

# It happened like this: a case for the case report

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**Abstract:** Case studies allow for in-depth, data-rich explorations of a single participant in their real-life settings. The value of the case study was once well recognised in health and medical research but was supplanted by research higher in the hierarchy of best evidence. However, case studies are still written, so what is a case study, why would one go to the effort of writing one, and what is worth reporting? This paper aims to provide insights into why anyone would still write a case study, what they are useful for, and what makes a good case study.

**Indexing Terms:** Case report, study, in-depth study, writing, research report

## Introduction

**W**hy write a case report? Are they even worth writing anymore? Most practitioners, students, and researchers will recall dragging themselves through writing a case study as part of their education.

Usually, it was not for interests' sake, but because they had to. Also familiar will be the hierarchy of evidence, where the systematic review sits, shining, at the pinnacle of best evidence. Following closely on the heels of the systematic review is the randomised controlled trial, and far down at the bottom of the heap is the lowly case report or study.\* (Daly et al., 2007; Hoe & Hoare, 2013; Roberts & Dicenso, 1999)

Sitting just above opinion and often termed as the weakest level of evidence, case reports can be dismissed as irrelevant. (Hoe & Hoare, 2013) However, where the case report excels is the data-rich description of a single case, providing insights into the unexplored, and alerting the clinician to unusual phenomenon. (Daly et al., 2007) Done well, a case report tells a vivid story, allowing a single patient's lived experience to bolster existing concepts or as a stepping-stone in understanding and formulating new theories.

There are many in-depth and informative guides describing how to write a case study or report which this paper will not discuss. Instead, this paper is

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\* = Journal style is 'Case Report' and we index papers as such. A 'Case Study' is essentially the same as a Case Report. The etymology suggests that qualified researchers talk in terms of 'studies' while clinicians, as 'reports.'

structured around the following main questions:

- ▶ What is a case study, and why write it?
- ▶ What types of cases should be used?
- ▶ What is worth reporting?
- ▶ What makes a good case report?

The aim of writing this piece is to provide insights on why one would write a case study and what they are useful for.

## Discussion

### *What is a case report/study?*

The illustrative case report/study and case series have a long history in clinical practice and research. They present detailed analyses, usually of a single patient, aiming to provide insights into the patient's clinical presentation and place the case within the broader understanding of current knowledge. (Crowe et al., 2011)

Perhaps one of the most famous examples of a case report is when, in 1861, an explosion and 13 pounds of iron bar ripped through a man's brain. That man being Phineas Gage, who inadvertently ushered in the modern era of neuroscience by allowing doctors to observe the changes of a brain-damaged man who, surprisingly, lived. (Damasio et al., 1994) In the early part of the 20<sup>th</sup> century, case studies of a single patient with interesting syndromes were one of the few ways medical science, especially neuroscience, was explored. (Shallice, 1979)

The problem with case reports of noteworthy individuals is that the findings of a single case cannot be extrapolated to a larger group of people – they have low external validity. Furthermore, one interesting case cannot prove causality either. (DePoy & Gitlin, 2019) Because of this, the case report fell from favour as more rigorous methodological approaches were adopted. (Moncrieff & Crawford, 2001; Morris & Titmuss, 2011) New methodological approaches sought to understand the mechanisms of disorders and test validity, causality, and efficacy. (Akobeng, 2005)

Newer research tried to make the participant representative of the population as a whole, whereas the case report often describes the participant as unusual or unique. (Kendall, 2003) However, the humble case study still has its place, especially as a preliminary or exploratory stage in research. Case studies form a base for developing more structured research, especially in areas of study for which existing theory is inadequate or when a fresh perspective is needed. (Eisenhardt, 1989)

Where the case study shines is in the specific, not the general. A specific case is chosen, the researcher comes to know it thoroughly, the aim being to describe what it is, what it does, and how it works. While there can be an emphasis on how the case is different, the true importance of a case study is in understanding the case itself, the how and the why of what is happening, (Crowe et al., 2011; Stake, 1995)

### *Why write a case report?*

A question to ask, when considering a case report, is: *What do you want to do?* For most clinicians, the answer is, at least anecdotally, that they want to write up an interesting or unusual case. They essentially want to write a story of a patient with unusual symptoms that got better with a particular type of care.

