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Feature Article

Occupational therapy publications by Australian authors: A bibliometric analysis

Ted Brown,[1] Sharon A. Gutman[2] and Yuh-Shan Ho[3]

[1]*Department of Occupational Therapy, Faculty of Medicine, Nursing and Health Sciences, Monash University – Peninsula Campus, Frankston, Victoria, Australia,* [2]*Programs in Occupational Therapy, Columbia University Medical Center, New York, New York, USA and* [3]*Trend Research Centre, Asia University, Taichung, Taiwan*

***Background*:** *Bibliometrics refers to the collection and measurement of publishing and citation data configurations with the goal of quantifying the influence of scholarly activities. Advantages of bibliometrics include the generation of quantitative indicators of impact, productivity, quality and collaboration. Those parties who benefit from the results of bibliometric analysis include researchers, educators, journal publishers, employers and research funding bodies.*

***Methods*:** *A bibliometric analysis was completed of peer-reviewed literature from 1991 to 2015, written by Australian occupational therapists (who were able to be identified as such), and indexed in the Science Citation Index-Expanded (SCI-Expanded) or the Social Sciences Citation Index (SSCI) databases. "Occupational therapy" and "occupational therapist(s)" were used as keywords to search journal articles' publication title, abstract, author details, keywords and* KeyWord Plus.

***Results*:** *Between 1991 and 2015, 752 peer-reviewed journal articles were published by Australian occupational therapy authors. On average, those articles had 3.7 authors, 35 references, and were nine pages in length. The top four journals in which Australian occupational therapists published were Australian Occupational Therapy Journal, British Journal of Occupational Therapy, American Journal of Occupational Therapy, and Physical and Occupational Therapy in Paediatrics. The four Australian institutions that generated the largest number of occupational therapy articles were the University of Queensland, University of Sydney, La Trobe University, and Monash University. The top four countries with whom Australian authors collaborated in manuscript writing were the United Kingdom, United States, Canada and Sweden.*

***Conclusion*:** *The volume of occupational therapy peer-reviewed literature has grown over the last two decades. Australian authors have and continue to make significant contributions to the occupational therapy body of knowledge nationally and internationally.*

KEY WORDS *journals, publications, bibliometric, SCI-expanded, SSCI.*

Introduction

Professional journals publish discipline-related findings regarding practice innovations, theoretical developments, professional debates and intervention studies that are disseminated to a large audience. The *Australian Occupational Therapy Journal (AOTJ)* was first published in 1952 and is the primary peer-reviewed occupational therapy journal published in Australia. The majority of authors who publish in *AOTJ* are Australian; however, authors from the United States of America (USA), Canada, New Zealand (NZ), United Kingdom (UK), Sweden and Israel, among others, also submit articles. All submissions to *AOTJ* are peer-reviewed in a double-blind process to ensure that accepted articles demonstrate quality, relevance and validity.

Other peer-reviewed occupational therapy journals that are published in English and accessible through electronic databases such as Medline, OTDBase and Cumulative Index to Nursing and Allied Health Literature (CINAHL) include the *British Journal of Occupational Therapy (BJOT), Canadian Journal of Occupational Therapy (CJOT), Hong Kong Journal of Occupational Therapy (HKJOT), American Journal of Occupational Therapy (AJOT), Scandinavian Journal of Occupational Therapy (SJOT), Physical and Occupational Therapy in Paediatrics (POTP),*

Ted Brown PhD, MSc, MPA, BScOT(Hons), OT(C), OTR, MRCOT, FOTARA; Associate Professor. **Sharon A. Gutman** PhD, MA, Post-Bac OT, BA, OTR, FAOTA; Professor. **Yuh-Shan Ho** PhD, MPhil, BSc; Professor.

Correspondence: Ted Brown, Department of Occupational Therapy, Faculty of Medicine, Nursing and Health Sciences, Monash University – Peninsula Campus, Frankston, Vic. 3199, Australia. Email: ted.brown@monash.edu

Conflict of interest statement
The authors declare no conflicts of interest.

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Occupational Therapy in Health Care (OTHC), Occupational Therapy International (OTI), Occupational Therapy in Mental Health (OTMH), Occupational Therapy Journal of Research (OTJR) and *New Zealand Journal of Occupational Therapy (NZJOT)*. Australian occupational therapists publish in discipline-specific journals such as those listed above as well as related journals. Examples of some of these related journals include the *Archives of Physical Medicine and Rehabilitation (APMR); Journal of Rehabilitation Medicine; Developmental Medicine and Child Neurology (DMCN); Clinical Rehabilitation, Disability and Rehabilitation; Journal of Inter-professional Care (JIC)* and *Australian Journal of Rural Health* (*AJRH*).

