

# Mapping the Intellectual Structure of Nursing Management

Cheng-Hua Wang, Yuan-Duen Lee, Hui-Lin Chou, and Jen-Hwa Kuo

**Abstract**—In this paper, scientometrics was adopted to analyze the citation data of multiple articles to identify the paradigm shift in nursing management. Nursing management is crucial in health care practice. By analyzing 120 656 citations of 5958 articles regarding security and privacy in the health care field, published from 2003 to 2012 and obtained from the Science Citation Index and Social Sciences Citation Index databases, the intellectual structure of nursing management in health studies was mapped to determine its development. After executing keyword analysis and tag cloud analysis, “nursing,” “management,” “care,” “health,” “quality,” “research,” and “education” were the emerging topics related to security and privacy in the health field. The findings of this study can provide valuable insights and implications regarding the nursing management of health. The mapping results can be used as a valuable tool for researchers to access the literature in this field.

**Index Terms**—Bibliometrics, nursing management, tag cloud.

## I. INTRODUCTION

The knowledge system of a discipline is also part of a more general knowledge system. It plays a basic role in the storage and propagation of knowledge in various disciplines, in formats such as journal articles, books, and monographs [1]. In the formal exchange of these three media (journal articles, books, and monographs), journal articles provide the most useful information because of the available timeline and evaluation of scholars.

In this study, bibliometrics and tag cloud analysis were used to determine the evolution of nursing management research from 2003 to 2012. An objective method, the invisible network of knowledge (INK), was used to investigate the applications of smart structures in the nursing management field.

An INK is defined as a set of interrelated invisible nodes. Each node serves a specific purpose for nursing management research, as in any other research field. By using quotation and cocitation analysis, this method can be used to explore the smart structures existing in any field, define its knowledge network, and depict the process of its knowledge diffusion.

The aim of this study was to provide nursing management researchers with a unique map to improve their understanding of nursing management-related publications and to provide a systematic and objective mapping of different themes and concepts in the development of the nursing management field. The linkages among publications were also identified and their statuses, positions, and contributions to the development

of the nursing management field were verified. The principal methods used were citation and tag cloud analysis.

Therefore, an INK was applied to attain these research goals:

- 1) To establish a comprehensive list of the essential and most influential scholars, journals, books, and articles in nursing management studies by objectively analyzing the citations.
- 2) To provide crucial insights regarding the current and future research paradigms by using an INK to analyze nursing management research, as well as the related research of scholars and practitioners in the management field.

## II. STUDIES OF ACADEMIC LITERATURE

Several techniques can be used to study a body of literature. The most frequently used method is the simple literature review, whereby a highly subjective approach is used to structure earlier works. Objective and quantitative techniques have recently become popular as available online databases increase. These techniques adopt author citations, cocitations, and systematic reviews [2] for examining the INK in the communication process identifiable in the written and published works of a given field. These techniques are attractive because they are objective and unobtrusive [3].

Several studies have used bibliometric techniques to study the management research literature [4]–[7]. Based on research, no similar study has been conducted on the current research of nursing management. Therefore, it is hoped that the findings of this study fill a gap in the nursing management literature by applying citation and tag cloud analysis to a representative sample of the recent research on nursing management archived by the Science Citation Index (SCI) and Social Sciences Citation Index (SSCI).

## III. METHODOLOGY

### A. Research Method

A search for journals related to “nursing” and “management” was conducted using the SCI and SSCI databases. Thus, the scope of this research was the entire databases of the SCI and SSCI from 2003 to 2012. The SCI and SSCI are widely used databases and include articles published in over 8000 leading scholarly journals worldwide. Arguments that other online databases might also be used for such analysis exist; however, using the SCI and SSCI provided the most comprehensive and most acceptable

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The authors are with the Chang Jung Christian University in Taiwan (e-mail: huager@mail.cjcu.edu.tw, ydlee@mail.cjcu.edu.tw, hhuillin@gmail.com, dynaopto@gmail.com).

sources of nursing management publications. To collect the data, a keyword was used for identifying the relevant articles in the SCI and SSCI databases. Using “nursing management” as a keyword, 5958 journal articles were collected, which further cited 120 656 publications as references. The cited references in these papers included both books and journal articles. Bibliometrics and tag clouds were applied in this study.

### B. Bibliometrics

The citation analysis method is mainly used to analyze the reference phenomenon or objects of journals, papers, and authors, and to explore the relationship between the sources of literature and citations. It can help researchers understand the current state of development of certain disciplines, the literature usage characteristics in the disciplines, the correlations among disciplines within the literature, and future trends of research through citation analysis.

### C. Tag Clouds

Using tag clouds is advantageous because they are visually creative and easy to use; tag clouds can be used to assess cluster focus and is beneficial for content promotion. It is a more efficient navigation tool than traditional text-based information retrieval systems. Tag clouds can also support unexpected discoveries while browsing, and can be used as a visual summary of the database content.

