

Introduction to Research in the Health Sciences

Stephen Polgar | Shane Thomas



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For Sue, Sharon and Rebecca

In appreciation of the support of my loving family
and all of the many research colleagues and students with
whom I have worked.

Introduction to **Research** in the **Health Sciences**

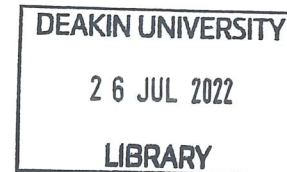
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CONTENTS

Preface

SECTION I Methodological Foundations of Health Research, 01

- 1 Foundations of Health Research, 02
- 2 Quantitative and Qualitative Methods, 08
- 3 The Research Process, 12

SECTION II Research Planning, 18

- 4 The Formulation of Research Questions, 20
- 5 Sampling Methods and External Validity, 26
- 6 Ethics, 34

SECTION III Research Designs, 40

- 7 Experimental Designs and Randomized Controlled Trials, 41
- 8 Surveys and Quasi-Experimental Designs, 49
- 9 Qualitative Research, 57

SECTION IV Data Collection, 63

- 10 Questionnaires and Survey Design, 64
- 11 Mixed Methods, 71
- 12 Interviewing Techniques, 75
- 13 Measurement and Observation, 83

SECTION V Descriptive Statistics, 92

- 14 Organization and Presentation of Data, 94
- 15 Measures of Central Tendency and Variability, 102

- 16 Standard Scores and Normal Distributions, 108
- 17 Correlation, 114

SECTION VI Data Analysis and Inference, 121

- 18 Probability and Confidence Intervals, 123
- 19 Hypothesis Testing, 132
- 20 Effect Size and the Interpretation of Evidence, 141
- 21 Qualitative Data Analysis, 150
- 22 Critical Evaluation of Published Research, 157

SECTION VII Evaluation and Dissemination of Research Results, 164

- 23 Synthesis of Research Evidence: Systematic Reviews and Meta-Analyses, 165
- 24 Translational Research, 177

Glossary of Research Terms, 185

References and Further Reading, 193

Appendix A: z-Scores and Associated Areas Between z and Mean and Beyond, 198

Appendix B: t Distribution, 203

Appendix C: Chi-square (χ^2), 205

Index, 206

Quantitative and Qualitative Methods

OUTLINE

Introduction, 8	Theories, 10
The Social Construction of Reality, 8	Theory Testing, 11
Contrasting Qualitative and Quantitative Methods, 9	Applications in Health Care Delivery, 11
Perception of Subject Matter, 9	Summary, 11
Positioning of Researcher, 10	
Data and Evidence, 10	

INTRODUCTION

In Chapter 1, we discussed the conceptual foundations of health research methods. We suggested that it was advantageous to conduct health research within a pragmatic framework that reflects real health problems and treatments. The pragmatic approach includes both quantitative and qualitative methods. In terms of the quantitative approach, health problems are frequently conceptualized as the impairments and dysfunctions of an organism, a machine that is malfunctioning. The aim for researchers is to accurately describe these problems and identify their causes and consequences. Accurate, evidence-based knowledge enables practitioners to prevent illness and mitigate effects of the associated impairment and dysfunction. This approach to research and practice conceptualizes patients as if they are broken mechanisms in need of repair. However, ignoring personal values and experiences may significantly diminish the effectiveness of health interventions. The human machine is not just a machine; it is, at the least, a thinking machine. And, according to many religious frameworks, it is a thinking machine with a soul. Qualitative research provides an important perspective of the nonmachine elements of all of the participants in clinical settings. There is strong evidence that clinical outcomes are directly affected by patient experience. Doyle, Lennox and Bell's 2013 review of 55 well-designed studies of this relationship strongly supports this conclusion. Their conclusion that 'Clinicians should resist sidelining patient experience as too subjective or mood-oriented,

divorced from the "real" clinical work of measuring safety and effectiveness' has been confirmed in many studies and is now considered to be a key component of many clinical guidelines.^{1,2} Qualitative research gives a voice to research participants, allowing researchers to gain valuable insights into how health problems are viewed and experienced by the research participants. These insights are clinically valuable and affect clinical outcomes. In this chapter, we will examine and contrast these two methods in greater detail.

