

Medical Research Paradigms: Positivistic Inquiry Paradigm versus Naturalistic Inquiry Paradigm

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Introduction

There were several reasons that triggered this study. Firstly, it arose from our early experience as a health care provider and then as a research officer. During these periods of our working life, the authors were struck by the philosophical contrast between positivistic (quantitative) inquiry approach and naturalistic (qualitative) inquiry approach on the one hand and the authority and the influence of the quantitative inquiry methods in medical schools on the other hand.

Secondly, based upon a review of the literature, which the authors carried out, we noticed that the vast majority of published articles in medicine were quantitative, particularly in Iran. However, our experience show that such studies did not resolve problems relating to health care systems or the results of quantitative research methods are often not implemented in clinical practice, particularly using cross sectional studies in examining attitudes, beliefs, and values and quasi-experimental designs, which are predominant in Iran.

Finally, the research modules, particularly the foundation of social research (Crotty, 1998), provide not only the opportunity for exercising our intellect, but clarifying philosophical thoughts regarding research paradigms in medicine. In this study, we are not expecting to provide the answer to philosophical questions that we have been faced with for millennia. We have a smaller ambition; to ask some relevant questions and satisfy ourselves that not only we have learned a great deal on the basics of the philosophy of social science, but have an understanding of the arguments that are relevant to medical research and methodology. In short, to explain the philosophical ontology of both a positivistic inquiry approach and a naturalistic inquiry approach and the way in which they are attached to "method". We do not expect this study to cover everything, but to provide a basic

framework for further exploration in the research topic, particularly on research methodology. Indeed, the purpose of this study is to portray the epistemological issues arising from qualitative and quantitative methods and to look at how these two different inquiry approaches can be integrated to create an effective medical inquiry paradigm.

The naturalistic inquiry paradigm

Any process of systematic research is said to be directed by a series of basic beliefs and values. These beliefs and values which shape the foundation of a research approach or theoretical and conceptual framework are designed in order to answer four questions: 1) "what is the nature of knowledge or reality" (ontology), 2) "what is relationship between the researcher and knowledge", and 3) "what constitutes adequate justification for knowledge?" (Epistemology), and 4) "how should the inquirer go about finding out knowledge"? (Methodology) (Bailey, 1997).

Guba (1990) stated "the quantitative inquiry approach is rooted in a realist ontology, that is the belief that there exists a reality out there, driven by immutable natural laws. Once committed to a realist ontology, the positivist is constrained to practice an objectivist epistemology. If there is a real world operating according to natural laws, then the inquirer must behave in way that put questions to nature and allow nature to answer back directly. The most appropriate methodology is thus empirical experimentalism".

From a positivist's point of view, a reality-based paradigm can be broken down into measurable segments. The naturalistic (qualitative) paradigm is based on different ontological and epistemological beliefs. Here, reality as a multiple, constructed, interdependent whole is not easily reduced numbers (Bailey, 1997). According to Guba (1990) "realities exist in the form multiple mental constructions, socially and experimentally based,

local and specific, dependent for their form and content on the persons who hold them".

Since in naturalistic paradigm, knower and know are insuperable, therefore the acquisition of knowledge depends on the interaction between the knower (inquirer) and the known (the object of inquiry) and the assumption that all events, phenomena and situations are bound by time and the context. As a result, generalisations are rarely impossible (Grbich, 1999). In this respect, Lincoln and Guba (1985) stated "the aim of inquiry is to develop an idiographic body of knowledge in the form of working hypothesis that describe the individual case". Moreover, they believe all entities appear to be in a changeable state so that it is impossible to distinguish causes from effects. The last axiom of a naturalistic paradigm is that all inquiry is value-laden and is influenced by the inquirer's values, the choice of paradigm, and the choice of "substantive theory" (ibid.).

The qualitative inquiry approach is holistic and inductive. It does not have any hypothesis. The goal is to develop theory. Therefore the outcome of qualitative inquiries is a theory and leads to knowledge development of producing of the theory, which in turn leads to a discipline. Since theory inductively developed, it is probably to be right (Morse and Field, 1995). Furthermore, qualitative inquiry approaches are employed when little is known about a phenomenon or when present theories need revising. Qualitative research approach is "rigorous" and time-consuming (ibid.) The naturalist elects to conduct research in the natural environment. This is because reality is a whole that cannot be fragmented for separate study of the part since the sum of the whole is not equal to the whole. The word "population" is foreign to the naturalist. A naturalist elects purposive sampling in order to increase the scope of data exposed for developing theory. If theory is to be grounded in data, the data must first be located and analyzed inductively (Lincoln and Guba, 1985). Moreover, instrumentation for the naturalist is not objective but subjective. Data analysis is open-ended and inductive for the naturalistic researcher. Therefore, designing a "dummy table" will be completely meaningless to the naturalistic researcher.

