Academic Productivity of American Shoulder and Elbow Surgeons Fellowship Programs and Affiliated Faculty

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ABSTRACT

BACKGROUND: Academic productivity is an important factor in determining career success and institutional ranking. The Hirsch-index (h-index) is a validated measure that assesses both quantity and quality of research output. The aim was to explore factors associated with increased academic productivity among American Shoulder and Elbow Surgeons(ASES)-recognized fellowship programs and faculty.

METHODS: Shoulder and elbow surgery fellowship programs and affiliated faculty were identified via the ASES website, searched on December 6, 2023. Program-specific and faculty-specific characteristics were recorded. The h-index and total publication number were used as metrics and determined for each faculty member using the Scopus database.

RESULTS: A total of 156 faculty members from 34 ASES fellowship programs were included, of which 96.2% were male, 77.6% academically affiliated, and 81.4% completed a shoulder and elbow surgery fellowship. The average years in practice was 18.3 years. The average h-index and total publications per fellowship program were 24.9(SD 12.5, IQR 16.6–33) and 520.3 (SD 458.8, IQR 181–649), respectively. Academic affiliation and faculty number were significant factors associated with increased h-index and total publications of a program. The average h-index and total publications per faculty member were 26.9 (SD 22.7, IQR 9.5–38.5) and 125.4(SD 145.4, IQR 26–169), respectively. Academic title of Professor, years in practice, and research staff were independent factors associated with faculty member productivity.

CONCLUSION: ASES-recognized fellowship programs and affiliated faculty demonstrated a high level of academic productivity. This information can help shoulder and elbow surgeons benchmark and further improve their research output and academic influence.

KEYWORDS: Academic productivity; shoulder and elbow surgery; research; h-index; fellowship

INTRODUCTION

Academic productivity continues to be strongly emphasized in the field of orthopedic surgery. In addition to clinical service and education, research productivity is a major factor in determining career success, institutional ranking, and eligibility for promotion for surgeon physicians.[1,2] As many orthopedic programs emphasize and strive for academic excellence, research productivity can also play an important role in faculty recruitment.[1,3,4] The cumulative productivity of faculty members within a program, which contributes to the overall reputation of a program, may also influence a candidate's choice of fellowship training.[5] Thus, an objective metric is necessary to quantify research productivity.

While several metrics exist to measure academic productivity, including total publications, total citations, publication type, journal impact factor, and grant funding, an accepted metric that assesses both quantity and quality of research output is the Hirsch index (h-index).[1,2,6] The h-index is defined as the number of publications (h) with at least h number of citations.[6] Hence, an author with an h-index of 4 has four publications that have been cited at least four times each. The h-index has been adopted and used as a benchmarking tool in academic medicine,[7-10] and in the field of orthopedics research, including sports medicine, spine, adult joint reconstruction, and hand surgery subspecialties.[2,11-13]

Within the field of shoulder and elbow surgery, Cope et al previously explored factors influencing academic productivity among fellowship programs and determined that the most important factors were the total number of years of experience of faculty in a fellowship program as well as medical school affiliation.[14] However, in their study, the authors only included publications between 2010 and 2014, assessed factors associated with productivity of fellowship programs and not that of the individual faculty members, and used total number of citations as the metric to measure academic productivity.[14] With the significance of academic productivity for both surgeon physicians and programs, the aim of our study is to characterize and explore factors associated with increased academic productivity among American Shoulder and Elbow Surgeons (ASES) recognized fellowship programs and affiliated faculty, using h-index and total number of publications as metrics.

METHODS

Study Design

Shoulder and elbow surgeons who are active participating full-time members within ASES-recognized shoulder and elbow fellowship programs were included in this study. A comprehensive list of current fellowship programs and faculty members was compiled via the ASES website (https://www.ases-assn.org/shoulder-and-elbow-fellowships/) searched on December 6, 2023. Each faculty member was searched individually to confirm their active association with the specific institution and fellowship program.

Independent Study Variables (Predictors)

Program-specific characteristics were collected from the respective website of each program, including academic affiliation, number of faculty members, number of fellows, clinical fellow research requirement, availability of a dedicated research staff, and region. Programs were categorized as academic-affiliated if their institution was associated with a medical school. Number of faculty members was categorized into three groups: 1–3, 4–5, and >5. Programs were assigned a region based on the US Census Bureau classification: West, Midwest, South, and Northeast.