With the introduction of electronic access to journals in the late 1990s, a new method of quantifying the publication performance and impact of journals, articles, authors, institutions and countries emerged, referred to as *bibliometrics* (Meho & Yang, 2007). Bibliometrics are a set of methods used to quantitatively analyse scientific, technological and professional literature that involves the application of quantitative analysis to publications and their citation counts (Bellis, 2009). There are a number of benefits related to the use of bibliometric analyses. In the broader context, bibliometric data are independent, objective, reproducible, inexpensive and economical; allow for temporal-based and institutional comparisons; and are scalable from the micro (individual researcher or department) to the macro (institutional, national or world) levels (Ismail, Nason, Marjanoic & Grant, 2009).

For managers and employers, benefits could include characterising the level of research and scientific output of units, organisations and departments; completing comparison analyses of institutions in similar fields at the regional, state, national and international level; gaining an overview of the research collaboration trends between institutions nationally and internationally; showing evidence of the discipline-specific development of institutions; providing data to support the allocation of research funds and filling academic vacancies; analysing areas for improvements in the publication behaviour of employees; and providing information on the position or ranking in the education, professional, research or scientific community (Bellis, 2009; Ismail *et al*., 2009). The use of quantitative performance-based metrics in academic institutions and health care agencies is indicative of the increased pressure to deliver measures of productivity, quality, impact and effectiveness.

Bibliometrics can also provide helpful information for researchers and educators, including verifying the perceptions of one's own publication profile, identifying weak points in one's publication profile, providing an outline of one's established education and research networks, maintaining relevancy and competitiveness, and identifying possible research collaborators. For funding bodies, bibliometric data can help to inform the adjudication process and allocations of research funding (Bornmann & Leydesdorff, 2014). For a specific discipline, bibliometric analysis of publications can help identify subject areas that are being well researched, areas that may need more research activity and resultant evidence about it, and recognise individuals who are active contributors to a profession's body of knowledge. The facts that databases only represent a portion of the literature internationally, electronic databases have a bias in favour of English-language publications, and metrics can be susceptible to manipulation are some of the cited challenges of using bibliometrics (Callaway, 2016).

Bibliometric methods are used to appraise the impact or perceived merit of specific journal, articles, researchers, institutions and subjects. The most common publication metric applied to peer-reviewed journals is the impact factor (IF). IFs are published yearly for journals that are indexed in Thomson Reuters' Journal Citation Reports (JCR) and refer to the average number of citations that journal articles receive from indexed journals in the preceding two or five years. IFs are frequently used as an index for a journal's relative stature within its field; higher IF journals are deemed to be more significant than those with lower scores (Brown, 2012).

For a journal to have a calculated IF, it needs to be included in one of two Thomson Reuters' databases: Science Citation Index-Expanded (SCI-Expanded) or Social Sciences Citation Index (SSCI). SCI-Expanded and SSCI are both accessible through the Web of Science Core Collection (WSCC). The SCI-Expanded is a multidisciplinary database that focusses on the scientific literature. It indexes over 6650 major journals that cover 150 scientific disciplines (e.g. agriculture, biochemistry, mathematics, medicine, zoology etc.). The SCCI is a multidisciplinary database that incorporates the social sciences journal literature by indexing over 1,950 journals from 50 social science fields (e.g. anthropology, law, psychology, public health, etc.).

Several occupational therapy journals are included in SCI-Expanded or SSCI (e.g. *AJOT, CJOT, BJOT, AOTJ, POTP, OTJR, OTI*, *HKJOT* and *SJOT*) and have calculated IF scores. *AJOT* and *OTJR* were the first two occupational therapy journals to receive IF scores (Holguin, 2009). An increase in the number of occupational therapy journals with IFs has occurred since 2009: *AOTJ*, 2009; *SJOT*, 2009; *HKJOT*, 2009; *POTP*, 2012; *OTI*, 2012; *CJOT*, 2012; and *BJOT*, 2013. The most recent IF for *AOTJ* was 1.616.

Thomson Reuters is a private, for-profit company that owns the databases used to calculate journal IFs. Journals must apply and meet specific criteria to be accepted onto the SCI-Expanded or SSCI. Thomson Reuters (2008) reports reviewing approximately 3,500 new journals annually for inclusion in SCI-Expanded, SSCI, and Arts & Humanities Citation Index; only 10% of journal applications are accepted. Journals indexed by Thomson Reuters must adhere to a specific set of operating criteria (e.g. peer-review, ethical publishing

standards, timeliness, international publishing conventions, English full-text availability, international focus and citation analyses) and can be delisted if breaching of these criteria occurs.

Currently, there are several key occupational therapy journals published in English that are not included in SCI-Expanded or SSCI (e.g. *OTHC; OTMH; NZJOT; Open Journal of Occupational Therapy [OJOT]*; *Journal of Occupational Therapy, Schools & Early Intervention [JOTSEI]; South African Journal of Occupational Therapy [SAJOT]; Philippine Journal of Occupational Therapy [PJOT]; Asian Journal of Occupational Therapy [AsJOT]; Indian Journal of Occupational Therapy [InJOT]; Irish Journal of Occupational Therapy [IJOT], World Federation of Occupational Therapists Bulletin; Physical and Occupational Therapy in Geriatrics [POTG]*) and do not have calculated IFs. The possession of an IF is commonly considered when prospective authors make decisions about manuscript submission (Gasparyan, 2013). Many university faculty are encouraged to publish only in journals with IFs (Jarwal, Brion & King, 2009). Recently, authors have challenged the idea that journal IFs are singularly indicative of quality research and prestige (Callaway, 2016).

