



## Four Facets to Know a Cancer Care-related Journal: An Example of Eur. J. Cancer Care (Engl.)

Wan-Ting Hsieh<sup>1,2</sup>, Tsair-Wei Chien<sup>3</sup> and Willy Chou<sup>4\*</sup>

<sup>1</sup>Department of Family Medicine, Chi Mei Medical Center, Tainan, Taiwan.

<sup>2</sup>Department of Palliative Medicine, Chi Mei Medical Center, Tainan, Taiwan.

<sup>3</sup>Department of Medical Research, Chi Mei Medical Center, Tainan, Taiwan.

<sup>4</sup>Department of Physical Medicine and Rehabilitation, Chiali Chi Mei Hospital, Tainan, Taiwan.

### **Authors' contributions**

*This work was carried out in collaboration among all authors. Author TWC developed the study concept and design. Authors TWC and WTH analyzed and interpreted the data. Author WC monitored the process of this study and help respond to the reviewers' advice and comments. Author TWC drafted the manuscript and all authors provided critical revisions for important intellectual content. The study was supervised by author WC. All authors read and approved the final manuscript.*

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### **ABSTRACT**

**Objective:** This study aimed to investigate the journal features by collecting some data from Pubmed Central (PMC) and to interpret the characteristics of the journal for Eur J Cancer Care (Engl) (EJCC).

**Methods:** Selecting 1611 abstracts and their corresponding author names and keywords on September 3, 2017, from PMC, we analyzed data mentioned above to address following features: (1) Nation distribution and author collaborations; (2) Journal features represented by article keywords; (3) The most productive authors and their authorship clusters; (4) The top 10 journals most similar to EJCC. Microsoft Excel VBA routines were programmed to extract data from PMC. Rasch model and SNA Pajek software were used to present visualized displays for EJCC features.

\*Corresponding author: Email: [smile@mail.chimei.org.tw](mailto:smile@mail.chimei.org.tw);

**Results:** We found (1) the majority of the articles are from UK (28%) Australia (10%) and Sweden (5%); (2) The most linked Keywords are cancer and breast cancer; (3) The most productive author is R Sanson-Fisher; (4) The top one journal with the most similarity to EJCC is Support Care Cancer.

**Conclusion:** Social network analysis that provides wide and deep insight into the relationships among nations, coauthor collaborations, abstract keywords and journals most similar to EJCC was performed in this study. The results can be provided to strategy and decision making for the target journal in the future.

*Keywords: Abstract keywords; authorship collaboration; Rasch analysis; social network analysis; medline.*

## ABBREVIATIONS

*EJCC: Eur. J. Cancer Care (Engl); CTT: Classic Test Theory; S.E.: Standard Error; SCI: Science Citation Index; SNA: Social Network Analysis; VBA: Visual Basic for Applications.*

## 1. INTRODUCTION

Comorbid is defined as existing simultaneously with and usually independently of another medical condition. As for cancer care patients, psychological distress problems are generally comorbid and can complicate the process of the treatment of patients bearing breast cancer [1]. Chronic pain problems are also common in nature and often co-occur with other anxiety problems [2]. In many situations, it is very hard to observe the association of two or more symptoms at one moment.

We often hear the apocryphal story that told us the co-occurrence of beer and diaper sales were strongly correlated [3-5] in the market. As such, all possible pairs of the observed phenomena can be studied with the help of computer techniques. However, we have not seen any that help us select the most possible pairs of co-occurred entities that are associated with others.

### 1.1 Social Network Analysis (SNA)

Social network analysis (SNA) [6-8] has been applied to analyze authorship collaborations. The co-authorship among researchers forms a typical type of social network, known as co-author network [7]. It is interesting in using SNA to explore the most paired relations for a journal through what it has been observed from the data, such as abstract keywords, collaborations, and other journals similar to the target journal.

Authors are also required to provide three or more keywords representing the main content of the article [9-12]. Keywords or short phrases described in an abstract can assist indexers in finding the article. However, none inspected

whether the keywords are substantially associated with the abstract and what keywords can represent the researched journal most in academics.