Perhaps a better question to ask would be: *Why, exactly, is this particular case or observation important?* (Vandenbroucke, 2001) Another issue to think about is how, if at all, the case might be generalisable to the larger population. In other words, is this case similar to many others, or is it a common occurrence? (Orum, 2015) Lastly: *What do you want to come out of the case?* Is it a stand-

alone case, written purely to entertain the reader? Does the case begin to define a new theory or explain a phenomenon more fully? Or does the case fit, like a piece of a puzzle, into a larger network of cases, forming the base from which to launch higher-level research? (Flyvbjerg, 2006; Orum, 2015)

Case reports can be thought of as having three different outcomes:

- ▶ exploratory – as a pilot to future research
- ▶ a narrative description, and
- ▶ explanatory as a way of testing theories. (Yin, 1994)

The type of case study an author is considering raises an important but often unacknowledged facet to research - money. Higher-level or best evidence research is expensive, and competition for funding is fierce. (Garcia & Sanz-Menéndez, 2005; Speich et al., 2018).

A researcher requesting grants or funding for a research project based on no published data is likely to find that funding bodies are as protective of their money as Smaug the dragon is of his hoard. However, if a project is based on multiple observations of a similar phenomenon, granting bodies can be more likely to part with their hard-won funds.

### What types of cases should be used?

#### *The normal case*

The typical or normal case is just that, normal. It is representative of a common, day-to-day occurrence in clinical practice. (Orum, 2015) The typical case is, perhaps, not the most exciting of cases, and while a single case cannot be extrapolated to the general population, a group of similar cases can be a platform from which to launch further research.

Typical cases are more commonly written up in situations where basic science and disease mechanisms are still being explored. (Vandenbroucke, 1999) An example of this in chiropractic practice would be the ubiquitous improvements in lower back pain that are often seen in everyday practice. A search of the literature ('chiropractic' + 'low back pain') illustrates how research on this topic has scaled the evidentiary pyramid. There are a plethora of case studies, (Bernard & Tuchin, 2016; Dunn et al., 2011; Parish, 2002; Stern et al., 1995) a moderate number of randomised controlled trials, (Hurwitz et al., 2006; Meade & Browne, 1986; Wilkey et al., 2008) and a few systematic reviews (Blanchette et al., 2016; Paige et al., 2017; Rubinstein et al., 2019; Walker et al., 2010).

The normal case has other, more exciting offshoots in that while attempting to explain the outcomes seen; they can generate basic science studies. In chiropractic, this has led down a rabbit hole of research to discover that a vertebral subluxations have brain-based origins, not just musculoskeletal causes. (Haavik et al., 2021)

The typical case could be viewed as the workhorse of cases, common, repetitive, and not particularly exciting, but gets the heavy lifting done when we want to find out why the basics work. Typical cases lend themselves to an exploratory style of case study. (Yin, 1994) Similar examples of the normal case in chiropractic care leading to higher-level research can be found in nocturnal enuresis (Reed et al., 1994) and infantile colic (Carnes et al., 2018).

#### *The unusual case*

The second type of case is the unusual or atypical case. (Flyvbjerg, 2006; Orum, 2015) These cases are not representative of what is commonly seen in practice or in the general population. An unusual case, sometimes called an *intrinsic* case study or report, is where a unique phenomenon is studied in-depth. (Crowe et al., 2011) Examples of unusual cases in chiropractic practice would be brain tumours, (Anderson, 2016) myogenic ptosis, (Murphy & Crisp, 2011) and changes in hearing, (Di Duro, 2006) Such cases are more of a narrative description, telling a story of what

happens in practice (Yin, 1994). Of course, if enough cases of an unusual phenomenon exist, they can become a framework for higher-level research.

