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A longitudinal analysis of bibliometric and impact factor trends among the core international journals of nursing, 1977–2008

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ABSTRACT

Background: Although bibliometric analysis affords significant insight into the progression and distribution of information within a particular research field, detailed longitudinal studies of this type are rare within the field of nursing.
Objectives: This study aimed to investigate, from a bibliometric perspective, the progression and trends of core international nursing journals over the longest possible time period.
Methods: A detailed bibliometric analysis was undertaken among 7 core international nursing periodicals using custom historical data sourced from the Thomson Reuters *Journal Citation Reports*®.
Results: In the 32 years between 1977 and 2008, the number of citations received by these 7 journals increased over 700%. A sustained and statistically significant ($p < 0.001$) 3-fold increase was also observed in the average impact factor score during this period. Statistical analysis revealed that all periodicals experienced significant ($p < 0.001$) improvements in their impact factors over time, with gains ranging from approximately 2- to 78-fold.
Conclusions: Overall, this study provides one of the most comprehensive, longitudinal bibliometric analyses ever conducted in the field of nursing. Impressive and continual impact factor gains suggest that published nursing research is being increasingly seen, heard and cited in the international academic community.

What is already known about the topic?

- Although nursing researchers often cite outside the main nursing literature, there remains a set of core, internationally recognized periodicals in this field.
- The proliferation of journals has made it increasingly difficult for clinicians to keep up to date with the latest research findings to guide their practice.
- Bibliometric analysis is often used to analyze trends in scholarly communication, and is being increasingly employed to assess the relative impact of scholarly publications.

What this paper adds

- The number of citations received by the nursing journals examined in this study increased dramatically between 1977 and 2008.
- The impact factor score for all 7 journals, both individually and as a combined group, has also increased significantly at rates ranging from 2- to 78-fold.
- Statistical analysis of the 32-year dataset suggests that journal impact factors in nursing will continue to rise in future.

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- Nursing research is being increasingly seen, heard and cited in the international community.

1. Introduction

It has been suggested that scientific knowledge is communicated to members of a profession via its literature, and as such, journals represent an important method for the dissemination of research findings to nurses (Oermann et al., 2008). Nursing research has developed quickly in recent decades, with the number of scientific nursing periodicals now rapidly increasing (Hallberg, 2009), and journals fast becoming the primary source of information within this field. Bibliometric research and the analysis of nursing periodicals have also become more common as clinicians find it increasingly difficult to keep up to date with the latest research findings to guide their practice (Oermann et al., 2008). Bibliometrics itself evolved from an age-old conundrum of librarians regarding which journals were the most important in each discipline. That is, which journals they should purchase given the seemingly endless number of titles on offer, versus the realities of limited and often declining, budgets (Meadows, 2005), and which journals they should keep.

In the 1950s, a young information scientist named Eugene Garfield created the *Science Citation Index*® (SCI) as an up-to-date tool to facilitate the dissemination and retrieval of scientific literature (Garfield, 1955). Even with this system the sheer volume of data was still extensive; the project contained over 1 million citations by the early 1960s for example (Garfield and Sher, 1963). The concept of a journal's *impact factor* was subsequently devised by Garfield and Sher as a means of ranking journals by citation count, rather than by number of publications (Garfield, 2006). This assisted Garfield's company, the *Institute for Scientific Information* (ISI), in deciding which journal titles to include in the SCI, as well as accounting for journals that published a relatively small number of articles but which received a comparatively large number of citations (Garfield, 2007). A by-product of the SCI, the *Journal Citation Reports*® (JCR) had evolved from the ISI's ranked author list (Garfield, 2006), and was officially launched by the ISI in 1975 (Garfield, 1976).

Although impact factors were largely ignored for many years by most people aside from librarians, information scientists and the occasional journal editor (Brown, 2007), they now occupy a position of great interest and debate among contemporary journals editors, academics and researchers (Smith, 2006). Citations are being increasingly seen as the 'currency' of modern science (Joseph, 2003), with the more citations an author receives, the more important their work is assumed to be (Norris and Oppenheim, 2003). With the introduction of schemes such as the *Research Assessment Exercise* (RAE) in the United Kingdom and the more recent *Exercise in Research Assessment* (ERA) in Australia, the importance of author citations and bibliometric performance has become even more relevant for contemporary academics. This has, in turn, led to increasing interest in bibliometric and other citation-based research in virtually all disciplines. One of the first bibliometric investigations of nursing periodicals was conducted by Garfield himself in the early 1980s using all 'core' nursing journals that were, at the time, included in the ISI's databases. Since then, various studies have investigated the content and performance of nursing periodicals from a variety of perspectives.