### 1.2 Author Collaborations and International Relations

Several manuscripts have been archived at the US National Library of Medicine National Institutes of Health (Pubmed.com). It has been also observed that some computer scientists having high hope on the machine-learning algorithms or other data mining techniques to quantify research information [13,14] for use in academics. Extracting the data from PMC may be possible for applying those data for understanding the features and characteristics of the specific journal we concern. As such, we are interested in inspecting what is the distribution of author nationality and what are the top 10 journals similar to the specific journal.

For the reason and fact that using internet information increase the yield of knowledge from the data generated [15-17]. How to display new knowledge for a target journal is required for further study.

### 1.3 Aims of the Study

It was aimed to investigate journal features by using data from PMC and visualizing the journal characteristics for Eur J Cancer Care (Engl) (EJCC) as followings: (i) nation distribution and coauthor collaborations; (ii) journal features represented by keywords; (iii) the most productive authors and their authorship clusters; (iv) the top 10 journals most similar to EJCC.

## 2. MATERIALS AND METHODS

### 2.1 Data Sources

We programmed Microsoft Excel visual basic for applications (VBA) modules for extracting abstracts and their corresponding author names. Keywords were also used in the study and extracted September 3, 2017, from PMC. Only those abstracts published by Eur J Cancer Care (Engl) (EJCC) and labelled with Journal Article were included. Others like those Published Erratum, Editorial or without author name(s) were excluded from this study. A total of 1611 abstracts were retrieved since 2005.

### 2.2 Data Arrangement to Fit the SNA Requirement

Before visualizing research findings using SNA, we should organize data that should follow the guidelines of Pajek software [18]. Microsoft Excel VBA was applied to deal with data fitting the SNA requirement.

### 2.3 Graphical Representations to Report

#### 2.3.1 Author origins and their relations

A contingency table was prepared for denoting the distribution of author origins. Their corresponding collaborations were separated apart using the clustered nodes(e.g., nations). The bigger bubble stands for the number of authors (including their coauthors) in papers. The wider line indicates the stronger relations between the two nodes. Community clusters algorithm was applied to determine the number of clusters.

#### 2.3.2 Keywords to present the journal research domain

If keywords represent the research domain of EJCC, the stronger relations between two keywords will be highlighted using SNA, like the concept of co-occurrence about beer and diaper sales [19]. The presentations of the bubbles and lines are interpreted similarly to the previous section.

#### 2.3.3 The most productive authors and their authorships

Coauthor collaborations in EJCC can be drawn using SNA and interpreted by their bubbles and connected lines. Through which, we selected the most productive authors who published the most number of papers in EJCC. With this, only those

with many contributions to EJCC are illustrated for focusing and narrowing the prestigious ones in the diagram [19].

### 2.3.4 Journals similar to EJCC

Each paper in PMC can be linked to those similar articles by the algorithm of Pubmed MeSH(Medical Subject Headings) terms. Through which, all those 1611 EJCC papers can be identified with similar journals by using their papers including EJCC himself. A total of 2577 journals were retrieved and 46,386 counts were recorded over the years since 2000. Rasch model of continuous items [20,21,22] was applied to analyze the data(i.e., 2577 journal rows and 13-year columns).

Rasch analysis overcomes the inherent weakness of conventional analytical techniques of classical test theory (CTT), such as factor analysis, requiring linear, interval scale data input [23]. Raw data collected through Likert-type scales are always ordinal since their categories indicate its ordering without any proportional levels of meaning [24,25,22]. Therefore, it is highly possible misleading conclusions if applying CTT to raw scores which are ordinal data (ie., the response from 1 to 5 ordered category for instance) in nature. We thus applied the Rasch model of continuous items [23] to compare the journals with the feature of the most similar to EJCC.

### 2.4 Statistical Tools and Data Analyses

Rasch model of continuous items [21] and SNA Pajek software [18] was used to display visual representations for results. Author-made Excel VBA modules were applied to organize data.

## 3. RESULTS

### 3.1 Author Nations and Their Relations

A total of top 20 extracted from the 1611 study articles since 2000 are shown in Table 1. We can see that the top 3 nations are the UK (28%) Australia (10%), and Sweden (5%). The diagram shown in Fig. 1 presents author collaboration among nations. The strongest authorship collaboration was from USA, UK, and Australia. Australia in the blue cluster has the most connections and collaborations with other countries. Some isolated nodes without any international collaboration are not shown in this diagram. The bigger bubble stands for the number of papers and coauthors in the past 13 years.