Faculty-specific characteristics were collected using physician profiles on departmental websites or via publicly available websites, including gender, clinical fellowship training, academic title, departmental position, and years in practice. Academic title was comprised of four categories: Assistant Professor, Associate Professor, Professor, and Clinical Instructor. Faculty members were recorded as a Clinical Instructor if they were not affiliated with an academic program. Departmental positions included positions such as Fellowship Director/Co-director and Chairman of the Department of Orthopaedics. Years in practice was calculated from last year of fellowship or residency to the year 2023. Program-specific characteristics were also assigned to each faculty member based on their associated institution and program in order to account for factors related to the program in the analysis.

Dependent Study Variables (Outcomes)

The Scopus database (Elsevier B.V., Amsterdam, Netherlands) was queried to collect the h-index, total number of publications, and total number of citations of each faculty member, and calculate the mean h-index and collective total number of publications for each fellowship program. Publications with more than one faculty member as an author were counted only once to avoid repetition when determining the collective total number of unique publications of each program. All searches were performed and completed in December 2023. The primary outcomes were mean h-index and mean number of publications.

Statistical Analysis

The mean, standard deviation, median, and interquartile range (IQR) of both the h-index and the number of publications were calculated for programs and faculty members. Univariate analysis of each program- and faculty-specific characteristic was performed using a two-tailed Student t-test for two-group comparisons and analysis of variance (ANOVA) for between-group comparisons of three or more subgroups. Variables with a p-value <.05 were included in the multivariate model, and a multivariate regression analysis was performed to identify statistically significant independent predictors of h-index and total number of publications for a program and faculty member. A p-value of <.05 determined significance. Statistical analyses were performed using Stata statistical software, Release 14.1 (StataCorp LLC, College Station, TX).

RESULTS

Program and Faculty Characteristics

Thirty-four shoulder and elbow fellowship programs were identified [**Table 1**]. Twenty-three (68%) had an academic

Table 1. Program Characteristics

Characteristic	N (%)
Academic Affiliation	
Yes	23 (67.7)
No	11 (32.3)
Number of Faculty Members	
1–3	13 (38.2)
4–5	11 (32.2)
>5	10 (29.4)
Number of Fellows	
1	24 (70.6)
2	8 (23.5)
3	1 (2.9)
4	1 (2.9)
Fellow Research Requirement	
Yes	26 (76.5)
No	8 (23.5)
Dedicated Research Staff	
Yes	21 (61.8)
No	13 (38.2)
Region	
Northeast	12 (35.3)
Southeast	5 (14.7)
Midwest	7 (20.6)
West	8 (23.5)
Southwest	2 (5.9)

Table 2. Faculty Characteristics

Characteristic	N (%)
Academic Affiliation	
Yes	121 (77.6)
No	35 (22.4)
Gender	
Male	150 (96.2)
Female	6 (3.8)
Shoulder and Elbow Fellowship trained	
Yes	127 (81.4)
No	29 (18.6)
Second Fellowship	
Sports Medicine	23 (19.0)
Hands	10 (8.3)
Trauma	3 (2.5)
Academic Title	
Assistant Professor	25 (16.0)
Associate Professor	28 (17.9)
Professor	55 (35.3)
Clinical Instructor	48 (30.8)
Departmental Position	
Yes	46 (29.5)
No	110 (70.5)
Years in Practice	
Mean	18.3
Standard deviation	11.1
Range	1, 49

Table 3. Mean h-index and total publications per fellowship program on univariate analysis

Characteristic	H-Index				Total Publications			
	Mean	SD	IQR	p-value	Mean	SD	IQR	p-value
Total Overall	24.9	12.5	16.6–33		520.3	458.8	181–649	
Academic Affiliation*								
Yes	30.6	10.6	24.8–34.8	<0.001	674.3	473.1	298–897	**0.002**
No	13.1	6.2	6.7–18.6		198.2	182.9	60–391	
Number of Faculty*								
1–3	18.5	9.3	11–26	**0.044**	197.5	147.1	108–283	**0.001**
4–5	30.6	12.9	20.5–38		614	474.5	298–741	
>5	27.1	12.9	18.4–33		836.8	469.2	504–1253	
Number of Fellows								
1	23.0	13.8	13.1–30.2	0.312	441.5	468.6	109–637	0.306
2	30.9	7.2	26.4–33.9		698.8	355.1	437–975	
>2	24.4	8.2	18.6–30.2		751.5	709.2	250–1253	
Fellow Research Requirement								
Yes	27.5	12.4	18.6–34	**0.015**	599	489.3	203–867	**0.035**
No	16.6	9.2	9.1–21.6		264.4	198.2	89–447.5	
Research Staff								
Yes	27.9	12.9	18.6–34	**0.037**	625.8	525.4	203–897	**0.044**
No	20.1	10.6	9.7–28.7		349.8	260.4	94–630	
Region								
Northeast	28.4	12.3	20.7–36.4	0.198	634.3	500.8	243–1075	0.521
Southeast	20.3	8.4	18.4–19.7		331	197.1	184–391	
Midwest	31.0	16.0	16.7–44.2		636.1	656.2	110–1208	
West	17.7	9.9	7.6–27.6		340.5	319.0	72–560	
Southwest	23.3	6.7	18.5–28		622.5	167.6	504–741	

