The Knowledge Base for Evidence-based Nursing
A Role for Mixed Methods Research?

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Evidence-based nursing is central to the knowledge base for nursing practice. Critics of evidence-based nursing dislike the central role that randomized controlled trials (RCTs) take in providing evidence for nursing, claiming that the context and experience of nursing care are removed from evaluation. Many nursing decisions involve questions regarding the effectiveness of interventions, best evaluated by RCTs. This article explores the epistemological and practical feasibility of combining qualitative research with RCTs (mixed methods research) in evaluations of nursing practice. Through theoretical and practical examples, it proposes that mixed methods research has the potential to enhance the evidence base for nursing. Key words: mixed methods, nursing knowledge, nursing practice, evidence based, qualitative studies, quantitative studies, research nursing

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Evidence-based nursing (EBN) has become an internationally recognized though contested part of nursing practice. The principle of evidence-based healthcare has been driven by requirements to deliver quality care within economically constrained conditions, and nursing has carved itself a defined niche in this. To practice EBN, a nurse is expected to combine the best research evidence with clinical expertise while taking into account the patients’ preferences and their situation in the context of the available resources. Such requirements leave nurses juggling the conflicting demands of day-to-day patient and client care with the expectation to deliver care in an “evidence-based” way.

Consideration of the 4 elements of EBN (Fig 1) should enable nurses to make evidence-based decisions. Factors that constrain the application of all parts of this “jigsaw” to decision-making processes are well documented and feature at individual and organizational levels. Nurses vary in their ability to appraise research quality and lack individual authority to implement research findings. Commonly, nurses have restricted access to research evidence, and there is a lack of incentive for organizations to put evidence into practice.

It is argued that while diverse ways of developing nursing knowledge have emerged over the last 30 years, nurses practicing EBN have adopted a predominantly medical model of evidence, with randomized controlled trials (RCTs) as the central research method to this. EBN has been criticized for this stance, focusing on the lack of relevance of RCTs for nursing practice and of the fact that other research methods are given an illusionary stance of credibility, when in fact there is none.

Empirical studies examining the type of questions that nurses ask, and the nature of
the decisions they make, have shown that these predominantly focus on effectiveness of the interventions they deliver.\textsuperscript{8} It is perhaps unfair to criticize EBN for focusing on RCTs, as it is the research method that provides the most valid evidence for questions of effectiveness if conducted well. Although RCTs may be central to the research base for nursing decisions, this does not sit comfortably with a profession that has traditionally drawn on multiple sources of knowledge, reflecting the eclectic nature of nursing practice.\textsuperscript{5,9} Knowledge derived from prior and current experiences and social interaction have been central to nurses’ delivering effective practice.\textsuperscript{6} This has been recognized for many years, and looking at the “modern day” EBN jigsaw (Fig 1), the principles of the early work of Carper\textsuperscript{5} of multiple ways of knowing in nursing are reflected in the make up of the jigsaw. The challenge facing nurses is having the ability to integrate knowledge from different sources to enhance the delivery of effective care. EBN could be the means to providing this integration, but has so far concentrated on polarized research knowledge. Context is however the key.

One of the primary motives for accessing research evidence by those practicing EBN is to reduce clinical uncertainty.\textsuperscript{10} The type of research evidence accessed to reduce this uncertainty should be determined by the question being asked, not by a preformulated hierarchy. RCTs are best used to answer questions of effectiveness: about whether a treatment works.\textsuperscript{10} Other types of questions, for example, regarding how a treatment is perceived by those receiving it, are best answered by qualitative research.\textsuperscript{2} The clear structure of matching research question to research method is problematic, as many nursing questions do not exist in isolation. The question of what is effective practice should be considered in the context in which it is delivered. This includes the type of patient; the setting; who delivers an intervention; and what training is required to do so. Single methods such as trials or qualitative research methods cannot satisfactorily address this complexity and contextuality alone.

