

Academic characteristics for successful national institutes of health funding in dermatology

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Abstract

Background: The National Institutes of Health (NIH) is a prominent organization that provides funding to academic scholars for research opportunities in the field of medicine, including dermatology. Objective: The purpose of our study was to identify academic characteristics in successful NIH funding in the department of dermatology.

Methods: The following measurements of scholarly productivity were assessed to examine if there is an association with higher funding: number of publications, H-index, leadership positions in dermatological societies, gender, academic rank, and degree type.

Results: After examination of all full-time faculty members in the department of dermatology receiving NIH funding in 2014, the study found that the number of publications, leadership in societies, and H-index are correlated with higher NIH funding.

Limitations: There is a lack of information on whether faculty that did not receive NIH funding for the year of 2014 actually applied to be funded and were rejected, or chose not to apply for funding at all.

Conclusion: Scholarly productivity is an important factor in securing NIH funding. The study also found that the degree type does not influence NIH funding, suggesting that faculty with all types of degrees are equally productive in academic dermatology.

Introduction

The National Institutes of Health (NIH) is a prominent organization that provides funding to academic scholars for research opportunities in the field of medicine, including dermatology. Several studies have used NIH funding as a marker of success [1-10]. NIH funding strengthens academic departments by allowing the department to invest funding into long-term development, hire extra faculty, and increase research productivity. The purpose of this study is to examine whether certain academic characteristics are associated with successfully securing funding in the field of dermatology. The authors chose to focus on the following measurements of scholarly productivity to examine if there is an association with higher funding: number of publications, H-index, leadership positions in dermatological societies, gender, academic rank, and degree type.

Individual dermatological scholarly output and research productivity can be measured by total number of publications. Leadership in societies, academic rank and degree type represent academic strength and quality. The H-index is an objective benchmark that has been inspected by many other departments and is an excellent indicator of the frequency and impact of an author's academic contributions. More specifically, H-index is a quantitative and meaningful measurement that takes into account the number of publications of an author, along with the number of times the work has been cited.¹¹ In a competitive funding environment, departments may need to focus on securing funding in addition to the characteristics that predict funding.

Scholarly productivity and academic success are important considerations when determining the contributions and influence of an individual faculty member as well as the strength of a department. Often, the value of a member to an academic department is represented by the amount of funding they secure for the department.

The National Institutes for Health (NIH) funding provides an easily comparable, readily available metric for which to compare departments and faculty in highly funded institutions. Several studies have used NIH funding as a marker for success for medical specialties. Specifically, within the department of dermatology, NIH funding was used to measure academic achievement as well as in the rank of residency programs [1,2]. The long-standing benefits of NIH funding in dermatology are so great that the term cascade effect has been used to describe it [3]. One reason for this may be because money invested in one phase of an institution's development is like priming the pump and will lead to the development of many other related phases [3]. Based on our investigation, the NIH has significant investment in the following fields: dermatologic oncology, dermatologic immunology, and dermatopathology.

Instead of investing funding dollars into specific projects, some

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departments invest NIH funding into long-term development. NIH dollars enable departments to hire extra faculty who are not only established investigators but also devoted teachers [3]. These individuals are the ones responsible for the increased scholarly output of dermatologists in the past 10 to 15 years. Experienced faculty hired by NIH-funded institutions has produced most of the research for the department of dermatology, making dermatology competitive in academic medicine and research [3].

Other investigators have compared cutaneous research funding by the NIH, National Institute of Arthritis and Musculoskeletal and Skin Diseases; however, to the authors' knowledge, this study is the first attempt at using both traditional and non-traditional metrics to characterize NIH funding in the department of dermatology [12,13].

Methods

Grants awarded to primary investigators (PIs) serving as full-time faculty in dermatology and dermatopathology departments were obtained using the NIH RePORTER database (<http://projectreporter.nih.gov/reporter.cfm>) and was the main outcome measure for this study.¹⁵ Non-faculty investigators, such as postdoctoral fellows, in addition to adjunct or part-time faculty were excluded from consideration. Faculty academic rank was obtained from listings on the websites of their respective dermatology departments. Ultimately, 67 NIH awards to 52 PIs on the database for calendar year 2014 were included for analysis.