Several content reviews of *AOTJ* articles have been published previously (e.g. Bell & Anderson, 1988; Cusick, 1995; Madill, Brintnell & Stewin, 1989; Ziviani, Behan & Rodger, 1984). Ziviani *et al.* completed a comparison review of the *BJOT, AJOT* and *AOTJ* from 1970 to 1982. Article content of the three journals focussed primarily on physical, professional, paediatric, mental health, sensory integration and community practice issues. Bell and Anderson completed a content analysis of the types of articles published in *AOTJ* from 1984 to 1987 ($n = 62$). Just under half of the articles were reviews, 23% were research articles and another 23% were descriptive publications. A year later, Madill *et al.* completed a content, citation and theme comparative analysis of articles published in *AOTJ* during two time periods (1963–1967 and 1983–1987). A total of 78 articles from each 5-year period were examined and it was noted that articles increasingly addressed professional promotion in the wider community and there was a need for a unifying Australian occupational therapy conceptual framework. Cusick described the traits of occupational therapy research literature published from 1987 to 1991 by conducting a literature review of *AOTJ* and the Australian Association of Occupational Therapists' conference proceedings. It was determined that the proportion of research articles published in *AOTJ* and presented at national conferences remained consistent during the 5-year period.

Rodger, McKenna and Brown (2007) examined the perceived quality and impact of occupational therapy journals based on the perspectives of published authors. Authors of articles published in 18 peer-reviewed English-language occupational therapy journals between January 2003 and June 2005 were invited to complete an online survey. A total of 544 authors were identified and 184 (33%) completed the survey. Six journals were highly rated across several criteria (that included reputation/prestige of the journal; availability and accessibility of the journal; rigour and quality of the journal's manuscript review process; timeliness of manuscript review and publication; ability of journal to impact on policy and practice; range and type of articles published in the journal; specificity of the journal; calibre of journal editor and editorial board; international perspective of the journal; journal IF; breadth of journal focus) on a scale of 10: *AJOT* 7.4, *AOTJ* 6.9, *BJOT* 7.0, *CJOT* 7.2, *OTJR* 7.0 and *SJOT* 7.0.

No formal bibliometric analysis of the peer-reviewed literature generated by Australian occupational therapists has been completed since 1995. The purpose of this study was to undertake a bibliometric analysis of the peer-reviewed literature published by Australian occupational therapists indexed in SCI-Expanded and SSCI from 1991 to 2015 to provide an overview of the publication trends within the discipline.

Method

Data were obtained from the online versions of SCI-Expanded and SSCI (updated June 20, 2016). JCR 2015 indexed a total of 11,990 journals, including 8,778 journals in 176 WSCC categories in SCI-Expanded and 3,212 journals in 57 WSCC categories in SSCI. "Occupational therapy" and "occupational therapist(s)" were used as keywords to search journal articles' publication titles, abstracts, author details, keywords and *KeyWords Plus*. *KeyWords Plus* augmented the title-word and author-keyword indexing by supplying additional search terms extracted from the titles of article references (Garfield, 1990). Only journal articles published from 1991 to 2015 were included in the search. Efforts were put in place, so that occupational therapy individual authors were not identified as part of the bibliometric analysis results that were reported.

In total 5,687 documents were found. A filter referred to as "front page," (Fu, Wang & Ho, 2012) allowed searching of keywords on article front pages, including article title, abstract and author keywords. All 5,687 of the retrieved documents were run through the "front page" filter. Documents that could only be retrieved through *KeyWords Plus*, but through no other filter, were excluded. The final filter was geographical location in which journal articles published by Australian authors were identified by the affiliation of at least one article author. One article author also had to be identified as an occupational therapist with an Australian affiliation.

Full records were downloaded into Microsoft Excel 2013 and additional coding was manually performed (Li & Ho, 2008). The first and third authors completed the manual coding of the type of journal articles. The

only document type that was analysed were journal articles. Other document categories –"conference abstracts," "book reviews," "letters to the editor," and "editorials"– were excluded as they did not yield publications with sufficient study details and may not have been peer-reviewed. IF scores (IF_{2015}) were retrieved from JCR 2015.

WSCC designates the corresponding author as the "reprint author;" this study instead used the term "corresponding author." In single author articles, the author was considered both first and corresponding author. For single institution articles, the institution was classified as the first and corresponding author's institution. Contributions of different institutions and countries were estimated by the affiliation of at least one article author (Ho, 2013).

