

Bibliometric analysis of literature regarding ostomy research based on the Web of Science database[†]

Original article

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Received: 20 December 2017; Accepted: 28 April 2018; Published: 20 September 2018

Abstract: **Objective:** To analyze the literature status and research hotspots of Science Citation Index (SCI)-related ostomy in the world and to provide references for scientific research and clinical work in the stoma care field.

Methods: Based on the Web of Science core database and its own analysis function, HistCite analysis software and Excel were used to study the published research about ostomy patients.

Results: A total of 1,262 articles were published between 1910 and 2016 with the authors from 48 countries and regions, 1,347 research institutions, published in 321 journals, with 4,048 first authors and coauthors; globally, there was a trend of slow growth in the number of authors every year. The study in the USA was absolutely in the lead position, and Canada and Turkey were more active. China's circulation volume was the 15th in the world. The periodical that published most often was the *Journal of Wound Ostomy and Continence Nursing*. The most interdisciplinary surgical studies were surgery and nursing, where these should be considered important. The most prolific author in the field was "Grant", and the highest cited article was entitled as "Living with a stoma: a review of the literature".

Conclusions: The related research of global stoma is constantly developing. The research hotspot is nursing before and after stoma surgery. China and the USA are leading countries in research. They should follow the recent trend to improve the depth and breadth of the research in the field.

Keywords: *Web of Science • ostomy • stoma • literature measurement • nursing*

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1. Introduction



With the development of modern medical technology, stoma has become very common in clinical practice. According to statistics, 100,000 patients in China undergo ostomy surgery each year, and the total number of ostomy patients has reached 1 million among military personnel.¹ After a colostomy, patients not only have discharge changes but also have peristomal complications, such as embarrassing odor, sleep

disorders, daily activity limitation, and serious psychological trauma problems that bring great pain to the patient.²⁻⁴ Nichols⁵ found that, compared with the general population, colostomy patients face more severe mental health, social function, and emotional state damage. Therefore, domestic and foreign scholars studying stoma are increasing, but with the increase in the amount of literature, determining how to efficiently manage and quickly find a foothold in scientific research has become an important obstacle for nursing scientific research personnel data. In this study, the stoma research of Science Citation Index (SCI) literature, as a source of information based on the Web of Science database, was analyzed, integrated, and drew

[†] This study was supported by the Humanities and Social Science Research Program of the Ministry of Education (No.15YJAZH105).

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as a citation chronological chart to provide a scientific reference and basis for clinical nursing educators and researchers.

2. Methods

2.1. Research tools

Web of Science is a journal citation information source that is currently recognized as having the most authoritative academic and international influence; it was launched by Thomson ISI Company. It is indexed by the SCI Expanded (SCIE), Social SCI (SSCI), and the Arts and Humanities Citation Index (A&HCI) and can be used as independent retrieval to retrieve publications.

HistCite is a free citation map analysis software developed by Dr. Eugene Garfield in 2001; its main function is to analyze and integrate the literature so that the results can graphically reflect the relationship among a field of perplexing literature. It not only can quickly locate the latest and most important literature, authors, source journals, and cross-disciplines but also can help readers quickly visualize the field of historical development to meet the huge demand of readers. The analysis of the Citation Index in this study involves the addition of Web of Science basic index data retrieval (such as author, year of publication, countries, institutions, journals) and the research direction including the number of records in the literature focus (Recs), local citation number (LCS), total citations (GCS), local citation reference (LCR), and the total number of citations (CR) as a measurement index.

2.2. Retrieval strategies and processing methods

In the Web of Science database search, the topic word was selected as “Ostomy” in the retrieval strategy, with a time limit of 2016; language and literature types were not restricted in the search. A total of 1,262 articles were retrieved on June 24, 2017. When information was exported, the “record and reference” were selected and saved as plain text to the specified path.

Web of Science, with bibliometric analysis and visual analysis software HistCite and Excel software, was used to conduct a comprehensive analysis of the information retrieval and mining data from published years, source journals, research direction, authors, institutions, countries, and regions. A citation chronological chart explored the development trend of related research stoma and popular information.

3. Results

3.1. Literature review of global ostomy research

A total of 1,262 articles with SCI-related stoma research from 1910 to 2016 were found in 48 countries and regions involving nine kinds of languages (English, 1,217 [96.43%]), 11 types of literature (journal articles, 848 articles [67.19%]), 321 magazines, 1,347 research institutions, and 4,048 first authors and coauthors. One of the most active countries was the USA, and the author with the highest number of publications was “Grant”. The publication titled “Living with a stoma: a review of the literature” was most frequently cited.

