

Qualitative research series

The art and science of clinical knowledge: evidence beyond measures and numbers

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Medical doctors claim that their discipline is founded on scientific knowledge. Yet, although the ideas of evidence based medicine are widely accepted, clinical decisions and methods of patient care are based on much more than just the results of controlled experiments. Clinical knowledge consists of interpretive action and interaction—factors that involve communication, opinions, and experiences. The traditional quantitative research methods represent a confined access to clinical knowing, since they incorporate only questions and phenomena that can be controlled, measured, and counted. The tacit knowing of an experienced practitioner should also be investigated, shared, and contested. Qualitative research methods are strategies for the systematic collection, organisation, and interpretation of textual material obtained from talk or observation, which allow the exploration of social events as experienced by individuals in their natural context. Qualitative inquiry could contribute to a broader understanding of medical science.

“... to focus on the validity and precision of all our information sources—research based or otherwise—is essential if physicians are to apply their knowledge efficiently and effectively. . . .”¹

Medical doctors believe that their field is founded on scientific knowledge;² where knowledge is defined as facts that can be empirically verified by the biomedical method. The quantitative research paradigm of medicine represents, however, a confined access to clinical knowledge, since it incorporates only questions and phenomena that can be controlled, measured, counted, and analysed by statistical methods.

In the first of two articles, I shall consider the nature of clinical knowledge in medicine, expose some of the shortcomings of traditional medical research methods, and finally introduce qualitative research methods as an approach to increase our understanding of medicine. My focus is on dilemmas related to the interpretation of evidence from tacit medical knowing. I do not, however, aim to provide an authoritative review of current debates about the role and scope of qualitative research in medicine. In my second article, I will discuss scientific quality within this field. I will address specific dilemmas when qualitative research methods are applied in medicine, and subsequently propose standards for qualitative inquiry.

The nature of clinical knowledge

Clinical practice might be an expression of systematic and critical assessment, continuous experimentation, and subsequent revision of knowledge in which informal norms and implicit algorithms are available for deliberation.³ Yet, although the ideas of the critical clinical school and evidence-based medicine are widely accepted, controlled experiments are rarely the sole basis

on which clinical decisions are made.^{4,5} When knowledge is applied to the individual patient, the logic of affirmation often over-rules the scientific logic of refutation.⁶ The experienced clinician realises that differences between actual everyday practice and accepted standards often arise.³ Clinical practice is, at its worst, a private enterprise, shut off from outside assessment, where pitfalls and fallacies are reproduced by dangerous and irrational subjectivism. We know, for example, that stereotyping related to sex, occupation, and social class subtly affects strategies for diagnosis and treatment.⁷ The tacit knowing held and applied by proficient practitioners, however, represents a valuable form of clinical knowledge, which has been acquired through experience, and which should be investigated, shared, and contested.^{8–10}

The task of the physician is two-fold: to understand the patient and to understand the disease.¹¹ According to Levenstein and colleagues,¹¹ there is a well tried clinical method for understanding diseases, but no equivalent method for understanding patients. However, even apparently clear-cut medical tasks are not always as scientifically proven as we would like to believe. There is, for example, much interobserver variation, which affects the accuracy and variability of assumed clinical facts¹²—ie, when reading of mammographic images.¹³ Also, laboratory research findings are affected by manipulation and interpretation.^{14,15} Furthermore, diagnosis of a disease is affected by a doctor's personal experiences, and is not always just a matter of objectively observable facts.¹⁶

The difficulty for medicine as a discipline is maybe not that this subjectivity is happening, but that the medical research tradition lacks strategies for the study of interpretive action, its dynamics and its consequences. Leder¹⁷ suggests that modern medicine is flawed because of a refusal to accept that results of research are outcomes of interpretation. In an attempt to escape all interpretive subjectivity, he stated, medicine has threatened to expunge its primary subject—the living, experiencing patient.¹⁷ The quantitative nature of biomedical inquiry rules out essential elements of clinical interaction and judgment—topics that involve communication, opinions, and experiences.¹⁸

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Clinicians sometimes become confused about how the biomedical logic of bodily processes can be challenged or even counteracted by an understanding of meaning and context. Human and social sciences can help to diagnose a disease in an individual, and to identify an appropriate treatment. Montgomery Hunter¹⁹ emphasises that understanding medicine as a narrative activity enables physicians and patients to shift the focus of medicine to the care of what ails the patient and away from the relatively simple matter of the diagnosis of disease.

