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Bibliometric analysis: Slovenian Journal of Public Health vs. European Journal of Public Health

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Abstract: Science would not exist without the publication of research results. Publishing the results of scientific research is the basic characteristic of the process of scientific information and communication. The impact of a local scientific journal, which does not lag behind an international journal in terms of quality, in an international area, is possible only if it is concurrently published in English. Comparison of the results of bibliometric analysis of the Slovenian Journal of Public Health (SJPH) and the European Journal of Public Health (EJPH) for the period 2003-2011, has led as to the conclusion that the SJPH is not behind EJPH. Therefore, Slovenian scientists could also publish the results of their research projects as scientific papers in local scientific journals.

Keywords: bibliometrics, public health, periodicals, international scientific journal, local scientific journal

1. Introduction

Bibliometrics is the exploration of the quantitative aspects of the production and the dissemination of written (scientific) information usage. Bibliometrics measures publications, patents, citations and other potential informative units or their properties, and uses them as the base for factors with which it measures and evaluates research, science and technology (Clarke et al., 2007; Costas et al., 2010; Južnič, 1998; Južnič, 1999; Takahashi-Omoe et al., 2009).

Bibliometrics provides a powerful set of tools and criteria for the study of structures and processes of scientific communication. Citation analysis, the most known bibliometric method, has not only consolidated its supremacy, but is also developing and using the possibilities offered by digital libraries and links in the world wide web, and is co-shaping webometrics (Mur and Južnič, 2006).

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Monitoring and dissemination of scientific achievements is an essential element of any research work. Impact is of crucial importance to scientific publications that in the process of scientific communication publish the results of research. Scientists contribute to this visibility with their publications. The result of the language barrier is the lesser visibility and impact of publications. Therefore, in scientific publishing, English has replaced other languages and has become the international language of scientific communication. The growing pressure of co-financiers on academic and research organisations in assessing their work leads to publication in high-profile international journals and often has the opposite effect on scientific communication in the local language.

The impact of a local scientific journal, which does not lag behind an international journal in terms of quality, in an international area, is possible only if it is concurrently published in English. This maintains professional terminology, enables greater international exposure for the contributors, including greater number of received citations, and according to the criteria of the Slovenian Research Agency (ARRS), higher quality publications. According to the results of analyses, we could expect greater financial support by the agency on local tenders for co-financing publishing of scientific journals, which would provide financial cover for translating articles into English. In Slovenia, it is important to ensure the highest quality of research. Since research work is linked to public funds, it commits researchers to present their results correctly (Demšar and Boh, 2006). The Rules of Indicators and Criteria for Measuring Scientific and Technical Efficiency used by the Co-operative online bibliographic system and services (COBISS) are used for monitoring research results in Slovenia. The system COBISS can monitor research achievements of each individual researcher, allowing us to evaluate their research results. Even though bibliometric indicators, including quoting, never constitute the sole criteria for evaluating the quality of research work, they do play an important part. Therefore it is essential to highlight all of its properties, especially in interdisciplinary areas.

The effort invested by an author in the preparation of a publication, is the same for a publication in an international or a local scientific journal. Regardless of where the research work is actually published, the authors more frequently choose to publish in prestigious international scientific journals. The reputation criterion for a scientific journal is the citation index. The difference is probably whether publication in a prestigious international journal is really a sign of the publication quality.

