

Has Diversity Increased in Orthopaedic Residency Programs since 1995?

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Abstract

Background Diversity among health professionals is believed to be an important step toward improving patient communication and addressing health disparities. Orthopaedic surgery traditionally has been overly represented by Caucasian males, and it remains one of the least racially and gender-diversified surgical subspecialties. As the US population becomes increasingly diverse, a concomitant increase in ethnic diversity and gender diversity is needed to ensure that all Americans receive high-quality, culturally competent health care.

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Questions/purposes We asked whether (1) representation of female orthopaedic residents and clinical faculty and (2) representation of ethnic minority orthopaedic residents, clinical faculty, and basic science faculty increased during the past 15 years since our original study.

Methods A questionnaire, created on SurveyMonkey®, was distributed by email to the coordinators of all 152 orthopaedic residency training programs in the United States. **Results** Eighty (53%) responses were received. The percentage of female orthopaedic surgery residents and female clinical faculty has nearly doubled since 1995. The percentages of African American, Asian/Pacific Islander, and Hispanic orthopaedic residents, and of clinical faculty have increased. Orthopaedic basic science research faculty is 83% male and is comprised primarily of Caucasians (62%) and Asian/Pacific Islanders (24%).

Conclusions Despite the increase in diversity in the orthopaedic workforce during the past 15 years, ethnic and gender disparities persist among orthopaedic residency programs regarding residents, clinical faculty, and basic research faculty. To increase diversity in orthopaedic residency programs, an emphasis on recruiting ethnic and gender minority candidates needs to become a priority in the orthopaedic academic community.

Introduction

According to the Council on Graduate Medical Education, the ethnic composition of the physician workforce does not reflect the diverse populations in the United States, which contributes to healthcare access problems for underrepresented minorities seeking medical care [12]. Historically, African American and Native Americans have trailed Caucasian Americans in almost every healthcare index,

including mortality and compromised average life expectancy [19]. No specialty in the discipline of surgery is devoid of documented evidence of racial disparities [3, 8, 15, 22, 34, 36]. Disparities in minority patient access to appropriate surgical management remain a major problem in the United States [2, 16, 20, 23]. With respect to disparities in orthopaedic care, the rates of total hip arthroplasty and total knee arthroplasty among African American and Hispanic patients are substantially lower than those among non-Hispanic Caucasian patients [24]. Hispanic patients presenting to the emergency department with long-bone fractures are half as likely as non-Hispanic Caucasians to receive pain medication, and they wait nearly twice as long as non-Hispanic Caucasians to receive pain medication [31, 32].

Diversity among health professionals is believed to be an important step toward improving patient communication and addressing healthcare disparities [27]. The profession of orthopaedic surgery traditionally has been overrepresented by Caucasian males, and it remains one of the least racially and gender-diversified surgical subspecialties [4, 5, 17].

The composition of the patients served by orthopaedic surgeons in the United States is changing. Thirty-nine percent of the 2050 population will be comprised of African Americans, Hispanic Americans, American Indians, Alaska Natives, and Pacific Islanders—groups that are underrepresented in the medical profession [32, 33]. As minorities become a larger percentage of the total US population, healthcare access problems and disparities will progressively worsen unless meeting the healthcare needs for this emerging majority becomes a priority.

One of the ways in which underrepresented minority communities can be better served is greater representation from their own minority group serving as their health professionals [21]. Patient-physician race-concordant visits are characterized by higher patient ratings of satisfaction and more positive judgments of physicians' participatory decision-making style [10, 11, 28]. Minority healthcare professionals are more likely than their Caucasian peers to treat patients of color and to practice in medically underserved communities [7]. As the US population becomes increasingly diverse, a concomitant increase in ethnic diversity among orthopaedic surgeons is needed to ensure that all American citizens receive high-quality, culturally competent health care.

Our previous study, which was conducted in 1995 and based on the most current US Census data at that time, surveyed 159 orthopaedic residency programs and showed that African Americans comprised 12.6% of the population but only 3.6% of the orthopaedic residents; Hispanics comprised 10.2% of the population but only 3% of orthopaedic residents [18]. It is unclear whether any progress has been made to enhance diversity.

Utilizing our previously distributed questionnaire, we reexamined the ethnic and gender workforce in current orthopaedic educational programs across the United States to determine if representation of (1) female orthopaedic residents and clinical faculty and (2) ethnic minority orthopaedic residents, clinical faculty, and basic science faculty has increased during the past 15 years.