The positivistic inquiry paradigm

In our society, if we mention science, people tend to think people in a white coat working at a lab bench mixing chemicals! They think that a boring

job. They speculate that scientists are not willing to listen to new ideas or to the opinions of others. A great deal of our stereotypes concerning science is from a period where science was dominated by a particular philosophy – *positivism*- that support some of these perspectives.

The positivistic perspectives' purpose is to portray the phenomena that human beings experience. Positivists believe that science relies entirely on observations and measurements. Indeed, knowledge of anything beyond that is impossible (Patton, 2002). Since we cannot directly observe and measure behaviours such as emotions and thoughts, these are not valid topics for scientific psychology. B.F Skinner believed that psychology needs to focus on positive and negative reinforcement of behaviour in order to predict how people behave (Hergenthalan and Olson, 2001). He argued that everything else is irrelevant as we cannot measure it.

While identifying cause and effect is impossible in a naturalistic inquiry approach, positivists believe that reality can be explained as the result of a cause that occurs before the effect temporally or simultaneously (Patton, 2002). Some positivist views are: (1) A single reality exists that can be fragmented into variables and processes, predicted and controlled; (2) the inquirer (the knower) and the inquired (the object of known) are separate, discreet entities; (3) the purpose of inquiry is to develop a "nomothetic" body of knowledge in the form of generalisations that are true and will hold for times and places; (4) inquiry is value-free and maintained as such through use of objective methodology (Grbich, 1999, Lincoln and Guba, 1985, Patton, 2002).

The positivist researcher believes that there exists an external reality separate from the observer and mode of observation whose properties can be determined through measurement and experimentation (empiricism). In fact, the purpose of empiricist research is to increase knowledge, whose results tend to be expressed quantitatively (Goodwin and Goodwin, 1984). Modern empirical science is committed to the search for knowledge. As first stated by Karl Popper, the "scientific method" is concerned with the formulation and attempted falsification of hypotheses or theories, in order to discover truth from lies and delusions (Patto, 2002).

According to Grbich (1999) "truth" will be found by applying the proposition of a measurable influence (independent variables) affecting

measurable outcomes (dependent variables) in cause-effect manner". In this approach, the issues relating to the rigour of an inquiry will be resolved by determining the validity and reliability of the measurement tools. When the measurement tools are proven valid and reliable, data can be collected by the inquirer. This data can be portrayed numerically and analyzed by statistical methods in order to identify the existing relationships between phenomena. Bias will be controlled by randomised sampling methods. Structured questionnaires or rating scales are often employed to collect data and are typically administered once only. This is because in this approach, it is supposed reality is "stable", i.e. the variables are constant. The primary purpose of a quantitative inquiry approach is to test the theory inductively by systematically testing the hypotheses (Morse and Field, 1995).

The gradual changes in scientific perspective

It seems that we have exaggerated the positivist approach in order to make a point. Given the above different philosophical approaches, knowledge existing in the real world can be interoperated in two different ways, either the qualitative inquiry approach or the quantitative inquiry approach.

The terms *post-positivism*, *constructionalism*, and *critical theory* have changed scientific views in recent years. For example, the positivistic approach shifted from dominant quantitative experimental designs to legitimately mix the quantitative, experimental paradigm, and natural inquiry approaches. These changes have led to the researchers understanding themselves as post-modern researchers. These researchers believe that knowledge exists in the social world and may best be realised using both qualitative inquiry approach and quasi-experimental designs (Bailey, 1997).

Patton (2002) stated "discretionary judgement is unavoidable in science, that proving causality with certainty in explaining social phenomena is problematic, that knowledge is inherently embedded in historically specific paradigms and is therefore relative rather than absolute, and that all methods are imperfect, so multiple methods, both quantitative and qualitative, are needed to generate and test theory, improve understanding over time of how the world operates, and support informed policy making and social program decision making. While being modest in asserting what can be known with any certainty, postpositivists do assert that it is possible, using empirical evidence, to distinguish between more and less plausible

claims, to test and choose between rival hypothesis, and to distinguish between belief and valid belief".

