



## A bibliometric analysis of occupational therapy publications

Ted Brown, Sharon A. Gutman, Yuh-Shan Ho & Kenneth N. K. Fong

To cite this article: Ted Brown, Sharon A. Gutman, Yuh-Shan Ho & Kenneth N. K. Fong (2018) A bibliometric analysis of occupational therapy publications, Scandinavian Journal of Occupational Therapy, 25:1, 1-14, DOI: [10.1080/11038128.2017.1329344](https://doi.org/10.1080/11038128.2017.1329344)

To link to this article: <http://dx.doi.org/10.1080/11038128.2017.1329344>



Published online: 16 May 2017.



Submit your article to this journal [↗](#)



Article views: 79



View related articles [↗](#)



View Crossmark data [↗](#)

## A bibliometric analysis of occupational therapy publications

Ted Brown<sup>a</sup>, Sharon A. Gutman<sup>b</sup>, Yuh-Shan Ho<sup>c</sup> and Kenneth N. K. Fong<sup>d</sup>

<sup>a</sup>Department of Occupational Therapy, Faculty of Medicine, Nursing and Health Sciences, Monash University – Peninsula Campus, Frankston, VIC, Australia; <sup>b</sup>Programs in Occupational Therapy, Columbia University Medical Center, New York, NY, USA; <sup>c</sup>Trend Research Centre, Asia University, Taichung, Taiwan; <sup>d</sup>Department of Rehabilitation Sciences, The Hong Kong Polytechnic University, Kowloon, Hong Kong

### ABSTRACT

**Background:** Bibliometrics involves the statistical analysis of the publications in a specific discipline or subject area. A bibliometric analysis of the occupational therapy refereed literature is needed.

**Aim:** A bibliometric analysis was completed of the occupational therapy literature from 1991–2014, indexed in the Science Citation Index-Expanded or the Social Sciences Citation Index.

**Method:** Publications were searched by title, abstract, keywords, and *KeyWords Plus*. Total number of article citations, citations per journal, and contributions per country, individual authors, and institution were calculated.

**Results:** 5,315 occupational therapy articles were published in 821 journals. It appears that there is a citation window of an approximate 10-year period between the time of publication and the peak number of citations an article receives. The top three most highly cited articles were published in *Developmental Medicine and Child Neurology*, *JAMA*, and *Lancet*. *AJOT*, *BJOT* and *AOTJ* published the largest number of occupational therapy articles with the United States, Australia, and Canada producing the highest number of publications. McMaster University, the University of Queensland, and the University of Toronto were the institutions that published the largest number of occupational therapy journal articles.

**Conclusion:** The occupational therapy literature is growing and the frequency of article citation is increasing.

### ARTICLE HISTORY

Received 13 October 2016

Revised 1 May 2017

Accepted 7 May 2017

### KEYWORDS

Citation rate; impact factor; journals; publications; peer-review; impact factor; citation rate; research literature

### Introduction

The four hallmarks of a profession are specialized knowledge, autonomy, authority, and altruism [1]. One of the key repositories of this specialized body of professional knowledge are peer-reviewed journals. The first official occupational therapy-specific journal, *Archives of Occupational Therapy*, was published in 1922 by the American Occupational Therapy Association (AOTA). The journal's name was changed in 1925 to *Occupational Therapy and Rehabilitation* [2], and finally to the *American Journal of Occupational Therapy* (AJOT) in 1947.

Other well established long-standing journals in occupational therapy are the *Canadian Journal of Occupational Therapy* (CJOT), published from 1933–present; *British Journal of Occupational Therapy* (BJOT), 1938–present; and *Australian Occupational Therapy Journal* (AOTJ), 1952–present. The *Occupational Therapy Journal of Research* (OTJR) was first published in 1980; its title changed in 2001 to

*OTJR: Occupation, Participation and Health*. Several specialty occupational therapy journals emerged in the 1980s including *Work, Physical and Occupational Therapy in Pediatrics* (POTP), *Occupational Therapy in Mental Health* (OTMH), and *Physical and Occupational Therapy in Geriatrics* (POTG). *Occupational Therapy International* (OTI) was first published in 1994. Occupational therapists publish manuscripts in profession-specific peer-reviewed journals (e.g. AJOT, CJOT, BJOT, AOTJ) and related journals including *Archives of Physical Medicine and Rehabilitation*; *Journal of Rehabilitation Medicine*; *Developmental Medicine and Child Neurology*; *Clinical Rehabilitation, Disability and Rehabilitation*; *Occupational Rehabilitation*; *Neurorehabilitation*; and *Journal of Allied Health*.

With the advent of electronic databases and online access to journal publications in the late 1990s, a new method of quantifying the performance and impact of journals and articles, referred to as *bibliometrics*, emerged [3]. Bibliometrics are ‘the application of

quantitative analysis and statistics to publications such as journal articles and their accompanying citation counts' [4]. Content and citation analysis are two frequently used bibliometric analytic approaches. Bibliometric methods are used to investigate the impact or perceived merit of a specific journal, article, researcher(s), university/research center, or field of study. The most widely known quantitative metric applied to peer-reviewed journals is the Impact Factor (IF). Impact factors are published yearly for those journals that are indexed in the Thomson Reuter's Journal Citation Reports. IFs are based on the calculation of the average number of citations to those papers that were published in the two preceding years which were cited by indexed journals. IFs are frequently used as an index for the relative importance of a journal within its field, with journals with higher IFs deemed to be more important than those with lower ones.

For a journal to have an IF calculated, it needs to be included in one of two Thomson Reuters databases: the Science Citation Index Expanded (SCI-Expanded) and the Social Sciences Citation Index (SSCI). The SCI-Expanded and SSCI are both accessible through the Web of Science Core Collection (WSCC). Several occupational therapy journals are included in SCI-Expanded or SSCI (e.g. *AJOT*, *CJOT*, *BJOT*, *AOTJ*, *POTP*, *OTJR*, *OTI*, *Hong Kong Journal of Occupational Therapy* [*HKJOT*], and *Scandinavian Journal of Occupational Therapy* [*SJOT*]) and have an IF. Apart from *AJOT* and *OTJR* which traditionally have had an IF, there has been an increase in the number of occupational therapy journals having an IF in recent years: *AOTJ* – 2009, *SJOT* – 2009, *HKJOT* – 2009, *POTP* – 2012, *OTI* – 2012, *CJOT* – 2012, and *BJOT* – 2013. Several key occupational therapy journals published in English are currently not included in WSCC databases (e.g. *Occupational Therapy in Health Care*; *OTMH*; *POTG*; *Open Journal of Occupational Therapy*; *Journal of Occupational Therapy, Schools & Early Intervention*; *South African Journal of Occupational Therapy*; *Philippine Journal of Occupational Therapy*; *Asian Journal of Occupational Therapy*; *Indian Journal of Occupational Therapy*; *Physical and Occupational Therapy in Geriatrics*) and do not have a calculated IF.

Several studies have investigated the publishing practices of occupational therapy journals [5–8], the content of specific occupational therapy journals [9–13], and the quantitative or perceived merit of occupational therapy journals [14,15]. Because several of these studies are now dated [16–19], a current

comprehensive bibliometric study of the occupational therapy literature is needed. Bibliometric studies are important for several reasons including evaluating the merit of individual scholars, university departments, and institutions. Bibliometric data is increasingly being used as a performance rating criteria in the university sector in the hiring of new academic staff, academic promotion applications, academic applications for tenure/permanency, and the awarding of competitive research grants. Therefore a detailed bibliometric examination of the peer-reviewed occupational therapy literature is warranted.

Given the relatively recent inclusion of occupational therapy journals in SCI-Expanded and SSCI, a bibliometric analysis that includes a broad range of science and social science literature would expand upon prior studies that have only examined specific occupational therapy journals. Therefore, the aim of this paper is to present the results of a bibliometric analysis of the occupational therapy literature published in journals listed in SCI-Expanded and SSCI from 1991–2014. The following research questions were posed:

- Which 10 journals listed in SCI-Expanded and SSCI published the largest number of peer-reviewed occupational therapy-related articles from 1991–2014?
- What were the most frequent WSCC categories under which fell peer-reviewed occupational therapy articles published in journals included in SCI-Expanded and SSCI from 1991–2014?
- What were the primary publication languages of peer-reviewed occupational therapy articles published in journals listed in SCI-Expanded and SSCI, 1991–2014?
- What were the most highly cited peer-reviewed articles in occupational therapy, published in journals listed in SCI-Expanded and SSCI, 1991–2014, and what were their citations per publication by decade and year?
- Which 10 countries generated the largest number of occupational therapy peer-reviewed articles published in journals listed in SCI-Expanded and SSCI, 1991–2014?
- Which 15 institutions internationally generated the largest number of occupational therapy peer-reviewed articles published in journals listed in SCI-Expanded and SSCI, 1991–2014?
- Who were the individual authors who published the largest number of occupational therapy peer-reviewed articles appearing in journals listed in SCI-Expanded and SSCI, 1991–2014?

