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Research Article

Do Education Grants Pay off for the MAOA?

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Background

The Mid America Orthopaedic Association (MAOA) began awarding education grants for residents and those new in practice (NIP) to attend the annual meeting in 1999 and to medical students since 2019. The purpose of this study is to report on grant winners, their gender, current position and MAOA membership.

a Ms. Genna R. Potter is a current medical student at the University of Arkansas for Medical Sciences. She is a graduate from the University of Arkansas. She obtained a B.S. in Biology from the Fulbright Honors Program. During her time at the U of A, she competed as pole vaulter on the nationally recognized Women's Track and Field team.

Conflicts of Interest Statement for Genna Potter

b Dr. Simon Mears is a board certified orthopaedic surgeon at the University of Arkansas for Medical Sciences as well as a professor of orthopaedic surgery in the College of Medicine and Vice Chair for Safety and Quality at the Department of Orthopaedic Surgery at UAMS. His special interests include total hip and knee replacement, hip fracture care, and geriatric orthopaedics.

Dr. Mears earned a Medical degree and a Ph.D. degree in Neurobiology from the University of Pittsburgh. He completed his orthopaedic residency at the Johns Hopkins University School of Medicine. He completed a fellowship in orthopaedic traumatology at the R. Adams Cowley Shock Trauma Center at the University of Maryland as well as a second fellowship in hip and knee replacement at the Mayo Clinic. He has won the prestigious Jahnigen Award in geriatric medicine. Dr. Mears practiced at the Johns Hopkins University for ten years and served there as Chairman of Orthopaedic Surgery at the Johns Hopkins Bayview Medical Center.

Dr. Mears specializes in hip and knee replacement including both primary and revision surgery. His research interests include the clinical outcomes of geriatric patients and the biomechanics of fixation in osteoporotic bone. He is currently vice president of the International Geriatric Fracture Society and Editor in Chief for the Journal, Geriatric Orthopaedic Surgery and Rehabilitation.

Visit Dr. Mears's Website

Visit the Open Payments Data Page for Dr. Mears

Conflicts of Interest Statement for Dr. Mears

c Dr. Alex Otwell is an incoming PGY-1 General Surgery resident at the University of Arkansas for Medical Sciences (UAMS) in Little Rock, AR. She attended medical school at UAMS and received her M.D. in May 2023, along with her M.P.H. from the UAMS College of Public Health.

Connect with Dr. Otwell on LinkedIn

Conflicts of Interest Statement for Dr. Otwell

d Dr. Lisa Cannada is an Orthopaedic Trauma Surgeon from Jacksonville, FL working for Novant Health Fracture Clinic and the Hughston Clinic. She is the clerkship Director for Orthopaedic Surgery and Director of Faculty Integration for the UNC Charlotte Medical Campus.

Dr. Cannada has made it her mission to make the path better for those that follow, by her mentoring, education and leadership roles. She is passionate about helping others. In 2022, Dr. Cannada received was she considers the two biggest honors of her career. The Ruth Jackson Orthopaedic Society awarded her the inaugural "She for She" award given to a person who supports and elevates others. The Orthopaedic Trauma Association awarded her the first OTA DEI and Health Disparities Leadership Award in October 2022. She is honored and humbled to lead by example. She has over 200 publications and 250 presentations at national meetings.

She could not do all this without the loving support of her husband Jeff and daughter Annalise and her parents, Theresa Metcalf and the late Dr. John Metcalf.

Visit Dr. Canada's Website

Visit the Open Payments Data Page for Dr. Cannada

Conflicts of Interest Statement for Dr. Cannada

Methods

The list of MAOA grant winners and their current membership status was obtained from the MAOA. A review of social media sites (Twitter, Facebook, Instagram), institutional and hospital websites were completed to determine current training or practice location for all award winners.

Results

475 senior orthopaedic residents and 50 NIP physicians received a total of 538 MAOA grants. 84% NIP physicians stayed in the Mid-America territory representing 21 different practices. Of senior residents, 63.2% remained in MAOA region representing 63 practices. 38 medical students from 2019-2021 received a total of 44 grants from MAOA. 22 of 38 (57.9%) of medical student winners matched into orthopaedic residency. 18 of the 22 (81.8%) of medical students matched in MAOA territory while four students (18.2%) matched outside of the region. Of students that have not graduated, five of nine (55.6%) are still pursuing orthopaedics. 40% of NIP physicians, 22.3% of senior residents and 5.3% of medical student winners are current members of MAOA. Membership to the MAOA has been rising as the number of grants awarded increases. Females represented 10.5% of all MAOA grants winners (6% of NIP, 10.1% of senior residents, and 21.1% of medical student grants); however, there has been an increase in female grant winners since 1999.