**Table 1. Papers in Eur. J. Cancer Care (Engl.) summarized by nation and year**

<b>Nation</b>	<b>&lt;--2005</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>Total</b>
UK	201	18	19	22	19	30	20	18	24	14	26	14	31	456
Australia	16	4	4	4	3	5	11	11	11	17	7	25	39	157
Sweden	24	3	6	8	6	5	5	5	1	2	1	5	6	77
USA	20	4	4	1	6	3	5	4	5	7	6	3	8	76
Germany	6	2	5	2	3	8	4	8	3	9	4	9	8	71
Italy	8	1	3	2	5	9	3	5	1	3	1	9	15	65
Canada	5	5	3			4	2	3	5	4	2	9	5	47
China	0			1	2	4	2	1	2	3	4	6	19	44
Greece	6	1	9	6	5	8	2		1		1		4	43
Netherlands	1	4		2	2	3	3	1	2	1	3	7	10	39
Turkey	2		4	5	4	2	1	2	2	2	1	7	5	37
Taiwan	1		3	3	2	2	2	3	2	2	2	4	9	35
France	3	1			2	2	5	5	2	1	2	6	3	32
Spain	2		1		3	5	2	1	4	1	3	7	3	32
Belgium	7	1			1		1	1	1	2	4	4	4	26
Ireland	4			2	1	2	3	1		1	3	6		23
Japan	5	2	1	2		1		2	5	1	2		2	23
Denmark	2	1					2	5	3	3	1	3	1	21
Brazil	4			3	1	2	1	1				3	2	17
Finland	9	1		1					1	1		1	2	16
<b>Total</b>	<b>326</b>	<b>48</b>	<b>62</b>	<b>64</b>	<b>65</b>	<b>95</b>	<b>74</b>	<b>77</b>	<b>75</b>	<b>74</b>	<b>73</b>	<b>128</b>	<b>176</b>	<b>1337</b>

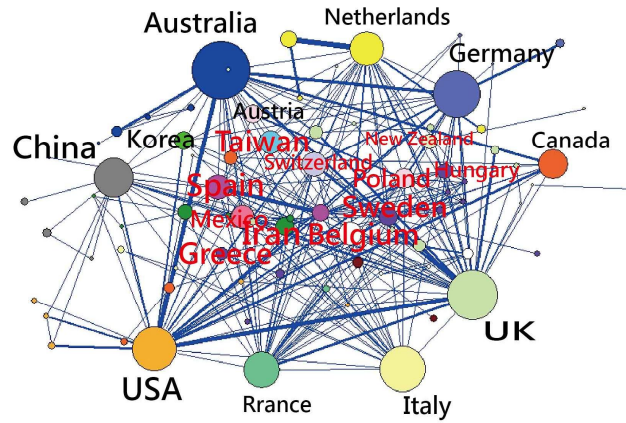


Fig. 1. Author collaboration among nations (areas) for Eur. J. Cancer Care (Engl.)

