77.74% reported using OMT on less than 5% of patients. Further analysis showed that 57% did not use OMT on any of their patients and only 8% of the respondents used OMT on greater than 25% of patients.[3] When DMU pOMMF graduates were asked to what extent they use OMT in their medical practice, just 16.4% reported not using OMT on any patients and over 30% reported using OMT on greater than 25% of their patients (Table 13 and Figure 9). Furthermore, the majority of DMU pOMMF graduates (80.7%) perceived the fellowship as significantly improving their ability to incorporate OMT into their medical practice (Table 12 and Figure 8). While these results may not be surprising for a fellowship that is primarily focused on teaching and utilizing OMM, the results suggest that the DMU pOMMF is successfully preparing pOMMF graduates to incorporate OMT in clinical practice.

Insufficient time and lack of confidence are some of the most common reasons physicians report for not using OMT in clinical practice.[2-4] The understanding and use of OMM is the ultimate distinction between allopathic and osteopathic physicians. Thus, finding ways to overcome barriers of utilizing OMT is of paramount interest to the osteopathic profession. Examples of pOMMF graduates utilizing OMT can be seen below:

"It was my pleasure to fully integrate OMT into my daily practice of Obstetrics & Gynecology...Treating full term patients prior to the onset of labor, to prepare the pelvis and entire system, only makes sense. To again treat these women postpartum, to address the normal trauma of delivery is how it should be. Gentle indirect appropriate CranioSacral therapy can be applied to any newborn without any risk of danger whatsoever and sometimes so spontaneously that is just a loving touch."

"The main thing the Fellowship influenced was my confidence in executing OMT in practice. Providing treatments to so many patients gave me the confidence that I knew how to problem-solve a complaint and figure out what to treat, which techniques to choose to treat it, and the "prescription" they needed (i.e. how much to treat in a single treatment, how frequent to follow-up, etc.). Repetition also gave me the confidence to incorporate OMT into my practice, giving me a framework to create a patient-centered treatment while knowing I could provide that full-body treatment in a 20-minute office visit."

The above examples combined with free text analysis showed that many DMU pOMMF graduates (47.2%) self-reported increased confidence in their OMT skills and an enhanced ability to incorporate OMM into patient care (Table 14). The confidence in OMT utilization is likely related to the extensive utilization of OMT during patient encounters in the DMU OMM clinic combined with the act of teaching osteopathic principles to medical students. The results of our study suggest that finding methods and tools to increase the confidence of osteopathic students and increasing exposure to using OMM in clinical practice are appropriate targets for improving the use of OMT after graduation from medical school.

Limitations of the Study

In addition to the previously mentioned limitations, it should be noted that other limitations include potential selection bias and inability to establish causal effect. Despite the clear impact the DMU pOMMF had on graduates' perceived leadership skills and personal attributes, it is difficult to determine if the inherent qualities of the medical students who chose to complete the fellowship or if the pOMMF itself was responsible for the outcomes of the study. This is a limitation that has been experienced by post-doctoral fellowship studies due to the highly motivated personalities of fellowship participants.[10] Further research would need to control for differences among graduates' academic excellence and extracurricular involvement at the medical school and undergraduate levels of education. More specific questions and comparisons to non-pOMMF osteopathic medicine graduates are needed to address whether the graduates were intent on becoming leaders and intent on utilizing OMM in their practice prior to the completion of the pOMMF.

Future Research

Further research could corroborate these findings with other pOMMFs and compare responses to non-pOMMF osteopathic medicine graduates to establish a control. A future study could investigate outcomes of changing pOMMF curriculum to encompass research projects. It would also be beneficial to compare the presence of department support and the presence of research mentors that pre-doctoral OMM fellows receive while conducting research. Further research should compare the use of OMT between non-pOMMF and pOMMF DMU graduates to understand the specific aspects of a fellowship that improve the frequency of OMT utilization and to discern the major barriers to using OMT after graduation. This is of the utmost importance

continued on page 31

continued from page 30

for osteopathic medical schools across the nation to understand in order to adequately distribute educational resources aimed at preserving and improving the skills of osteopathy.

Conclusion

The study supports that the DMU pOMMF may create positive downstream effects in the medical careers of its graduates by providing abundant teaching opportunities, encouraging leadership roles, and promoting the utilization of OMT within residency and future practice. Graduates draw from the DMU pOMMF experiences to promote their medical and professional careers. Limitations include potential selection bias and inability to establish causal effect without a control population of non-pOMMF graduates from DMU or other institutions. Further research could corroborate these findings with other pOMMFs and compare responses to non-pOMMF graduates.