Collaboration type was determined by author affiliations and addresses (Fu *et al.*, 2012), where the term "single country article" was assigned if the researchers' addresses were from the same country. The term "internationally collaborative article" was designated to articles that were co-authored by individuals from multiple countries. The term "single institution article" was assigned if the researchers' addresses were from the same institution. The term "inter-institutionally collaborative article" was assigned if authors were from different institutions (Li & Ho, 2008).

It should be noted that the *AJOT* and *OTJR* were the first occupational therapy journals that were accepted on the JCR WSCC. After that point, starting from 2009 onwards, a number of other occupational therapy specific journals were accepted onto the JCR WSCC, including the *BJOT, CJOT, SJOT, AOTJ, OTI, HKJOT* and *POTP*. As such, it is acknowledged that the manuscripts by Australian authors published in occupational therapy-specific journals between 1991 and 2008 may have been overlooked as part of this analysis. Only articles written by Australian occupational therapy authors that were published in journals listed on the JCR WSCC during that time period would have been picked up by the current review. However, the current analysis still provides an important overview that can be used for benchmarking purposes.

Results

Publication outputs

The number of journal articles generated by Australian occupational therapists (who were able to be identified as such) during 1991–2015 that were listed in SCI-Expanded or SSCI was 752. The number of publications authored by Australian occupational therapists on an annual basis gradually increased from one in 1992 to a maximum number of 93 in 2011. There was only one article authored by an Australian occupational therapist listed on the SCI-Expanded or SSCI in 1992 as the *AOTJ* was not accepted onto these databases until 2009. There may have been other articles by Australian authors in 1992 but they were not picked up by the JCR WSCC.

Each journal article had on average 3.7 authors and 35 references with a mean length of nine pages. The mean number of Australian occupational therapists per manuscript ranged from 1.3 to 4.2 during 1991–2015 with the number gradually increasing in 2002 onward. The average length per manuscript ranged from five to 13 pages with the majority of manuscripts eight to 10 pages (see Table 1).

WSCC subject categories and journals

Based on the classification of subject categories in JCR 2015, the publication output data for Australian

TABLE 1: *Number of articles included in the Science Citation Index-Expanded (SCI-Expanded) and the Social Science Citation Index (SSCI) databases from 1991 to 2015 authored by Australian occupational therapists*

Year	TP	AU	AU/TP	NR	NR/TP	PG	PG/TP
1991	2	6	3.0	44	22	20	10
1992	1	3	3.0	56	56	17	17
1993	4	6	1.5	86	22	20	5.0
1994	5	18	3.6	95	19	54	11
1995	6	18	3.0	114	19	53	8.8
1996	7	32	4.6	219	31	46	6.6
1997	4	9	2.3	132	33	44	11
1998	3	4	1.3	98	33	35	12
1999	7	24	3.4	260	37	93	13
2000	4	10	2.5	136	34	34	8.5
2001	10	26	2.6	451	45	95	9.5
2002	7	21	3.0	266	38	55	7.9
2003	10	37	3.7	279	28	82	8.2
2004	17	63	3.7	627	37	137	8.1
2005	15	56	3.7	501	33	129	8.6
2006	18	66	3.7	574	32	160	8.9
2007	49	170	3.5	1733	35	407	8.3
2008	41	129	3.1	1494	36	384	9.4
2009	76	270	3.6	2942	39	715	9.4
2010	72	276	3.8	2620	36	649	9.0
2011	93	352	3.8	3007	32	812	8.7
2012	66	260	3.9	2256	34	574	8.7
2013	82	341	4.2	3045	37	785	9.6
2014	74	288	3.9	2514	34	657	8.9
2015	79	316	4.0	2699	34	727	9.2
Total	752	2801		26248		6784	
Average			3.7		35		9.0

TP, total number of articles; AU, number of authors; NR, number of references cited; PG, page count.

occupational therapists (who were able to be identified as such) were distributed across 15 WSCC categories in SCI-Expanded and SSCI. The top WSCC subject category was *rehabilitation* with 65 journals in SCI-Expanded and 71 journals in SSCI. The *rehabilitation* category included 511 of the designated articles authored by Australian occupational therapists from 1991 to 2015. In other words, 68% of the 752 Australian occupational therapy authored articles fell into the WSCC *rehabilitation* category. The second most frequent WSCC category was *health care sciences and services* with 48 articles (6.4%). The third most common category was *public, environmental and occupational health* with 45 articles (6.0%) as well as *clinical neurology*, also with 45 articles (6.0%).

