Using Bibliometrics to Interpret the Contribution of Nursing Science
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In a Nurse Author and Editor article, Smith (2012) addressed key questions about bibliometrics and nursing. Using this valuable presentation as a starting point, this article looks at specific bibliometric studies and their contribution our understanding of the status of evidence-based practice (EBP) in nursing. Bibliometrics are motivated by the need to measure the yield from research funding (Rafferty and Traynor 2006), to quantify the contribution of the scientific literature, to assess the maturity and relative importance of a discipline's contributions (Cecil, Thompson & Parahoo 2006), or to gauge the value of scientific and scholarly contributions to disciplines including nursing (Polit & Beck 2009).

Scientists embrace bibliometrics because they are data driven and provide the intellectual reassurance that we associate with facts. The interpretation of facts as related to the progress of our discipline relies on our vision and the goals that we share. Let us assume that nursing embraces a goal of having practice based on research. Worldwide, resources are directed to EBP in nursing. For example, Kitson (2007) observed that health administrators across the globe are concerned with improving the quality, effectiveness and safety of healthcare and that two significant movements - the quality and safety movement and the EBP movement - have influenced research that supports and deepens our understanding of how research is used in practice. One value of having a common goal such as EPB is that it helps to organize and consolidate efforts. In nursing, EBP has helped to provide a bridge between knowledge generation and application. Naturally, questions arise about how well our literature supports nursing practice or EBP. Two studies that address this question merit close attention and provide a platform for interpreting our progress and our constraints.

Concerns about the research base to support EBP motivated Mantzoukas (2009) to analyze research published in high impact nursing journals between 2000 and 2006 and to identify potential barriers that may limit the use of published research in the practice context. Included were 2,574 articles that reflected an explicit data sample and a systematic method of data collection and analysis. Of these, 51% implemented quantitative methods, 37% implemented qualitative methods, 2% implemented mixed-method analysis and 10% were secondary data analyses. Almost half (46%) of the 2,574 articles were descriptive studies and 4% were hypothesis/theory testing types of research. The results showed that only a small number of studies used experimental methodologies that included control and randomization. According to Mantzoukas, the limited number of RCTs may reflect lack of knowledge about experimental studies and a mistrust of trials in nursing. Mantzoukas posited that the dominance of non-experimental and qualitative methods reflected researchers’ tendency to adapt to practice requirements and practitioners demands for more inclusive and representative types of evidence.

There are specific limitations of descriptive studies as related to the EBP movement. A frequent error in reports of descriptive studies is going beyond the data in order to make inferences and draw associations without data to support them. Needed for use in the practice setting is for evidence
tested via interpretative, evaluative and hypothesis/theory testing research. Descriptive studies are not able to provide evidence to alter practice or provide alternatives for practice.

Mantzoukas stated that in order for published studies to provide adequate evidence for practice, nursing journals need to increase the publication of studies using RCT methods. Similarly, systematic and integrative types of evidence emerging from systematic reviews, meta-synthesis and meta-analysis methodologies need to be promoted by nursing journals as important sources of evidence and researchers need to be encouraged to undertake such studies. Finally, nursing journals need to encourage more high quality research evidence that derives from interpretative, theory testing and evaluative types of studies that are practice related and practice relevant.

These recommendations are a logical interpretation of the facts that Mantzoukas derived from bibliometrics. Additional interpretation is indicated. The content of scholarly journals is constrained by what is submitted to the journals. Journal editors with the help of peer reviewers select the highest quality studies that they receive. The underlying fact is that too few RCTs, systematic reviews, meta-syntheses and meta-analyses are submitted to nursing journals. Further, nursing journals are in a period of unprecedented change in the transition from print to electronic publication and the number of journals is increasing rapidly. Additionally, the journals used in Mantzoukas’s analysis are managing increasing numbers of manuscript submissions as nursing authors reach to publish in high ranking journals and there are increasing numbers of active nurse scientists throughout many regions of the world. It is likely that greater emphasis should be placed on achieving improved funding for nursing studies that are practice related and practice relevant. Improved evidence depends on improved resources at the front end of the EPB process.

It is fortunate that Beckstead (2009) reanalyzed Mantzoukas’s data because additional facts were obtained to interpret. This reanalysis is noteworthy because this kind of innovative reinterpretation of research data is unusual in the nursing literature. Data sharing should be encouraged because it permits a greater yield for research efforts and is relatively easy with electronic data bases. Beckstead (2009) normalized Mantzoukas’s frequency data for the absolute number of articles published in each journal, then correlated these values with citation frequency as reflected in their impact factor scores and categorized research articles into those that used quantitative methods and those that used qualitative methods. Beckstead showed that as the percentage of articles using quantitative methods increased across journals, so did the IF scores (r = 0.231) and as the percentage of articles using qualitative methods increased across journals, the IF scores decreased (r = -0.293). Thus, Beckstead provided evidence that the quantitative research activities in nursing are tied to the published literature (because the basis of the analysis is citation rates) while the qualitative research activities did not. It is likely that quantitative studies build on the literature more directly than than qualitative ones.

Beckstead noted that the percentage of articles that employed experimental methods ranged from 3.1% to 18% over the 10 journals surveyed. Calculating the correlation between these values and the IF scores yielded r = 0.307. Similarly, journals with a higher percentage of articles using qualitative methods were cited less frequently (r = -0.395). Based on Mantzoukas's results, managerial/policy issues and spiritual/metaphysical issues made up only small percentages of the total number of articles (7% and 3% respectively), and Beckstead showed that the variations in these percentages across journals were the most strongly correlated with IF scores, although in opposite directions. Articles addressing managerial/policy issues appeared tied to previously published work while articles in spiritual/metaphysical issues were not. This pattern of correlations
provided insight into the relative progression of nursing research.

Beckstead’s analysis showed how what nurses are writing and what nurses are citing are related and offered a general sense of scientific progress in nursing research. Using the IF as a measure of linkage between published articles, and correlating it with Mantzoukas’s systematic content analysis it was possible to examine what type of content builds on prior scholarship and what type of content does not.

The facts from Beckstead’s analysis would lead us to the interpretation that more quantitative research like that recommended by Mantzoukas is needed to support the goal of EBP. The two analyses would lead to the interpretation that the nursing literature is inadequate to support EBP. Anyone who has turned to the nursing literature to develop an EBP protocol would quickly understand this without the benefit of bibliometrics. But, bibliometrics provide data and data is used to establish policy and influence funding priorities. Improvements in resources to support research are needed to allow nursing science to evolve.

Changing the complex process from innovative idea to publication of research results is complex and beyond the scope of this presentation, but research on the content of the nursing literature offers some insight into issues at the publication end of the process. The highly interdisciplinary nature of nursing’s contribution to the literature and the high rate at which the literature of other disciplines is cited in the nursing literature was documented in a number of studies (DiCenso, Cullen & Ciliska 2000; Allen, Jacobs & Levy 2006). Nurse scientists contribute to and use the literature of other disciplines. Their contributions to the literature beyond nursing are not captured in bibliometrics of the nursing literature and as a result the contributions are nursing science are diluted and lack visibility (Jairath 2007).

Bibliometrics is a powerful tool and Mantzoukas and Beckstead use it to uncover relationships that we would not otherwise see in the literature of high ranking nursing journals. To realize EBP in nursing, shifts in the type of research funded and published will be needed. Bibliometrics offers facts and we interpret them.

References


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