

QUALITATIVE RESEARCH

An introduction to reading and appraising qualitative research

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This article explores the difference between qualitative and quantitative research and the need for doctors to be able to interpret and appraise qualitative research

The number of qualitative research articles published in medical journals has increased substantially over the past few years.¹ Qualitative studies have contributed to our understanding of important clinical issues, such as patients' reasons for following or abandoning medical recommendations^{2,3} and patients' and carers' needs and wishes at the end of life.^{4,5} None the less, healthcare professionals still have strong concerns about a widespread lack of understanding of the nature and uses of such research.^{1,6,7}

This knowledge gap can be particularly problematic for a physician who is asked to review, for a journal or a grant agency, one of the increasing numbers of papers that makes use of qualitative or "mixed" (combined quantitative and qualitative) methods. Several articles in various medical subfields⁸⁻¹⁰ have highlighted this problem in the review process. It can lead to refusals by journals to publish well conducted research because of a lack of understanding of the methods involved.¹⁰ However, this same knowledge deficit among reviewers can also result in the acceptance and publication of qualitative articles that are methodologically poor.⁹

Arguments from the proponents of evidence based medicine about the need for clinicians to evaluate evidence and incorporate it into their own practice are now well accepted. Busy clinicians often depend on journals' peer review processes to evaluate the evidence for them, but this strategy is less reliable for qualitative papers than it is for their quantitative counterparts. However, although physicians who routinely read medical journals are increasingly able to critically appraise methodologically straightforward quantitative studies (and have access to excellent published resources^{11,12} for evaluating more complex studies), they have less access to the resources and training needed to appraise qualitative work.

Several attempts have been made to fill this gap in the clinical medical literature.¹³⁻¹⁶ These articles, however, simplify qualitative methodology for the medical reader and treat it as a homogeneous entity, giving little attention to its historical traditions and theoretical bases. In fact, "qualitative methods" is an umbrella term for a heterogeneous group of methodologies with different theoretical underpinnings and different ways of thinking about knowledge. Different qualitative methodologies are useful for asking different sorts of questions. Thus, just as randomised controlled trials, meta-analyses, and case-control studies are designed for answering different types of research questions, different kinds of qualitative research are useful in studying a variety of problems. Further, these different qualitative research methods need to be appraised in different ways.

This article is the first in a series that will introduce several major qualitative research approaches to readers. These approaches may differ at four different levels: in the tools that qualitative researchers use, in the methodologies they use to analyse those tools, in the theories that inform those methodologies, and in their beliefs about knowledge itself. Although we will examine methodologies and theories separately for the sake of clarity, it is important to realise that qualitative researchers pay attention to the theoretical bases of their methodological approaches, and so their choices of which theory and which methodologies to use are related. This series will also inform readers about appropriate ways to determine the quality and usefulness of qualitative clinical research. Additionally, we have compiled a table with a list of definitions of key terms used in the articles (table 1).

What's so different about qualitative research?

The differences between what are commonly called quantitative and qualitative research run deeper than the presence and absence of numbers. In general, quantitative research focuses on answering the questions "what?" "how much?" and "why?" whereas qualitative research focuses on answering the questions "why?" and "how?" Qualitative research also allows for the generation of rich data and the exploration of "real

This is the first in a series of six articles that aim to help readers to critically appraise the increasing number of qualitative research articles in clinical journals. The series editors are Ayelet Kuper and Scott Reeves.