Conclusions

371 of 563 (65.9%) MAOA grant awardees continue to practice in MAOA states. The numbers of female grantees is increasing over time. Our data would indicate the continued value of MAOA education grants to students, residents, and new in practice orthopaedic surgeons. These grants serve to introduce trainees to MAOA, forge relationships with physicians in geographic proximity and allow for practice in scientific presentation. Though there is a trend in increasing membership, membership in the MAOA of grantees could be improved and a concerted drive to encourage membership and loyalty in the organization should be considered.

INTRODUCTION

Orthopaedic surgery is one of the most competitive fields in medicine to successfully match. Orthopaedic surgery has the highest rate of specialty preference continuity from medical students when compared to other specialities ("2021 Report on Residents Executive Summary," n.d.). In 2022, nearly 1,500 students applied to at least one of approximately 200 orthopaedic residency programs in which 875 matched into the specialty, resulting in a 63% match rate ("Residency Data & Reports," n.d.). After training, orthopaedic physician retention in the state of residency has consistently been less in comparison to other specialties with, 43.2% practicing in the state in which they received training ("Residency Data & Reports," n.d.).

Additionally, orthopaedic residency continues to fall behind other specialties in terms of gender and racial diversity (Poon et al. 2019; Vij et al. 2022). According to the 2018 AAOS Census, membership consisted of 5.8% female surgeons, 6.7% Asian, 2.2%Latino, and 1.9% Black ("Aaos Orthopaedic Surgeon Census," n.d.). This diversity lessens further when broken down by state particularly in midwestern and southern states. Organizations, such as the Mid-America Orthopaedic Association (MAOA), strive to improve upon physician retention, diversification, and educational expansion in orthopaedics.

The MAOA is a regional society composed of 20 states formed to facilitate education and networking among its members. In the Mission Statement of the MAOA, it includes that the organization seeks to serve its members through an annual meeting educational program. This MAOA annual meeting has been held since its founding in 1982. A goal of MAOA is to encourage physician loyalty to the organization with its offerings to young surgeons, residents, and medical students. To accomplish this, there are multiple educational grant opportunities for research and for travel to the meeting for medical students, residents, and those new in practice surgeons. These grants were created to alleviate the financial burden that coincides with showcasing research at the annual meeting. The grants contribute funds towards travel, lodging, and meeting supplies such as posters and registration fees that can become barriers for participation in the conference. With it's minimization of the financial burden, the grant permits access to educational enrichment, networking opportunities, and participation in advancements in orthopaedic surgery. All the while, it allows opportunity for attendees to develop skills presenting research in a low key environment. In addition, travelling fellowships are offered as an enriching educational experience for young surgeons in practice. The MAOA grant categories include either multipurpose resident grants, traveling fellowship grants, and education grants for medical students, residents, or new in practice physicians. The purpose of our study was to report on MAOA education grant winners, their demographics, current position and location, and membership status.

MATERIALS AND METHODS

Grants have been awarded by the MAOA for senior residents and new in practice physicians (NIP) since 1999 and to medical students since 2019. These grants are specifically for persons located in one of the 20 MAOA states: Alabama, Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Nebraska, North Dakota, Ohio, Oklahoma, South Dakota, Tennessee, Texas, or Wisconsin. To be qualified to apply for an education grant, the individual must have been a presenter of a podium or poster presentation at the annual meeting for that year. Senior residents/fellows education grants had to be in their final two years of residency to apply. For new in practice orthopedists, the grant must be received by individuals in their first or second year of practice. These grant winners were selected by the MAOA Education Committee.

The MAOA grant winners were obtained from the organization website (https://www.maoa.org/) and confirmed with staff. The list of grant recipients was obtained along with the following information: MAOA membership status, gender, grant winner year, and institution when the grant was received.

An internet search of social media and institution/hospital websites was conducted to determine current institution of residency or practice for all winners. Social media sites included Twitter, Instagram, or Facebook. For medical students, graduation status and subspecialty was determined. Each individual's current institution was determined to be academic or private practice.

RESULTS

There were 487 senior orthopaedic resident, 51 new in practice, and 44 medical student grants awarded from 1999 to 2021 (Table 1); however, 563 individuals won grants over this period with a total of 582 awards received due to 19 individuals winning multiple years (1 NIP, 12 residents and 6 medical students).