In total, 752 articles from 1991 to 2015 were authored by Australian occupational therapists (who were able to be identified as such) and were published in a range of different journals. Table 2 reports the top 13 journals in which Australian occupational therapists published accounting for 65.4% (n = 492) of the total article number. The top four journals had "occupational therapy" as part of the journal title: *AOTJ* (224 articles, 30% of 752 articles), *BJOT* (65 articles, 8.6%), *AJOT* (44 articles, 5.9%) and *POTP* (29 articles, 3.9%). *OTJR* (20 articles, 2.7%) and *CJOT* (17 articles, 2.3%) also published a number of articles by Australian authors. Non-discipline-specific journals in which Australian authors published, included *Disability and Rehabilitation, APMR, DMCN, AJRH* and *JIC*. Journals with the highest IF_{2015} in SCI-Expanded that published Australian occupational therapist authored articles were *DMCN* (IF_{2015} = 3.615) with 12 articles, *APMR* (IF_{2015} = 3.045) with 12 articles, *Disability and Rehabilitation* (IF_{2015} = 1.919) with 26 articles and *AJOT* (IF_{2015} = 1.806) with 44 articles.

Institutional publication performance

Table 3 reports the top 20 institutions ranked by the number of articles published by Australian occupational therapists (who were able to be identified as such) that were listed on the SCI-Expanded and SSCI. The top eight ranking institutions were the University of Queensland (UQ) (201 articles, 27% of total); University of Sydney (UofS) (132 articles, 18%), La Trobe University (LTU) (118 articles; 16%), Monash University (MU) (84 articles, 11%); University of Newcastle (38 articles, 5.1%), Deakin University (34 articles, 4.5%), Princess Alexandra Hospital (33 articles, 4.4%) and James Cook University (31 articles, 4.1%). UQ published the most articles (n = 201), including 50 single institution articles, 54 internationally collaborative articles, 30 first authored articles and 30 corresponding authored articles. UofS published the second largest number of journal publications (n = 132), including 16 single institution articles, 26 internationally collaborative articles, 13 first authored articles and 13 corresponding authored articles. The next two most productive institutions were LTU (n = 118) and MU (n = 84).

International collaborating countries

Table 4 reports the top 10 country affiliations of international collaborators who co-authored articles with Australian occupational therapists (who were able to be identified as such) that were indexed in SCI-Expanded and SSCI from 1991 to 2015. The UK had the highest number of authors who collaborated with Australian occupational therapists with a total of 42 co-authored

TABLE 2: *Top 12 peer-reviewed journals listed in the Science Citation Index-Expanded (SCI-Expanded) or the Social Science Citation Index (SSCI) databases from 1991 to 2015 that have published 10 or more articles by Australian occupational therapists*

Journal	TP (%)	IF_{2015}	Web of science category
Australian Occupational Therapy Journal	224 (30)	1.404	Rehabilitation
British Journal of Occupational Therapy	65 (8.6)	0.935	Rehabilitation
American Journal of Occupational Therapy	44 (5.9)	1.806	Rehabilitation
Physical & Occupational Therapy in Paediatrics Journal	29 (3.9)	1.255	Rehabilitation and paediatrics
Disability and Rehabilitation	26 (3.5)	1.919	Rehabilitation
OTJR-Occupation Participation and Health	20 (2.7)	0.524	Rehabilitation
Canadian Journal of Occupational Therapy	17 (2.3)	1.179	Rehabilitation
Archives of Physical Medicine and Rehabilitation	12 (1.6)	3.045	Rehabilitation and sport sciences
Developmental Medicine and Child Neurology	12 (1.6)	3.615	Clinical neurology paediatrics
Australian Journal of Rural Health	11 (1.5)	0.764	Public, environ. and occ health, nursing
Journal of Inter-professional Care	11 (1.5)	1.645	Health care sci and services, health pol
Scandinavian Journal of Occupational Therapy	11 (1.5)	0.957	Rehabilitation
Work-A Journal of Prevention, Assessment & Rehabilitation	10 (1.3)	0.715	Public, environ and occ health

TP, total number of articles; IF_{2015}, Impact Factor for 2015.

TABLE 3: *Top 20 Australian institution affiliations of occupational therapists who have published articles listed in the Science Citation Index-Expanded (SCI-Expanded) or the Social Science Citation Index (SSCI) databases from 1991 to 2015*