The research evidence that underpins EBN needs to reflect the complexity of nurses’ decision making. Currently, the research community is doing a disservice to nursing. Nurses need to reclaim EBN from the perception that the medical model underpins it by populating it with the sorts of evidence that are meaningful to nurses. The differing forms of knowledge required by nurses need not be mutually exclusive. Many nursing questions straddle both the major research paradigms,\textsuperscript{11} and the evidence base now needs to reflect this. There is an approach that can provide the integrated knowledge required for nursing practice: mixed methods research. By combining qualitative research methods to capture the experiential and intuitive aspects of nursing knowledge with quantitative methods used in RCTs, the evidence base for nursing can be widened. EBN needs to be situated in the broader social context, reflecting the diversity of the knowledge base and the circumstances in which it is realized.

This article presents a critical evaluation of a theoretical justification for one form of mixed methods research: the use of qualitative research methods to improve the design, conduct, and implementation of effectiveness studies for nursing. The article seeks to demonstrate that by using mixed methods research in this way, the evidence base for nursing can become epistemologically compatible
with the nature of nursing and will be better able to meet the knowledge requirements of practicing nurses. The development of mixed methods approaches is briefly explored and the waning of the "paradigm wars" discussed in the context of current debates. The issues of quality of qualitative research and those of generalizability are addressed, and consideration given to some of the potential problems with the proposed approach. The article concludes with a discussion of the practical application of mixed methods research to EBN.

THE DIVISION BETWEEN QUALITATIVE AND QUANTITATIVE RESEARCH METHODS

In the health research field, there have been 2 main approaches to research that have received attention—quantitative and qualitative. Debates as to the role and purpose of each approach have been occurring since the mid-19th century. Originally, the two were seen as more or less complementary, but bifurcated during the early to mid-20th century with the development of statistical methods, leading to a predominance of quantitative methods.12 Nursing along with the disciplines of sociology and psychology drove a revival of qualitative methods during the 1960s and 1970s, leading to wider acceptance.13,14

Traditionally, there has been seen to be a division between qualitative and quantitative research methods, each being identified with distinct paradigms. The distinctions are present on a number of levels, from epistemology to the level of methods and techniques.15 Most commonly, the distinction manifests itself at the level of method in the techniques used to collect and analyze data.

The division between qualitative and quantitative research is not one that is helpful to nursing practice. I have already discussed how nursing questions are multifaceted and straddle both paradigms. It is now time to make analytical sense of the situation that arises from the divided position of qualitative and quantitative research methods.

A key element to this discussion is the concept of binary oppositions, whereby one term is always prior or dominant to the other that is secondary or subordinate.16 Examples of common binary structures in place (rightly or wrongly) are masculine-feminine, theory-practice, mind-body, etc.16 There is a longstanding tradition of binary oppositions in the social sciences. I argue that this is now transferable to nursing with quantitative-qualitative research methods being constructed into a binary opposition.

The idea of quantitative-qualitative as a binary structure is one that has pervaded debates on EBN for a number of years.17,18 Binary pairings are not "normal" or "natural," but are constructions that reflect assumptions of value and status.16 This power dynamic can be seen in the assumptions of the "ownership" of research methods in healthcare. Professional divisions are often reflected in methodological divisions, with nurses identifying more strongly with qualitative research, considering that it brings them closer to the patient.19 The idea of binary oppositions is not one that should sit comfortably with nursing, as it has traditionally adopted a holistic approach to nursing care. Published nursing research, however, most commonly reflects a position of binary opposition, rather than of holism. Using combined qualitative and quantitative research methods in mixed methods research should greater reflect the holistic nature of nursing practice.

