

DISCUSSION PAPER

Using Framework Analysis in nursing research: a worked example

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Abstract

Aims. To demonstrate Framework Analysis using a worked example and to illustrate how criticisms of qualitative data analysis including issues of clarity and transparency can be addressed.

Background. Critics of the analysis of qualitative data sometimes cite lack of clarity and transparency about analytical procedures; this can deter nurse researchers from undertaking qualitative studies. Framework Analysis is flexible, systematic, and rigorous, offering clarity, transparency, an audit trail, an option for theme-based and case-based analysis and for readily retrievable data. This paper offers further explanation of the process undertaken which is illustrated with a worked example.

Data source and research design. Data were collected from 31 nursing students in 2009 using semi-structured interviews.

Discussion. The data collected are not reported directly here but used as a worked example for the five steps of Framework Analysis. Suggestions are provided to guide researchers through essential steps in undertaking Framework Analysis. The benefits and limitations of Framework Analysis are discussed.

Implications for nursing. Nurses increasingly use qualitative research methods and need to use an analysis approach that offers transparency and rigour which Framework Analysis can provide. Nurse researchers may find the detailed critique of Framework Analysis presented in this paper a useful resource when designing and conducting qualitative studies.

Conclusion. Qualitative data analysis presents challenges in relation to the volume and complexity of data obtained and the need to present an 'audit trail' for those using the research findings. Framework Analysis is an appropriate, rigorous and systematic method for undertaking qualitative analysis.

Keywords: Framework Analysis, nursing, qualitative data analysis

Introduction

Nurse researchers, motivated by the challenge of developing an evidence base for optimum care delivery, increasingly

use qualitative methods to address their research aims (Attride-Sterling 2001). These methods generate large amounts of data which must be rigorously analysed. In a helpful overview of approaches to qualitative data analysis, Thorne (2000) describes grounded theory's use of constant comparison, phenomenology's application of hermeneutics,

ethnography's description of cultures and the frameworks or stories that people employ in narrative analysis. There is also the focus on text and the use of language within discourse analysis (Albery & Munafo 2008). However, many published papers describe undertaking what could be defined as thematic or qualitative content analysis, even if failing to name it in this way or referring to it as one of the more recognized methodologies listed above (Sandelowski 2000, Braun & Clark 2006). This paper counters some of the criticisms levelled against qualitative research analysis and thematic analysis in particular, by discussing a worked example of Framework Analysis (FA) in nursing. FA is an emerging method of qualitative thematic data analysis that is increasingly popular in healthcare studies.

Background

Criticisms of qualitative data analysis

Antaki (2002) has argued that there is often an absence of clear and concise guidelines around thematic analysis, an issue that Attride-Sterling (2001) identifies as a disadvantage in the facilitation of methodological analysis. However, Braun and Clark (2006) state that the use of tools or guidelines that are too rigid can reduce flexibility and constrain analysis.

The opacity of qualitative data analysis is a common source of criticism levelled at this approach (Murphy *et al.* 1998). Furber (2010) asserts that there is a real need for transparency so that research reviewers, including those who have funded a study, can see how the findings were derived. Dixon-Woods (2011) highlights the need for techniques that enhance coding transparency. A lack of depth to analysis processes has been raised as a concern (Attride-Sterling 2001). Popay *et al.* (1998), for example, state that there is limited detail in most reports of analysis and findings from qualitative research to interpret the context and meaning of data.

Subjectivity, inherent in interpretive qualitative research (Sword 1999), has been criticized. However, it could be argued that no research or analysis approach is completely free of assumptions and biases and such a charge relates to the philosophy of knowledge informing differing methodologies. Quantitative research's link with positivism places a premium on striving for objective knowledge, with participants regarded as objects whose data can be universalized (Elliott *et al.* 1999). Conversely, qualitative research is underpinned by various traditions (e.g. phenomenological, critical, postmodernist) that focus on human experience and social life, including people's use of language (Elliott *et al.*

1999). Flick (1998), therefore, argues that the researcher's communication with research participants is an explicit part of knowledge production in qualitative approaches. She goes on to state that the researcher's feelings and reflections on their actions during the research process become data in their own right and this might apply to data such as field notes and reflexive diaries.

Taylor and Ussher (2001) highlight that authors of a qualitative paper often talk about themes 'emerging' from the data. They feel that this undermines the researcher's significant input into theme identification and selection. It is therefore important that the role of the analyst in deriving themes is acknowledged to reduce the use of 'emerging themes' as a term because this implies that they appear with no thought or consideration. An audit trail can be helpful in this respect, which relates to being transparent about choices made during a study (e.g. through keeping a journal). It involves recording information about thought processes and decisions in terms of, for example, sampling, analysis and how codes and themes were developed.