## Method

Occupational therapy literature published in the past two decades was analyzed with regard to journal annual publication output, publication in SCI-Expanded and SSCI journals, WSCC category, countries generating the highest publication number, language of publication, and institutions producing the largest number of publications. The publication impact was analyzed using total citations and citations in recent years. For the purposes of this analysis, an occupational therapy article was one defined as one that is published by one or more authors who identified as an occupational therapist, focused on a topic related to the field of occupational therapy, or had the term 'occupational therapist' or 'occupational therapy' on its front page. Data were obtained from the online databases of SCI-Expanded and SSCI (updated on March 02, 2016). According to the 2014 Journal Citation Reports (JCR), there were 8,618 journals in 176 WSCC categories, and 3,143 journals in 56 WSCC categories in SCI-Expanded and SSCI. It should be noted that WSCC only represents about 15% of the total number of English language journals currently published worldwide [20].

'Occupational therapy,' 'occupational therapist,' and 'occupational therapists' were searched within the publication years 1991-2014 in publication titles, abstracts, author keywords, and *KeyWords Plus*. *KeyWords Plus* supplies additional search terms that are extracted from the titles of an article's references. This search approach substantially augments title-word and author-keyword searching [21]. We only used the WSCC document categories of 'articles' and 'reviews.' Articles include reports of research on original works and reviews include review articles and surveys of previously published literature. Review articles such as scoping reviews, narrative reviews, meta-synthesis, and systematic reviews were not excluded from the search since they are stand-alone articles in their own right. Other WSCC document categories—'conference abstracts,' 'letters to the editor,' 'abstracts of previously published items,' 'book reviews,' 'news items,' 'reprints,' 'corrections,' 'proceedings papers' and 'editorials'—were excluded since they did not yield publications with sufficient study details and may not have been peer-reviewed. In total 5,687 articles were located based on search results. Another search filter, 'front page,' [22] was used to identify articles that contained keyword search terms on their 'front page' (in titles, abstracts, authors' affiliations, and keywords). Documents that could only be searched by *KeyWords Plus* were excluded. This resulted in a final number of

5,315 publications that met inclusion search criteria; these articles were regarded as the occupational therapy literature from 1991-2014.

JCR 2014 impact factors ( $IF_{2014}$ ) of the journals in which all articles were published were recorded. The total number of article citations from initial publication to December 2014 was recorded as *Times Cited*<sub>2014</sub> ( $TC_{2014}$ ) [23]. Citations per publication (CPP) was calculated using the following equation:  $TC_{2014}/\text{publication}$ . In addition,  $C_{2014}$ , total citations received in 2014 alone was calculated [22]. The advantage of  $TC_{\text{year}}$  and  $C_{\text{year}}$  is that they are invariable and ensure repeatability compared with the citation index from WSCC [23].

In the WSCC database, the contact author is designated as the 'reprint author;' in this study, the term 'corresponding author' was used [22]. In single author articles where corresponding authorship was unspecified, the single author was designated as both first and corresponding author. Similarly, for a single institution article, the institution was classified as the first and corresponding author's institution [24].

Articles originating from England, Scotland, Northern Ireland, and Wales were reclassified under the heading, United Kingdom (UK). Articles from Hong Kong or Hong Kong Special Administrative Region (HKSAR) were treated as distinct categories, separate from China. Articles from the *Union of Soviet Socialist Republics* (USSR) were reclassified as from Russia [22]. Articles from Ciskei were reclassified as from South Africa. Contributions of different institutions and countries were estimated by the affiliation of at least one article author.

Collaboration type was determined by author address [25], where the term 'single country article' was assigned if researcher addresses were from the same country. The term 'internationally collaborative article' was designated to those articles that were coauthored by researchers from more than one country. The term 'single institution article' was assigned if researcher addresses were from the same organization. The term 'inter-institutionally collaborative article' was assigned if authors were from different institutions [26].

## Results

### Language of publication

Ninety-six percent ( $n = 5094$ ) of the 5,315 articles were published in English followed by German ( $n = 129$  articles), French ( $n = 38$ ), Spanish ( $n = 25$ ), and Portuguese ( $n = 15$ ). Other languages in which

less frequent articles were published included Italian ( $n = 3$  articles), Turkish ( $n = 3$ ), Russian ( $n = 2$ ), and one article each for Croatian, Korean, Polish, Romanian, Serbian, and Slovenian.

Forty-eight percent ( $n = 106$ ) of the 221 non-English occupational therapy articles had no citations ( $TC_{2014} = 0$ ), 19% ( $n = 42$ ) had only one citation ( $TC_{2014} = 1$ ), and 7.7% ( $n = 17$ ) articles had two citations ( $TC_{2014} = 2$ ). Of the 5,094 English articles, 19%, 12%, and 8.6% had  $TC_{2014} = 0$ ,  $TC_{2014} = 1$ , and  $TC_{2014} = 2$ , respectively. The most frequently cited non-English article ('Multidisciplinary Treatment Program on Chronic Low Back Pain. 4. Prognosis of Treatment Outcome and Final Conclusions,' [Pfungsten et al., 1997]) was published in German with a  $TC_{2014} = 35$ . In addition, the  $CPP$  of English articles ( $CPP = 11$ ) was about four times that of German ( $CPP = 2.5$ ), French ( $CPP = 2.2$ ), and Spanish ( $CPP = 1.7$ ) articles. Articles published in Italian, Turkish, Russian, Croatian, Korean, Polish, Romanian, Serbian, and Slovenian had a  $CPP = 0$ .

### Publication outputs

Ho recently calculated the relationship between the number of highly cited articles and their citations

per publication ( $CPP = TC_{year}/publication$ ) by decade [22] and year [24]. Figure 1 presents an overview of occupational therapy publications, annual number of articles published, and  $CPP$  during the time period of 1991-2014. The number of occupational therapy publication outputs per year remained largely unchanged during 1991-2005 with an average of 135 occupational therapy-specific articles published in peer-reviewed journals. After 2006, there was a marked increase in the number of occupational therapy articles published with a peak reached in 2013 (see Figure 1). The mean number of  $CPP$  for all occupational therapy articles published in English was 11. The highest  $CPP$  (32) occurred in 1997.

The top two  $TC_{2014}$  articles published in 1997 were (1) 'Development and Reliability of a System to Classify Gross Motor Function in Children with Cerebral Palsy' by Palisano *et al.* [27], published in *Developmental Medicine and Child Neurology* with a  $TC_{2014}$  of 1,831, and (2) 'Diagnosis and Treatment of Alzheimer Disease and Related Disorders: Consensus Statement of the American Association for Geriatric Psychiatry, the Alzheimer's Association, and the American Geriatrics Society' by Small [28], published in *JAMA—Journal of the American Medical Association* with a  $TC_{2014}$  of 590. These articles,