### What is worth reporting?

Case reports break down, broadly speaking, into two categories: the progress of health science and education, and quality assurance. (Vandenbroucke, 1999) More specific potential roles are as follows:

#### *The study of mechanisms*

Case reports and case series have been instrumental in advancing scientific knowledge by giving the basic science study a foothold from which to start, (Vandenbroucke, 1999) For example, case reports of patients with adult respiratory distress syndrome were found to have better blood oxygen when they turned themselves prone whilst sleeping. (Pierce & Saltzman, 1974) Closer to home, case studies into chiropractic care for visual problems (Gilman & Bergstrand, 1990; Schutte et al., 1989; Stephens & Gorman, 1995) eventually led to experimental studies in the same field. (Cade et al., 2021; Carrick, 1997)

#### *Intervention and prognosis*

Sometimes the outcome of an intervention is surprising, especially if it is contrary to what the accepted literature says the intervention will achieve. (Vandenbroucke, 1999) Studies of prognosis can be useful when presented in a case series, or collection of case reports – such as a series of patients whose quality of life improved with chiropractic care, (Jones et al., 2018)

#### *Education*

The use of clinical case descriptions, or vignettes, in health and medical education is unmatched when helping to learn about a disorder, (Nendaz et al., 2000) Case reports are great illustrators of patient presentations, showing us a disease or disorder in a real-life context. Knowing what a disorder looks like in real life helps a clinician identify it better than a dry collection of signs and symptoms from a textbook. Case reports are a useful way of teaching about a patients problems in-depth and help us to think deeply about the mechanism of the problem. (Nendaz et al., 2000; Vandenbroucke, 2001)

#### *Quality Assurance*

The *British Medical Journal* ran a weekly publication called *Lesson of the Week* (*British Medical Journal, 2015*) aimed at teaching by the mistakes of others. Quality assurance in case report form works by identifying unfavourable outcomes and discussing if said outcomes could have been prevented, (Vandenbroucke, 1999, 2001) Using case reports as a form of quality assurance seems like an informative use of this type of research; however, they would be likely to be challenging to write for the mistake-maker.

#### *Description of new diseases and the recognition of side effects*

As in the famous case of Phineas Gage, case reports are a way of bringing attention to a new disease or disorder. They can highlight possible side effects of an intervention or medication to a wider audience, such as the surprising side effect of Pfizer's little blue pill originally developed for combating heart disease, (Nachtsheim, 1998)

### What makes a good case report?

Deciding if a case report works depends on why the report was written in the first place. If the case was written to teach about the unknown or to help recognise the different or unusual, then yes, a case report has a high sensitivity to novelty and thus works well. (Nachtsheim, 1998) As a driver for clinical decision making the case report may not be the most specific tool available to

the clinician. (Vandenbroucke, 2001) Interestingly, case reports detailing the side effects of interventions turn out to be correct, more often than not. (Venning, 1982)

So, what makes a good case report? Specifically, a good case report gets the author's point across. The point made depends on the type of report that has been chosen, the study of mechanisms, education, prognosis, or quality assurance. (Vandenbroucke, 2001) When writing a case, the most difficult thing is preparing an argument based solely on the case itself that convinces the reader. In short, know what point you want to make, make it, and be brief. (Vandenbroucke, 1999)

## Conclusion

The hierarchy of evidence places the systematic review and randomised controlled trial at the top of the heap.

Higher-level research in the traditional pyramid is rigorous, valid, and helps to prove causality. (Rosner, 2012) Before this happens, the research question needs to be discovered, meaning the hierarchy of evidence needs to be turned on its head, as argued by this *Journal*. (Ebrall, 2021)

When generating new ideas and new research questions, the humble case report sits at the top of the heap with its observations of phenomena, discussions of mechanisms, and surprising outcomes post-intervention. While the case reports cannot be easily generalised, they do stimulate learning.

Therefore, the discovery aspect of case reports, both educational and scientific, makes case reports so interesting to read and so vital for scientific advancement – even in the age of evidence-based medicine.

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### *About the Case Report project*

This paper informs the [ASRF Case Report Project 2021](#), a project designed to gather client studies from chiropractors and transform them into much-needed case reports, focused on the effects of chiropractic care on clinical presentations highly relevant to chiropractic, such as stress, immunity and adaptability.

The January issue of the *Journal* features a tranche of Case Reports. This paper is a valuable guide to their merit in your practice.

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