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Research Article

Gender Disparity of Orthopaedic Surgery Grand Rounds Speakers

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Introduction

Women are significantly underrepresented within orthopaedic surgery and academia. Limited opportunities to present at local and national conferences may impact professional advancement for women. The purpose of this study was to determine how often female orthopaedic surgeons presented at orthopaedic grand rounds between 2016-2021, if there was a difference between the types of presentations (technical vs non-technical) given by female and male speakers, and whether the COVID-19 pandemic increased the number of opportunities available for female orthopaedic surgeons to speak at orthopaedic grand rounds with the increase of online platforms.

Methods

A cross sectional study of 8 ACGME accredited orthopaedic residency programs, who are a part of COERG, was performed. Program directors were asked to describe the demographics of grand rounds speakers and the types of presentations given by those speakers before and after the COVID-19 pandemic from September 2016 to September 2021.

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Conflicts of Interest Statement for Dr. Sheena Amin

Visit the Open Payments Data Page for Dr. Sheena Amin

b Hayden Hartman is a fourth year medical student pursuing orthopaedic surgery. Her research interests include diversity in orthopaedics, sex-specific outcomes, and the female athlete.

Conflicts of Interest Statement for Hayden Hartman

c Victoria Ierulli is a second-year medical student at Tulane University with a strong interest in orthopaedics. She leads a club for students interested in surgery and is in charge of a student-run screening clinic. Outside of academics, Victoria enjoys playing soccer and volunteering with Miracle League.

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Conflicts of Interest Statement for Victoria Ierulli

d Dr. Mary Mulcahey is a Board Certified orthopaedic surgeon specializing in shoulder and knee surgery and sports medicine. She is a New Hampshire native, who received her Bachelor of Arts in Biochemistry from Dartmouth College and her Doctor of Medicine from the University of Rochester School of Medicine. She completed her orthopaedic residency at Brown University, followed by a fellowship in Orthopaedic Trauma at the same institution. Dr. Mulcahey then went on to do a fellowship in sports medicine at San Diego Arthroscopy and Sports Medicine. Dr. Mulcahey is Professor and Chief of Sports Medicine in the Department of Orthopaedic Surgery and Rehabilitation at Loyola University Medical Center in Chicago. She is also Director of the Women's Sports Medicine Program at Loyola. Dr. Mulcahey is past President of the Ruth Jackson Orthopaedic Society. Additionally, she recently served on the AANA Board of Directors, and she is currently on the AOSSM Education Committee, the AJSM Electronic Media Editorial Board, and she was selected for the AOSSM Traveling Fellowship to Europe in April 2022. Dr. Mulcahey is a team physician for the Loyola University Chicago Ramblers athletic teams.

Visit Dr. Mary Mulcahey

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Results

Between September 2016-February 2020, 472 male (83.7%) and 92 (16.3%) female orthopaedic surgeons presented during grand rounds. There was no significant difference in the gender distribution of speakers from March 2020-September 2021 during which 81 men (79.4%) and 21 women (20.6%) presented (p=0.315). Men were more likely than women to present on technical topics before (p=0.006) and after the COVID-19 pandemic (p=0.023).

Conclusion

Male orthopaedic surgeons more frequently present at grand rounds in comparison to female orthopaedic surgeons. This was unchanged during the COVID-19 pandemic when online platforms were increasingly utilized. Male speakers were more likely to present on technical topics; whereas female speakers were more likely to present on non-technical topics. Understanding the gender disparity amongst orthopaedic grand rounds speakers is necessary for programs to re-evaluate and revise the methodology by which speakers are selected. This can allow for more balanced topic discussions and can foster female career advancement in academia.