Using tag clouds implements a preliminary search, addresses the social network angle, uses popular wisdom, accumulates gradually, and can facilitate innovative theories and diagnoses, providing a new thought direction. The tag cloud is a common display method used for the search results in folksonomy-based websites, presenting varying tag sizes according to the frequency and the popularity of the keywords. In other words, the tag cloud is a type of sole glossary that presents words in different colors and sizes; for example, a circular shape that succinctly presents the subjects indexed as applied in the network, enabling the immediate identification of popular tags. Each tag is a directional common subject group link and simultaneously one type of survey tool.

## IV. RESULTS

### A. Citation Analysis

To identify the key publications and scholars that have established the foundation of nursing management research, the citation data were tabulated for each of the 5958 source documents and 120 656 references by using Microsoft Excel. The citation analysis produced background statistics, as shown in the following tables. Table I lists the most cited journals in nursing management over the last decade, among which the *Journal of the American Geriatrics Society*, *Journal of Advanced Nursing*, and *Jama-Journal of the American Medical Association* were the three most cited journals. The general pattern of the most cited journals shows that nursing management research features strategic, management-, and medical-specific journals.

The most cited and most influential papers by the most influential scholars were then identified using the total counts

of citations within the selected journal articles. As shown in Table II, the most cited digital divide publication between 2003 and 2007 (the first 5 years) was a paper by Folstein, “Mini-Mental State: A Practical Method for Grading Cognitive State of Patients for the Clinician,” followed by “Pain in Cognitively Impaired Nursing Home Patients” by Ferrel, and “Pain and Its Treatment in Outpatients with Metastatic Cancer” by Cleeland (Table II).

TABLE I: THE MOST FREQUENTLY CITED JOURNALS: 2003-2012

Journal	Total Citation
Journal of the American Geriatrics Society	1905
Journal of Advanced Nursing	1370
Jama-Journal of The American Medical Association	1181
Journal of the American Medical Directors Association	986
New England Journal of Medicine	959
British Medical Journal	914
Journal of Pain and Symptom Management	874
Cochrane Database of Systematic Reviews	555
Archives of Internal Medicine	520
Journal of Clinical Nursing	517
International Journal of Geriatric Psychiatry	467
Lancet	456
Gerontologist	441
Diabetes Care	406
Chest	389
Neurology	357
Journal of Nursing Administration	334
Journals of Gerontology Series A-Biological Sciences and Medical Sciences	334
American Journal of Geriatric Psychiatry	317
Critical Care Medicine	313

TABLE II: HIGHLY CITED DOCUMENTS: 2003-2007

Full Citation Index For Document	Total Citations
Folstein MF, 1975, Journal of Psychiatric Research, V12, P189	22
Ferrell BA, 1995, Journal of Pain and Symptom Management, V10, P591	16
Cleeland CS, 1994, New England Journal of Medicine, V330, P592	15
Bernabei R, 1998, Jama-Journal of The American Medical Association, V279, P1877	14
Ferrell BA, 1990, Journal of the American Geriatrics Society, V38, P409	14
Ferrell BA, 1995, Annals of Internal Medicine, V123, P681	14
Max MB, 1995, Jama-Journal of The American Medical Association, V274, P1874	12
AGS, 2002, Journal of the American Geriatrics Society, V50, pS205	10
McCaffery M, 1997, Journal of Pain and Symptom Management, V14, P175	10
Rich MW, 1995, New England Journal of Medicine, V333, P1190	10
Shamoon H, 1993, New England Journal of Medicine, V329, P977	10

For the second 5 years (2008–2012), the most cited digital divide publications were the same as those in the first 5 years. The third most cited were “Nurse Staffing and Patient Mortality, Nurse Burnout, and Job Dissatisfaction” by Aiken, “Mini-Mental State: A Practical Method for Grading Cognitive State of Patients for the Clinician” by Folstein, and “Postoperative Pain Experience: Results From a National Survey Suggest Postoperative Pain Continues to be Undermanaged” by Apfelbaum (Table III).

### B. Tag Cloud Analysis

In this study, the SCI and SSCI databases were used for analysis. The SCI and SSCI are widely used databases that include articles published in over 8000 leading scholarly journals worldwide. Arguments that other online databases

might also be used for such analysis exist; however, the SCI and SSCI are the most comprehensive and suitable databases of nursing management publications.

TABLE III: HIGHLY CITED DOCUMENTS: 2008-2012

Full Citation Index For Document	Total Citations
Aiken LH, 2002, Jama-Journal of The American Medical Association, V288, P1987	26
Folstein MF, 1975, Journal of Psychiatric Research, V12, P189	25
Apfelbaum JL, 2003, Anesthesia and Analgesia, V97, P534	24
Gordon DB, 2005, Archives of Internal Medicine, V165, P1574	23
Graneheim UH, 2004, Nurse Education Today, V24, P105	21
Bodenheimer T, 2002, Jama-Journal of The American Medical Association, V288, P2469	20
Hadjistavropoulos T, 2007, Clinical Journal of Pain, V23, pS1	20
Schafheutle EI, 2001, Journal of Advanced Nursing, V33, P728	20
Won A, 1999, Journal of the American Geriatrics Society, V47, P936	20
FERRELL BA, 1990, Journal of the American Geriatrics Society, V38, P409	19
Livingston G, 2005, American Journal of Psychiatry, V162, P1996	19



Fig. 1. Tag clouds in key word of nursing management (2003-2007).