Of the 563 number of grant winners, 371 individuals (65.9%) remain in Mid-America territory representing multiple institutions and practices (Table 1). Majority of winners reside in Ohio and Illinois (Fig. 1). The majority of NIP (29 of 50; 58%) and senior resident (295 of 475; 62.1%) grant winners currently work in private practice (Table 2,3). The Mayo Clinic produced the greatest number of grant winners.

Table 1. Total grant winner Data

Category	Grant Winners (n(%))
Grant Winners	
NIP	50 (8.9)
Senior Residents	475 (84.4)
Medical Students	38 (6.7)
Locations	
MAOA territory	371 (65.9)
Not MAOA Territory	182 (32.3)
Unknown	10 (1.8)
Practice Type*	
Academic	175 (33.3)
Private	324 (61.7)
Other/Unknown	26 (5.0)
Total Grant Winners	563

*Percentages calculated from Residents and NIP

128 grant recipients are current members of MAOA. Membership status is low at 40% among new in practice orthopedists, 23% for senior residents, and 5% for medical students (Fig. 2). Membership of grantees to the MAOA has been increasing simultaneously with the increasing number of grants awarded (Fig. 3). 22 medical student winners matched into orthopaedics with nine who have not graduated yet. The majority of medical students who matched orthopaedics did so in MAOA territory (18 of 22; 81.8%) with only four students matching outside the region (Table 4). Additionally, of the nine students that have not yet graduated medical school, five are still known to be interested in pursuing a career in orthopaedics.

Gender breakdown of grant recipients was predominantly male (504 of 563, 89.5%) (Fig. 4). Female gender represented 6% of NIP physician, 10.1% of senior resident, and 21.1% of medical student grant winners (Fig. 4). The proportion of females receiving grants has increased since the inception of MAOA grants (Fig. 5). From 1999 to 2010, ten females were awarded to NIP and senior residents. From 2011 to 2021, 41 females were awarded to NIP and senior residents with eight female medical students awarded since 2019. Of the 128 grant winners who are MAOA members, Female membership was found to be 12.5%.

DISCUSSION

Organizations such as the MAOA provide a unique opportunity to facilitate scholarly discussion, advancements in the field of orthopaedic practice, and networking to upcoming physicians. There are many benefits to joining orthopaedic organizations such as the MAOA which includes education. For residents and practicing physicians, it provides opportunities for professional development, networking, vendor exposure, and continuing medical education credits (Stoklosa 2022). Additionally, there is support for further research in the field of orthopaedics and affect clinical practice. For students, the annual meeting is a chance to present their work in a collegial environment and interact with residents and attendings, gaining insight into residency programs and practices. Organizations such as MAOA also allow for mentorship opportunities (Stoklosa 2022). Mentorship proves to be crucial in the influence of medical students' pursuit in a career in orthopaedics (Meyer et al. 2021). This could play a role in our findings that 81.8% of individual's who matched orthopaedics did so in the Mid America states.

Despite the benefits of the MAOA, membership status of award recipients remains low based on the available data, exposing a need for support and retention. The idea of orthopaedic associations being equipped to expand upon education, research, and advocacy is not new. The challenge of any association is to provide a solid network for actual influence that results in individuals wanting to participate. This requires organizations to change with the climate of the current healthcare system and ideals held by the people it serves. It demands that these associations remain relevant, nimble, and streamline their endeavors to make membership worthwhile (Nelson 2000).

Table 2. Senior resident grant winner data

Senior Residents (n (%))		
Locations		
	MAOA territory	300 (63.2)
	Not MAOA Territory	171 (36.0)
	Unknown	4 (0.8)
Practice Type		
	Academic	155 (32.6)
	Private	295 (62.1)
	Other/Unknown	25 (5.3)
Total Grant Winners		475

Table 3. New In Practice grant winner data

New In Practice (n (%))	
Locations	
MAOA territory	42 (84.0)
Not MAOA Territory	7 (14.0)
Unknown	1 (2.0)
Practice Type	
Academic	20 (40.0)
Private	29 (58.0)
Other/Unknown	1 (2.0)
Total Grant Winners	50

One way to potentially promote membership is to get individuals involved early. The MAOA provides opportunities for medical student and resident presentations and schol-

