A Citation Analysis of the Philippine Journal of Nutrition, 2001-2011

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Abstract

Journals are effective tools in publicizing updated information, and reflect interactions of information on a certain field of knowledge. This study used citation analysis to identify the current knowledge trends found in the *Philippine Journal of Nutrition* during the period of 2001-2011. Citation analysis is a practical basis for an effective collection development of libraries. Seventy-eight articles were analyzed and extracted a total of 1,530 citations. Data was encoded into a statistical software and then analyzed through frequency counts and descriptive statistics.

The study revealed the following findings: the most cited bibliographic format in *PJN* was journal article with 52.5% of the total citations followed by book and book chapter with 16.9% ; the most cited journal title was *The American Journal of Clinical Nutrition* (67.3% of 804 journal articles) followed by *Philippine Journal of Nutrition* (29.4%). The highly cited title was the *Philippine nutrition: facts and figures* (10 citations). The predominant country of publication was the United States with (39.3%) followed by Philippines that was cited 363 times. The most cited author in *PJN* was the World Health Organization with 70 citations followed by Food and Research Institute with 65 citations; predominant publishers cited in *PJN* was American Society of Clinical Nutrition with 127 citation followed by WHO with 82 citation. The age of cited materials in *PJN* was 6 years and for individual year, 1998 was the citation peak. Food and Beverages received the highest subject frequency count in *PJN* (15.4%) followed by Technology, Industry and Agriculture (12.8%).

Keywords: collection management, indexing, bibliometrics, MeSH,, citation analysis

Introduction and Literature Review

Scholars from various fields utilize journals as tools publishing new discoveries and commentaries on current developments within their respective disciplines. Released as quarterly, bimonthly, or monthly publications, journals serve as a quick channel for communicating up-to-date reliable information.

Scientific knowledge is characterized by rapid and constant production of new information and modification of previous discoveries. Production of scientific information is being described as a continuous cycle that does not have exact endpoints (University of Cincinnati Libraries). The process starts with the identification of the topic of interest. Sources such as journal articles, news clipping and science documentary could be the basis of idea or topic for research. After distinguishing the topic, identifying what to investigate by formulating problem statement will follow.

Then conducting the research which includes library research which undergoes tasks such as finding out first what is already known topic, what is unknown before proceeding to the actual research activity. University of Cincinnati Libraries also emphasized the important stage of this cycle which is writing and dissemination of journal articles. It is said that "articles in scientific journals present new results from scientific research in an authoritative context and preserve the results of past research" (University of Cincinnati, 2013). The process continues as the results of research presented in journal articles, refined and summarized form of it can also be published in edited volumes (e.g. annual reviews) and textbooks. Lastly, this scientific information is compiled into scientific reference sources (e.g. encyclopedias and handbooks).

In the field of medical research, it can also be observed how fast information has been generated with the research process. Many breakthroughs in medicine have been developed through these researches (e.g. clinical trials, preclinical researches) in keeping with the main goal of medicine which is to increase longevity of human beings. Medicine is defined as "any activity that promotes, preserves and helps to restore the physical and mental integrity of the individual" (Lewinshohn, 1998, p. 1261). The field of medicine, just like other sciences, is faced with a challenge of supplying quality and up-to-date research. In light of this challenge, journals serve as communication vessel thereby contributing to the advancement of the field.

Almost all of the fields of knowledge have their own journal publication. In medicine, journals exist to provide doctors, students and other allied health practitioners, as well as the public with up-to-date information on medical technology and medical practices. The frequency of publication of the journals (quarterly, bimonthly, or monthly issues) makes them more effective in delivering current information. In terms of content effectiveness, the publication includes articles that inform its readers about the developments in medicine. Case reports performed by doctors and new developments on their professions and practices are published in journals. Moreover, it covers different topics ranging from general or basic health sciences to clinical health sciences which are more specialized.

For the current study, a journal (*Philippine Journal of Nutrition*) that specializes in the field of medicine which is nutrition, was chosen to be the focus of the research. There were several studies that used specialized journals as focus of their research. For instance, Ross (2007) wrote about the impact and value of *The Journal of Nutrition* (JN). She reported about the status of *JN*, its impact and value to nutritional scientists. The journal received a 3.689 impact factor rating for 2005, and half-life values that ranges from 2.8 to 9.9 years. Moreover, several studies of scientific literature using bibliometrics on different fields have been done. McMillan & Hamilton (2000) used bibliometrics to measure publishing and patenting patterns in a group of US pharmaceutical companies; Garousi and Varma (2012) did bibliometric assessment of Canadian institutions in the discipline of Electrical and Computer Engineering; and Evans (2010) on her *Gender and Citation in Two LIS E-Journals: A Bibliometric Analysis of LIBRES and Information Research*.

