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Research & Dissertation Writing for Postgraduate Medical Students

Editors
Madhuri S Kurdi
Sukhminder Jit Singh Bajwa

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CHAPTER 7

Dissertation Writing – Title, Introduction, Aims and Objectives, Review of Literature, Abstract, References and Citation Management

Madhuri S Kurdi, Prashant Joshi

INTRODUCTION

The dissertation has to be written in a well-structured manner with some specific headings. The initial headings include title, abstract, introduction, aims and objectives, and review of literature. The title, aims and objectives are clearly written in the synopsis that is presented before the start of the research project of the dissertation. These will remain the same in the dissertation. The review of literature will be written in brief in the synopsis, whereas it will be written in detail in the dissertation.

This chapter touches upon the intricacies and finer aspects of framing the title, aims and objectives, writing sections of the dissertation such as the abstract, introduction, review of literature, references and also on how to do citation management.

THE TITLE

The title for the thesis is what an opening batsman is for a cricket match. It is the signpost of the study. The title should have the following characteristics:

- Should neither be too short and cryptic, nor should it be too long.
- Should be clear and brief.
- Should grab the readers' attention.
- Should be accurate with no spelling mistakes.
- Should be concise, descriptive, and informative.
- Should convey important content of the study.
- Should be specific and mention the type of study.
- Should not be misleading.
- Should not contain nonstandard abbreviations.
- Should reflect the purpose of the study.
- Should be scientific and not appear poetic.
- Should not be put in inverted commas.

Examples of well-framed titles of a research study are:

- *Comparison of ease of intubation with Airtraq®, Miller, Macintosh laryngoscope blades in children: A prospective randomised trial*
- *A randomised controlled trial comparing video laryngoscopy versus conventional blind technique for transoesophageal echocardiography probe insertion in paediatric patients undergoing cardiac surgery: A pilot study*

Examples of badly framed titles of a research study are:

- *To compare the efficacy of three techniques in reducing etomidate-induced myoclonus: A randomised controlled trial*
- *Transnasal humidified rapid insufflation ventilatory exchange (THRIVE): A game changer in apnoeic anaesthesia for shared airway procedures: A retrospective study*
- *Comparison of i-gel®, Ambu® AuraGain™, Baska Mask, LMA® Protector™ for airway management of obese surgical patients: A randomised comparative study.*

THE ABSTRACT SECTION

It is a summary of the study. It is like the icing on the cake. It is the first heading to be encountered by the reader and just like any "first look", it gives a

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general idea to the examiner regarding the study. It contains only important information related to the study. It is structured and written using subheadings such as Background, Objectives, Materials and Methods, Results and Conclusion. It will not contain discussion and references. Only important observations will be clearly indicated in it. *p* values and confidence intervals should be mentioned in the results. The present tense is used only for facts already established, especially in the background part. The past tense is used for parts already established or for findings of the study that the dissertation is based on. An abstract cannot be too long. The number of words is usually restricted to around 250–300.

THE INTRODUCTION SECTION

This is the first heading of the thesis that appears immediately after the table of contents. It should include the topics of the research/thesis, the focus and scope of the topic, and the aims of the research. The researcher makes the first connection with the reader through the introduction and hence it should be written in a manner that can interest the reader or examiner and give them a clear idea of the subject matter written in the thesis. The introduction can be written during the course of the study, when the study data is being collected, or at the end of writing the thesis. It should be structured, brief, and concise. It should extend to no more than one or two pages. The introduction should start with statistics or key facts to draw the reader's attention to the topic. The importance of the research topic and its relevance in the current scientific world should be mentioned. The research question that was taken up in the thesis should be clearly mentioned in a simple way. The main job of the introduction is to tell readers why the researcher undertook the study. The introduction should clarify what the author's (researcher's) work adds on to the existing knowledge on the topic and touch upon the novelty of the research.