Clinical interaction requires the understanding of particulars to be integrated with the understanding of universals. When medical knowledge generated from groups is applied to individuals, careful negotiations with the specific patient and situation are essential for adequate understanding and management.^{8,20,21} A patient's life, history, and feelings are not easily translated to biomedical variables and statistics.^{19,22} Therefore, specific methods need to be designed to grasp the cultural gaps that sometimes distort diagnostic clarity,²³ symptoms as experienced by the patient,²⁴ and talk as material for scientific analysis.²⁵ Methods for the systematic exploration of such hypotheses are rare in medicine.

The art of medicine

According to Polanyi,²⁶ human knowing is characterised by the fact that we know more than we can impart. A person, for example, might be able to do complicated actions, constituting comprehensive knowledge, though at the same time be unable to explain their actions. The ability to identify many small factors and to see how they fit together as a whole is fundamental for this kind of practical understanding. Polanyi refers to the art of diagnosing as an example of skilful testing and expert observation, which cannot always be explicitly accounted for.

Schön⁶ describes the competence of experienced practitioners to consider what they know intuitively in the midst of action as reflection-in-action. Reflection-in-action comprises the practitioner's unconscious and inarticulate conversation with the situation, where reframing and reworking of the problem leads to its restructuring. The practitioner's repertoire of examples, images, understandings, and actions—rarely made explicit in action—embraces a capacity for dealing with unique situations and individuals. This practical, clinical knowledge is gradually developed to a more advanced capacity as the practitioner gains in experience.²⁷ In clinical work, tacit knowing constitutes an important part of diagnostic reasoning and judgment of medical conditions.²⁸ As practitioners, we apply a broad range of experiential knowledge and strategies that are hardly mentioned in the textbooks.

This tacit and practical knowing inherent in clinical practice is often referred to as the art of medicine. However, such a definition might, unfortunately, protect clinical knowledge and action from scrutiny and attention, by establishing the art of medicine as being the opposite of the science of medicine. My claim is not to say that the practitioner should always know and be able to tell what is going on, but to challenge the medical research tradition to understand more of what is going on in clinical practice. What some people see as the invisible power of the art of medicine might just be a provisional lack of visualisation, articulation, and documentation, and a challenge for research.²⁹ Qualitative research methods could provide means for academic descriptions, analysis, and development of hitherto inarticulated clinical knowledge, beyond the level that can be reached

through apprenticeship as a way of disseminating knowledge. What is, for example, said in the medical literature about the sensations and interpretations related to the palpation of an enlarged liver?

The failure of traditional quantitative approaches to get to grips with the interactional, interpretive, and normative elements of clinical medicine calls for additional strategies. How can prevalences or rating scales help us to understand the barriers for patients from deprived populations with respect to cardiological referral?²³ How do practitioners perceive patients suffering from conditions that are frustrating and unremitting?²⁷ Which patterns of communication arise when doctors ask patients to write diaries about their symptoms?³⁰ How is the everyday life of a patient with chronic fatigue syndrome affected by symptom experience?²⁴ Why do patients change their GP?³¹ How is the pattern of consultations seen by my more experienced colleagues who still enjoy their practice?⁸

Questions such as these remind us that medicine, as a discipline dealing with health and disease in the living bodies of human beings in their sociocultural environments, needs a broad scope and base of knowledge. Numbers alone can never provide the whole range of evidence needed for clinical work—evidence here meaning more than the outcomes of randomised controlled trials. Hence, to systematise clinical knowledge for description and analysis should not be thought of as a blasphemous or unreasonable threat to the art of medicine. Qualitative research methods can help bridge the gaps between theory and practice in medicine, provided that standards of scientific rigour and quality are maintained.

Qualitative research

Qualitative research methods, also called naturalistic inquiry,^{32,33} were developed within the social and human sciences, and refer to theories on interpretation (hermeneutics) and human experience (phenomenology). They include various strategies for systematic collection, organisation, and interpretation of textual material obtained by talking with people or through observation. The aim of such research is to investigate the meaning of social phenomena as experienced by the people themselves.³⁴ Contemporary qualitative inquiry belongs to the traditions of postmodernism and social constructionism,³⁵ in which the researcher is an active participant in the development of knowledge; investigators are prepared to achieve partial understanding and to identify new questions about their research topic, rather than definite answers.

The notion of “qualitative” refers to quality in the sense of hallmarks, features, character, nuances, complexity, or nature of the phenomenon under study. Qualitative inquiry might be applied on a descriptive level, but can also include values and norms. Hence, qualitative methods can be used as tools for quality assessment, but do not in themselves signify quality in the sense of good, adequate, or excellent. They are more appropriate for understanding than for explanation, and they cannot be applied to answer questions about numerical matters such as extent, distribution, or differences.