Over recent decades, computer assisted qualitative data analysis software (CAQDAS) has facilitated researchers in their management of data, playing a key role in an audit trail. It is outside the scope of this paper to discuss this topic in-depth; readers can find more details in other publications (e.g. Wickham & Woods 2005, Garcia-Horta & Guerra-Ramos 2009, Lewis & Silver 2009). However, although computer packages can assist with the analytical process, researchers should bear in mind that the role of these packages is in organizing and sorting data, rather than interpretation; even when using a CAQDAS, investigators are still required to engage in 'intellectual and conceptualizing processes' (Thorne 2000; 68). Qualitative data analysis is a conceptual process and critical thought is needed. Those regarding computers as a means of analysis comparable to systems for quantitative data should be aware that the packages do not analyse qualitative data—the researcher is still required to do this. Hence, what can sometimes be considered at first glance to be an easy means of analysis is actually a process requiring time and thought—themes cannot be identified using short cuts if the researcher wishes to remain true to the data (Braun & Clark 2006).

Dixon-Woods (2011) suggests that the use of analysis teams can enhance qualitative data analysis transparency. Given that research is often performed by more than one person, it seems reasonable that an analysis approach should facilitate team analysis to improve rigour and so that, if one researcher leaves or is absent for any reason, other members of the team can continue analysis without

having to start at the beginning of the process again. This relates back to the previously mentioned need for both transparency and an audit trail. It is also possible that teams comprising individuals with differing roles and from different backgrounds may enhance rigour in data analysis. This is particularly the case in FA where teamwork and collaborative analysis is facilitated by the matrix-based nature of the analysis. Involving more than one person in qualitative analysis also addresses the issues of dependability and confirmability (Tobin & Begley 2004). Keeping a reflexive journal improves rigour by ensuring that procedures during the study and emerging ideas are recorded from recruitment of participants through to development of themes (Elliott *et al.* 1999).

Background to Framework Analysis

Framework Analysis was developed by social policy researchers in the UK (Ritchie & Spencer 1994, Ritchie *et al.* 2003) as a pragmatic approach for real-world investigations. It is increasingly used in healthcare research settings such as midwifery (Furber 2010), nursing (Swallow *et al.* 2011), and health psychology (Tierney *et al.* 2011). FA involves several inter-related but distinct stages (Rabiee 2004) that allow for theme-based or case-based analysis, or a combination of the two, through the development of charts that may be read across (cases) or downwards (themes).

Framework Analysis borrows principles from different epistemological traditions in the social science field; it is this eclecticism that has remained its strength throughout its development (Ritchie *et al.* 2003). However, it should be noted that FA is a method of data analysis rather than a research paradigm such as ethnography, phenomenology, or grounded theory. Its ontological position adheres most closely to subtle realism (Snape & Spencer 2003), which maintains that the social world exists independently of individual subjective understanding, but is only accessible in qualitative research via participants' interpretations which are further interpreted by the researcher (Hammersley & Atkinson 1995). This links to nursing's tradition of adopting a holistic approach to care. Such work may be undertaken using a qualitative approach. FA gives nurses a structured and established rigorous process for managing data, whilst also allowing for the flexibility associated with qualitative enquiry (Swallow *et al.* 2011). There are similarities between different approaches to qualitative research, including data immersion and reduction and a comparison of emerging themes. However, unlike entirely inductive and iterative approaches such as grounded theory, FA may be shaped by existing ideas and is less focused on producing a new theory.

It was developed for addressing specific questions and in that sense can be seen as an applied research approach that is useful for informing both policy and practice.

The benefits of FA

Framework Analysis is an explicit approach to analysis and sits in a thematic methodology (Bridgell *et al.* 2008). It is considered as straightforward, provides transparent results and offers conclusions that can be related back to original data (Johnston *et al.* 2011). FA may be undertaken both during and after data collection (Ritchie *et al.* 2003). There is also the possibility for individual but linked studies to be analysed separately and then combined in the final analysis to identify crossing themes (Furber & McGowan 2011). It allows for flexibility and the easy retrieval of data to show others how decisions were derived (Swallow *et al.* 2011). Dixon-Woods (2011) praises the use of charting in FA for assisting transparency and team working. Charting also enables investigators with competing responsibilities (e.g. running a clinic) to stop the analysis and return later to continue where they left off.