In 1999, for example, a task force was first established to help 'map' the literature in nursing, as part of a larger project to help characterize the literature of allied health fields using a common bibliometric methodology (Schloman, 1999). Nursing literature has also been investigated by region, including in the United Kingdom (Traynor et al., 2001), the United States (Allen and Levy, 2006), Australia (Borbasi et al., 2002; Wilkes et al., 2002), Spain (Pardo et al., 2001) and Taiwan (Huang et al., 2006). In 2009, Crookes and colleagues developed a ranking tool for refereed journals in which nursing and midwifery researchers publish their work (Crookes et al., 2009). Via consultation with experts in the field, the authors developed a novel technique called the *Journal Evaluation Tool* (JET) which sorted 52 periodicals into four quality bands. A few years earlier than this, the Allen (*Cumulative Index to Nursing and Allied Health Literature* – CINAHL) Rating System had been developed for nursing journals, one which judged periodicals on content, reputation and frequency of citations (Plohman et al., 2008). Other scholars have used the JCR more broadly as a selection technique when investigating journals. Dougherty et al. (2004) for example, looked at international content in 'high ranking nursing journals' by consulting all 42 nursing journals that were listed in the 2000 Social Sciences Citation Index (SSCI). Angordans et al. (2009) appear to have gone one step further, by proposing that nursing journals adopt their own model for publication, irrespective of the medical model. Regardless of what nursing journals and academic models a researcher ultimately chooses to analyze the literature, it is clear that bibliometric analysis of this nature provides interesting and relevant information on the progression of academic publishing over time.

Despite this fact, however, no author has ever investigated the bibliometric performance of core nursing journals over a long period of time. While some recent investigations have examined single (Dougherty et al., 2004) and multiple years (Mantzoukas, 2009; Oermann et al., 2008), again, none has focused on longitudinal bibliometric analyses.

2. Aim

The current study aimed to investigate, from a bibliometric perspective, the longitudinal progression and trends of core international nursing journals for the longest possible period of time.

3. Method

3.1. Journal selection

The age and completeness of data used in the current study were dependent on how long each individual journal had been included in the JCR. Titles selected for inclusion

were based on the list of 'core' nursing journals originally proposed by Garfield (1984) as follows: the *American Journal of Nursing* (AJN), the *International Journal of Nursing Studies* (IJNS), the *Journal of Advanced Nursing* (JAN), the *Journal of Nurse-Midwifery* (later to become the *Journal of Midwifery & Women's Health*) (JNM/JMWH), the *Journal of Nursing Administration* (JNA), *Nursing Research* (NR) and *Research in Nursing & Health* (RNH). Garfield originally selected these titles as they were, at the time, the only nursing periodicals listed in the ISI's databases. The ISI's databases were also, at the time, the only databases containing this type of citation-based data. Information on how journals are selected for inclusion in the ISI/Thomson Reuters databases has been described in detail elsewhere (Testa, 2006). All journals in the current study were originally included in the (SSCI), with the AJN and NR also being listed in the SCI of 1983. Examination of these 7 periodicals in the current study afforded a longitudinal analysis of bibliometric and impact factor trends over the longest possible time period, that being the 32 years from 1977 to 2008.

3.2. Data sources

As Garfield originally explained, early citation-based data for nursing journals was listed predominately in the SSCI, with some overlap in the SCI. For these reasons, detailed historical data for the current study was sourced from the Thomson Reuters JCR via a custom order in 2009. The comprehensiveness of the dataset depended on how long each individual journal has been listed in these databases. As a result, JCR data for the AJN, IJNS and NR was available from 1977 onwards, data for RNH was available from 1979, data for JAN was available from 1980, data for the JNM/JMWH was available from 1983, while data for JNA was available from 1984. The cutoff point for each journal in the current study was 2008, that being the year of the most recently available data. The 7 periodicals investigated and the time periods analyzed for each title in the current study are detailed in Table 1.

