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Research Article

Publication Productivity in the Medical Radiation Sciences

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ABSTRACT

Introduction: The evidence-based foundation of the health professions is dependent on research and its dissemination through peer-reviewed journals. The growth of a health profession is dependent on the sharing of knowledge. Various metrics have been used to measure the quality of journals, articles, and authors. These metrics, however, have many flaws. Publication productivity and patterns provide better insights that can guide professional and journal strategy.

Methodology: Bibliometric data were collected from seven key peer-reviewed, international journals for the medical radiation sciences. These key journals were examined over the period 2009–2013 inclusive (5 years). Medical radiation technologists (MRTs) who had published two or more articles in the seven journals during the study period were further investigated through PubMed and ResearchGate to produce a list of publications (excluding those already identified in the seven primary journals) from the 5-year period. Further analysis was performed on the most prolific authors.

Results: A total of 969 articles were published in the seven key peer-review journals that met the inclusion criteria. The 969 articles were written by a total of 2,083 different authors. Overall, 80.5% (1,676 of 2,083) of all authors only published once within the seven journals and 110 of these authors were the sole author of their article. A total of 165 MRTs were identified who had published three or more articles.

Conclusion: MRTs contribute significantly to the knowledge base of both the medical radiation science professions and the wider health community through active research.

Keywords: Metrics; MRS; MRT; productivity; publication

RÉSUMÉ

Introduction : Les fondements reposant sur les preuves scientifiques des professions de la santé dépendent de la recherche et de sa diffusion dans les revues à comité de lecture. La croissance d'une profession de la santé dépend du partage des connaissances. Différentes mesures ont été utilisées pour évaluer la qualité des publications, des articles et des auteurs. Ces mesures ont cependant plusieurs faiblesses. La productivité et les tendances fournissent de meilleures perceptions qui peuvent guider la stratégie de la profession et de la revue.

Méthodologie : Des données bibliométriques ont été recueillies sur sept revues internationales clés avec comité de lecture dans le domaine des sciences de la radiation médicale (SRM). L'examen a porté sur la période de 2009 à 2013 inclusivement (cinq ans). Les technologues en radiation médicale (TRM) qui ont publié au moins deux articles dans l'un de ces sept revues durant la période examinée ont fait l'objet d'une enquête plus poussée via PubMed et ResearchGate, afin de produire une liste de leurs publications (autres que celles déjà recensées dans les sept revues sous examen) au cours de la période de cinq ans. Une analyse plus poussée a été faite sur les auteurs les plus prolifiques.

Résultats : Au total, 969 articles ont été publiés dans les sept revues clés avec comité de lecture répondant aux critères d'inclusion. Les 969 articles ont été rédigés par 2083 auteurs différents, dont 80,5 % (1676/2083) n'ont publié qu'une seule fois dans les sept revues; 110 de ces auteurs avaient écrit seuls l'article. Nous avons recensé 165 TRM ayant publié au moins trois articles.

Conclusion : Les TRM apportent une contribution significative à la base de connaissance des professions de SRM et à la communauté plus large de la santé par une participation active à la recherche.

Introduction

The evidence-based foundation of the health professions is dependent not only on research but also its dissemination through peer-reviewed journals [1–4]. The advancement of

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any health profession requires the sharing of discoveries and knowledge by both individuals and teams [1–5]. For there to be evidence-based practice, it is essential that rigorously tested and peer-evaluated evidence exists to inform practice [1,2,4]. The evidence provided by research can inform clinical practice and decision making, help plan and deliver health care, and is used for education and training [1]. Dissemination is the final step in the research process and ensures that new knowledge is at the forefront of professional practice [2–4,6].

The idea of measuring the quality of a journal is not new; however, there is no universally accepted measure of quality [7,8]. The analysis of citations is an integral component of assessing journal quality, and the journal impact factor is one of the most well-known methods of measuring quality [4,8–11]. Citation analysis and impact factors provide measures of the presumption of quality gleaned from the number of times an article has been cited in other articles [4,7–10,12].

