

LITERATURE CLUSTERING ANALYSIS OF GERIATRIC NURSING RESEARCH

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Abstract—The purpose of our work is to obtain a multi-dimensional research hotspot after literature cluster analysis of global gerontology research hotspots from 2008 to 2017. Clustering information, such as major research institutions, journals, related diseases, treatment methods, chemical drugs and Chinese herbal medicine, cross-subjects was extracted using “geriatrics nursing” as a search subject based on the PubMedplus retrieval and clustering analysis system. The analysis showed that there are 10 major diseases related to gerontological nursing, such as neurological diseases, Alzheimer's disease, central nervous system diseases, brain diseases, dementia, etc.; the main chemicals associated with gerontology are indigo carmine, amaranth. Nearly 20 species such as dye, 30 kinds of Chinese herbal medicines such as tea tree root, and clusters of subjects related to geriatric nursing include geriatrics, rehabilitation medicine, psychosis and mental health. PubMedplus is a very useful biomedical text mining tool. The cluster analysis of the research focus of geriatric nursing can grasp the overall development trend of geriatric nursing at home and abroad, reveal the frontier research hotspots, and provide valuable clues for basic and clinical research.

Keywords—Geriatrics Nursing, PubMed, Clustering Analysis

I. INTRODUCTION

In 1999, the Population Division of the United Nations Department of Economic and Social Statistics calculated that the age of the elderly was 60 and above. In 1999, there were 593 million elderly people in the world, and there were 1 elderly person per 10 people. It is estimated that there will be 1 elderly person per 5 people in 2050[1]. This shows that the trend of population aging is inevitable on a global scale. Take the United States and China, two representative countries. In 2011, the elderly aged 65 and over accounted for 17.4% of the total population of the United States. It is estimated that the proportion of the elderly population in the United States will reach 20%

by 2030 and 23% by 2050[2]. China entered an aging society in 1999. The problem of old age, especially the health of the elderly, is an important social issue that China will face[3-5]. The "Statistical Bulletin on Social Service Development" issued by the Ministry of Civil Affairs of China shows, from 2011 to 2015, the population aged 60 and above in China was 194 million (14.3% of the total population), 202 million (14.8% of the total population), 212 million (15.5% of the total population), 222 million (16.1% of the total population) and 2.31 (16.8% of the total population), respectively[6-10].

Faced with the rapid population aging, responding to the huge demand for aged care services and aged care services has become a serious challenge for every country in the world. The elderly have special clinical manifestations and response characteristics in their physical, psychological, spiritual and social aspects of existing or potential health problems. As one of the nursing specialties, Geriatric Nursing aims to study and understand the various needs of the elderly to provide targeted care measures to maintain and improve the health and quality of life of the elderly[11].

PubMedplus hierarchical retrieval and cluster analysis system is a literature analysis software based on PubMed, using PubMed's officially authorized interface, cluster analysis of documents can be achieved from more than 30 search portals such as journals, countries, institutions, and authors. This paper uses PubMedplus literature clustering function to collate, mine and analyze multi-dimensional and multi-level data of Geriatric Nursing literature from 2008 to 2017, in order to grasp the overall development trend of Geriatric Nursing at home and abroad, and to reveal the hotspots of frontier research, and provide reference for the clinical and scientific research of the elderly geriatrics in China.

II. DATA SOURCE AND ANALYSIS METHOD

Use the PubMedplus search system to search all PubMed documents with “Geriatrics Nursing”, and then filter geriatrics and nursing in the subject. The search date was January 27, 2018, and a total of 43805 articles were retrieved. After the intelligent elimination of

repetitive content by PubMedplus, the multi-level analysis method provided by PubMedplus was used to analyze the main research strength (institutions) of geriatrics research, the research literature source journals, related diseases, treatment methods, chemical drugs, Chinese herbs and disciplines.

III. Results and Analysis

A. Annual change in literature

The annual changes published in the paper can reflect the development process of the research in this field and the research level of a certain period of time to some extent[12,13].

According to the age distribution of the literature on a geriatrics aged nursing research in table 1 below, the number of aged nursing papers collected by PubMed increased steadily from 2008 to 2017.

TABLE. 1 DISTRIBUTION OF GERIATRICS NURSING RESEARCH LITERATURE FROM 2008 TO 2017

Year	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Number	1654	1611	1789	1870	1970	2120	2535	2671	2771	2255
Proportion	3.776%	3.678%	4.084%	4.269%	4.497%	4.840%	5.787%	6.098%	6.326%	5.143%

According to D.S. Price's scientific literature growth theory, the number of annual publications since the rise of global geriatrics research shows that the research on geriatric nursing has been booming in the past decade[14].