The total number of publications during 2014 was determined using the Scopus database.¹⁴ The PI gender and academic degree (MD, MD/PhD, or PhD) was determined using the institution's dermatology website. An H-index calculator available on the Scopus database was used to calculate this bibliometric for the included faculty [11,14].

The authors determined the following dermatological societies to be pre-eminent and were included in the analysis: American Academy of Dermatology, American Board of Dermatology, American Dermatological Association, American Society for Dermatologic Surgery, American Society for Laser Medicine and Surgery, American Society for Mohs Surgery, American Society of Dermatology, American Society of Dermatopathology, Medical Dermatology Society, and the Society for Investigative Dermatology.

Data analysis

The researchers reviewed and evaluated all data gathered using standard protocols. Statistical comparisons were made using logistical regression, with threshold for significance set to $P < 0.05$. All quantitative and statistical calculations were performed in Excel 2010 (Microsoft Corp., Redmond, WA) and SPSS version 21 (IBM Corp., Armonk, New York).

Results

A total of 52 NIH-funded full-time dermatology faculty receiving 67 grants during 2014 were included for analysis. It was determined that number of publications, leadership in dermatology societies, and H-index were academic characteristics statistically associated with successful NIH funding ($P < 0.05$). It was determined that academic rank, gender, and degree type were not associated with successful NIH funding ($P > 0.05$), which is different compared to analysis done in other departments [9,10].

Although not statistically associated with successful NIH funding, out of all NIH-funded faculty, 11/52 (21.15%) were female. Further

analysis revealed that 9% of funded females were department chairs as opposed to 17% for their male counterparts. 0% of the females were research directors compared with 2.4% of NIH-funded male faculty. 27% of the females were Professors compared to 36.5% for males. 27% of the females were Associate Professors compared to 17% for males. 27% of the females were Assistant Professors compared to 19.5% for males. 9% of the females were Instructors compared to 7.3% for males.

Discussion

Despite its importance to the growth of research, NIH funding is becoming increasingly difficult to come by [16]. In 2012, only 18% of grant applications successfully achieved funding from the NIH, a sharp decline from the 31% success rate 10 years earlier [4]. Given that NIH funding is so valuable and increasingly more difficult to come by, the aim of this study was to determine the academic characteristics of successful NIH funding recipients in the department of dermatology. In a tough funding climate where reimbursements are declining, it is important to recognize successful departments and scrutinize their characteristics.

The authors chose to focus on standard measurements of scholarly prowess such as number of publications and leadership. A newer metric, H-index, was also included. This index is rapidly gaining acceptance among the academic medical community and has been associated with increased scholarly productivity and NIH funding in some medical fields such as ophthalmology and orthopedic surgery [8,17]. Results of this study showed that H-index is positively correlated with NIH funding, such that faculty members with higher H-index received higher NIH dollars. This suggests that faculty who produce more research that is more frequently cited secure more NIH funding.

While the H-index is one measure of academic strength, the quality of faculty, as demonstrated through leadership in prominent dermatology societies, also increases academic productivity, which in turn helps to secure more NIH funding. This study found that leadership is correlated with higher NIH dollars among successfully funded faculty. Individuals who gain leadership in academic societies are often influential in their fields as well as highly productive in their academic output, suggesting that academic promotion to a higher leadership position may result in higher NIH funding.

Furthermore, the study investigated if academic degree, MD, MD/PhD, or PhD, had any influence on receiving NIH funding. Results show this had no influence on success. This is consistent with studies done for the orthopedic surgery, otolaryngology, and ophthalmology departments [6,8,17]. These studies likewise found that the mean H-index of NIH-funded faculty whose terminal degree was an MD (or MD equivalent) was not statistically different than colleagues with PhDs or both MD and PhD degrees. Though one study has suggested that MD/PhDs in dermatology are more likely to choose a career in academics as well as stay in academics as compared to MDs, this does not seem to be reflected in the amount of funding they receive [18]. Terminal degree may not be an important indicator for gaining NIH funding in dermatology and those receiving basic science training in addition to traditional medical training have no advantage in securing funding.

