

# CHAPTER 1

## WHAT, WHY AND HOW OF RESEARCH

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### CHAPTER OVERVIEW

This chapter covers the following topics:

- The interplay of research and practice
- The nature of knowledge
- What is evidence?
- Evidence grows and changes
- Evidence in the world of practice
- The impact of evidence on practice
- Thinking critically about research

### KEY TERMS

Control

Data

Design

Evidence-based practice

Expertise

Intuition

Paradigm shift

Practitioner

Qualitative evidence

Quantitative evidence

Research

Science

**Evidence-based practice**

Practice that is informed by the careful consideration and evaluation of relevant information, and client/patient and practitioner experience and preference.

**Research**

The purposeful collection and consideration of information to investigate a defined question.

**Practitioner**

A person recognised by a professional group.

There are many reasons for choosing to study in the health sciences—some students are motivated by the opportunity to work alongside patients (the words ‘patient’, ‘consumer’, ‘client’ and ‘service user’ will be used interchangeably throughout this book) and others have a particular career plan in mind. All students will find themselves learning about **evidence-based practice** and **research** during their studies. These concepts are central to learning and practice in the health sciences and may initiate a range of responses in students from strong interest to the sense that this may one of those subjects that just has to be survived! Some students may have been involved with research projects at school or in other settings and therefore have an understanding of the processes and the work involved. For others this will be a new area, possibly creating a certain sense of trepidation about what lies ahead.

## THE INTERPLAY OF RESEARCH AND PRACTICE

It is common for students to wonder about the relevance of research, especially if their aim is to be the best health **practitioner** that they can. However, most people interested in the area of health science already have questions about practice such as why things are done in certain ways, what way is best, or how current thinking or practice can be improved. Often these questions emerge from personal experience and play some role in students’ choice of study. It is common for people in general and health practitioners in particular to form opinions about what they think is best. These opinions are informed by personal understandings and the views and opinions of others, including colleagues and patients. The processes of thinking, questioning, investigating and reflecting on information from a wide range of sources, people and contexts are at the heart of finding and using evidence to guide practice.

This is what a student (we will call her Lauren) said when reflecting back on how her undergraduate education had prepared her for getting her first job:

I entered my degree thinking I probably wasn’t going to change the world, but I intended to change the world for my clients, that’s for sure. I wanted my clients to have every opportunity to engage in the life they wanted; not settle for a life they should be grateful for, or a life that would do. So how will my degree enable me to do this? I can see how my degree armed me with the skills and knowledge to understand people in different settings, to know what to assess and [how to] design interventions, to reason and make decisions. And let’s not forget the dreaded research papers. How will we, as newly graduated practitioners, know how to achieve better health outcomes for our clients and promote our profession’s credibility without evidence? And when better to plant that seed than when I’m first learning everything? (Lauren, September 2012)

It is not surprising that health science students want to become the best practitioners they can be. As a student it is easy to see how being a good communicator, learning

practice techniques, and engaging in clinical and professional reasoning come together to help make good practitioners. This is the stuff of everyday practice. Evidence and research are threaded through practice and professional work and study in the health sciences.

## THE NATURE OF KNOWLEDGE

One of the features of the modern world is the vast array of information that is generated and the access that people have to it; the world of student health practitioners is no different. One of the challenges is to know how to manage, understand and use this information. This requires having tools for finding, sorting and evaluating information as well as skills for interpreting and using it.

One of the expectations of students graduating from entry level degrees is that they will be critical consumers of research. In other words, health science students and graduates are expected to use research-generated knowledge, or evidence, to **design**, implement and evaluate the most effective interventions for the people and communities they serve. This expectation changes at the postgraduate level of study where students are expected to make a contribution to a field which may be described in terms of new knowledge; this involves actually doing research rather than just accessing and understanding it.

### Design

The process of planning and creating a solution to a problem.

Gaining a bachelor's degree-level qualification in the health and disability sector requires becoming familiar with research in a way that informs practice decisions. The interplay of research evidence and practice therefore ensures that advancing knowledge contributes to the delivery of services and ultimately to enhancing outcomes for service users. This is what evidence-based health practice means; it involves questioning what to do, searching for relevant information, critically considering the information available, building new knowledge and reflecting on it in a way that develops effective practice.

## WHAT IS EVIDENCE?

The statement 'not everything that counts can be counted, and not everything that can be counted counts' has been attributed to Einstein and Cameron (Cameron, 1963) and while the exact phrase and history of it are difficult to track, the principle that 'just because information exists does not mean it is useful' is important to consider. Evidence-based health practice has been described as 'the integration of best research evidence with clinical experience and client values' (Sackett, Straus, Richardson, Rosenberg, & Haynes, 2000, p. 1). As such, equal privilege is afforded to available knowledge arising from rigorous and trustworthy research (qualitative and quantitative evidence), practice wisdom, and the consumers' needs, goals and aspirations. The nature of the question asked determines the nature of the evidence that is most relevant and useful.