Essential Contents of Introduction

- Statement of general topic and background information.
- Definition of terms and scope of the research topic.
- Mention of current lacunae in information on the topic and the need for the study.
- Clear statement of the research question and hypothesis.

The sentences in the introduction that are picked up from other publications should be suitably superscripted with the number of the article that is cited in the References section. Mistakes commonly made while writing an introduction include—inability to state clearly the research question of the study, inclusion of review of literature, too long an introduction, and failure to define the need for the study.

THE AIMS AND OBJECTIVES

Every researcher should know what are the aims and objectives of the study before starting the study because an aimless study means a study without a foundation. A researcher without aims and objectives for his/her study is like a driver driving without a clear destination in mind. Not only should a researcher have aims and objectives, but these should be well-defined. Aims and objectives provide a clear direction and purpose for the study and help the researcher to stay focused and avoid getting off-track during the course of the study. Though aims and objectives sound similar and are interconnected, they are two distinct entities which serve different purposes.

Aims Section

These are general statements that describe the overall purpose of the research study. They are broad in scope and provide a general direction for the research. They are written in a general, abstract, and theoretical manner to depict the ultimate goal of the research study.

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Example: To investigate the impact of sevoflurane administration on perioperative outcomes.

Objectives Section

These are specific, measurable, and achievable goals/endpoints that the researcher wants to accomplish within a specified time frame. These are statements that describe activities/tasks/steps that need to be carried out to achieve the aims of the research. They are narrower than aims in scope and provide specific details about how the research will be carried out. Unlike aims, objectives are concrete and operational. They are **s**pecific, **m**easurable, **a**chievable, **r**elevant, and **t**ime bound (SMART).

Example: Determining the impact of sevoflurane induction on emergence delirium.

Objectives can be *primary and secondary*. The primary objective is the most important endpoint and should reflect the research question. The additional endpoints which we want to study are termed as the secondary objectives.

Confusion between Aims and Objectives

Very few students and researchers understand the true meaning of "aims and objectives" and they often think that these terms are synonymous. However, it is pertinent to note that aims provide a broad context and final destination of the research, whereas objectives provide the small steps that the researcher must climb to reach the ultimate goal. Aims indicate what is to be achieved and objectives indicate how it is to be achieved. Objectives divide the aims into smaller parts. Well-defined aims and objectives ensure that the study remains relevant and meaningful, make the researcher stay focused on the research topic, guide the research design, help with effective allocation of resources, and assist in evaluating research by finding out whether the aim has been met and the research has reached its goals. They enhance communication and foster collaboration among the research team members.

How to Frame the Aims and Objectives?

They should be framed in such a way as to establish the scope, depth, and ultimate direction of the research. They can be devised based on the research question and after doing a good literature review. Action verbs such as "investigate", "evaluate", "compare", "find out", and "analyse" can be used while framing the aims and objectives.

Common mistakes found in the framed aims and objectives include too general/unclear aims and objectives with lack of focus, too narrow/specific aims and objectives, framing too many unrealistic objectives, no matching with the research hypothesis, nonfeasibility in terms of time, budget, and resources, and unethical objectives that can jeopardise the research participants' safety.

An Example of Well-framed Study Objectives Matching the Title

- *Title of the study:* Comparison of efficacy of ketamine and fentanyl for pain relief during burns dressing
- *Aim of the study:* Compare the effectiveness of analgesia provided by ketamine and fentanyl for dressing change in burns patients.
- *Primary objective:* To compare the percentage change in pre- and postprocedure pain score between patients receiving fentanyl or ketamine for dressing change in burns intensive care unit.
- *Secondary objectives:*
  - To compare patient satisfaction regarding pain relief by using Likert scale.
  - To compare the changes in haemodynamic response during procedure in these patients.
  - To compare the side effects of ketamine and fentanyl in these patients.