Institution	TP	TPR (%)	IPR (%)	CPR (%)	FPR (%)	RPR (%)
University of Queensland, QLD	201	1 (27)	1 (25)	1 (27)	1 (15)	1 (15)
University of Sydney, NSQ	132	2 (18)	2 (12)	2 (20)	2 (10)	2 (10)
La Trobe University, VIC	118	3 (16)	3 (8.3)	3 (19)	3 (7.3)	3 (7.0)
Monash University, VIC	84	4 (11)	4 (6.3)	4 (14)	4 (6.0)	4 (6.3)
University of Newcastle, NSW	38	5 (5.1)	4 (6.3)	9 (4.4)	5 (3.2)	5 (3.4)
Deakin University, VIC	34	6 (4.5)	7 (3.2)	7 (5.2)	6 (2.5)	6 (2.7)
Princess Alexandra Hosp., QLD	33	7 (4.4)	22 (0.4)	5 (6.4)	10 (1.5)	12 (1.5)
James Cook University, QLD	31	8 (4.1)	9 (2.0)	7 (5.2)	9 (1.7)	9 (1.6)
University of Melbourne, VIC	27	9 (3.6)	N/A	6 (5.4)	17 (0.8)	17 (0.81)
University of South Australia, SA	25	10 (3.3)	6 (4.0)	18 (3.0)	6 (2.5)	6 (2.7)
Uni. of Western Sydney, NSW	25	10 (3.3)	14 (1.2)	9 (4.4)	13 (1.3)	13 (1.3)
Charles Sturt University, VIC	22	12 (2.9)	9 (2.0)	14 (3.4)	8 (2.0)	8 (2.3)
Griffith University, QLD	22	12 (2.9)	22 (0.40)	11 (4.2)	22 (0.53)	20 (0.54)
Queensland Uni. Tech., QLD	22	12 (2.9)	12 (1.6)	13 (3.6)	16 (0.93)	16 (0.94)
Curtin University, WA	21	15 (2.8)	12 (1.6)	14 (3.4)	10 (1.5)	9 (1.6)
Uni. of New South Wales, NSW	21	15 (2.8)	17 (0.79)	12 (3.8)	22 (0.53)	20 (0.54)
Royal Children's Hospital, VIC	18	17 (2.4)	22 (0.40)	14 (3.4)	10 (1.5)	9 (1.6)
Curtin University, WA	16	18 (2.1)	8 (2.4)	25 (2.0)	13 (1.3)	13 (1.3)
Flinders University, SA	16	18 (2.1)	14 (1.2)	20 (2.6)	15 (1.2)	13 (1.3)
Queensland Health, QLD	16	18 (2.1)	N/A	17 (3.2)	19 (0.66)	20 (0.54)

TP, total number of articles; TPR (%), rank and the percentage of total articles; IPR (%), rank and the percentage of single institution articles; CPR (%), rank and the percentage of articles international collaborative articles; FPR (%), rank and the percentage of first author articles; RPR (%), rank and the percentage of the corresponding authored articles; hosp., hospital; uni., university; tech., technology; N/A, not available.

articles while the USA had the second highest number of co-authored papers with a total of 34. Canada (n = 24), Sweden (n = 21) and NZ (n = 12) were other countries in which authors co-wrote articles with Australian authors.

Discussion

Publication outputs

From 1991 to 2015, Australian occupational therapists (who were able to be identified as such) published 752 articles in journals listed in SCI-Expanded and SSCI. The number of publications authored annually by Australian occupational therapists has increased incrementally during this period (see Table 1). Madill *et al.* (1989) and Potter (2010) have reported similar trends in which the number of Australian occupational therapist authored research articles has expanded. This increase is likely related to the number of occupational therapy-specific journals that have recently been accepted into JCR (e.g. *CJOT, SJOT, AOTJ, POTP, HKJOT*) (Brown, 2012). In other words, the increased number of discipline-specific journals in which occupational therapy authors typically publish are now included and counted in WSCC database publication metrics. Another reason for the increased number of occupational therapy journal publications relates to the increased number of occupational therapy education programs that have opened up in Australia since 2000 as well as more practitioners completing doctoral degrees and assuming positions in which research is a key component.

Journal publication performance

From 1991 to 2015 Australian occupational therapists published 752 articles in a range of different journals, some subject-relevant and some discipline-specific (Potter, 2010). *AOTJ*, *BJOT*, *AJOT*, *POTP*, *OTJR*, *CJOT* and *SJOT* were occupational therapy-specific journals that published the largest number of articles by Australian occupational therapists. *Disability and Rehabilitation, APMR, DMCN, AJRH, JIC* and *WORK* were subject-relevant journals in which Australian occupational therapists frequently published. Rodger *et al.* (2007) similarly found that occupational therapy authors published in a range of non-discipline-specific journals.

Journals with the highest IF_{2015} in which Australian occupational therapists published were *Neurology* (IF_{2015} = 8.166), *Paediatrics* (IF_{2015} = 5.800), *JAGS*

(IF_{2015} = 3.842), *DMCN* (IF_{2015} = 3.615) and *APMR* (IF_{2015} = 3.045). Occupational therapy-specific journals with the three highest IFs were *AJOT* (IF_{2015} = 1.806), *AOTJ* (IF_{2015} = 1.616) and *POTP* (IF_{2015} = 1.255).

It is possible that Australian occupational therapists are opting for journals outside the discipline with higher IFs and perceived higher prestige, so they can establish a recognised track record and compete for academic promotion and/or receipt of research grants. Hopefully, this trend will decrease as more occupational therapy journals are listed in JCR; occupational therapy journal IFs continues to rise; more occupational therapists complete doctoral degrees; and more occupational therapists publish high quality quantitative, qualitative and mixed methods studies (Brown, 2012). It is also possible that occupational therapy authors opted to publish outside the profession to reach a wider audience, and to inform other disciplines of their work. Similarly, occupational therapists' areas of research may be in a related but distinct content area (e.g. physiology, anatomy, kinesiology, ergonomics, psychology, sociology) or more relevant to a specific diagnostic group (e.g. neurology, oncology, palliative care, mental health, orthopaedics, paediatrics). Therefore, such therapists may decide to publish their empirical work in journals related to those specific subjects.