Table 1 | Definitions of key terms used in the articles in this series

Term	Definition
Action research	A method that involves the researcher in working in collaboration with participants through cycles of evaluation and development to produce positive change in their practice or relationships
Constructivism	A belief about knowledge (epistemology) that asserts that the reality we perceive is constructed by our social, historical, and individual contexts, and so there can be no absolute shared truth
Credibility or trustworthiness	Terms used to describe the extent that findings generated from qualitative research are believable to others; quantitative researchers often refer to this as internal validity
Critical theory	A theoretical framework that assumes an oppressive relation between the powerful and the powerless; critical theorists try to use their explanations of oppression to eliminate current inequities of power
Dependability	A term used to describe the extent that findings generated from qualitative research are dependable in the sense that the researcher has accounted for the continually changing social context in which the research takes place
Discourse analysis	A methodology that analyses language to enable an understanding of its role in constructing the social world. Critical discourse analysis focuses on the macrolevel features of oral and written texts in their social contexts (as opposed to "linguistic discourse analysis," which includes the microlevel analysis of grammatical features)
Epistemology	A person's beliefs about knowledge (such as "what can be known?"); also, the subdiscipline in philosophy in which researchers study the nature of knowledge
Ethnography	A methodology that aims to understand the meanings and behaviours associated with the membership of groups, teams, etc. through the collection of observational and interview data
Feminism	A theoretical framework that is driven by an interest in women's experiences, often focusing on power differentials, with the goal of resolving inequities in society
Grounded theory	A methodology that uses iterative data collection (such as interviews, observations) and analysis to build theories about social phenomena
Hermeneutics	A theoretical framework that asserts that understanding can be reached through iterative, empirically based interpretation of a text, artefact, or interaction explicitly carried out in its cultural and historical context
Interactionism	A theoretical framework that asserts that social reality is constructed from individuals' interactions and interpretations of their social world
Member validation	A research technique in which the researcher feeds back elements of a study to participants to provide them with an opportunity to make judgments on the resonance of those elements with their own experience (sometimes referred to as member checking)
Objectivism	A belief about knowledge (epistemology) that asserts that there is an absolute truth or reality that can be discovered and that knowledge is therefore objective and neutral
Phenomenology	A theoretical framework that focuses on exploring how individuals make sense of the world and that aims to provide insightful accounts into the subjective experience of these individuals
Positivism	A theoretical framework that is guided by the search for the objective truth that will contribute to the progress of humankind
Purposive (or theoretical) sampling	A research technique in which research participants are chosen to represent a range of beliefs and experiences that the researcher believes will be relevant to the research question
Postmodernism	A theoretical framework that encompasses the concept of a fragmented, ever changing reality; also, the abandonment of the modernist ideals of progress and rationality
Reflexivity	A research technique to enhance researchers' recognition of their own influence on their research, such as how their gender, ethnic background, and social status influence the choices they make about methods, data collection, and analysis
Resonance	A term employed to describe the extent that findings from qualitative research "resonate" with (have meaning for) readers/audiences; broader resonance allows researchers more confidence with respect to the applicability of their research to other settings
Saturation	A research technique that is used during a study to inform the number of participants necessary for a given sample; data are analysed concurrently with data collection, and the sample is said to be saturated (so data collection can cease) when new themes stop emerging from the data that have already been gathered
Triangulation	A research technique in which a researcher compares the findings of different methods and the perspectives of different people or groups to help produce a more comprehensive set of findings; this is not the same as inter-rater reliability, and does not necessarily require more than one researcher

life" behaviour, enabling research participants to speak for themselves. Box 1 contains recent examples of questions examined in studies using qualitative research methods.

Many quantitative researchers in the health sciences work from the assumption that there is an absolute truth, a "reality," which they are trying to discover. For these researchers, knowledge is objective and neutral. This belief about knowledge has been called "objectivism" and the theoretical framework it implies is called "positivism" (see table 2). However, the relevance of this objectivist belief about knowledge has been the subject of challenges since the end of the 19th century. Many of these challenges have come from studies of social phenomena, such as individual and group behaviour. Most qualitative researchers today share a different belief about knowledge, called "constructivism," which holds that the reality we perceive is constructed by our social, historical, and individual contexts.