The present study found that gender has no correlation with NIH funding. This trend contradicts what has been found in some other specialties such as otolaryngology [5]. One reason for this may be that more females choose to enter nonsurgical fields such as dermatology, instead of surgical specialties, which often have more

difficult time training and recruiting females [6]. Despite the more equal representation of females and males in dermatology, the number of females who receive NIH funding is far less.

One reason for this may be that there are gender differences in leadership positions across all specialties. Leadership positions have been shown to positively correlate with NIH funding in radiology, urology, neurosurgery, orthopedic surgery, ophthalmology and among anesthesiologists [17,19-22]. Department Chairs and Research Directors are often considered to be among the highest academically ranked individuals in the department. Department chairs and research directors have been shown to be highly correlated with NIH funding in the department of orthopedic surgery and general surgery [17,23]. This may be attributed to their ability to increase the reputation of a department by bringing in extra sources of funding and recruiting better talent. The authors found that of the 11 female faculty members receiving NIH funding in dermatology, 9% are Department Chairs or Research Directors. This is far less than the 20% of males who hold one of these two positions. This finding is not unique to the department of dermatology. A 2011 Mayo Clinic Study evaluated gender differences in leadership positions across all specialties and found that females are underrepresented among senior faculty [7]. This may be because females have lower scholarly impact during the earlier stages of their career, which may impede academic advancement early on. Although women surpass men in scholarly productivity later on in their careers, the initial effects of low productivity continue to hinder academic promotion [7,8]. Further, this suggests that productivity and experience of the investigator translates to more NIH funding. As such, our study demonstrates that dermatologists in high ranking positions such Chief of Department or Research Director are more likely to receive NIH funding. This finding illustrates the difficulty for young dermatologists to receive NIH funding, thus hindering the academic pipeline.

To our knowledge, this study represents the first attempt to use both traditional metrics and non-traditional metrics of academic success to characterize NIH funding in the department of dermatology.

Limitations

There is a lack of information on whether faculty that did not receive NIH funding for the year of 2014 actually applied to be funded and were rejected, or chose not to apply for funding at all. We have no knowledge of individuals who may have attempted to gain NIH funding and thus, we are not able to characterize individuals who may have been unsuccessful at gaining funding.

The authors also relied on program websites, databases, and society websites to gather data and assumed that all information contained on these websites were accurate and up-to-date at the time of data collection.

Furthermore, the NIH RePORTER only lists NIH funding for the lead investigator on the project and does not credit any co-investigators no matter how large or small of a role they played in the project design.

The Scopus database, which was used to gather data on H-index, only includes research published in 1995 or later. Thus, some senior faculty members who published prior to this year may have an H-index that does not accurately reflect their true score. Similarly, some newer faculty members may have a lower H-index simply due to their articles not gathering as many citations as older publications. Additionally, the H-index does not take into consideration individuals who self-cite their research to artificially increase their score.

Because of the retrospective nature and inherent restrictions of our study design, we are not able to attribute causation or claim that the above-mentioned factors are predictive of NIH funding. Our findings can be used to comment only on the strong association of securing NIH funding with scholarly impact.

Conclusion

The purpose of our study was to identify academic characteristics in successful National Institutes of Health funding in the department of dermatology. After examination of all full-time faculty members in the department of dermatology receiving NIH funding in 2014, the study found that the number of publications, leadership in societies, and H-index are correlated with higher NIH funding. This supports the idea that scholarly productivity is an important factor in securing NIH funding. The study also found that the degree type does not influence NIH funding, suggesting that faculty with all types of degrees are equally productive in academic dermatology. Although the present study did not find that gender influences the amount of NIH funding, it did find that females are underrepresented among the faculty members receiving NIH funding in 2014. This may be because fewer females hold leadership positions of high academic rank. Positions such as department chair and research director, which females are highly underrepresented in, often secure more NIH funding.

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