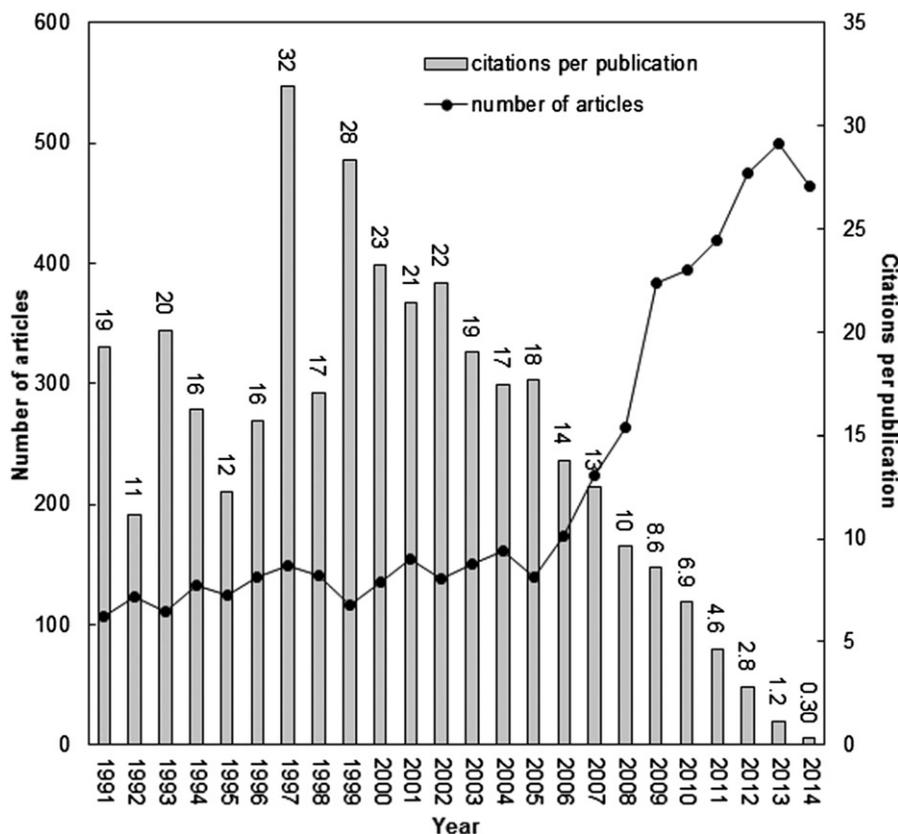


Figure 1. Annual number of articles and citations per publication by year.

however, are not directly related to occupational therapy even though the term ‘occupational therapy’ was mentioned in the abstracts on the front page of both articles. This is a noted limitation and bias of the bibliometric methods used and the journals that are included in and excluded from WSCC.

The second highest *CPP* (28) was found in the year 1999. The top 10 *TC*<sub>2014</sub> articles were published in 1999 and included two articles: (1) ‘Prevention of Falls in the Elderly Trial (PROFET): A Randomised Controlled Trial’ by Close *et al.* [29], published in the *Lancet* with a *TC*<sub>2014</sub> of 456 (4<sup>th</sup> of 5,315 articles), and (2) ‘Rehabilitation of Persons with Traumatic Brain Injury’ by Ragnarsson *et al.* [30], published in *JAMA* with *TC*<sub>2014</sub> of 300 (7<sup>th</sup> of 5,315 articles). In addition, 14% ( $n = 8$ ) of the 58 articles with a *TC*<sub>2014</sub> >100 were published in 1999, which contributed to the high *CPP* in this year. This suggests that in 1999, occupational therapists completed and published many notable research articles that were subsequently highly cited.

### Web of science core collection (WSCC) categories and journals

Based on the classification of subject categories in the 2014 JCR, the publication output data for occupational therapy research was distributed across 118 of the WSCC categories in SCI-Expanded and SSCI. The top WSCC subject category was *rehabilitation* for 64 journals in SCI-Expanded and 70 journals in SSCI. The *rehabilitation* category included 3,367 of the ‘occupational therapy’ designated articles. In other words, 63% ( $n = 3348$ ) of the 5,315 ‘occupational therapy’ designated articles fell into the WSCC *rehabilitation* category. The second most frequent WSCC category was *clinical neurology* with 192 (6.8%) journals in SCI-Expanded. The third most common category was *public, environmental, and*

*occupational health* with 162 journals in SCI-Expanded and 145 journals in SSCI (5.1%).

The WSCC categories of *rehabilitation* (64 journals in SCI-Expanded, 70 journals in SSCI); *public, environmental, and occupational health* (162, 145); *psychiatry* (140, 133); *nursing* (110, 108); *substance abuse* (19, 36); and *history and philosophy of science* (59, 43) were subject categories included in both SCI-Expanded and SSCI. The top 10 most cited articles were published in the categories of *general and internal medicine* ( $n = 6$ ), *clinical neurology* ( $n = 2$ ), and *pediatrics* ( $n = 1$ ). Only two of the 10 most cited articles were published in the WSCC *rehabilitation* category.

In total, 5,315 ‘occupational therapy’ articles were published in a range of 821 different journals. Out of these 821 journals, 434 journals (53%) contained only one ‘occupational therapy’ specific article, 135 (16%) journals contained two, 76 (9.3%) journals contained three, and 43 (5.2%) journals contained four articles. Table 1 reports the top 10 journals that published ‘occupational therapy’ specific articles accounting for 49% ( $n = 2604$ ) of the total number of articles. The top four journals had ‘occupational therapy’ as part of the journal title: *AJOT* with 1,154 articles (21.7% of 5,315 articles), *BJOT* (274 articles, 5.2%), *AOTJ* (261 articles, 4.9%), and *SJOT* (181 articles, 3.4%). *Work—A Journal of Prevention Assessment & Rehabilitation* was the only journal that was not classified in the WSCC category of *rehabilitation* in Table 1. The percentage of the top productive journals within the *rehabilitation* category was high ( $n = 1169$ , 22% of 5,315 articles).

Journals with the highest *IF*<sub>2014</sub> in SCI-Expanded were the *New England Journal of Medicine* (*IF*<sub>2014</sub> = 55.873) with two articles, *Lancet* (*IF*<sub>2014</sub> = 45.217) with five articles, *JAMA* (*IF*<sub>2014</sub> = 35.289) with four articles, and *Lancet Neurology* (*IF*<sub>2014</sub> = 21.896) with two articles. The journal with the highest *IF*<sub>2014</sub> in

**Table 1.** The 10 most productive journals with the number of articles, impact factor, and category of journals during the period of 1991 to 2014.

Journal	TP (%)	<i>IF</i> <sub>2014</sub>	DB	Web of Science category
American Journal of Occupational Therapy	1154 (22)	1.532	SSCI	Rehabilitation
British Journal of Occupational Therapy	274 (5.2)	0.636	SCI-E, SSCI	Rehabilitation
Australian Occupational Therapy Journal	261 (4.9)	0.846	SCI-E	Rehabilitation
Scandinavian Journal of Occupational Therapy	181 (3.4)	1.090	SCI-E, SSCI	Rehabilitation
Archives of Physical Medicine and Rehabilitation	144 (2.7)	2.565	SCI-E	Rehabilitation; Sport Sciences
Canadian Journal of Occupational Therapy	143 (2.7)	0.915	SCI-E, SSCI	Rehabilitation
Disability and Rehabilitation	131 (2.5)	1.985	SCI-E, SSCI	Rehabilitation
OTJR - Occupation Participation and Health	130 (2.4)	0.462	SCI-E, SSCI	Rehabilitation
Work - A Journal of Prevention Assessment & Rehabilitation	96 (1.8)	0.320	SCI-E	Public, Environmental and Occupational Health
Occupational Therapy International	90 (1.7)	0.780	SCI-E, SSCI	Rehabilitation

TP: total number of articles; %: the percentage of articles in total articles; *IF*<sub>2014</sub>: impact factor in 2014; DB: database; SCI-E: Science Citation Index Expanded; SSCI: Social Science Citation Index.

SSCI was the *Journal of Abnormal Psychology* ( $IF_{2014} = 5.153$ ) with one article. The journal with the highest  $IF_{2014}$  listed in both SCI-Expanded and SSCI was the *American Journal of Psychiatry* ( $IF_{2014} = 12.295$ ) with one article. The top three most frequently cited articles in 'occupational therapy' were published in *Developmental Medicine and Child Neurology* ( $IF_{2014} = 3.510$ ), *JAMA* ( $IF_{2014} = 35.289$ ), and *Lancet* ( $IF_{2014} = 45.217$ ).

### Country publication performance

Six bibliometric indicators (total publications [TP], independent publications [IP], collaborative publications [CP], first authored publications [FP], corresponding authored publications [RP], and single authored publications [SP]) were used to compare publications of individual countries and institutions [31,32]. In relation to author affiliations in WSCC, 4,784 (90% of 5,315) articles were single country articles from 60 different countries, and 530 (10%) were internationally collaborative articles from 70 countries.