3.3. Items investigated

Five bibliometric items were investigated in the current study: *citations received*, *citable items*, *immediacy indices*, *cited half lives* and journal *impact factors*, similar to previous studies conducted in other fields (Lee et al., 2005; Sims and McGhee, 2003; Smith, 2008). Exact definitions for each of these items can be found on the Thomson Reuters Website (2009). *Citations received* is the number of times that articles published in a given journal are cited in the reference lists of any ISI/Thomson Reuters listed journal in a given year (Smith, 2008). *Citable items* are the 'meaty' or 'substantial' articles published by a particular journal in a given year, and those that are used for the denominator upon which its yearly impact factor score is based (Garfield, 1986). The *immediacy index* of a journal is a measure of how quickly its articles are being cited and one that is calculated by dividing the number of articles published per year by the number of times they are cited in that same year (Zwahlen et al., 2004). The term *cited half life* is a measure of obsolescence (Nicholas et al., 2005) and refers to the number of years, going back from the current year, that account for half of all citations in the current year (2009) (Anon., 2001), or more briefly, the number of retrospective years required to find half the cited references in a particular journal (Garfield, 2007).

A journal's *impact factor* is calculated by considering all citations in 1 year to a journal's content published in the previous 2 years, and dividing this figure by the number of substantial, or citable, items published by the same journal in the same 2-year time period (Garfield, 2006). More detailed information on how the denominator is ascertained has been described elsewhere (McVeigh and Mann, 2009).

Table 1
Nursing periodicals and citation time periods analyzed.

Core International Nursing Journals[a]	Analysis period[b]
American Journal of Nursing	1977–2008
International Journal of Nursing Studies	1977–2008
Journal of Advanced Nursing	1980–2008
Journal of Nurse-Midwifery/Journal of Midwifery & Women's Health[c]	1983–2008
Journal of Nursing Administration	1984–2008
Nursing Research	1977–2008
Research in Nursing & Health	1979–2008

[a] Core nursing journal list as originally proposed by Garfield (1984).
[b] As investigated during the current study (raw data extracted from the Thomson Reuters *Journal Citation Reports*®, 1977–2008 via a custom order).
[c] Name change in January 2000 (Shah, 2005).

3.4. Data analysis

To help elucidate trends in the number of citations received, citable items, the immediacy index and journal impact factors, the average of all 7 journals was plotted with respect to year. The assessment of trends in cited half lives was less straightforward as scores in excess of 10 years are listed in the JCR as '>10.0' rather than the actual number of years (Smith, 2010). For these reasons, the scores for all 7 journals were combined into 4-year blocks and the proportions established in five categories (0–2.4 years, 2.5–4.9 years, 5.0–7.4 years, 7.5–9.9 years and ≥10 years). A bar graph was then plotted to display the proportion of cited half lives by category. A detailed analysis of impact factor trends was undertaken by individual journal and also as an overall group. Calculations were similar to those used in previous studies, including the *Index of Annual Change* (IAC) and related probability (p) values (Lopez-Abente and Munoz-Tinoco, 2005), the average impact factor score and standard deviation (SD) of impact factor fluctuations (Fan and McGhee, 2008; Ogden and Bartley, 2008; Smith, 2009a; Sombatsompop et al., 2004), 95% confidence intervals (95%CI) of the average impact factor score and percentage (%) change in impact factors over time (Chew et al., 2007; Smith, 2008).

4. Results

Fig. 1 displays the trend of average citations received and citable items between 1977 and 2008 among the 7