Institutional publication performance

UQ, UofS, LTU, MU, University of Newcastle, Deakin University, Princess Alexandra Hospital, QLD and James Cook University were the top ranking institutions that published the largest number of journal articles written by Australian occupational therapists. UQ was the primary affiliation of Australian occupational therapists who published the largest number of journal articles listed in the SCI-Expanded and SSCI from 1991 to 2015. UQ, UofS and MU are members of the Group of Eight which includes the eight most research intensive Australian universities. This may impact the research culture or key performance indicators for academic faculty working at those institutions and partially account for the observed large number of journal publications.

UQ commenced its Bachelor of Occupational Therapy in 1968 and offered the first bachelor degree to be conferred in occupational therapy in Australia, having previously been offered as a diploma (since 1955). Occupational therapy at UQ has been in the tertiary environment for over 45 years and this has likely influenced the occupational therapy academic staff. Evidence of UQ's leadership in research includes introducing a research masters program in occupational therapy in 1976, conferring the first occupational therapy-specific PhD in 1990, and being the first Australian university to appoint a professor in occupational therapy in the mid-1990s. These likely have been contextual factors that have promoted a strong research culture in UQ's occupational therapy program and encouraged faculty to publish their work in peer-reviewed journals.

UofS's occupational therapy course was previously offered at the diploma level at Cumberland College of Health Sciences beginning in 1975. A Bachelor of Applied Science in occupational therapy was introduced in 1976. In 1989, in response to the Commonwealth Government's introduction of a Unified National System of Higher Education, Cumberland College was dissolved and re-established as the Faculty of Health Sciences at UofS in 1991 (Faculty of Health Sciences, University of Sydney, 1996). UofS's occupational therapy course was then offered at a bachelors level.

TABLE 4: *Top ten country affiliations of authors who have collaborated with Australian occupational therapists to publish articles listed in the Science Citation Index-Expanded (SCI-Expanded) and the Social Science Citation Index (SSCI) databases from 1991 to 2015*

Country	TP	TPR (%)	CPR (%)	FPR (%)	RPR (%)
United Kingdom	42	1 (5.6)	1 (31)	1 (2.3)	2 (2.0)
United States	34	2 (4.5)	2 (25)	2 (2.1)	1 (2.1)
Canada	24	3 (3.2)	3 (18)	3 (1.2)	3 (1.2)
Sweden	21	4 (2.8)	4 (16)	5 (0.53)	5 (0.54)
New Zealand	12	5 (1.6)	5 (8.9)	4 (0.8)	4 (0.81)
Singapore	7	6 (0.93)	6 (5.2)	5 (0.53)	6 (0.40)
China	6	7 (0.80)	7 (4.4)	7 (0.40)	6 (0.40)
Taiwan	5	8 (0.66)	8 (3.7)	N/A	N/A
Malaysia	5	8 (0.66)	8 (3.7)	9 (0.13)	8 (0.13)
Netherlands	4	10 (0.53)	10 (3.0)	9 (0.13)	8 (0.13)

TP, total number of articles; CPR, Internationally collaborative articles with Australia rank and the percentage of total articles; FPR, first author articles rank and the percentage of total articles; RPR, corresponding author articles rank and the percentage of total articles; R, rank; N/A, not available.

Research masters and doctoral programs began in 1990 and this was likely a contributing factor to establishing a research culture in occupational therapy at this institution.

In 1972, with approval from Victorian Institute of Colleges, the Victorian School of Occupational Therapy began offering a Bachelor of Applied Science (Occupational Therapy) and the original Diploma was phased out. In 1975, the three Victorian schools of physiotherapy, and speech and occupational therapy were discontinued and re-established as Lincoln Institute of Health Sciences (LIHS) which offered bachelor degree programs in these areas (Mocellin, 1978). In 1988, LIHS merged with LTU forming a Faculty of Health Sciences (La Trobe Rural Health School, 2008). The move of the occupational therapy course from LIHS to the university sector did not occur until the early 1990s, around the same time as UofS, and likely influenced the research culture that LTU occupational therapy academic staff experienced.

The MU occupational therapy course was established more recently in 2005. From a temporal perspective, UQ, UofS and LTU have existed longer; occupational therapy faculty at these programs have had longer research trajectories in which to generate journal articles. Given that MU is one of the three Group of Eight universities that offers occupational therapy entry-level programs, it is likely that being located in a research intensive university would attract academic staff whose education and research orientations align with MU's expectations.