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- *Conclusion (A well written conclusion which matches the objectives stated):* Both fentanyl and ketamine provided adequate analgesia during burns dressing, but fentanyl offered better analgesia than ketamine. Haemodynamic parameters such as heart rate, systolic and diastolic blood pressure were better controlled with fentanyl group during the procedures. Patient satisfaction for the analgesia provided was also better with fentanyl group.

What are Outcomes?

Outcomes are the measurable endpoints of objectives which are monitored during the study. The occurrence and absence of the outcomes indicate that the results have been achieved. The outcomes should originate and be in alignment with the objectives. The outcomes of the study need to be defined a priori and a standard validated method should be mentioned to measure them.

Examples of Objectives and Outcomes

- *Aim:* To determine the degree of hypotension of a new drug as compared to a standard induction agent.
- *Primary objective:* To evaluate the degree of hypotension after its administration and compare it with the effect of an agent in clinical use.
- *Primary outcome:* To determine whether a significant reduction in mean arterial pressure occurs with the new drug compared to a standard induction agent.
- *Secondary objective:* Recording other adverse effects of the drug.
- *Secondary outcome:* Recording of rash along the venous path; events such as cough after its administration.

REVIEW OF LITERATURE SECTION

It is a survey of published materials relevant to a particular area of research, for example, the topic of the dissertation. It provides a description summary of each published article related to the topic of research and critically evaluates the research work depicted in the article. Review of literature can help identify "gaps" in the literature and scientific knowledge related to the topic of research.

A well written review of literature provides the readers with background information necessary to understand the work of the researcher. It provides a thorough and critical outline of the intellectual developments in the field of research and resolves conflicts between differences in observations of different research studies. It can provide new perspectives on the previously published work related to the topic.

Search strategies for review of literature include using keywords, Medical Subject Headings (MeSH) terms, filters, publication type and date, databases on search, Boolean search strings, and exclusion criteria in search (*Example:* **Annexure 7**).

Review of literature should be done stepwise. The steps include:

- Identification of sources of literature
- Reading the sources
- Listing the sources
- Identifying gaps in existing scientific knowledge
- Writing the review of literature

Identification of Sources of Literature

- Primary
  - Articles published in peer reviewed journals
  - Preliminary reports/conference proceedings
- Secondary
  - Systematic reviews
  - Meta-analyses
- Tertiary
  - Books

Literature search can be done in two ways:

1. Library searching
2. Web-based methods using search engines and evidence-based databases.

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Examples: Google/Google Scholar/Yahoo search engines and electronic databases such as PubMed, MeSH, Medline, CINAHL, Embase, etc.

Reading Sources of Literature

One should initially go through all articles' texts to get an idea of their general content. The next step would be to adopt a focused approach and read the abstract of each article followed by the introduction and conclusion part of the article. Each article of interest is next read in depth and critically especially in relation to the methodological approach, discussion, and general hypothesis.

Listing Sources of Literature

A list of the identified sources of literature can be made using reference tools such as Mendeley that can allow one to store the reference sources online and via a desktop application. Citation tools that are attached to these programs will help export citations in a chosen format later on, when writing and citing the references at the end of the dissertation.

Identification of Research Gaps

A gap means a lacuna or missing piece of information on the topic of research. It means that researchers have not yet touched upon this part and that this information has to be obtained by future research. The hypothesis related to the topic of current research should ideally help to fill the research gaps.

It should be written under subheadings related to the topic of dissertation.

Example: If the topic is "Assessment of airway changes during pregnancy with ultrasonography and clinical airway screening tests: a prospective observational study", the subheadings for the review of literature would be:

- Airway assessment in an adult
- Anatomical and physiological changes of pregnancy with focus on airway changes in pregnancy
- Basics of ultrasonography including technique and devices
- Sonographic measurements and assessment of airway.

Studies related to the topic of the thesis or published studies that are similar to the topic of the research are described in the review of literature. One can use third person phrases such as: "Dasgupta, et al. are of the view that...." or "the authors of a study concluded that". The studies selected for the review can be described in brief with respect to the aims, methodology, observation, and conclusion.