As an approach, from the authors' experience, FA can be useful when more practiced investigators are supporting those new to qualitative research because it provides a clear track of how data moved from interview to transcripts to themes, with summaries in charts enabling researchers to discuss ideas. It also permits researchers and service users to work together and consider a study's progress (Furber *et al.* 2009) and provides an audit trail which improves dependability (Flick 1998).

Data sources

The research method used to collect data for the analysis to be discussed below is described more fully elsewhere (Ward 2010, 2011, 2012a,b).

Discussion

Framework Analysis and nursing research – a worked example

In summary, the study involved 31 nursing students. Participants were recruited to explore their experiences of clinical placements and their education needs in relation to infection prevention and control. Each participant was interviewed once for up to an hour by the first author who acted as the Principal Investigator (PI). She used a semi-structured approach until data saturation was reached. FA

was selected because it is flexible in terms of allowing data collection and analysis to run in tandem or consecutively (Srivastava & Thomson 2009) and provides a structured approach to transcript analysis. The other three authors became involved in the analysis process as they have significant experience in using FA. Following each interview field notes were taken and a reflexive diary was kept to ensure self awareness during the process from beginning to end and to acknowledge that there is subjectivity in terms of the researcher's psychological and emotional responses, a common issue in qualitative research approaches. According to Sim and Wright (2000), some elements of subjectivity can be useful in enhancing insights which have been drawn from the data. A conceptual framework is shown as chart S1 to denote what was involved in each stage and to provide examples from the study under discussion.

Stage 1 familiarization – through immersion in the data

According to Rabiee (2004), the overall aim of this stage is to become immersed in the details of each transcript, to gain a sense of whole interviews prior to dividing them into sections and identifying recurring themes. The PI familiarized herself with all transcripts and was also the person who undertook all the interviews which improved the time taken to become fully familiar with the data (Ritchie *et al.* 2003). Field notes made immediately following each interview were read alongside transcripts by the PI to ensure that the context was taken into consideration. Field notes were also useful when developing the codes and indexing frame later in the FA process. Arthur and Nazroo (2003) highlight that field notes enable the researcher to record what is seen and heard during interviews, what thoughts and feelings occur and issues that may be relevant during analysis and these were important considerations when undertaking stage 1 of FA.

Srivastava and Thomson (2009) have stated that, due to the large volume of data in qualitative research, not every piece of material may be reviewed at this stage. However, the PI felt that the sample size was small enough for all transcripts to be studied. This ensured that all data from all participants were considered and that no data were overlooked. It was seen to be a more complete process, particularly with the PI being a novice in the use of FA as it was thought that data which were not commonly repeated might be missed if only a proportion of material was reviewed. Once this process was completed, a sample of transcripts was given to the FA interest group in the university. This group allows novice researchers to learn from more experienced ones and for individuals to pass on tips

and references. All authors are members of this group and were involved in aspects of analysis with the PI analysing all transcripts and other members analysing a sample to improve consistency and rigour. There can be difficulties associated with a team approach to analysis in terms of agreement on themes and codes. However, in this instance there was one person leading and undertaking the research (the PI) who was more immersed in the data having conducted the interviews. She was ultimately responsible for decisions. Sim and Wright (2000) argue that the analyst must move to higher levels of abstraction without moving too far from the data: having a team approach to analysis ensured that this occurred. The fact that all transcripts were included meant that this process was time consuming. Overall, several whole days were invested in this stage alone but it was considered to be worth the time commitment for fuller inclusion and understanding of data.

Stage 2 developing a theoretical framework by identifying recurrent and important themes

The recurring themes identified in stage 1 can now be added to a chart either on paper or using computer software such as NVIVO, Microsoft excel (Swallow *et al.* 2003), or Microsoft Word (Furber 2010). In this case paper charts were used which may seem more time consuming but can be useful when wishing to see all the data at once as the charts can be displayed across a wall or even a room. This stage was undertaken by the PI alone. Table 1 outlines original themes and sub-themes identified in the study being described in this paper. These were derived from immersion in the data as discussed above and in collaboration with the members of the FA interest group. At this stage there was consensus but this may not always be the case, which is one of the difficulties that may be encountered in team analysis. As all transcripts were analysed by the PI but only a sample by the FA interest group, it was considered that, had consensus not been reached, the PI would have been able to defend her choice of codes and initial themes through the use of the field notes taken during the interviews and the reflexive diary kept during the process. At this stage there were the two main themes of university and practice related issues with sub-themes in these, which formed the draft framework. This stage is also time consuming and due to other commitments took place over several weeks.

Stage 3 indexing and pilot charting

The draft framework developed in stage 2 was applied back to the transcripts and notes were made regarding which

Table 1 Initial key themes and sub-themes from stage 2.

