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Gender Differences in Receipt of National Institutes of Health R01 Grants Among Junior Faculty at an Academic Medical Center: The Role of Connectivity, Rank, and Research Productivity

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Abstract

Objective: To determine whether there were gender differences in likelihood of receiving a first National Institutes of Health (NIH) R01 award among 5445 instructors and assistant professors at Harvard Medical School (HMS).

Materials and Methods: Data on R01 award principal investigators were obtained from NIH ExPORTER and linked with faculty data. Using Cox proportional hazard regression, we examined the association of gender with receipt of first R01 award between 2008 and 2015 accounting for demographics, research productivity metrics, and professional characteristics.

Results: Compared to males, females had fewer publications, lower *h*-index, smaller coauthor networks and were less likely to be assistant professors ($p < 0.0001$). Four hundred and thirteen of 5445 faculty (7.6%) received their first R01 award during the study period. There was no gender difference in receipt of R01 awards in age-adjusted (hazard ratio [HR]: 0.87, 95% confidence interval [CI]: 0.70–1.08) or multivariable-adjusted models (HR: 1.07, 95% CI: 0.86–1.34). Compared to white males, there was a nonsignificant 10%, 18%, and 30% lower rate of R01 receipt among white, Asian or Pacific Islander, and underrepresented minority females, respectively. These differences were eliminated in the multivariable-adjusted model. Network reach, age, HMS start year, *h*-index, academic rank, previous K award, terminal degree, and HMS training were all significant predictors of receiving an R01 award.

Conclusions: A relatively small proportion of HMS junior faculty obtained their first NIH R01 award during the study period. There was no significant gender difference in likelihood of award. However, we are unable to distinguish faculty that never applied from those who applied and were not successful.

Keywords: gender, NIH grants, R01

Introduction

Over the past 30 years, women have reached parity with, or surpassed, men in undergraduate and medical school enrollment and graduation rates.[1–3] However, despite these gains, women remain underrepresented in leadership roles in academic medicine. They are less likely to be department chairs[4] and to achieve the rank of full professor.[3,5,6] For junior faculty at academic research centers an essential step for promotion is to establish research independence.

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A key indicator of independence is attainment of an R01 award from the National Institutes of Health (NIH) as principal investigator. Data on whether women are less likely to receive NIH grants, R01s, in particular, are mixed. According to NIH data, among those who apply, R01 success rates are similar for men and women.[7] This is consistent with other studies showing success rates for new (Type 1) R01 submissions are similar between men and women,[8,9] no difference in receipt of any Federal grant,[10] and similar NIH K (career development award) to NIH R (research grant) conversion rates within a single department and institution.[11] However, several studies have found that women are less likely to obtain NIH funding, including lower rates of conversion from a K to R grant nationally,[12] lower proportion of R grants in otolaryngology,[13] and lower R01 success rates for Asian and Black women compared to white men and women.[14] It is possible that these varying results are driven by subgroups and intersectionality. For example, gender differences may be apparent only within certain organizational contexts, or may be apparent only when we look at both race and gender. These conflicting results could also be due to differences in the ability to account for organizational context, including academic discipline, faculty research networks, research productivity metrics, and academic rank.

Differences in publications may contribute to gender differences in promotion and grant success, and several studies have demonstrated that women in academic medicine have fewer publications[10,15] and lower publication impact (as measured by *h*-index)[10,16] compared to men. In our previous work we found that female instructors and assistant professors were more likely to be in disciplines with lower levels of NIH funding and with lower average numbers of publications, *h*-index, and network reach (the number first and second degree intraorganizational coauthor connections).[17] Female faculty were also less likely to be promoted to assistant or associate professor than men, but these differences were eliminated after adjustment for bibliometric factors like *h*-index, number of publications, and network reach.[18] In the current analysis we examine the association between gender and receipt of first NIH R01 award among 5445 junior faculty at Harvard Medical School (HMS). Given our findings with respect to promotion, we further investigate the factors that contribute to any observed gender differences in R01 awards, with a focus on the role of bibliometrics and coauthor networks.

Materials and Methods

Study population

The study population includes HMS faculty with an appointment of full-time Instructor and full-time or part-time Assistant Professor with no previous R01 award as of January 1, 2008 ($n = 5445$). Data are from the Harvard Pathways data repository, which aggregates information on HMS faculty from multiple existing sources—HMS administrative systems provide demographic data and professional characteristics, and a publicly available online directory and social networking tool for Harvard faculty, Harvard Catalyst Profiles (''Profiles''), captures faculty authored publication.[19] Data collection, usage, and security are governed by an institutional data use agreement and overseen by the HMS Committee on Human Subjects (M19492-101).