A further contradistinction between qualitative and quantitative research methods is the acknowledgement of their philosophical roots. One of the significant attributes of qualitative research is that a working philosophical consensus has been established. This is in contrast to quantitative research that can treat methodology as a technical matter.20 The idea follows on from this that the difference between qualitative and quantitative research is more than an issue of quantification, but relates to ontological and epistemological concerns.20 This leads many researchers to take the position that the two approaches cannot be combined because of
their antithetical backgrounds. This is a questionable stance. Quantitative research has disentangled itself from its philosophical roots, obscuring its origins. It does not stand alone as a technical approach to research, but is as steeped in epistemology as qualitative research. Quantitative methodologists have not had to defend what they do in the same way as those using qualitative methodologies and get away with this because of its dominant approach. Perhaps, this disentanglement is to be applauded as quantitative research has developed highly sophisticated, but predominantly, mechanical methods that can be carried out by researchers unaware of the epistemology underpinning them. In contrast, qualitative research appears at times to be so entangled with its philosophical assumptions as to be handicapped by them. At the same time, qualitative research engages in broader philosophical assumptions that are part of its reflexive approach. I take the stance that both qualitative and qualitative approaches share similar epistemological and ontological positions, in as much as they are both grounded in an empirical world that can be represented. Commonly, it is the emphasis, not the philosophy of the research that is the only difference.

**WANING OF THE “PARADIGM WARS” AND THE DEVELOPMENT OF MIXED METHODS APPROACHES**

The idea of research methodologies sharing epistemological and ontological positions has led to the “waning of the paradigm wars” that had raged in the 1970s and 1980s. There are a number of reasons for this erosion of dichotomy. One is the development of the idea that there are no deterministic links between the choice of research method and its epistemological and ontological commitments. It is argued that the differences between the techniques of qualitative and quantitative research are “essentially divergent clusters of epistemological assumptions.” Another is the requirement for pragmatism in research. I have already discussed the current disservice provided by the research community for nursing practice. Polarizing approaches can lead to misrepresentations as to what each approach and its associated methods can achieve. What are available are a range of positions located on more than one dimension, capturing the full range of research options available for use. Research methods are much more “free-floating” epistemologically and ontologically than is often supposed. While different strategies are adopted to deal with them, the range of approaches involve the same forms of inference and methodological problems. The implication of this is that purpose and circumstance drive the method for research, not methodological commitment.

**Mixed methods approaches**

The discussion of the breakdown of epistemological boundaries begins to sound like a proposition for “methods without barriers” and atheoretical data gathering. What is being proposed is not that the uniqueness of each approach is removed, but that complementarity can occur within nursing research to provide multidimensional answers to questions. Mixed methods approaches to nursing research involving the combination of qualitative and quantitative research designs, in sequence or contemporaneously, is a way to achieve this. Historically, this may have been considered as triangulation in which both qualitative and quantitative research methods were used to allow comparison and verification of results from different perspectives. Triangulation is only one rationale for mixed methods research, and is interpreted in many different ways.

There are 4 main ways in which qualitative and quantitative research methods can be combined: triangulation; qualitative research methods as a facilitator of quantitative research methods; quantitative research methods facilitating qualitative work; complementarity in which qualitative and quantitative research methods are employed in order the 2 aspects of an investigation can be dovetailed. Mixed methods research clearly takes on many forms and has become
increasingly widespread over the last 25 years in the social sciences. The approach has been adopted more slowly in health and nursing research, as the methodological divide is perhaps more entrenched and also reflects the professional divisions identified earlier in the discussion of binary oppositions.

The erosion of the idea of 2 methodological paradigms existing does not lead to a proposition for a third paradigm. Mixed methods research can be viewed as a post-positivist position, although this has a range of meanings to different authors. What is recognized is that greater pragmatism and reflexivity means that a range of positions are feasible, dependent on the circumstances of research. Thus, the position of a research study within the multitude of research methods available is led by the research question, rather than being driven by methodological or philosophical commitments. Given that both paradigms assume a position of empirical reality that can be “made sense of,” these developments may seem to create a logical ceasefire to the “paradigm wars” that have raged since the 20th century. In health research, the paradigmatic division has hindered the development of holistic nursing knowledge.

The potential for qualitative research in mixed methods research

There are a number of ways in which qualitative and quantitative research methods can be combined in mixed methods research. The focus of this article is on one specific form of mixed methods research, the use of qualitative research methods to improve the design, conduct, and implementation of effectiveness studies for nursing. This has been advocated by a number of prominent qualitative nurse researchers.