On the other hand, constructivism and critical theory are more specific reinterpretations of natural inquiry. They concentrate on such ontological and epistemological matters as are based on the association between the inquirer and the participant, and the process of constructing meaning itself. It is noteworthy, however, that feminist research is a part of critical theory, which values the informant as co-inquirer and narrative analysis. Indeed, feminist research is a form of constructivism which defines meaning by both the narrator and the researcher. In these new approaches, the words of qualitative inquiry approach expresses as broad and in-depth constructs and concepts (Bailey, 1997).

Medical research paradigm

Hopefully the above debates have shown the nature of both the qualitative and quantitative inquiry approaches. As pointed out earlier, in approaching their inquiries, researchers have commonly followed one of two paradigms. Since the philosophy of education in medical school differs from in other schools (the study of epistemology, logic, philosophy of science and metaphysics in medicine), the medical researchers' approach differs as to how to conduct research. According to Spike (1991) philosophers are looking to use their abstract reasoning only to study pure science. Furthermore, philosophers wish to suggest facts and ideas about theoretical fields. Perhaps a Platonic approach is predominant, that is, "the desire to inhabit a world of intelligible and immutable truths".

Medicine is the study and treatment of diseases; therefore it is not a pure science like physics and mathematics. Now the question is raised, "what is medical inquiry approach in medical schools?" Answers to this question have been given by epidemiologists and biostatisticians. Both have a positivistic approach to medical inquiries. Epidemiology is the study of the distribution and determinants of health-related states and events in population and the control of health problems, or the study of epidemic disease. The types of epidemiological studies are specified by epidemiologists. They are: retrospective studies (case-control studies), prospective studies (Cohort studies), randomised clinical trials, and survival analysis. All epidemiological studies assume a

positivist (quantitative) perspective, that is, using techniques of biostatistics to determine the association between exposure and disease (cause and effect) (Zweig and Blake, 1988). Experimental studies (randomised clinical studies), observational studies (case-control and cohort studies), and descriptive studies (cross-sectional and case series studies) are carried out to collect data from a sample. This data is then analysed using statistical methods in order to generalise the target population (Morton, 1990). Perhaps, unconsciously these modules (epidemiology and biostatistics) had a major effect on the positivistic perspective in medical schools. Since the purpose of these modules is to increase the epistemology of quantitative research in medical students, the naturalistic inquiry approach has not been well received in medical schools. Accordingly, students carry out research based on positivistic approaches. Perhaps, the reason why the positivist inquiry paradigm is predominant in biomedical research is that other research paradigms such as qualitative inquiry paradigm are not taught. In other words, undergraduate medical education does not equip doctors with the skills of qualitative research, nor yet with a sense of its value, even though clinical practice is qualitative in nature. As a result, clinicians and clinical and health services researchers have no knowledge of naturalistic inquiry approaches and are unsure how it may relate to their research (Poses and Isen, 1998).

In addition, the evidence-based medicine movement has taught that clinical practice and health policy should be based on the best evidence available (ibid.). What is the best available practice? Hampton (2002) stated "The freedom of a doctor to treat an individual patient in the way he believes best has been markedly limited by the concept of evidence-based medicine. Clearly all would wish to practice according to the best available evidence, but it has become accepted that "evidence-based" means that which is derived from randomized, and preferably double-blind, clinical trials". If the best evidence is randomised clinical trials, i.e. using quantitative methods, clinicians have the right to focus on quantitative issues in preference to qualitative issues. Because they are more predominant.

The usefulness of qualitative inquiry paradigm in medicine

The review of the literature shows that clinicians have conducted some qualitative research despite

the fact that it has been criticised for its lack of scientific rigour. Mays and Pope (1995) indicated that qualitative research paradigm is only an assembly of story and personal views, strongly subject to researcher bias. Moreover, it has been criticised for lacking reproducibility and generalisability. On the other hand, the vast majority of qualitative researchers have failed to give sufficient descriptions in their research reports of their assumptions and methods, especially with concerning data analysis. This has contributed to some criticism of unfair bias from quantitative researchers (ibid.).