With the advent of new technology, accessing published journal articles has been much easier than before because of technology. Open access journals and online databases are just some of the tools that made this possible. Exchange of information between health professionals placed the industry on a stage which is continually improving and open for developments. This makes journals a good venue for medical researches and an effective instrument in disseminating information.

In the field of library science, information professionals deal with recorded knowledge in providing services for information seekers. This necessitates adequate knowledge on the information trends present on the field of library science. This also entails assessment of institution and other information providers like libraries to ensure that they are giving the right materials to their clientele. To do this, libraries have designed different methodologies to find out whether these goals are met. Examples are survey instruments aimed to measure user satisfaction and solicit feedback or suggestions; review of the usage of information materials such as journals, periodicals and books by conducting researches about them. "As part of the information highway that connects people to the world of knowledge" (Evans, 2005, p. 4) the challenges of how materials in their custody are to be used most efficiently to meet the users' information needs should be faced and cannot be neglected (Ash, 1974). Studying journals and citation analysis of the articles is one way of evaluating the collections of a library and assessing its weaknesses and strengths.

Citation Analysis

"Citation" or description of the source of an idea or concept started to develop after the Renaissance. The first use of footnotes similar to citations is traced back to the 16th century (White, 1985). "The main function of a citation is to establish a relationship between the citing and the cited documents. Citations can be used to evaluate the relevant sources, support the validity of an author's statements, and provide a more extensive reading list for the initiated researchers" (Smith, 1981, pp. 84–85; White, 1985, pp. 38–39).

According to Eugene Garfield (1979) who is known for his writings about citation indexes, the purpose of citation analysis is to provide a quantitative picture of journal utility and relationships that is useful in many ways. In the case of librarians this can be a tool for managing journal collections. For the specific community like

researchers, it may be a way of identifying useful journals when the interaction between specialties or disciplines pushes him or her beyond the borders of familiar territory as well as for the scientist studying the structure of the literature. Moreover, Reitz (2004) specifies that citation analysis is a bibliometric technique in which works cited in publications are examined to determine patterns of scholarly communication (e.g. the comparative importance of books versus journals, or of current versus retrospective sources, in one or more academic disciplines).

Therefore, citation analysis can be helpful in identifying core journals in the library collection, ranking journals based on citation count, such that those which receive the highest citation can be adjudged as highly used and ranked accordingly. Citation analysis will also help to analyze the local usage of subscribed journals in addition to identifying the journals that are not subscribed by the library. This type of study could easily justify or develop usage-focused journal collection acquisition policy (Kumar & Dora, 2011).

The Philippine Journal of Nutrition (*PJN*)

The Philippine Journal of Nutrition is an example of journal publication in the country that is established and has reliable publication history. It is for these reasons that the journal was chosen to be the material for this study. The journal is published quarterly by the Philippine Association of Nutrition, Inc. (PAN) and Food and Nutrition Research Institute (FNRI). The scientific articles published in *PJN* are peer-reviewed. The scope of the topics includes public health nutrition, clinical nutrition and nutrition epidemiology. The journal also discusses topics on the areas of food science and technology, applied and public health of nutrition, food management, food and nutrition policy and planning and other related areas.

The publication contains original papers, short communications, technical notes and preliminary research articles, policy and position, scientific meetings, conferences and the like, and similar technical materials of relevance to the health and nutrition condition in the Philippines. Moreover, book reviews and notices of relevant books and other publications, notices of scientific and technical meeting or summaries of such meetings, as well as news items of relevance to the members of the PAN and FNRI are also published on this journal (PAN, 2006).

As early as 1962, *Philippine Journal of Nutrition* (*PJN*) has been bridging people and information towards the achievement of suitable nutrition of Filipinos. The organization managing this journal is composed of nutrition advocates that are interested in the food and nutrition problems in the country and who support all efforts directed towards the attainment of proper nutrition of Filipinos and also its advancement. PAN was founded on 9 March 1947 by the country's leading experts who early on, had the vision of good nutrition for Filipinos. An average of 3-5 articles is included in every issue of *PJN*. (PAN, 2006).

Objectives of the Study

This study aims to conduct a citation analysis to understand the current information needs of the users as well as to acquire a clear view on the development of health and nutrition research in the Philippines. It also endeavors to identify the information

exchange among nutrition advocates. The researcher attempts to carry out these goals by analyzing the articles and citations published in the *Philippine Journal of Nutrition* during the time frame of 2001-2011. The following specific objectives are sought to achieve in this study:

1. To determine the current trends of knowledge exhibited in *PJN* articles;
2. To find out the highly cited authors or editors in *PJN* articles;
3. To determine the most cited titles of books/journals/articles in the *PJN*;
4. To find out the types of materials mostly used in the citations of *PJN*;
5. To identify the core journals used in the citations of *PJN*;
6. To identify the predominant country of publication for the cited materials found in the issue of the *PJN*;
7. To determine the predominant publisher of cited materials;
8. To know the item age of the materials; and
9. To ascertain the current subject trends of medical research based on the articles of *PJN*

Significance of the Study

The researcher intends to perform a citation analysis on the *PJN* for the reason that only few studies which involve bibliometric techniques applied on medical literature have been done. Most of the studies previously conducted utilized theses, dissertations, reports and other bibliographic formats for their bibliographic (e.g. Quimsing (1987), David (1997), Macawili (2001), Villanueva (2005) etc.). The researcher believes that the same technique can be applied to journals.

