

SECTION 1

Contextual Materials

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Introduction to Healthcare Research for Evidence-Based Practice

Introduction

This book is about research in healthcare, seen principally from the viewpoint of students undertaking pre-registration and post-registration educational programmes. We are both active healthcare researchers and are passionate believers in research by healthcare professionals (HCPs)¹ for the benefit of the patients and clients we serve. Our own background is principally in mental health nursing, although, as teachers and researchers, we have widened the scope of our work beyond a purely mental health focus. Likewise, as researchers we have typically worked in multidisciplinary research, with the broad range of other HCPs, with medical practitioner researchers and with researchers from a range of non-clinical disciplines. In preparing this book, we have sought to make it relevant to colleagues from across the disciplines, and we hope this comes over in the material that follows. We both started to get interested in research from early on in our clinical careers, and did a good deal of research while still mainly working as clinicians. The real reason we started in research was because we were interested in whether the things we did with patients and clients made a difference to their experiences of illness, recovery and health. If you have picked up this book, we guess you have a similar interest, and we hope we can work with you in developing that interest and finding ways you can translate your ideas into practical projects, whether these be through

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your own research or your examination of the research literature to inform your practice.

In the following pages, we will try and take you through the various elements of undertaking a piece of research. Even if you do not have to do research yourself as part of your educational course, this book is still for you for three reasons. First, much of the material we present is *essential*, not just for doing your own research, but for understanding the research of others. Because almost all healthcare courses these days require you to critically appraise the research that is already out there, you need an understanding of how to do that. Books and articles which just deal with critical appraisal are fine, as far as they go, but you will certainly have a much better understanding of how to evaluate published research if you have a clear idea of the various elements that go into a research project, the methods used by researchers and the reasoning behind methodological choices they have made. This book will give you that information.

Second, you will almost certainly encounter, during your course or later, the need to undertake some project work, for example developing a new guideline or a new way of organising care. All the information given here will help you to organise and evaluate that project.

Finally, a great deal of clinical practice is investigated by medical practitioners and non-clinical researchers, partly because comparatively few HCPs other than medical practitioners go on to become full-time researchers. We want to increase the number that do, so that HCPs are increasingly responsible for evaluating their own practice and get the credit for doing so. Ultimately, we would like you to be in a position to decide you want to be one of those people, so part of the job of this book is to give you a taste of what is involved, including some of its complexities, so that you will want to go on and find out more. We believe that research is essentially a practical skill and is best learnt through an apprenticeship system, and so the best piece of advice we can give you is to get hold of someone who has experience of actually doing research, translating research into practice, doing a systematic review and so on, and learn from them.

Then, use this book as your workshop guide. If you cannot find such an experienced researcher, then we hope this book will be able to tell you some of the things they would have. The book is not heavily referenced (usually only a few per chapter), but each of the references is important, and is easily available, either from your library or from the internet. We have made considerable use of web sources so as to make it easy for you to find the best supporting information. We know web sources do not necessarily remain current forever, but we believe the best ones do. When we came to write the second edition of this book, we found only a few sites that were no longer available.

The scope of healthcare research

Until quite recently, healthcare research had a reputation for being an introspective pursuit which was more concerned with investigating its own workforce than undertaking clinical research. Some commentators have suggested that becoming a teacher of healthcare professionals frequently involved ceasing to have any clinical responsibility for patient care or, indeed, much contact with clinical settings at all. In consequence, those teachers wishing to do research had little access to patients or were often out of touch with issues which were important to patients. They did, however, have contact with students, and so ended up developing research interests related to education and the views and experiences of student nurses. Sometimes, it was difficult to see how this research would benefit patients. Although this criticism was chiefly aimed at nurse researchers, our experience with the broad range of healthcare professionals suggests it holds true equally in other disciplines, a belief reinforced by the fact that initiatives to increase research by non-medical health disciplines have typically been applied across the range of disciplines.

We do believe that healthcare research is changing for the better, though, and is nowadays much more concerned with patient care, rather than being overly inward looking towards its own professions. Whilst we recognise that it is important for research to be done into such things as the opinions and experiences of students and members of the healthcare professions, or the ways in which these professionals are educated, we also think that the eventual point of all healthcare research should be the greater good of patients. Therefore, we suggest, the vast bulk of research into such issues as the views of the professions themselves should have immediate consequences for patient care. If it does not, then why do we want healthcare researchers doing it, rather than, say, sociologists or educationalists? Surely, examination of, for example, occupational therapists' opinions of their educational preparation, can be done as well by researchers from other disciplines. Given that healthcare researchers are a rare breed, we hope that the growing focus on clinical research, where nurses can make a distinctive contribution, will continue.

