Title: Breaking from binaries – using a sequential mixed methods design

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Abstract

Aim To outline the traditional worldviews of healthcare research and discuss the benefits and challenges of using mixed methods approaches in contributing to the development of nursing and midwifery knowledge.

Background There has been much debate about the contribution of mixed methods research to nursing and midwifery knowledge in recent years.

Data sources A sequential exploratory design is used as an exemplar of a mixed methods approach. The study discussed used a combination of focus-group interviews and a quantitative instrument to obtain a fuller understanding of women's experiences of childbirth.

Review methods

The mixed methods study example qualitative data were analysed using thematic analysis. Quantitative data were analysed using regression analysis

Discussion

Polarised debates about the veracity, philosophical integrity and motivation for conducting Mixed Methods research have largely abated. Mixed Methods Research has the potential to contribute to a deeper more contextual understanding of a variety of subjects and experiences furthering knowledge for clinical practice.

Conclusion

The purpose of the research study should be the main instigator when choosing from an array of Mixed Methods research designs. Mixed Methods Research offers a variety of models that can augment investigative capabilities and provide richer data than a discrete method alone.

Implications for practice/research

This paper offers an example of an exploratory sequential approach to investigate women's childbirth experiences. A clear framework for the conduct and integration of the different phases of the Mixed Methods Research process is provided. This approach can be used by practitioners and policy makers to improve practice.

Keywords

Mixed methods, discrete choice experiment, sequential design, childbirth experiences

Introduction

Much of nursing and midwifery research aims to bring about changes in practice through improved knowledge. Until recently, the healthcare research agenda has focused on traditional positivist or naturalistic approaches or worldviews (Twinn 2003). The positivist approach to research is objective and scientific. The research is conducted using a structured design, where the researcher withholds their beliefs in order not to contaminate the data. Analysis is statistical presenting data in numerical forms. Naturalistic approaches adopt a different set of beliefs about various aspects of the research process. Unlike the positivist approach the researcher recognises that they can have a potential effect on the research process. The design is systematic but flexible recognising that data can be complex and contextual. The analysis is rigorous, with researchers sifting through information and presenting data in the form of words which offer a theory or a description of the phenomenon under investigation. Qualitative research aligns itself with naturalistic approaches, while quantitative research is closely aligned with positivism. In health care, quantitative research is often favoured, with the randomised controlled trial considered the 'gold standard' for the development of healthcare interventions.

However, holistic care, which is central to nursing and midwifery philosophies, is incompatible with a purely positivist approach. Using statistical measures alone can ignore or minimise human experiences, including their psychological and emotional aspects. Conversely, qualitative studies have been criticised, mainly because of their often small, convenience sample size and a lack of generalisability, which can lead to a perception that they are less powerful and less influential than quantitative research.

Sandelowski (2003) contended that the criticisms levelled at both approaches are misplaced. She asserted that neither qualitative nor quantitative methods are inherently strong or weak, except in relation to particular perspectives and standards of enquiry (Sandelowski 2003). Different approaches to research address diverse purposes or intentions. Qualitative approaches focus on the multiple realities of an information-rich sample and challenging assumptions that are taken for granted, whereas quantitative approaches centre on the measurement of single, determinate realities, seeking to find statistically significant reductive information that can then be generalised.

Both perspectives have valuable contributions to make to the body of nursing and midwifery knowledge, and the blame for deficiencies in approaches may lie with researchers

choosing incorrect approaches or executing them in the wrong way (Sandelowski 2003). Contemporary nursing and midwifery practice covers a broad and complex spectrum of care, from before conception and birth, to health and illness, to death. Their theoretical and philosophical aspects encompass concepts such as holism, individualised care, partnership, empowerment and advocacy. The environment in which practice occurs therefore requires different, multi-level, realistic, contextual perspectives to further develop nursing and midwifery knowledge (Twinn 2003). The increasing complexity of health care has been part of the drive towards the development of new approaches, different combinations of approaches, and the blending of research practices and perspectives.

Experiences from both paradigms

Understanding complex experiences is central to nursing and midwifery care. The experiences of healthcare users are increasingly being used to assess, plan and implement changes in service provision and policy development (Lees 2011). Qualitative and quantitative approaches have been used to enrich contemporary knowledge of healthcare experiences using a variety of perspectives, methods and designs.

Qualitative data have the potential to identify disparities between the perceptions of users and providers of care (Lees 2011). They have been invaluable in providing in-depth insights into women's feelings about childbirth, the consequent effects on their lives, and those of their families and community. Quantitative designs have traditionally used 'satisfaction studies', surveys or measurements of psychological components such as 'self-efficacy' to evaluate childbirth experiences (Larkin *et al* 2009). Quantitative satisfaction studies are restricted as they rely on a global satisfaction index, often omitting important details that are significant to the healthcare user (Lees 2011). Satisfaction studies in relation to childbirth are limited due to potential participants valuing the status quo and feeling reluctant to criticise their care, believing it to be as good as it could be (van Teijlingen *et al* 2003).