The top 10 countries (US, Canada, Australia, UK, Netherlands, Germany, Israel, Japan, Hong Kong) published more than 80 articles each, accounting for 89% of all articles published, and are listed in Table 2 with the six bibliometric indicators [32,33]. The US ranked top on all six indicators, including total articles ( $n = 2072$ , 39% of 5,315), single country articles ( $n = 1866$ , 39% of 4,784), internationally collaborative articles ( $n = 228$ , 43% of 530), first author articles ( $n = 1567$ , 37% of 4,236), corresponding author articles ( $n = 1096$ , 37% of 5,151), and single author articles ( $n = 480$ , 59% of 814). The US also published the most frequently cited articles in occupational therapy, those by Schweickert *et al.* [34] and Rao *et al.* [35].

### Institutional publication performance

Table 3 shows the top 15 institutions ranked by number of articles. Five of these institutions were in

Canada, four in Australia, four in the US, and two in Sweden. The University of Queensland in Australia published the most articles ( $n = 186$ ) including 60 single institution articles, 27 internationally collaborative articles, 97 nationally collaborative articles, 107 first authored articles, 106 corresponding authored articles, and 6 single author articles. The University of Toronto ( $n = 90$ ) and McMaster University ( $n = 70$ ), both in Canada, and the University of Sydney in Australia ( $n = 70$ ) also published notable numbers of nationally collaborative articles.

The Karolinska Institute in Sweden published the largest number of internationally collaborative articles ( $n = 30$ ), followed by the Universities of Queensland ( $n = 27$ ) and Toronto ( $n = 26$ ). The University of Southern California in the US published the largest number of single authored articles ( $n = 36$ ) followed by Texas Women's University in the US ( $n = 20$ ). Results in Table 3 report the publication patterns of 'occupational therapy' specific articles from individual institutions. The University of Southern California was the only one of 15 institutions that published more than 50% of all articles as single institution articles (SP) ( $n = 53$ , 52% of 101 articles). The highest percentage of internationally collaborative articles (ICP) was generated by the Karolinska Institute ( $n = 30$ , 30% of 99 articles). Four other institutions had an ICP of 21%: McMaster University; University of Illinois, US; Boston University, US; and the University of British Columbia. McGill University in Canada had the highest percentage of nationally collaborative articles (NCP) ( $n = 54$ , 67% of 81 articles) while the Universities of Southern California ( $n = 39$ , 39% of 101 articles) and Illinois in the US ( $n = 35$ , 39% of 84 articles) published less than 50% of nationally collaborative articles (NCP). Table 4 reports the top three authors from the top ten countries.

The proportion of percentage of single institutional articles (% SP referred to as S), percentage of internationally collaborative articles (% ICP referred to as I),

**Table 2.** The top ten most productive countries/regions with a  $TP > 80$ .

Country/region	TP	TPR (%)	IPR (%)	CPR (%)	FPR (%)	RPR (%)	SPR (%)
United States	2,059	1 (39)	1 (39)	1 (43)	1 (37)	1 (37)	1 (59)
Australia	673	2 (13)	2 (12)	4 (21)	2 (12)	2 (12)	4 (6.5)
Canada	667	3 (13)	3 (11)	3 (24)	3 (11)	3 (11)	3 (10)
United Kingdom	613	4 (12)	4 (10)	2 (26)	4 (10)	4 (10)	2 (10)
Sweden	383	5 (7.3)	5 (6.2)	5 (17)	5 (6.3)	5 (6.3)	6 (2.8)
Germany	185	6 (3.5)	6 (3)	7 (8.3)	6 (3.0)	6 (3.1)	5 (3.2)
Netherlands	163	7 (3.1)	7 (2.2)	6 (11)	7 (2.5)	7 (2.5)	9 (0.61)
Israel	104	8 (2.0)	9 (1.5)	9 (5.9)	8 (1.7)	8 (1.6)	7 (1.4)
Japan	89	9 (1.7)	8 (1.6)	21 (2.4)	9 (1.6)	9 (1.6)	11 (0.49)
Hong Kong	83	10 (1.6)	10 (1.2)	10 (5.1)	10 (1.3)	10 (1.3)	8 (0.74)

TP: total number of articles; TPR (%): rank and the percentage of total articles; IPR (%): rank and the percentage of independent articles; CPR (%): rank and the percentage of internationally collaborative articles; FPR (%): rank and the percentage of first authored articles; RPR (%): rank and the percentage of the corresponding authored articles; SPR: rank and the percentage of the single authored articles.

Table 3. The top 15 most productive institutions in relation to journal article publications 1991-2014.

Institution	TP	TPR (%)	SPR (%)	ICPR (%)	NCPR (%)	FPR (%)	RPR (%)	SAPR (%)	SP (%)	ICP (%)	NCP (%)
University of Queensland, Australia	18	1 (3.6)	1 (2.9)	2 (5.0)	1 (3.7)	1 (2.0)	1 (2.1)	21 (0.74)	60 (32)	27 (15)	97 (52)
University of Toronto, Canada	14	2 (2.8)	5 (1.4)	3 (4.8)	2 (3.4)	4 (1.3)	4 (1.3)	8 (1.5)	29 (20)	26 (18)	90 (62)
McMaster University, Canada	11	3 (2.2)	8 (1.2)	4 (3.9)	3 (2.7)	5 (1.3)	5 (1.2)	8 (1.5)	25 (22)	21 (18)	70 (60)
University of Sydney, Australia	11	3 (2.2)	3 (1.5)	9 (2.9)	3 (2.7)	3 (1.4)	3 (1.4)	37 (0.49)	30 (26)	16 (14)	70 (60)
University of Southern California, US	10	5 (1.9)	2 (2.6)	26 (1.7)	13 (1.5)	2 (1.4)	2 (1.4)	1 (4.4)	53 (52)	9 (8.9)	39 (39)
La Trobe University, Australia	99	6 (1.9)	13 (1.0)	8 (3.7)	5 (2.2)	7 (0.94)	8 (0.92)	14 (1.0)	21 (21)	20 (20)	57 (58)
Karolinska Institute, Sweden	99	6 (1.9)	17 (0.87)	1 (5.5)	7 (1.9)	6 (1.0)	6 (1.0)	37 (0.49)	18 (18)	30 (30)	51 (52)
University of Illinois, US	84	8 (1.6)	3 (1.5)	4 (3.9)	18 (1.3)	9 (0.92)	8 (0.92)	3 (2.0)	30 (36)	21 (25)	33 (39)
University of Western Ontario, Canada	83	9 (1.6)	17 (0.87)	12 (2.8)	8 (1.9)	18 (0.65)	19 (0.62)	28 (0.61)	18 (22)	15 (18)	50 (60)
Lund University, Sweden	82	10 (1.6)	12 (1.1)	9 (2.9)	9 (1.7)	7 (0.94)	7 (1.0)	21 (0.74)	22 (27)	16 (20)	44 (54)
Boston University, US	82	10 (1.6)	15 (1.0)	4 (3.9)	11 (1.6)	11 (0.8)	12 (0.82)	10 (1.2)	20 (24)	21 (26)	41 (50)
McGill University, Canada	81	12 (1.6)	27 (0.63)	15 (2.6)	6 (2.1)	14 (0.73)	13 (0.72)	37 (0.49)	13 (16)	14 (17)	54 (67)
University of British Columbia, Canada	76	13 (1.5)	20 (0.78)	4 (3.9)	14 (1.5)	19 (0.61)	18 (0.64)	6 (1.6)	16 (21)	21 (28)	38 (50)
Monash University, Australia	72	14 (1.4)	22 (0.73)	12 (2.8)	10 (1.6)	12 (0.79)	11 (0.84)	28 (0.61)	15 (21)	15 (21)	42 (58)
University of Washington, US	68	15 (1.3)	10 (1.1)	67 (0.74)	11 (1.6)	13 (0.75)	16 (0.7)	37 (0.49)	23 (34)	4 (5.9)	41 (60)

TP: total number of articles; TPR (%): rank and the percentage of total articles; SPR (%): rank of and the percentage of single institution articles; ICPR (%): rank of and the percentage of internationally collaborative articles; NCPR (%): rank and the percentage of nationally collaborative articles; FPR (%): rank and the percentage of first author articles; RPR (%): rank and the percentage of the corresponding authored articles; SAPR (%): rank and the percentage of the single author articles; SP (%): the number of single institution articles and the percentage of single institution articles in total articles of each institution; ICP (%): the number of internationally collaborative articles and the percentage of internationally collaborative articles in total articles of each institution; NCP (%): the number of nationally collaborative articles and the percentage of nationally collaborative articles in total articles of each institution.

and percentage of nationally collaborative articles (% NCP referred to as N), referred to as ‘S:I:N,’ has been developed to compare different institutions’ publication characteristics [32,33]. This proportion indicator reports three important rates related to institutional collaboration and is more comprehensive than just one traditional collaboration rate reported for measurement and comparison purposes. In the occupational therapy profession, the proportion of S:I:N was 40:10:50, indicating that international collaborations were less frequent compared to single institutional and nationally collaborative publications. McGill University’s proportion of S:I:N was 16:17:67, indicating that their occupational therapy research had more national collaboration among different institutions than international collaborations between countries. In Canada, the Universities of Montreal and Toronto, and McGill University were the most collaborative, while the Australian universities—University of Sydney, La Trobe University, and Monash University—published the largest number of nationally collaborative articles.