SD, Standard deviation; IQR, Interquartile range.
P-values in bold indicate significance in the univariate analysis.
* Factors that were significantly associated with increased mean h-index and total number of publications in the multivariate analysis.

affiliation with a medical school. The number of faculty members varied across programs: 13 (38%) had one to three faculty members, 11 (32%) had four to five, and 10 (30%) had more than five members. A total of 47 fellowship positions were available at the 34 programs, with 24 programs (71%) offering a position for one fellow, and 8 (24%) offering positions for two fellows. Twenty-six (77%) had a research requirement for fellows, and 21 (62%) had a dedicated research staff. The majority of fellowship programs were in the Northeast (35.3%), followed by the West (23.5%) and Midwest (20.6%).

Within the 34 fellowship programs, a total of 156 faculty members were identified [**Table 2**]. The majority of faculty members were at academic programs (n=121, 78%) and were male (n=150, 96%). One hundred and twenty-seven (81%) faculty members were shoulder and elbow fellowship trained, of which 35 completed an additional fellowship in sports medicine (n=23), hand (n=10), or trauma (n=5). Of note, one faculty member completed three fellowships in shoulder and elbow, sports medicine, and hand. With regards to academic title, 16% were Assistant Professors, 18% were Associate Professors, 35% were Professors, and 31% were Clinical Instructors. Forty-six (29.5%) held departmental positions. The mean years in practice was 18.3 ± 11.1 (median 17; range, 1–49 years).

Academic Productivity of Programs and Faculty

The average collective number of total publications of all faculty members in a program was 520.3 ± 458.8 (median 391; IQR, 181–649), and the average h-index per fellowship program was 24.9 ± 12.5 (median 25.4; IQR, 16.6–33) [**Table 3**]. The average number of publications per faculty member was 125.4 ± 145.4 (median 74; IQR, 26–169); the average h-index was 26.9 ± 22.7 (median 21; IQR, 9.5–38.5); and the average number of citations was 4291.9 ± 7092.7 (median 1567; IQR, 421.5–5061.5) [**Table 4**].

Table 4. Mean h-index and total publications per fellowship-associated faculty member on univariate analysis

Characteristic	H–Index				Total Publications			
	Mean	SD	IQR	p–value	Mean	SD	IQR	p–value
Total Overall	26.9	22.7	9.5–38.5		125.4	145.4	26–169	
Academic Affiliation								
Yes	30.4	23.3	14–42	**<0.001**	147.4	153.9	41–209	**<0.001**
No	14.6	15.3	4–16		49.2	71.3	7–50	
Gender								
Male	27.0	22.9	10–38	0.310	126.0	146.1	26–166	0.285
Female	22.3	19.1	9–42		108.7	137.8	25–179	
Shoulder and Elbow Fellowship Trained								
Yes	25.8	21.0	10–38	0.877	119.9	127.5	27–164	0.837
No	31.3	29.2	7–47		149.3	207.5	17–187	
Academic Title*								
Professor	42.3	23.7	23–59	**<0.001**	221.4	175.3	85–310	**<0.001**
Associate Professor	25.4	12.3	17–31.5		116.9	80.5	52–173	
Assistant Professor	17.1	24.0	5–20		70.2	126.6	17–74	
Clinical Instructor	15.0	14.0	5.5–19		48.9	63.6	7.5–60	
Departmental Position								
Yes	31.6	23.1	16–42	**0.045**	143.5	137.7	43–182	0.157
No	24.9	23.1	6–34		117.7	148.4	20–162	
Fellow Research Requirement								
Yes	30.3	23.6	12–42	**<0.001**	152.0	157.7	41–220	**<0.001**
No	17.5	17.0	7–21		52.9	63.5	10–62	
Research Staff*								
Yes	30.4	22.9	14–42	**0.005**	150.2	156.5	38–220	**0.002**
No	20.7	21.2	6–24		82.2	112.5	18–88	
Region								
Northeast	32.5	23.3	16–43	**0.008**	150.0	137.4	58–213	**0.044**
Southeast	19.1	15.2	6–25		87.6	87.6	25–135	
Midwest	33.2	22.8	17–44		170.4	192.4	49–209	
West	18.7	18.0	5–24		88.3	117.4	8–102	
Southwest	21.4	29.0	5–21.4		77.8	157.6	8–66.5	

