

Student publications in the New Zealand Medical Student Journal: the first fourteen years

Cameron Wells¹, Dr Ibrahim Al-Busaidi²

¹School of Medicine, Faculty of Medical and Health Sciences, The University of Auckland

²Christchurch Hospital, Canterbury District Health Board

Cameron is a BMedSc(Hons) student at The University of Auckland in the Department of Surgery. He has been involved with the NZMSJ as an author, reviewer, and editor. He is interested in academic general surgery, physiology, and how to get more medical students involved in research. Ibrahim is a second-year hour officer at the Canterbury District Health Board.

Abstract

Introduction: Medical student journals (MSJs) play an important role in supporting students to improve their academic writing skills, gain familiarity with the peer-review process and ultimately publish their work. International literature examining the role of MSJs is scarce, with no published analyses of their outputs or impact on the scholarly activities of medical students. The aim of the current study was to examine the author characteristics and publishing trends in the New Zealand Medical Student Journal (NZMSJ).

Methods: A retrospective analysis of all articles published in the NZMSJ from 2004 to 2017 was performed. Article related data were collected for student-authored publications, in addition to author, editor and reviewer gender. Univariate analysis was conducted using the chi-squared goodness-of-fit test.

Results: Twenty-four issues of the NZMSJ have been published to date, containing a total of 204 student-authored articles. Published articles were more likely to be authored by clinical students than pre-clinical students ($P < 0.001$). No gender gap was identified in the authorship of articles or overall editorial board positions. However, NZMSJ issues were significantly more likely to have a male Editor in Chief (71% $P = 0.04$).

Conclusion: The NZMSJ provides students with opportunities to publish their work and develop their academic skills. Medical students should be encouraged to submit their academic work for publication in the NZMSJ. Future research should investigate the impact of publication in MSJs on students' subsequent scholarly activities.

Background

Medical students have made many notable contributions to science throughout history, being responsible for the discovery of heparin, insulin, the sinoatrial node, and ether anaesthesia, among others.^{1,2} A broad range of research opportunities currently exist for medical students in New Zealand, including summer studentships, intercalated degrees, and other extracurricular research activities.³ Multiple studies have shown that New Zealand medical students are capable of successfully publishing research in peer-reviewed academic literature.⁴⁻⁷ Despite these successes, many students still face considerable challenges when attempting to publish their work in mainstream medical and scientific journals.^{8,9} Academic publishing can be daunting, arduous, and time-consuming, and may

result in demotivating rejections, impacting on students' confidence and discouraging them from being involved with research in the future.⁹

A number of medical student journals (MSJs) have been established in response to these challenges, and aim to promote academic research and publishing amongst the medical student community. These include the New Zealand Medical Student Journal (NZMSJ),¹⁰ Australian Medical Student Journal (AMSJ),¹¹ and Student BMJ.¹² MSJs provide a student-friendly environment for students to publish their work, improve their academic writing skills and gain familiarity with the peer-review process.³ More than 18 MSJs are published in English across the world, with several more in other languages.⁸

The NZMSJ is a student-led journal which is indexed in Google Scholar and primarily publishes academic articles written by medical students.¹⁰ The journal was founded in 2003, with the first issue published in 2004, making it one of the longest-running MSJs in existence, and publishes two issues each year.⁸ The primary objective of the NZMSJ is to help "medical students make the transition from writing for medical school to publishing quality work in professional journals".¹⁰ The journal publishes several different types of articles, including academic research (original and review articles), case reports, feature articles (usually opinion or perspective items), and reviews of books, podcasts, documentaries, and other media.

Despite the recognised importance of MSJs in providing a platform for medical students to develop skills and experience in academic publishing, no analysis of articles published in the NZMSJ has formally been conducted to date.⁹ Furthermore, the international literature examining the role of MSJs is scarce, with no published analyses of their impact on scholarly activities of medical students.

The aim of this retrospective analysis was to describe and examine the characteristics and trends in publication of student-authored articles in the NZMSJ.

Methods

Search strategy

All published issues of the NZMSJ were retrospectively identified via the journal website.¹³ Issue 1 of the NZMSJ was published in March 2004, while the most recent edition of the NZMSJ analysed was Issue 24 (June 2017), representing a 14-year period available for analysis.