The University of Illinois had the most even distribution of publications with a S:I:N ratio of 36:25:39. The University of Southern California published more single institutionally completed research with a S:I:N ratio of 52:8.9:39. The Karolinska Institute (S:I:N = 18:30:52) had the highest percentage of internationally collaborative articles as a proportion of its total publications ( $n = 30, 30\%$ ).

### Authors’ publication performance

The Y-index is a newly developed metric proposed by Ho [22,33] that evaluates publication intensity and characteristics of contributing authors, institutions, and countries. The Y-index provides insight into the features of author, institution, and country contributions. The construction of the Y-index includes two parameters ( $j$  and  $h$ ) and is an attempt to assess both the publication intensity and characteristics of publication contribution as a single index. It is related to the numbers of first author publications ( $FP$ ) and corresponding author publications ( $RP$ ) defined as:

$$j = FP + RP \tag{1}$$

$$h = \tan^{-1} \left( \frac{RP}{FP} \right) \tag{2}$$

An author, institution, or country with a higher  $j$  indicates more publications as first or corresponding author which suggests leadership in publishing peer-reviewed articles.  $h$  differentiates the nature of the

**Table 4.** Top three authors in each top 10 countries.

Country/region	Institution/Affiliation	Authors	Rank <sup>a</sup>	Rank <sup>b</sup> (TP)	Rank <sup>b</sup> (FP)	Rank <sup>b</sup> (RP)	Rank <sup>b</sup> (SP)
United States	Colorado State University	A.G. Fisher	1	5 (26)	72 (4)	78 (4)	16 (3)
United States	Medical College of Ohio	D.L. Nelson	2	5 (26)	14 (8)	11 (10)	16 (3)
United States	John Hopkins University	L.N. Gitlin	3	7 (25)	3 (16)	5 (15)	N/A
Australia	Monash University	T. Brown	1	2 (34)	1 (19)	1 (23)	8 (4)
Australia	University of Queensland & Cooperative Research Centre for Living with Autism	S. Rodger	1	2 (34)	7 (13)	8 (14)	N/A
Australia	University of Queensland & Queensland Cerebral Palsy & Rehabilitation Research Centre	J. Ziviani	3	7 (25)	72 (4)	35 (6)	N/A
Canada	McMaster University	M. Law	1	4 (28)	33 (6)	35 (6)	34 (2)
Canada	McGill University	N. Korner-Bitensky	2	19 (19)	72 (4)	54 (5)	N/A
Canada	University of Toronto	H.J. Polatajko	3	41 (14)	46 (5)	54 (5)	N/A
United Kingdom	Derbyshire Royal Infirmary	A. Hammond	1	23 (18)	14 (8)	18 (8)	16 (3)
United Kingdom	Queen Margaret University	K. Forsyth	2	25 (17)	N/A	164 (3)	N/A
United Kingdom	Queen's Medical Centre	A. Drummond	3	27 (16)	72 (4)	78 (4)	N/A
Sweden	Lund University	M. Eklund	1	1 (37)	6 (14)	5 (15)	34 (2)
Sweden	Lund University	S. Iwarsson	2	16 (20)	46 (5)	54 (5)	N/A
Sweden <sup>c</sup>	Umea University	A. Kottorp	3	19 (19)	46 (5)	78 (4)	N/A
Sweden <sup>c</sup>	Karolinska Institute	K. Tham	3	19 (19)	276 (2)	288 (2)	N/A
Germany	University of Munich	A. Cieza	1	56 (12)	276 (2)	288 (2)	N/A
Germany	University Hospital Freiburg	S. Voigt-Radloff	2	92 (9)	72 (4)	164 (3)	N/A
Germany	Hannover Medical School	C. Gutenbrunner	3	275 (5)	276 (2)	288 (2)	N/A
Netherlands	Netherlands Institute of Primary Health Care	J. Dekker	1	13 (22)	691 (1)	704 (1)	N/A
Netherlands	Radboud University Nijmegen Medical Centre	M.J.L. Graff	2	74 (10)	72 (4)	78 (4)	N/A
Netherlands	Radboud University Nijmegen Medical Centre	E.H.C. Cup	3	118 (8)	152 (3)	164 (3)	N/A
Israel	Hebrew University of Jerusalem	N. Katz	1	19 (19)	10 (10)	11 (10)	N/A
Israel <sup>c</sup>	Tel Aviv University	O. Bart	2	74 (10)	276 (2)	54 (5)	N/A
Israel <sup>c</sup>	Tel Aviv University	T. Jarus	2	74 (10)	152 (3)	78 (4)	N/A
Israel <sup>c</sup>	Tel Aviv University	H. Ring	2	74 (10)	276 (2)	78 (4)	N/A
Japan	Jikei University	M. Abo	1	27 (16)	691 (1)	3 (16)	N/A
Japan	Kobe International University	M. Uesugi	2	192 (6)	33 (6)	35 (6)	N/A
Japan <sup>c</sup>	Fujita Health University	Y. Kanada	3	275 (5)	691 (1)	704 (1)	N/A
Japan <sup>c</sup>	Fujita Health University	H. Sakurai	3	275 (5)	72 (4)	78 (4)	N/A
Hong Kong	Hong Kong Polytechnic University	J.C.C. Chung	1	275 (5)	276 (2)	164 (3)	34 (2)
Hong Kong	Hong Kong Polytechnic University	C.W.P. Li-Tsang	1	275 (5)	691 (1)	78 (4)	N/A
Hong Kong	Hong Kong Polytechnic University	D.W.K. Man	1	275 (5)	691 (1)	78 (4)	N/A

Rank<sup>a</sup>: rank in each country; Rank<sup>b</sup>: rank in occupational therapy field; TP: total number of articles; FP: first author articles; RP: corresponding authored articles; SP: single author articles.

<sup>c</sup>Sweden, Israel and Japan have four authors listed since two or more of the authors have the same rank in that respective country.

publication leadership role.  $h > 0.7854$  indicates more corresponding author publications,  $h = 0.7854$  shows the same number of first and corresponding author publications, and  $h < 0.7854$  means more first author publications. When  $h = 0$ ,  $j$  is the number of first author publications and when  $h = \pi/2$ ,  $j$  is the number of corresponding author publications.

There is a limitation when applying the Y-index. Only articles with both first and corresponding author information are included. A total of 5,103 articles

(96% of 5,315 articles) by 12,646 authors in occupational therapy were analyzed. Only 3,272 (29%) of the 12,646 authors were both first and corresponding author on articles they had published. Altogether 126 (3.9%) of 3,272 authors had an  $h > 0.7854$  and 48 (1.5%) authors had an  $h < 0.7854$ . Ninety-five percent (3,098 authors) had the same number of first and corresponding author articles.