Most of the qualitative research theories and methodologies that will be discussed in this series assume this constructivist approach to the nature of knowledge. As table 2 shows, constructivism encompasses many theories, which differ on such matters as how much of someone's perception of reality results from aspects of that individual and how much from aspects of the society that surrounds him or her. Some theories (such as interactionism) also assume that there is one shared reality for a group of people, while others (such as postmodernism) assume that multiple realities exist in parallel because of the differences between individuals. However, in all of these theoretical frameworks, individuals create, negotiate, and interpret meanings for their actions and for the social situations in which they exist. This does not usually imply the lack of the real physical world around us, just that our interpretations of that world can differ depending on our social contexts.

Importantly, researchers can also use quantitative methods (such as statistics) and believe that reality is constructed. For example, the items contained in a survey of patient satisfaction are constructed by researchers and will reflect their understanding of the range of possible things about which a patient might be satisfied (or not). Table 2 summarises a comparison between objectivist and constructivist approaches.

How does qualitative research work?

Qualitative research aims to generate in-depth accounts from individuals and groups by talking with them, watching their behaviour, and analysing their artefacts (such as diaries, meeting minutes, photographs) and taking into account the different contexts in which they are based. Qualitative researchers primarily gather data from interviews (semistructured or unstructured), focus groups, observations, or documents and other written artefacts. Their data analysis is largely inductive, allowing meaning to emerge from the data, rather than the more deductive, hypothesis centred approach favoured by quantitative researchers. Analysis in

Box 1 Recent research questions examined in studies using qualitative methods

- How do inpatients receiving palliative care for advanced cancer perceive heparin thromboprophylaxis in terms of its impact on their overall quality of life? (Noble SJ, Nelson A, Turner C, Finlay IG. Acceptability of low molecular weight heparin thromboprophylaxis for inpatients receiving palliative care: qualitative study. *BMJ* 2006;332:577-80)
- How do women who are being abused by their partners want their health care providers to react to the disclosure of this abuse? (Feder GS, Hutson M, Ramsay J, Takeda AR. Women exposed to intimate partner violence: expectations and experiences when they encounter health care professionals: a meta-analysis of qualitative studies. *Arch Intern Med* 2006;166(1):22-37)
- How do patients and physicians think that medical errors should be discussed? (Gallagher TH, Waterman AD, Ebers AG, Fraser VJ, Levinson W. Patients' and physicians' attitudes regarding the disclosure of medical errors. *JAMA* 2003;289:1001-7)
- What medical and non-medical factors affect the priorities for admission to a hospital's critical care unit? (Mielke J, Martin DK, Singer PA. Priority setting in a hospital critical care unit: qualitative case study. *Crit Care Med* 2003;31:2764-8)
- How do British patients of Pakistani and Indian origin with type 2 diabetes perceive the use of oral hypoglycaemic agents? (Lawton J, Ahmad N, Hallowell N, Hanna L, Douglas M. Perceptions and experiences of taking oral hypoglycaemic agents among people of Pakistani and Indian origin: qualitative study. *BMJ* 2005;330:1247)
- How do the school aged children of women in whom breast cancer has been newly diagnosed perceive their mothers' illness and its treatment? (Forrest G, Plumb C, Ziebland S, Stein A. Breast cancer in the family—children's perceptions of their mother's cancer and its initial treatment: qualitative study. *BMJ* 2006;332:998-1003).

qualitative research is also theory based and often iterative, moving between empirical findings and conceptual frameworks.

Understanding the context in which people live is a central concern for qualitative researchers. Qualitative researchers need to identify their own contexts so that they understand how their own views and beliefs may influence the interactions they have with their participants (a process often referred to as “situating” themselves). Research questions and findings are

therefore invariably and directly influenced by the researchers' perspectives and by the unique perspectives of their research participants. This influence should be made explicit in qualitative research papers. It is distinctly different from what the quantitative world would call “bias,” because the term bias implies that there is a true reality that the researchers' perspectives are hindering them from seeing.