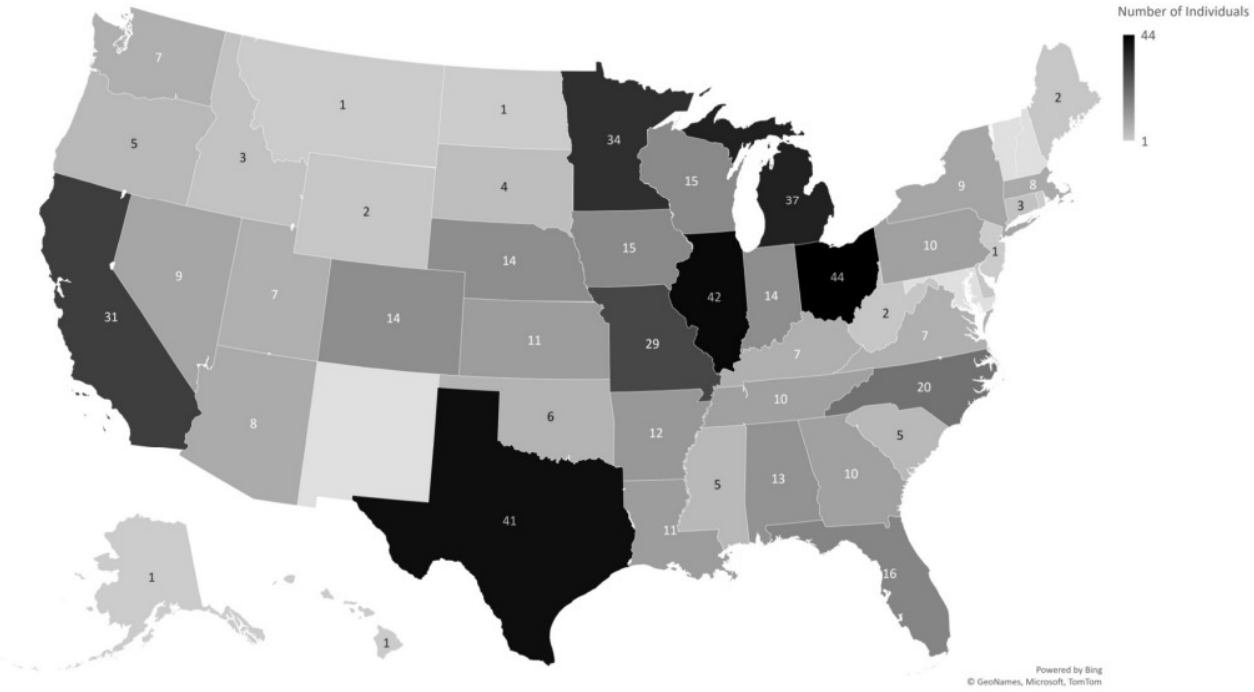

Figure 1. Distribution of MAOA Grant Winners

arships, which incites a feeling of inclusion and support from the beginning. Having support from a large professional coalition perpetuates a sense of familiarity and comfort, which gives a purpose for an individual to pay it forward in the future. This concept is akin to medical device industry targeting surgical trainees to use certain implants because it has been shown to influence continued use in their future practice (Fury et al. 2019). The more exposure to the organization fosters loyalty between the parties. Additionally, if an individual feels involved/supported early on in their career or prior to their career even starting, it generates more of a positive personal attachment to the association.

An important consideration of increasing membership is the ability to fund the resources required to support a hopefully regional physician base. Based on our data, it appears that the as the number of grants given per year increases, a rise in memberships to the MAOA coincides. It could be theorized that individuals who won a grant in the past feel the desire to pay it forward to the next generation as the grants provided by the MAOA are funded by member donations. One goal of the MAOA is to make advancements that will ultimately improve the care and satisfaction of the Mid America populace, and it has been shown that many of the grant winners remained in Mid America territory (65.9%) (Fig. 3). Thus, it is imperative to improve membership and