## CASE STUDY 1.1

### TYPES OF EVIDENCE—NUMBERS AND STATISTICS GIVE ONE VIEW WHILE NARRATIVE GIVES ANOTHER

#### Quantitative evidence

Information collected through rigorously conducted research processes with an emphasis on the quantity of data.

#### Qualitative evidence

Information collected through a rigorous research process that emphasised the quality and richness of data.

#### Control

A research cohort not treated in an active way to provide a point of comparison.

**Quantitative evidence** (such as numbers and statistics) and **qualitative evidence** (such as stories and narrative) combine to present a comprehensive picture—to tell the ‘whole story’.

Drawing on trustworthy evidence from quantitative and qualitative research is valuable when designing effective interventions. To illustrate, unintentional falls are a major cause of injury and disability for older New Zealanders. In 2010 alone, over 3,100 serious, non-fatal falls were reported for those aged 75 and older, showing a pattern of increasing annual frequency (Statistics New Zealand, 2011). The personal, social and health care costs of serious and less serious falls are significant. Numerous studies in Aotearoa New Zealand, Australia and other countries have considered the efficacy and cost-benefits of falls prevention programmes that target modifiable risk factors. For example, a recent intervention study in the United Kingdom of 204 community-dwelling seniors who had fallen, but not been admitted to hospital, is fairly typical of the multi-factorial programmes being tested and implemented. As well as being more cost-effective, the structured falls-prevention programme led by nurses, occupational therapists and physiotherapists resulted in better participant outcomes, including fewer subsequent falls and higher quality of life, than the existing rehabilitation services (Sach et al., 2012). Yet, even though both programmes were making a difference, participants still withdrew from both the experimental and **control** groups. Qualitative research offers some suggestions as why older people do not participate in or complete community and clinic-based falls-prevention programmes (Child et al., 2012; Elskamp, Hartholt, Patka, van Beeck, & van der Cammen, et al., 2012).

When interviewed about their own and others’ experiences of falling, as well as likelihood of falling in the near future, older people in South Australia wanted to be viewed by others as not the type of person who falls. In other words, participating in a falls-prevention programme threatened their sense of who they were (Dollard, Barton, Newbury, & Turnbull, 2012).

Similarly, older people in The Netherlands who were seen by emergency services following a fall thought of themselves as being too well to attend a

falls-prevention programme (Elskamp et al., 2012). Such qualitative research adds depth to understanding what is going on and why. Making use of different forms of research evidence means richer understandings can be taken into account when designing effective health, disability or social services.

Thinking critically about evidence helps to broaden the range of information that a practitioner may bring to any situation. An appreciation of the notion of **expertise** can lead to seeing the client or patient as an expert, with knowledge that is based on lived experience and can contribute to understanding the situation and addressing it. Trusting human **intuition** and experience can also inform the planning and delivery of health-care and disability support services (Welsh & Lyons, 2001). Most experienced practitioners can tell stories of situations in which they ‘knew’ there was a problem before it was completely obvious and acting on their intuition and clinical judgment had a positive outcome whereas if they had waited for objective information to appear, it may have been too late to have made such a difference.

#### **Expertise**

Expert skills and knowledge.

#### **Intuition**

The process of knowing something as a result of personal and/or professional insight.

## EVIDENCE GROWS AND CHANGES

In order for evidence to inform practice, research needs to be relevant and useful. However, what is known and its relevance change and develop over time. It is important to appreciate that the usefulness of research can be altered as a consequence of the development of a field of knowledge, or when the context in which the problem exists changes. Research activities include various processes designed to ensure the integrity of new information. The concepts of review and debate are highly valued within the research community. Practitioners and researchers alike need to be aware of new and emerging concepts and how such knowledge impacts on their understanding and approach to any given practice situation.

### CASE STUDY 1.2

#### PREPARING PATIENTS FOR SURGERY

Aotearoa New Zealand has a particularly high incidence of bowel cancer and therefore is a nation in which much bowel surgery takes place every year. Practitioners working with these patients follow routine protocols to prepare

*(continued next page)*

them for this type of surgery. A surgeon working in Auckland (Mattias Soop) is part of an international team which has been investigating pre-surgery preparation for bowel surgery patients through extensive analysis of research and practice and has challenged a number of conventional parts of this preparation (Fearon et al., 2005; Lassen et al., 2009)—see Table 1.1.