That said, many people are largely unaware of the contributions to research that healthcare professionals have made already, or the effect which that research has had on care. Just two fairly random examples from our own areas of interest give an idea of the scope of research by healthcare professionals. Professor Mary Jo Dropkin, from the University of Long Island, has written definitive studies of the psychosocial impact of head and neck cancer. Her work is cited by researchers across the whole range of health disciplines and has changed the way we think about head and neck cancer. In the UK, Professor Trudie Chalder from

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Kings College, London, is a world-recognised expert in fatigue, and developed the leading mode of treatment in this area. Once again, her work is referred to by all the healthcare professions. When you consider that fatigue is cited as a major symptom in almost all long-term physical conditions, it is easy to see the extent of this HCP's contribution to the potential well-being of patients via her research.

Whose business is research in healthcare?

As you can tell from the above, we think it is primarily the business of HCPs themselves to evaluate and develop our care through research. These days, almost all large-scale research is undertaken in teams, and almost all these teams are multidisciplinary. All HCPs need to be equipped to take a full part in these teams. In the past, we have been ill equipped to do so, and, given the packed nature of healthcare pre-registration education, research often takes a back seat. As we said above, very few clinicians go on to be full-time researchers, but all of us are research *users*, even when we are not aware of it. Being a *knowledgeable, aware* consumer of research findings is integral to competent practice.

Apart from using research in our own clinical practice, we have a further ethical obligation concerning use of research, and one which exceeds the responsibility of members of the general public. For example, HCPs need to be sufficiently knowledgeable about research to help patients who may become involved in research projects run by other members of the clinical team to make reasonable, informed choices about, for example, participation in such a study. Similarly, patients may ask our views about treatment which is currently practiced, and we are unable to offer such advice without an informed understanding of the evidence base. This, in turn, comes from an understanding of the research approaches which have been used to generate this evidence.

Surprisingly, even in everyday life, away from clinical practice, our role as an HCP gives us a greater ethical obligation to understand the evidence behind healthcare interventions, because our role may give us a certain amount of authority when we communicate (even very informally) with others about healthcare matters and healthcare research. Accordingly, we have a special responsibility to ensure that we know what we are talking about. This implies, once again, a knowledge of research methods.

Which brings us to our final point in this section. Very little healthcare has been subject to robust clinical research. This leaves us, we believe, with two important responsibilities. First, we should be basing our care as far as possible on the best available evidence. This implies an ability to search for, appraise and implement that evidence. Appraisal requires a basic understanding of the merits of the studies we read, and

a knowledge of research methods is essential to that understanding. Second, the knowledge base needs building, so involvement, at whatever level, in research to build it is as part of our ethical responsibility as HCPs in just the same way as use of current best evidence.

Perhaps the key questions at the heart of evidence-based practice in the health professions are as follows:

What works?

What works best?

How does it work?

Research provides a starting point in answering these questions.

Using this book to get involved in healthcare research

We want this book to be a practical guide. Part of being practical is being as easy to access as possible. This leaves us with a problem. We have tried to make each chapter as stand-alone as possible, but at the same time we wanted to avoid repetition, so we do not go over every piece of background information necessary in each chapter. This means there will inevitably be some shifting around for you between chapters, and we hope you will dip in and out to follow up things we have not been able to cover over and over again as they occur in different contexts. To help you do this, we are going to avoid giving you the traditional detailed chapter-by-chapter description of what is going to be covered in this book. Instead, here we are simply giving you each chapter title, followed by the key points section for that chapter. As a result, at any point, you will be able to flick back to this chapter (dog ear it now) and read through key points to give you an idea of where relevant issues are covered. Please do not feel you have to read the whole book. It is a tool. Use what you need and leave the rest. Maybe it will be of use later.

The chapters

Chapter 2: The research process – organising your research

The research process is a way of organising a research project.

The study aims and objectives guide the study.

The literature review provides the context for the study and determines the need for it.

All stages of the process should be clearly described with appropriate rationale.

Issues of ethics are fundamental to the research process.

Dissemination and implementation complete the research process and start the research cycle with new questions.