Qualitative researchers, in contrast, generally believe that such “reality” is a construction. In the qualitative paradigm, the goal is precisely to understand, not erase, differing perspectives. These perspectives are accepted as inescapably affecting all research (both qualitative and quantitative), whether through choice of research questions and methods, through the process of data interpretation, or through the choice of which results to publish. The process of situating the researcher's viewpoint allows readers to decide for themselves the effect such perspectives might have had on the research. The findings of a qualitative study are also not intended to be generalisable in the same way as the results of a quantitative study. They may, however, be transferable to other contexts, and readers can assess their applicability to their own settings. Study results can also be used to extend or modify existing theories; as theories are often used across multiple domains, changes in such theories can in turn affect thinking in other research areas (the use of theories in qualitative research is the topic of a later paper in this series).

Conclusions

Qualitative methods are becoming increasingly prevalent in medical and related research. They provide additional ways for health researchers to explore and explain the contexts in which they and their patients function, enabling a more comprehensive understanding of many aspects of the healthcare system. The biggest challenge facing a new reader in this field is the

Table 2 | Comparison of objectivist and constructivist approaches

Topic	Objectivist approach	Constructivist approach
Common theoretical frameworks	Positivism	Interactionism; phenomenology; hermeneutics; critical theory; feminism; postmodernism
Common methodologies	Experimental; quasi-experimental	Ethnography; grounded theory; action research; discourse analysis
Common research tools	Statistical analysis; surveys	Observations; interviews and focus groups; document analysis
Orientation	Quantitative	Qualitative; quantitative
Fundamental questions	What? Why (cause)?	How? Why (explanation)?
Underlying approach	Experimental	Naturalistic; exploratory
Researcher stance	Detached stance	Situated, involved stance
Sampling techniques	Random	Purposive; theoretical
Research context	Excluded	Central importance
Data analysis	Deductive	Inductive
Quality criteria	Internal and external validity; reliability; statistical significance	Trustworthiness and dependability; credibility; resonance
Researchers' values	Excluded (influence denied)	Included (formative)
Knowledge accumulation	Accretion (“building blocks”); cause and effect	More informed, deeper understanding

First three rows based on Crotty.¹⁷

SUMMARY POINTS

The presence of qualitative research articles in clinical journals has increased substantially in recent years

Clinicians need to be able to interpret and appraise qualitative research to apply its results to their practice

Qualitative researchers make different assumptions from quantitative researchers and therefore use different data collection and analysis tools

Quantitative research focuses on answering the questions "what?" "how much?" and "why?" whereas qualitative research focuses on answering the questions "why?" and "how?"

plethora of unfamiliar terms and concepts in the qualitative approach. This series is intended to help readers to understand the qualitative research that may be relevant to their clinical practice.

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RATIONAL IMAGING

Investigating severe interscapular pain

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This article explores the radiological investigations for identifying the cause of severe interscapular pain, focusing on how to exclude acute myocardial infarction, aortic dissection, and pulmonary embolism

A 52 year old woman presented with a sudden onset (two hour history) of severe interscapular burning pain associated with shortness of breath. Her medical history was unremarkable except for a strong family history of coronary heart disease.

Examination was normal apart from a blood pressure of 150/80 mm Hg and heart rate of 110 beats/min. The respiratory rate was 14 breaths/min, and the patient was afebrile with otherwise normal cardiorespiratory examination. Chest radiography showed borderline widened mediastinum and upper lobe venous congestion. Electrocardiography showed non-specific changes in the T waves. Blood gas analysis showed the patient to be hypoxic (PaO₂ = 8 kPa (normal 8-14 kPa)), with no evidence of carbon dioxide

retention. Her full blood count and biochemical profile were normal except for mildly raised C reactive protein and positive D-dimers. Baseline level of troponin I was <0.01 ng/ml.

Chest pain was partially relieved by glyceril trinitrate spray; subsequently the patient was given a morphine injection to ease her pain.

What are the next investigations?

The three important diagnoses that need to be excluded (the "triple rule out") are:

- Acute myocardial infarction
- Acute aortic syndrome (aortic dissection or intramural haematoma)
- Pulmonary embolism.