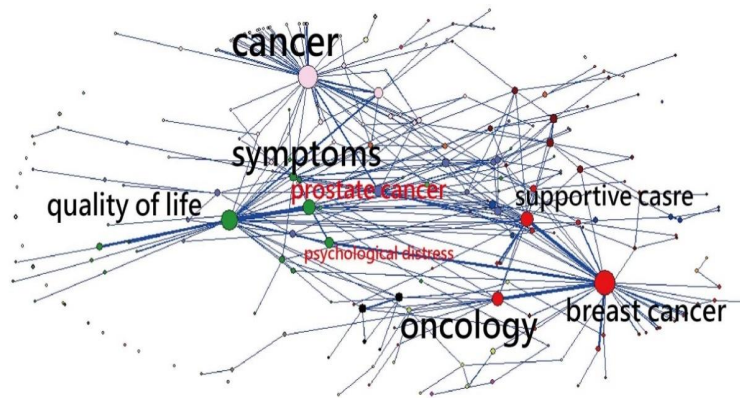


Fig. 2. The most two occurrences in keyword are Cancer and breast cancer

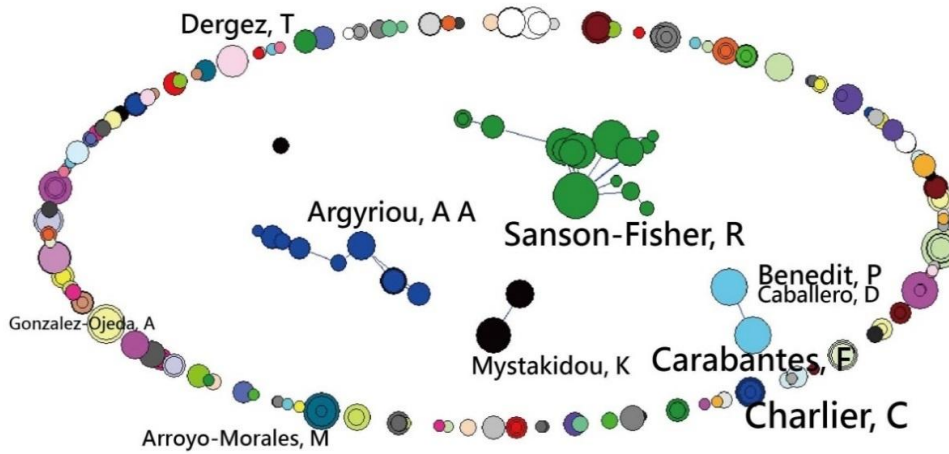
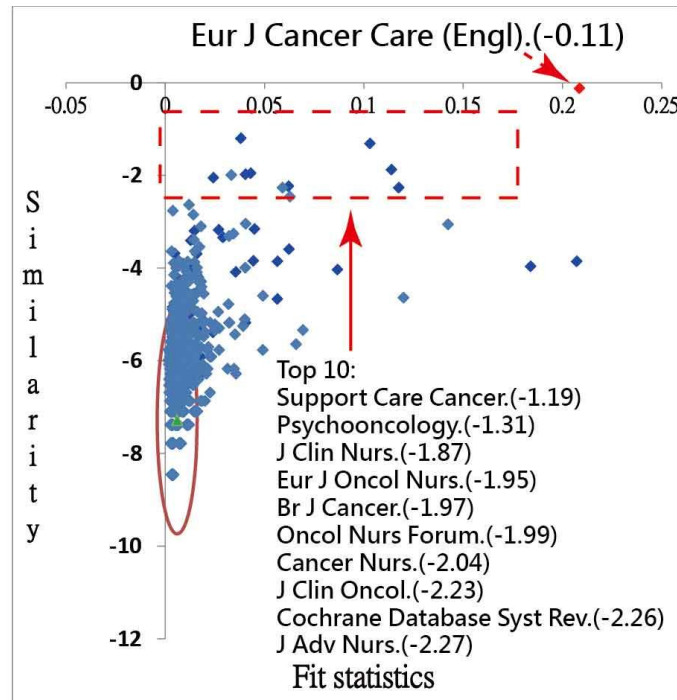


Fig. 3. The most linked cluster for authors is related to R Sanson-Fisher



**Fig. 4. The most similar journals to Eur. J. Cancer Care (Engl.) are those Support Care Cancer et al.**

### 3.2 Keywords to Present the Journal Research Domain

The top seven keywords (weighted connection counts in parentheses) are listed as Cancer, breast cancer, quality of life, prostate cancer, supportive care, oncology, and symptoms. We can see that the two bigger bubbles with a wider connection line in the green cluster are quality of life and prostate cancer in Fig. 2, indicating these two are commonly co-occurred and discussed in EJCC papers.

### 3.3 The Most Productive Authors and Their Authorships

The top 10 productive authors (including coauthors in papers) are listed below: Sanson-Fisher, R; Chambers, S K; Carey, M; Gonzalez-Ojeda, A; Aranda, S; Arroyo-Morales, M; Benedit, P; Caballero, D; Cantos, B; Carabantes, F. Eight big clusters labelled with names are represented in Fig. 3.

### 3.4 Journals Similar to EJCC

The top ten journals with the most similarity to EJCC are listed in Fig. 4, such as Support Care

Cancer, Psychooncology, J Clin Nurs, Eur J Oncol Nurs., Br J Cancer, Oncol Nurs Forum, Cancer Nurs., J Clin Oncol.,Cochrane Database Syst Rev., and J Adv Nurs. We can see the similarity distance for other journals from EJCC in Vertical Axis.