This study will benefit the research practitioners especially those in the field of medicine, nutrition advocates, professionals and experts on health and nutrition, students and the library that houses the materials. The findings of this study can be used by librarians and libraries to make a citation index that will serve as reference for the researchers in locating materials that are related to their studies. For the students and researchers, they will know the availability of the materials related to this field as well as gauge the informative value of the materials.

The results of the research will give a preview of the current subject trends found on the publication that may help the researchers to decide and assess what topic of research shall be done in the future and on what subjects to focus more. This may guide the writers and contributors in preparation of research activities. The data may also determine if there are subject headings on the articles that are not included on subject heading tool such as Medical Subject Heading or MeSH.

Moreover, the findings of the study will help the library that manages the collections by evaluating and updating their collection. For example, in the case of identifying the most cited journals/articles/books, the findings can be used in formulating collection development retention, deselection, relegation and disposal policies (Al & Tonta, 2004). In addition to this, Gao, Yu, and Luo (2009) explained how citation analysis can be a very important tool to investigate user information needs and determine the potential use of individual journal titles for a specific subject field. Through this analysis, journals that are always used on a specific field will be more prioritized and that will help in building a good collection of information materials.

Lastly, the data obtained from this study can be utilized for further research questions and topics for future research.

Scope and Limitations of the Study

The research will be limited to articles in *Philippine Journal of Nutrition* published from 2001-2011, Journal Volumes 48 to 58. Out of 58 volumes, the researcher chose to focus on a 10-year time frame for current assessment of subject trends discussed on the said journal. Volume 53 (2006), issue number 1-2 and Volume 50 (2003), issue number 3-4 were not included, as it only contains conference proceedings, specifically the program of the event and speeches of the speakers. Written works in the *PJN* that do not contain citation lists were excluded from the current research.

Methodology

The researcher prepared a form to capture elements of citations such as author or editor, date of publication, title, type of material, country of publication and publisher. The data where then encoded using the Statistical Package for the Social Sciences (SPSS) in preparation for an efficient tallying of the results and Microsoft Excel for formatting. Descriptive statistical runs were executed afterwards to satisfy the research objectives.

All of the citations in articles of the *Philippine Journal of Nutrition* volume numbers 48-58 published for a time frame of 2001 to 2011 were included in this study. Volume 53 (2006), issue number 1-2 and Volume 50 (2003), issue number 3-4 were not included for the reason that the materials only contain conference proceedings without citations specifically the program of the event and speeches of the speakers.

Elements of the cited materials such as *PJN* volume and issue numbers, title, author of the articles, author or editor name of the citing materials, title of the cited materials, country of publication, publisher and year of publication were taken as to be used in filling up the fields of the worksheet.

Electronic worksheets containing the mentioned elements were filled up by the researcher through computer program Statistical Package for the Social Sciences (SPSS) and Microsoft Excel. SPSS was used for data encoding and tallying the frequency counts of the data. For formatting of graphs and tables, Microsoft Excel was used.

Locating the materials for this study was the first step for data collection. The *Philippine Journal of Nutrition* journals are housed in three libraries of the University of the Philippines Diliman (Main Library serial sections, College of Education Library and College of Home Economics library). Recent publications were accessed in the library in College of Home Economics and Department of Health Central Library.

After locating the materials, each journal issue within the specified time frame was checked as well as the articles. The researcher prepared a list that was used for an orderly acquiring of materials. It enumerates the general information of the contents of the journals like the year of publication, volume numbers, issue number or the

months that it covers and number of articles that can be extracted. Articles that contain conference proceedings and articles without citations were excluded.

The data were collected manually by photocopying the journal cover, first page of the article that contains the title and author of the article; and the pages that holds the bibliographic citations. The information that was gathered from the materials was entered to an electronic worksheet for data entry.

The findings of the study of author or editor names, titles, countries of publication and languages of the data extracted were analyzed by frequency counts and presented in percentage distribution. The rank order and rank distributions was also used for data analysis. For the age distribution of materials, central tendency was utilized in evaluating it and by using arithmetic mean, mode, median and range as specific statistical measures.

Presentation, Analysis and Interpretation of Data

Seventy-eight (78) articles from the *Philippine Journal of Nutrition* (*PJN*) were used for the current study on citation analysis. A total of 1, 530 citations were extracted from journal volume numbers 48-58 of *PJN*.