**TABLE 1.1 PROBLEMS AND RESEARCH-BASED SOLUTIONS**

TRADITIONAL PRACTICE	PROBLEMS IDENTIFIED	RESEARCH-BASED PRACTICE
Extensive preoperative bowel preparation	Dehydration, fluid and electrolyte imbalance Risk of cardiac complications	Patients undergoing colonic resection should not receive routine oral bowel preparation.
Fasting from midnight on the day of surgery	Thirst and hunger anxiety Not a major risk factor	Patients should fast for liquids for two hours and solids for six hours preoperatively.

Changes in practice based on this information benefit patients not only in terms of outcomes but also positively influence their experience of this treatment.

It is tempting to think that any specific piece of evidence may be ultimately right and therefore indisputable but, in reality in the context of practice, the need to keep seeking a more detailed understanding and the advent of new technology means that new questions constantly can be asked and new perspectives sought. The continued consideration of problems and attempts to seek new answers lead to changes in practice even in what may appear to be very developed fields of knowledge.

## EVIDENCE IN THE WORLD OF PRACTICE

Human existence and the contexts in which practitioners and those they serve involve many variables. One of the challenges when linking research to practice is that often the most precise and definitive research only answers a very small question which may be only partially helpful for the particular situation that the practitioner and the patient find themselves in. A large amount of research in the health and disability sector is undertaken in relation to medications. The specific research questions often relate to the effectiveness of the medication.

**CASE STUDY 1.3****NEW PERSPECTIVES ON OLD INFORMATION—PHARMACOGENETICS**

Despite extensive resources spent on researching medicines there is evidence that unless patients have a genetic code that equips them to fully metabolise the specific components within it they will not be able to fully benefit from it. Research from the UK by Brian Spear and his colleagues (2001) identifies the proportion of the world's population which have the genetic code to gain the most benefit from various types of medications.

**TABLE 1.2** EXAMPLES OF FINDINGS ABOUT THE PROPORTION OF THE POPULATION ABLE TO BENEFIT FROM TYPES OF MEDICATIONS BASED ON GENETIC PROFILE

TYPE OF ISSUE	EFFICACY (%)
Alzheimer's disease	30
Asthma	60
Diabetes	57
Oncology	25
Rheumatoid arthritis	50
Schizophrenia	60

Source: Spear, Heath-Chiozzi, & Huff, 2001

This information could help explain why some patients do not seem to respond to or benefit from medications to the same extent as others.

The existence of research in relation to any specific issue or problem does not mean that all of the relevant questions have been asked or answered. Existing information may not be providing a comprehensive picture when there are questions about the sample or the relevance of the specific question in relation to the complex world of practice (Shaw, 2006).

## THE IMPACT OF EVIDENCE ON PRACTICE

**Paradigm shift**  
A change in the theoretical framework or perspective from which information and knowledge has been viewed.

Practice changes over time as evidence evolves, as do the approaches to asking questions and seeking answers. The concept of a **paradigm shift** refers to a situation in which there has been a significant change in thinking within a field of knowledge or practice. This usually involves commonly held assumptions about the things that are thought to be true in current practice being challenged and questioned. The concept of the paradigm shift was suggested by Kuhn (1970) and denotes a change from one way of thinking to another. Such journeys within groups of practitioners and fields of knowledge are often driven by people who act as agents of change. In the case of scientific endeavour this change agent is new research or evidence.

### CASE STUDY 1.4

#### PARADIGM SHIFT

An example of a paradigm shift in the world of musculoskeletal practice is the treatment of tendinitis, in particular the Achilles tendon. Generally speaking when an anatomical structure is mentioned with the suffix 'itis', this implies an inflammatory process affecting the structure (for example, appendicitis can be defined as inflammation of the appendix). Therefore any patient presenting with a sore tendon was diagnosed with an inflamed tendon or tendinitis. Within this paradigm the methods of treatment to help resolve this problem revolved around reducing inflammation and swelling, rest, ice, compression, elevation, massage, ultrasound, stretches and anti-inflammatory medications.

However, not all patients who presented with this type of condition improved with this regimen; many of them had the condition for months well beyond the accepted time for normal inflammation to have resolved. Some patients also required surgery despite the best conservative care (Alfredson, Pietila, Jonsson, & Lorentzon, 1998; Maffulli, Sharma, & Luscombe, 2004). Research identified that these types of tendon problems were not inflammatory—in fact, tendon biopsy showed no inflammatory cells in the tendon, but there were instead great degeneration in the tendon and types of collagen that did not tolerate normal loads well (Khan, Cook, Taunton, & Bonar, 2000, Maffulli et al., 2004).

