Canadian Medical Education Journal
Revue canadienne de l'éducation médicale

The role of collaboration and mentorship in the publication of surgical resident research
Le rôle de la collaboration et du mentorat dans la publication des travaux de recherche des résidents en chirurgie

Zarrukh Baig, Zaini Sarwar, Carlos Verdiales and Michael AJ Moser

Volume 14, Number 3, 2023

URI: https://id.erudit.org/iderudit/1106005ar
DOI: https://doi.org/10.36834/cmej.74702

See table of contents

Publisher(s)

Canadian Medical Education Journal

ISSN

1923-1202 (digital)

Explore this journal

Cite this article

Baig, Z., Sarwar, Z., Verdiales, C. & Moser, M. (2023). The role of collaboration and mentorship in the publication of surgical resident research. *Canadian Medical Education Journal / Revue canadienne de l'éducation médicale*, *14*(3), 87–91. https://doi.org/10.36834/cmej.74702

Article abstract

Background: Research is an integral part of surgical training and a mandated competency by national accreditation bodies. Most residents engage in research, but the conversion of this research into peer-reviewed publications is unknown. The objectives of this study were to assess the conversion rate of resident research into published manuscripts and determine what variables predict publication.

Methods: Through a retrospective design, 99 resident research abstracts were identified from the Surgery Research Day at the University of Saskatchewan 2008-2018. Publication status was verified using Google Scholar and PubMed. Variables associated with resident-specific, mentor-specific, and project-specific variables were assessed for their role in predicting publication.

Results: Fifty-two (53%) of the 99 abstracts were published in a peer-reviewed journal, and 43 (43%) were presented at a national conference. Logistic regression analysis revealed multidisciplinary research (OR 4.46, CI 1.8-11.4, p = 0.002), projects involving multiple resident researchers (OR 2.56, CI 1.02-6.43, p = 0.045), and faculty supervisor having > 25 publications (OR 2.46, CI 1.03-5.88, p = 0.042) as significant predictors of publication.

Conclusions: Our study identifies 3 variables related to collaboration and mentorship that can serve as potential starting points to increase research productivity amongst medical trainees.

Canadian Medical Education Journal

Brief Reports

The role of collaboration and mentorship in the publication of surgical resident research

Le rôle de la collaboration et du mentorat dans la publication des travaux de recherche des résidents en chirurgie

Zarrukh Baig,[1] Zaini Sarwar,[2] Carlos Verdiales,[1] Michael AJ Moser[1,2]

[1]Department of Surgery, University of Saskatchewan, Saskatchewan, Canada; [2]College of Medicine, University of Saskatchewan, Saskatchewan, Canada

Correspondence to: Michael A. J. Moser, Department of Surgery, University of Saskatchewan, 103 Hospital Drive Saskatoon, SK, Canada; phone: 1-306-655-5319l; email: mike.moser@usask.ca

Published ahead of issue: Dec 19, 2022; published Jun 27, 2023. CMEJ 2023, 14(3) Available at https://doi.org/10.36834/cmej.74702

Abstract

Background: Research is an integral part of surgical training and a mandated competency by national accreditation bodies. Most residents engage in research, but the conversion of this research into peer-reviewed publications is unknown. The objectives of this study were to assess the conversion rate of resident research into published manuscripts and determine what variables predict publication.

Methods: Through a retrospective design, 99 resident research abstracts were identified from the Surgery Research Day at the University of Saskatchewan 2008-2018. Publication status was verified using Google Scholar and PubMed. Variables associated with resident-specific, mentor-specific, and project-specific variables were assessed for their role in predicting publication.

Results: Fifty-two (53%) of the 99 abstracts were published in a peer-reviewed journal, and 43 (43%) were presented at a national conference. Logistic regression analysis revealed multidisciplinary research (OR 4.46, CI 1.8-11.4, p = 0.002), projects involving multiple resident researchers (OR 2.56, CI 1.02-6.43, p = 0.045), and faculty supervisor having > 25 publications (OR 2.46, CI 1.03-5.88, p = 0.042) as significant predictors of publication.