Format of Material Cited

An overall item sample of 1, 530 citations were examined for this study. Table 1 shows the distribution of cited materials by bibliographic format, journal articles with 804 citations (52.5%) was identified to be the most cited material type followed by book and book chapters with 259 citations (16.9%) and scientific and technical reports with 103 citations (6.7%).

For comparison, local studies of theses and dissertations (Chievnavin, 1983; Villaflor, 1998; Macawili, 2001) expressed the similarity of results in terms of predominance of journal articles as citation sources. Similarly, earlier studies like Edwards (1999); Dulle et al. (2004); Chikate and Patel (2008) and Gao et al. (2009). This may explain how researchers on sciences specifically medicine rely on journals as the source of up-to-date information.

Table 1

Distribution of Citations by Bibliographic Format

Bibliographic Format	Frequency	Percentage
Journal article	804	52.5
Book and Book Chapter	259	16.9
Scientific and Technical Report	103	6.7
Web Site	80	5.2
Standards and Guidelines	42	2.7
Conference Proceedings	38	2.5
Review	34	2.2
Legislation	29	1.9
Bulletin	24	1.6
Conference Paper	20	1.3
Medical and Health Statistics	16	1
Newspaper Article	16	1
Manuscript	15	1
Thesis	15	1
Newsletter	11	0.7
Papers Presented at Meetings	8	0.5
Magazine Article	5	0.3
Annals	4	0.3
Electronic Supplementary Materials	3	0.2
Brochure	2	0.1
Chart	2	0.1
Total	1530	100

Frequency Distribution of Journals

The data revealed that there were 804 journal articles out of 1, 530 citations. *The American Journal of Clinical Nutrition* was the highly cited journal (128 citations or 67.3% of 804 journal articles) followed by *Philippine Journal of Nutrition* with 56 citations (29.4%) and *The Journal of Nutrition*, with 32 citations (16.8%).

Bradford's Law of Scattering determines the useful journals on this field by providing ranks and zones that give basis on the formulation of the core journals. On this study, the journals were arranged from most cited to least cited through frequency counts. Zone or groups were formed in such a way that the number of items or frequency counts of the citations are about the same. The first zone is treated as the nuclear zone or highly productive zone, second zone as moderately productive zone and lastly the third zone as low productive zone. Through this law, it identifies also how many titles of journals can be found on each zone. The Bradford Multiplier for this study is 6.2 and 6.26 was used to identify the number of journal titles in each zone. Using the formula prescribed by Bradford, the distribution or number of titles per zone was identified. Zone 1 has a total of 5 journal titles; zone 2 has 31 journals titles and lastly zone 3 with 194 journal titles or 5:31:194 ratio.

The core journals (zone 1 or highly productive zone) for the *PJN* based on *Bradford's Law of Scattering* are the following:

1. *The American Journal of Clinical Nutrition*
2. *Philippine Journal of Nutrition*
3. *The Journal of Nutrition*
4. *European Journal of Clinical Nutrition*
5. *Journal of Agricultural and Food Chemistry*

Zone 2 or moderately productive zone contains the following:

1. *Asia Pacific Journal of Clinical Nutrition*
2. *BMJ : British medical journal*
3. *Lancet*
4. *Planta Medica*
5. *Circulation*
6. *Diabetes*
7. *Journal of the American Dietetic Association*
8. *Physiology & Behavior*
9. *The British Journal of Nutrition*
10. *Diabetes care*
11. *Journal of the American Medical Association*
12. *American Journal of Epidemiology*
13. *Appetite*
14. *Philippine Journal of Science*
15. *American Journal of Public Health*
16. *International Journal of Epidemiology*
17. *Journal of the Nutritionist-Dietitians' Association of the Philippines*
18. *The New England Journal of Medicine*
19. *JAMA : the Journal of the American Medical Association*
20. *Obesity Research*
21. *Food Technology*
22. *International Journal for Vitamin and Nutrition Research*
23. *Journal of Clinical pathology*
24. *Journal of Nutritional Immunology*
25. *The Journal of Pediatrics*
26. *Archives of Internal Medicine*
27. *Diabetologia*
28. *Journal of Ehnopharmacology*
29. *Journal of Food Science*
30. *Journal of the American College of Cardiology*
31. *Journal of the American College of Nutrition*

Based on frequency count, Table 2 shows the order of most cited titles used in *Philippine Journal of Nutrition*.