3.2. Document year situation and dispatch state

Based on the related literature, publication year and national area were analyzed; overall, the results showed that the global annual productivity appeared to have an increasing trend. Especially from 2010, stoma research began an active period and reached a peak in 2016 (Table 1; Figure 1). The USA ranked the first in the world, with most publications regarding stoma, with a total of 645 articles; Canada, Turkey, and other countries in this field were also more active. China ranked the 15th in the world with 17 published articles (Table 2).

3.3. Distribution of the top 10 periodicals in stoma study

The SCI articles about stoma research were distributed in 321 journals during 1910–2016. Among the top 10 journals, 626 articles were published, accounting for 49.6% of the total amount of literature. The *Journal of Wound Ostomy and Continence published by Nursing* had the most publications regarding stoma (Table 3). For the impact factor of journal, in addition to *Gastroenterology* having a high impact factor (18.382), the impact factor of the journals mostly ranged from 1 to 3, reflecting that the field is still evolving, and it is possible to achieve significant development.

3.4. Distribution of the top 10 interdisciplinary subjects of stoma study

The results of this study showed that there were some crossover between the articles published in the

Year	Recs	TLCS	Year	Recs	TLCS	Year	Recs	TLCS	Year	Recs	TLCS	Year	Recs	TLCS
1910	1	0	1981	2	0	1991	4	3	2001	17	15	2011	80	92
1963	1	0	1982	3	3	1992	12	30	2002	5	20	2012	91	86
1968	1	0	1983	5	27	1993	7	1	2003	11	7	2013	108	110
1972	2	1	1984	5	21	1994	7	20	2004	15	55	2014	141	68
1974	4	0	1985	8	6	1995	11	11	2005	40	164	2015	104	35
1975	1	0	1986	1	0	1996	6	6	2006	53	102	2016	156	3
1977	2	0	1987	6	4	1997	13	37	2007	50	252			
1978	6	5	1988	2	3	1998	12	25	2008	56	163			
1979	4	0	1989	2	2	1999	11	6	2009	65	187			
1980	4	0	1990	3	18	2000	13	7	2010	109	193			

Table 1. Reports and citations of global ostomy research during 1910–2016.

Note: TLCS: total local citation score.

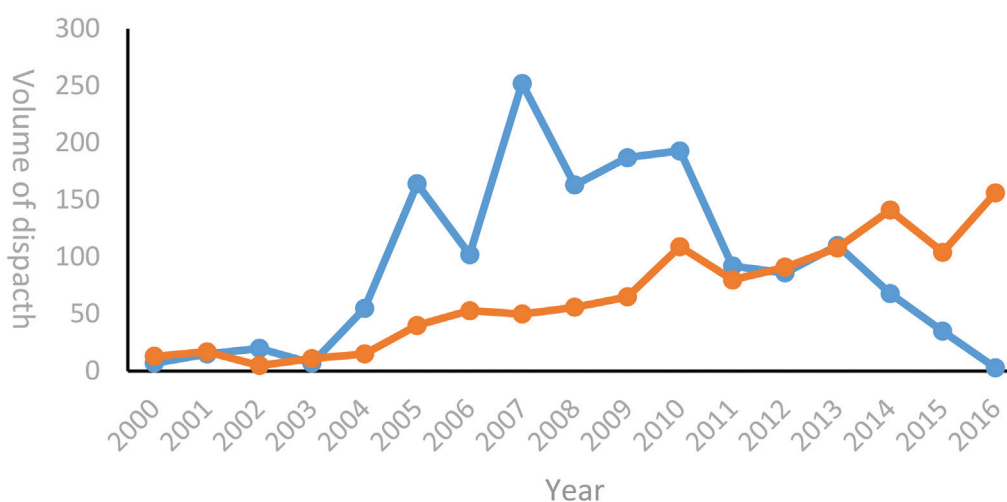


Figure 1. Global ostomy research articles and citations during 2000–2016.

Note: Orange stands for volume; blue stands for TLCS.

SCI journals and other disciplines, as summarized in Table 4. Among the interdisciplinary subjects, the largest quantity is surgery (478 articles), then nursing, followed by gastrointestinal hepatology, pediatrics, general medicine, and dermatology.