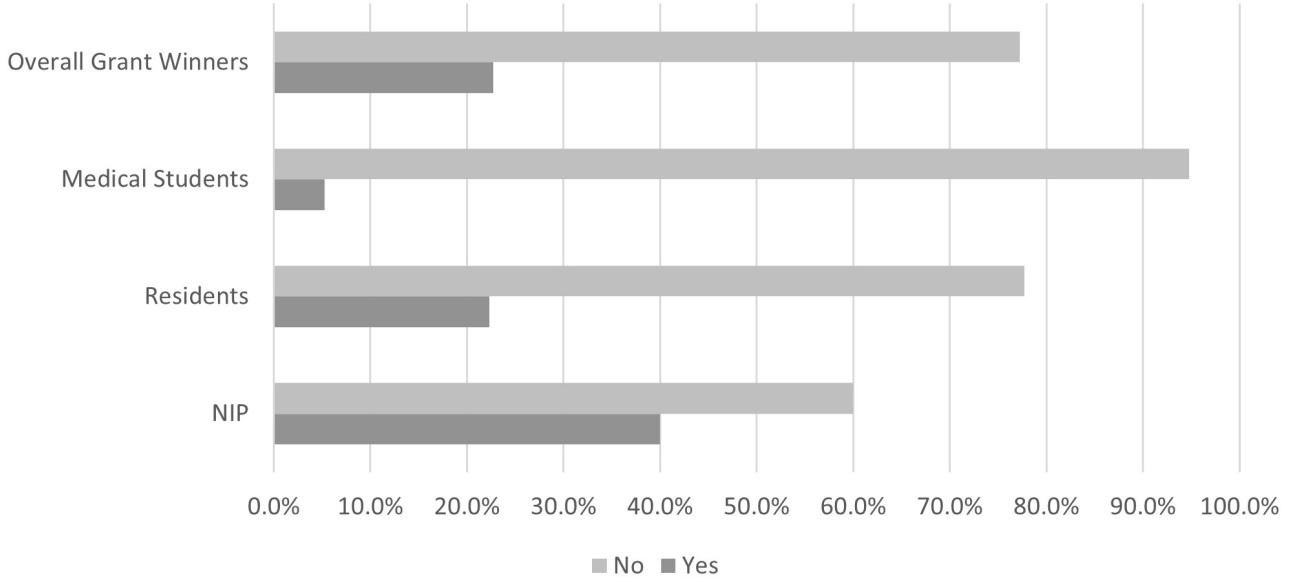

Figure 2. Membership Status of Grant Winners

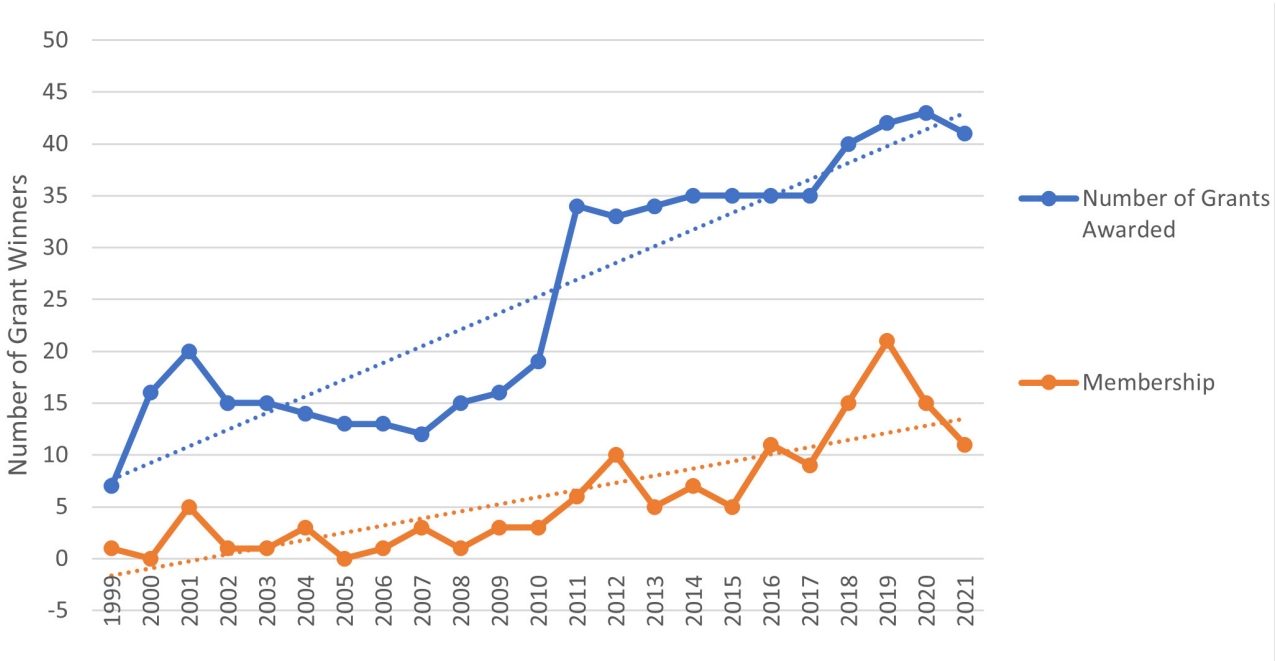

Figure 3. Number of Grants Awarded Compared to Number of Winner MAOA Membership from 1999 to 2021

Table 4. Medical student grant winner data

Medical Students (n (%))	
Matched Orthopaedics	22 (57.9)
Located in MAOA territory	18 (81.8)
Not located in MAOA territory	4 (18.2)
Matched Other Specialty	2 (5.3)
Not Yet Graduated	9 (23.7)
Known Interest in Orthopaedics	5 (55.6)
Unknown	5 (13.1)
Total Grant Winners	38

foster financial support, so there is continued ability to provide grants to a physician base that will be caring for the future Mid America populations. Just as residency location has an influence on the region of fellowship, grant funding appears to play a role in the influence of practice (Krueger et al. 2021).