B. Main research analysis

In this work, the main analysis includes: analysis of countries and regions where the literature is produced, analysis of research institutions, and analysis of researchers.

1) Analysis of major countries and regions

Studying the geographical distribution of the literature output can help researchers recognize the countries and regions that are currently leading in a certain research field, thus helping researchers to understand the international research position of the field in this field, to find a benchmark country, and to facilitate more effective research.

In 2008-2017, the top 10 countries or regions in the field of geriatric nursing research were: the United States, the United Kingdom, Canada, Australia, the Netherlands, Germany, Japan, Sweden, France, and Taiwan. From the perspective of the distribution of countries and regions, the United States has the largest number of publications in the world, with 13,422 articles, accounting for more than 60% of the total number of countries in the top 10 countries (regions), and accounting for 30.6% of the total number of documents in the field, far ahead of the UK in the

second place and Canada in the third place, showing the US's leading position in the field of aged nursing research.

TABLE. 2 LIST OF DOCUMENTS ISSUED BY COUNTRIES IN THE WORLD

Sort by volume	Country / Region	Volume from 2008 to 2017	Proportion
1	United States	13422	30.642%
2	United Kingdom	2089	4.701%
3	Canada	1694	3.867%
4	Australian	1223	2.792%
5	Netherlands	1094	2.498%
6	Germany	981	2.240%
7	Japan	929	2.121%
8	Sweden	883	2.016%
9	France	779	1.778%
10	China Taiwan	723	1.651%

2) 3.2.2 Analysis of major research institutions

a) Analysis of foreign research institutions

Table 3 shows the number of publications of the top 10 research institutions in the world in the field of geriatric nursing in 2008-2017. According to the total number of issued, the top 10 geriatric nursing research institutions in the world are from the United States. 70% of the top 20 research institutions in the world are American research institutions, indicating the absolute dominance of the US research level in this field. None of China's research institutions is on the list.

TABLE. 3 FROM 2008 TO 2017, THE WORLD'S TOP 10 RESEARCH INSTITUTIONS OF GERIATRICS PUBLISHED PAPERS

Sort by volume	Research institutions	Volume from 2008 to 2017
1.	University of California	556
2.	University of North Carolina	402
3.	University of bluesburg	357
4.	Washington University	337
5.	Johns Hopkins University	329
6.	University of California, Los Angeles	324
7.	University of Maryland	315
8.	Brown University	300
9.	York University	281
10.	University of Michigan	273

b) Domestic research institutions

The number of domestic research institutions with the first author published papers included in PubMed was less than 30, respectively, Huaxi Hospital of Sichuan University (24), Central South University (9), Shandong University (9), Fudan University (8), Second Affiliated Hospital of Zhejiang University Medical College (6), Tianjin Medical University (4), Hangzhou Normal University (4), Third Military Medical

University (4), and the First Affiliated Hospital of Suzhou University (4).

C. Analysis of Source Journals of Geriatric Nursing Research Literature

The quality of source journals is an important indicator that researchers must consider when engaging in relevant research. Through the statistics and analysis of the evaluation indexes of the journal of origin in the field of geriatrics, on the one hand, the academic level and influence of the journal of origin can be determined, and the current development trend of nursing discipline can be grasped; on the other hand, the spatial distribution characteristics of the research literature in this field can be revealed, which can provide reference for researchers.

Table 4 is the top 10 source journals published in the field of geriatric nursing from 2008 to 2017, respectively, j gerontol nurs, j am med dir assoc, j am geriater soc, geriater nurs, nurs times int j geriater psychiatry, nurs older people, soins gerontol, age ageing, int psychogeriatr.

TAB. 4 2008-2017 GERIATRIC NURSING PAPERS TOP 10

Serial	Title	volume	Proportion
1	j gerontol nurs	2785	6.358%
2	j am med dir assoc	2776	6.337%
3	j am geriater soc	2630	6.004%
4	geriater nurs	1889	4.312%
5	nurs times	716	1.635%
6	int j geriater psychiatry	569	1.299%
7	nurs older people	567	1.294%
8	soins gerontol	543	1.240%
9	age ageing	529	1.208%
10	int psychogeriatr	496	1.132%

D. Cluster research on geriatric diseases, symptoms and treatment methods

The clustering disease information was searched in Medline, and repeated items were removed to obtain diseases related to vascular aging. According to the number of literatures, the top 10 diseases were listed in table 5 below. The diseases most closely related to the geriatric care are neurological diseases, dementia, central nervous system diseases, etc.