## 4. DISCUSSION

This study used SNA techniques to present that (1) the most number of papers are UK(28%) Australia(10%) and Sweden(5%); (2) The most linked Keywords are cancer and breast cancer; (3) the most productive author is R Sanson-Fisher; (4) The top-ranked journals most similar to EJCC are those Support Care Cancer., Psychooncology, J Clin Nurs. et al.

### 4.1 What This Adds to what was Known

Several studies [6-8] have investigated the author collaboration using SNA. An apocryphal story told that discovering the co-occurrence is like beer and diaper sales [3-5]. Any demonstrating a concrete way for showing how to conduct this exploration (or, say, how to dance on data) and how to present informative messages to the readership. We show the way of

how easy is that the SNA can display all possible pairs of our observed phenomena at a short time using the Pajek software.

Again, Rasch analysis can transform ordinal category scores into interval logit scores and overcome the inherent weakness of classical test theory that requires linear, interval scale data input [21,23-25]. We applied the Rasch model of continuous items [21] to compare the journals most similar to EJCC shown in Fig. 4.

Journal authorship collaboration can be compared with each other, see Fig. 3. We can see that five or more author-patterns were the prevailing pattern which is similar to the previous study [6]. Hence the EJCC researchers have a good collaboration in the subject category of psychiatry which is consistent with the previous studies investigating scientific collaboration of Iranian Psychology and Psychiatry Researchers [7,26].

There are 1611 papers with the keyword terms in title abstract when searching Pubmed database in 2017 September 1. Two papers[27,28] incorporated MeSH into social network analysis to explore journal knowledge of interest but failed to demonstrate it using MP4 video as we did in this study. The way we illustrated the strongest relation in all possible interest-type format is novel and promising in the future, particularly in the field of bibliometrics and medicine researches.

#### **4.2 What It Implies and What should be Changed?**

Scientific publication is one of the objective measurements to evaluate the achievements of a medical discipline [29]. Many journals are indexed in the Thomson Reuters Science Citation Index (SCI). Since the advent of bibliometrics, citation analysis has been widely used in many disciplines for evaluating the influence of academic articles [21,28,30-36]. It is worth using SNA to report journal features.

Several algorithms have been developed and used with SNA to explore data. If we investigate whether any author or paper most fits the research domain of a journal and its scope within the journal's keyword network, the centrality measures in SNA can be applied [6]. It means that the core subject can be analyzed using the centrality measure [7,8] yielded by SNA.

#### **4.3 Strengths of This Study**

We applied the Rasch model of continuous items [21] to analyze the dataset(i.e., 2577 journal rows and 13-year columns) and compare the similarity of journals to EJCC, which is never seen before in the literature.

Another strength and feature of this study is the MP4 video showing the manuscript for interested readers who can quickly understand the author's research approaches and processes used in this study. The nation distribution in Fig. 1 is merit in easily understanding the feature of international collaborations for the journal. Most authors of EJCC come from Europe, the USA and Australia (see Fig. 1). China is present having the trend of increasing paper publications in EJCC (see Table 1). One picture is worth ten thousand words. We hope the following studies can report more such kinds of information using SNA to readers in future.

#### **4.4 Limitations and Future Study**

The interpretation and generalization of the conclusions should be carried out with caution. First, the data were collected from PMC for a single journal. It is worth noting that any attempt to generalize the findings should be made in a similar journal domain with a similar topic and scope contexts.

Second, although the data were extracted from PMC and carefully dealt with every linkage as correct as possible, the original downloaded text file including some errors in symbols such as period and comma in author address that might lead to some biases in the results.

Third, there are many algorithms used for performing the SNA. We merely applied separation components showing in Figures. Any changes made with the algorithm will present different patterns. Fourth, the social network analysis is not subject to the Pajek software we used in this study, Others such as Ucinet [37] and Gephi [38] are suggested to readers for use in future.

#### **5. CONCLUSION**

Social network analysis that provides wide and deep insight into the relationships among nations, coauthor collaborations, abstract keywords and journals most similar to EJCC was

performed in this study. The results can be provided to strategy and decision making for the target journal in the future.

## CONSENT

Not available due to data extracted from publicly Medline.

## ETHICAL APPROVAL

Not applicable because all data were downloaded from Medline.

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## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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