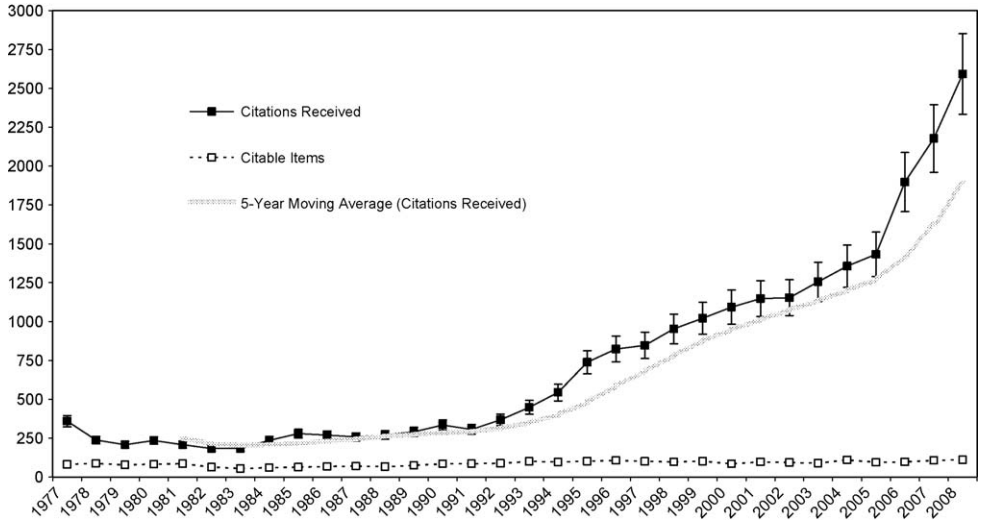

Fig. 1. Average citations received and citable items among the core international journals of nursing, 1977–2008. (Data sourced from the Thomson Reuters Journal Citation Reports®, 1977–2008).

nursing journals analyzed in this study. In 1977 an average of approximately 360 citations were being received per year, a figure which had risen dramatically to around 2600 per year in 2008, a statistically significant ($p < 0.001$) increase of approximately 722%. This also meant that each journal was receiving, on average, an increase of approximately 65 extra citations per year. On the other hand, however, as Fig. 1 indicates, the average number of citable items published each year was relatively consistent and changed only slightly, from approximately 80 items per year in 1977 to around 110 items per year in 2008.

Fig. 2 displays longitudinal trends in the average immediacy index per year, a 32-year time period during which a slight overall trend can be seen. In 1977 the average immediacy index was approximately 0.17, a figure that had risen to approximately 0.26 in 2008. In other words, by 2008 around one-quarter of all articles published in the core nursing journals were being cited in the same year as publication. Fig. 3 displays the changing proportion of cited half lives in 4-year blocks between 1977 and 2008. No journals recorded a cited half life below 2.4 years. Overall, around 45% of cited half lives were between 5 and 7.4 years and around one-fifth 2.5– 4.9 years. The former average half life (5.0–7.4 years) appeared to be the most common time-frame, representing half of all values in 1977–1980 and over 60% by 1997–2000. Due to

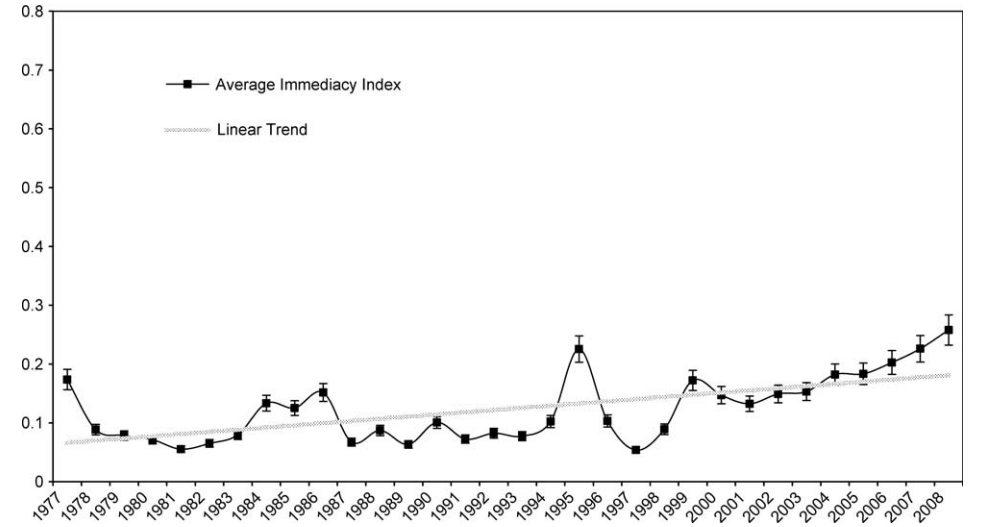

Fig. 2. Longitudinal trends in the average immediacy index among the core international journals of nursing, 1977–2008. (Data sourced from the Thomson Reuters Journal Citation Reports®, 1977–2008).