Materials and Methods

The pilot questionnaire originally was developed in 1994. It was reviewed by three orthopaedic chairpersons and four orthopaedic clinical faculty members. Based on their comments, a second pilot survey was developed and reviewed by 20 orthopaedic residents. The pilot survey then was revised, finalized, and distributed to 159 orthopaedic residency chairpersons in 1995. This same questionnaire was modified only slightly based on comments from responses received in 1995. The final version of the survey was uploaded onto SurveyMonkey® (1999–2011 www.SurveyMonkey.com, LLC, Palo Alto, CA, USA) and distributed by email between January 3, 2011, and May 6, 2011, to the coordinators of all 152 Accreditation Council for Graduate Medical Education (ACGME)-accredited orthopaedic educational programs in the United States, which has decreased in number from 159 in 1995 to 152 as of 2010. The coordinators' email addresses were obtained from the American Medical Association's Fellowship and Residency Electronic Interactive Database (FREIDA). FREIDA Online has contact information for 9000 graduate medical education programs accredited by the ACGME and for greater than 200 combined specialty programs. Residency coordinators with an active email address were contacted by email and provided a letter that described the purpose of our study and identified the principal investigator. The announcement informed participants that the computerized survey would take approximately 30 minutes to complete and contained a unique, self-identifying link to the survey. Each questionnaire contained 15 questions addressing the ethnicity of the institution's orthopaedic residents, orthopaedic clinical faculty, and orthopaedic basic science research faculty (supplemental materials are available with the online version of CORR). We categorized ethnicity in the following manner: Caucasian, African-American, Asian/Pacific Islander, Native American/Alaskan Native, Hispanic, and Other. The questionnaire also requested identification of residents' gender, the proportion of residency graduates who continued in orthopaedic fellowships, and the type of fellowship secured. Participants were informed that survey participation was voluntary and were given the option to decline with no consequence.

No incentives were offered for survey completion. Consent was implied if participants completed and submitted the survey. Followup emails with an attached survey link were sent to nonresponders 3 weeks after initial survey distribution. After the second email wave distribution, 93 typewritten letters were sent to program directors of nonresponding programs. After the third email wave distribution, 10 typewritten letters were sent to nonresponding program chairpersons. Response rates for individual waves were as follows: Wave 1: n = 34 (22%); Wave 2: n = 16 (14%); Wave 3: n = 15 (15%); and Wave 4: n = 10 (11%). We received one letter from a chairperson declining participation. Eighty (53%) responses were received (Table 1).

Results

The percentage of female orthopaedic surgery residents and clinical faculty has increased since 1995 (Table 2). A

Table 1. Geographic distribution of responding and nonresponding programs

Region	Number (%) of responding programs	Number (%) of nonresponding programs
New England	5 (6)	4 (5)
Middle Atlantic	16 (20)	16 (22)
East North Central	17 (21)	9 (13)
West North Central	5 (6)	5 (7)
South Atlantic	11 (14)	17 (24)
East South Central	4 (5)	4 (6)
West South Central	8 (10)	8 (11)
Mountain	2 (3)	3 (4)
Pacific	11 (14)	6 (8)
Puerto Rico	1 (1)	0 (0)
Total	80 (100)	72 (100)

higher percentage of male postgraduate year (PGY)-5 orthopaedic surgery residents secured postgraduate fellowships than female PGY-5 orthopaedic surgery residents (Fig. 1). Only 17% of basic science research faculty is comprised of female researchers (Table 2).

The percentages of African American, Asian/Pacific Islander, and Hispanic orthopaedic residents and clinical faculty have increased during the past 15 years, whereas the percentages of Caucasian and Native American/Alaskan Native orthopaedic residents have decreased (Table 2). Regarding basic science research faculty, the percentages of African American and Native American researchers have decreased, whereas the percentages of Hispanic and Asian/Pacific Islander researchers have increased (Table 2).

Discussion

As the population treated by orthopaedic surgeons becomes increasingly diverse, there is a need to increase the

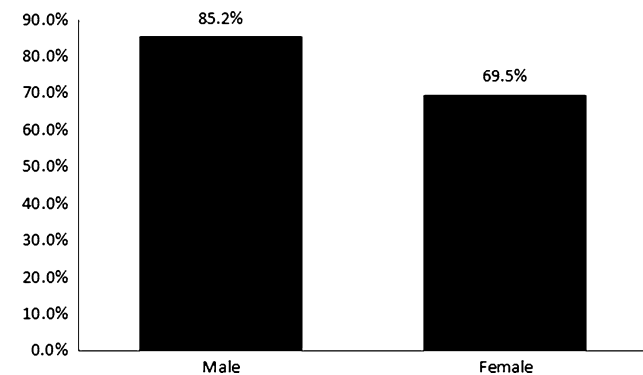


Fig. 1 Of 2009 orthopaedic residency graduates (PGY-5+), men are securing postresidency orthopaedic fellowships at a greater percentage than females.