Qualitative methods are useful for the study of human and social experience, communication, thoughts, expectations, meaning, attitudes, and processes, especially related to interaction, relations, development, interpretation, movement, and activity—all core components of clinical knowledge. Contextual issues are

better studied with these methods than with quantitative approaches. However, qualitative research should not be used only to study communication and interaction, but also to answer questions such as “what is x like?”, “how might y happen?”, “which hypotheses could be proposed for z?”, “by touch alone, how can one tell the difference between an enlarged liver and one that is palpable because of other reasons?”, and “what makes a surgeon operate even when in doubt?”.

Data for analysis is collected by use of semistructured interviews with individuals^{7,23,35} or groups;^{24,36} through observation, with more or less participation and intervention;^{10,25} by keeping field notes;⁸ by means of open-ended survey questions;³⁷ or from action research, where data sources are multiple and complex.^{9,38,39}

Qualitative research in medicine

Qualitative research methods are now being used in the field of medicine.^{1,40} Several studies of varying quality have been published over the past years, some by highly reputable medical journals. Research into health services often applies methodologies from anthropology (eg, participant observation) or psychology (eg, in-depth interviews).^{35,41} Qualitative studies on communication and doctor-patient interaction^{8,9,10,25,30} have been presented from general practice research. Crossdisciplinary or multidisciplinary approaches indicate the potential of looking at medicine from a different conceptual framework, but also provide demanding challenges with respect to dialogue and collaboration across traditional cultural boundaries.

This path of development might have misled doctors to believe that qualitative methods are restricted to the “soft” domains of medicine. Although the social and human sciences long ago established traditions for interpretation of narratives and social structures, medicine still seems somehow reluctant towards qualitative approaches. However, qualitative approaches can be applied to a broad range of research questions. By combining qualitative and quantitative approaches, the shortcomings of both strategies can be offset.⁴² Triangulation, a notion drawn from land surveying, implies that a more accurate or adequate account can be provided when a point is described from different perspectives or angles. The validity of clinical evidence can be strengthened when qualitative and quantitative methods complement each other. However, the scientific quality of an individual study—qualitative or quantitative—must certainly be available for assessment according to broadly accepted criteria. I will discuss these in my second article.

Qualitative approaches are often seen to represent a distinctive paradigm,^{33,43} drawing on text instead of numbers, applying procedures for interpretation of meaning instead of statistics to calculate probabilities, aiming for wholeness rather than details, and acknowledging the involvement of the researcher in the construction of knowledge. Social scientists have also asserted a special devotion to theoretical accounts and frameworks for qualitative approaches. However, for a medical researcher who compares qualitative and quantitative methods, the similarities might be more apparent than the differences. Although procedures used in the interpretation of textual information differ from those used in statistical analysis, the aim of both qualitative and quantitative research is much the same.

Qualitative and quantitative strategies should be thought of as being complementary rather than conflicting. Medical researchers need a broad range of

research skills to choose the path of inquiry that will most adequately provide valid accounts of the actual study field. No methodology can in itself warrant scientific quality—the crucial condition is how the process of knowledge aggregation and organisation is handled and presented.