An article was deemed to be authored by a student if the author biography clearly identified at least one student author. Articles published by medical graduates that were clearly stated as written prior to graduation were included in this definition. Editorials and guest editorials were excluded.

Data collection

Data were collected from previously published issues of the NZMSJ. No attempt was made to contact authors due to the lack of accurate contact details. For each issue, the total number of articles, as well as the number

of student-authored articles was recorded. For each student-authored article, the following data were collected: number of authors (student and non-student), gender of student authors, student authorship order (first vs. co-author vs. both), level of university study (preclinical vs. clinical vs. intercalated research year vs. other undergraduate degree), institutional/medical school affiliation (University of Auckland vs. University of Otago vs. international), and the type of publication (original research vs. case report vs. academic review vs. feature article vs. book/media review).

Author gender was recorded as per the author biography, which is written by the author as part of their submission. If unclear, an Internet search was performed using the author's name to attempt to determine the gender of the author. For each issue of the NZMSJ analysed, the names and gender of the student editors and reviewers were also recorded.

Statistical analysis

Collected information was entered into a pre-designed Excel spreadsheet. Descriptive statistics were utilised for the majority of the data. Continuous data were expressed as mean ± standard deviation (SD). The χ^2 goodness-of-fit test was used to determine variance from an equally-proportioned distribution for author gender, author year level, and editor/reviewer gender. A P-value of < 0.05 was considered statistically significant. All analyses were performed using SPSS for Macintosh (Version 22; IBM Corp., Armonk, NY, USA).

Results

Study sample

To date, 24 issues of the NZMSJ have been published, with two being published as a combined release in 2014 (Issue 18/19). A total of 309 articles have been published, of which 204 articles (66%) were authored by at least one student.

The proportion of student-authored articles varied from 33% to 85% per issue, although there was no discernible trend over the 14-year period (Figure 1). Likewise, there was no clear trend in the overall number of articles published per year.

Student-authored publications

Overall, there were 273 authors (230 students, 43 non-students) contributing to the 204 student-authored publications. Accounting for students who published more than one article in the NZMSJ, there were 185 unique student authors identified. Of these, 88 were female (48%), and 97 were male (52%) (P=0.51), showing no statistically significant gender gap for authorship in the NZMSJ.

The majority of student-authored articles (92.2%) were written by a single student author, while only one article was identified that did not have a student named as first author (Table 1). Most articles (73.5%) were authored by clinical medical students, with a clear increase in authorship rates from 2nd to 6th year (P<0.001) (Figure 2). Academic review articles

and feature articles made up most of the student authored publications in the NZMSJ (26% each), while original research and case reports contributed only 15% and 4% respectively. Over 90% of student authors were affiliated to either the University of Auckland or University of Otago, with only 15 articles attributed to overseas student authors (P<0.001).

Table 1. Characteristics of student authored articles in the NZMSJ, 2004-2017

	n = 204 (%)	P-value*
Student authorship order		<0.001
First author only	188 (92.2%)	
Co-author only	1 (0.5%)	
Both (multiple student authors)	15 (7.4%)	
Stage of study **		<0.001
Preclinical	40 (19.6%)	
Clinical	150 (73.5%)	
Intercalated	7 (3.4%)	
Other undergraduate	2 (1.0%)	
Not stated	8 (3.9%)	
Institutional affiliation		<0.001
University of Auckland	80 (39.2%)	
University of Otago	104 (51.0%)	
Overseas	15 (7.4%)	
Not stated	5 (2.5%)	
Type of article		<0.001
Original research	31 (15.2%)	
Academic review	52 (25.5%)	
Case report	9 (4.4%)	
Feature article	53 (26.0%)	
Book/media review	38 (18.6%)	

* Chi-squared goodness of fit test with null hypothesis being an equally-proportioned distribution.

** Percentages do not add to 100% due to three articles authored by both preclinical and clinical medical students.

Editorial staff and reviewers

Over the 24 issues, there were a total of 433 acknowledgements to students contributing to the NZMSJ as editors or reviewers (mean 18.8 per issue, SD 5.2). This corresponded to 130 individuals (63 males, 65 females, 2 unclear) (P=0.86). Each individual contributed to a mean 3.3 (SD 2.1) issues of the NZMSJ.