Table 2
Top 20 Most Cited Journal Titles in the PJN

Journal Title	Frequency	Percent on No. of Journals
The American Journal of Clinical Nutrition	128	57.3
Philippine Journal of Nutrition	56	29.4
The Journal of Nutrition	32	16.8
European Journal of Clinical Nutrition	27	14.2
Journal of Agricultural and Food Chemistry	25	13.1
Asia Pacific Journal of Clinical Nutrition	23	12.1
BMJ : British medical journal	18	9.5
Lancet	16	8.4
Planta Medica	15	7.9
Circulation	13	6.8
Diabetes	12	6.3
Journal of the American Dietetic Association	12	6.3
Physiology & Behavior	11	5.8
The British Journal of Nutrition	11	5.8
Diabetes Care	10	5.3

Cited Titles by Frequency Distribution

The highly cited title for this study is the "Philippine nutrition: facts and figures" (10 citations) published by Food and Nutrition Research Institute and Department of Science and Technology. Its maiden issue came out in 2001 and is updated regularly in a certain number of years. It provides information about overall health quality of Filipinos by presenting statistics, facts and figures and trends. Followed by "7th national nutrition survey" (6 citations); "4th National Nutrition Survey, Philippines, 1993.Part D. Biochemical nutrition survey" and "Food composition tables" which were cited five times.

Geographic Distribution

Citations found in *PJN* provide country of publication that was used in analyzing the geographical distribution of materials. Table 3 shows the geographical distribution of 1, 530 citations.

Table 3
Cited Countries of Publication in the PJN

Country	Frequency	Percentage
United States	601	39.3
Philippines	363	23.7
England	232	15.2
Switzerland	115	7.5
No country	33	2.2
Canada	28	1.8
Japan	24	1.6
Taiwan	24	1.6
Netherlands	22	1.4
Italy	15	1
Germany	10	0.7
India	8	0.5
New Zealand	6	0.4
Ireland	6	0.4
Sweden	5	0.3
France	5	0.3
Denmark	4	0.3
Thailand	4	0.3
Singapore	3	0.2
China	3	0.2
Malaysia	3	0.2
Australia	3	0.2
Korea	2	0.1
Belgium	2	0.1
Hong Kong	1	0.1
Indonesia	1	0.1
Mexico	1	0.1
Poland	1	0.1
Vietnam	1	0.1
Scotland	1	0.1
Finland	1	0.1
Austria	1	0.1
Singapore	1	0.1
Total	1530	100

Of the 1, 530 citations in *PJN*, 601 titles (39.3%) were published in the United States followed by literatures published in the Philippines that was cited 363 times (23.7%). Third is England with 232 titles (15.2%).

Local studies conducted by Chievnavin, 1983; Villaflor, 1998; Macawili, 2001 and Meraña, 2007 share the same findings in terms of the predominant country which is

United States. Moreover, foreign research performed by Chikate and Patel, 2008 had the same findings of United States as predominant country. Through this, it can be identified that most of the researches published in *PJN* rely on sources from the United States. One reason is that this country has the capacity to produce a large amount of scientific information and new discoveries compared to other countries. It can also be assumed that research support in the field is a possible factor that contributes on this accumulation of information.

Frequency Distribution by Authors

The most cited author for this study is the World Health Organization with 70 citations followed by Food and Research Institute with 65 citations and Department of Science and Technology with 40 citations.
World Health Organization is the predominant author or corporate author cited on *PJN*. As described:

WHO is the directing and coordinating authority for health within the United Nations system. It is responsible for providing leadership on global health matters, shaping the health research agenda, setting norms and standards, articulating evidence-based policy options, providing technical support to countries and monitoring and assessing health trends (World Health Organization, 2012).

Consistent to the organization's purposes and goals, it has been producing useful literatures focusing on health. WHO has 194 member countries making the materials they produced more accessible to other people especially researchers. Unlike the studies conducted by David, 1985; Bugaay, 1997; Villaflor, 1998; Sibug, 1999 and Macawili, 2001 which resulted to a single person author, this study resulted to a corporate body or association as an author.

Frequency Distribution of Publishers

For the predominant publishers cited in *PJN*, American Society of Clinical Nutrition was the most cited with 127 citation (8.3%) followed by WHO with 82 citation (5.4%) and Food Nutrition Research (FNRI) with 60 citation (3.9%).
As the most cited publisher, American Society of Clinical Nutrition is:

A division of the American Society for Nutritional Sciences, the ASCN works to provide and implement educational and training programs for health professionals and students in the area of clinical nutrition. It provides support for current and ongoing research activities related to human nutrition. It also acts as an advocate for issues related to clinical nutrition and research, and promotes the professional use of nutrition science in disease prevention, health promotion, and patient care (American Society for Nutrition, 2012).

The first three highly cited publishers can be classified as to associations or organizations.