All countries, where the language of publication is not English, have the problem of visibility of their scientific contributions. This is also similar in Croatia, where an analysis was carried out that included 13 journals in the field of biomedicine published in the English language. Six journals were examined that are at the cutting edge of scientific publishing in Croatia. All six journals have been published for at least twenty years and all were published in English

prior to 1995. Scopus indexed all six journals even before they started publishing in English in their entirety. After the journals started publishing in English, international visibility (they analysed indices in Medline, Scopus and WoS) was noticeable only with two journals (Croatian Medical Journal and Neurologia Croatica), while only one of the analysed journals (Croatian Medical Journal) managed to increase citation with international visibility. The analysis results showed that changing the publication language brings positive changes, including, international visibility of the journal, an international editorial board, increased publication of foreign authors, all of which are the basis for visibility and the integration of local authors into the global circle of scientific communication. (Pulišelić and Petrak, 2006)

2. Bibliometric analysis of the SJPH and EJPH

Data from a review of the SJPH and EJPH publications were collected from the year 2003 to 2011 inclusive. Throughout the period analysed, the journal SJPH was published as a quarterly. In the analysed nine-year period, 36 regular issues of the SJPH were reviewed. The analysis included all original and review scientific papers; contributions published as editorials, letters to the editor, reports and necrologies were not included. 190 articles were reviewed in the analysed period. All articles included in the analysis had cited references. On average, 27.01 references were cited per article (Table 1).

During the period from 2003 to 2004, the journal EJPH was published four times a year; from 2005 onwards it was issued as a bimonthly, entirely published in English. In the analysed nine-year period, 50 regular issues or 826 articles were reviewed. All the 826 analysed articles from the EJPH cited references. With 25.727 references listed in the 826 articles, that is an average of 31.14 references per article (Table 1).

Since in Slovenia the Rules of Indicators and Criteria for Measuring Scientific and Technical Efficiency determine that a scientific paper must be at least four pages long, otherwise it is considered a short scientific contribution and is estimated only with 80% points, the analysis only included articles that were comprised of four or more pages.

3. Results of the bibliometric analysis of the SJPH and EJPH

In the period 2003-2011, a total of 531 authors published 190 articles in the journal SJPH. Table 1 shows the number of authors per year of publication and the number of authors per article in each year. Throughout the period analysed for the SJPH, the ratio ranged between 2.3 and 3.3. Compared with the SJPH analysis for the period 1992-2003 where the ratio ranged between 1.17 and 2.31 (Miholič, 2005), the ratio has increased, reflecting a trend also present in the world (Cronin et al., 2003; Cronin and Franks, 2006); namely, that the authorship of an article belongs to more than one author.

If we compare the results of the SJPH with the results of the EJPH, where the ratio varies between 3.89 and 4.78 (in the period 2001-2005, the ratio ranged between 3.4 and 4.55) (Miholič, 2007) and the findings of the Radiology and Oncology analysis (in the period 1992-2001, the ratio ranged between 2.51 and 3.93) (Musek et al., 2003), we can see that multiple authors are present in all journals, which shows that articles not only reflect teamwork on research projects, but also the collaboration of authors from various scientific disciplines. Multiple authors both increase the credibility of a research work and the possibility of co-financing research projects.

Table 1. The number of authors and citations in the analysed articles, 2003-2011

year	SJPH				
	no. of authors	no. of articles	r*	no. of citations	r**
2003	47	19	2.47	438	23.05
2004	56	24	2.33	452	18.83
2005	64	21	3.04	466	22.19
2006	46	20	2.3	566	28.3
2007	49	18	2.72	445	24.72
2008	65	20	3.25	658	32.9
2009	66	20	3.3	648	32.4
2010	61	22	2.77	651	29.59
2011	77	26	2.96	808	31.07
total	531	190	2.79	5132	27.01
year	EJPH				
	no. of authors	no. of articles	r*	no. of citations	r**
2003	230	59	3.89	1529	25.91
2004	360	79	4.55	2250	28.48
2005	448	103	4.34	2830	27.47
2006	411	93	4.41	2945	31.67
2007	415	90	4.61	3004	33.38

2008	453	97	4.67	3316	34.18
2009	435	91	4.78	2985	32.08
2010	458	99	4.63	3221	32.54
2011	567	115	4.93	3647	31.71
total	377	826	4.57	25727	31.14

Legend:

r* - ratio no. of authors / no. of articles

r** - ratio no. of citations / article

In nine years, articles in both Slovenian and English were published in the journal SJPH. Most of the articles in English were published by Slovenian authors.