3.5. Analysis of high-yield authors and highly cited articles

From 1910 to 2016, a total of 4,048 first authors and coauthors were involved in research related to stoma and published SCI articles. The author “Grant” was the most prolific author; other authors in the top 10 are listed in Table 5. Furthermore, this study used the HistCite Graphs Maker automatic drawing function

according to the LCS or GCS quantity of total literature. The system automatically numbers the literature and presents different relationships in different sizes of circles and different pointing arrows (the greater the circle, the higher the citation frequency of the articles, the arrow line indicates the reference relationship of the different literature, and the arrow points to the referenced document) to form this study citation chronological chart. Through a chronological chart, No. 211 (Figure 2 was labeled 1, titled “Living with a stoma: a review of the literature”) had the biggest circle, and the arrow pointed to the publication that played an important role in the research of stoma. No. 391 (marked as 2, titled “Demographic and clinical factors related to ostomy complications and quality of life in veterans

Ranking	Country	Dispatch volume (chapter)	Percentage	Citation frequency (times)
1	USA	648	51.43	1,139
2	Unknown	183	14.52	84
3	Canada	63	5.00	81
4	Turkey	43	3.41	40
5	UK	38	3.02	125
6	Brazil	32	2.54	21
7	Japan	30	2.38	46
8	Sweden	30	2.38	103
9	Italy	25	1.98	28
10	Netherlands	25	1.98	23
11	Germany	24	1.90	7
12	Denmark	21	1.67	66
13	Spain	21	1.67	18
14	France	17	1.35	13
15	People's Republic of China	17	1.35	18

Table 2. Countries and regions in the top 10 volume of ostomy research.

with an ostomy”) had the second largest circle size; this article also should arouse the reader’s attention (Figure 2; Table 6).

4. Discussion

4.1. Current status and development trend of stoma-related research

From 1910 to 2016, the study of stoma showed a trend of continuous growth, so the study of stoma has been performed by international scholars. Although the origins of the global study of ostomy were relatively early, the concern in the field of nursing began in 1990,⁶ only 27 years ago. From the total number of documents and cited frequency, America’s research in this field was in the lead position; China ranked 15th with 17 articles, but compared with some international counterparts in Europe and America, there is still a big gap, and future research should continue to expand its breadth and depth to improve China’s international influence in this field. As far as publishing journal was concerned, *Journal of Wound Ostomy and Continence Nursing* ranked the first in published article quantity, accounting for 28.5% of the total published articles in the world; this journal had a more authoritative position in this field that was of significant reference to domestic scholars who were conducting research related to ostomy and provided the

Ranking	Source journal	2016 (IF)	Article quantity (chapter)	Percentage
1	<i>Journal of Wound Ostomy and Continence Nursing</i>	1.359	359	28.48
2	<i>Ostomy Wound Management</i>	1.149	82	6.50
3	<i>Diseases of the Colon Rectum</i>	3.519	65	5.15
4	<i>Journal of Pediatric Surgery</i>	1.976	30	2.38
5	<i>American Surgeon</i>	0.700	21	1.66
6	<i>American Journal of Surgery</i>	2.612	19	1.51
7	<i>Gastroenterology</i>	18.392	13	1.03
8	<i>International Journal of Colorectal Disease</i>	2.426	13	1.03
9	<i>American Journal of Nursing</i>	1.663	12	0.95
10	<i>Journal of Gastrointestinal Surgery</i>	2.963	12	0.95

Table 3. Distribution of the top 10 journals in stoma study.
Note: IF: impact factor.

Subjects	Article quantity (chapter)	Percentage
Surgery	478	37.49
Nursing	458	35.92
Gastroenterology and hepatology	196	15.37
Oncology	82	6.43
Pediatrics	62	4.86
General medicine	54	4.24
Dermatology	39	3.06
Health care studies	29	2.28
Department of urology	22	1.73
Nutrition	21	1.65

Table 4. Distribution of the top 10 interdisciplinary subjects of stoma study.

Ranking	Author	Article quantity (chapter)	TLCS (times)	TGCS (times)
1	Grant	46	456	728
2	Krouse	35	331	541
3	Wendel	29	208	355
4	Hornbrook	25	133	281
5	Gray	20	38	101
6	Baldwin	19	198	329
7	Baldwin	17	107	233
8	Anonymous	17	8	0
9	Turnbull	16	5	11
10	Altschuler	15	75	130

Table 5. Top 10 author status of stoma study.
Note: TLCS: total local citation score; TGCS: total global citation score.