Fig. 2. Tag clouds in key word of nursing management (2008-2012).

Unlike other prior studies, the data used in this study were not drawn from journals chosen by peer researchers [9]. Instead, the entire databases of SCI and SSCI from 2003 to 2012 served as the scope of analysis. To collect the data, a keyword search of the titles and abstracts of relevant articles was conducted. Using “nursing management” as the keyword, 5958 journal articles were collected and these articles further cited 120 656 publications as references. In stage 1, based on the results of the tag cloud analysis shown in Figs. 1 and 2, the tag clouds are clearly visually impactful because the dominant words are immediately identifiable, rendering what was tacit within the document implicit. In this study, the changes in the use of words over time were analyzed, the tag clouds of the individual documents were described, and the prominent messages were identified (Table IV). The largest tag

(indicating the most frequently used term) is “nursing” (165 →678), and the other large tags are the words “management” (130→467), “care” (94→294) and “pain” (86→239), which are also dominant. The rest of the noteworthy keywords are “education” (17→82), “self-management” (11→53), “community” (11→45), and “guidelines” (8→36).

TABLE IV: KEYWORD ANALYSIS OF COMPARISON CHART FROM 2003 TO 2012: SHOWING TOP 30 POSSIBLE WORDS

Key words	2003-2007	2008-2012	Difference
nursing	165	678	513
management	130	467	337
care	94	294	200
pain	86	239	153
health	30	158	128
patient	22	112	90
practice	19	95	76
education	17	82	65
chronic	16	74	58
medication	na	57	57
hospital	14	62	48
review	na	47	47
disease	22	66	44
quality	25	69	44
clinical	12	54	42
self-management	11	53	42
system	15	52	37
community	11	45	34
research	21	55	34
evaluation	na	34	34
cancer	10	42	32
long-term	11	41	30
intervention	11	40	29
home	46	74	28
guidelines	8	36	28
assessment	23	49	26
therapy	15	40	25
symptom	15	35	20
case	19	35	16
diabetes	20	36	16

## V. CONCLUSION

Extensive research on nursing management was conducted during the past decade. In this study, nursing management research was investigated using citation and cocitation data published in the SCI and SSCI between 2003 and 2012.

The mapping of the intellectual structure of nursing management studies indicated that the field now has its own literature and that it has developed into a legitimate academic field. The publication of nursing management-specific journals, such as the *The American Geriatrics Society*, *Journal of Advanced Nursing*, and *Jama-Journal of the American Medical Association*, indicates that nursing management has gained the status required for an independent research field. Because the nursing management field is still new and the analysis has shown that it has an evolving structure, it is believed that nursing management publication outlets will gain the popularity and prestige that is required to become a more prominent academic field when the current paradigms and key research themes in nursing management studies, how they interrelate, and what they represent have been identified. As the number of scholars and resources contributing to nursing management increases, the academic environment conducive to the cross-fertilization of research ideas will be formed and nursing management as a research field will gain more momentum for further development.

Although this paper provides essential insights into nursing management research, certain limitations are associated with the use of citation and cocitation analysis for identifying influential authors or group research topics. The citation dataset collected from the SCI and SSCI only provided information regarding the first author of each document (it is possible to obtain information concerning the other authors, but the cost of doing so renders citation analysis less attractive), implying that the citation analysis overestimated the influence of the first author in any given document; therefore, their coauthors, who might have been equally crucial and influential to the research, were thus undervalued by this method. Furthermore, the use of factor analysis to group authors into subfields only identified major research themes and neglected minor research or nursing leadership themes. To overcome these problems, further studies must be conducted; for example, by analyzing each document manually or using different databases for comparison.

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tourism management.

**Cheng-Hua Wang** is an associate professor at the doctoral program at the Chang Jung Christian University, Taiwan. He received his Ph.D. degree from the Department of Industrial Engineering and Engineering Management at National Tsing Hua University, Taiwan. His research interests include operations research, enterprise resource planning, and

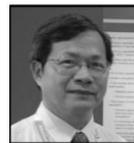


organizational behavior, and leadership.

**Yuen-Duan Lee** is a professor at the Graduate School of Business and Operations Management of Chang Jung Christian University, Taiwan. He received his Ph.D. degree from the education management and human resources Department at Drake University, United States. His research interests include international business topics, strategic human resource management, organizational behavior, and leadership.



**Hui-Lin Chou** is a doctoral student at the Graduate School of Business and Operations Management, Chang Jung Christian University, Taiwan. She received her master's degree from the Department of Public and Cultural Affairs at National Taitung University, Taiwan. Her research interests include human resource management, nursing management, and public policy.



management information systems, and accounting.

**Jen-Hwa Kuo** is a doctoral student at the Graduate School of Business and Operations Management, Chang Jung Christian University, Taiwan. He received his M.S. degree from the graduate institute of industrial economics at National Central University, Taiwan. His research interests include enterprise resource planning, management information systems, and accounting.