Demographic and professional characteristics

Sex and race/ethnicity are collected by HMS and its affiliated hospitals through affirmative action reports submitted when faculty are hired. We categorized race as Underrepresented minority (URM: includes African American, Hispanic, or American Indian), Asian or Pacific Islander (API), or White. Age was grouped into four categories: <40, 40–49, 50–59, and ≥60. We categorized academic rank as instructor (full time) or assistant professor (full- and part-time). Start year was the first year of employment at HMS (1975–1984, 1985–1994, 1995–2004, and 2005–2008). Time in rank was calculated as the number of years since first appointment at current academic rank. Terminal degree was defined as the highest educational degree attained with degrees classified as: medical (MD, MBBS, DO, *etc.*), doctoral (PhD, ScD, PsyD, PharmD, EdD), medical/doctoral degree (any combination of listed MD or PhD degrees), or other (MBA, JD, *etc.*). A historical job title of HMS ''research fellow'' or ''clinical fellow'' defined individuals who participated in HMS training as interns, residents, or fellows. We defined work status as full time or part-time. Academic discipline was categorized as anesthesia, medicine, neurology, pediatrics, psychiatry, radiology, surgery, or unknown/other.

Publication metrics

A detailed description of the Profiles publication data can be found elsewhere.[17] In brief, articles are regularly imported from MEDLINE through automatic processes using a name disambiguation algorithm.[20] Publications are also obtained through several one-time bulk uploads of publication data from faculty promotion databases and commercial publication sources. In addition, faculty can manually add or remove publications. Only publications in Profiles that could be associated with Pubmed IDs were used in this study.

For each faculty member we calculated the total number of publications, *h*-index, and network reach. *h*-index incorporates both quantity and visibility of publications. It is the number of publications a faculty member has with at least that same number of citations. For example, a person with 45 total publications, 20 of which have at least 20 citations each, the other 25 each have 19 citations or less, would have an *h*-index of 20.[21] Intraorganizational coauthor network reach is defined as the number of coauthors a faculty member has plus the number of coauthors those coauthors have.[18] Individuals are only counted once in determining a faculty member's reach. It can be thought of as the number of colleagues within a faculty member's institution that he or she can easily ''reach'' because they have either directly published an article together previously or they have a coauthor in common. This metric is also equivalent to the number first and second degree connections in the faculty member's intraorganizational coauthor network graph.

NIH grant awards

We downloaded NIH grant award information from NIH ExPORTER in January 2016. Data obtained included the following: principal investigator name and ID number, project title, organization, core project number, activity code (*e.g.*, P01, R01, K22, and so on), budget start date, application type, funding institute or center (*i.e.*, NCI, NHLBI,

NIAID, and so on), fiscal year, organization name, city, state, and country. Data were available only on awarded grants according to principal investigator. No data were available on applications that were not awarded or on coinvestigators of awarded grants. NIH grants were matched to faculty using a disambiguation algorithm based on name, institution, Harvard affiliate institution, grant dates and appointment dates, and rank.

We collapsed NIH ExPORTER data so that each grant appeared only once and only in the year the grant was first awarded. Faculty members with an activity code ''K01'', ''K02'', ''K04'', ''K05'', ''K06'', ''K07'', ''K08'', ''K11'', ''K14'', ''K15'', ''K16'', ''K18'', ''K20'', ''K21'', ''K22'', ''K23'', ''K24'', ''K25'', ''K26'', ''K99'', for a grant awarded before January 1, 2008, were considered to have a previous K (career development) award. Faculty members identified with an activity code of ''R01'' awarded between January 1, 2008 and December 31, 2015 were considered to have received an R01 as principal investigator during the study period.