INTRODUCTION

Despite the gender parity that exists in medical education, there is still a lack of female representation in academic medicine, especially within orthopaedic surgery (Linscheid, Holliday, Ahmed, et al. 2020; Mulcahey et al. 2018; Gerull et al. 2020; Vij et al., n.d.; Meadows, Skinner, Faraj, et al. 2022). According to the Association of American Medical Colleges (AAMC), women accounted for approximately 48% of all medical graduates in the United States and 41% of full-time medical school faculty in 2018 ("AAMC: Representation of Women in Academic Medicine," n.d.). These trends are not reflected in orthopaedic surgery, with only 8% of practicing orthopaedic surgeons being female, as of 2019 (Linscheid, Holliday, Ahmed, et al. 2020; "AAMC: Representation of Women in Academic Medicine," n.d.; "AAMC: Department Chairs by Department, Sex, and Race/Ethnicity," n.d.). Additionally, only 20% of assistant professors, 15% of associate professors, and 9% of full professors in orthopaedics are women (Gerull et al. 2020). Leadership in orthopaedics demonstrates similar disparities, with only 6 of 120 (5%) orthopaedic surgery department chairs in the United States being women ("AAMC: Department Chairs by Department, Sex, and Race/Ethnicity," n.d.). Furthermore, in a 2022 survey study, Ramos et al. found that 52% of state and regional orthopaedic societies never had a female president, and 75% of societies who reported having a female president had only one (Ramos, Daban, Kale, et al., n.d.). The disparity in female representation in academics and leadership in orthopaedic surgery may be the result of limited opportunities for career advancement.

Speaking at national meetings and presenting at grand rounds are important components for career advancement in academic medicine. These engagements allow orthopaedic surgeons to not only share their expertise, but also gain visibility amongst their colleagues. Several studies have demonstrated that women are less likely to present at medical conferences and on specialty panels (Gerull et al. 2020; Kraus, Gali, Cunningham, et al. 2020; Arora et al. 2020; Buell, Hemmelgarn, and Straus 2018; Boiko, Anderson, and Gordon 2017; Santosa, Larson, Vannucci, et al. 2019; Larson, Sharkey, Poorman, et al. 2020). A study by Arora et al. that evaluated the representation of women speakers from 2017 to 2018 at various national subspecialty medical conferences in five different countries found that only 30.1% were women (Arora et al. 2020). Similarly, in 2018, Gerull et al. evaluated the prevalence of female presenters at orthopaedic society meetings and found that only 13% of speakers were women (Gerull et al. 2020). They also found that female presenters were more likely to have a non-technical topic than men (e.g. diversity and work-life balance). Snow et al. had comparable findings in their study of female grand rounds speakers from 2020 to 2021 in which they also observed that only 13.6% of orthopaedic grand rounds speakers were women, with women being more likely to present on a non-technical topic (Snow et al., n.d.).

Although prior studies have evaluated the prevalence of female physicians who present at national meetings and

grand rounds, there is a lack of data available in the field of orthopaedic surgery. To our knowledge, the studies by Gerull et al. and Snow et al. are the only studies that address this topic in relation to orthopaedic surgery (Gerull et al. 2020; Snow et al., n.d.). However, the findings of both studies are limited to one year, with no data available to observe changes in female representation in speaking roles over time. With the recent COVID-19 pandemic, there may have been a change in the demographics of speakers due to several conferences transitioning to online platforms, which has effectively eliminated geographic barriers and travel expenses.

The purpose of this study was to determine how often female orthopaedic surgeons presented at orthopaedic grand rounds between 2016 – 2021, if there was a difference between the types of presentations (technical vs non-technical) given by female and male speakers, and whether the COVID-19 pandemic increased the number of opportunities available for female orthopaedic surgeons to speak at orthopaedic grand rounds with the transition to online platforms.