Qualitative research seeks to explore how people make sense of the world around them, who they are, and how they present this and respond to others. This is essential to social relationships and underpins the experiential nature of nursing knowledge. Qualitative research has a particular strength in that it can begin to explain how these perceptions change in relation to other things, for example, illness, threats to health, and interaction with healthcare providers. It can provide a more comprehensive view of nursing care in a sociocultural context. It is acknowledged that the field of qualitative research is a highly contested one, but it is from this basic stance that I now examine whether qualitative research can fit the proposed role within effectiveness research for nursing.

Qualitative research methods can be used to harness the benefits of clinical trials and in particular can emphasize the distinctive work and outcomes associated with nursing practice. Qualitative research methods can do this by studying process, how outcomes are achieved, how situations evolve, and why interventions and implementation succeed or fail. Six reasons have been identified as to why qualitative methods are needed in health services research: to understand why interventions work; to improve the accuracy and relevance of quantitative studies; to identify appropriate variables to be studied; to explain unexpected results; and to generate hypotheses. So what are the unique aspects of qualitative research that create this need?

Through a predominantly interpretivist epistemological position, qualitative research uses a range of research methods, rising from a number of philosophical approaches to study the social world. The description “qualitative research” is in many ways imprecise because of this myriad of approaches captured within the term. In fact, some authors have contended that to use the term qualitative research is misleading, as each qualitative methodology has its own traditions and approaches. I would argue that the similarities of purpose between the methods enable discussion of the whole to go ahead. When advocating the use of a qualitative method within or alongside an RCT, then a specific method must be chosen that is appropriate to answer the question being asked.

The qualitative component of mixed methods research may be collected purposively
in response to a particular research question, or may use relevant, existing data from other studies. How these data might be incorporated has received some attention, most of which has concentrated on prospective collection, but would not preclude use of qualitative data obtained from other sources. Issues include the order of collection of data—either sequential or concurrent; the priority given to each approach within the study—whether equal, or skewed toward one method; where integration of data types may occur in the study; and whether a theoretical framework guides the entire design. These represent key issues in the combination of qualitative and quantitative research, and consider each approach as an equal player.

**Practical enactment of mixed methods research**

Empirical developments are starting to reflect the new paradigmatic continuum, and as a result are producing research findings that contribute to holistic nursing knowledge. A recent RCT comparing alternating pressure overlays with alternating pressure mattresses to prevent pressure ulcer development also collected qualitative data on the impact of pressure ulcers on patients' well-being. This enabled the conclusion that patients could choose their mattress of choice without being at increased risk of developing a pressure ulcer. In addition, the qualitative research provided insight into the impact of nursing practices of prevention and treatment of pressure ulcers on an individual while in hospital and later at home.

A further example that demonstrates a different sequencing of mixed methods research—quantitative then qualitative, can be found in work examining the effectiveness of long-term anticoagulation regimens for patients with cancer receiving palliative care. This RCT found that a regimen involving once-daily injections of low-molecular-weight heparin (LMWH) provided superior anticoagulation to existing regimens using oral heparin. The result created concern among specialist palliative care practitioners, as the invasiveness and distress caused by daily injections in comparison with a single tablet seemed too great for this population of patients. After the RCT was completed, qualitative studies were undertaken to establish patients' views on the acceptability of this alternative form of treatment. The patients interviewed either had experienced both forms of treatment or were receiving preventative therapy. Those who had experienced both found LMWH to be preferable to warfarin therapy, having the benefits of simplicity, freedom, less bruising, greater control, and to be trivial compared with chemotherapy. Patients on preventative therapy found LMWH acceptable, considering that it improved their quality of life by giving them a feeling of safety and reassurance given their potential risk of embolism. LMWH was also preferred to the preventative measure of antiembolic stockings, as they had a negative impact on quality of life. These qualitative studies confirmed that LMWH could be advocated as the regimen of choice for the anticoagulation therapy in patients with advanced cancer from both clinical and patient perspectives.