Table 2. Year percentage comparisons of the gender and ethnic composition of orthopaedic residents, clinical faculty, and research faculty

Demographic	Residents		Clinical faculty		Research faculty	
	1995 N = 1500 (%)	2010 N = 1877 (%)	1995 N = 1780 (%)	2010 N = 2289 (%)	1995 N = 225 (%)	2010 N = 335 (%)
Female sex	92 (6.1)	272 (14.5)	87 (4.9)	185 (8.1)	Unknown	56 (16.7)
Ethnicity						
Caucasian	1263 (84.2)	1447 (77.1)	1622 (91.1)	1966 (85.9)	151 (67.2)	206 (61.5)
African American	54 (3.6)	101 (5.4)	37 (2.1)	71 (3.1)	29 (12.9)	9 (2.7)
Asian/Pacific Islander	99 (6.6)	221 (11.8)	45 (2.5)	179 (7.8)	20 (9.0)	82 (24.4)
Native American/Alaskan Native	33 (2.2)	4 (0.2)	34 (1.9)	5 (0.2)	17 (7.5)	0 (0)
Hispanic	45 (3.0)	65 (3.5)	25 (1.4)	52 (2.3)	8 (3.4)	23 (6.8)
Other	6 (0.4)	39 (2.1)	0 (0)	16 (0.7)	0 (0)	15 (4.5)

diversity in the orthopaedic workforce to enhance patient satisfaction and provide high-quality, culturally competent orthopaedic health care. The purpose of our study is to determine if representation of (1) female orthopaedic residents and clinical faculty and (2) ethnic minority orthopaedic residents, clinical faculty, and basic science faculty increased during the past 15 years.

We acknowledge limitations to our study. First, our response rate is 53%. To increase our response rate, we initially contacted the Association of Residency Coordinators in Orthopaedic Surgery to request the listserv of all the orthopaedic residency coordinator members; however, our request was denied owing to privacy issues. We sent type-written letters to the orthopaedic program directors and chairpersons after the second and third waves of survey distributions. Seventy-two programs did not respond to our survey after four attempts. It is unclear how the metrics of participating programs differed from those of nonparticipating programs. One residency coordinator informed us that the information requested at her institution was not readily available, especially the demographic information of the basic science research faculty. Additionally, we did not mail a hard copy of the survey to orthopaedic residency coordinators who did not respond to our survey. Security firewalls also limited respondents' access to our emailed surveys. Even though our response rate is 53%, which is similar to the rate in our previous study (56%) [18], this is a respectable response rate for a survey administered by email and does not jeopardize the quality of our findings. Second, the residency coordinators completed the questionnaire. Despite the questionnaire asking questions regarding ethnicity of residents, clinical faculty, and basic science researchers, the residency coordinators were able to obtain this information, although we cannot ensure errors from recall bias.

Compared with the 1995 results [18], our current findings show gender diversity in the orthopaedic workforce has increased during the past 15 years. The percentage of female orthopaedic surgery residents has increased from 6.1% to 14.5%, whereas the percentage of female clinical faculty has increased from 4.9% to 8.1%. Since 1980, women have steadily increased their numbers among medical school graduates. In 2007, women comprised nearly 50% of the 16,142 US medical school graduates [1]. Our data confirm that the number of female orthopaedists likewise has increased during the past 15 years. However, women continue to be underrepresented in orthopaedic surgery residencies. Interestingly, gender underrepresentation in orthopaedics does not reflect a failure of surgical subspecialties as a whole to recruit women; surgical subspecialties other than orthopaedics have been considerably more successful in increasing the numbers of women entering their ranks during the past 35 years [14]. There are several possible explanations for the persistent gender discrepancy in

orthopaedic surgery. In the past, women were discouraged from entering orthopaedics given its reputation as a specialty for which women were not physically suited [30]. The orthopaedic profession may lose more than half of the traditional top-tier residency applicant pool unless orthopaedic educational programs increase efforts and effectiveness in recruiting more female applicants [17]. To decrease this gender discrepancy, female medical students should be encouraged to apply to orthopaedic programs and have the opportunity to develop mentoring opportunities with women orthopaedic surgeons or other appropriate mentors to help dispel false stereotypes of the orthopaedic profession.