The aims of this chapter are to:

1. Outline different conceptual approaches to health research.
2. Compare and contrast specific dimensions of qualitative and quantitative approaches to advancing knowledge and effective practice.
3. Emphasize the importance of using evidence from both qualitative and quantitative perspectives.

THE SOCIAL CONSTRUCTION OF REALITY

As discussed in Chapter 1, knowledge is acquired and applied from a particular perspective. An example outside health research will illustrate the contrast between qualitative and quantitative perspectives. Imagine that you are given a bank note and it has ≤\$100 printed on it. You can examine this object from a number of perspectives depending on who you are and how you are positioned in relation to this object.

- If you were a person from a remote part of the world with no exposure to such bank notes, you might see it as a decorative object and value it as a curio. (Qualitative.)
- If you were a person having financial difficulties, ≤\$100 would be seen as a means to buy food or cover bills. (Quantitative.)
- If you were an accountant, you would focus on the number printed on the bill for making fiscal calculations. (Quantitative.)
- If you were a counterfeiter (we hope not!), you would be intensely interested in the physical properties of the object, such as its length, width, colour and texture: details required for successful forgery. (Quantitative.)

Money is very much a social construct. It is 'real' enough; having it or not having it can influence all aspects of life, including the level of health services a person can access. At the same time, money is an abstraction; it can take virtually any physical form (e.g. coins, notes, credit cards or a set of numbers representing your bank balance). The reality of money is constructed through the actions of a number of institutions (e.g. banks, state treasuries, etc.) which determine its value for buying goods and services. The point here is that health researchers can look at a problem from different perspectives and select the appropriate method to solve it depending on the questions they are asking and the nature of the information they wish to acquire.

The importance of integrated qualitative and quantitative research approaches is reflected in the strong emphasis that is now given to patient-/person-centred care in contemporary health systems and services. There are many policy and scholarly papers about patient-centred care; however, a good definition is offered by the Institute of Medicine: 'Providing care that is respectful of, and

responsive to, individual patient preferences, needs and values, and ensuring that patient values guide all clinical decisions'. Various international health agencies such as the NHS (United Kingdom: <https://www.england.nhs.uk/integrated-care-pioneers/resources/patient-care/>) also provide extensive discussions about the desirability of patient-centred care in contemporary health care. This contemporary emphasis requires that health research methods can accommodate the rigorous study of patient values, preferences and needs, and hence we are obligated to use both qualitative and quantitative approaches.

CONTRASTING QUALITATIVE AND QUANTITATIVE METHODS

In this section, we will identify and discuss the fundamental differences between quantitative and qualitative methods (Table 2.1). One key difference is that these two methods have different historical and disciplinary backgrounds. Quantitative methods are based on the traditions of the natural sciences (physics, biology, etc.), whereas qualitative methods emerged from disciplines such as philosophy, anthropology and other social sciences (see Ch. 09).

Perception of Subject Matter

As discussed in Chapter 1, quantitative researchers favour a 'naive' realistic view of knowledge. The associated research strategies focus on the discovery of novel facts about the world. *Reductionism* is central to conducting quantitative research. Reductionism refers to the process of reducing complex phenomena to simpler, more fundamental elements. For example, the advancement of the discipline of chemistry has been greatly enhanced by reducing the immense variety

TABLE 2.1 Contrast between Quantitative and Qualitative Methods

	Quantitative	Qualitative
Perception of subject matter	Reductionistic: identification and operational definition of specific variables	Holistic: persons in the context of their social environments
Positioning of researcher	Objective: detached observation and precise measurement of variables	Subjective: close personal interaction with participants
Database	Quantitative: interrelationships among specific variables	Qualitative: descriptions of actions and related personal meanings in context
Theories	Normative: general propositions explaining causal relationships among variables	Interpretive: providing insights into the nature and social contexts of personal meanings
Theory testing	Controlled: empirically supporting or falsifying hypotheses deduced from theories	Consensual: matching researcher's interpretations with those of participants and other observers
Applications	Prediction and control of health-related factors in applied settings	Interacting with persons in a consensual, value-consonant fashion in health care settings

