

RESEARCH LETTER

Assessing Comfort in Conducting Research Among Medical Students Interested in Dermatology

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ABSTRACT

Introduction: Participation in research has become increasingly popular amongst US medical students hoping to match into dermatology residency. While medical students have increasingly high research output by the time of graduation, the preparedness of medical students for independent research is unknown.

Methods: An anonymous survey was distributed to 137 dermatology interest groups across the country. The survey contained 21 multiple choice and free text questions that assessed students' research experiences and self-assessed competency in key research components. Fifty-seven students participated.

Results: Students were most comfortable with creating posters for presenting research, writing an abstract and reviewing charts to gather pertinent data for research projects. Students reported a below-average comfort level with data analysis. Medical students who participated in more than eight research experiences and those who perform epidemiological research or commentaries have greater confidence in their ability to conduct research.

Conclusion: Experience in research is associated with the ability to conduct research independently, but there is significant variance in the comfortability to perform essential research-related tasks.

INTRODUCTION

Conducting research in medical school can foster a commitment to lifelong learning. Formal research instruction includes activities such as Self-Directed Learning (SDL) and Problem-Based Learning (PBL), as well as sessions in Evidence Based Medicine (EBM).^{1,2} However, skills gained from isolated activities such as these may be limited. Though research during medical school has increasingly become an

expectation, high numbers of research projects may not indicate competence in all research-related skills.

The assessment of research activity is frequently based on project outcomes rather than evaluation of the skills required for successful completion of research projects.³⁻⁵ Frameworks have been developed that define the skills deemed essential for medical research,⁶ but many do not provide an assessment tool.^{7,8} The literature lacks a clear conceptual framework⁹ to assess

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medical student clinical or translational research skills and attitudes toward performing defined research tasks. While objective self-assessment is inherently imperfect, it has been established that objective competence requires a degree of subjective awareness of one's personal performance and judgement.¹⁰ Epstein et al proposes a framework that emphasizes integrating external and internal data to assess performance on future learning and self-assessment of skill.¹¹ This study integrates medical student self-assessment of comfortability with externally defined requisite standards of research. Our analysis seeks to discover if the current method of undergraduate medical research results in a high degree of self-assessed competence with research skills.

METHODS

An anonymous survey approved by the Tulane Institutional Review Board was distributed to 137 Dermatology Interest Group (DIG) presidents at Dermatology Interest Group Association (DIGA) affiliated medical schools to be distributed to their members via email listservs. The survey contained 21 questions and consisted of multiple choice and fill-in-the-blank questions that assessed students' background and research experience. The survey utilized a Likert scale to assess students' comfortability with conducting research.

RESULTS

57 responses were received. Responses included students of all years of medical school and 96.4% had participated in research during medical school. First year students represented 30.4% of all survey

responses. A majority of students had research experiences outside of the standard medical curriculum with 85.4% of respondents indicating that they were involved in research during undergraduate education and 62.5% participating in research years before attending medical school. 79% of respondents reported having a research mentor in medical school. Twenty-nine percent of students reported participating in dermatology-specific research during medical school. The number and types of research projects varied among respondents. (Tables 1 and 2)

Table 1. Number of research projects students participated in during medical school.

Number of research projects	(%) student participation N=45
1-3	N=21 (46.6)
4-7	N=12 (26.7)
8+	N=12 (26.7)

Table 2. Student participation in various categories of research.

Research project category	(%) student participation N=127
Case report/case series	N=27 (21.3)
Review article	N=17 (13.4)
Commentary/editorial	N=8 (6.3)
Basic science research study	N=13 (10.2)
Clinical medicine research study	N=29 (22.8)
Educational research study	N=16 (12.6)
Epidemiological research study	N=12 (9.5)
Other	N=5 (3.9)

Comfort levels with different research skills varied when measured on a Likert scale. Students reported the highest average