The MAOA has provided a total of 582 grants; however, the gender diversity is sparse. Currently, the MAOA grant recipients have a vastly male demographic (89.5%). Female representation of grant recipients is certainly higher when comparing medical student winners in relation to residents and drastically compared to new in practice physicians. Trending female grant winners from 1999 to 2021, there has been an increase in the percentage of female grantees; however, female MAOA membership of grant recipients is low (12.5%). In general, female representation in orthopaedic residency and fellowship is 15.3% with a gradual, but slow increase of women in the field (Attia et al. 2021). Additionally, a recent study in 2021 displays similar findings regarding orthopaedic specialty societies having lower female representation, females in leadership roles, and fewer grants awarded (Attia et al. 2021). The MAOA is not

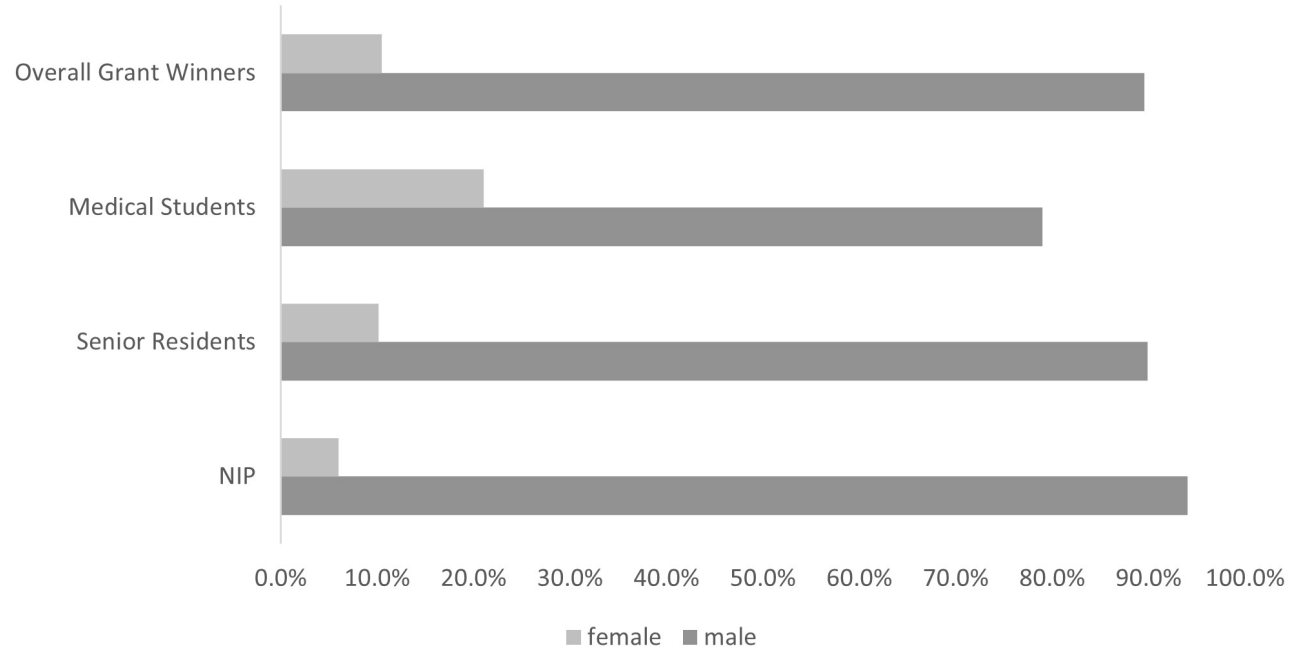

Figure 4. Gender Demographics for MAOA Grant Winners

an exception to this trend. However, the MAOA has made efforts to have female representation on the Board of Directors. Pertaining to orthopaedic organizations, it has been found that having women in leadership roles has a direct influence in the number of female members that the society has (Ramos et al. 2022). It is important to diversify orthopaedics because underrepresented groups, whether gender or racial, report improved patient satisfaction, comfort, and trust in the physician's decision-making skills when working with someone from a similar culture (Reede 2003; Takeshita et al. 2020). Thus serving a diverse patient population, it would be appropriate for orthopaedics to have a physician base that reflects the times. Scholarships and funding female applicants in orthopaedics could postulate to be a method to increase female retention in the orthopaedic specialty (Vajapey, Cannada, and Samora 2019).