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of materials to the interaction and combination of elements, represented in the periodic table. Also, the enormous array of physical and mental symptoms has been compiled into taxonomies of illnesses. Good health can be differentiated from ill health along with a number of clearly defined factors, such as blood pressure, cholesterol levels or the presence or absence of infectious agents. For example, ischaemic heart disease can be attributed to diminished blood flow in the coronary arteries. This in turn can be linked to risk factors such as high cholesterol or high blood pressure.

Understanding the risk factors and causes of heart disease enables the implementation of interventions to reduce the burden of this condition on individuals and in the general community. To identify causal associations, clearly stated hypotheses need to be tested in research studies (see Ch. 1). An important example of this is the relationship between factors or variables representing changes in signs and symptoms of a disease. For example, Lipitor is effective in lowering blood cholesterol, thus reducing the incidence of heart attack.

However, by reducing health problems to specific disease processes and associated signs and symptoms, quantitative researchers may lose track of the individual with the health problem. A *holistic* patient-centred perspective focuses on the person with the medical problem in the context of the individual's physical and social environment and their values, needs and preferences. Qualitative researchers aim to understand how individuals experience health problems and the reasons for their actions to cope with these problems. For example, qualitative researchers investigating heart disease would consider the participants' experiences and understanding of their health issue. Therefore the person at risk of a heart attack is no longer reduced to a failing mechanism, but rather is perceived as an active agent for achieving positive changes.

Positioning of Researcher

Quantitative research is conducted to discover valid and reliable facts about the world, as discussed in Chapter 1. The fundamental positioning of the researcher is 'objective', aiming to perceive and record events dispassionately, without any personal bias or distortion. However, there is recognition of the possibility of error and bias entailed in collecting data. Therefore quantitative health research has invested much effort in devising and evaluating accurate measuring instruments and tests (see Ch. 14). Also, research designs such as 'double-blind randomized controlled trials' (see Ch. 7) have been implemented to reduce the effects of both observer and participant bias.

The problem with highly structured data collection is that participants' true responses may be restricted or hidden because of the method employed to uncover them. Qualitative researchers find standardized instruments intrusive, as they may restrict self-expression and they may

impede the understanding of the actual experiences, ideas and emotional responses of the participants. To understand personal meanings and subjective experiences, one has to become involved with the lives of the participants being studied. In this way, the researcher takes a subjective position, a degree of empathy may develop between the researcher and the participant and this may enhance consideration of the patient's values, needs and preferences as required by patient-centred care principles. By empathy we mean the ability to 'put ourselves in the other person's shoes', that is, to see things from their perspective(s).

Data and Evidence

By 'data' we mean the results of a study which are collected and analysed to provide the evidence required to solve a research problem. The data obtained in quantitative research consist of sets of observations and measurements, descriptions of physical and behavioural events, health and illness. These are summarized and analysed in accordance with statistical principles outlined at an introductory level in Sections V and VI.

In qualitative research, the database is essentially an analysis of the narrative (or a story, if you like) that reports what has happened to people, what they did or said in specific situations. This narrative should be adequately detailed so as to illuminate for the reader the personal meanings that the health-related events had for the informants.

The data in qualitative research are descriptive, a detailed or thorough description of what people said, their actions and activities, and interactions with other people. An important aspect of qualitative research is keeping thorough, up-to-date field notes. These should be recorded as closely as possible to the time of occurrence of the phenomena under study. The field notes should contain direct quotations from the participants and the settings in which the statements and actions were recorded. Where possible (where it is appropriate and not overly intrusive), the researcher may use audio and video recordings. This helps record interviews, and it improves accuracy in conveying what was said and done in a given setting, since it is possible to review the obtained information.