Qualitative and quantitative designs have made important contributions to the understanding of people's experiences from different perspectives. A recognition of their intricacies results in the need for innovative approaches that use mixed methods to address complex research questions, rather than adopting a particular approach (Twinn 2003). A mixed methods approach has the potential to explore contextual understandings that require multiple perspectives. Evidence in the nursing literature attests to the contemporary use of mixed methods to the extent that a textbook of mixed methods has been published (Andrew and Halcomb 2009).

From the perspective of midwifery, there are few published, mixed methods studies that focus explicitly on women's experiences of childbirth. Jomeen and Martin (2005) used mixed methods to explore whether there was a multidimensional measure of anxiety and depression in early pregnancy. Further examples include Kingdon *et al* (2009), who explored women's choosing of caesarean sections, and Beake *et al* (2013), who developed a competency assessment for midwives to use when caring for women with an intellectual disability. Lees (2011) concludes that mixed methods is the most effective approach in exploring experiences of health care as it provides a more complete contextual understanding of users' views.

Advantages of mixed methods

Mixed methods research (MMR) has been described in many different ways. Johnson *et al* (2007) have amalgamated 19 separate definitions: 'MMR is the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (for example, use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the purposes of breadth and depth of understanding and corroboration.'

A broad rationale for adopting MMR in health services research (O'Cathain *et al* 2007) includes an increased contextual understanding of health care, improved confidence in findings, strategic use such as funding, and ensuring different groups in society are heard. Teddlie and Tashakkori (2009) outlined the three advantages of MMR as:

- Being able to simultaneously address a range of confirmatory and exploratory questions with qualitative and quantitative approaches.
- Providing better (stronger) inferences.
- Offering the opportunity for a greater assortment of divergent views.

The intention and purpose of MMR, therefore, is to attain a deeper level of understanding and a commitment to engagement with diverse viewpoints, paradigms and methods. Notwithstanding its advantages, undertaking a mixed methods study can be challenging in terms of researchers' abilities and resources, which can be compounded by shifting definitions in relation to design, analysis and integration of data.

Challenges of mixed methods

A major challenge to reading and understanding MMR is the lack of uniformity in the terminology and description, and absence of clarity as to when and at what level they are mixed (Sandelowski 2003). Such confusion has led to criticisms of using a 'pick and mix approach', presenting triangulation as a mixed methods design (Sandelowski 2003, Twinn 2003), and a perceived lack of ontological and epistemological coherence by some nurse researchers (Lipscomb 2008). Creswell (2011) identified several enduring controversies about MMR and revisited previous arguments against mixed methods, such as inconsistent descriptions and terminology, paradigmatic independence, over-emphasis on positivism, integrating methods and methodologies without clear rationale, and appropriation of research methodologies already in use. There are therefore unresolved issues about the conception and process of mixed methods designs.

Despite these controversies, there is an increasing acceptance of mixed methods as a legitimate and valuable research design (Teddlie and Tashakkori 2009). This paper provides an overview of MMR, so does not explore these ongoing debates.

Mixed methods research designs

It is impossible to provide an exhaustive list of MMR designs because of their large number and inherent capacity to transform and adapt (Teddlie and Tashakkori 2006). Greene (2007) emphasised using the intent or purpose of the research as a focal point when deciding the most appropriate design, rather than being wedded to specific approaches or methods. The choice of a mixed method design therefore arises from the study question rather than the method driving the question. The three main purposes of a mixed methods design are: development, complementarity and expansion (Greene 2008).

A developmental mixed method strategy, such as the development of an instrument, is sequential and assesses a number of constructs of phenomena where one method is used to inform the other (Greene 2007). Complementarity seeks to enhance our understanding of complex social phenomena by establishing connections between their multidimensional aspects (Greene 2007). Greene explained 'expansion' as a means of extending the scope and breadth of a study, thus examining multiple phenomena in different ways. Each method can assess a different phenomenon, which collectively expands the breadth of the study beyond the scope of a single method (Greene 2007).

To illustrate the steps in the process, a sequential exploratory design is discussed as an example of a mixed methods approach to a study of women's experiences of childbirth.

The sequential exploratory design

MMR designs provide an organisational framework for different research processes, including the purpose of the study, sampling, analysis, mixing, interpretation and the reporting of the study. Teddlie and Tashakkori (2006) outlined the four main dimensions of their design typology as: the number of approaches used; the number of strands or phases of the design; the type of implementation process (concurrent sequential or conversion); and the stage at which integration takes place. The sequential exploratory design involves collecting and analysing qualitative and then quantitative data in two consecutive phases within a single study. This design is ideal for the exploration of new phenomena (Creswell and Plano Clarke 2007) where there is little knowledge about the area being researched.

The research's design was driven by its aims and objectives and incorporated multiple justifications. The design sought to capture more fully the complexity of human phenomena and understand women's experiences (Sandelowski 2003) by gathering and analysing qualitative and quantitative data. This was also a strategic decision, as the study would then have appealed to research audiences from qualitative and quantitative traditions. This design also allowed the participants' opinions to be heard in relation to their childbirth experiences.

