

Improving Numeracy in Medicine, by Bonny P McClain (2015).

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Numeracy | Medicine | Statistics | Research

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None.

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What this paper adds: Bonny P McClain (2015) has created a useful introduction to the world of statistics in medicine, which can help medical students take their first dive into the topic. The book covers a wide variety of concepts in statistics and asks thought provoking questions which help you develop as a clinician and a researcher.

Introduction: Numeracy is a fundamental skill in medicine, both on the wards and when conducting research. Unfortunately, many clinicians need to improve their numeracy skills because “237 million medication errors are made every year in England” (BMJ, 2020, no page) and 21% occur when the drug is being prescribed, many of these due to numeracy errors (BMJ, 2020). The GMC and the BMJ are both urging medical students and practicing

clinicians to improve their numeracy skills.

Improving numeracy in medicine (2015), offers an overview of common numeracy problems, including how numeracy information is presented. The book can be used as an introduction to medical research and may benefit any student thinking of undertaking a research project. The book discusses many interesting concepts in research, encouraging the reader to think about the reasons behind many of the important decisions made by author(s) who publish works of research.

Context: The book aims to improve clinicians' and medical students' understanding of data to allow them to develop skills they need to interpret health literature and improve their practice. The text efficiently introduces many of the different numeracy challenges that currently exist in healthcare and discusses how to approach them. The author, Bonny P McClain, is a data analyst with experience in the medical field. In the text it is evident that she has a wealth of experience in different fields and understands how to explain complex

topics using straight forward and simple examples. However, the lack of clinical focus in some sections of the book may be a limiting factor for some readers.

The first half of the book defines a few different terms and discusses the important concepts to consider in numeracy. The 'health literature' section specifically gives a solid introduction as to why data and research are clinically relevant, whilst the 'numeracy' section establishes the patient's point of view, which many consider to be an increasingly important part of medical literature. Establishing the patient's point of view early is useful because it helps the clinician to stop at all the clinical examples throughout the book and think of how they can affect the patient. The section of the book on 'important concepts' provides a nice overview of the different pitfalls to look out for in the world of statistics, such as the difference between correlation and causation. It also explains the classifications of different clinical trials. The second half of the text has two main objectives. The first part focuses heavily on different statistical tests in clinical research and the second part

presents an example research paper which takes the reader through the techniques used to analyse it. The first part has invaluable sections on the ' p -value' and the 'number needed to treat (NNT)'. These are two essential tests used in research to prove, amongst other things, the efficacy of drugs and therapeutic treatments. The three sections on the p -value are a fundamental addition to any text discussing numeracy above GCSE level, and an important part of clinical practice as p -values are used to determine the statistical significance of new treatments and adverse effects, which in turn help determine their clinical significance. The author's explanation is good throughout these sections, and she adds simple yet crucial examples to help understand p -values. Critically, there are good links to the clinical setting, like the difference between what is deemed statistically and/ or clinically significant, which is recognised as an essential element of the practice of evidence-based medicine.

The author continues to explain well and use concrete examples in the section NNT (number needed to treat). NNT is used to translate knowledge

from clinical trials to the population and to help doctors and regulators like National Institute of Clinical Excellence (NICE) to make decisions about which drugs to administer to patients based on clinical findings and cost effectiveness. Again, the author explains this section very well and tailors it specifically for clinicians using examples to easily explain some complicated concepts. In the latter part of the second half, the author provides a set of questions she recommends that the reader ask whenever they review a research paper. Then the author goes through an example of a research paper, answering the questions as she goes along, pulling together lots of different concepts and tests already introduced earlier in the book.

The book is sprinkled with a few black and white pictures and diagrams to illustrate different tests and concepts. The author concludes by reflecting on the limitations of data; a key message is that regardless of the different tests performed, the results are only as good as the sample. At the end of the book, there are two pages of information which give links to literacy

resources, as well as websites that the reader might find useful.