Since EJPH is an international and multidisciplinary journal, the authorship of published articles belongs to a broader international circle of scientists. Over a period of nine years, authors from all continents, that is, from all over the world published in the journal.

It is interesting that the majority of the most represented are scientists who come from countries where English is not the native language, with the exception of the United Kingdom, of course. The fact is that scientists strive for greater visibility, not only at the national level but also at an international level, which is why they choose to write and publish articles in English, even though it is not their native language. Despite this fact, scientific journals have a long tradition of publication, and in some countries (e.g. Italy) insist on publishing a national journal in the field of public health, since it is more natural to read articles in their native language, which most people also prefer (McCarthy and Clarke, 2007; McCarthy and Paná, 2007).

Throughout the analysed nine-year period, a quarter of the articles at the journal SJPH were written by a single author, almost 29% of the articles had two authors, slightly less than a quarter of the articles were written by three authors, and almost a quarter of the articles had more than three authors. For the EJPH, the ratio was different. Two-thirds of the articles had more than three authors, 16% of the articles had three authors, 14% of the articles had two authors, and only 4% of the articles were written by a single author (Figure 1).

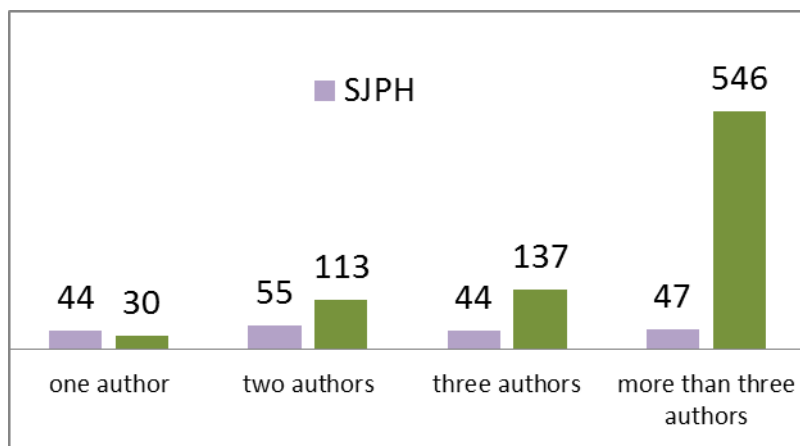


Figure 1. Number of authors at the SJPH and EJPH in the period 2003-2011.

Since Slovenia is a small country with a small body of scientists researching and publishing in a particular field, which is also apparent by the number of articles published in the SJPH, we could reasonably expect that the collaboration of scientists with their colleagues abroad would be more present (Clarke et al., 2007). But unfortunately, it is not. Despite the knowledge that both journals have no restrictions accepting articles and that everyone may publish in the Slovenian journal, including English-language articles removing the language barrier. The cause can also lie with the smaller interest from both local and foreign non-Slovenian authors, since the Slovenian journal does not yet have large recognition, and publishing in the journal does not bring international visibility, or perhaps the reason lies in the insufficient international cooperation of Slovenian scientists with those abroad in the field of social medicine and health care.

3.1. Citation analysis

The citation analysis included all citations and references that authors listed at the end of their articles in the chapter Literature.

In the citation analysis we determined the following article characteristics in the journal:

- language of cited publications,
- citation of various sources of information,
- citation age.

3.1.1. Analysis of cited publication languages

Authors who published in the SJPH during the years 2003-2011, predominantly referenced literature in English, the second place was taken by literature in Slovenian, followed by literature in German and other languages such as Serbo-Croatian, Italian, and Swedish. Similar results were seen in the period 1992-

2003, when authors predominantly used literature in English, followed by Slovenian-language literature (Miholič, 2005). The portion of English-language literature was lower (63%) in the period 1992-2003, while the portion of literature in Slovenian was higher (32%) than in the past nine years (Miholič, 2005). In the analysed period 2003-2011, 77% of the cited literature is in English, 22% in Slovenian, while the portion of other languages is very low (1%). The portion of cited literature in English in the journal EJPH was higher (94%), with almost six per cent in other languages, and less than one per cent in Slovenian.