Age of Cited Materials

Cited item age was calculated by subtracting the cited item publication date from the citing article publication date. Based on the computation, the mean age of citations is 9 years, median age is 7 years and mode age is 6 years. This explains that the age of the cited materials which is frequently cited in the *PJN* is 6 years. Moreover, 1998 is the predominant year cited.
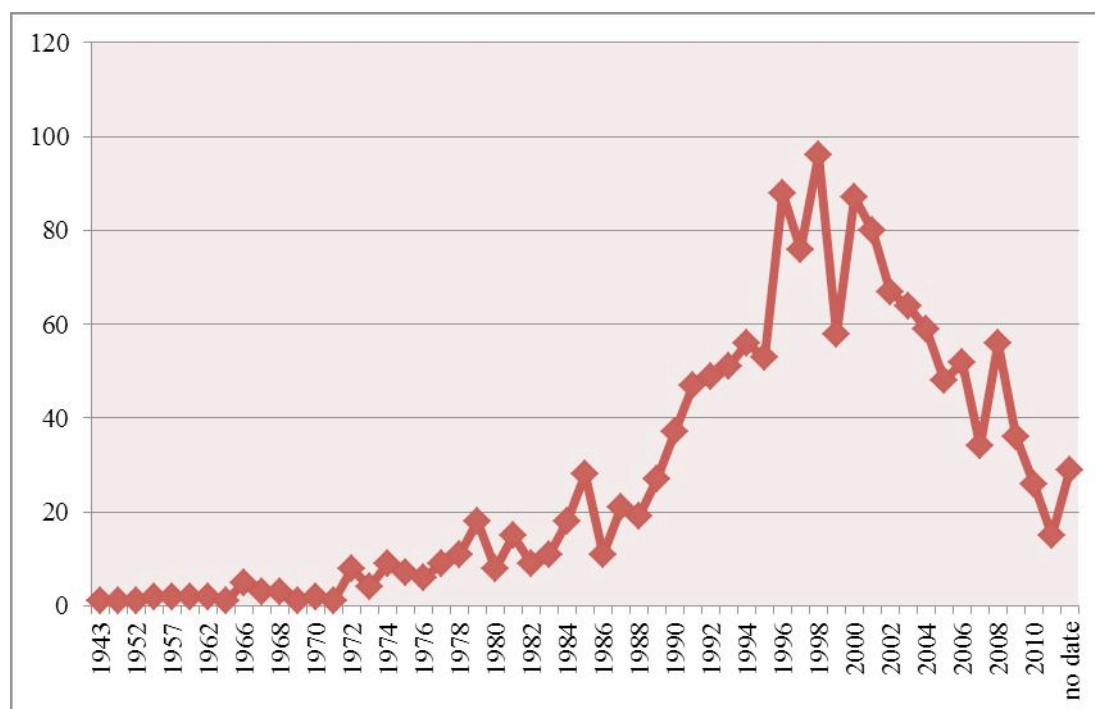

Figure 1: Distribution of citation by year

Subject Trends in the articles of *PJN*

This current study used Medical Subject Heading (MeSH) for assigning subjects of the articles found in *PJN*. Based on the result, Food and Beverages which pertains to edible or potable substances (MeSH scope note) received the highest frequency (12 counts or 15.4%). Specific subjects that under this category are: Vegetable; Soybeans; Food, fortified; and Milk, human was found out to be the focus of the articles. Followed by Technology, Industry and Agriculture (10 counts or 12.8%) topics on Food labeling; Food safety; Food services; Food handling; Agriculture and Gardening composed the discussion for the general subject of Technology, Industry and Agriculture. Third highest number of frequency in subject is Nutrition Surveys with 9 counts or 11.5% which is described on MeSH as a systematic collection of factual data pertaining to the nutritional status of a human population within a given geographic area.

Topics being discussed on articles of *PJN* ranges from general subjects such as health and wellness of the family to technical topics such as food processing and food technology. Table 4 shows the distribution of subject in *PJN* articles.

Table 4
Frequency Distribution of Subjects in PJN articles

Subject	Frequency	Percent
Food and Beverages	12	15.4
Technology, Industry and Agriculture	10	12.8
Nutrition Surveys	9	11.5
Nutrition Assessment	6	7.7
Malnutrition	5	6.4
Maternal Nutritional Physiological Phenomena	5	6.4
Nutrition Policy	5	6.4
Elder Nutritional Physiological Phenomena	4	5.1
Nutrition Disorders	3	3.8
Antioxidants	2	2.6
Nutritional Physiological Phenomena	2	2.6
Ascorbic Acid	1	1.3
Bone Diseases	1	1.3
Cardiovascular Diseases	1	1.3
Child Nutrition Sciences	1	1.3
Child Nutritional Physiological Phenomena	1	1.3
Eating	1	1.3
Ecological and Environmental Phenomena	1	1.3
Health Promotion	1	1.3
Infant Nutritional Physiological Phenomena	1	1.3
Infection	1	1.3
Nutrition Status	1	1.3
Nutritional Status	1	1.3
Nutritional Support	1	1.3
Nutritive Value	1	1.3
Preventive Medicine	1	1.3

Conclusion

Citation analysis as defined in previous chapters of this paper determines patterns of scholarly communication; it is a tool that helps in identifying core journals and other materials in the library collection for improvement of its services. Due to the great amount and often coinciding data found in the field, distinguishing exactly which information sources do nutrition and health practitioners' use and need is challenging. On this study, it was proven that citation analysis can be classify as a useful tool for

evaluating library collections, distinguishing important materials used by the users and a practical basis for collection development

