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# Quantitative Research Methods in Health Sciences



**Rajendra Karkee**

*Foreword*
**Colin Binns**

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# 3
CHAPTER

# Research Process and Research Integrity

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Research process follows a systematic procedure to answer research questions. After setting research objectives, the procedure is mainly concerned with obtaining data and analysing it (Table 3.1). Though, the process seems sequential, it can go around (Varkevisser et al. 2003). In fact, the research process is like a trip—travelling round a road where you can stop at certain points along the way. It starts with destination (objectives); has critical junctions and need to make choices (sampling---measurement---analysis); sometimes back travelling (reviewing previous steps) and finally reach the destination (conclusions and implications).

Research process starts with a **proposal development**, which is also a cyclical process. During proposal development, it may be necessary to cycle back to prior steps many times before finally reaching a satisfactory research objectives and methods.

You should possess **'research integrity'** while undertaking research. Demonstrating research integrity (or responsible conduct of research) means you should follow or exemplify the standards established by professionals and society for the proper conduct of research. You can find standards and proper behaviors as rules, regulations, guidelines, code of ethics etc. developed by government or institutes. Internationally, Singapore Statement on Research Integrity lists fourteen specific responsibilities under four basic principles (honesty, accountability, professional courtesy and good stewardship).

Demonstrating trustworthiness on these responsibilities can be complex in some situation where it is hard to take decision as right or wrong. In these situations, your mentor or ethics committee can

**TABLE 3.1** Research process and development of a research proposal

| *Questions to be asked* | *Steps to be taken* | *Incorporation in research proposal* |
|---|---|---|
| What is the problem and why do we research it? | Prioritising problems, problem identification, analysis, and justification | 1. Introduction and Rationale (►4) |
| What information is available? | Literature and other available information | Literature Review (►19.2) |
| What are the aims of the research? | Formulation of research objectives | 2. Objectives (►5) |
| What data are needed to meet the objectives and how are the data collected and analysed? | Research methodology | 3. Materials and Methods (►6) |
| ▪ What approach will be followed to collect the information? | | 3.1 Types of study (► 6.1 and 10) |
| ▪ From whom and when we collect it? How many subjects are included and how are they selected? | | 3.2 Study pop, area and sampling (►6.2 and 11) |
| ▪ How do we quantify and measure the information? | | 3.3 Variables and measurement scale (►6.3) |
| ▪ What tools and techniques do we need to collect the information? When and with whom will we collect the data? | | 3.4 Data collection procedures and tools (►6.4, 12, 20.2) |
| ▪ What will we do with the collected data? | | 3.5 Data processing and analysis (►13, 14, and 15) |
| ▪ Are we likely harming anyone due to the study? | | 4. Ethical considerations (►7 and 20.3) |
| Who will do what, and when? | Work plan | 5. Time table (►8) |
| How much money do we need for this study? | Budget | 6. Budget (►8) |
| Where is the information located? | Literature search | 7. References (►9 and 18.7) |

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instruct you. In other instances, researchers can resort to behaviors that significantly compromise the proper professional conduct of research or the accuracy of the research result; and such behavior is termed as '**serious misconduct**', for examples *plagiarism, deliberate fabrication and falsification of data*. In other instances, behaviors are not serious but also do not comply with the standards for responsible conduct and termed as 'minor misconduct' or 'questionable research practices', e.g. improper authorship, exaggerating findings in abstracts or improper interpretation of data. Since research mostly relies on self-regulation to detect and correct serious misbehavior, any serious or minor misconduct are often not reported or investigated.

Research integrity applies throughout the research process: designing, conducting and reporting of research. During designing phase, you should carefully plan your research, get approval for human participants from ethics committee (►7), and declare any **conflict of interests** including personal, professional, and financial. Personal interest (for example, family obligations could conflict with the need to spend long hours in the laboratory or library or a long duration in field), professional interest (for example, getting a job or research grants, becoming a research leader or publishing articles) and financial interests (to get financial benefit) can compromise to presentation of final research results and conclusion, i.e. on the integrity of research. During conducting phase, you should protect your human participants including environment, properly document the methods and procedures of data collection, storing and sharing of data collected, and proper analysis and interpretation of data. During reporting phase, you should be careful on plagiarism and authorship.

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# Quantitative Research Methods in Health Sciences

***Salient Features***

- Organization of the book stems from the elements of a research proposal so that reader will know where the epidemiology and biostatistics skills and knowledge fit in the research process. The reader will gain knowledge and skills in developing a proposal, analyzing data and writing an article
- The book practically demonstrates research process with the author's own PhD research project as an example as well as numerous other examples
- Contains the real examples of proposal, questionnaire and data files, which have been linked to several published articles in peer-reviewed indexed journals
- The readers are shown how to analyze the data by SPSS and STATA software and can reproduce the analysis outputs of the book and findings of the linked published articles
- Contains numerous tables, figures, boxes and cross-references to illustrate epidemiological and statistical concepts as its title indicates.



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