3.1.2. Analysis of the citation of various sources of information

For the analysis of the citation of various sources of information, we separated the cited literature into articles, monographs, contributions from conferences, and other (grey literature, regulations, official journals, statistical publications and electronic publications). The analysis showed that during the analysed period, authors most frequently cited journal articles (64% at the SJPH, 76% at EJPH), followed by monographs (23% at the SJPH, 17% at EJPH), while the smallest portion of cited literature (13% at the SJPH, 7% at EJPH) was from congresses and literature listed under 'other'. Today, articles in scientific journals are one of the most important information sources in science. The advantage of articles over monographs is primarily their currency, since the publication of a specific monograph takes a lot longer than the publication of an article in a scientific journal.

3.1.3. Citation age analysis

Most of the analysed articles, from both journals and by individual years, contained citations and references aged 0-10 years. At the journal SJPH, in the period 2003-2011, on average a good third of the literature used in articles was in the 0-5 years age group (1,816 citations), with a similar portion present in the journal EJPH (8,817 citations). This was followed by a poor third of articles that had citations from the 6-10 years age group (1,625 citations), while the EJPH had a good third of citations from the 6-10 years age group (9,413 citations). Both journals, SJPH and EJPH had 17% of articles with literature from the 11-15 years age group (881 citations at the journal SJPH, 4,438 citations at EJPH). There were 9% of articles that had literature from the 16-20 years age group (480 citations); the same portion was seen with the journal EJPH with 2,094 citations. References older than 21 years were found in only 6% of the articles (330 citations) at the SJPH, and 4% of articles (1,055 citations) at the journal EJPH.

4. Conclusions

Apart from the financial support provided by the agency, the evaluation of Slovenian scientific journals is of vital importance. Professional bodies (scientific councils for individual areas) evaluate Slovenian scientific journals, and based on their quality place them on a list of journals not included in international bibliographic databases, while they are taken into account for the

categorisation of scientific publications. Based on the Rules of Indicators and Criteria for Measuring Scientific and Technical Efficiency Slovenian scientific journals and the publications in them are considered by scientific performance. Such evaluating and scoring in the researchers' bibliographies allows for the preservation of issues and the influx of higher quality scientific articles in Slovenian scientific journals that are published in Slovenian. Despite a journal not being internationally acclaimed, due to the scoring provided by the rules, the researchers should endeavour to publish in Slovenian, to inform colleagues of their research results in Slovenian, and not only strive for international exposure and recognition.

Comparison of the results of bibliometric analysis of the SJPH and the EJPH for the period 2003-2011, has led as to the conclusion that the SJPH is not behind EJPH. Therefore, Slovenian scientists could also publish the results of their research projects as scientific papers in local scientific journals. The difference in publication is that publishing in EJPH brings greater exposure and a greater number of received citations, which every author wants, yet scientists should have an interest in maintaining local scientific journals and informing the local professional public of their findings, and not just in scrambling for citations.

According to analyses, we can conclude that the impact of local journals in an international context is only possible if they are concurrently published in English. Therefore, greater international exposure can be assured for the authors' contributions, which increases the authors' interest in publishing in local journals. In the future, an initiative is expected of the Slovenian Research Agency, as a financier to numerous studies carried out by Slovenian scientists, to publish research in the form of articles, such as e.g. Open Access (OA).

Examples in this area are the two largest financiers of research in the field of medicine: the American National Institute of Health and the British Wellcome Trust, which require from scientists that a version of their research is available in OA. This approach reliably contributes to promoting public access to publications and the faster flow of information and knowledge to other scientists in electronic form. Finally, it also affects the transparency of fund usage for the researches.

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