Conclusions: Our study identifies three variables related to collaboration and mentorship that can serve as potential starting points to increase research productivity amongst medical trainees.

Résumé

Contexte : La recherche fait partie intégrante de la formation en chirurgie et elle est définie comme une compétence obligatoire par les organismes d'agrément nationaux. La plupart des résidents font de la recherche, mais la portion de ces travaux qui donne lieu à des publications évaluées par les pairs demeure inconnue. Les objectifs de cette étude étaient d'évaluer le taux de conversion en publications des travaux de recherche des résidents et de déterminer les variables permettant de prédire la publication.

Méthodes : Aux fins de cette étude rétrospective, nous avons repéré 99 résumés de recherche présentés par des résidents dans le cadre de la Journée de la recherche en chirurgie à l'Université de Saskatchewan entre 2008 et 2018. Le statut de publication a été vérifié en utilisant Google Scholar et PubMed. Des variables liées au résident, au mentor et au projet ont été évaluées pour déterminer leur rôle dans la prédiction d'une publication.

Résultats : Cinquante-deux (53 %) des 99 résumés ont été publiés dans une revue évaluée par les pairs, et 43 (43 %) ont été présentés à une conférence nationale. L'analyse de régression logistique a révélé que la recherche multidisciplinaire (OR 4,46, CI 1,8-11,4, p=0,002), les projets regroupant plusieurs chercheurs résidents (OR 2,56, CI 1,02-6,43, p=0,045) et ceux supervisés par un membre du corps professoral ayant > 25 publications (OR 2,46, CI 1,03-5,88, p=0,042) étaient des prédicteurs significatifs d'une publication.

Conclusions : Notre étude fait ressortir trois variables liées à la collaboration et au mentorat qui peuvent servir de points de départ pour accroître la productivité en recherche des médecins résidents.

Introduction

Research is an essential component of surgical education. Engaging in and interpreting novel literature is paramount in providing up-to-date, evidence-based medicine.[1–3] Furthermore, the publication of resident research projects can also have a positive impact on surgical trainees.[1,2] It is often a barometer for academic productivity and competency in research may be a stimulus for establishing a future career as surgical scientists. Based on previous reports, the conversion rate of resident research into peer-reviewed publications is typically between 30-50%.[4–6] Barriers to publication have been described, including time limitations, lack of quality in study design, and lack of prior research experience by surgical residents.[7,8] A 2015 study of plastic surgery residents at Johns Hopkins University found that increased post-graduate year was inversely correlated with higher abstract conversion.[4] The same study also found that the academic rank of the mentor is also associated with an increased rate of abstract conversion.[4] Senior academic mentors can play a pivotal role in nurturing future physician-scientists in helping them achieve their research aspirations.[9,10]

The primary objective of this study was to assess the conversion rate of resident research abstracts into peer-reviewed publications in a Canadian Surgical Residency Program. A secondary aim of this study was to identify variables associated with the positive conversion of abstracts.

Methods

We performed a retrospective cohort study by downloading Resident Research Day program booklets from 2008-2020, from the publicly accessible University of Saskatchewan Department of Surgery website. This annual symposium allows surgical residents from various disciplines to present their research completed during their clinical training. We identified one hundred and seventeen abstracts with resident presenters for this study and excluded abstracts presented by faculty or medical students. The median time to publication was 12 months, with a range of 11-20 months; therefore, we excluded the abstracts from 2019 and 2020 to allow for at least 20 months of follow-up from the presentation date for each abstract.

Variables that could influence the publication of abstracts were postulated based on the literature and included resident-specific, mentor-specific, and project-specific variables.[4,7] The thirteen variables included the following: post-graduate year of training (PGY), whether the resident won an award at the symposium, the total number of residents listed as co-authors of the abstract, the presenting resident's surgical subspecialty, whether the resident was engaged in the Clinical Investigator Program (CIP), resident's prior number of publications, faculty mentor's number of years in practice, faculty mentor's number of previous publications, whether faculty mentor was a basic scientist, whether the project was financed by a major grant, type of research, type of data collection, and whether the project was multidisciplinary.