There are other approaches to rate journals, and there are also many methods used to measure the quality or impact of a particular article or author; however, these methods also contain flaws. For example, citation rates may be higher in poorly written, methodologically flawed, or controversial articles rather than being an indicator of article quality or impact. Author productivity and publication patterns reflect professionalism and scholarly maturity as well as providing an insight that can inform journal strategy [2–4]. Author productivity provides an insight into the state of play of the professions across the globe, the investment in knowledge economy, approach to advanced practice, and indeed, opportunity for development. It should be noted, however, that publication productivity (or quantity) does not equate to quality. It is a metric of quantity only.

There is an inequality in publication productivity with the most productive authors contributing disproportionately to a profession's evidence base [3,13]. Alfred J. Lotka published an article in 1926 in which he examined the frequency distribution of publication productivity and was seemingly the first to do so [3,13]. Lotka found that productivity followed an inverse square distribution, which is now known as Lotka's law [3,13]. Lotka's law states that the number of authors publishing n articles is equal to $1.0/n^2$ of those that had just published one article [3,13]. Generalizations have been made from this law; for example, that 50% of publications are produced by 6.0% of authors [13].

In 2013, the publication patterns in radiography (diagnostic and therapeutic) were published [3,4]. The studies aimed to establish the level of author productivity within international radiography journals covering both the diagnostic and therapeutic disciplines [3,4]. The publication examined four "key" journals: the *Journal of Medical Imaging and Radiation Sciences* (*JMIRS*), *Radiography*, The *South African Radiographer*, and *The Radiographer* (now rebranded as the *Journal of Medical Radiation Sciences, JMRS*) [3,4]. The 23 most prolific authors (contributed to eight or more articles at a mean rate of one per year) were identified and evaluated further [3]. The previous study [3,4] did not, however, examine the medical radiation sciences (MRSs) as a whole, instead focusing on radiography (diagnostic radiography) and radiation therapy (therapeutic radiography). By including the *JMIRS*, which represents the technical professions in all specialisations of the MRSs, nuclear medicine technologist (NMT) authors were incidentally sampled with two NMT authors featuring in the list of the top 23 authors. A physicist and a doctor of medicine (MD) were also incidentally sampled in the list of top 23 authors. The data also revealed a bias toward radiography. The study was not globally representative because only four journals were included. This resulted in the United States being undersampled as none of the four journals originated in the USA. The study also did not account for medical radiation technologists (MRTs), including radiographers, radiation therapists, and NMTs, publishing more widely in journals outside prescribed technical journals.

Although the metrics provided in the previously published study [3,4] offer a useful insight into publications, sampling bias was thought to possibly limit both the accuracy and the usefulness of the data for strategic planning. The purpose of this study was to undertake an examination of the publication patterns across the MRSs.

Methodology

This study was an analysis of bibliometric data collected from seven key peer-reviewed, international journals for the MRSs. The *JMIRS* (key international journal based in Canada), *The Radiographer* (Australian-based international journal now rebranded as the *Journal of Medical Radiation Sciences*), *Radiography* (UK), *The South African Radiographer* (South Africa), *The Journal of Nuclear Medicine Technology* (*JNMT*; USA), *Radiologic Technology* (USA based), and *Radiation Therapist* (USA based) were selected as the key journals for their respective disciplines. These key journals were examined over the period 2009–2013 inclusive (5 years). Five years was considered an appropriate cycle to maintain currency (journal status and market position) and reflect the fluctuations in annual publication outputs among individuals. Author names, qualifications, affiliations, countries of origin, article names, year of publication, collaboration, cross-institutional status, and publication types were collected and compiled for each article in each journal. It was also noted where each author was positioned in the order of authors for each article. Original research, review articles, case studies, teaching cases, and guest articles were included; however, editorials, correspondence, and educational material reviews were excluded.

NMTs, radiographers, and radiation therapists (RTs) who had published two or more articles, irrespective of author position on the article, in the seven journals during the study period were analysed further. These authors were searched through PubMed and a list of their publications (excluding those already identified in the seven primary journals) from the 5-year period was compiled and the same information extracted. PubMed was searched because it contains more

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