References

- Horton R. The interpretive turn. *Lancet* 1995; **346**: 3.
- Sassower R, Grodin MA. Scientific uncertainty and medical responsibility. *Theor Med* 1987; **8**: 221–34.
- Stein HF. The role of some nonbiomedical parameters in clinical decision making: an ethnographic approach. *Qual Health Res* 1991; **1**: 6–26.
- Wulff HR. Rational diagnosis and treatment. *J Med Philos* 1986; **11**: 123–24.
- Sackett DL, Richardson WS, Rosenberg W, Haynes RB. Evidence-based medicine: how to practice and teach EBM. New York: Churchill Livingstone, 1997.
- Schön DA. The reflective practitioner: how professionals think in action. London: Avebury, 1991.
- Skelton AM, Murphy EA, Murphy RJL, O'Dowd TC. General practitioner perceptions of low back patients. *Fam Pract* 1995; **12**: 44–48.
- Miller WL. Routine, ceremony, or drama: an exploratory study of the primary care clinical encounter. *J Fam Pract* 1992; **34**: 289–96.
- Stensland P, Malterud K. New gateways to dialogue in general practice: development of an illness diary to expand communication. *Scand J Prim Health Care* 1997; **15**: 175–79.
- Malterud K, Hollnagel H. Encouraging the strengths of women patients: a case study from general practice on empowering dialogues. *Scand J Public Health* 1999; **27**: 254–59.
- Levenstein JH, McCracken EC, McWhinney IR, Stewart MA, Brown JBB. The patient-centred clinical method: 1 A model for the doctor-patient interaction in family medicine. *Fam Pract* 1986; **3**: 24–30.
- Koran LM. The reliability of clinical methods, data and judgments. *N Engl J Med* 1975; **293**: 642–701.
- Elmore JG, Wells CK, Lee CH, Howard DH, Feinstein AF. Variability in radiologists' interpretation of mammograms. *N Engl J Med* 1994; **331**: 1493–99.
- Latour B, Woolgar S. Laboratory life: the construction of scientific facts. Princeton: Princeton University Press, 1986.
- Anon. Subjectivity in data analysis. *Lancet* 1991; **337**: 401–02.
- Malterud K. The (gendered) construction of medical diagnosis: interpretation of symptoms and signs in female patients. *Theor Med Bioethics* 1999; **20**: 275–86.
- Leder D. Clinical interpretation: the hermeneutics of medicine. *Theor Med* 1990; **11**: 9–24.
- Foss L. The challenge to biomedicine: a foundations perspective. *J Med Philos* 1989; **14**: 165–91.
- Hunter KM. Doctors' stories: the narrative structure of medical knowledge. Princeton: Princeton University Press, 1991.
- McWhinney IR. “An acquaintance with particulars...” *Fam Med* 1989; **21**: 296–98.
- Hollnagel H. Explaining risk factors to patients during a general practice consultation: conveying group-based epidemiological knowledge to individual patients'. *Scand J Prim Health Care* 1999; **17**: 3–5.
- Mishler EG. The discourse of medicine: dialectics of medical interviews. Norwood: Atlex Publishing Corporation, 1984.
- Gardner K, Chapple A. Barriers to referral in patients with angina: qualitative study. *BMJ* 1999; **319**: 418–21.
- Söderlund A, Skoge AM, Malterud K. “I could not lift my arm holding the fork...”: living with chronic fatigue syndrome. *Scand J Prim Health Care* 2000; **18**: 165–69.
- Nessa J. From a medical consultation to a written text. *Scand J Prim Health Care* 1995; **13**: 83–92.
- Polanyi M. The tacit dimension. Gloucester: Peter Smith, 1983.
- Dreyfus HL, Dreyfus SE. Putting computers in their place. *Soc Res* 1986; **53**: 57–76.
- Widdershoven-Heerding I. Medicine as a form of practical understanding. *Theor Med* 1987; **8**: 179–85.
- Malterud K. The legitimacy of clinical knowledge: towards a medical epistemology embracing the art of medicine. *Theor Med* 1995; **16**: 183–98.
- Stensland P, Malterud K. Approaching the locked dialogues of the body: communicating symptoms through illness diaries. *Scand J Prim Health Care* 1999; **17**: 75–80.
- Gandhi IG, Parle JV, Greenfield SM, Gould S. A qualitative

- investigation into why patients change their GPs. *Fam Pract* 1997 **14**: 49–57.
- 32 Lincoln YS, Guba EG. Naturalistic inquiry. Newbury Park: Sage Publications, 1985.
- 33 Miles MB, Huberman AM. Qualitative data analysis: an expanded sourcebook, 2nd edn. Thousand Oaks: Sage Publications, 1994.
- 34 Burkett GL, Godkin MA. Qualitative research in family medicine. *J Fam Pract* 1983; **16**: 625–26.
- 35 Kvale S. InterViews: an introduction to qualitative research writing. Thousand Oaks: Sage Publications, 1996.
- 36 Krueger RA. Focus groups: a practical guide for applied research. Thousand Oaks: Sage Publications, 1994.
- 37 Malterud K, Børheim A. Peeing barbed wire: symptom experiences in women with lower urinary tract infection. *Scand J Prim Health Care* 1999; **17**: 49–51.
- 38 Whyte WF, ed. Participatory action research. Newbury Park: Sage Publications, 1991.
- 39 Malterud K. Action research: a strategy for evaluation of medical interventions. *Fam Pract* 1995; **12**: 476–81.
- 40 Jones R. Why do qualitative research? It should begin to close the gap between the sciences of discovery and implementation. *BMJ* 1995; **311**: 2.
- 41 Bogdewic SP. Participant observation. In: Crabtree BF, Miller WL, eds. Doing qualitative research, 2nd edn. Thousand Oaks: Sage Publications, 1999: 47–69.
- 42 Barbour RS. The case for combining qualitative and quantitative approaches in health services research. *J Health Serv Res Policy* 1999; **4**: 39–43.
- 43 Pope CP, Mays N, eds. Qualitative research in health care, 2nd edn. London: BMJ Books, 2000.