Figure 2 displays the distribution of the top 31 occupational therapy authors with a  $j \geq 14$  ( $j$  Cos  $h$

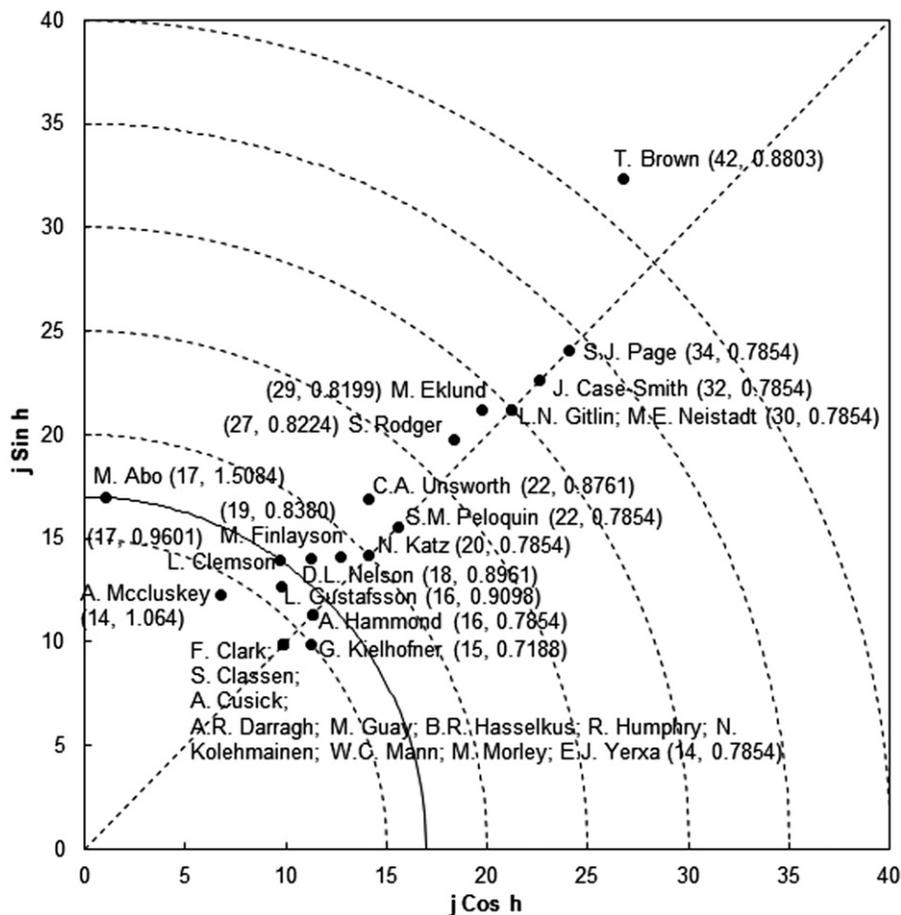


Figure 2. Top 31 authors with Y-index ( $j \geq 14$ ).

and  $j \sin h$  are chosen as the  $x$  and  $y$  coordinate axes). Each dot represents one value that could be one author or many authors when they have the same publication intensity and characteristics. The authors with the highest publication intensity and publication contribution were T. Brown ( $j = 42$ ), S.J. Page ( $j = 34$ ), J. Case-Smith ( $j = 32$ ), and L.N. Gitlin and M.E. Neistadt (each with  $j = 30$ ), M. Eklund ( $j = 29$ ), and S. Rodger ( $j = 27$ ). The most recent position and affiliation of these authors are:

- *Dr. Ted Brown*: Associate Professor, Department of Occupational Therapy, School of Primary and Allied Health Care, Faculty of Medicine, Nursing and Health Sciences, Monash University – Peninsula Campus, Australia;
- *Dr. Stephen J. Page*: Associate Professor, Division of Occupational Therapy, School of Health and Rehabilitation Sciences, Ohio State University, US;
- *Dr. Jane Case-Smith*: (deceased) Professor, Division of Occupational Therapy, School of Health and Rehabilitation Sciences, Ohio State University, US;

- *Dr. Laura N. Gitlin*: Professor, School of Nursing; Director, Center for Innovative Care in Aging, Johns Hopkins University, US;
- *Dr. Maureen E. Neistadt*: (deceased) Associate Professor, Occupational Therapy Department, University of New Hampshire, US;
- *Dr. Mona Eklund*: Professor, Division of Occupational Therapy and Gerontology, Lund University, Sweden;
- *Dr. Sylvia Rodger*: (deceased) Director of Research & Education, Cooperative Research Centre for Living With Autism, St Lucia; and Emeritus Professor, Division of Occupational Therapy, School of Health and Rehabilitation Sciences, University of Queensland, Australia.

Publication characteristics constant,  $h$ , could help to obtain the different proportions of corresponding author articles ( $RP$ ) to first author articles ( $FP$ ). It is helpful especially when a  $j$  of authors are the same to distinguish the different performance levels of authors. For example, the  $j$  of M. Abo and L. Clemson were both the same at a score of 17 (see Figure 2). In other words, this indicates that the two authors have the

same publication intensity. However, the  $h$  of M. Abo was 1.508, but the  $h$  of L. Clemson was 0.9601. M. Abo had a greater proportion of corresponding author articles to first author articles than L. Clemson. However, G. Kielhofner was the only one who had a greater proportion of first author to corresponding author articles with  $h = 0.7188$ .

## Discussion

### Language of publication

In the bibliometric analysis completed, 96% of the 5,315 articles found were published in English. This is not surprising since the majority of journals registered in WSCC publish in English. The occupational therapy-specific journals listed in Table 1 all publish English-only articles. As well, the four countries that published the largest number of occupational therapy articles are English-speaking: US, Australia, Canada, and UK. Of the 15 institutions that published the largest number of occupational therapy journal publications, 13 of them are based in English-speaking countries. The dominance of the English language in scholarly publishing has been noted in other professions as well [36,37].

### Publication outputs

The top two articles with the highest total citation numbers in journals in WSCC were published in two non-occupational therapy journals: Palisano *et al.* [27] published in *Developmental Medicine and Child Neurology* with a total of 1,831 citations from 1997-2014; and Small [28] published in *JAMA* with 590 citations from 1997-2014. Both of these journals have a medical focus and have high impact factors.

The year 1999 was the most prolific and productive year for occupational therapy journal articles that were highly cited—8/58 articles with a  $TC_{2014} > 100$  were published. This suggests that in 1999, occupational therapy investigators completed and published many notable research articles. The two articles with the highest number of citations in 1999 were again published in two non-occupational therapy journals: Close *et al.* [29] published in the *Lancet* with 456 citations; and Ragnarsson *et al.* [30] published in *JAMA* with 300 citations. Similarly, these two journals have a strong medical focus and high impact factors.

The impact of published research in a cognate field has been compared with the number of citations received from other publications in WSCC [38,39]. Post-publication, it appears that one decade is

required for an article's citation number to reach a plateau (see Figure 1). Similarly, publications labeled as 'classic articles' with a  $TC_{year} \geq 1,000$  in the top-cited research journals in SCI-Expanded [24], and highly cited publications ( $TC_{year} \geq 100$ ) in materials science and engineering [22], also required about 10 years to reach a citation plateau. It might be concluded that to evaluate the true, longer term impact of journal publications, citations accumulated over at least one decade is needed. In order to verify this 10-year citation lag, Chuang and Ho [39] concluded that regardless of the data collection year, all journal articles published in Taiwan exhibited an approximate 10-year period between data collection and peak citations.

Similarly, a total of 4,385 occupational therapy articles (83% of 5,315 articles) had no citations in the year they were published ( $C_0 = 0$ ), and 702 (13%) articles had only one citation ( $C_0 = 1$ ).

More recently, with an increasing number of journals being added to SCI-Expanded and SSCI, some articles have had higher citation rates in their first year of publication ( $C_0$ ) [32]. Furthermore, among the top 100  $C_0$  articles, only 12% and 13% of them were among the top 100  $TC_{2014}$  and  $C_{2014}$  articles, respectively. In other words, using a 5-year time-span as the assessment period may not be indicative of the true impact of a published paper [39,40]. This may call into question the wide use of 2- and 5-year journal Impact Factors and how indicative of 'impact' these time periods really are for individual articles and whole journal publications [41,42]. Again, it appears that the 10-year post-publication period is the most robust and indicative of the true impact of a journal article based on the frequency and number of citations.

### Web of science subject categories

The distribution of subject categories for research topics has been studied previously [31,42]. The results provide insight about the trends, frequency of use, and distribution of subject categories [31,43] including an understanding of the categories in which the majority of occupational therapy literature has been published. The most frequently used subject classifications were *rehabilitation*; *clinical neurology*; and *public, environmental, and occupational health*. This is somewhat surprising given the range of professional areas where occupational therapists practice. For example, many therapists work in the practice areas of mental health and pediatrics, but this is not reflected in the most frequently used subject

categories. *Rehabilitation* and *clinical neurology* as categories are related since many clients presenting with neurological diagnoses are seen by therapists in rehabilitation settings or receive rehabilitation interventions. The *public*, *environmental*, and *occupational health* categories fit with the occupational therapy practice areas of health promotion, occupational health and safety, and vocational rehabilitation.