Statistical analysis

Chi-square (categorical variables) and Kruskal–Wallis (continuous variables) were used to compare characteristics of participants according to sex (Table 1) and R01 award status (Table 2). Cox proportional hazards regression, jointly stratified by academic discipline and calendar year to account for differences in the probability of award over time and across disciplines, was used to generate hazard ratios (HRs) and 95% confidence intervals (CIs) for the association between sex and

Table 1. Characteristics of Harvard Medical School Instructors and Assistant Professors in 2008 According to Gender

	Total		*Female*		*Male*		
	n = *5445*		n = *2435*		n = *3010*		
	Median	*IQR*	*Median*	*IQR*	*Median*	*IQR*	p-*Value*
Network reach	39	196	17	150	61.5	227	<0.0001
h-Index	1	3	1	2	1	3	<0.0001
Publications	4	14	3	10	6	17	<0.0001
Coauthors	2	8	1	6	3	10	<0.0001
Time in rank (years)	4.5	5.8	4.4	6	4.5	6.1	0.2
	n	%	*n*	%	*n*	%	
Race							0.70
API	1053	19.3	460	18.9	593	19.7	
URM	346	6.4	163	6.7	183	6.1	
White	3906	71.7	1747	71.8	2159	71.7	
Unknown	140	2.6	65	2.7	75	2.5	
Age group							<0.0001
<40	963	17.7	497	20.4	466	15.5	
40–49	2472	45.4	1108	45.5	1364	45.3	
50–59	1279	23.5	595	24.4	684	22.7	
≥60	731	13.4	235	9.7	496	16.5	
Previous K award	474	8.7	186	7.6	288	9.6	0.01
Rank							<0.0001
Instructor	3611	66.3	1776	72.9	1835	61.0	
Assistant professor	1834	33.7	659	27.1	1175	39.0	
Work status[a]							0.04
Full time	1456	79.4	540	81.9	916	78.0	
Part-time	378	20.6	119	18.1	259	22.0	
Terminal degree							<0.0001
MD/PhD	389	7.1	110	4.5	279	9.3	
MD only	3563	65.4	1622	66.6	1941	64.5	
PhD only	1301	23.9	620	25.5	681	22.6	
Other Degree/unknown	192	3.5	83	3.4	109	3.6	
HMS training	3688	67.7	1640	67.4	2048	68.0	0.59
Discipline							<0.0001
Medicine	1924	35.3	827	34.0	1097	36.5	
Neurology	259	4.8	108	4.4	151	5.0	
Pathology	167	3.1	83	3.4	84	2.8	
Pediatrics	580	10.7	328	13.5	252	8.4	
Psychiatry	764	14.0	417	17.1	347	11.5	
Radiology	335	6.2	122	5.0	213	7.1	
Surgery	399	6.9	120	4.9	265	8.8	
Other or unknown	1088	18.9	430	17.7	601	20.0	

[a]Among Assistant Professors only.
IQR, interquartile range; API, Asian or Pacific Islander; URM, underrepresented minority; HMS, Harvard Medical School.

Table 2. Comparison of Harvard Medical School Instructors and Assistant Professors in 2008 According to Award of First National Institutes of Health R01 Grant, 2008–2015

	No n = *5032* *Median*	*IQR*	*Yes* n = *413* *Median*	*IQR*	p-*Value*
Network reach	29	177	203	315	<0.0001
h-Index	1	2	4	4	<0.0001
Publications	3	12	17	21	<0.0001
Coauthors	2	8	9	13	<0.0001
Time in rank (years)	4.5	6	3.2	2.5	<0.0001
	n	%	*n*	%	
Female	2277	45.3	158	38.3	0.006
Race					0.01
API	949	18.9	104	25.2	
URM	326	6.5	20	4.8	
White	3629	72.1	277	67.1	
Unknown	128	2.5	12	2.9	
Age group					<0.0001
<40	873	17.4	90	21.8	
40–49	2180	43.3	292	70.7	
50–59	1249	24.8	30	7.3	
≥60	730	14.5	1	0.2	
Previous K award	291	5.8	183	44.3	<0.0001
Rank					<0.0001
Instructor	3416	67.9	195	47.2	
Assistant professor	1616	32.1	218	52.8	
Work status[a]					<0.0001
Full time	377	23.3	217	99.5	
Part-time	1239	76.7	1	0.5	
Terminal degree					<0.0001
MD/PhD	336	6.7	53	12.8	
MD only	3397	67.5	166	40.2	
PhD only	1125	22.4	176	42.6	
Other Degree/ unknown	174	3.5	18	4.4	
HMS training	3364	66.9	324	78.5	<0.0001
Discipline					<0.0001
Medicine	1751	34.8	173	41.9	
Neurology	226	4.5	33	8.0	
Pathology	147	2.9	20	4.8	
Pediatrics	534	10.6	46	11.1	
Psychiatry	732	14.6	32	7.8	
Radiology	306	6.1	29	7.0	
Surgery	364	7.2	21	5.1	
Other or unknown	972	19.3	59	14.3	

[a]Among Assistant Professors only.