Our findings also show that ethnic diversity has increased during the past 15 years. African American, Asian/Pacific Islander, and Hispanic orthopaedic residents have increased by 1.8%, 5.2%, and 0.5%, respectively. Similar trends are seen for African Americans, Asian/Pacific Islanders, and Hispanics regarding clinical faculty. Orthopaedic basic science research faculty is comprised primarily of Caucasians and Asian/Pacific Islanders. Despite the increase in diversity in the orthopaedic workforce, ethnic disparities remain among orthopaedic residency educational programs for residents, clinical faculty, and basic science research faculty. In 1995, African Americans and Hispanics comprised 5.8% and 5.7% of US medical school graduates, compared with 6.8% and 6.7% in 2007 [1]. This disparity stems from barriers underrepresented minorities encounter when pursuing an education [21, 35]. These obstacles begin as early as the primary school years and may continue through medical school [21, 26]. Increasing the number of underrepresented minority students who successfully advance through the elementary, secondary, and postsecondary academic pipeline is the first step toward increasing the number of underrepresented minority students eligible to enter medical school and pursue orthopaedics as a career. If underrepresented minorities remain in the academic pipeline, the proportions of underrepresented minority college graduates who apply to medical school are similar to, or even greater than, the proportions of white college graduates applying to medical school [9]. Underrepresented minority college graduates in 2000–2001 applied to medical school at a rate of 28 per 1000 graduates compared with a rate of 25 per 1000 white college graduates applying to medical school that year [13]. Since orthopaedic residency programs are limited to the medical school applicant pool, there is a need for pipeline programs during the elementary and middle school years to subsequently increase the number of underrepresented minorities who enroll in college and medical school [29]. Underrepresented minority medical students interested in orthopaedics should seek out mentors and role models who are able to define and show the requisite academic and research pathways needed to achieve acceptance into an orthopaedic residency.

Table 3. Comparison of studies investigating diversity in orthopaedics during the past 10 years

Study	Year of data analysis	Residents				Clinical faculty			
		Female	Caucasian	African-American	Hispanic	Female	Caucasian	African-American	Hispanic
		Number (%)	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)	Number (%)
Blakemore et al. [5]	2001	(8.9) [#]	*	*	*	*	*	*	*
Day et al. [14]	2007	399 (12.4)	2193 (68.3)	127 (4.0)	123 (3.8)	327 (13.4)	1860 (76.0)	61 (2.5)	59 (2.4)
Okike et al. [25]	2008	*	*	149 (4.5)	150 (4.5)	*	*	*	*
Current study	2010	272 (14.5)	1447 (77.1)	101 (5.4)	65 (3.5)	185 (8.1)	1966 (85.9)	71 (3.1)	52 (2.3)

[#] Study did not mention raw numbers; * study did not investigate the specified variable.

There have been few studies investigating diversity changes in orthopaedics during the past decade (Table 3). Blakemore et al. [5] reported that the percentage of female orthopaedic residents increased from 0.6% in 1970 to 8.9% in 2001, however, statistical comparison of the fields indicated that the increases in the proportion of women in general surgery, ophthalmology, obstetrics and gynecology, otolaryngology, and urology were greater than the proportion of women in orthopaedic surgery during this 30-year period. Day et al. [14] reported that in 2007, the ethnic composition of orthopaedic residents was lower than for several other specialties including general surgery, neurosurgery, internal medicine, family medicine, and pediatrics. They also stated that African-Americans, Hispanics, and Asian-Americans were underrepresented among orthopaedic faculty compared with their representation in orthopaedic residency programs [14]. Okike et al. [25] reported that from 2001 to 2008, orthopaedic surgery was less diverse than 11 other residencies examined [25]. In addition, temporal analysis conducted by Okike et al. showed that this situation has existed for decades, with no suggestion of change in the near future [25]. Our study showed similar discrepancies in diversity in the orthopaedic workforce. Although there have been improvements in diversity in orthopaedic surgery residencies during the past 15 years, gender and ethnic disparities continue to exist. Therefore, much more needs to be done to encourage women and underrepresented minorities to enter the profession of orthopaedic surgery. It remains unclear why diversity in orthopaedics remains low. The problem may be attributable to a lack of interest, lack of exposure, or lack of support; however, women and underrepresented minorities more often are channeled toward nonsurgical specialties such as internal medicine, pediatrics, and primary care [6]. As minority physicians are more likely to treat patients of color and patients lacking health insurance, and practice in underserved communities, there is evidently a need for more minority orthopaedic surgeons as the population of the United States becomes more diverse.

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