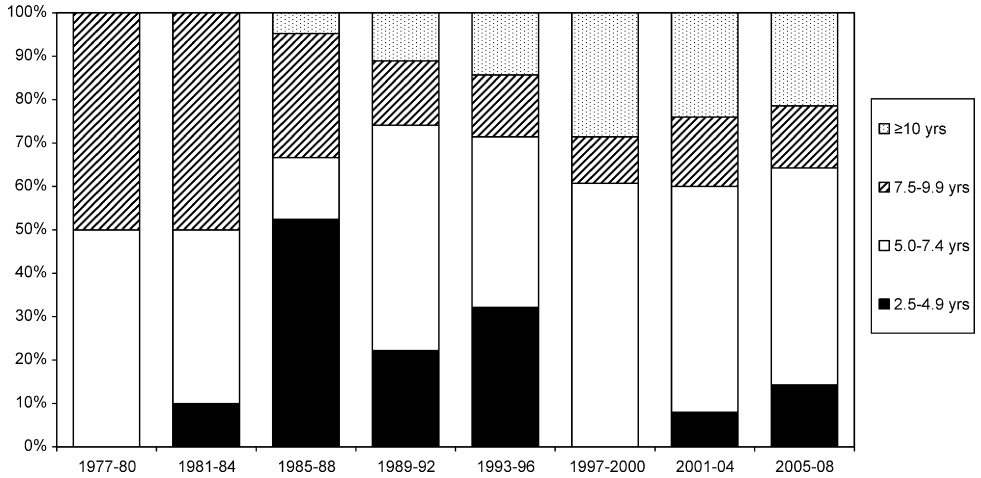

Fig. 3. Proportional cited half lives among the core international journals of nursing, 1977–2008. (Data sourced from the Thomson Reuters Journal Citation Reports®, 1977–2008).

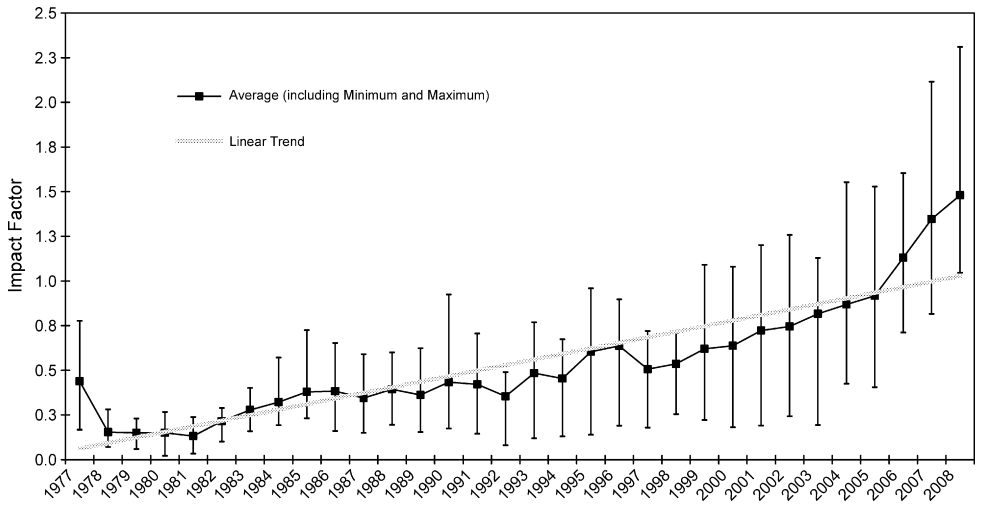

Fig. 4. Longitudinal trends in the average impact factor score among the core international journals of nursing, 1977–2008. (Data sourced from the Thomson Reuters Journal Citation Reports®, 1977–2008).

Table 2
Longitudinal statistical analysis of impact factor scores among the core international journals of nursing, 1977–2008.

Journal name[a]	IAC[b]	*p* value[b]	average[c]	SD[c]	95%CI[d]	% change[e]
American Journal of Nursing	0.015	<0.001	0.269	0.240	0.183–0.356	626%
International Journal of Nursing Studies	0.040	<0.001	0.500	0.507	0.317–0.683	619%
Journal of Advanced Nursing	0.045	<0.001	0.594	0.407	0.439–0.748	7876%
Journal of Nurse-Midwifery/Journal of Midwifery & Women's Health [f]	0.025	<0.001	0.564	0.232	0.472–0.656	390%
Journal of Nursing Administration	0.031	<0.001	0.591	0.286	0.474–0.709	670%
Nursing Research	0.041	<0.001	0.824	0.435	0.667–0.981	198%
Research in Nursing & Health	0.037	<0.001	0.719	0.334	0.589–0.848	2470%
Overall	0.033	<0.001	0.577	0.399	0.522–0.632	337%