Table 3. Hazard Ratios and 95% Confidence Intervals for Association of Gender and Other Characteristics with Award of First National Institutes of Health R01 Grant Among 5445 Junior Faculty at Harvard Medical School, 2008–2015

Characteristic	*Age adjusted*[a] *HR (95% CI)*	*Multivariable adjusted*[b] *HR (95% CI)*
Sex		
Male	1.00 (Ref)	1.00 (Ref)
Female	0.87 (0.70–1.08)	1.07 (0.86–1.34)
Network reach		
0	1.00 (Ref)	1.00 (Ref)
1–79	2.44 (1.50–3.95)	1.71 (1.03–2.85)
80–238	3.90 (2.50–6.08)	2.09 (1.29–3.37)
239–2451	5.39 (3.49–8.33)	2.29 (1.39–3.75)
p-Trend	<0.0001	0.002
Race		
White	1.00 (Ref)	1.00 (Ref)
URM	0.80 (0.50–1.29)	0.88 (0.54–1.44)
API	1.00 (0.78–1.28)	1.09 (0.85–1.41)
Age group		
<40	1.30 (0.83–2.04)	1.36 (0.84–2.13)
40–49	2.42 (1.66–3.51)	2.01 (1.38–2.95)
50–59	1.00 (Ref)	1.00 (Ref)
≥60	0.89 (0.47–1.70)	1.16 (0.60–2.21)
Time in rank (years)	0.87 (0.83–0.90)	0.99 (0.94–1.05)
HMS start year (years)	1.02 (0.99–1.04)	1.12 (1.07–1.17)
h-Index	1.13 (1.13–1.15)	1.04 (1.01–1.07)
Number of publications	1.01 (1.00–1.01)	1.00 (0.99–1.01)
Academic rank		
Instructor	1.00 (Ref)	1.00 (Ref)
Assistant professor	5.88 (4.27–8.11)	3.88 (2.79–5.38)
Associate professor	6.59 (3.96–11.0)	4.09 (2.44–6.86)
Previous NIH K award		
No	1.00 (Ref)	1.00 (Ref)
Yes	4.07 (3.18–5.21)	2.94 (2.29–3.79)
Terminal degree		
MD/PhD	1.79 (1.24–2.59)	1.06 (0.72–1.56)
MD only	1.00 (Ref)	1.00 (Ref)
PhD only	2.90 (2.27–3.72)	2.69 (2.05–3.54)
Other Degree/unknown	2.24 (1.30–3.84)	2.03 (1.17–3.50)
HMS training		
No	1.00 (Ref)	1.00 (Ref)
Yes	1.31 (1.02–1.70)	1.33 (1.01–1.75)
Work status		
Full time	1.00 (Ref)	1.00 (Ref)
Part-time	0.85 (0.49–1.48)	1.09 (0.62–1.94)

[a]Adjusted for age, start year, and time in rank.
[b]Mutually adjusted for all variables in table.
HR, hazard ratio; CI, confidence interval; NIH, National Institutes of Health.

receipt of a NIH R01 (Table 3). We examined the association gender stratified by selected factors (Fig. 1) and jointly classified gender and race to see if gender associations differed by race (Fig. 2). We present models adjusted for age only and with simultaneous adjustment for race/ethnicity, age, academic rank, work status, previous K award, network reach, number of publications, *h*-index, terminal degree, time in rank, and HMS training.

Faculty stopped contributing person-time when they received an R01 award, ceased employment at HMS, on the date of death, or the study cutoff date December 31, 2015, whichever occurred first. Time-varying covariates (*i.e.*, age, time in rank, academic rank, network reach, number of publications, and *h*-index) were updated in the analysis annually. Faculty that left HMS could reenter the analysis if they returned to HMS during the study period. The proportionality of relative hazards over time was examined by visual inspection. *p*-Values are two sided and use a significance level of 0.05. Analyses were performed using SAS version 9.4 (Cary, NC).