Key themes	Sub-themes
Practice	Good practice Bad practice Improving practice Area influence Impact on student practice Confusion Consequences of poor practice Power differential Attitudes to infection control
University	Reporting poor practice University education Practice education Theory-practice links Preferred teaching methods Educational needs

theme was reflected in each section. Ritchie *et al.* (2003) suggest that this is one way of undertaking this stage. A second way is to import transcripts into a computer file such as Microsoft Word or NVIVO. Noting emerging ideas on post-it notes may also be useful because they can be moved when thinking about how themes and sub-themes are related. In this worked example, as part of stage 3, themes and sub-themes were refined, combined and developed (Table 2). This process involves reading through transcript data and noting the related theme on the draft framework and was undertaken by the PI alone. The data in this case were indexed by coding and annotating the themes from the draft framework on the transcripts along-

side the appropriate text. This allowed the PI to become further immersed in the data so that themes and sub-themes could be refined (Ritchie *et al.* 2003). Decisions in this stage were based on similarities and differences between initial themes and themes becoming clearer through further data immersion. It was identified that some sub-themes in the initial framework could belong in either main theme. This was the main basis for adjustment of themes to more accurately reflect the data and sub-themes emerging. A refined framework therefore resulted from this stage to ensure that data fit in only one theme and was not repeated in several.

Stage 4 summarizing data in analytical framework

This stage allowed the researcher to reduce material into understandable but brief summaries of what was said by participants (Ritchie *et al.* 2003) (Table 3). It has been argued that this can be more easily managed with a computer package as summaries can then be linked back to full text in the transcripts (Swallow *et al.* 2003). When using FA it can be difficult for the inexperienced analyst to know how much information to include in each section so as to not overfill charts but to have enough summarized data to make sense without having to frequently refer back to the original data. Novice researchers often make the initial

Table 2 Resulting key themes following stage 3.

Key theme	Sub-themes
What is seen as good and bad practice, the basis for this and the effects on learning	What is perceived to be good practice What is perceived to be inappropriate practice The basis for this judgement The impact of observed practice on student practices The impact of observed practice on student learning
Barriers to reporting poor practice	Barriers related to placement outcome Barriers related to lack of knowledge of processes Barriers related to inter-personal impact Barriers related to power differential
The consequences of poor practice	Perceived consequences Observed consequences
The theory-practice link	The role of theory in supporting practice Consequences of not knowing theory which supports practice
Barriers and facilitators to good practice and learning good practice	Barriers to good practice Barriers to learning good practice Facilitators of good practice Facilitators to learning good practice
Attitudes towards infection control and the infection control nurse	Attitudes of staff towards infection control Attitudes of students towards infection control Attitudes towards the infection control nurse
Educational needs and preferences	Educational needs expressed by students – university related Educational needs expressed by students – practice related Preferences for teaching and learning in infection control in university

Table 3 Examples of data summaries from stage 4.

Theme	Good/bad practice, basis and effects		
Sub-theme	1.1 What is good practice?	1.2 What is inappropriate practice?	1.3 Basis for this judgement
Student 1	Use of alcohol handrub (page 4) Different coloured aprons for different tasks (page 3)	Resheathing needles (page 1) Not changing gloves between patients (page 2)	What has been taught at university (page 6) Positive role models (page 6)
Student 2	Cleaning beds between patients (page 2) Having gloves and aprons available near beds (page 2)	Not taking sharps bins to point of use of sharp (page 3) Not cleaning theatre trolleys (page 4)	NICE guidelines (page 5) Common sense (page 6)
Student 3	Weekly hand hygiene audits (page 2)	Reusing single use devices (page 1) Poor aseptic technique (page 2)	What has been taught at uni (page 4) What the infection control nurse says to do (page 7)
Student 4	Not touching curtains after hand washing (page 6) Changing gloves between patients (page 6)	Insertion of urinary catheter without gloves (page 5) Hand jewellery (page 2) Poor IV site care (page 4)	What mentor says is correct (page 6)

error of providing too much information in charts rather than succinctly summarizing data (Li & Seale 2007). This can be overcome using the page line numbering function in Word, as demonstrated in Table 3, which enables the researcher to summarize a piece of data in the chart and include a reference of where to locate it in the transcript from line numbers on the left hand side. An asterisk can also be employed to indicate a particularly rich or meaningful quotation and where to find it in the transcript without having to write it out in full in the summary chart (Ritchie *et al.* 2003).