[a] Journals investigated in this study as originally proposed by Garfield (1984).
[b] Index of Annual Change (IAC) and related probability (*p*) values (Lopez-Abente and Munoz-Tinoco, 2005).
[c] Average impact factor score and standard deviation (SD) of impact factor fluctuations (Fan and McGhee, 2008; Ogden and Bartley, 2008; Smith, 2009a,b,c; Sombatsompop et al., 2004).
[d] 95% confidence interval (95%CI) of the average impact factor score.
[e] Percentage (%) change in impact factors (Chew et al., 2007; Smith, 2008).
[f] The Journal of Nurse-Midwifery changed its name to the Journal of Midwifery & Women's Health in 2000 (Shah, 2005) (all calculations performed using custom data from the Thomson Reuters *Journal Citation Reports*®, 1977–2008).

the aforementioned limitations, detailed trend analysis of this particular variable was not possible.

Longitudinal trends in the average journal impact factor are displayed in Fig. 4, with the results of detailed statistical analysis displayed in Table 2. A sustained and statistically significant ($p < 0.001$) overall increase in the average impact factor was observed between 1977 (when the average value was approximately 0.4), to 2008 when it had increased over 3-fold (to approximately 1.5). In 1977 impact factor scores ranged from approximately 0.2 to 0.8, a figure that had increased to approximately 1.1–2.3. Statistical analysis suggests that all 7 nursing journals experienced statistically significant (all $p < 0.001$) increases in their impact factors over time, ranging from 198% to 7876%. The grand mean was approximately 0.6, with the overall average impact factor score increasing approximately 0.03 per year.

5. Discussion

This study provides a very comprehensive, longitudinal bibliometric analysis of important journals in the field of nursing. The first major finding was that the number of citations received by nursing journals has been steadily increasing over the past 32 years. There are a few probable reasons for this. Firstly, there is probably a growing awareness of nursing literature, most likely due to the increasing focus on publication and citation that is occurring within virtually all research fields. Scientific knowledge is communicated to members of a profession via its literature, and as such, journals represent an important method for the dissemination of research findings to nurses (Oermann et al., 2008). Secondly, the visibility of nursing research for the general public has also increased, and this may have important repercussions in scholarly research as the promotion of certain topics in the mass media has been known to influence citations (Chew et al., 2007). Thirdly, within the world of academic research, citations are now being seen as the 'currency' of modern science (Joseph, 2003), leading to a danger of authors simply citing as many articles as possible – regardless of whether they are relevant or not. The number of citations available depends on the field of study, however (Smith and Rivett, 2009), and this means that the absolute number of citations received in nursing will tend to be lower than in some other fields, such as general medicine, for example. Nevertheless, the statistically significant increase in citations revealed in the current study suggests that nursing research is becoming increasingly recognized by international scholars.

Longitudinal analysis of the average immediacy index revealed a slight overall upward trend over time, although the rise was rather moderate given the 32-year period under study. This finding was not unexpected, however, as some other bibliometric investigations have also found inconclusive results when examining the immediacy index of journals over time (Smith, 2008). Examination of cited half lives in the current study suggests that the age of the majority of articles cited to nursing journals may be slightly increasing, with almost half being between 5 and 7.4 years old. Indeed, no journal ever recorded a cited half life below 2.4 years, despite 32 years of data being analyzed. This suggests that relatively older articles are being more often cited by others – a phenomenon that may occur for a variety of reasons. Firstly, it could be due to an increasing awareness of some 'classic' articles in the nursing literature. Garfield's original study of nursing journals in 1984 for example, Garfield (1984) reported that nursing's first citation classic was a 14-year-old review paper published by Mary-Vesta Marston (later Marston-Scott) (Marston-Scott, 1970). Her article had received almost 200 citations by the mid-1980s, leading Marston-Scott to appear (by invitation) twice in the ISI's *Current Contents* series (Marston-Scott, 1984, 1985). Secondly, with an increasing number of nursing journals entering the bibliometric databases in recent years, there is an increasing amount of research material that now exists in the field of nursing. This makes nursing research more visible in a general sense. Thirdly, it could be a combination of the two. Either way, and similar to some other studies, a clear analysis of trends in cited half lives remains difficult due to the fact that any values over 10 years are not recorded as discrete numbers, instead being denoted as the category ">10" in the Thomson Reuters database (Smith, 2010).