Results

Table 1 shows the characteristics of faculty overall and according to sex. Male faculty had higher network reach,

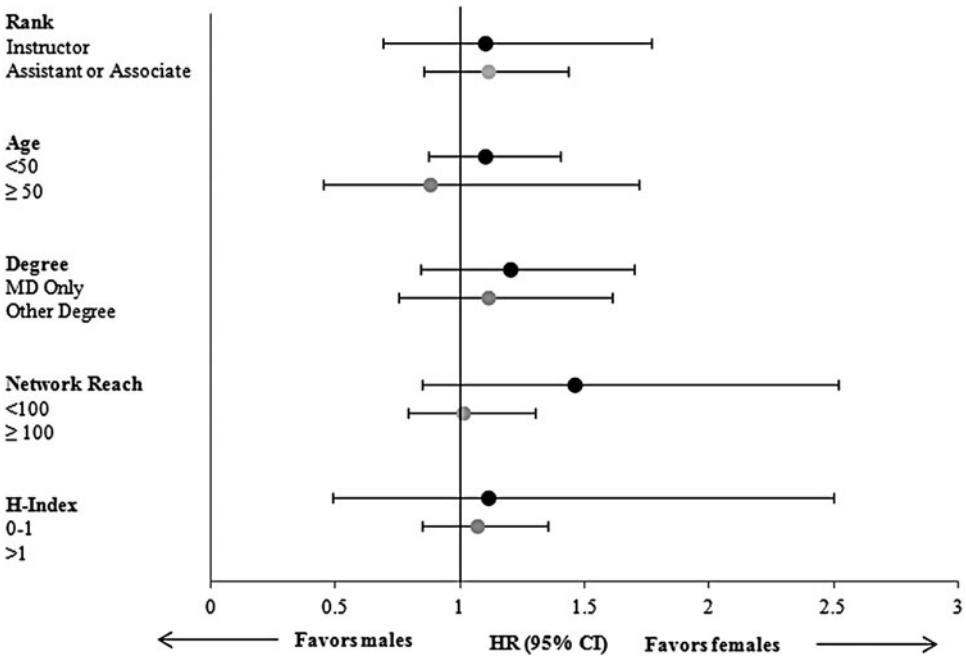

FIG. 1. Multivariable-adjusted hazard ratios and 95% confidence intervals for association of gender with first National Institutes of Health R01 award stratified by selected characteristics, 5445 junior faculty at Harvard Medical School, 2008–2014.

h-index, more publications, and coauthors compared to females ($p < 0.0001$). Median network reach was 61.5 among males compared to 17 among females. Compared to males, females were younger, less likely to have had a previous K award, less likely to be assistant professors, and more likely to be in pediatrics or psychiatry ($p < 0.0001$). These differences persisted when we restricted the comparison to only instructors or only assistant professors (data not shown). There were no sex differences in time in rank, race, or HMS training. One-fifth (20.4%) of females were younger than 40 compared to 15.5% of males.

Over the 6-year follow-up period, 413 of 5445 junior faculty (7.6%) received their first R01 award (Table 2). Compared to those that did not obtain an R01, faculty that did had higher median network reach (203 vs. 29; $p < 0.0001$), *h*-index (4 vs. 1; $p < 0.0001$), publications (17 vs. 3; $p < 0.0001$), and coauthors (9 vs. 2; $p < 0.0001$). Faculty receiving an R01 were more likely to be API (25.2% vs. 18.9%) and to have had a previous K award (44.3% vs. 5.8%; $p < 0.0001$) and were less likely to be female (38.3% vs. 45.3%; $p < 0.0001$). R01 award was also associated with rank, terminal degree, HMS training, and academic discipline.

There was no gender difference in R01 awards in age-adjusted or multivariable-adjusted models (Table 3). When adjusted for age and time in rank only, there was a nonsignificant 13% lower rate of R01 award among female junior