### **Journal publication performance**

The top four journals that published the largest number of highly cited occupational therapy articles were *AJOT*, *BJOT*, *AOTJ*, and *SJOT*. These are all English language publications. *AJOT*, *BJOT*, and *AOTJ* have all been in existence for more than 60 years whereas *SJOT* has been published for over 20 years. Madill *et al.* [11] and Cusick [10] have published a content analysis of the types of articles published in *AOTJ* whereas Mountain [12] completed a retrospective review of articles published in *BJOT*. Studies published by Rodger *et al.* [15] and Potter [13] both reported that *AJOT*, *BJOT*, *AOTJ*, and *SJOT* are considered high status journals in the occupational therapy publishing arena. The reason is probably due to the fact that these journals have been in the field of occupational therapy for many years and had already achieved a higher status.

### **Country publication performance**

The top 10 most productive countries/regions for occupational therapy publications were the US, Australia, Canada, UK, Sweden, Germany, Netherlands, Israel, Japan, and Hong Kong. The US ranked top on all six publication indicators (total, single country, internationally collaborative, first author, corresponding author, and single author articles). Domination in occupational therapy articles by the US was not surprising given it has the largest number of occupational therapy university courses which employ many academic staff with doctoral qualifications [44–47]. However, given the much smaller population and number of occupational therapists in Australia, Canada, and Sweden compared to the US, these three countries have also been major contributors to the occupational therapy body of knowledge through journal article publication.

### **Institutional publication performance**

Canada ( $n=5$ ), Australia ( $n=4$ ), US ( $n=4$ ), and Sweden ( $n=2$ ) were the four countries that had two

or more institutions that published the largest number of journal articles. Notable higher education institutions were the University of Toronto and McMaster University in Canada, the Universities of Queensland and Sydney in Australia, the Universities of Southern California and Illinois in the United States, and the Karolinka Institute and Lund University in Sweden. Again, taking into consideration the much smaller number of occupational therapy education programs and practicing occupational therapists in Canada, Australia, and Sweden compared to the US, the number of highly cited journal articles published by these three countries is notable and striking. Further investigation of the potential reasons for this fact is warranted.

### **Authors' publication performance**

The Y-index is a metric developed by Ho [22,34] designed to assess both the publication intensity and characteristics of contribution as a single index for authors. It is based on the numbers of first and corresponding author publications. Authors with the highest Y-index were T. Brown, S.J. Page, J. Case-Smith, L.N. Gitlin, E.M. Neistadt, M. Eklund, and S. Rodger. All of these authors have doctoral level qualifications and were employed as faculty members at a university. All but one of the authors were occupational therapy academics (L.N. Gitlin is a sociologist). Two of the authors were from Australia (T. Brown and S. Rodger) with the rest being based in the US. Four of the authors are still research active and three of the authors are deceased.

### **Limitations**

Data for the bibliometric analysis were obtained only from the online databases of SCI-Expanded and SSCI of WSCC. Based on the 2014 JCR, 8,618 journals in 176 WSCC categories and 3,143 journals in 56 WSCC categories in SCI-Expanded and SSCI were indexed. Therefore only 36.5% of journals in the WSCC database were included in the analysis for this study. Also, journals not indexed in WSCC were not included in the bibliometric analysis. 'According to *Ulrich's Global Series Directory* (ProQuest, 2016), there are approximately 73,130 active, academic English-language journals in publication as of December 2013, so WSCC indexes about 15% of existing journals' [20]. Therefore it is possible that key occupational therapy journal articles were missed or not included in this analysis. This is an acknowledged limitation.

Only the document types labeled ‘article’ and ‘review’ were considered in the WSCC. Other document categories (e.g. conference abstracts, letters to the editor, editorials) were excluded since they did not report sufficient study details. This is also a second acknowledged limitation of the current bibliometric analysis. However, review articles such as systematic reviews, qualitative evidence synthesis, scoping reviews, rapid reviews or state-of-the-art reviews amongst others were included [48]. The third limitation relates to the temporal coverage of the journal articles included in the bibliometric analysis. Occupational therapy articles published before 1991 and after 2014 were not included in the current bibliometric examination. For journal articles published before the mid-1990s, there may be a chance that an electronic version of the article was not available and therefore may have been missed in the search and analysis. Additionally, in an attempt to target a wider readership, some occupational therapy-specific journals now encourage authors to avoid using the terms ‘occupational therapy,’ [49,50] which may have also impacted the results reported in this paper.

A fourth acknowledged limitation is that all occupational therapy journals are not listed in SCI-Expanded and SSCI, and of those indexed, the majority have only been added within the last five years. This introduces an inherent bias in the selection process of occupational therapy journal articles that were included in this bibliometric analysis. The same is also true for the calculation of  $IF_{2014}$ , since journals listed in SCI-Expanded and SSCI that have reported impact factors, and the citation data used to compute IFs, are based only on citations in other said listed SCI-Expanded and SSCI journals.

The final recognized limitation is that it is possible that some occupational therapy authors who did not formally identify themselves as occupational therapists on the front page of their journal articles may have unintentionally been missed in the bibliometric search strategy results reported in the current paper. For example, some occupational therapy researchers who publish in medical/health science, basic science or social science journals that do not relate specifically to the occupational therapy field may have been missed. As well, many research journals do not specify the professional degree (e.g. OT reg or OTR) of authors, but only allow the academic degree (e.g. PhD) of authors to be reported, therefore, identifying these individuals was not possible. Further, some occupational therapy researchers publish on topics that are not viewed as

specifically occupational therapy-related research (e.g. medical research, basic science research) and would have been inadvertently not included. Finally the traditions of the publication traditions and senior authorship that exists between countries, academic disciplines, and academic institutions was not taken into consideration. However, it was not empirically feasible to allocate publication credit to individual authors of each individual journal article included in the bibliometric analysis since such a wide diversity of publication author ordering traditions exist [51–52].

### **Future research**

It is recommended that the bibliometric methodology [53–55] be replicated in individual countries to discern the most research productive institutions and authors in occupational therapy. This would provide valuable information for national and international bench marking purposes. It is also recommended that a bibliometric analysis specific to occupational therapy practice areas (e.g. neurology, pediatrics, 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, institutions, and authors in these areas can be identified.

### **Conclusion**

The occupational therapy-related body of peer-reviewed literature has grown exponentially over the last two decades. It appears that there is a citation window of an approximate 10-year period between the time of publication and the peak number of citations an article receives. The countries that have been the largest contributors to the occupational therapy body of knowledge are the US, Australia, Canada, UK, and Sweden. The top five occupational therapy journals are *AJOT*, *BJOT*, *AOTJ*, *SJOT*, and *CJOT*. It is significant to note that given the dominance of the US in the occupational therapy field, of the top six contributing institutions to the literature, three were from Australia (University of Queensland, University of Sydney, and La Trobe University), two were from Canada (University of Toronto and McMaster University), and only one was from the US (University of Southern California). The top three most productive Canadian occupational therapy authors were M. Law, N. Korner-Bitensky, and H.J. Polatajko. The five international occupational therapy

authors with a Y-index ( $j \geq 30$ ) were T. Brown, S.J. Page, J. Case-Smith, L.N. Gitlin, and M.E. Neistadt.

## Disclosure statement

The authors alone are responsible for the content and writing of the paper. The authors report no conflicts of interest.