TABLE. 5 TOP 10 DISEASE TYPES

No.	Disease	volume	Proportion
1	Nervous system disease	7277	15.300%
2	Dementia	6702	13.586%
3	Central nervous system disease	5347	12.207%
4	Brain disease	5277	12.047%
5	Alzheimer's disease	2166	4.945%
6	Trauma and injury	1755	4.007%
7	Neurodegenerative disease	1732	3.954%
8	Pain	1720	3.927%
9	Nutrition and metabolic diseases	1704	3.890%
10	Cardiovascular diseases	1689	3.856%

Clustering with PubMedplus, eliminating duplicates and selecting symptoms with a number greater than 700, a cluster of symptoms associated with geriatrics was obtained. Chronic diseases, death, pain, neurobehavioral manifestations, and systemic fatigue are the most important symptoms according to the literature number.

The top 10 geriatric nursing related treatment methods are obtained by PubMedplus clustering, respectively, Nursing, Patient Care, Rehabilitation, Long-Term Care, Activities of Daily Living, Hospitalization, Psychotherapy, Drug Therapy, Home Care (Non-Professional), Advanced Care, Hospice Care, Hospice Care.

E. Cluster research on geriatrics drug

1) Chemical drug clustering

Clustering by Pubmedplus, eliminating duplicates and selecting the top-ranked drugs, we can get, Indigo Carmine(1241), Amaranth Dye(1240), Amaranth And Reagents(724), Melatonin(650), Pimotrin(541), Antimicrobials(348), Valium(343), Steroids(315), Diphenyl Pentyl Diamide(282), Cephalosporin(281).

2) Chinese herbal medicine clustering

Like all natural products, the rose is complex in composition and contains many chemical components such as polyphenols and flavonoids[15]. It has the functions of reducing and eliminating free radicals, antioxidant activities, anti-thrombosis, anti-cancer, anti-inflammatory, anti-bacterial and immunomodulatory effects, lowering blood fat and preventing physical activity such as heart disease[16-19]. Tea tree root has active site for preventing gout, anti-inflammatory and analgesic effects[20-21]. The top ten Chinese herbal medicines are listed in Table 6 below.

TABLE. 6 TOP10 CHINESE HERBAL MEDICINES RELATED TO GERIATRICS RESEARCH FROM 2008 TO 2017

No.	Chinese medicine name	Volume
1	Rose	75
2	Tobacco	54
3	Honey	36
4	Tea tree root	30
5	Coffee beans	11
6	Rice bud	11
7	Corn must	9
8	Oat	8
9	Pine nuts	8
10	Soy yellow roll	7

F. Interdisciplinary clustering

Cross-infiltration between disciplines is an inevitable choice to realize the development of the discipline itself and solve major problems. The development of interdisciplinary nursing will not only help to integrate the paradigms between different disciplines, integrate disciplinary resources, deal with the complexity of medical and health problems, and improve the social service ability of nursing, but also helpful to break down the barriers between different disciplines, enrich the connotation of disciplines, realize the sustainable development of nursing disciplines, and cultivate high-quality nursing personnel with high quality.

In the interdisciplinary field of geriatrics medicine, the distribution of subjects involved is shown in table 7 below.

TABLE. 7 INTERDISCIPLINARY NURSING

No.	Interdisciplinary nursing	Volume
1	Nursing	43803
2	Geriatric medicine	43805
3	Psychiatry and mental health	13498
4	Rehabilitation medicine	7394
5	Epidemiology and health statistics	6879
6	Emergency medicine	2510
7	Nutrition and food hygiene	2483
8	Clinical laboratory diagnostics	2385
9	Cardiovascular disease	2124
10	Osteosurgery	2118

IV. CONCLUSION AND SUGGESTION

The scientific literature is the carrier of the objective records of scientific research results, reflecting the level of scientific research. Through the analysis of the literature and the content of the subject, we can objectively understand the status of the development of the subject from the perspective of the literature. This paper analyzes the cluster analysis of geriatric nursing through PubMedplus, obtains the development status of geriatrics nursing, reveals the hot research points, so as to grasp the overall development trend of geriatrics at home and abroad.

In addition, through the cluster analysis of geriatric nursing, the following suggestions are proposed:

- Many research issues in the field of geriatric care require multi-disciplinary collaboration to make research results more influential and applicable. For example, in recent years, geriatric nursing researchers have cooperated with clinical medicine, sociology, psychology, political science and other professionals in topics such as hospice care, aged care ethics, health aging, aging in place and quality of life.
- In order to meet the more severe population aging situation, the international community should strengthen the international cooperation research on geriatric care, expand and deepen the field of aged care research, and use evidence-based evidence in practice to accelerate the development of geriatric nursing research.

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