The rationale for allocating data to different themes can be difficult to identify in full research papers; provision of an example of the process can act as an illustration (Horsburgh 2003). An example of summarizing data and allocating this to a sub-theme for the study being discussed based on one participant's narrative was in response to a question about why students do not report poor practice:

you're worried that...if you started to say something...that could then affect you getting signed off

This section of the transcript was summarized in the chart as 'worried about passing placement' in the sub-theme of 'barriers related to placement outcomes' in the key theme of 'Barriers to reporting poor practice' (see Chart S1). In FA each stage of the process is connected so, for example, summaries can be linked back to actual quotes in transcripts, demonstrating a clear audit trail.

Stage 5 synthesizing data by mapping and interpreting

Allowing for refinement of themes in FA is said to aid in the overall development of a conceptual framework (Smith

& Firth 2011). This stage allows for comparison of themes and sub-themes and checking against original transcripts, field notes, and audio recordings to ensure appropriate context. In this stage of the data analysis of the example under discussion, the charts were reviewed to see the whole data set which included checking the summaries on the charts against the original data and comparing the themes and sub-themes with each other to see if any further changes or merging was required. No changes were made to the themes or sub-themes at this stage and the final theoretical framework was agreed. This stage demonstrates the transparency of FA as at each stage the analysis process can be compared back to original data, enhancing rigour (Ezzy 2002). Ezzy (2002) also argues that this facilitates the inductive and iterative approach that is inherent in qualitative research, an issue earlier referred to when comparing FA with other approaches.

Limitations of FA

While this paper illustrates a worked example of FA in practice, it is important to note that there are limitations to the approach, as with other qualitative data analysis methods. FA can be time consuming, a disadvantage inherent in all thorough qualitative data analysis methods. It needs to be undertaken in a committed fashion to allow all data to be considered and to ensure a rigorous process. FA has been criticized for lacking the same theoretical underpinning as other qualitative approaches such as grounded theory and ethnography (Smith & Bekker 2011), though this has been highlighted earlier as a difference which can have advantages. FA has been identified throughout this paper as a flexible approach. However, it is argued by Pope *et al.* (2000)

What is already known about this topic

- Qualitative research methods produce vast amounts of data which then have to be analysed.
- There have been several criticisms levelled at qualitative data analysis in terms of issues such as opacity, transparency, and audit trail.
- Whatever paradigm researchers choose for their studies, they need to select a data analysis method that meets the needs of the paradigm and addresses criticisms.

What this paper adds

- This paper addresses some of the criticisms levelled at qualitative data analysis through a discussion of the use of Framework Analysis.
- A worked example is provided, demonstrating its use in practice.
- The background to and merits and limitations of Framework Analysis are discussed.

Implications for practice

- Nurses using qualitative research methods can use Framework Analysis to address previous criticisms of qualitative research.
- With qualitative approaches becoming more common in nursing research, a method of analysing data which provides transparency, an audit trail and promotes team working is available and accessible for nurses to use.

that this flexibility can be a limitation because there is the potential for researchers to think that this flexibility means that short cuts can be taken, which is not the case.

Implications for nursing

Nurses, increasingly, undertake qualitative research but in doing so may be criticised for their lack of rigour, transparency, and audit trail in analysis. As an approach initially developed for the social sciences, FA is now being recognized much more in nursing and is therefore a data analysis approach which could be applied by both novice and expert nurse researchers when using qualitative data collection methods. Using this approach will address many of

the criticisms levelled at analysis and will also enable nurses to work in teams as researchers and data analysts wish.

Conclusion

There is no single recommended best practice for qualitative data analysis, but it does need to be transparent and auditable to improve the credibility of findings. FA addresses some of the criticisms levelled at thematic analysis. A worked example has been presented here to demonstrate its use in nursing research, highlighting how it involves organizing, reducing, and interpreting data. The various means of handling data in FA, in terms of its management and organization (e.g. using paper, post-it notes, Microsoft Word, Microsoft Excel, or NVIVO), offer flexibility and can meet the needs of different researchers. While there are difficulties inherent in qualitative analysis and therefore in FA, there are ways of attending to these to ensure that the process is rigorous. In particular, team analysis can be useful for confirming codes and themes. FA therefore supports several researchers being involved in the process of qualitative data analysis.

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Conflict of interest

None declared.

Author contributions

All authors have agreed on the final version and meet at least one of the following criteria (recommended by the ICMJE*):

- substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data;
- drafting the article or revising it critically for important intellectual content.

*http://www.icmje.org/ethical_1author.html.

Supporting Information

Additional Supporting Information may be found in the online version of this article:

Chart S1. Conceptual Representation of stages involved in analysis of the study.

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