A clear diagnosis in this patient's case must be established before any treatment is started as treatment options vary tremendously.

Serial electrocardiography and 12 hour troponin I testing A troponin test that is repeated after 12 hours, combined with serial electrocardiography until the pain resolves, has a high accuracy for ruling in or out

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This series provides an update on the best use of different imaging methods for common or important clinical presentations. The series advisers are Fergus Gleeson, consultant radiologist, Churchill Hospital, Oxford, and Kamini Patel, consultant radiologist, Homerton University Hospital, London.

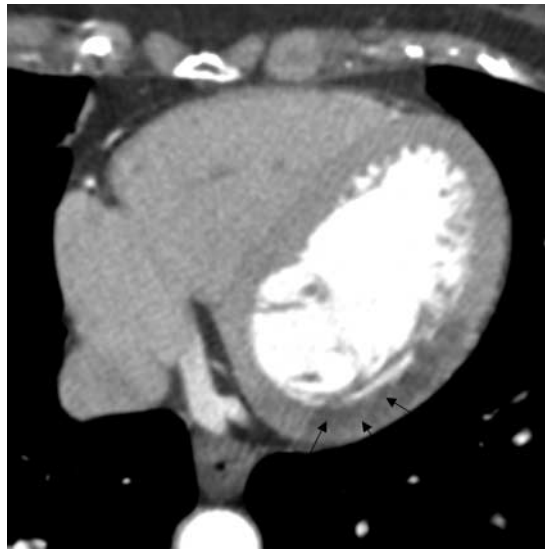


Fig 1 | Multidetector computed tomogram—cross section through the left ventricle showing posterior transmural infarction (arrows)

acute coronary syndrome or myocardial infarction. The disadvantage of this approach is that it relies on troponin T released from the already dead myocardium. In addition, it does not give any information about the possibility of pulmonary embolism or aortic dissection.

Echocardiography

The sensitivity of transthoracic echocardiography in detecting an acute aortic syndrome is about 60%, and specificity 30%.¹ The primary problem with transthoracic echocardiography is its inability to adequately visualise the distal ascending, transverse, and descending aorta in a substantial majority of patients.

Transoesophageal echocardiography can be used for detecting acute aortic syndrome owing to the close proximity of the oesophagus to the thoracic aorta and the absence of an intervening lung or chest wall. Transoesophageal echocardiography is a portable procedure, which can be done in an emergency unit; however, the procedure has an overall risk of complications of 2% (complications such as bacteraemia, oesophageal rupture, and bleeding). It has high sensitivity (97-99%) for identifying thoracic aortic dissection but its specificity is only 77-85%, and the aortic arch is not visualised in its entirety.¹

Echocardiography is useful in investigating a pulmonary embolism but detects only the haemodynamic consequences of obstructive embolism, which is present in only 30-40% of patients. Echocardiographic abnormalities suggestive of acute pulmonary embolism include increased right ventricular size, flattening of the interventricular septum, and pathological tricuspid regurgitation.²

Echocardiography may be useful for ruling out acute myocardial infarction by showing normal regional wall motion. The sensitivity of echocardiography is very high (93%), but the specificity is limited (31%) as many

other causes of wall motion abnormalities exist. Thus, the major potential value of echocardiography is to help exclude rather than diagnose an acute myocardial infarction.³

Electrocardiogram gated multidetector computed tomography

Computed tomography is done in late diastole when the heart is relatively stationary and not degraded by movement blur. The advantages of doing electrocardiogram gated thoracic multidetector computed tomography is that it can give information about the heart, lungs (including pulmonary vasculature), and great vessels all in one study.