SD, Standard deviation; IQR, Interquartile range.
P-values in bold indicate significance in the univariate analysis.
* Factors that were significantly associated with increased mean h-index and total number of publications in the multivariate analysis.

Factors Associated with Increased Productivity of Fellowship Programs

On univariate analysis, academic affiliation (p<0.001), number of faculty members (p=0.044), fellow research requirement (p=0.015), and research staff (p=0.037) were significantly associated with increased mean h-index for a program [**Table 3**]. However, on multivariate analysis, only

academic affiliation (regression coefficient [RC] 14.1, 95% CI 6.8–21.6, p=0.001) and number of faculty members (>5 vs. 1–3: RC 8.2, 95% CI 0.8–15.5, p=0.030; 4–5 vs. 1–3: RC 11.5, 95% CI 4.3–18.7, p=0.003) remained significant and were independent predictors for increased mean h-index for fellowship programs (R2=0.62) [**Table 5**].
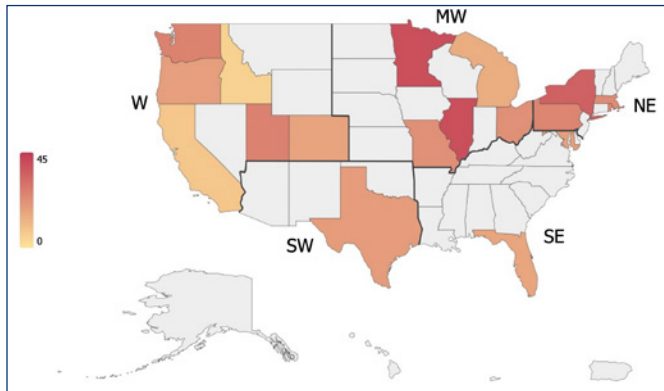
Similarly, when assessing factors associated with increased total number of publications for a program, academic affiliation (p=0.002), number of faculty members (p=0.001), fellow research requirement (p=0.035), and research staff (p=0.044) were significant [**Table 3**]. On multivariate analysis, academic affiliation (RC 295.3, 95% CI 25.5–565.0, p=0.033) and number of faculty members (>5 vs. 1–3: RC 658.2, 95% CI 390.6–925.7, p<0.001; 4–5 vs. 1–3: RC 433.9, 95% CI 172.2–695.5, p=0.002) were found to be independent predictors for increased total publications (R2=0.63) [**Table 5**]. Number of fellows and region had no significant effect on mean h-index and total publications.

Factors Associated with Increased Productivity of Faculty Members

On univariate analysis, academic affiliation (p<0.001), academic title (p<0.001), departmental position (p=0.045), fellow research requirement (p<0.001), research staff (p=0.004), region (p=0.008), and years in practice (p<0.001) were significantly associated with increased mean h-index per faculty member [**Table 4**]. The distribution of the average h-index of faculty members across U.S. states and region is displayed in **Figure 1**. However, on multivariate analysis, only academic title (Professor vs. Clinical Instructor: RC 18.9, 95% CI 5.3–32.4, p=0.007), years in practice (RC 0.7, 95% CI 0.4–1.0, p<0.001), and research staff (RC 7.6, 95% CI 0.3–14.9, p=0.041) remained significant and were independent predictors for increased mean h-index (R2=0.42) [**Table 5**].