Our study has limitations. Our data does not have the self-identified gender of the individual. It is possible that some individuals are misgendered or identify as non-binary. Our study did not have information on grant winners preferred gender or age. We identified current practice location from website searches and it possible that these could be outdated. Additionally, not all individuals have a social media presence or keep their profiles on private settings; thus, it would impede on verifying/determining some of the study variables.

CONCLUSION

The MAOA fosters education, research, and patient care advancements for the Mid America regions. The meeting represents an opportunity to stay abreast of current clinical research impacting practice, interact with leaders in the field, develop relationships which can lead to opportunities for residency, fellowship and employment and a sense of belonging in the organization. The support of the region's medical students, residents, and new in practice physicians through grants is an integral portion of the MAOA and are supported through member donations. The grants provide opportunities for young trainees and practitioners to attend a scientific meeting where we have demonstrated 59% publication rate of presentations (Loeffelholz, Piening, and Cannada 2018). While the majority of grant winners practice in Mid America states, many are not current members. Continued work is needed by the organization to improve the strength of the bond with grant winners. The organization has a major goal of improving diversification of the association and the field of orthopaedic surgery. Funding individuals through grants and scholarships proves to be one way to increase diversity. Including minority representation in director roles and other leadership positions within the organization could serve as another effort to promote inclusion. In all, there should be coordinated effort and strategic plans to encourage membership, diversification, and commitment to the organization.

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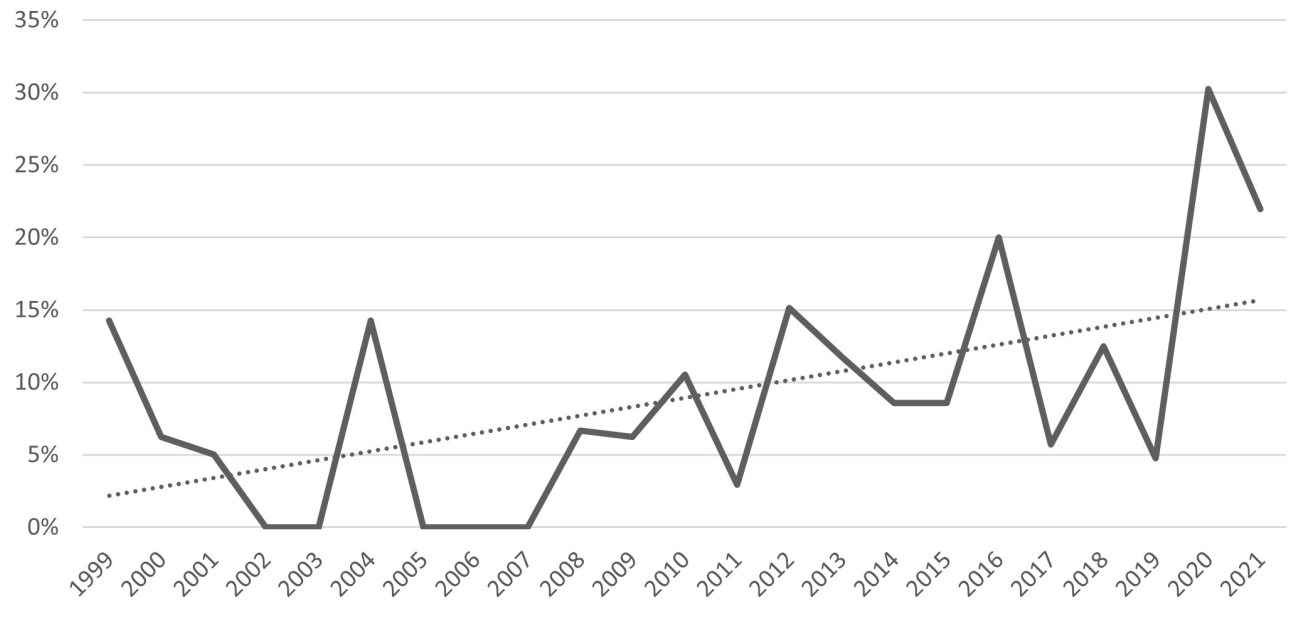

Figure 5. Percentage of Female Grant Winners from 1999 to 2021

REFERENCES

"2021 Report on Residents Executive Summary." n.d. AAMC. Accessed September 10, 2022. https://www.aamc.org/data-reports/students-residents/data/report-residents/2021/executive-summary.