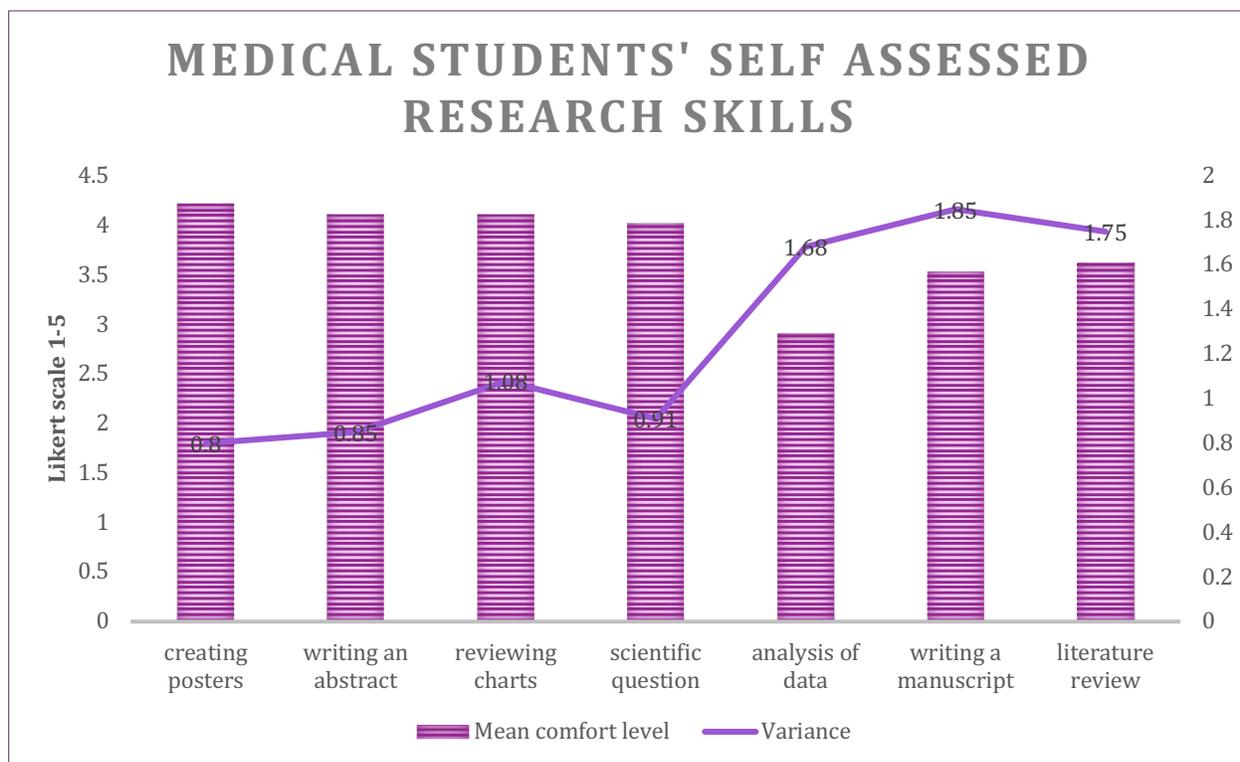


Figure 1: Graphical representation of students' responses on a Likert scale of 1-5

comfort with creating posters for presenting research (4.22 mean, 0.80 variance). Respondents reported considerable comfort with writing an abstract (4.11 mean, 0.85 variance), reviewing charts to gather pertinent data for research projects (4.11 mean, 1.08 variance), and developing a scientific question (4.02 mean, 0.91 variance). Students reported the lowest average comfort with analysis of collected data (2.91 mean, 1.68 variance). The most variance in responses was found in comfortability with writing a manuscript for publication (3.53 mean, 1.85 variance) and conducting literature reviews (3.62 mean, 1.75 variance). Students were confident in their abilities to conduct research during residency (4.20 mean) with 51.1% of respondents "completely comfortable" in their abilities.

A chi square test revealed a significant association between the number of research projects that students participated in and their

comfortability with writing an IRB protocol, writing a manuscript for publication, and conducting scholarly activity as part of residency in the future ($p < .05$). Post hoc comparisons revealed that those who participated in >8 research projects were more confident in their ability to conduct research as part of residency than those who had participated in 1-3 projects or 4-7 projects ($p=0.02$). Differences in quality of research yielded varied confidence in ability to conduct research in residency. Conducting epidemiological research and writing a commentary/editorial showed a significant association ($p=0.02$ and 0.04 , respectively). Writing case reports or review articles showed no association with confidence of conducting research during residency ($p=0.14$ and 0.23 , respectively). Notably, there was an association between year in medical school and comfortability with giving oral presentations and chart review (both $p=0.01$). There was no association between

completing a research year and any measure of comfort ($p = >.05$).

DISCUSSION

Participation in research is popular among US medical students hoping to match into dermatology residency. Students interested in the field recognize the high importance that residency programs place on research participation and publications. The average number of abstracts, presentations, and publications among US seniors who matched into dermatology in 2020 is nineteen.¹² However, our survey revealed that students interested in dermatology as a career do not report consistent levels of comfort regarding ability to conduct various forms of research.

Although self-directed learning is considered a standard for medical school accreditation, independent research is not a requirement.² Instituting research as a standard for accreditation would encourage medical schools to teach the fundamentals of research. There may be potential time and cost restraints associated with implementing formal curriculum interventions. An alternative approach which has been already widely implemented among medical students—mentorship—has been previously associated with increased research productivity, while lack of mentorship has been associated with loss of interest in an academic career.¹³ While mentorship is highly utilized among our study population, mentorship alone has not closed the gaps uncovered by our study.

Overall, participation in a larger quantity of research projects yields greater comfortability with writing an IRB protocol and writing a manuscript for publication. Additionally, case reports have been inversely associated with research

productivity during residency, a finding that may be supported by our finding that students who performed case reports had less confidence in research skills.¹⁴ Future research comparing dermatology applicant comfortability with research compared to that of other similarly competitive specialties could help to establish the pervasiveness of research knowledge gaps and subsequently develop strategies – across specialty and institution – to close those gaps. Providing the framework in which medical students can participate in the pre-clinical years of medical school may help build the necessary skills to perform higher quality research in dermatology.

The study is limited by use of a non-validated study low response rate and recall bias. Because we collected responses from all years of medical school, reported comfort levels may vary based on student-year and curriculum. Overall response rate is unknown due to dissemination via listserv. It is possible that students not applying to dermatology were included in the survey. Self-selection bias likely occurred and could be associated with respondents completing more or less research than the average dermatology applicant. The results are not generalizable to all medical students.

CONCLUSION

Among medical students interested in specializing in dermatology, there are notable discrepancies, as well as some concerning gaps, within students' research skills. Research-focused interventions, such as research participation requirements and/or online educational modules, may be the key to enhancing medical students' research skills. Future studies could examine whether these gaps discourage or encourage participation in research during residency. It

is yet to be determined whether high scholarly productivity during medical school is associated with high productivity during residency training.

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