The sensitivity and specificity of 64-slice multidetector computed tomography in detecting atherosclerotic coronary artery disease are 80-99% and 95-97% respectively.⁴ After acute myocardial infarction it will show atheroma or occlusion of the affected artery and the corresponding perfusion defect. In a prospective study of 58 patients presenting to emergency departments with chest pain and with no new electrocardiographic changes or raised biochemical markers, multidetector computed tomography had 100% sensitivity and 92% specificity, with 100% negative predictive value for ruling out acute coronary syndrome in or out.⁵

Multidetector computed tomography is the imaging of choice for acute aortic syndrome as it is usually more readily available and less invasive than transoesophageal echocardiography. It can show a dissection flap or an intramural haematoma. The sensitivity of standard computed tomography for diagnosing aortic dissection is 83-98% and the specificity is 87-100%.⁶ The addition of electrocardiogram gating improves image quality and allows coronary artery analysis. Multidetector computed tomography is extensively used in North America but is underused in the United Kingdom.



Fig 2 | Multidetector computed tomogram—reformatted image showing severe stenosis in the circumflex artery (arrow)

LEARNING POINTS

Three important diagnoses to consider in interscapular chest pain include pulmonary embolism, myocardial infarction, and aortic dissection

Echocardiography can rule out myocardial infarction if ventricular wall motion is normal but has a low sensitivity for diagnosing pulmonary embolism and aortic dissection

Multidetector computed tomography is optimal for excluding the three diagnoses above; it has more than 90% sensitivity and specificity for diagnosing pulmonary embolism and aortic dissection. The use of electrocardiogram gating allows evaluation of the coronary arteries and detection of acute myocardial infarction in selected patients

The procedure is also very sensitive in detecting pulmonary embolus. The sensitivity of computed tomography pulmonary angiography is 90% and the specificity 95% in detecting a pulmonary embolism.⁷

Radiation dosage from multidetector computed tomography is variable and is dependent on the technique used. With prospective gated scanning, doses of less than 5 mSv are achievable.

Myocardial perfusion imaging

Myocardial perfusion imaging can be used mainly to rule out an acute coronary syndrome with a negative predictive value of >99%.⁸ However, it is not used for diagnosing pulmonary embolus or acute aortic syndrome because it is a dedicated myocardium study. In addition, myocardial perfusion imaging is a lengthy procedure, taking about four hours, so not suitable for acutely ill patients.

Outcome

Multidetector computed tomography was performed. We ruled out aortic dissection and pulmonary embolism. However, the tomograms showed extensive

perfusion defect in the circumflex territory, suggesting acute posterolateral myocardial infarction (fig 1). Analysis of the coronary arteries using curved reformats (oblique reformats to show all the vessels in one image) showed a severe stenosis in the circumflex artery and disease in the left anterior descending artery (fig 2). This was confirmed at invasive coronary angiography, and the patient had revascularisation with coronary stenting.

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Paradoxical medicine

Being from a middle class family in Pakistan and studying classic Ayurvedic medicine as a hobby, our maternal grandfather always wanted one of his children to become a medical doctor. For various reasons, mostly financial, this dream never materialised. However, our mother continued to pursue this wish, and eventually three of her children became medical doctors in the Netherlands.

One December the whole family came together to celebrate the holiday season. The weather was cold and wet, and several family members developed a horrible cold and cough.

Being strong proponents of evidence based medicine in our daily clinical practice, we doctors advised various standard remedies such as not going out into cold and dry air too often, stopping smoking, taking cough syrup, etc. Unsurprisingly, none of these helped, so we resorted to advising doing nothing and letting nature take its course.

During our childhood, however, our mother had treated us with herbal medicines to cure common ailments. With time, and influenced by our studies, we became less and

less fond of those treatments. Undaunted, our mother now administered such a herbal mixture to those of the family who were coughing. We will never know whether it was the natural course of the illness (no control group), the placebo effect of the mixture (no blinding), motherly love (confounding), or a true healing effect (only a randomised clinical trial could prove this), but everyone's cough disappeared within two to three days.

We would never prescribe this mixture to any of our patients because of lack of clinical evidence, but we can't deny that, after drinking the mixture under strict maternal orders, our coughs, too, started to subside.

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