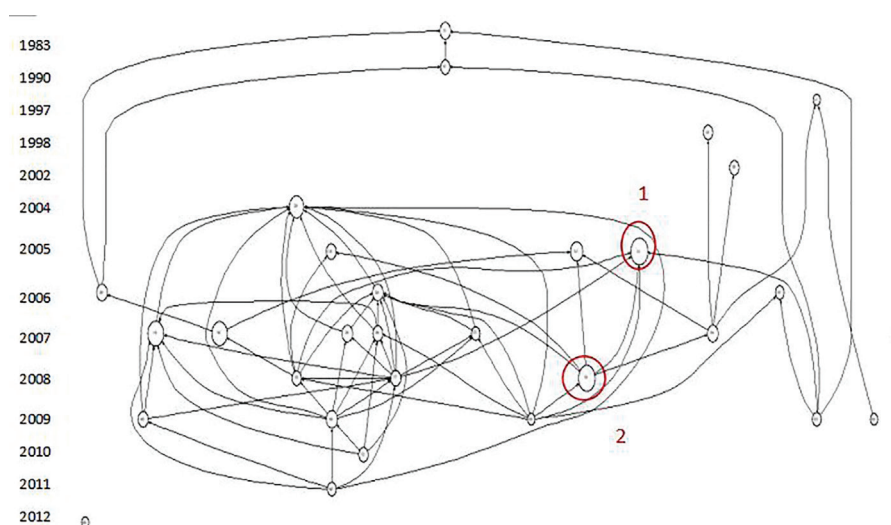


Figure 2. Citation chronological chart of stoma research literature.

Ranking	Author	Literature title	Journal	Cited frequency	Published year
1	Brown	Living with a stoma: a review of the literature	<i>Journal of Clinical Nursing</i>	57	2005
2	Pittman	Demographic and clinical factors related to ostomy complications and quality of life in veterans with an ostomy	<i>Journal of Wound Ostomy and Continence Nursing</i>	52	2008
3	Krouse	Quality of life outcomes in 599 cancer and non-cancer patients with colostomies	<i>Journal of Surgical Research</i>	48	2007
4	Richbourg	Difficulties experienced by the ostomate after hospital discharge	<i>Journal of Wound Ostomy and Continence Nursing</i>	47	2007
5	Grant	Revision and psychometric testing of the City of Hope Quality of Life Ostomy Questionnaire	<i>Quality of Life Research</i>	44	2004

Table 6. Top 5 high-frequency cited literature titles about stoma study.

basis for the whereabouts of the submission. The analysis of the most prolific author and frequently cited articles can show the basic trend of the development of a research field.^{7,8} This study showed that the author with the most published related stoma studies was “Grant” (a total of 46 articles were cited by the first author and the coauthors, and the total number of citations was 456 times) who played an important role in this field. The article titled “Living with a stoma: a review of the literature” had the highest citation frequency and was the core literature in this field with important reference significance for the related research.

4.2. Hot issues and future directions in ostomy research

Through analysis and reading of the core literature, important interdisciplinary subjects of ostomy research were surgery and nursing, indicating that a large number of related studies were carried out around ostomy

techniques and pre- and postoperative care; this direction has been the focus and a hot spot in the field. Furthermore, reading core literature showed that a study on the high degree of concern about stoma was mainly focused on the problem of stoma complications, including peristomal skin damage, bad smell, limited physical activity, and sex change, followed by social and psychological problems, quality of life of patients with colostomy, patients with stoma, nurses, and stoma-related scale.⁹⁻¹³ Therefore, domestic researchers can begin academic research on issues such as stoma complications, psychological care of ostomy patients, specialized ostomy care, and continuity of care in the future.

In summary, the research literature regarding stoma has seen continuous growth from 1910 to 2016. Compared with American and European counterparts, there is still a big gap, and the depth and breadth of the study need to be further deepened. The development of any discipline cannot be separated from scientific research¹⁴; to make great progress in stoma-related research, mul-

tidisciplinary collaboration should be emphasized. In addition, researchers should focus on the study of problems such as complications around colostomy, psycho-

logical problems of colostomy patients and continuing care of specialists, and the construction of effective intervention models.

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How to cite this article: Gao L, Cao X-Z, Zhang Y, Liu T-F, Zhang A-H. Bibliometric analysis of literature regarding ostomy research based on the Web of Science database. *Front Nurs*. 2018; 3: 193-198. <https://doi.org/10.1515/for-2018-0026>.