The research culture of an academic institution where occupational therapy courses are located appears to impact the research publication productivity of its academic staff. That UQ, UofS and MU are located in research intensive universities, would account for the higher publication rates of these institutions. Until 2001, LTU was the only occupational therapy education program in Victoria, a factor that could additionally account for the notable number of LTU faculty published articles.

Implications

The findings of this study have several implications. In the first instance, the findings can be used to establish a baseline of the publication profile of Australian occupational therapists. This can be used for future tracking or comparison purposes. Similarly, the findings can be used for benchmarking purposes, particularly related to specific institutions. As well, the findings provide an indicator of where Australian occupational therapists most commonly publish their work and which countries they most frequently collaborate with. Finally, the results of this bibliometric analysis provide a broad overview of peer-reviewed journal publication landscape of Australian occupational therapy authors.

Limitations

Data for the bibliometric analysis were obtained only from the online databases of SCI-Expanded and SSCI. Based on JCR 2015, 8,778 journals in 176 WSCC categories and 3,212 journals in 57 WSCC categories are indexed in SCI-Expanded and SSCI. Therefore, only 73.2% of journals listed in SCI-Expanded and 26.3% of journals listed in SSCI were included in this study's analysis. Also, journals not indexed in WSCC were not included in this bibliometric analysis. "According to *Ulrich's Global Series Directory* (ProQuest, 2014), there are approximately 73,130 active, academic English-language journals in publication as of December 2013, so WSCC indexes about 15% of existing journals" (Carpenter, Cone & Sarli, 2014, p. 1164). It is possible that key journal articles published in occupational therapy-specific journals were missed or not included in this analysis. This is an acknowledged limitation.

Only the WSCC document type labelled "article" was considered. Other document categories (e.g. conference abstracts, book reviews, letters to the editor, editorials) were excluded as they did not report sufficient study details. This is a second acknowledged weakness of the current bibliometric analysis. The third limitation relates to the temporal coverage of the journal articles included in the analysis. Occupational therapy articles published before 1991 and after 2015 were not included. For journal articles published before the mid-1990s, there may be a chance that an electronic version of the article was not available and was missed in the search and analysis.

A fourth limitation of the analysis was that only the words "occupational therapy" and "occupational therapist(s)" were used as key search terms for journal article publications in SCI-Expanded and SSCI. If Australian occupational therapists did not indicate that they were occupational therapists or did not have occupational therapy affiliations on journal publications they had written, it is possible that their articles were missed by the search strategy. In other words, Australian occupational therapists who have published articles in refereed journals in SCI-Expanded and SSCI who were not able to be identified as such were missed.

A final limitation is that the majority of occupational therapy journals that are currently included in JCR WSCC were only accepted into that database from 2009 to 2013. *AJOT* and *OTJR* were the first two occupational therapy journals to have a reported IF and they were accepted into JCR WSCC slightly earlier than 2009. The majority of literature published by Australian authors in occupational therapy-specific journals from 1991 to 2008 may have been missed as part of this analysis.

Future research

It is recommended that the bibliometric methodology be replicated in other countries to discern the most

research productive institutions in occupational therapy. This would provide valuable information for cross-institutional and international bench marking purposes. It is also recommended that a bibliometric analysis specific to occupational therapy practice areas (e.g. neurology, paediatrics, mental health, geriatrics, rehabilitation, community-based care) or subject areas (e.g. health promotion, population health, activity participation, occupational performance, occupational science) be completed, so that key journals, and in these areas can be identified.

Conclusion

The occupational therapy-related body of peer-reviewed literature written by Australian occupational therapists has grown exponentially over the last two decades. From 1991 to 2015, 752 occupational therapy journal articles were published by 2801 authors, most of whom were Australian. The top four journals listed in JCR WSCC in which occupational therapists have published are *AOTJ*, *BJOT*, *AJOT* and *POTP*. The four institutions that generated the largest number of occupational therapy articles were UQ, UofS, LTU and MU. The top four countries with which Australian occupational therapists most frequently collaborated in the writing of journal manuscripts were the UK, USA, Canada and Sweden. The implications of this study are that Australian occupational therapists have and continue to make outstanding contributions to the occupational therapy body of knowledge both nationally and internationally, and should be proud of this meaningful and notable achievement.

Key points for occupational therapy

- 752 peer-reviewed journal articles were published by Australian occupational therapy authors between 1991 and 2015,
- The top four journals where occupational therapists have published their work are the *AOTJ*, *BJOT*, *AJOT* and *POTP*.
- Australian authors have and continue to make noteworthy contributions to the occupational therapy body of knowledge nationally and globally.

Authors' contributions

Dr Yuh-Shan Ho performed the statistical analyses and drafted the manuscript. Dr Ted Brown designed the study and drafted the manuscript. Dr Sharon Gutman assisted with interpretation of the data findings and drafted the manuscript. All contributing authors approved the final submitted manuscript. The three authors were all involved in design, data collection, analysis, interpretation and write-up of this manuscript.

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