Recommendations

1. Collection maintenance and continuation of journal subscription of at least the first 3 core journals: for The American Journal of Clinical Nutrition and *Philippine Journal of Nutrition* as well as updating their current collection of the European Journal of Clinical Nutrition
2. Citation analysis may be combined with other methodology such as interviews and content analysis; taking in consideration of the opinion of the users, combination with quantitative measures such as library statistics in order to develop a more thorough assessment and image of their research needs.
3. Researchers may consider the use of accessible online tools to enable quantitative citation analysis for example Web of Science mapping tool. (Nightingale and Marshall, 2011)
4. Investigation of other Philippine journals with different disciplines or specialization in medicine with the same bibliometric tool for further understanding of the local literature can also be consider.
5. Bibliographic citations of *PJN* should be improved in terms of appropriate and standard formatting.
6. *Philippine Journal of Nutrition* should continue to contribute knowledge about nutrition and health in the country through publishing up-to-date researches and reports on their journal.

References

All About PAN. (n.d.). *http://www.fnri.dost.gov.ph - FNRI Home*. Retrieved August 6, 2012, from http://fnri.dost.gov.ph/files/fnri%20files/pan/profile.htm

Ash, J. (1974). Library use of public health materials: description and analysis. *Bulletin of the Medical Library Association.*

Bradford, S. C. (1934). Sources of Information on Specific Subjects. Engineering. 137, 85-86.

In Hertzel, Dorothy H. (2003). Bibliometrics history. In Encyclopedia of Library and Information Science, 2 (pp. 288- 328). New York: Marcel Drekker

Broadus, R.N. (1977). *Application of citation analyses to library collection building.* In Advances in Librarianship. New York: Wiley.

Bush, I. R., Epstein, I., & Sainz, A. (1997). The use of social science sources in social work practice journals: An application of citation analysis. *Social Work Research*, 21(1), 45-57 Retrieved September 15, 2012, from the ProQuest Central database.

Ching, J. & Chennupati, K R. (2002). Collection evaluation through citation analysis techniques: A case study of the ministry of education, Singapore. *Library Review*, 51. 8/9: 398-405. Retrieved September 15, 2012, from the ProQuest Central database.

D'Auria, Jennifer P. (2006). *Bibliometrics*. New York: Springer Publishing Company. Retrieved September 15, 2012, from the ProQuest Central database.

David, L. T. (1985). *Philippine libraries and librarianship : an analysis of citations.* Unpublished M.L.S. special problem, University of the Philippines Diliman, Institute of Library Science.

Evans, E.G. (2005). *Developing library and information center collections.* Westport, Conn.: Libraries Unlimited.

Gao, S., Yu, W., & Luo, F. (2009). Citation analysis of PhD thesis at Wuhan University, China. *Library Collections, Acquisitions, and Technical Services*, *33*(1), 8-16. Retrieved July 7, 2012, from the ScienceDirect database.

Garfield, E. (1979). *Citation indexing - its theory and application in science, technology, and humanities*. New York: Wiley.

Garfield, E. (1979). Current comments: Most-Cited Articles of the 1960s. 1. Physical Sciences. *Essays of an information scientist*, 4(21), 155-166. Retrieved July 7, 2012, from http://www.garfield.library.upenn.edu/essays/v4p156y1979-80.pdf.

Garfield, E. (1979). Current comments: Why are the impacts of the leading medical journals so similar and yet so different? Item-by-item audits reveal a diversity of editorial material. *Essays of an information scientist*, 10(2), p. 10. Retrieved July 7, 2012, from http://www.garfield.library.upenn.edu/essays/v10p007y1987.pdf

Garfield, E. (1984). Citation data as science indicators. In Essays of an information scientist. Philadelphia: ISI Press.

Garousi, V., & Varma, T. (2012). A Bibliometrics Analysis of Canadian Electrical and Computer Engineering Institutions (1996-2006) Based on IEEE Journal Publications. *Computer and Information Science*, *5*(4), 1-24. Retrieved September 15, 2012, from the ProQuest Central database.

Gore et al. (2009). Trends in health sciences library and information science research: an analysis of research publication s in the *Bulletin of Medical Library Association* and *Journal of the Medical Library Association* from 1991 to 2007. *Journal of Medical Library Association.* Retrieved September 15, 2012, from the ProQuest Central database.

HjØrland, B. & Nicolaisen, J. (2005). Bradford's law of scattering: Ambiguities in the concept of "subject". *In Proceedings of the 5th International Conference on Conceptions of Library and Information Science*, 96-106.

Kumar, H. A., & Dora, M. (2011). Citation analysis of doctoral dissertations at IIMA: A review of the local use of journals. *Library Collections, Acquisitions, & Technical Services*, *35*, 32-39. Retrieved July 7, 2012, from the ScienceDirect database.