The primary outcome variable was successful conversion to a published article in a peer-reviewed journal. Secondary outcomes included time to publication, the journal's impact factor, and whether the abstract was presented at a national conference.

We used PubMed and Google Scholar, and a specific search strategy to verify whether each abstract was published or not. First, we searched for the primary author of the abstract. Next, we searched for the primary investigator (faculty mentor) and reviewed their list of publications. If we could not identify a publication with the first two searches, then we searched for key words in the title of the abstract. Once we identified a publication, we ensured that the listed authors and methods matched the corresponding abstract. Before concluding that an abstract was not published, we required that at least five searches done in this manner had failed to find a result.

The collected data were entered into SPSS ver 26 (IBM Corporation, Armonk, NY) for statistical analysis, and Chi-squared testing identified 5 variables with a p-value <0.20. These variables, which included *resident had prior publications, project involved multiple resident researchers, resident presentation won an award, faculty mentor had >25 publications, and the project was multidisciplinary*, were then entered into a 'backward' logistic regression analysis.

Our study was exempt from Research Ethics Board (REB) approval as the Research Day programs are readily available to the public on our department website.

Results

We analyzed 99 resident abstracts from 2008-2018 and found publications for 52 (53%) in peer-reviewed journals with a median impact factor of 2.54. We also found

evidence of presentation at a national conference for 43% of the abstracts.

Regarding resident-specific variables (Table 1), residents having prior publications were more likely to publish their findings (27/51 vs. 14/48, p = 0.02). Likewise, projects involving multiple resident researchers reached sufficient significance to be included in the logistic regression analysis (24/51 vs 15/48, p = 0.13). However, there was no statistically significant association with CIP engagement or winning an award on publication. The PGY rank of the resident and the surgical subspecialty likewise was statistically nonsignificant in publication.

In terms of mentor-specific variables, we found that projects supervised by mentors with >25 publications were more likely to be published (30/51 vs 19/48, p=0.04). However, the years in practice or engagement in basic science research were both statistically nonsignificant in our study.

Regarding project-specific variables, multidisciplinary projects were more likely to be published (27/51 vs. 12/48, p = 0.04), while the type of research was not statistically significantly associated.

In constructing the logistic regression model, "multidisciplinary project" and "mentor is a basic scientist" could not both be included because of collinearity. We selected "multidisciplinary project" as it had a much more significant association with publication (p=0.004 vs. p = 0.13). Logistic regression analysis (Table 2) revealed multidisciplinary research (OR 4.46, CI 1.8-11.4, p = 0.002), projects involving multiple resident researchers (OR 2.56, CI 1.02-6.43, p = 0.045), and faculty supervisor having > 25 publications (OR 2.46, CI 1.03-5.88, p = 0.042) as being significantly associated with conversion to publication.

Table 1. Resident-, mentor- and project-specific differences in publication for 99 abstracts presented at the Department of Surgery Annual Resident Research Day at the University of Saskatchewan 2008-2018.

Project Characteristic	Published (51)	Not Published (48)	p-value*
Resident Specific Variables			
Post-Graduate Year			
PGY1	2	4	
PGY2	16	14	
PGY3	14	12	0.92
PGY4	10	9	
PGY5+	9	9	
Surgical subspecialties of residents			
Neurosurgery	16	17	
General Surgery	24	19	0.67
Orthopedic Surgery	10	10	
Other Surgical Disciplines	1	2	
Resident had prior publications	27	14	0.02
Project with multiple resident researchers	24	15	0.13
Resident presentation received an award	26	17	0.12
Resident enrolled in Clinical Investigator program	10	5	0.22
Mentor Specific Variables			
Faculty mentor has been in practice for over 14 years	25	21	0.66
Faculty mentor has more than 25 publications	30	19	0.07
Supervisor is a basic scientist	11	5	0.13
Project Specific Variables			
Type of Research			
Retrospective	27	25	
Prospective	4	9	0.37
Basic Science	10	6	
Other (Surveys or Observational Studies)	12	6	
Multidisciplinary project	27	12	0.004
College of Medicine $30,000 Research Grant	4	1	0.39

** Calculated using the Chi-squared test.*

Table 2. Multivariate logistic regression analysis of variables influencing publication of Resident Research Day projects from the University of Saskatchewan 2008-2018.