MATERIALS AND METHODS

This is a cross sectional study of Accreditation Council for Graduate Medical Education (ACGME) orthopaedic surgery residency programs in the United States (US) who are a part of the Collaborative Orthopaedic Education Research Group (COERG). There are 175 ACGME accredited programs in the US, and 89 programs were a part of COERG as of May 2022. The study was presented at the monthly COERG research meeting in January 2022. Afterwards, an anonymous survey was distributed via Qualtrics to the orthopaedic surgery residency program directors who expressed interest in participating. This study was evaluated by the Institutional Review Board at the senior author's institution and was considered exempt. The distributed survey included questions related to the number of grand rounds given within their department from September 2016 to February 2020, the number of speakers that were female within that time frame, and the types of presentations that were given by male and female presenters at their institution. When inquiring about gender, the survey did provide an option for "other (please specify)" in addition to "male" and "female." The presentations were designated as either technical or non-technical talks. Technical talks were defined as a lecture about topics including a surgical technique, outcome, basic science, or nonoperative treatment. Non-technical talks included topics such as diversity and inclusion, work-life balance, social media, education, relationships, and work environment. The participants were then asked to answer these same questions for the period from March 2020 to September 2021 to determine whether there was a difference in female representation amongst speakers during the COVID-19 pandemic. Additionally, the survey asked program directors if they shifted to a virtual platform after March 2020, to determine if a virtual platform allowed for greater gender diversity of grand rounds speakers. Lastly, the survey asked program directors to comment on who selects grand rounds speakers at their institution and to describe if there were any changes during the five-year period referenced in the survey.

STATISTICAL ANALYSIS

Descriptive statistics were used to describe the number of female and male grand rounds speakers, the types of presentations given, the platform used for grand rounds, as well as the selection committee. Statistical analysis was performed by using the Statistical Package for the Social Sciences (SPSS) (IBM, Armonk, NY, USA). Welch's t test was utilized to compare the average number of speakers before and after the pandemic. Additionally, Fisher's exact test was used to compare the gender diversity of grand rounds speakers before and after the pandemic as well as the types of presentations given by male and female presenters. Values were considered statistically significant if $p \leq 0.05$.

RESULTS

DEMOGRAPHICS

Eight orthopaedic surgery residency program directors (PD), all of whom identified as male, completed the survey. Geographically, four programs were in the Northeast (50%), two were in the Midwest (25%), and one in the South (12.25%). One program chose not to disclose their geographic location (12.25%). Seven out of eight programs (87.5%) indicated that the grand rounds speakers at their institution were selected by male orthopaedic surgeons in their department from September 2016 to September 2021, whereas one program (12.25%) indicated that grand rounds speakers were selected by an education committee during the same time period.

FREQUENCY OF FEMALE ORTHOPAEDIC GRAND ROUNDS SPEAKERS

Prior to the COVID-19 pandemic, programs invited, on average, 2.4 speakers per month to give grand rounds (range=1-3). Four of the eight programs (50%) reported that they invited speakers three times a month, while three programs (37.5%) invited speakers twice a month. One program invited a speaker once a month (12.25%). This was relatively unchanged during the COVID-19 pandemic (March 2020 – September 2021), when programs invited 2 speakers a month (range=1-3) (p=0.266). Six of the 8 programs (75%) invited speakers twice a month, whereas one program (12.25%) invited three speakers every month. One program invited a speaker once a month (12.25%). Between September 2016 to February 2020, 472 male speakers (83.7%, range: 15-131) and 92 female speakers (16.3%, range: 5-31) presented at grand rounds in the participating institutions (Table 1). There were no speakers who were identified under the "other" category. There was no significant difference in the gender distribution of speakers from March 2020 to September 2021, during which 81 men (79.4%, range: 2-28) and 21 women (20.6%, range: 0-7) presented (p=0.315). Two programs reported that they had 0 female

Table 1. Grand Rounds Speaker Data From Sept 2016-Sept 2021.

Pre-COVID (Sept 2016-Feb 2020)		Post-COVID (March 2020-Sept 2021)	
Number of Presenters		Number of Presenters	
Male	472 (83.7%)	Male	81 (79.4%)
Female	92 (16.3%)	Female	21(20.6%)
			P=0.315
Type of Presentations of Male Presenters		Types of Presentations of Male Presents	
Technical	366 (77.5%)	Technical	70 (86.4%)
Non-Technical	46 (9.8%)	Non-Technical	11 (13.6%)
Not Described	60 (12.7%)		
Type of Presentations of Female Presenters		Type of Presentations of Female Presenters	
Technical	71 (77.2%)	Technical	13 (61.9%)
Non-Technical	21 (22.8%)	Non-Technical	8 (38.1%)
	P=0.006		P=0.023

grand rounds speakers during the pandemic, although one of these programs previously reported that they had 31 female presenters prior to the COVID-19 pandemic from September 2016 to February 2020. Once again, there were no speakers who were identified under the "other" category.