Evaluation: The text is intended as an introduction to numeracy mainly for undergraduates, but many of the concepts the author discusses are also important for more experienced medical professionals. There is significant examination of the approaches to numeracy in medicine and thinking about the important ideas around it, such as asking what we are trying to get from this analysis rather than how to do it. For many reading this text, who may not have thought deeply about why they are carrying out specific statistical tests, this is an interesting forte into numeracy and statistics for medical students and medical professions. Some of the questions brought up in the first section of this book would be very useful for any medical individual to consider when planning to do some research or when reading a paper. Specific statistical tests and concepts are first discussed in the section on 'Difference in the means', however, the author's explanation is very short and simple which might make this book less useful to some readers who may

require additional explanation. Unfortunately, this section is not fully accessible to all undergraduates because in many cases it assumes a certain level of knowledge and does not explain the meaning of certain statistical terms. Several of the terms the author alludes to are covered in A-level maths, which could make it less accessible for those undergraduates who have only studied at GCSE level. Furthermore, this section of the book becomes less medical, and the format changes, making the book seem more like a handbook on statistics than one on improving numeracy in medicine. Evidence from clinical trials is frequently applied to clinical practice, and so it is essential that medical students and qualified clinical professionals have a good understanding of them. The author presents an overview of different types of clinical trials and the strengths and weaknesses of each type. This helps the reader to appraise clinical trial papers and decide on the strength of the paper for themselves. This is a very well-written and well-explained section of the book. In a future edition, it would be useful to expand this section because it was the most

valuable section for me as an undergraduate medical student. I would have appreciated more discussion around the methodology of clinical trials and the interpretation and application of results. Furthermore, it would have been interesting for the author to talk more about the importance of randomisation and the processes of sampling, such as the difference between randomising a sample and identifying a powered sample which is more proportional to the population.

The second half of the book starts with multiple short sections on different tests and concepts used in research papers, like the p -value and odds ratio. The author's explanations are effective most of the time, although some sections are not always fully explained, often because they are not long enough. In these sections, the author uses several pictures and diagrams, however, they contribute little to the reader's understanding because they are not always explained. The format of these sections could be improved because the sections do not link together well. In order to improve this half of the book, it would help to add a

glossary for the different statistical phrases and acronyms used, as the author frequently uses abbreviations which the reader needs to remember in order to move on. After these sections, the author brings together and applies several of the concepts discussed earlier when analysing a research paper. This provides a very good clinical example, which strengthens the reader's understanding. It also links back to multiple concepts discussed earlier in the book, such as the issue of the media misrepresenting the conclusions and data of different research papers. The universal list of questions the author provides could be used by any clinician researching a paper to evaluate research in almost any field. In terms of layout, the formatting is a significant issue throughout the book, making it difficult to navigate due to the lack of page numbers, which is basic academic convention. There are many other formatting issues in the text which, although not serious, are numerous and noticeable, such as a lack of signposting and chapter headings. This may impact the flow of the text for some readers. On the other hand, the font is very large and

accessible, making it easy to read. The author could consider significantly improving the layout for a potential 2nd edition, by altering the structure of the text to be more like a conventional handbook with chapter headings. Finally, the author could also consider adding a list of definitions on each page or at the end of the book to help readers who need more support understanding the concepts being discussed.

Numeracy in medicine is generally split into two branches: the statistical branch, which doctors use to analyse, present and interpret research; and the clinical branch, in which doctors use numeracy for example, for drug calculations and interpreting information in clinical practice.

Unfortunately, this text only covers the statistical side of numeracy used in research papers and does not address the clinical side. As a result, I feel that the title of the text, 'Improving Numeracy in Medicine', could be refined to better fit the contents of the book, such as, 'Improving Research in Medicine', or 'Improving Statistics in Medicine'.

Summary: This is a good introductory text for any medical student interested in research and reading papers, however, they may need to search up some of the terminology. In each section, the author provides an introduction to elements of the key concepts in statistics, and a helpful list of online and offline resources will allow the reader to build on their research skills. Overall, it could be considered a useful introduction to research and statistics, however, in my opinion it might not satisfy all audiences. The author has a unique style of writing which may not suit all readers, but once fully engaged with the book, the author does present some thought-provoking questions and examples. The lack of page numbers and issues navigating through the book could make it difficult to justify including it in a formal module reading list, but I think it would be a worthwhile addition to the bookshelf of any student starting their first research project.

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