## References

- [1] Hodson R, Sullivan TA. The social organization of work. Belmont (CA): Wadsworth, Cengage Learning; 2012.
- [2] Hopkins HL. An historical perspective on occupational therapy. In: Hopkins HL, Smith HD, editors. Willard and Spackman's occupational therapy. 6th ed. New York: Lippincott; 1983. p. 3–23.
- [3] Meho LI, Yang K. A new era in citation and bibliometric analyses: Web of Science, Scopus, and Google Scholar. *J Assoc Inf Sci Technol*. 2007;58:2105–2125.
- [4] Thomsom R. Using bibliometrics: a guide to evaluating research performance with citation data. Philadelphia (PA): Thomsom Reuters; 2008.
- [5] Brown GT. Characteristics of occupational therapy journals of WFOT member countries: a descriptive survey. *Occup Ther Int*. 1997;4:116–137.
- [6] Brown GT, Rodger S, Brown AJ. Publication practices of English language occupational therapy journals. *Br J Occup Ther*. 2005;68:85–92.
- [7] Leung EKA. Evidence-based practice in occupational therapy. *HK J Occup Ther*. 2002;12:21–32.
- [8] Schroeder J. An overlap analysis of occupational therapy electronic journals available in full-text databases and subscription services. *J Elect Resour Med Libr*. 2008;5:346–361.
- [9] Brown GT, Brown AJ. Characteristics of the occupational therapy journal of research: the first twenty years. *Occup Ther Health Care*. 2005;19:73–92.
- [10] Cusick A. Australian occupational therapy research: A review of publications 1987–91. *Aust Occup Ther J*. 1995;42:67–75.
- [11] Madill H, Brintnell S, Stewin L. Professional literature: one view of a national perspective. *Aust Occup Ther J*. 1989;36:110–119.
- [12] Mountain GA. A review of the literature in the British Journal of Occupational Therapy, 1989–1996. *Br J Occup Ther*. 1997;60:430–435.
- [13] Potter J. Mapping the literature of occupational therapy: an update. *J Med Libr Assoc*. 2010;98:235–242.
- [14] Brown T. Journal quality metrics: options to consider other than impact factors. *Am J Occup Ther*. 2011;65:346–350.
- [15] Rodger S, McKenna K, Brown T. Quality and impact of occupational therapy journals: authors' perspectives. *Aust Occup Ther J*. 2007;54:174–184.
- [16] Johnson KS, Leising DJ. The literature of occupational therapy: a citation analysis study. *Am J Occup Ther*. 1986;40:390–396.
- [17] Ottenbacher K, Short MA. Publication trends in occupational therapy. *Occup Ther J Res*. 1982;2: 80–88.
- [18] Reed KL. Occupational therapy articles in serial publications: an analysis of sources. *Bull Med Libr Assoc*. 1988;76:125–130.
- [19] Ziviani J, Behan S, Rodger S. Occupational therapy journals: the state of the art. *Aust Occup Ther J*. 1984;30:6–12.
- [20] Carpenter CR, Cone DC, Sarli CC. Using publication metrics to highlight academic productivity and research impact. *Acad Emerg Med*. 2014;21: 1160–1172.
- [21] Garfield E. KeyWords Plus: ISI's breakthrough retrieval method. Part 1. Expanding your searching power on Current Contents on Diskette. *Cur Cont*. 1990;32:5–9.
- [22] Fu HZ, Wang MH, Ho YS. The most frequently cited adsorption research articles in the Science Citation Index (Expanded). *J Colloid Interf Sci*. 2012;379:148–156.
- [23] Ho HC, Ho YS. Publications in dance field in Arts & Humanities Citation Index: a bibliometric analysis. *Scientometrics*. 2015;105:1031–1040.
- [24] Ho YS. The top-cited research works in the Science Citation Index Expanded. *Scientometrics*. 2013;94:1297–1312.
- [25] Ho YS. Bibliometric analysis of adsorption technology in environmental science. *J Environ Protect Sci*. 2007;1:1–11.
- [26] Li Z, Ho YS. Use of citation per publication as an indicator to evaluate contingent valuation research. *Scientometrics*. 2008;75:97–110.
- [27] Palisano R, Rosenbaum P, Walter S, et al. Development and reliability of a system to classify gross motor function in children with cerebral palsy. *Dev Med Child Neurol*. 1997;39:214–223.
- [28] Small GW, Rabins PV, Barry PP, et al. Diagnosis and treatment of Alzheimer disease and related disorders: consensus statement of the American Association for Geriatric Psychiatry, the Alzheimer's Association, and the American Geriatrics Society. *JAMA*. 1997;278:1363–1371.
- [29] Close J, Ellis M, Hooper R, et al. Prevention of falls in the elderly trial (PROFET): a randomised controlled trial. *Lancet*. 1999;353:93–97.
- [30] Ragnarsson KT, Moses LG, Clarke WR, et al. Rehabilitation of persons with traumatic brain injury. *JAMA*. 1999;282:974–983.
- [31] Ho YS, Satoh H, Lin SY. Japanese lung cancer research trends and performance in Science Citation Index. *Intern Med*. 2010;49:2219–2228.
- [32] Ho YS, Kahn M. A bibliometric study of highly cited reviews in the Science Citation Index Expanded™. *J Assoc Inform Sci Tech*. 2014;65:372–385.
- [33] Ho YS. Classic articles on social work field in Social Science Citation Index: a bibliometric analysis. *Scientometrics*. 2014;98:137–155.
- [34] Schweickert WD, Pohlman MC, Pohlman AS, et al. Early physical and occupational therapy in mechanically ventilated, critically ill patients: a randomised controlled trial. *Lancet*. 2009;373:1874–1882.
- [35] Rao SM, Leo GJ, Bernardin L, et al. Cognitive dysfunction in multiple sclerosis. I. Frequency, patterns, and prediction. *Neurology*. 1991;41:685–691.

- [36] Curry MJ, Lillis T. *Academic writing in a global context: the politics and practices of publishing in english*. Oxon (UK): Routledge; 2010.
- [37] Mamel RE. The dominance of English in the international scientific periodical literature and the future of language use in science. *AILA Rev.* 2007;20:53–71.
- [38] Chuang KY, Ho YS. Bibliometric profile of top-cited single-author articles in the Science Citation Index Expanded. *J Informetrics.* 2014;8:951–962.
- [39] Chuang KY, Ho YS. An evaluation based on highly cited publications in Taiwan. *Cur Sci.* 2015;108:933–941.
- [40] Greenwood DC. Reliability of journal impact factor rankings. *BMC Med Res Methodol.* 2007;7:48.
- [41] Frandsen TF, Rousseau R. Article impact calculated over arbitrary periods. *J Am Soc Inf Sci.* 2005;56:58–62.
- [42] Wang J. Citation time window choice for research impact evaluation. *Scientometrics.* 2013;94:851–872.
- [43] Chiu WT, Ho YS. Bibliometric analysis of tsunami research. *Scientometrics.* 2007;73:3–17.
- [44] Fu HZ, Wang MH, Ho YS. Mapping of drinking water research: a bibliometric analysis of research output during 1992–2011. *Sci Total Environ.* 2013;443:757–765.
- [45] Altbach PG. The imperial tongue: English as the dominating academic language. *Int High Educ.* 2007;49:2–4.
- [46] Ulrichsweb Global Serials Directory [Internet]. Ann Arbor, Michigan: ProQuest. 2016. Available from: <http://ulrichsweb.serialssolutions.com/login>.
- [47] Li M, Shankar S, Tang KK. Why does the US dominate university league tables? School of Economics Discussion Paper No. 391, School of Economics, The University of Queensland [Internet]. Brisbane, Queensland, Australia: University of Queensland; 2009. Available from: <http://www.uq.edu.au/economics/abstract/391.pdf>.
- [48] Grant MJ, Booth A. A typology of reviews: an analysis of 14 review types and associated methodologies. *Health Info Libr J.* 2009;26:91–108.
- [49] Gage Richards L. State of the Journal, 2016. *Am J Occup Ther.* 2016;70:1–5.
- [50] American Occupational Therapy Association. Guidelines for contributors to AJOT. *Am J Occup Ther.* 2016;70(Suppl 2):S1–S25.
- [51] Tscharrntke T, Hochberg ME, Rand TA, et al. Author sequence and credit for contributions in multiauthored publications. *PLoS Biol.* 2007;5:e18.
- [52] Smith E, Williams-Jones B. Authorship and responsibility in health sciences research: a review of procedures for fairly allocating authorship in multi-author studies. *Sci Eng Ethics.* 2012;18:199–212.
- [53] Fu HZ, Ho YS. Comparison of independent research of China's top universities using bibliometric indicators. *Scientometrics.* 2013;96:259–276.
- [54] Fu H-Z, Ho Y-S. Top cited articles in adsorption research using Y-index. *Res Eval.* 2014;23:12–20.
- [55] Fu H-Z, Ho Y-S. Highly cited Canada articles in Science Citation Index Expanded: a bibliometric analysis. *Can Soc Sci.* 2015;11:50–62.