Chapter 3: Choosing methodological approaches

Researchers tend to associate inductive reasoning with qualitative research and theory building, and deductive reasoning with quantitative research and theory testing.

Quantitative approaches emphasise cause–effect relationships and prediction.

Qualitative approaches emphasise exploration.

Researchers should examine the goals of their research when choosing methodological approaches.

Consider qualitative approaches first for studies of individuals' experiences; research with excluded and hard to reach groups; pilot studies.

Consider quantitative approaches first for epidemiological studies of large groups; treatment comparison studies.

Chapter 4: Searching the literature

Literature searches are done primarily to ensure awareness of a field of research.

Systematic reviews examine the literature using systematised, transparent criteria.

A search strategy consists of the research question, its components, sources of information, search terms, retrieval and inclusion criteria, available resources.

Sensitivity (recall) refers to comprehensivity of a search strategy.

Specificity (precision) refers to relevance of a search strategy.

The scope of a search is determined by its search strategy.

Chapter 5: Ethics of healthcare research

Codifications of research ethics date from the Nuremberg code and the declaration of Helsinki.

Autonomy, beneficence, non-maleficence and justice are key principles in research ethics.

Autonomy refers to an individual's freedom to choose and act.

Beneficence and non-maleficence require that we maximise good and minimise harm.

Justice is the maximising of fairness to all.

Research ethics committees exist to interpret these concepts for the protection of research participants and researchers.

All research should receive ethical scrutiny.

All NHS-related research must receive approval from a Research Ethics Committee (REC).

NHS REC approval is centrally organised and standardised.

All NHS research must receive Research Governance approval from the NHS institution in which it takes place.

Research Governance approval is locally organised by each institution and there is limited standardisation.

Chapter 6: Basic concepts – sampling, reliability and validity

Sampling is an everyday activity, not peculiar to research.

A population is a total group from which a sample is drawn.

Some populations are themselves samples from larger populations

Representativeness is key to sampling, but is defined differently by quantitative and qualitative researchers.

Samples may be random or non-random.

Sampling technique is guided by the aim of the research.

Validity is the extent to which a study examines the entity it says it does.

Reliability is that it does so in a systematised, repeatable way.

Quantitative and qualitative researchers place different emphasis on different aspects of validity and reliability.

Chapter 7: Issues in qualitative data collection

Data collection choices are made in response to research aims.

Sampling in qualitative research aims at illumination rather than representativeness.

Interviews may be structured, semi-structured or unstructured.

Interviews are normally transcribed verbatim.

Sometimes, qualitative data can be gleaned from questionnaires.

Observational studies benefit from painstaking field notes.

Published work can be subjected to similar data analysis to other research methods.

Chapter 8: Case studies

Case studies are descriptive pieces of qualitative research.

Case studies may be stand-alone investigations or illustrations from larger studies.

Case studies examine a particular person, group, situation or set of circumstances in detail.

Case studies are not necessarily typical of general experiences.

Case studies rely on a high level of detailed description.

Sample selection for case studies can lead to challenges in terms of typicality or inevitable comparisons with other settings.

Chapter 9: Ethnography

Ethnography involves the in-depth study of a culture.

Ethnographic approaches use elements of ethnography.

Ethnographic approaches can be combined with other methods.

Ethnographic approaches usually involve extended amounts of field work.

Ethnography combines observation with other methods such as interviews.

Formal recording of interviews may often be impossible, so field notes are particularly important.

Disconfirming evidence is actively sought.

The range of phenomena to be observed is potentially overwhelming.

Ethnography reminds us of the importance of cultural context.

Chapter 10: Phenomenology

Phenomenology is concerned with individuals' perceptions of their experiences.

Phenomenology as a philosophy is concerned with seeing things without making value judgements.

Phenomenology frequently uses in-depth interviews and series of interviews.

Bracketing is the attempt to put aside one's own thoughts, feelings and beliefs.

The researcher avoids explanations of people's accounts so that the person's own voice can emerge.

Phenomenology aims to create vivid personal insights.

Chapter 11: A pragmatic approach to qualitative data analysis

Content analysis refers to the organising and ordering of textual material.

Transcription involves writing out recordings of an interview.

Some degree of quantification is possible.

Categories can be pre-defined or can emerge from the data.

The pragmatic approach involves six stages:

- taking memos after each interview
- reading transcripts and making notes of general themes
- repeated reading and generating open coding headings to describe all aspects of the data
- reducing the codes under higher order headings
- returning to the data with the higher order codes
- collating the organised data for reporting

Chapter 12: Limitations of qualitative research

Qualitative research does not claim to be scientific in the same way as quantitative research.