In contrast to immediacy indices and cited half lives, longitudinal analysis of journal impact factors did reveal some clear and positive trends in the field of nursing. Firstly, and perhaps most importantly of all, was clear evidence of a sustained and statistically significant overall increase in the average impact factor between 1977 and 2008. Parallel with this more than 3-fold increase in the average impact factor score was statistically significant increases in the impact factor scores of each individual nursing journal over time – increases ranging from approximately 2- to almost 80-fold. Given that many contemporary journal editors celebrate when their impact factor rises (Smith, 2006), results from the current study are certainly cause for some celebration due to the prestige that high scores will bring, as well as the wider connotations of what these scores may actually signify. While this result in nursing might be expected, given that impact factors in some fields are believed to be 'drifting upwards' (Ogden and Bartley, 2008), it is not necessarily consistent across all journals or research fields. A recent study of journals in general and internal medicine for example, found that while impact factors for the top-ranked periodicals increased between 1999 and 2007, they actually decreased among their lower ranked counterparts (Foo, 2009).

Even so, most would agree that large impact factor gains suggest a rising importance of nursing research and scholarship within the academic and scientific community. 'Reading maketh a full nurse' Doyle stated in 1933 (Doyle, 1933) and professional nursing journals have always been a key resource for continuing one's education and for obtaining practical updates in clinical areas (Skinner and Miller, 1989). There is a wide variety of publishing options for the nursing profession, the extent of which has been carefully documented since at least 1977 (McCloskey, 1977) and on through the 1980s (McCloskey and Swanson, 1982; Swanson and McCloskey, 1986; Swanson et al.,

1991). In some sense, nurses in academia have historically experienced conflict in deciding whether to publish in purely academic journals (which benefits their academic career), or whether to publish in journals that reach practicing clinicians (McCloskey and Buckwalter, 1982). On the other hand, while nursing research utilization has experienced significant growth in recent years, the repeated citation of a few key references suggests that the field remains potentially underdeveloped (Estabrooks et al., 2004).

As a result of the changing professional environment, the nature of nursing has also changed over time with its academic periodicals having had to regularly integrate new technologies and practices into their working sphere (King and Likis, 2008). One of these changes has no doubt been an increasing awareness of the importance of citations, reference lists and impact factors for those who choose to publish their research in academic periodicals (Smith, 2009b). Introduction of the RAE in the UK and ERA in Australia has elevated author citations to an even more critical issue for contemporary academics. Authors now worry about what and who to cite and whether their own work will even be cited at all. On the other hand, while academics and researchers are being increasingly compelled to submit their work to the highest impact factor journals, the current study suggests that nursing periodicals *are* rapidly approaching this 'holy grail'. As a result, nursing journals with high impact factors (such as the 7 titles in the current study) will be increasingly seen as *the* ideal forum for the publication of contemporary nursing research – both for clinical benefit and for career advancement.

Although the future looks bright in this regard, there still remain some key issues to consider when using impact factors to evaluate nursing journals and nursing research (Smith and Hazelton, 2008). These issues are worthy of some discussion. Firstly, there is the issue of validity regarding measures used by the ISI. While much contemporary debate has focused on whether impact factors, citation counts and the selection of journals for inclusion in the ISI databases is appropriate, these databases represent some of the oldest and most comprehensive collections of bibliometric data, having been first promulgated over 50 years ago. As the current study sought to examine bibliometric indicators among nursing journals for the longest possible period of time, the selection of Garfield's 'core' periodicals was deemed appropriate. Nonetheless, the current investigation does suggest that longitudinal analysis of certain indicators may not be appropriate, particularly the immediacy index, as it does not appear to provide a clear indication of time-based trends. Similar findings have also been demonstrated in other fields (Smith, 2010), even when occasional peaks for this indicator have been recorded (Smith, 2009c).