	Multivariate Logistic Regression		
Variable	p-value	Odds Ratio	95% CI
Multidisciplinary project	0.002	4.5	1.8-11.4
Project with multiple resident researchers	0.045	2.6	1.1-6.4
Faculty mentor had > 25 publications	0.042	2.5	1.1-5.9
Resident presentation received an award	-	-	-
Resident had prior publications	-	-	-

Nagelkerke R^2=0.237
X^2=19.392, 5 df, p=0.002
95%CI: 95% Confidence Interval

Discussion

In this cohort, 53% of resident abstracts from the Annual Research Day were eventually published in a peer-reviewed journal. Although we are a medium-sized residency program without a particularly strong history in surgical research, the percentage of abstracts that went on to publication is nonetheless similar to that seen in other Canadian and American Surgical Residency Programs.[4,11]

Through a logistic regression analysis model, we found that resident projects are more likely to be published when projects are multidisciplinary, when projects involve multiple resident researchers, and when projects are supervised by faculty mentors with greater than 25 previous publications. These are associations only and do not elucidate the mechanism whereby these variables increase the chance of publication.

Through a literature review, we did not encounter any studies documenting the role of multidisciplinary collaboration in the publication of resident research projects. In a centre such as ours with limited ongoing surgical research projects, the role of surgical residents and faculty collaborating with established researchers in other fields likely takes on greater importance.[12]

Another novel finding in our study was that multi-resident involvement in a project improves the odds of publication. This is in agreement with previous literature that identified co-authors' lack of time and interest as one of the main barriers to successful publication.[7,13] The involvement of multiple residents can help overcome time constraints and raise the enthusiasm for pursuing publication.[14–16]

We included presentation at a national conference as a secondary outcome. This search identified that 43% of the abstracts were submitted at a national conference, all of which were eventually published, implying that high-quality projects worthy of acceptance at a national conference would subsequently go on to publication in a peer-reviewed journal.

The role of surgical mentors with substantial publication experience has been previously validated as a key variable in converting abstracts into peer-reviewed publications.[4,7] The involvement of experienced co-authors in resident projects can guide mentees with research design and facilitate the development of publishable manuscripts. Our early analysis suggested that a resident with prior publications also increased the likelihood of publication, but this significance was lost after adjusting for co-variables in the logistic regression model. The most likely explanation is that residents with prior publications often engaged in research with the same faculty members. The role of experienced faculty in providing invaluable mentorship has been documented before, and our results agree with the literature.[4,9,10]

Our study has several limitations owing to the retrospective design of this project. The only resident projects considered in this study were those accepted at the Annual Resident Research Day, which excludes research projects not presented at this symposium. Also, there are likely other variables that are not well-documented nor easy to verify that might influence the publication of these resident projects, such as supervisors' roles and responsibilities, protected time for resident research, number of rejections by peer-reviewed publications, and others.

Another potential limitation of this analysis is that our search strategy was based on PubMed and Google Scholar. Both engines index publications in journals that meet the criteria for indexing, which exclude non-peer-reviewed journals. Given the time constraints of a surgical residency, it is possible that residents chose to publish their findings

in the most likely to accept journal. Finally, the variables identified in our study might not be generalizable to other surgical residency programs and may also not apply to non-surgical programs. Over the 10 years of these annual symposiums, there was also a change in the administration of all the surgical programs as well as the department of surgery. These changes led to a greater emphasis on resident research and a greater volume of resident presentations for the annual symposium; however, we did not identify any significant changes in the percentage of resident publications resulting from these administrative changes.

Conclusions

The results of this study suggest that abstracts presented by surgical residents at annual research days at our center have about a 53% publication rate. Based on our study, resident projects are more likely to be published when there is collaboration between multiple disciplines, when projects involve more than one resident, and when projects are supervised by faculty mentors with greater than 25 previous publications. These variables should be considered as ideas to help boost research productivity and research acumen amongst residents. Further research is warranted into this topic to dissect the mechanisms whereby the identified variables lead to an increased chance of publication. Future research might also include a prospective trial to assess what changes are meaningful in increasing resident research productivity.