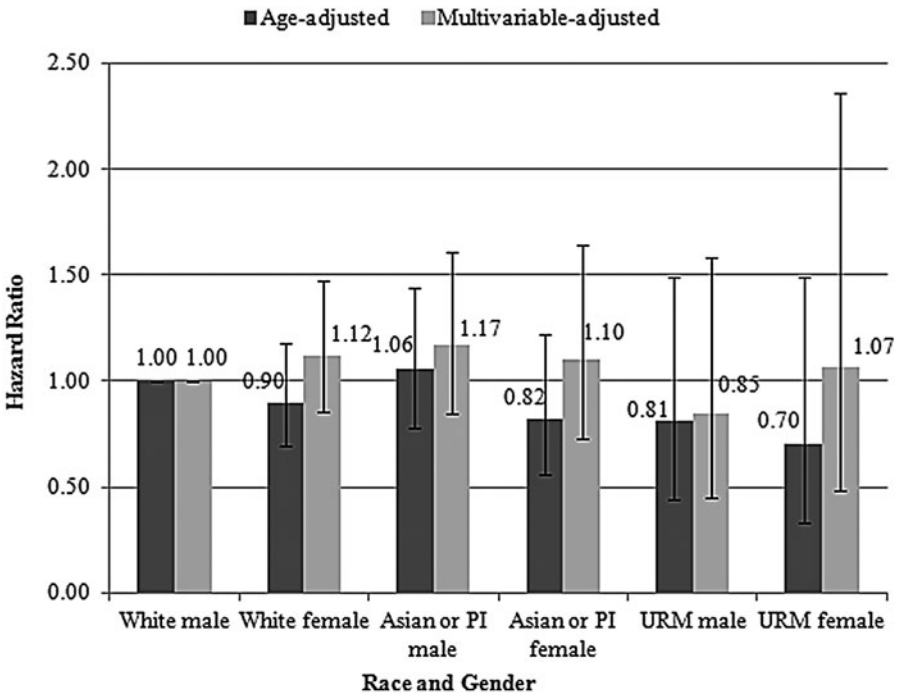

FIG. 2. Multivariable-adjusted hazard ratios and 95% confidence intervals for association of cross-classified race and gender, 5445 junior faculty at Harvard Medical School, 2008–2014.

faculty compared to males (HR: 0.87, 95% CI: 0.70–1.08). When we further accounted for publication and network metrics, as well as demographic and professional characteristics, the association was further attenuated (1.07, 95% CI: 0.86–1.34). In multivariable-adjusted models, network reach, age, HMS start year, *h*-index, academic rank, previous K award, terminal degree, and HMS training were all significant predictors of receipt of R01 award. Faculty in the highest category of network reach were more than twice as likely to receive an R01 award during the study period (HR: 2.29, 95% CI: 1.39–3.75; *p*-trend: 0.002), and each unit increase in *h*-index was associated with a 4% increase in likelihood of receipt of R01 award. Compared to faculty without a previous K award, those that had a K were nearly thrice as likely to obtain their first R01 award during the study period (HR: 2.94, 95% CI: 2.29–3.79). Among 459 junior faculty members with a previous K award, a similar proportion of males (38.1%) and females (38.2%) received their first R01 award (data not shown). Number of publications and race were not associated with R01 award.

We found no evidence of effect modification by rank, age, terminal degree, network reach, or *h*-index (Fig. 1). When we jointly classified gender and race, we found that in the age-adjusted model females of all races were less likely to receive R01s compared to white males (Fig. 2). Although CIs were wide, and results were not statistically significant, the HRs suggested that compared to white males, there was a 10%, 18%, and 30% lower rate of R01 receipt among white, API, and URM females, respectively. For women of all races, this difference was significantly attenuated in the multivariable adjusted model.

Conclusions

Compared to males, female junior faculty at HMS had smaller coauthor networks, lower *h*-index, and fewer publications. However, in age-adjusted and multivariable comparisons, there was no gender difference in likelihood of receiving first NIH R01 award during the study period. We observed some suggestive, but statistically nonsignificant, differences according to race and gender, with the lowest rates of NIH award receipt observed among URM females. Network reach, age, HMS start year, *h*-index, academic rank, previous K award, terminal degree, and HMS training were all significant predictors of receiving an R01 award. Our finding of gender differences in rank and research productivity metrics is consistent with prior reports.[15,16,18,22,23] Despite these differences in research productivity metrics and other factors, males and females had similar rates of receipt of first NIH R01 award.

Applying for, and receiving, an R01 is a complex process that requires preliminary data, institutional support, and a strong research team. For junior faculty, this process generally requires mentorship from a more senior investigator who can provide guidance on how to prepare the application, build a research team, and bring together institutional resources to support the application. A 2009 survey of 1179 HMS and Harvard School of Dental Medicine female faculty found that only 54% had a mentor and the majority (72%) without a mentor wanted one.[24] However, because that survey was only administered to female faculty at HMS it is unclear whether their lack of mentorship differed from that of male faculty. The importance of having a strong research team and access to institutional resources could, in part, explain how network reach, a measure of coauthor connections within the institution, as well as HMS training, was associated with R01 award receipt. Female junior faculty had lower network reach, but were equally likely to have trained at HMS as males. Our team is currently investigating how intraorganizational coauthor networks are formed and how and what resources are transmitted through them.