Secondly, and despite increases in recent years, there are still relatively few nursing journals that actually have impact factors. In 2005, only 31 nursing periodicals out of approximately 6000 were being listed in the JCR (Melby, 2005). When Mantzoukas conducted his study in 2009, only 34 nursing journals had been assigned an impact factor since the year 2000 (Mantzoukas, 2009). Although lobbying by the *International Academy of Nursing Editors* (INANE) and the *Medical Library Association* (MLA) has increased the proliferation of nursing journals in the Thomson Reuters database to 75, this still represents only a small proportion of the thousands of nursing journals worldwide (Ketefian and Freda, 2009). On the other hand, those general nursing journals that *are* listed in the databases tend to suffer from relatively low impact factor scores, particularly when compared to other health-related fields such as general medicine. In Garfield's original study from 1984 for example, the 1983 impact factor scores for nursing journals only ranged from 0.16 to 0.40 (Garfield, 1984). Over 20 years later, in 2005, no nursing journals had achieved a score greater than two and only six of them had a score greater than one (Johnstone, 2007). Thirdly there is the recent proliferation of new journals in nursing, both with and without impact factors. An even greater divide may now be occurring between periodicals with high impact factors versus their lower ranked counterparts and those with no impact factors at all. Certainly the impact factor range is wide. In the current study for example, although the average impact factor for all journals was 0.6, values ranged from the lowest at 0.3 to the highest at 0.8.

Nevertheless, for all its controversies, 'impact factor fever' has now risen to prominence in many academic fields, as research grants, university promotions and other academic milestones are being increasingly judged using this measure (Smith, 2007). Although at one point it did not really matter where nursing scholars published their work – as long as they published, there is now increasing pressure for academics to submit their research to journals with the highest impact factor (Jackson et al., 2009). According to Chan, 'impact factor addiction' has become not only an individual issue, but also a social issue (Chan, 2009). This in turn, creates a further conundrum as to where nursing researchers should actually be publishing their work, given that not everything in the academic literature that is read is cited, and not everything that is cited is necessarily read (Urquhart, 2006). It has been suggested that the reliance on citation counts may disadvantage nursing researchers in specialty fields such as nursing education, given that many top-ranked journals rarely publish articles in this particular area (Ironside, 2007). Some scholars have suggested that nursing researchers publish more frequently in other specialized journals (Hallberg, 2009) and that qualitative research is more likely to be published in journals with relatively low impact factors (McKibbon and Gadd, 2004). This situation may be changing, however, as an increasing number of nursing periodicals that publish qualitative research, are being added to the databases.

In assessing the more philosophical aspects of this study it is important to acknowledge that the selection of journals is crucial for any bibliometric analysis that attempts to investigate trends across an entire field. The current investigation utilized Garfield's 1984 list of 'core journals', which were at the time, the only nursing journals indexed in the SSCI and the SCI (Garfield, 1984). Following up this core group over 25 years later allows a comprehensive bibliometric analysis to be undertaken

which spans the longest possible period of time (in this case, 32 years) – something which would not have been possible using other journal lists or alternative bibliometric databases. Even so, it is important to acknowledge that the use of ISI/Thomson Reuters bibliometric databases and performance indicators is not without its inherent limitations, issues which have fuelled debate in the academic world for some time (Garfield, 2006; Kurmis, 2003; Seglen, 1997). While the examination of only 7 journals out of approximately 80 titles currently listed in the JCR may appear to be limiting, it is important to remember that most nursing periodicals have only been added to the databases in recent years. In order to conduct a useful longitudinal analysis, accurate data spanning the longest possible time period is needed, ipso facto, the oldest dataset (Garfield's 'core' list from 1984) must be used.

Furthermore, it is important to acknowledge that various other studies have utilized different methods in their selection of nursing journals. In 2009 for example, Mantzoukas investigated 'high impact nursing journals' by selecting the top 10 ranking general nursing periodicals listed in the 2006 JCR (Mantzoukas, 2009). In this study, the author analyzed abstracts published in these top 10 journals between 2000 and 2006, finding that nursing journals published research that had been obtained via a wide range of methodologies. According to Beckstead (2009), this demonstrates that the progression of nursing research is occurring at varying rates and is a function of the research methods employed, the type of evidence generated and the category of issues being studied.

6. Conclusion

This study provides a very comprehensive, longitudinal bibliometric analysis of important journals in the field of nursing. Investigation of the progression and continuing rise of 7 core international nursing journals over a 32-year time period revealed the existence of important bibliometric trends, not the least of which was clear evidence of rapidly rising impact factors in the field of nursing. Results also suggest that journal impact factors will continue to rise in future, thus confirming the supposition that nursing research is being increasingly seen, heard and cited in the international community. Impressive and continual impact factor gains demonstrate that nursing research and nursing periodicals now rightfully occupy an eminent position in the international scholarly literature.

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Ethical approval. None .

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