Samples in qualitative research are rarely representative.

The researcher's own influence on the emerging data may be checked by bracketing and by discussion with respondents.

There is too much variability to allow replication of qualitative studies.

Qualitative research does not aim to generalise.

Neither researcher nor respondent is necessarily aware of their own biases.

Analysis of interviews can be affected by hindsight bias.

Validation by respondents is itself potentially problematic.

Respondents can offer explanations about things they have no way of knowing about.

The illuminative value of quantitative research is slowly gaining ground in healthcare.

Chapter 13: Sampling, reliability and validity issues in data collection and analysis

Random sampling decreases the likelihood that members of a sample are different from its population.

Stratification and cluster sampling both ensure adequate representation of population subgroups in a sample.

Quota sampling and systematic sampling approximate to random sampling.

Convenience sampling is the simplest form of sampling but is least likely to conform to its population.

External validity refers to the applicability of a study to the real world.

Population validity refers to the similarity between a study sample and its population.

Ecological validity refers to the similarity between study conditions and procedures and the real world.

Internal validity determines the confidence we can have in cause-effect relationships in a study.

Reliability consists of two concepts: consistency and repeatability.

Consistency implies that, if a phenomenon is unchanged, it will be measured as the same by several observers or by several measuring methods.

Repeatability means that, if a phenomenon is unchanged, it will be measured as the same on several occasions.

Chapter 14: Cause and effect, hypothesis testing and estimation

Assertions about cause and effect are probabilistic, not definitive.

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We make cause–effect predictions in daily life.

Cause–effect predictions in healthcare research are the same as those in daily life.

Quantitative researchers are concerned with independent variables, dependent variables and intervening variables.

Researchers manipulate independent variables, observe any changes to dependent variables and attempt to account for intervening variables.

Hypotheses are explicit statements of the predicted relationship between independent and dependent variables.

Directional hypotheses are made only when there is reason to think a relationship operates only in one direction.

Adequate statistical power is essential to the safe acceptance of the null hypothesis.

Hypothesis testing is an all-or-nothing statement of relatedness, but estimation emphasises the extent of a relationship.

Chapter 15: Experimental and quasi-experimental approaches

Experiments consist of three elements: manipulation of the independent variable, use of a control group, random allocation to experimental conditions.

These three elements allow experiments to claim a high degree of internal validity.

Quasi-experimental designs use a similar *general* approach to true experiments but control and/or random assignment may be missing.

Repeated measures approaches use the same participants for all experimental conditions.

Repeated measures approaches are vulnerable to order effects.

Order effects may be reduced by counterbalancing.

Independent groups designs use different participants for different experimental conditions.

Independent groups designs without randomisation are vulnerable to differences in participant characteristics (subject variability).

Matched pairs designs match participants on important variables to combat subject variability.

Factorial designs study interactions between several different independent variables.

Chapter 16: The single case experiment

Single case experiments apply experimental methods to treatment of single individuals.

Single case experiments allow you to do research in the course of clinical practice.

In AB designs and variants, different interventions are introduced and withdrawn sequentially.

In multiple baseline designs, responses to different interventions are compared cross-sectionally.

Systematised measurement is essential to single case experiments.

Data analysis is often confined to visual inspection of changes in scores.

Visual inspection can involve examining raw scores, means, levels, trends and latencies.

Statistical approaches have been developed because the interpretation of visual data can be subject to bias.

Single case experiments have good internal validity but poor external validity.

Chapter 17: Randomised controlled trials

A randomised controlled trial (RCT) is a type of experiment.

RCTs involve randomisation, a control group and manipulation of the independent variable.

RCTs attempt to control bias.

RCTs are the most effective way of examining cause and effect relationships, including the effect of treatment on patients.

Explanatory trials possess high internal validity and establish what principle, mechanism or theory accounts for a change in patient condition.

Pragmatic trials possess high external validity and establish how well a principle, a mechanism or a theory translates into the real clinical world.

RCTs are essential in providing patients with accurate information about healthcare interventions.

Chapter 18: Non-experimental approaches

Non-experimental approaches involve observation of naturally occurring relationships and differences between variables.

Non-experimental approaches are useful when experimental approaches are unethical or impractical.

Causal inference is weak in non-experimental approaches.

Descriptive designs only describe relationships between variables.