Lawani, SM. (1981). Bibliometrics- its theoretical foundations, methods and applications. *Libri*, 31(4): 294-315

Lewinsohn, R. (1998). Medical theories, science, and the practice of medicine. *Soc. Sci. Med.*, *46*(10), 1261-1270. Retrieved July 7, 2012, from the ScienceDirect database.

Macawili, A. G. (2001). *A citation analysis of theses and dissertations at the University of the Philippines College of Nursing.* Unpublished M.L.S. special problem, University of the Philippines Diliman, Institute of Library Science.

McMillan, G & Hamilton, R, III. (2000). Using bibliometrics to measure firm knowledge: An analysis of the US pharmaceutical industry. *Technology Analysis & Strategic Management*; 12 (4): 465-475. Retrieved September 15, 2012, from the ProQuest Central database.

Patrias K. (2007). Citing Medicine: The NLM Style Guide for Authors, Editors, and Publishers [Internet]. 2nd edition. Bethesda (MD): National Library of Medicine (US); 2007-.

Penpimol Vamanont Chievnavin, (1983). *A citation analysis of the ACTA MEDICA PHILIPPINA, 1977-1981*. Unpublished M.L.S. University of the Philippines Diliman, Institute of Library Science.

Philippine Journal of Nutrition. (n.d.). *Philippine Association of Nutrition*. Retrieved July 7, 2012, from pan.fnri.dost.gov.ph/index.php?option=com_content&task=view&id=27&Itemid=54

Pritchard, A. (1969). Statistical bibliography or bibliometrics?. *Journal of Documentation*, *25*(4), 348-349.

Prytherch, R. J. (2005). *Harrod's librarians' glossary and reference book a directory of over 10,200 terms, organizations, projects and acronyms in the areas of information management, library science, publishing and archive management (10th ed*.). Aldershot, Hants, England: Ashgate.

Quimsing, L. B. (1987*). Utilization of SLS-provided literature in the PCARRD research proposals and terminal reports : a citation analysis with implications to PCARRD scientific literature*. Unpublished M.L.S. special problem, University of the Philippines Diliman, Institute of Library Science.

Reece-Evans, L. (2010). Gender and Citation in Two LIS E-Journals: A Bibliometric Analysis of LIBRES and Information Research. *LIBRES: Library and Information Science Research Electronic Journal,* 20. 1: 1-18. Retrieved September 15, 2012, from the ProQuest Central database.

Reitz, J. M. (2004). *Dictionary for library and information science*. Westport, Conn.: Libraries Unlimited.

Riahinia, N. (2010). A citation analysis study of MA dissertations in the library and information science field in universities in Tehran. *Library Review*, 59. (1): 56-64. Retrieved September 15, 2012, from the ProQuest Central database.

Ross, C. A. (2007). The Journal of Nutrition in 2007-impact and value. *The Journal of Nutrition*, 137, 2. Retrieved December 2, 2012, from the ProQuest Central database.

Schneider, J. & Borlund, P. (2004). Introduction to bibliometrics for construction and maintenance of thesauri: Methodical consideration. *Journal of Documentation*, 60, (5), 524-549. Retrieved September 15, 2012, from the ProQuest Central database.

Smith, L. C. (1981). Citation analysis. *Library Trends*, 30, 83–106.

Smyth, J. (2011). Tracking trends: students' information use in the social sciences and humanities, 1995-2008. *Libraries and the Academy*. Retrieved November 30, 2012, from the ProQuest Central database.

The Importance of Medical Journals | Medical education. (n.d.). *Medical Education, Medical School, Medical Research, Medical Journals*. Retrieved August 5, 2012, from http://www.unn-edu.net/importance-of-medical-journals.htm

Tonta, Y., & Al, U. (2006). Scatter and obsolescence of journals cited in theses and dissertations of librarianship. *Library & Information Science Research*, *28*(2), 281-296. Retrieved July 7, 2012, from the ScienceDirect database.

U.S. National Library of Medicine. (2012). *Medical Subject Headings*. Retrieved February 11, 2013, from http://www.nlm.nih.gov/mesh/

University of Cincinnati. (2013). The Cycle of Scientific Literature. Retrieved February 8, 2013, from http://www.libraries.uc.edu/libraries/cas/cycle3.html

Villanueva, M. V. (2005). *An analysis of citation and research trends of Bachelor of Library and Information Science (BLIS) theses 1996-2004.* Unpublished B.L.I.S. theses, University of the Philippines Diliman, Institute of Library and Information Science.

Vinagrera, E.R. (2009). *A citation analysis of the Philippine Sociological Review, 1953-2007.* Unpublished B.L.I.S. University of the Philippines Diliman, School of Library and Information Studies.

White, E. C. (1985, Winter). Bibliometrics: From curiosity to convention. *Special Libraries*, 76, 35–42.

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