TYPES OF PRESENTATION

Study participants were then asked to describe the types of presentations (technical vs non-technical) given by male and female speakers, as well as to report if the speakers were involved in any additional type of education (e.g., leading a skills lab, journal club, or case-based discussions). Between September 2016 and February 2020, male presenters were more likely to speak on a technical topic than female presenters (p=0.006). Of the 92 female grand rounds speakers, 71 (77.2%) presented on a technical topic and 21 (22.8%) on non-technical topics. When analyzing the male cohort, one program reported that they had 60 male speakers (12.7%) present from September 2016 to February 2020. However, the program did not identify the types of presentations given by those speakers, so that data was excluded from the analysis. Of the remaining 412 male grand rounds speakers, 366 presented technical talks (88.8%) and 46 gave non-technical talks (11.2%).

Only 2 programs (25%) reported that their female speakers were involved in education in addition to their grand rounds' presentation. In total, 10 female speakers (10.9%) were involved in educational activities in addition to their presentation. One female speaker (1.1%) led a skills lab and 9 female speakers (9.8%) participated in case-based discussion sessions. In comparison, four programs (50%) identified that their male speakers were involved in either hosting a journal club or case-based discussion in addition to their grand rounds' presentation. Forty-eight male speakers (10.1%) were involved in these additional educational sessions. Nine male speakers (1.9%) led a journal club and 39 (8.3%) participated in case-based discussions.

Program directors were also asked to address these same questions for the March 2020 to September 2021 period after the onset of the COVID-19 pandemic. There was no change in the gender distribution of presentations between male and female speakers. Male speakers were still more likely to present on a technical topic than female speakers (p=0.023). Of the 21 female presenters during this period, 13 gave technical talks (61.9%) and 8 gave non-technical talks (38.1%). In comparison, there were 81 male speakers, 70 of whom gave technical talks (86.4%) and 11 gave non-technical talks (13.6%). Two programs (25%) reported that none of their male speakers presented on a non-technical topic. Additionally, one program (12.25%) reported that 5 of their female speakers led case-based discussions (23.8%). Only one program (12.25%) reported that 7 male speakers (11.1%) were involved with a case-based discussion.

EDUCATIONAL PLATFORMS

With the onset of the COVID-19 pandemic, online educational platforms were increasingly utilized for resident education. From September 2016 to February 2020, 4 of 8 programs (50%) did not utilize an online platform for grand rounds. Of the four programs (50%) who did use an online platform, one program (12.25%) indicated that they used a virtual platform 1-20% of the time for grand rounds, 2 programs (25%) indicated they utilized a virtual platform 21-40% of the time, and 1 program (12.25%) used an online platform 41-60% of the time. Between March 2020 to September 2021, three programs (37.5%) reported utilizing a virtual platform 61-80% of the time for grand rounds and 4 (50%) reported utilizing an online platform 81-100% of the time. Only 1 program (12.25%) indicated that they did not use a virtual platform for grand rounds after the onset of the pandemic. Despite the increase in use of virtual platforms, there was no significant change in the gender distribution of grand rounds speakers.

DISCUSSION

The primary purpose of this study was to determine how often female orthopaedic surgeons presented at orthopaedic grand rounds between 2016 – 2021, if there was a difference between the types of presentations (technical vs non-technical) given by female versus male speakers, and whether the COVID-19 pandemic increased the number of opportunities available for female orthopaedic surgeons to speak at orthopaedic grand rounds with the transition to online platforms. The results of this study demonstrated that there was a higher frequency of male orthopaedic surgeons who gave grand rounds and that male speakers were more likely to present on a technical topic in comparison to female speakers. Furthermore, although several programs transitioned to online platforms after the onset of the COVID-19 pandemic, there was no significant change in the representation of female grand rounds speakers, or the types of presentations given by them.