The findings from these two pieces of qualitative research enabled the results from the initial RCT to be placed in clinical context from both patients' and healthcare professionals' perspectives. The qualitative research findings enhanced those of the RCT, which otherwise may never have been implemented because of the perceived unacceptability of the treatment by practitioners. The combination of both pieces of research created evidence directly relevant to nursing practice.

**WHAT ARE THE CHALLENGES FACING MIXED METHODS RESEARCH?**

In highlighting the inadequacy of existing research to inform nursing practice, and addressing the epistemological and practical assumptions of mixed methods research, I have established a case for the combination of RCTs and qualitative research. There are challenges to using qualitative research within and alongside RCTs, which should be considered
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as mixed methods research is becoming more popular. Two key challenges are the quality and generalizability of research.

The quality of research

Producing research that is of high quality is a challenge to all researchers, but is articulated differently according to the paradigm being used. Definitions of quality for an RCT are clearly defined. This is not the case for qualitative research. Some of the assumptions about quality have stemmed from the lack of consensus about what qualitative research is, the variety of methods employed under its guise, and the different approaches that these methods take. Given such a lack of consensus about what qualitative research is, it is small wonder that there is minimal concordance as to what constitutes quality.

The debate as to what contributes to good quality qualitative research is beyond the scope of this article, but reflects many of the issues confronting quantitative researchers. A comprehensive examination of the issues acknowledges the controversy surrounding whether quality criteria should be used in qualitative research and what these should be. Two overarching criteria are proposed that must govern assessment of the value of qualitative research—validity and relevance. This approach relies on the transparency of reporting of data collection and analysis, with particular attention paid to the analysis of negative cases. It is argued the responsibility lies with the researcher to ensure that findings are sufficiently plausible and credible.

What needs to be established is whether there are implications for the quality requirements of either qualitative research or RCTs when the two are combined. This requires exploration by researchers undertaking mixed methods research.

The generalizability of qualitative research

An area of controversy within mixed method research is the generalizability of qualitative research. One of the main issues is how far the results can be generalized beyond the constraints of a study to other areas of nursing practice. The generalizability of an individual study depends on the methods being used. What is being addressed here is the wider issue of generalizability of qualitative methodologies. Whether this is an appropriate goal for qualitative research has received a range of responses. Those who argue against, put the case that meaning is contextualized to the situation where it occurred and cannot be extrapolated beyond that. Consequently, any attempts at generalizing are highly problematic.

Others offer more balanced approaches to generalizability, for example, transferability and moderatum generalization. Both of these continue with the theme of the contextual nature of the research, but look for similarities between the “sending” and “receiving” sites with generalizations moderated accordingly. Whose responsibility it is to make such judgments is debated. One claim is that the responsibility lies with the researcher to determine on what grounds claims for generalization are being made, and what limits there are. This is unlikely to happen automatically, so research needs to be designed and conducted in a way that ensures this will occur. Countering this stance are the views of those who argue that the responsibility to determine generalizability lies with the reader of research. Production of knowledge becomes contested, as various agents seek to legitimize a subject through competing discourses. I would argue that one cannot happen without the other. Authors of research should provide thematic representation in the context of ongoing theoretical and empirical debates and transparency of methods and analysis. Readers should then be able to make judgments of validity, relevance, and generalizability.

Generalizability is key to the role qualitative research can play within mixed methods research at both the levels of methodology and method. In the study proposed earlier comparing pressure-relieving equipment, qualitative methods were undertaken with a
Table 1. Challenges facing mixed methods researchers incorporating qualitative research into RCTs