The outcome of our study was receipt of a first NIH R01 award, but this represents two separate events, applying for the award and successfully obtaining funding following scientific and programmatic review. In the present study we are unable to distinguish faculty that never applied from those who applied and were not successful. In a national study of NIH extramural funding, men and women who applied for NIH grants were equally likely to have their grants funded, but women were less likely to apply than men.[7] A 2008 study of HMS faculty reached a similar conclusion. They found that for applications submitted between 2001 and 2003, success rates were similar between men and women; gender differences in grant awards were driven by lower rates of application among women.[25] This was true for grants overall and for NIH grants specifically. If we assume that success rates remain similar between men and women at HMS, then our finding of no gender difference in R01 receipt suggests that the gap in application rates observed in the 2008 study may have closed. Future studies should examine factors associated with decision to apply, including mentoring and career development programs, and how they have changed over time for men and women. However, we focused only on first award among junior faculty, and there is some evidence that women may face challenges in R01 renewals. Women received significantly lower priority, approach, and significance scores than men, despite reviewers using more positive descriptors of the grant application and the investigator, suggesting subtle gender bias.[26,27]

We were unable to account for differences in career track for Instructors (*i.e.*, investigator, teaching and educational leadership, clinical expertise, and innovation) as HMS faculty are only required to declare their track when they go up for promotion. Career track data exist for Assistant Professors, but are not currently a part of our database and therefore were not available for this analysis. Some research suggests that compared to men, women in academic medicine are more likely to select career paths that emphasize teaching and patient care over research.[28] In national data, of 83 medical schools that offered the clinician-educator faculty track, where faculty focus is on teaching and/or patient care and research or scholarship may not be required for advancement, 77% had a higher proportion of women on this track. In comparison, of 102 schools that offered the traditional tenure track, where faculty focus on teaching, research/scholarship, and patient care, only 20% had a higher proportion of women than men select that track.[29] Faculty on the clinician-educator track have slower progression for promotion than other tracks,[30–32] potentially contributing to women's lower academic rank relative to men. Without data on career track for this analysis, it is possible that we include clinically oriented faculty that may be less likely to apply for NIH R01 grants. However, given our finding of no gender difference in R01 awards, there are at least two possible

inferences for HMS junior faculty: (1) there is no gender imbalance in career track; and (2) career track is not associated with receipt of first R01. We hope to investigate the role of career track in grant awards in future studies.

In addition to career track, studies have demonstrated differences in preferences for specialty, with men more likely to select surgery and women more likely to choose pediatrics, obstetrics and gynecology, or general medicine.[33] In prior work we demonstrated that at HMS, women are not equally distributed across academic disciplines and that the disciplines vary with respect to the proportion of faculty with R01 and the median number of publications per faculty member.[17] Therefore, to account for disciplinary differences in the distribution of men and women and underlying differences in the probability of receiving an R01, we stratified our models by discipline.

This study focused on NIH R01 grants, but an R01 is generally not a faculty member's first grant. There are often prior grants that generate preliminary data necessary for the R01 application. Our study showed that prior K awardees were almost thrice more likely to receive an R01 during the study period and there was no difference in K to R01 conversion between men and women. However, there are other grants such as internal awards, grants from professional associations and foundations, industry-sponsored awards, and coinvestigator roles on NIH grants, which are important preparation for an R01 that we were unable to capture in the present study. These other awards may be especially important for faculty at the rank of instructor. This study was conducted at a single research-intensive institution and results may not be generalizable. We encourage similar studies at other institutions. A multi-institutional study could also address the small numbers we encountered for our analyses of cross-classified race and gender. Finally, although our power was limited, our results suggest that magnitude of gender differences differs by race, with the greatest initial gap in R01 awards observed for URM females. However, it appears that similar factors such as prior K awards and bibliometrics account for the gender difference across racial groups.

In conclusion, <10% of HMS junior faculty included in our study obtained their first NIH R01 award during the study period and we observed no significant sex disparity. More work is needed to understand factors that contribute to parity in receipt of first R01 award between male and female junior faculty at HMS.

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Author Disclosure Statement

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