Theories

Theories represent our current state of knowledge about the state of the world. Theories are abstract, coherent explanatory systems that integrate and accommodate a broad range of research findings. Theories may be constituted of premises stated in everyday language, with particular attention paid to the appropriate use of concepts and the logical development of the premises.

Theories based on quantitative evidence integrate patterns of findings concerning the interrelationships among variables. Such theories often contain 'models', which may be mathematical and/or systems representations of the

patterns of findings. Models of anatomic and physiologic processes, such as those of the circulatory or nervous systems, are good examples of successful quantitative models. Quantitative theories are 'normative' in the sense that they aim to describe and explain, as closely as possible, how things ideally work. They represent what is assumed to be stable and universally applicable. Conversely, theories integrating evidence from qualitative research do not address facts about how objects are constituted and interact, but rather are the overall interpretations of personal meanings emerging in specific social settings.

Qualitative health researchers approach theory formation by attempting to identify common 'themes' or categories of meanings emerging from the data. The important point here is that the theoretical categories are developed from evidence expressing personal meanings, rather than 'facts' derived from the statistical treatment of objective measurements of specific variables. In this way, theory is said to be 'grounded' in the narratives of a group of individuals.

Theory Testing

Theories based on quantitative evidence are tested through precisely stated predictions or hypotheses logically deduced from the theories (see Ch. 1). The accuracy of a quantitative theory is judged by the extent to which the predictions generated by the theory match the evidence produced by methodologically rigorous research. However, as discussed in Chapter 1, theories are not easily discarded on the basis of preliminary, insufficient evidence.

Testing qualitative theories is somewhat different, as no causal mechanisms are included in the theoretical framework. The simplest verification of qualitative interpretations is to go to the participants themselves to establish if the researcher's interpretations make sense to them. The extent to which a consensus develops between researchers and their participants is one of the important indications of the truth of qualitative theories.

Applications in Health Care Delivery

The applications of quantitative evidence and theories are essentially technical, providing mechanisms in terms of which we can *predict* and *control* specific health-related variables. That is, we apply quantitative approaches for (1) discovering the causes of diseases and disabilities, (2) predicting the burden of diseases and disabilities on individuals or populations, (3) developing and validating assessment procedures and (4) evaluating the effectiveness of interventions.

In contrast, qualitative research provides evidence and theories that enable us to better understand our participants as human beings. This research discloses how

illnesses, disability and health care delivery affect people's lives interpreted from their points of view.

SUMMARY

Qualitative research is based on the assumption that reality is *socially constructed*. It entails disciplined enquiry examining the personal meanings of individuals' experiences and actions in the context of their social environments. By *qualitative* we mean that the data consists of detailed descriptions based on language or pictures recorded by the investigator. The term '*discipline*' indicates that the enquiry is guided by explicit methodological principles for defining problems, collecting and analysing the evidence, and formulating and evaluating theories. *Personal meaning* refers to the way in which individuals subjectively perceive and explain their experiences, actions and social environments.

In contrast, quantitative research holds the view that reality is independent of personal views and social contexts. The role of the researcher is to discover the objects and processes as they exist in the world. Quantitative research also involves disciplined enquiry based on reducing issues and problems to defined variables. Data collection involves measurement and observation under controlled conditions, enabling researchers to generate mechanistic or systems theories for explaining how variables are interrelated. The data are presented in a numerical form and are analysed using statistical techniques.

Different research designs may be used to generate evidence of the same processes, although from different perspectives. For instance, any complex clinical phenomenon, such as schizophrenia, may be studied using any of the research strategies outlined in this text. To understand the scope of the problems and the effectiveness of the appropriate treatments, it is desirable to use a variety of research strategies. Conversely, a comprehensive theory of a clinical problem should generate any number of hypotheses within the realm of the research strategies discussed in this book. We examine the analysis of qualitative data in Chapter X.

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