Similar findings were shown for mean total publications per faculty on univariate and multivariate regression models. Academic affiliation (p<0.001), academic title (p<0.001), fellow research requirement (p<0.001), research staff (p=0.002), region (p=0.044), and years in practice (p<0.001) were significantly associated with increased mean total publications per faculty member on univariate analysis [**Table 4**]. Academic title (Professor vs. Clinical Instructor: RC 127.8, 95% CI 37–218.5, p=0.006),

Figure 1. Distribution of the average h-index of faculty members across U.S. states and regions

Table 5. Significant factors associated with increased mean h-index and total number of publications for programs and faculty on multivariate analysis

Predictor	H-index		Total Publications	
	p-value	RC (95% CI)	p-value	RC (95% CI)
Program				
Academic Affiliation	0.001	14.1 (6.8–21.6)	0.033	295.3 (25.5–565.0)
Number of Faculty				
4–5	0.003	11.5 (4.3–18.7)	0.002	433.9 (172.2–695.5)
>5	0.030	8.2 (0.8–15.5)	<0.001	658.2 (390.6–925.7)
Faculty				
Research Staff	0.041	7.6 (0.3–14.9)	0.028	55.6 (6.2–105.1)
Academic Title				
Professor	0.007	18.9 (5.3–32.4)	0.006	127.8 (37–218.5)
Years in Practice	<0.001	0.7 (0.4–1.0)	0.005	2.9 (0.9–4.9)

RC, Regression coefficient; CI, confidence interval.

years in practice (RC 2.9, 95% CI 0.9–4.9, p=0.005), and research staff (RC 55.6, 95% CI 6.2–105.1, p=0.028) were significant on multivariate analysis and were independent predictors for increased mean total publications (R2=0.34) [**Table 5**]. Gender, Shoulder and Elbow fellowship training, and second fellowship training had no significant effect on mean h-index and total publications for faculty members.

DISCUSSION

As many orthopedic programs emphasize and strive for academic excellence, research productivity has become an important factor in determining career success, institutional ranking, promotion or hire for surgeon physicians, and recruitment of applicants interested in shoulder and elbow fellowship. This study aims to describe the academic productivity within the field of shoulder and elbow surgery, and identify factors associated with increased research output and impact using the h-index as a metric. The h-index is an extensively studied and validated measure of academic productivity that accounts for both quantity and quality.[15]

Our study found that shoulder and elbow surgeons associated with ASES-recognized fellowship programs displayed a high level of academic productivity, that was, in fact, superior to fellowship-associated faculty of other orthopedic subspecialties. Our findings showed a mean h-index of 26.9 and a mean number of publications of 125.4 among 156 fellowship-associated shoulder and elbow faculty. In comparison, the average h-index and average number of publications were 22.8 and 80.1 among 310 fellowship-associated spine surgeons,[16] 12.8 and 50.1 among 375 fellowship-associated adult joint reconstructive surgeons,[2] and 10.2 and 44 among 366 fellowship-associated hand surgeons.[12] The mean faculty years in practice in these studies were 17.2, 17.7, and 17, respectively,[2,12,16] which was comparable to the 18.3 years of shoulder and elbow faculty in our study. In addition, 689 fellowship-associated sports medicine faculty and 247 musculoskeletal tumor faculty had average h-indexes of 15.02

and 12.8, respectively.[5,17] However, the cohort size of faculty members in this study was less than that of other studies in different subspecialties; this lower cohort size may have resulted in a higher mean productivity. The median h-index and number of publications were 21 and 74, respectively, which may be more representative of the academic productivity of shoulder and elbow surgeons, as the mean may be skewed by surgeons who are exceptionally productive.

While this study is the first to utilize h-index as a measure of academic productivity in the field of shoulder and elbow surgery, few studies have explored this topic using alternative measures. Cope et al investigated factors associated with publication impact among ASES-recognized fellowship programs using citation frequency of publications between the years 2010–2014 as the outcome measure.[14] The authors found that both total years of faculty experience in a fellowship program and medical school affiliation were independent factors associated with increased total citations, which was in parallel with findings of our study using the h-index.[14] However, their study included only 28 programs and 84 surgeons, which was less than the 32 programs and 156 surgeons of our study.[14] Sudah et al also performed a study assessing the academic productivity of ASES fellowship faculty using a novel metric developed by the National Institutes of Health (NIH) known as the relative citation ratio (RCR).[18] The RCR aims to measure overall research impact and can be defined as the total number of citations per year of a publication divided by the average number of citations

per year received by NIH-funded papers in the same field.[18] The authors demonstrated that the 145 ASES fellowship faculty members of 33 programs produced highly impactful research with a median RCR of 1.8 relative to the standard NIH RCR value of 1.0, and a median weighted RCR of 67.0 representing high overall research productivity.[18] Longer career duration and academic rank both had a significant effect on the weighted RCR score, suggesting that faculty with more experience have greater overall research productivity and impact, in line with findings of our study.[18]

Assessing the overall academic productivity of ASES fellowship programs, the mean h-index and total number of publications per program were found to be 24.9 and 520.3, respectively, and academic affiliation and higher number of faculty were identified as independent factors associated with increased mean h-index and total publications of a program [**Table 5**]. The association between increased productivity and fellowship program affiliation with a medical school appears intuitive as surgeons at these programs often have a heightened interest in conducting research and contributing to the field. To add to that, these programs may have the appropriate research infrastructure as well as greater resources and personnel available to dedicate to research. Programs with a greater number of faculty members also had an expectedly higher research output and impact. However, a greater number of fellows did not have a significant effect. While not significant in the multivariate analysis, programs with a research requirement for fellows and the presence of a research staff had a higher mean h-index and total number of publications.