FREQUENCY OF FEMALE ORTHOPAEDIC GRAND ROUNDS SPEAKERS

In this study, male orthopaedic surgeons presented during grand rounds four times more often than female orthopaedic surgeons. Overall, women comprised approximately 20% of grand rounds speakers, whereas men comprised almost 80%. This frequency was relatively unchanged even after the COVID-19 pandemic. The findings of this study are comparable to the results of other studies performed not only in orthopaedics, but in other medical and surgical subspecialities which indicate that women are vastly underrepresented amongst speakers at national and local conferences (Gerull et al. 2020; Kraus, Gali, Cunningham, et al. 2020; Arora et al. 2020; Buell, Hemmelgarn, and Straus 2018; Boiko, Anderson, and Gordon 2017; Santosa, Larson, Vannucci, et al. 2019; Larson, Sharkey, Poorman, et al. 2020). Within orthopaedics, Gerull et al. observed that women comprise only 14% of speakers at annual orthopaedic society meetings in 2018 (Gerull et al. 2020). Similarly, Snow et al. found that only 13.6% of orthopaedic grand rounds speakers from 2020-2021 were female in a study of 49 orthopaedic surgery residency programs (Snow et al., n.d.).

It has been suggested that the gender gap may be associated with a lack of interest rather than a lack of invitation of female orthopaedic surgeons to present at the local and national levels. However, previous studies have evaluated the gender disparity amongst invited presenters in academia outside of orthopaedics, which suggested that female and male professionals equally value these types of opportunities. For example, Nittrouer et al. performed a study between 2013 and 2014 to evaluate the gender disparity amongst invited colloquia speakers at the top 50 colleges and universities in the United States (Nittrouer et al. 2018). The authors found that women were not only less likely to be invited to be a colloquia speaker, but also were less likely to decline invitations for colloquium talks than men. Additionally, they performed a survey to ask faculty members about their perception of the importance of giving talks, and the authors found that women and men equally value the opportunity of colloquium presentations (Nittrouer et al. 2018). Given these findings, it is unlikely that the limited number of female orthopaedic surgeons giving grand rounds is due to a lack of interest or to female orthopaedic surgeons declining the opportunity to present.

Women continue to be underrepresented during speaking engagements at the local and national level throughout medicine. However, this disparity is even more apparent in orthopaedic surgery, in which only 8% of practicing orthopaedic surgeons are female. It has been hypothesized that the limited representation of female speakers at orthopaedic meetings may be due to fact that such few women pursue a career in orthopaedic surgery. However, Kraus et al. evaluated the proportion of female speakers at anesthesiology grand rounds between 2007-2018 and found that although there was a statistically significant increase in the number of female anesthesiologists within their department over the course of a decade, the increase in the number of female presenters at grand rounds was not proportional (Kraus, Gali, Cunningham, et al. 2020). These findings suggests that the small proportion of female speakers at orthopaedic grand rounds may not entirely be associated with the small percentage of female orthopaedic surgeons. Therefore, as the number of female orthopaedic surgeons increases, an intentional effort must be made to invite women to speak at academic conferences to provide opportunities for professional development and academic advancement.

TYPES OF PRESENTATION

During their evaluation of presentations by female orthopaedic surgeons at orthopaedic society meetings, Gerull et al. found that women were more likely to present on non-technical topics than technical topics in comparison their male counterparts, which is consistent with the findings of our study (Gerull et al. 2020). Similarly Snow et al. in their evaluation of grand rounds speakers between 2020 and 2021, found that female speakers were more likely to speak on a non-technical topic (Snow et al., n.d.). Although the non-technical topics are important, they do not carry the same esteem as technical presentations. By presenting on a technical topic, presenters can share their knowledge as an expert in their field. A non-technical topic presentation does not allow for the same opportunity, which makes the type of presentation another topic of gender disparity. Since female presenters are more likely to speak about a non-technical topic, they do not receive the same recognition or prestige as their male counterparts. It is, therefore, important to not only invite more women to speak during orthopaedic conferences, but also to encourage female presenters to speak about technical topics. In contrast, two programs in this study reported that none of their male speakers presented on a non-technical topic. As important as it is for female orthopaedic surgeons to present on technical topics, it is equally important for male orthopaedic surgeons to be involved in some of the non-technical talks. This provides an opportunity for the audience, often com-

posed of residents in training, to provide a more balanced discussion on topics such as wellness and work life balance.