Conflicts of Interest: The authors have no relevant conflicts of interest to declare.
Funding: There was no financial or grant support provided for this project.

References

1. Frank JR, Danoff D. The CanMEDS initiative: implementing an outcomes-based framework of physician competencies. *Med teach*. 2007 Jan 3;29(7). https://doi.org/10.1080/01421590701746983
2. The Royal College of Physicians and Surgeons of Canada. *Specialty training requirements in general surgery*. [Internet]. Available at: https://www.royalcollege.ca/rcsite/documents/ibd/general_surgery_str_e [Accessed July 2021].
3. O'Brien J, D'Eon M. Rethinking clinical research training in residency. *Can Med Educ J*. 2014;5. PMID: 26451223 https://doi.org/10.36834/cmej.36627
4. Susarla SM, Lopez J, Mundinger GS, Lifchez SD, Redett RJ. Abstract presentations by residents at an intramural research day: what factors affect publication? *J Surg Educ.* 201;72(4). https://doi.org/10.1016/j.jsurg.2015.01.001
5. Mills LS, Steiner AZ, Rodman AM, Donnell CL, Steiner MJ. Trainee participation in an annual research day is associated with future publications. *Teach Learn Med*. 2011;23(1). https://doi.org/10.1080/10401334.2011.536895
6. Bhandari M, Patenall V, Devereaux PJ, et al. An observational study of orthopaedic abstracts and subsequent full-text publications. *J Bone Joint Surg*. 2002;84(4). https://doi.org/10.2106/00004623-200204000-00017
7. Smart RJ, Susarla SM, Kaban LB, Dodson TB. Factors Associated with Converting Scientific Abstracts to Published Manuscripts. *J Craniofacial Surg*. 2013;24(1). https://doi.org/10.1097/SCS.0b013e318270fdef
8. Pattani R, Wu PE, Dhalla IA. Resident duty hours in Canada: past, present and future. *CMAJ.* 2014;186(10). https://doi.org/10.1503/cmaj.131053
9. Atesok KI, Hurwitz SR, Egol KA, et al. Perspective. *Acad Med*. 2012 May;87(5):592-7. https://doi.org/10.1097/ACM.0b013e31824d2b57
10. Retrouvey M, Grajo JR, Awan O, et al. Transitioning from radiology training to academic faculty: the importance of mentorship. *Curr. Probl*. 2020 Jul;49(4):219-23. https://doi.org/10.1067/j.cpradiol.2019.02.011
11. Allen L, Vogt K, Mele T, Ott M, Leslie K, Colquhoun P. Evaluating the impact of a resident research program in general surgery. *Can Med Educ J.* 2017;8 (3). https://doi.org/10.36834/cmej.36719
12. National Research Council (US) Committee on Research at the Intersection of the Physical and Life Sciences. *Research at the intersection of the physical and life sciences.* Washington, DC: National Academies Press. 2010. https://doi.org/10.17226/12809
13. Chan RK, Lockyer J, Hutchison C. Block to succeed: the Canadian orthopedic resident research experience. *Can J Surg*. 2009; 52(3). PMID: 19503662
14. Msaouel P, Kappos T, Tasoulis A, et al. Assessment of cognitive biases and biostatistics knowledge of medical residents: a multicenter, cross-sectional questionnaire study. *Med Ed*. 2014 Jan 12;19(1). https://doi.org/10.3402/meo.v19.23646
15. Windish DM, Huot SJ, Green ML. Medicine residents' understanding of the biostatistics and results in the medical literature. *JAMA*. 2007 Sep 5;298(9) https://doi.org/10.1001/jama.298.9.1010
16. Donegan DJ, Kim TW, Lee G-C. Publication Rates of Presentations at an Annual Meeting of the American Academy of Orthopaedic Surgeons. *Clin Orthop Relat Res.*. 2010 May;468(5). https://doi.org/10.1007/s11999-009-1171-5