Causal-comparative designs (comparative/ex post facto designs) compare two or more naturally occurring groups.

Correlational designs explore relationships between variables in a single group.

Some correlational approaches allow prediction through the assignment of predictor variables.

Chapter 19: Surveys

Surveys are often wrongly assumed to be simple to carry out properly. Sampling technique and sample size are important in determining the margin of error in a survey.

Survey designs are typically observational, but may also use experimental and quasi-experimental approaches.

Decisions about question construction and questionnaire administration are fundamental to a successful survey.

A recent systematic review has revealed that some 'research folklore' guidelines about survey methods and question construction are not supported by empirical research.

Chapter 20: The role of statistics

Statistics are important because they convey large amounts of data in an understandable way.

Statistics describe data and allow us to draw inferences based on probability from these data.

Data are divided into continuous (ratio, interval, ordinal) and categorical (nominal/categorical) data.

Statistical tests are divided into parametric and non-parametric tests.

Parametric tests usually assume data are at interval level, normally distributed and possess homogeneity of variance.

Different statistical tests are designed to deal with different types of data.

Different tests are designed to deal with different sources of variability from different research designs.

Chapter 21: Evidence-based practice and clinical effectiveness

Research aims to add to the evidence to inform clinical practice.

Evidence-based practice (EBP) and clinical effectiveness are related terms, but clinical effectiveness has the narrower focus.

EBP is a process involving asking answerable questions, finding evidence, appraising the evidence, applying evidence to practice, evaluating performance of EBP.

The hierarchy of evidence runs from most to least trustworthy on the basis of freedom from bias.

EBP is intended to enhance clinical decision-making, not replace it.

Chapter 22: Critical evaluation of research reports

The ability to weigh evidence is a required skill for competent practitioners.

A good literature review should critically examine the literature and set the current study in that context.

The method section should be detailed and demonstrate appropriate choices.

Different specific methodological issues are associated with qualitative and quantitative research.

The results section should be clear.

Quantitative results should distinguish between significant and non-significant results.

Qualitative results should avoid claims as to generalisability.

The discussion section should set the results in the context of the literature, implications for practice and further research.

Study weaknesses should be honestly and comprehensively reported.

Chapter 23: Writing a research report

The report is a product – help the reader.

All reports follow a similar general structure.

The executive summary is all most readers will read.

Do not spend too long on general methodological debate.

When reporting results:

- be clear
- be comprehensive
- distinguish clearly between results and comment

A good discussion amplifies the study results, shows the importance of the study results, relates the results to earlier research and theory, admits shortcomings of the study, shows implications for future research and for practice.

Follow assignment or journal guidelines exactly.

Write with short words, sentences and paragraphs.

Use linking sentences to join paragraphs.

Avoid punctuation you do not understand.

Write in written English, not spoken English.

Read work aloud to help with punctuation.

Chapter 24: Getting research into practice

The theory of diffusion of innovation divides change adopters into innovators, early adopters, early and late majority, and laggards.

Change diffusion is mediated by personal characteristics and accessibility of the innovation.

Journal articles are ineffective in changing practice.

A clear dissemination and implementation strategy should be devised on the basis of a diagnostic analysis.

The analysis should inform broad-based interventions to introduce the change.

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The BARRIERS scale identifies four elements of barriers to change the adopter, the organisation, the innovation and the communication.

Notes on person and gender

We wrote this book together, with the idea of a series of conversations with you, the reader, in mind. For that reason, it is written largely in the first person plural, and we often address you directly. Occasionally, we vary this slightly and use the first person singular. This is usually to recount something which has happened to one of us and which has influenced our development as individuals and as researchers. Really, this is just to avoid cumbersome expressions like ‘one of the authors (RN)’ and so on. We hope this direct style is one you can engage with and will help you get into the spirit of a conversation with us about research.

We have made no definite choice about the use of the personal pronoun, and we refer to he or she pretty much indiscriminately throughout the book.

Good luck with this book and your research.

Endnote

1. Throughout this book, we will use the expression ‘Healthcare Professionals’ to refer to the broad range of clinical professions in healthcare (e.g. nurses, midwives, physiotherapists, occupational therapists, radiographers, podiatrists, clinical prosthetists and many, many others). We are excluding medical practitioners from this category for no other reason than that their educational and clinical tradition has developed very differently, and led to a different (and, perhaps greater) preparation for and engagement with the research that provides evidence for practice.