The study's objectives were to:

- Determine women's expectations of childbirth.
- Identify the components or attributes of childbirth that are important to women.
- Determine the relative value or usefulness that women assign to elements of their experiences.
- Investigate the associations between women's preferences regarding childbirth and variables such as parity, age and model of maternity care.

While the overall aim of the study may appear to lend itself to a qualitative design, the identification of specific elements of childbirth, such as individualised care and access to pain relief, combined with the relative value women ascribe to those elements, required a more complex approach. A qualitative study would have identified the elements but would not have enabled the researcher to establish quantitatively those considered most important. A quantitative study would not have identified women's priorities linked with local organisations, so the quantitative attributes would have been based on conjecture.

Focus group interviews (FGIs) involving discussion and debate were used to identify the

attributes of the childbirth experience that were important to women (stage one). Stage two involved the development of a discrete choice experiment (DCE) instrument, a quantitative tool used to establish the relative importance of the attributes identified (stage three) (Figure 1). The DCE is an economics tool increasingly used in health care to identify service users' priorities. The DCE quantitative data analysis allowed the priorities to be ranked in terms of their relative value. Consequently, the first two objectives were fulfilled by the initial, qualitative phase, while the remaining objectives were fulfilled by the second, quantitative one. This provided two of the justifications for a mixed methods approach: developmental (where one method informs the other) and complementarity (enhanced understanding of a phenomenon). Thus, quantitative and qualitative approaches were used to address different aspects of childbirth. The use of mixed methods helped to achieve in the qualitative phase a more complete appreciation of the important elements of childbirth and, in the quantitative phase, a ranking of those elements, which contributed to a better understanding of the overall phenomenon.

Stage 1. Qualitative data collection and analysis

The initial qualitative descriptive study used five antenatal and five postnatal FGIs. Qualitative data analysis generated important characteristics or attributes of childbirth. The use of qualitative data to inform a quantitative instrument is sometimes referred to as 'quantitising' (Sandelowski 2000), with qualitative data transformed into quantitative data using content analysis. The aim of the study, however, precluded using decontextualised iterative content alone. Themes and subthemes were identified; overlapping themes were reviewed and subsequently merged where appropriate. The data transformation, rather than being a linear process, involved a 'to and fro' between the developing instrument and the FGI data.

Stage 2. Exploratory instrument development and testing

Six elements of childbirth experiences were identified, such as individualised care and access to pain relief. The DCE offered women a 'menu' of choices made up of the six elements arranged in various combinations. In choosing a particular composite or 'menu of elements', women identified the value they attributed to each one. This stage also involved the development and testing of the DCE, including the conducting of a pilot study and refinement of the final DCE instrument. A detailed account of DCE conception and development is described elsewhere (Coast and Horrocks 2007).

Stage 3. Collection and analysis of quantitative data

DCE data analysis information will be restricted to a few aspects here; Hensher *et al* (2005) contains further information. The basis of the DCE analysis is the use of regression models. A linear additive model, which can identify the direct independent effect of each attribute on the response choice (Hensher *et al* 2005), was used. This identified women's priorities for each attribute and their importance to childbirth.

Once the analysis was complete, the two types of data were used together to address the four research objectives. The quantitative research instrument enabled the prioritisation of the elements of childbirth identified by the FGIs. Statistical significance established from the regression analysis revealed women's priorities. For example, although the FGIs established that decision-making was an important element of childbirth, the DCE showed that access to pain relief was valued more highly by women, thereby providing a more nuanced investigation of childbirth.

DCE development has been criticised for its lack of clarity and transparency in generating attributes (Coast and Horrocks 2007). MMR has the potential to help in the development of the DCE. The sequential exploratory design is a straightforward way to organise and develop DCE attributes. With this type of design, the 'mixing' occurs in the way the two phases are connected. The connection occurred as data and findings from stage one informed development of the quantitative instrument in stage two, which led to the collection of data in stage three addressing the same substantive issue of women's experiences of childbirth.

Conclusion

Mixed methods are not inherently superior to individual methods. The acid test of the mixed methods design is the appraisal of whether the information gained from the study contributed to an overall better understanding of women's experiences of childbirth. Qualitative and quantitative phases had different but linked roles in the study that offered complementary evidence about the subject. The qualitative elements of experiences of childbirth, when examined quantitatively, enabled important priorities to be identified. The particular values that women ascribed to each element could not have been identified from a qualitative study alone. Equally, the elements emerging from the FGIs enabled users' opinions to be heard while providing transparency and validity to the development of the DCE instrument. It is useful therefore for care providers to understand women's priorities so as to provide optimum care.

This article provides an example of a mixed methods study using a sequential exploratory design. An example of how quantitative and qualitative components are linked throughout the design and process is outlined. Thus, the findings were the result of a fusion of the evidence provided by

quantitative and qualitative methods, enabling a fuller understanding of women's childbirth experiences. The blending of both types of data allowed a more informed, contextual understanding that provided statistical support to indicate respondents' priorities on a larger scale. This information can be used to identify practice and policy changes to improve users' experiences, thereby enhancing care.

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Stage 1
Qualitative
data analysis

Stage
2
Testing
instrument

Stage
3
Quantitative
data analysis

(Creswell and Plano
Clarke 2001)