With regard to factors influencing the academic productivity of fellowship-associated shoulder and elbow surgeons, the academic rank of "Professor", increased years in practice, and the presence of research staff were found to be independent factors associated with increased h-index and total publication number of faculty members [**Table 5**]. The increased productivity observed among professors and those with more years in practice can be attributed to their accumulated experience and the extended duration available to generate publications with a higher number of article citations. In their study, Sudah et al also found that full professors were the most productive subgroup.[18] Interestingly, the availability of research staff in the form of research coordinators or fellows was a significant factor for faculty member productivity, but not for the overall productivity of a program. This could be elucidated by the fact that research staff often work directly with specific faculty members rather than with every member within a program.

Moreover, financial research support is another important factor that has been shown to influence surgeon research productivity. Haislup et al evaluated the relationship between academic influence, industry payments, and NIH funding among ASES fellowship faculty.[19] The authors found that NIH funding highly correlated with increased research productivity, with surgeons with NIH funding having a significantly greater h-index and total number of publications.[19] Although industry research payments was not associated with increased h-index, surgeons had a significantly greater total number of publications, suggesting that industry research funding may increase quantity but not necessarily research influence.[19] Industry non-research payments were not significantly associated with h-index or total publication number.[19]

On the other hand, although not significant in the multivariate analysis, numerous factors including male gender, academic affiliation, departmental position, fellow research requirement, and region were found to result in an increased mean h-index and total number of publications among faculty members [**Table 4**]. Males have been shown to outnumber females at every academic rank, and as a result, outproduce females in research output.[17] In our study, only 3.8% of fellowship-associated faculty members were females, highlighting a significant under-representation of women in ASES-recognized shoulder and elbow fellowship programs. Faculty members in the Northeast and Midwest regions had higher average h-indexes and total publications than other US regions, as shown in **Table 4**.

Furthermore, while faculty members who did not undergo a formal shoulder and elbow fellowship training had a higher mean h-index and total number of publications than those that did, this finding was also not statistically significant [**Table 4**]. This increase may be attributed to the historical rarity of conducting a fellowship following residency graduation for certain faculty members, as well as faculty with fellowship training in other orthopedic subspecialties, resulting in publications unrelated to shoulder and elbow surgery. In addition, among faculty members that underwent formal shoulder and elbow fellowship training, undertaking a second fellowship in another orthopedic subspeciality was not found to significantly affect academic productivity [**Table 4**].

Our study has limitations. First, while the h-index is a robust predictor metric of research impact, it is not the only metric by which academic productivity can be measured. The h-index heavily relies on the number of citations, irrespective of their context or quality, and can thus be confounded by self-citations as well as limited by a discipline's citation potential. Additional limitations of the h-index include the inability to consider author order number, the lack of sensitivity to publication recency, and bias towards established researchers with longer research activity. Second, our study cohort included only ASES-recognized fellowship faculty members, and hence our findings may not be generalizable to the entire field of shoulder and elbow surgery. Some faculty members may have academic interests outside of shoulder and elbow in other orthopedic subspecialties. Data collected from the ASES website and program-specific websites may change over time as well. While the SCOPUS database has an extensive Medline coverage and provides abundant publication data, some articles may be wrongly attributed to authors with similar or the same name as the actual author.

CONCLUSION

Shoulder and elbow surgeons affiliated with ASES-recognized fellowship programs displayed a high level of academic productivity, with a mean h-index of 26.9 and a mean total number of publications of 125.4. Factors associated with increased academic productivity of a faculty member included academic title of Professor, increased years in practice, and the presence of a research staff. The collective average h-index and total number of publications for a fellowship program was 24.9 and 520.3, respectively, and academic affiliation and increased number of faculty members were found to significantly increase research productivity. Understanding the academic productivity within the field of shoulder and elbow surgery, along with the contributing factors, allows fellowship programs and surgeons to benchmark their research performance and pursue enhanced productivity.

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