IMPACT OF THE COVID-19 PANDEMIC

Due to the COVID-19 pandemic, resident education had to be modified, and there was a greater utilization of online platforms (Kogan et al. 2020). In this study, the surveyed orthopaedic residency programs mirrored this trend. It was hypothesized that the online platforms would allow for a greater diversity of speakers since the time and cost associated with travel were no longer significant barriers. The results of our study showed no change in the proportion of male and female grand rounds speakers during the COVID-19 pandemic. However, two programs (28%) reported that they had no female grand rounds speakers during this period. One of the two programs had previously reported that they had 31 female speakers at their institution from September 2016 to February 2020, which was the highest number of female speakers reported at single program in this study.

The COVID-19 pandemic continues to have significant impact in medicine not only regarding patient care and resident education, but also gender equity. Although the general work force is now equally comprised of both men and women, women are still most often considered the primary caregivers and homemakers. The COVID-19 pandemic has propagated some of these gender inequities in academic medicine with a disproportionate increase in home responsibilities for female physicians in comparison to male physicians. Comparably, radiologists and oncologists performed surveys in their respective fields, and female physicians reported that their responsibilities at home increased significantly more than their male counterparts, which negatively impacted their professional productivity and ability to engage in scholarly activity, such as research (Garrido, Adjei, Bajpai, et al. 2021; Plaunova et al. 2021; Tso and Parikh 2021). This brings forth the concern that the new challenges associated with the pandemic may further propagate the gender inequity in medicine and limit the ability of women to advance their careers in academia (Woitowich et al. 2021).

GRAND ROUNDS SPEAKER SELECTION

Seven out of the eight programs who responded to the survey indicated that grand rounds speakers were selected by male orthopaedic surgeons. A study by Arora et al. observed that women were more likely to be invited to speak at medical conferences if there were women on the committee selecting the speakers (Arora et al. 2020). Similarly, Gerull et al. found that women had more opportunities to speak at national conferences if there were women in leadership positions within the society or if there was a diversity initiative within the society (Gerull et al. 2020). Therefore, one way to increase the gender diversity of physicians in academia is through the mentorship and promotion of female orthopaedic surgeons. Speaking at grand rounds not only allows for career advancement, but also increases the visibility of female mentors for female medical students. When female orthopaedic surgeons were asked about their opinion regarding why female medical students may not pursue orthopaedic surgery, 69% responded that they believe it is associated with a lack of strong mentorship (Rohde, Wolf, and Adams 2016). Increasing the diversity of speakers at orthopaedic grand rounds would create more opportunities for female medical students to connect with female mentors. This would in turn foster female interest and improve the gender diversity of the field overall.

LIMITATIONS

This study has several limitations. The findings of this study are limited to the eight programs who elected to participate in the study, which may serve as a source of selection bias. However, the findings of this study are comparable to studies performed in other medical subspecialties, as well as the study performed by Gerull et al. in 2018 and Snow et al. from 2020-2021 (Gerull et al. 2020; Snow et al., n.d.). Additionally, program directors who agreed to participate may be individuals who are cognizant of the gender gap within orthopaedics and understand the importance of diversity. As a result, the programs included in this study may a higher frequency of female speakers in comparison to other programs.

CONCLUSION

Male orthopaedic surgeons more frequently present at grand rounds in comparison to female orthopaedic surgeons. This was unchanged during the COVID-19 pandemic when online platforms were increasingly utilized. Male speakers were more likely to present on technical topics; whereas female speakers were more likely to present on non-technical topics. Understanding the gender disparity amongst orthopaedic grand rounds speakers is necessary for programs to re-evaluate and revise the methodology by which speakers are selected. This can allow for more balanced topic discussions and can foster female career advancement in academia.

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