"Aaos Orthopaedic Surgeon Census." n.d. In *American Academy of Orthopaedic Surgeons*. Accessed September 10, 2022. https://www.aaos.org/quality/practice-management/aaos-orthopaedic-surgeon-census/.

Attia, Aria C., Symone M. Brown, Amy L. Ladd, and Mary K. Mulcahey. 2021. "Representation of Male and Female Orthopedic Surgeons in Specialty Societies." *Orthopedics* 44 (5): 289–92. https://doi.org/10.3928/01477447-20210819-04.

Fury, Matthew S., Trevor H. Schott, Abhiram R. Bhashyam, and Brian C. Goh. 2019. "The Interaction Between Industry, Orthopaedic Surgical Practice, and Residency Education: A Roundtable Discussion with Drs. James Kang, Mitchel Harris, George Dyer, and John Wright." *The Orthopaedic Journal at Harvard Medical School* 20 (June):69–77.

Krueger, Chad A., Jonathan R. Helms, Anthony J. Bell, Heidi Israel, and Lisa K. Cannada. 2021. "An Applicant's Residency Program Region May Influence Where They Complete Fellowship." *Journal of Surgical Orthopaedic Advances* 30 (1): 30–35.

Loeffelholz, Z.D., A.J. Piening, and L.K. Cannada. 2018. "Resident Involvement and Publication Rates at the Mid-America Orthopaedic Annual Meetings." *Case Orthopaedic Journal* 15 (1): 46–49.

Meyer, Lucy E., Symone M. Brown, Kevin Black, Ann VanHeest, Lisa K. Cannada, Keith Kenter, and Mary K. Mulcahey. 2021. "Evaluation of Factors That May Influence a Medical Students Decision to Pursue a Career in Orthopaedic Surgery." *ECronicon Open Access Orthopaedics* 12 (8): 45–56.

Nelson, Thomas C. 2000. "Orthopaedic Professional Scientific Organizations What Should Their Role Be? How Should They Be Managed?" *The Iowa Orthopaedic Journal* 20:101–5.

Poon, Selina, Daniel Kiridly, Muhammad Mutawakkil, Stephen Wendolowski, Rachel Gecelter, Myriam Kline, and Lewis B. Lane. 2019. "Current Trends in Sex, Race, and Ethnic Diversity in Orthopaedic Surgery Residency." *Journal of the American Academy of Orthopaedic Surgeons* 27 (16): e725–33. https://doi.org/10.5435/jaaos-d-18-00131.

Ramos, Tolulope, Roxanne Daban, Nisha Kale, Symone Brown, Cadence Miskimin, Lisa K. Cannada, and Mary K. Mulcahey. 2022. "Women in Leadership in State and Regional Orthopaedic Societies." *JAAOS: Global Research and Reviews* 6 (4). https://doi.org/10.5435/jaaosglobal-d-21-00317.

Reede, Joan Y. 2003. "A Recurring Theme: The Need for Minority Physicians." *Health Affairs* 22 (4): 91–93. https://doi.org/10.1377/hlthaff.22.4.91.

"Residency Data & Reports." n.d. NRMP. Accessed September 10, 2022. https://www.nrmp.org/match-data-analytics/residency-data-reports/.

Stoklosa, Aaron. 2022. "Eight Benefits of Joining a Professional Orthopedic Association." Specialty-Specific EHR Systems. December 19, 2022. https://www.modmed.com/resources/blog/eight-benefits-of-joining-a-professional-orthopedic-association.

Takeshita, Junko, Shiyu Wang, Alison W. Loren, Nandita Mitra, Justine Shults, Daniel B. Shin, and Deirdre L. Sawinski. 2020. "Association of Racial/Ethnic and Gender Concordance between Patients and Physicians with Patient Experience Ratings." *JAMA Network Open* 3 (11): e2024583. https://doi.org/10.1001/jamanetworkopen.2020.24583.

Vajapey, Sravya, Lisa K. Cannada, and Julie Balch Samora. 2019. "What Proportion of Women Who Received Funding to Attend a Ruth Jackson Orthopaedic Society Meeting Pursued a Career in Orthopaedics?" *Clinical Orthopaedics & Related Research* 477 (7): 1722–26. https://doi.org/10.1097/corr.0000000000000720.

Vij, Neeraj, Ian Singleton, Roy Bisht, Francisco Lucio, Selina Poon, and Mohan V. Belthur. 2022. "Ethnic and Sex Diversity in Academic Orthopaedic Surgery: A Cross-Sectional Study." *JAAOS: Global Research and Reviews* 6 (3). https://doi.org/10.5435/jaaosglobal-d-21-00321.