References

1. Seffinger DM, *Foundations of Osteopathic Medicine: Philosophy, Science, Clinical Applications, and Research*. 4th ed. Lippincott Williams and Wilkins; 2018:2-17.
2. Spaeth DG, Pheley AM. Use of osteopathic manipulative treatment by Ohio osteopathic physicians in various specialties. *J Am Osteopath Assoc*. 2003; 103(1):16-26. doi.org/10.7556/jaoa.2003.103.1.16.
3. Healy CJ, Brockway MD, Wilde BB. Osteopathic manipulative treatment (OMT) use among osteopathic physicians in the United States. *J Am Osteopath Assoc*. 2021;121(1):57-61. doi.org/10.1515/jom-2020-0013.
4. Roberge RJ, Roberge MR. Overcoming Barriers to the Use of Osteopathic Manipulation Techniques in the Emergency Department. *W J Emerg Med*. 2009;10(3):184-189. www.ncbi.nlm.nih.gov/pmc/articles/PMC2729220/.
5. Rodeghero J, Wang YC, Flynn T, Cleland JA, Wainner RS, Whitman JM. The impact of physical therapy residency or fellowship education on clinical outcomes for patients with musculoskeletal conditions. *J Orthop Sports Phys Ther*. 2015;45(2):86-96. www.jospt.org/doi/10.2519/jospt.2015.5255.
6. Johnson SM, Kurtz ME. Diminished use of osteopathic manipulative treatment and its impact on the uniqueness of the osteopathic profession. *Acad Med*. 2001;76(8):821-828. doi.org/10.1097/00001888-200108000-00016.
7. Taylor JS, Friedman RH, Speckman JL, Ash AS, Moskowitz MA, Carr PL. Fellowship training and career outcomes for primary care physician-faculty. *Acad Med*. 2001;76(4):366-372. doi.org/10.1097/00001888-200104000-00015.
8. Rodnick JE. Research fellowships: a road less traveled. *Fam Med*. 1999;31:438–9.
9. Searle NS, Hatem CJ, Perkowski L, Wilkerson L. Why invest in an educational fellowship program?. *Acad Med*. 2006;81(11):936-940. doi.org/10.1097/01.acm.0000242476.57510.ce.
10. Lown BA, Newman LR, Hatem CJ. The personal and professional impact of a fellowship in medical education. *Acad Med*. 2009;84(8):1089-1097. doi.org/10.1097/acm.0b013e3181ad1635.
11. Bedi A, Lewis D. A Survey of Predoctoral Osteopathic Manual Medicine (OMM) Fellowships. Poster presented at: AAO Convocation; March 2018; Dallas, Texas. http://files.academyofosteopathy.org/LBORC/Posters/2018/Bedi_OMMFellowship_Poster.pdf
12. Akers B, Davis G, Keys J, Pierce-Talsma SL, Lung G. Impact of Predoctoral Teaching Fellows on Osteopathic Medical Students: A Near-Peer Teaching Program Evaluation. *AAO Journal*. 2019, 29(4): 9-16. doi.org/10.53702/2375-5717-29.4.9
13. Barnhardt EW, Comer F, Zmuda E, Rakowsky A. Impact of an osteopathic presence in a large categorical pediatric residency training program. *J Osteopath Med*. January 2021:35-42. doi.org/10.1515/jom-2019-0317.
14. Hatem, Charles MD. Teaching approaches that reflect and promote professionalism. *Acad Med*. 2003; 78(7): 709-713. doi.org/10.1097/00001888-200307000-00010.
15. National Resident Matching Program, Data Release and Research Committee: Results of the 2020 NRMP Program Director Survey. National Resident Matching Program, Washington, DC. 2020. https://mk0nrmp3oyqui6wqfm.kinstacdn.com/wp-content/uploads/2020/08/2020-PD-Survey.pdf
16. Rojas, R. Emerging team leader dynamics in contingent situations: A doctoral-level simulation. *High Educ*. 2017; 29(1): 186-191. https://files.eric.ed.gov/fulltext/EJ1135839.pdf
17. Gottwald M. Lansdown G. Clinical Governance: Improving the Quality of Healthcare for Patients and Service Users. BerkshireEngland: Open University Press; 2014:94.
18. Gunderman RB. Leadership in Healthcare. London, England: Springer; 2009:102.
19. Karpinski J, Ajjawi R, Moreau K. Fellowship training: a qualitative study of scope and purpose across one department of medicine. BMC Med Educ. 2017;17(1):223. Published 2017 Nov 21. doi.org/10.1186/s12909-017-1062-5. ■