Of the Chief Editors of the NZMSJ to date, 5 of 12 have been female

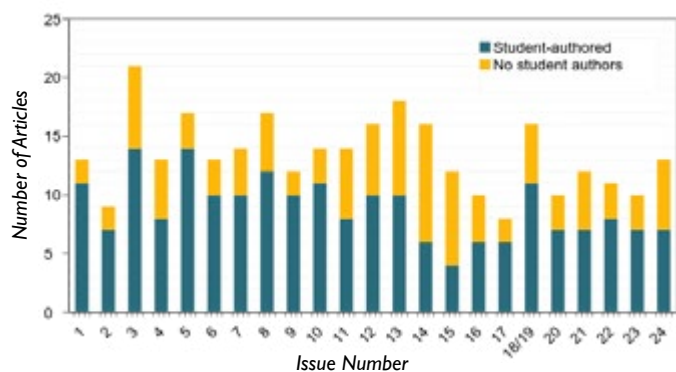


Figure 1. Trend of total articles per issue vs. student authored articles (2004-2017).

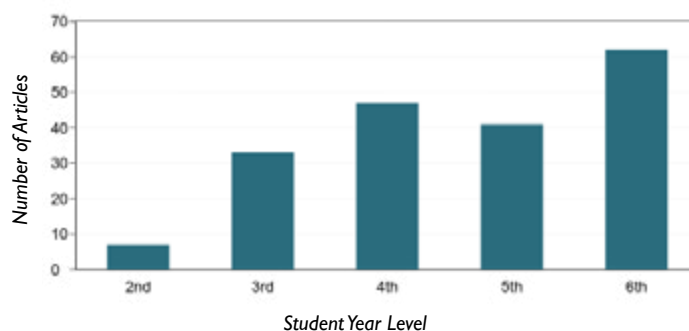


Figure 2. Number of articles in the NZMSJ published by medical student year level. P< 0.001 for variance from an equally proportioned distribution.

(42%, $P=0.56$), who have been responsible for 7 of 24 issues (29%, $P=0.04$) published thus far. The Deputy Editor position was formally established from Issue 13 onwards, and three of the five individuals who have held this role have been female. Of the Academic and Features Editors acknowledged in the journal, 45% (19 of 42) have been female ($P=0.55$). Student reviewer names have been provided in the NZMSJ since Issue 13, with 52 females (58%) and 37 males (42%) listed ($P=0.11$).

Table 2. Gender data for student authors, editors, and reviewers

	n (%)	P-value*
Student authors	n = 185	0.51
Female	88 (47.6%)	
Male	97 (52.4%)	
Overall editors/reviewers	n = 128	0.86
Female	65 (50.8%)	
Male	63 (48.5%)	
Chief Editors	n = 12	0.56
Female	5 (41.7%)	
Male	7 (58.3%)	
Deputy Editors	n = 5	0.66
Female	3 (60%)	
Male	2 (40%)	
Academic/Features Editors	n = 42	0.55
Female	19 (45.2%)	
Male	23 (54.8%)	
Reviewers	n = 89	0.11
Female	52 (58.4%)	
Male	37 (41.6%)	

* Chi-squared goodness of fit test with null hypothesis being an equally-proportioned distribution.

Discussion

The NZMSJ provides a medium for New Zealand medical students to publish their academic work in a peer-reviewed journal, with over 200 student-authored articles identified in the current retrospective analysis. No trend in the number of student-authored articles was evident over the 14-year history of the NZMSJ, suggesting the journal has consistently provided opportunities for medical students to publish and develop their academic skills.

To the authors' knowledge, no other analyses of articles published in MSJs have been conducted, despite there being over 20 MSJs in print as of 2017.^{8,14} NZMSJ articles were significantly more likely to be authored by clinical medical students, similar to the trend found by Al-Busaidi et al. in an analysis of articles published in the New Zealand Medical Journal.⁵ Wells et al. also found that senior students completing summer studentships at Auckland University were significantly more likely to have subsequently published in the mainstream literature as a first author.⁷ This trend is likely influenced by multiple factors; senior students are more experienced and have had more opportunities to conduct research. Additionally, the time taken to review and process articles may also delay the time from submission to publication.