Such criticisms lead clinicians and clinical and health services researchers to publish many papers intended to clarify the aims of qualitative methods in medical and health care systems. With regard to this, even they acknowledged the term *observational methods* to be a source of some confusion in medical research. Mays and Pope (1995) showed that qualitative observational inquiries are very different from the type of observational studies (case-control and cohort studies) conducted in epidemiology. Furthermore, some authors in their papers provide short definitions of some of the philosophical terms used in qualitative research such as epistemology, ontology, methodologies, naturalistic research, and etc.

On the other hand, clinicians could not answer some questions via the quantitative inquiry methods that have been widely raised in health care research. Such as "why does evidence from meticulous trials have so little impact on clinical practice?" "How do the ways in which clinical teams coordinate, affect patient's outcomes?" "Why do many people accept advice on health living but not put it into practice?" (May and Pope, 1996). In addition, since health-care systems deal with people and individuals more complex than the subjects of the natural sciences, there are a great deal of questions about human interaction and how people interpret interaction which medical professionals may wish to answer. Experimental and quasi-experimental design cannot answer these questions (Pope and Mays, 1995).

A first step toward deciding the appropriate methodological path, both of a qualitative approach and a quantitative approach is to concentrate on the fundamental question the inquiry intends to answer. Such questions are very important for designing research methods. They are "what", "when" "whether or not", "how many",

“to who”, “how”, “why”. A typical feature of qualitative inquiry approach is not mainly seeking to offer quantified answers to research questions (pato, 2002). Therefore, what is the purpose of qualitative research in health-care systems? What particular quality do they give to the medical knowledge exactly?

The understanding of the goal of a qualitative inquiry approach will answer the above questions. According to Pope and Mays (1995) the purpose of qualitative research in health systems is “the development of concepts which help us to understand social phenomena in natural (rather than experimental) settings, giving due emphasis to the meanings, experiences, and views of all the participants”.

Based on the assumption that reality is socially constructed, complex, and constantly changing, qualitative inquiry explores behaviour through human perceptions, understandings, and beliefs that motivate them. For a doctor, knowing that an intensive insulin regime works may be secondary to knowing if the patient will comply with such treatment. The exploration of patient compliance with treatment regimes requires a qualitative inquiry approach (Pope and Mays, 1995).

While a quantitative inquiry can measure the incidence, the prevalence and the odds ratio (the number of people with disease who were exposed to a risk factor), it cannot answer why, for example despite improving medical technology, asthma is getting worse. Qualitative studies are concerned with answering question such as “What is X, how does X vary in different circumstances” and why?” (Pope and Mays, 1995). Qualitative inquires are especially useful when describing a phenomenon from the “*emic* perspective”, that is, the view of the problem from the original perspective. In health care systems, emic perspectives may be the views of the patient, carers, and relatives (Morse and Field, 1995). It should be noted that naturalistic inquiries should be carried out when little attention has been given to the present knowledge or a phenomenon (ibid.).

While qualitative researchers have made a great effort to find the position of qualitative inquiry approach in health services research, clinical staff cannot easily accept the research methodologies of social sciences, in which the generation of hypotheses replaces the testing of hypotheses, explanation replaces measurement, and understanding replaces generalisability.

In addition, Qualitative research is a phenomenological paradigm. Phenomenologist’s try to portray an experience as it is and explain it directly without various casual explanations. In fact, the researcher investigates a deeper and fuller meaning of the informants’ experience of a particular phenomenon (Morse and Field, 1995). Qualitative inquiry is a grounded theoretical approach. The main aim of a grounded theory is to create explanatory models of human behaviour that are based on the data. Data collection and analysis of data take place concurrently. The primary difference between this methodology and other approaches in qualitative research is its emphasis on theory development. (Bailey, 1997, Morse and Field, 1995). Furthermore, Qualitative inquiry paradigms are employed inductively, observations lead to theory whilst quantitative inquiries are used deductively and described as objective, hard, and reproducible (ibid.).

After a long debate between qualitative and quantitative inquiry methods, clinical scientists have shown that qualitative research can be carried out as a crucial pilot to quantitative research. “Triangulation” boosts a study by integrating methods, both quantitative and qualitative approaches that can enhance the validation of research. The third way in which qualitative research can complement quantitative research is by exploring areas not amenable to quantitative research on its own (Patton, 2002, Jones, 1995, Pope and Mys, 1995, Stange et al., 1989).

It is concluded that quantitative and qualitative research are not better or worse than each other, nor are they in competition. They are complementary. Qualitative research can help to answer the ‘how many, how often’ questions but qualitative research can help to illuminate ‘why’ questions.

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