Example: In a study on five obese patients and seven morbidly obese adults, a submandibular sonographic examination performed in the supine position showed that the sonographic hyomental distance ratios in the difficult intubation group were in the 1–1.05 range and those in the easy intubation groups were in the 1.12–1.16 range, thus showing that the preoperative assessment of the hyomental distance ratio may predict difficult laryngoscopy resulting in difficult intubation.[23] Here, 23 stands for the citation number of the concerned reference article cited in the reference part. Studies can be quoted and described in series in this way in a chronological order depending on the year of published article, viz. 2019 study followed by 2020, 2021, and so on up to date. The most recently conducted studies should always be included. Newer articles, especially of previous 5 years, should be given preference. One can also start with the most recent article and go back chronologically.

Tips for Writing Review of Literature

- One should be selective while reviewing research and choose key papers related to the topic. It is not necessary that every piece of literature related to the topic should be reviewed. However, the review should be up to date and should not miss out on important, good quality articles that have robust study designs.

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- Review of literature can include review of published original research articles and conference papers.
- One should write in simple language and use formal style of writing.
- Using strong or personal language is not advisable.
- The sentences should not be plagiarised, that means sentences should not be picked up verbatim from the source of literature and entered in the review of literature without superscripting them with the concerned reference.
- The sentences that refer to published literature should be superscripted with the concerned reference, viz. the number of the reference in the bibliography.
- It is easy to access articles from the web. However, one should select articles that appear authentic and are published in standard journals.
- A systematic record of all references should be kept while writing review of literature. These have to be mentioned later on in the bibliography/references section.

THE REFERENCES SECTION

We look further by standing on the shoulders of giants. This is the core of the ethical principle behind citation, and therefore they should be relevant and attribute the credit of primary discoveries/inventions appropriately. Scientifically, no research is done in isolation and citations, viz. references are what indicate the previously published work that we are referring to at various stages during our thesis. The sources of literature from which one takes sentences or ideas or information for the dissertation become the "References". These are to be written in an orderly fashion in the part of the dissertation known as References/Bibliography. These references are usually entered in Vancouver style in the text part of the manuscript (the reference number is superscripted in brackets next to relevant text) i.e., they should appear in the same consecutive numerical order as they appear in the final references section.

The correct punctuation marks should be used while writing references. "et al". can be used after 6 authors if the referred article has >6 authors.

Book references, web-based references, and journal references are to be written in a typical style.

Example of a Correctly Written Journal Article Reference

Jarvik JG, Maravilla KR, Haynor DR, Levitz M, Deyo RA. Rapid MR imaging versus plain radiography in patients with low back pain: initial results of a randomized study. Radiology. 1997;204:447-54.

Example of a Correctly Written Book Reference

Bajwa SJ, Kurdi MS. Endocrine surgery. In: Dinsmore J, Zoumprouli A, editors. Lee's Synopsis of Anaesthesia. 15th ed. Gurgaon: RELX India Pvt. Ltd; 2023. pp.643-62.

Example of a Correctly Written Web-based Reference

Cancer-Pain.Org [homepage on the Internet]. New York: Association of Cancer Online Resources, Inc; c2000-01 [updated 2002 May 16; cited 2002 Jul 9]. Available from: http://www.cancer-pain.org/.

Few Examples of Badly Written References

- *Assistant professor, department of anaesthesia and Intensive Care, Queen's Institute of Medical Sciences Hyderabad Telangana, MD DSPMBBS. Comparison of epidural Fentanyl and Buprenorphine as Adjuvants to Bupivacaine in Lower Abdominal Surgeries:*

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A randomized clinical Study. J Med Sci Clin Res. 2016 Dec 23;04(12):14842-7.