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<th>Challenge</th>
<th>Rationale</th>
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<td>Logistical constraints</td>
<td>Trials likely to take longer if incorporating qualitative research</td>
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<td>Cost of research raised</td>
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<td>Resources spread thinly across methods</td>
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<td>The “trash-can” approach</td>
<td>Qualitative research used to collect data on difficult trial outcomes</td>
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<td>rather than trialists using appropriate measures</td>
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<tr>
<td>Quality of qualitative research lowered</td>
<td>Qualitative research undertaken by people without the skills to do so</td>
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<tr>
<td>Overall quality of research is lowered</td>
<td>Using more methods does not automatically improve the quality of research</td>
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<tr>
<td>Mixed methods are seen as superior</td>
<td>Research methods must be guided by the research problem and there is potential for a popularist approach to be used to answer inappropriate questions</td>
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subsample of the trial population. These data were then generalized to the wider trial population (and beyond). Qualitative research needs to be generalizable beyond the immediate context in which it was collected, otherwise there is little point in mixed methods research.

Other challenges

There are a number of further challenges in addition to quality and generalizability that require consideration when planning and undertaking mixed methods research. These are outlined in Table 1 and particularly focus on the incorporation of qualitative research methods with RCTs.

There are clear advantages to incorporating qualitative research into trials of nursing practice, but these need to be addressed with caution as the approach is not universally applicable to all research problems. Combination of approaches requires careful thought from the very beginning of project planning, with particular consideration of the financing, appropriateness, skills of the team, and the quality and rigor of the research.

The practicalities of mixed methods research for EBN

A recent editorial in the journal Evidence-Based Nursing proposes that the priorities for EBN over the next few years include bridging the research transfer gap and ensuring effective strategies to get evidence into use by practitioners, managers, and policy makers.47 Broadening the evidence base for nursing, by using mixed methods for researching appropriate nursing questions, may enhance the applicability of the evidence base available for practitioners. This in turn may narrow the gap between research and practice by ensuring that the evidence found has maximum relevance for nurses. How this may be achieved is illustrated in Figure 2. By capturing aspects of clinical experience and patient

Figure 2. The influence of mixed methods research on evidence-based decision making for nursing.
preference in a formalized way, the “research from evidence” piece of the jigsaw contains evidence that reflects more accurately the complexity of the decision under consideration. If evidence appears more relevant, this may increase the chance of it being put to use by practitioners, managers, and policy makers.

There is also potential impact on the accessibility of research, thereby enhancing the chances of transfer into practice. If nurses are seeking evidence of effectiveness and contextual relevance of a treatment, mixed methods research should be able to provide research evidence that addresses both of these areas. This will streamline searching processes. For this to occur, authors and publishers of mixed methods research will need to provide adequate indexing of the research, and ensure that mixed methods research is reported as just that—mixed. It has been common for mixed methods research in the past to be published as separate parts, often without cross-reference. The purpose of mixed methods research is to ensure that each method enriches the other, becoming greater than the sum of its parts. To achieve this fully, a synthesis must be published.

A further area of development that will aid the practical enactment of mixed methods research for EBN are tools for appraising the quality of mixed methods research. The varied ability of nurses to appraise the research quality has already been discussed. This remains an issue and there is currently little consensus as to what constitutes quality within mixed methods research. The development of appraisal tools remains a high priority.

The quality of research needs to be high in order to achieve the potential of mixed methods research. The challenge to nurse researchers is to ensure consistency in the quality of all the approaches employed in order that no tension exists between idea and execution.

CONCLUSION

This article is a manifesto for the evidence that feeds into EBN. It examines the need to synthesize different types of research for EBN, a change from the current dichotomized position. Mixed methods research provides a framework for this. Combining qualitative and quantitative research is epistemologically valid and practically feasible. Of particular interest is the role of qualitative research in combination with RCTs. Using both research approaches can produce findings that enhance the evidence base for nursing, although this is not without problems. These include issues related to getting mixed methods research published, how it is indexed in databases, and how it is appraised.

The article has tried to recapture the essence of EBN in order to develop nursing practice. The challenge for the future is to ensure that nurse researchers are not only aware of the potential of mixed methods research for nursing but also champion and conduct nursing research using the methods. This will enable the evidence base for nursing to be broadened and more accurately reflect the diverse nature of knowledge required for nursing practice.

REFERENCES