Few authors completing intercalated degrees were authors of NZMSJ

articles, despite a previous analysis of BMedSc(Hons) students at Otago showing a publication rate of 33%.⁶ Given the differences between the present study and the analysis of Al-Busaidi et al.,⁶ it appears high-quality research undertaken by intercalating students and their supervisors is more likely to be published in mainstream journals. However, approximately two-thirds of students still remain unpublished following an intercalated BMedSc(Hons) year or summer studentship.^{6,7} The NZMSJ may have an important role in supporting students who have completed summer studentships and/or intercalated degrees publish the results of their work, if they are unable or unwilling to publish in the mainstream medical literature.

A gender gap has previously been identified in academic medicine, with females being less likely to hold senior academic positions,^{15,16} publish in mainstream medical journals,¹⁷ and to be appointed as editorial staff of journals.^{18,19} The current study examined whether the gender gap in academic medicine begins at a medical student level, and found no evidence of a gender gap in authorship in the NZMSJ. However, despite there being no significant overall difference in the gender of chief editors, significantly more issues of the NZMSJ had male chief editors, indicating males were more likely to hold the role for a longer period of time. As part of a larger effort to combat gender inequity in academia, peer-mentoring programmes or other positive interventions for women should be considered.²⁰ To the authors' knowledge, these do not formally exist in New Zealand medical schools, and may provide female medical students with opportunities to develop academic skills to reduce the gender gap observed in more senior academic roles.

The null hypothesis for this analysis was that there would be an equal distribution in authorship and editorial/reviewer positions between males and females (ie. 50% male and 50% female). However, this may be an incorrect assumption, given that females now outnumber males at most medical schools around the world and in New Zealand,^{21,22} meaning an "equal" distribution may still under-represent women. The lack of available data on the number and gender of New Zealand medical students over the past 14 years prevented adjustment for this trend, and therefore the true gender gap is possibly wider than calculated in the present study.

There are several other limitations of the present analysis. The citation rate and academic impact of articles published in the NZMSJ was unable to be assessed due to inconsistent Google Scholar indexing over the 14-year period. It was also not possible to obtain a matched "control group" of students who have published in mainstream journals other than the NZMSJ, or have not published at all. The impact of publication in the NZMSJ on subsequent academic output by students should be investigated in further studies as a measure of student development. Due to the retrospective nature of the analysis, it was not possible to obtain and assess important variables that were not readily available; ethnicity, age, and/or undergraduate/postgraduate entry to the medical programme, and these remain areas for future research. Finally, while authors were able to "self-report" gender in the author biography, it was not possible to assess fully non-binary genders, and this remains a weakness of the present study.

Despite these limitations, findings from this study have implications for medical students, MSJs, including the NZMSJ, and future research. First, non-clinical medical students appear to be underrepresented in medical student and mainstream journals.^{5,7} MSJs should target junior medical students and encourage them to submit their research to provide them with early experiences in peer-review and academic publishing. Second, inconsistent indexing of MSJs may result in reduced visibility of published research and therefore low accessibility among the wider international medical student audience. Achieving better recognition and international visibility through consistent indexing in biomedical databases should be an objective for all MSJs.

Future research should examine the effect of publication in the NZMSJ on subsequent academic activities, such as publication in mainstream medical journals, and completion of higher academic degrees. The identification

of barriers to publication faced by medical students may facilitate the development of targeted strategies to improve publication rates,^{3,23} and thus further the role of the NZMSJ in publishing the work of medical students from New Zealand and abroad.

Conclusion

The NZMSJ provides medical students with opportunities to publish their work and develop their academic skills. Given that up to two-thirds of medical student research remains unpublished, students should be encouraged to submit their work to the NZMSJ. No gender gap in authorship or overall editorial board representation was identified, though NZMSJ issues were significantly more likely to have a male Chief Editor. Future work should investigate the impact of publication in the NZMSJ and other MSJs on students' subsequent scholarly activities.

Conflict of Interest: Cameron Wells is the NZMSJ Academic Editor. This article has gone through a double blinded peer-review process applied to all articles submitted to the NZMSJ and has achieved a standard required for publishing. The authors have no other conflicts of interests to declare.

Correspondence: Cameron Wells, cameron.wells@auckland.ac.nz

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