- *Dept of Anaesthesia, Rajah Bhoj Medical College and Hospital, Chidambaram, Tamil Nadu, India, Sittaramane DS. A Comparative Study of the Effect of Fentanyl 25MCG with Bupivacaine 0.5% Verses Buprenorphine 60 MCG with Bupivacaine 0.5% in Spinal Anaesthesia for Elective Caeserean Section. J Med Sci Clin Res [Internet]. 2017 Nov 15 [cited 2022 Jan 21]; 5(11).*
- *Post Graduate, Department of Anaesthesiology, BEMS, Muppala DBM. Comparative Study of Epidural Injection of 0.5% Bupivacaine with Buprenorphine and 0.5% Bupivacaine with Fentanyl for Lowe Limb Surgeries. J Med Sci Clin Res [Internet]. 2020 Nov 20[cited 2022 Jan 22]; 08(11).*
- *Baird WLM, Reid AM. The neuromuscular blocking properties of a new steroid compound, pancuronium bromide. A pilot study in man. Br J Anaesth. 1967.39;775:80.*

Citation Management

Depending on the breadth and depth of the inquiry, the references may run into hundreds of documents. If not organised properly, referencing and making bibliography in the thesis often becomes a time consuming and stressful affair. Citation management software are tools which facilitate this process, and with some effort in organising, they can create the bibliography section at the click of a button, make it very easy to modify it several times and format it as per various citation styles. Some of the key features of this software are reference collection and organisation, automatic citation and bibliography generation, integration with word processors such as MS Word, Pages, etc., collaboration and sharing, and PDF annotation and note taking. Popular tools which serve this purpose include Zotero, Mendeley, EndNote, RefWorks, and BibTeX.

CONCLUSION

The initial parts of a dissertation, including the introduction and review of literature, should be written in a systematic and organised way by referring to literature related to the topic and by having a clear idea of the study. The title, aims and objectives, and abstract are important headings of a dissertation which should be brief, scientifically accurate and concise. These headings of the dissertation form the pillars on which the remaining part of the dissertation is built.

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8. UNSW students. How to write a thesis introduction. [Online] Available from https://www.student.unsw.edu.au/introductions [Last accessed July, 2025].
9. Websites of scientific journals.

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Research & Dissertation Writing for Postgraduate Medical Students

Salient Features

- This book is compiled to guide fresh postgraduate and undergraduate medical/nursing students and young postgraduate guides who are relatively naive in the context of research and dissertation writing
- The book has 15 chapters on varied topics related to scientific research, including study designs, sample size, data collection and representation, basics of statistics, ethics of research, academic integrity, strategies for successful completion of a dissertation, and the various steps of a dissertation, including writing it under various headings
- Every sincerely conducted research study should culminate in a paper presentation and scientific publication. Hence, chapters giving tips on successful paper and poster presentation and scientific publication have been included in this book
- The section on frequently asked questions related to a dissertation clears practical doubts of both the student and the guide
- The authors of the chapters are experienced faculty from different medical specialties and from medical colleges across our nation
- The book provides information in simple language based on the authors' practical experiences
- The book has 11 annexures, which provide a clear idea to the reader on how to make a patient consent form, synopsis template, ethics committee approval certificate, study proforma, master chart and an examiner's report of a dissertation.



Madhuri S Kurdi is currently working as a Professor in the Department of Anaesthesiology. Karnataka Medical College and Research Institute, Hubli, Karnataka, India. She is a senior postgraduate teacher, guide and examiner. Having spent nearly three decades with postgraduate students, she has observed them closely and understood their needs. She has a deep interest in research and scientific publications. She has been a part of the editorial team of various reputed scientific journals, including the Indian Journal of Anaesthesia and Journal of Anaesthesiology Clinical Pharmacology, and has authored several scientific publications. She is a recipient of several prestigious national awards, including the Indian Society of Anaesthesiologists Bhopal National Award for academic excellence in 2024.



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