So the paradigm shift involved rethinking the concept of inflammation in the tissues; this in turn debunked the model of care that had been predicated on inflammation. It led to a change in treatment from emphasising rest and



reduced loading to one of gradually increasing load via strengthening the muscles and tendon, and return to a sport or activity programme (over a 12-week period). The shift in treatment approach has now been demonstrated to be more effective than surgery in people with this type of condition (Alfredson, Pietila, Jonsson, & Lorentzon, 1998). This shift has been reflected in a change of name from tendinitis to tendinopathy, which more accurately reflects the pathological process in the tendon. There is also now a body of research that supports this approach in a wide range of tendon conditions (Svernlöv & Adolfsson, 2001; Mafi, Lorentzon, & Alfredson, 2001; Norregaard, Larsen, Bieler, & Langberg, 2007; Ohberg, Lorentzon, & Alfredson, 2004).

There are many examples of practice within health science that have been considered standard for a long time and yet have been challenged by research. Research which investigates a real-life question and explores information from various perspectives (such as qualitative information from patients and practitioners, and quantitative information from mechanical analysis) is likely to be the most meaningful and useful. Understanding evidence and research is necessary to the provision of high-quality care within the health-care and disability support sector.

## THINKING CRITICALLY ABOUT RESEARCH

Research, like most areas of human endeavour, has the potential to challenge territories, boundaries and interests. The pressure for industry to use research to produce and market products (such as pharmaceuticals) and the demands on practitioners and academic health professionals to describe and reflect on their practice requires that high standards are maintained and that critical questions are asked. The existence of research results does not mean that the new knowledge is useful or relevant. If the research did not pose a useful question or did not investigate it in a manner that represented real life or practice then it may demonstrate good **science** but not be of any use.

Engaging in research often means asking challenging questions or questioning the status quo. This is not always an easy place to be. Historically, there are examples of people having suffered for their new ideas which were deemed radical and foolish. In the 1780s Semmelweis suggested that practitioners should wash their hands between patients and particularly between carrying out postmortems and delivering babies. He was ostracised for his views (Widmer, 2000) but today hand washing is considered by the World Health Organization to be of the greatest importance (Pittet, Allegranzi, & Boyce, 2009) for professionals and the general population.

### Science

The body of processes used to develop and extend knowledge (often with an emphasis on empiricism and positivism).

## RESEARCH ALIVE 1.1

### RESEARCH AND PRACTICE

There are many developments underway interrogating the interface between research and practice. A particularly innovative approach is that of the REACT (randomised evaluations of accepted choices in treatment trials).

The traditional approach to medical (especially pharmaceutical) research has been to randomise patients into groups at the beginning of the study comparing two treatment approaches. This process is complex and time-consuming. The REACT trials involve links in the software and records that are routinely kept by general practitioners. At the point where a particular diagnosis is made and more than one accepted treatment is available the system asks specific questions and then links the patient's **data** into the system. This enables follow-up and analysis via the information kept in the health system and also provides long-term information about 'real life' outcomes (such as adverse health events that patients experience) rather than surrogate outcomes (such as changes in cholesterol or blood pressure) (van Staa et al., 2012).

#### Data

Information that is gathered for the purpose of analysis and research.

## SUMMARY

Evidence and research are concepts that students need to understand. They are central to understanding and developing practice and necessary to keeping up to date with knowledge and innovations, ultimately contributing to the delivery and evaluation of the best possible care and support. A foundation knowledge of these concepts gained during undergraduate education will also equip practitioners well to further develop their careers in practice, teaching or research.

## REFLECTION POINTS

- Thinking back on this chapter, what are the main messages that you draw from it?
- How has your thinking about the relevance of research to your learning changed?
- How has this chapter challenged and/or affirmed your understandings and beliefs about research?

## STUDY QUESTIONS

- 1 How would you describe the concept of evidence?
- 2 Why would evidence be relevant to an undergraduate student in the health sciences?
- 3 What are the differences between quantitative and qualitative evidence?
- 4 Why is research important for practitioners and patients?

## ADDITIONAL READING

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## WEBSITES

Is the five-second rule true?

<http://www.youtube.com/watch?v=rYXdsOEWBj0&feature=b-mv>

Health Research Council of New Zealand:

<http://www.hrc.govt.nz>

<http://www.hrc.govt.nz/funding-opportunities/maori-development>

New Zealand Social Science Data Service:

[http://www.nzssds.org.nz/surveys\\_in\\_nz/nzsrda](http://www.nzssds.org.nz/surveys_in_nz/nzsrda)

Te Pou—supporting and developing the mental health, addiction and disability workforce in New Zealand:

<http://www.tepou.co.nz>

Unite for Sight—why research matters:

<http://www.uniteforsight.org/research-course/module2>